



Transcending boredom in daily life: the impact of self-transcendent emotions and meaning in life

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Abstract

Boredom is a pervasive emotion linked to various mental health and societal issues. Recent cross-sectional and experimental research suggests that self-transcendent emotions—a subcategory of positive emotions that decrease self-focus and increase feelings of connection—predict less boredom by increasing perceptions of meaning. We investigate for the first time (a) if the ability of self-transcendent emotions to ward off boredom materializes in day-to-day life, and (b) if these effects occur at the within-person level (day-to-day fluctuations within an individual). We conducted a preregistered 14-day diary study ($N = 1,531$ daily reports from 114 participants) to investigate this. On days that people experienced more awe, gratitude, compassion, and/or self-compassion than usual, they reported less daily boredom, even when controlling for other forms of affect, supporting our hypotheses. Further analyses showed that daily perceptions of meaning in life mediated the link between self-transcendent emotions and boredom. Our results have important theoretical and practical implications, suggesting that self-transcendent emotions promote a sense of meaning, thereby helping to counter boredom in everyday life.

Keywords Awe · Gratitude · Compassion · Meaning in life · Boredom

Boredom is a common feature of everyday life and arises across a range of settings (Chin et al., 2017). When left unresolved, it can undermine well-being and contribute to maladaptive behavioral outcomes (Goldberg et al., 2011; Moynihan et al., 2021; Pfattheicher et al., 2021; Seiler et al., 2023). Although boredom is widespread and carries potentially harmful consequences, little is known about how individuals can effectively regulate boredom in daily life. Boredom tends to thrive when meaning perceptions are

low (e.g., lack of perceived purpose in an activity or life; Fahlman et al., 2009; Van Tilburg & Igou, 2012). Furthermore, sources of meaning, such as religiosity, can prevent boredom (e.g., Moynihan et al., 2021; Van Tilburg et al., 2019). Indeed, cross-sectional work shows that individual self-transcendent emotions—positive emotions that shift attention from the self towards others and/or the wider environment (Stellar et al., 2017)—can elevate a sense of meaning (Yuan et al., 2023), thereby reducing boredom (O'Dea et al., 2024). Integrating past work, we propose that self-transcendent emotions—specifically awe, gratitude, self-compassion, and compassion for others—help to alleviate boredom in everyday life by infusing a sense of meaning. Most of the research on boredom and its remedies to date, including that on self-transcendent emotions, faces important limitations. Many proposed remedies to boredom rely on interventions aimed at changing one's environment (e.g., introducing natural environments; O'Dea et al. 2025a) or modifying contextual constraints (e.g., modifying students' level of control over educational tasks; Goetz et al., 2024) that are often outside the direct control of the individual (e.g., changing education practice). Other individual level preventers of boredom, such as high dispositional

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self-control (Mugon et al., 2020) and religiosity (Van Tilburg et al., 2019), are presumably reasonably stable over time and accordingly may benefit those who possess them but remain out of reach for those who do not. Nevertheless, some boredom remedies have been proposed that do not require modification of one's external environment or rely on stable individual factors. Recent experimental and correlational work demonstrated that the momentary experience of self-transcendent emotions, specifically gratitude, awe, and self-compassion can predict less boredom (O'Dea et al., 2022; O'Dea et al., 2024; O'Dea et al., 2025b). This is particularly relevant because research shows that it is possible to stimulate these emotions with relative ease (e.g., through journaling exercises, meditations, and videos; Gordon et al., 2017; Neff, 2023; Wood et al., 2010) and without requiring major external changes. While investigations of self-transcendent emotions and boredom are promising and address an important gap in boredom remedies, there are important limitations of this research that must be addressed. The past work on self-transcendent emotions and boredom has been conducted exclusively at the between-person level (e.g., are people who experience more spontaneous self-affirmation than others also less bored than others?; O'Dea et al., 2023). It remains unclear how these affective processes impact people within-persons (e.g., does a boost in gratitude result in less boredom that day?), despite our theoretical assumptions being based at the within-person level. In the present investigation, we overcome these limitations by studying the dynamic, within-person relationships between variables in the ecologically valid context of everyday life (Nezlek, 2012).

Self-transcendent emotions

Self-transcendent emotions are a subcategory of positive emotions that feature reduced self-focus, an increased sense of connectedness, and are theorized to primarily function to foster healthy social relationships (Stellar et al., 2017; Yaden et al., 2017). These emotions are commonly experienced in daily life (Bai et al., 2017; Nezlek et al., 2017). While there isn't an exclusive list of self-transcendent emotions, Stellar et al. (2017), in their formative review, proposed that awe, gratitude, and compassion are three discrete emotions that best encompass the key features of self-transcendent emotions. We extend compassion to include compassion for others *and* the self. Gratitude arises from an appreciation of the positive aspects of life and is closely tied to positive relationships (Algoe et al., 2012; Wood et al., 2010). Awe involves being in the presence of something vast that goes beyond one's current understanding (Kelter & Haidt, 2003), and compassion is the feeling of concern for another's suffering,

accompanied by a desire to alleviate that suffering (Goetz et al., 2010). Self-compassion involves being mindful and nonjudgmental of one's own suffering, feeling connected to others who are also suffering, and understanding and supporting oneself through difficult times (Neff, 2003, 2023). A core component of self-compassion is common humanity (Neff, 2003), which involves an awareness that one's suffering is a part of the larger human experience rather than perceiving one's experiences as isolated and alone. Consistently, self-compassion promotes gratitude towards others and prosocial behavior over time (Yang et al., 2021). This decreased self-salience and heightened feeling of connectedness is consistent with definitions of self-transcendent emotions; thus, we categorize self-compassion in the current investigation as such.

Despite shared self-transcendent aspects, each of the above emotions feature distinct appraisals, feelings, and expressions and like all emotions, have unique cognitive, behavioral, and physiological effects (Abatista & Cova, 2023; Ekman, 1992; Lerner & Keltner, 2000). Further, while they are categorized as positive emotions, some self-transcendent emotions can involve negative valence appraisals, leading to a more mixed affective state. For instance, compassion arising from witnessing suffering can be mixed with negative affect (Sassenrath et al., 2017), and awe can be experienced in response to fear-inducing events (Gordon et al., 2017). For this reason, we investigate both emotion-specific effects, to capture their uniqueness, and the broader impact of self-transcendent emotions as a unified construct.

Self-transcendent emotions and meaning in life

Meaning in life is generally considered to contain three key components: feeling that one's life has purpose, existential significance, and makes sense (Costin & Vignoles, 2020; Martela & Steger, 2016). Many theorists have argued that meaning in life is fundamentally about self-transcendence—the ability to connect to someone or something outside of the self (Frankl, 1984; Huang & Yang, 2022; Reker & Wong, 1988; Schell, 2011). Self-transcendent emotions, arising out of reduced self-focus and increased feelings of connectedness (Yaden et al., 2017), therefore appear to enhance a sense of meaning (O'Dea et al., 2024; Yuan et al., 2024) and buffer against experiences of meaninglessness (Heine et al., 2006). Gratitude encourages an attentiveness to positive events and circumstances, thereby helping individuals to find meaning in everyday life (McCullough, 2002). Compassion drives prosocial behavior, a potent source of meaning in life (Klein, 2017). Awe may facilitate a cognitive and motivational mindset shift that is conducive to meaning in life (Danvers et al., 2016; Ihm et al., 2019). Indeed, self-compassion, compassion for others, gratitude,

and awe are associated with greater meaning in life cross-sectionally (Lucarini et al., 2022; O’Dea et al., 2022; O’Dea et al., 2024; Yuan et al., 2023). Both awe and gratitude are associated with meaning within persons (Nezlek et al., 2017; Yuan et al., 2023), and brief experimental inductions of gratitude and awe can increase meaning in life (Dai et al., 2022; O’Dea et al., 2024).

Self-transcendent emotions may breed a sense of meaningfulness in everyday life through two notable pathways: (1) by feeling meaningful in the moment and (2) by increasing social connection. Consistent with the feeling-as-information hypothesis (Schwarz, 2001), people may use their affective state to inform their sense of meaning in life. Indeed, positive mood inductions have been shown to boost meaning in life (King et al., 2006). Self-transcendent emotions tend to elicit positive feelings (Stellar et al., 2017), however, they go beyond general positive affect by also offering a sense of connectedness. Indeed, Van Cappellen et al. (2013) found positive affect inductions only increased meaning in life when they elicited self-transcendent emotions. This suggests that meaning in life arises not just from general positivity but depends on the extent to which one feels connected to someone or something outside of the self. In this way, self-transcendent emotions help us feel close to others and foster social relationships (Stellar et al., 2017; Yaden et al., 2017). Social belonging is an incontrovertible contributor to meaning in life (Heine et al., 2006; Hicks et al., 2010; Lambert et al., 2013); thus, social connection is likely a central mechanism through which self-transcendent emotions inform meaning in life. Social relationships address all three components of meaning in life; they instill purpose, make people feel significant to others, and organize people’s experience (King & Hicks, 2021). By helping people attain and foster high-quality relationships and boost positive mood, self-transcendent emotions may contribute to meaning in life.

Boredom and meaning

Boredom can be defined as “the aversive experience of wanting, but being unable, to engage in satisfying activity” (Eastwood et al., 2012, p. 482). It is a prevalent emotion (Chin et al., 2017) that arises due to inadequate attentional engagement caused by task characteristics (e.g., monotonous), internal factors (e.g., personality), and/or cognitive appraisals of the situation (Tam et al., 2021a). State boredom is an aversive state that motivates behaviors aimed at resolving it (Bench & Lench, 2013). It may direct attention towards more meaningful activity (e.g., prosocial tendencies; Van Tilburg and Igou 2017b); however, boredom more often triggers adverse outcomes (e.g., unhealthy food

consumption; Moynihan et al., 2015) to avoid or escape the experience. Further, state boredom has been identified as an important factor in the occurrence of psychopathology (Seiler et al., 2023). If left unresolved, prolonged experiences of state boredom are believed to develop into chronic boredom (also known as boredom proneness; Tam et al., 2021b). Chronic boredom is linked to ample affective and cognitive dysfunctions, including increased depression, aggression (Golberg et al., 2011; Pfattheicher et al., 2021; Seiler et al., 2023), and addictive behaviors (e.g., gambling, Mercer & Eastwood, 2010; binge-drinking, Biolcati et al., 2016). Further, boredom can lead to significant mental health problems and antagonistic social outcomes in applied contexts, such as educational, work, and clinical settings (Seiler et al., 2023; Tze et al., 2016; van Hooff & van Hooff, 2014). Evidently, boredom is a worthy target for intervention. However, research into individual-level coping strategies for boredom is so far limited.

Low perceptions of meaning are a core feature of the boredom experience (Van Tilburg and Igou 2017a). Barbalet (1999) proposed that boredom serves an essential function by signaling that meaning is lacking and needs to be found. Similarly, the pragmatic meaning-regulation hypothesis (Van Tilburg and Igou 2012; Tilburg and Igou 2017a) argues that boredom signals that one’s current activity lacks meaning and motivates a desire to search for meaning elsewhere (Van Tilburg & Igou, 2011; Van Tilburg et al., 2013). Experimentally manipulating low perceptions of meaning leads to an increase in boredom (Fahlman et al., 2009; Westgate & Wilson, 2018), suggesting that meaning perceptions causally contribute to boredom. Further support comes from experience sampling findings demonstrating that the perceived meaningfulness of an activity is negatively associated with boredom (Chan et al., 2018). Consistent with existential meaning-making frameworks (Heine et al., 2006), people may protect themselves from boredom, a meaning threat, by maintaining high levels of meaning in life through a variety of sources. Given the psychological burdens associated with boredom (Pfattheicher et al., 2021; Seiler et al., 2023), understanding the psychological factors that can alleviate boredom by bolstering meaning has important practical implications. For instance, Lin et al. (2023) found that people felt less bored on days with greater social interaction and this relationship was explained by greater daily meaning. Recent cross-sectional and experimental evidence suggests that self-transcendent emotions, like awe and gratitude, predict less boredom by protecting meaning in life (O’Dea et al., 2024; O’Dea et al., 2025a, 2025b). In sum, the link between meaning and boredom is theoretically and empirically robust (Barbalet, 1999; Chan et al., 2018; Fahlman et al., 2009; Van Tilburg & Igou, 2012), however,

few studies have examined how boredom can be alleviated in ecologically valid settings.

Within-person processes and daily diary methodology

Between-person variance reflects differences between individuals on psychological variables measured at a particular moment, whereas within-person variance reflects differences within individuals over various measurements. Research on boredom has mostly focused on between-person variance, for example by studying boredom as a stable trait (i.e., boredom proneness; Tam et al., 2021b) or examining how differences in people's state boredom correspond to differences between those individuals on other variables using data collected single point in time (e.g., O'Dea et al., 2022). While this research is useful, it cannot capture the real-time dynamics of emotions and may lead to incorrect conclusions about the emotional process (Hamaker, 2012). Boredom is most often experienced as a fleeting emotional state (Chin et al., 2017; Van Tilburg and Igou 2017a) and is largely influenced by person-situation dynamics (Tam et al., 2021a). For example, a university student may spend a Friday in long, dull lectures reporting high levels of boredom but spend the subsequent day hiking in nature and report low levels of boredom (O'Dea et al. 2025a). Despite the necessity of studying boredom as a fluctuating state, very little research has examined it at this level. This is important as between-person and within-person relationships can be statistically orthogonal (Hamaker, 2012); findings at the between-person level do not necessarily hold at the within-person level. For instance, Newman et al. (2018) found that meaning search is negatively related to meaning presence between persons but positively related within persons. As a result, little is known about how individuals experience and regulate boredom in their daily lives.

Theories of meaning (e.g., Heine et al., 2006), including our theoretical framework, express their rationale primarily at the level of *within*-person processes (e.g., 'when someone's sense of meaning reduces, they seek to remedy this') and typically not *between*-person processes (e.g., 'when someone's sense of meaning is lower than that of others, they seek remedies more than others do'; see Mahadevan et al., 2020, 2023 for similar critiques). Despite the very different premises that between and within-person studies test and the theoretical centrality of within-person processes, most research on this topic has focused on between-person analysis instead. Accordingly, this is the first study to examine self-transcendent emotions as a resource to regulate boredom by supporting meaning perceptions within persons.

If the hypothesized relationships are evident within persons, this will not only strengthen our theoretical assumptions but also demonstrate how individuals regulate boredom in daily life, with important practical implications for well-being. Within-person designs enable the examination of real-time emotional changes that are crucial for interventions. Laboratory experiments may induce emotions (e.g., awe; Piff et al., 2015) that individuals are otherwise not inclined to experience, which does not capture how these processes function in a real-life setting (Diener et al., 2022). Further, cross-sectional studies may suggest that trait-building exercises (e.g., being generally compassionate) are an effective strategy for reducing boredom but interventions targeting state processes (e.g., workplace boredom reduced by lunchtime nature walks for awe) may be more effective if the effect occurs primarily within-persons.

Longitudinal studies with multiple time points are necessary to capture within-person variability and distinguish at which levels of analysis these processes operate (Bolger & Laurenceau, 2013). We examined within-person associations among self-transcendent emotions, meaning in life, and boredom using daily diary methodology (see Bolger & Laurenceau, 2013). This technique requires participants to answer end-of-day reports over the course of several days or weeks (Nezlek, 2012) and captures daily emotional experiences as they are lived (Bolger, 2003). Daily diary designs are ideal for capturing within-person variability and separating within-person and between-person effects using multilevel modelling (Nezlek, 2012), thereby addressing the shortcomings of prior research and contributing to theoretical advancement.

Overview and hypotheses

This research was designed to enrich our understanding of the psychological processes that limit boredom for individuals in their daily lives. To serve these goals, we examined within-person associations using a 14-day diary study design. First, we hypothesized that on days participants felt higher levels of self-transcendent emotions (gratitude, awe, compassion, and self-compassion) than usual, they would experience higher meaning in life (Hypotheses 1a-1d) and lower boredom (Hypotheses 2a-2d) compared to their personal average. Next, we hypothesized that participants would experience lower levels of boredom on the days they experienced more meaning in life than usual (Hypothesis 3). We tested whether these relationships persisted after controlling for key covariates (i.e., other positive and negative emotions) to ensure that the observed effects were not merely attributable to fluctuations in general positive or negative emotional experiences. Lastly, we predicted that

the relationship between daily fluctuations in self-transcendent emotions and daily fluctuations in boredom would be statistically mediated by daily fluctuations in meaning in life (Hypotheses 4a-d; Fig. 1). We preregistered our hypotheses, sample size, exclusion criteria, and analysis plans (https://aspredicted.org/T23_599) and the data is openly available online: https://osf.io/6eb35/?view_only=e6b8c70457414bac8af20b44f48c759d.

Method

Procedure

The study was advertised to undergraduate students at the University of Limerick for course credit. The study received ethical approval from the research ethics committee of the university. Participants attended an online information session about the study, completed a baseline questionnaire, and gave informed consent prior to beginning the daily diary portion of the study. In the information session, participants were encouraged to turn on their email notifications for the course of the two weeks and to set daily reminders to complete the surveys. In the baseline survey, participants completed trait measures unrelated to the current investigation. Next, participants completed a short Qualtrics survey online every evening for 14 days. Emails with a link to each daily survey were sent to participants at 16:00 each day, followed by a reminder email at 21:00 that evening to participants who had not yet completed that day's survey. Participants who missed five or fewer surveys during the original 14-day period were given an opportunity to complete those additional daily surveys up to 20 days after the survey began. After completing the daily measures for 14 days, participants were debriefed and awarded course credit.

Participants

We aimed to recruit as many participants as possible (but at least 80) from a finite pool of undergraduate students to ensure sufficient power to detect within-person effects in our analysis (Snijders, 2005). Our sample size exceeded the multilevel-modeling power recommendations (30–50

level-2 observations; Maas & Hox, 2005). In total, 117 participants completed the baseline survey and gave informed consent. In the daily diary study, 1,584 daily reports from 116 participants were collected overall. Responses after 12:00 the following day, participants with less than two valid responses, excess responses after 14 complete responses, and duplicate responses by the same participant on the same day were excluded from the analysis. There were 52 daily responses eliminated in total. This resulted in a final sample of 114 participants (94 female, 16 male, 2 non-binary, 1 transgender woman, 1 other) and 1,531 observations. Participant's ages ranged from 18 to 44 years ($M=19.87$, $SD=4.06$). Of the sample, 97 participants were Irish (5 Polish, 2 Italian, 1 Brazilian, 1 Czech, 1 English, 1 French, 1 Ghanaian, 1 Lithuanian, 1 Malaysian, 1 South African, 1 Ugandan, 1 Zambian). The average number of completed daily surveys was 13.43 ($SD=1.70$, $Mdn=14$, $Min=2$) out of a possible 14.

Daily diary measures

We kept the daily measures as brief as possible to keep compliance and engagement levels high, as is recommended in this type of state emotion assessment (Moore & Martin, 2022). We calculated item reliability using a multilevel model-based within-person reliability estimate, based on guidelines by Nezlek (2017) and Bonito et al. (2012). Notably, item-level reliability tends to be lower than person-level reliability (Nezlek, 2017). Participants completed the following measures each evening for 14 days.

Self-transcendent emotions

Items measuring awe, gratitude, compassion, and self-compassion were presented in random order. Participants were asked to indicate to what degree they felt each of the following emotions each day on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*). Daily awe was assessed with the items “awe”, “full of wonder”, and “amazement” ($M=3.83$, $SD=1.36$; item reliability = 0.66; Guan et al., 2019; Stellar et al., 2018). Daily gratitude was measured by the 3-item Gratitude Adjective Checklist (“grateful”, “thankful”, “appreciative”; $M=5.21$, $SD=1.17$; item reliability = 0.78; McCullough et al., 2002). Daily compassion (for others) was assessed with the items “compassion for others”, “moved by others”, and “sympathetic” ($M=4.65$, $SD=1.14$; item reliability = 0.46; Oveis et al., 2010). Daily self-compassion was measured with three items, “self-compassion”, “kindness towards myself”, and “compassion for myself” ($M=4.56$, $SD=1.22$; item reliability = 0.73).

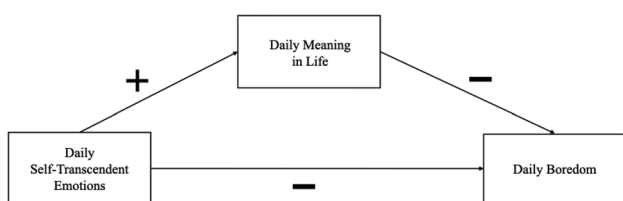


Fig. 1 Conceptual path of how daily self-transcendent emotions predict less daily boredom

Meaning in life

Daily presence of meaning in life was measured using the two items “How meaningful did you feel your life was today?” and “How much did you feel your life had purpose today?” (Kashdan & Nezlek, 2012; Newman et al., 2023), on a 7-point scale (1 = *Not at all*, 7 = *Very much*; $M=4.00$, $SD=1.45$; item reliability = 0.82).

Boredom

Daily boredom was assessed with the items “How much boredom did you experience today?” (1 = *None at all*, 7 = *A lot*) and “How boring was your day?” (Moynihan et al., 2015; 1 = *Not at all*, 7 = *Very*; $M=3.03$, $SD=1.56$; item reliability = 0.86).

Positive and negative emotions

Participants indicated the extent to which they felt anger ($M=2.31$, $SD=1.43$), disgust ($M=2.18$, $SD=1.37$), pride ($M=2.85$, $SD=1.43$), sadness ($M=2.69$, $SD=1.42$), and happiness ($M=3.81$, $SD=1.13$), each day on a 7-point scale (1 = *Not at all*, 7 = *Extremely*).

Overall, the descriptive statistics suggested that participants experienced a predominance of positive emotions (particularly gratitude and compassion), moderate meaning in life, and relatively low boredom over the two-week period. The relatively high standard deviations suggest significant variability across individuals and days.

Data analytic approach

We examined the extent to which within-person fluctuations in self-transcendent emotions correspond to within-person fluctuations in daily meaning and daily boredom. The data in this study contained a nested structure such that the daily surveys (Level 1) were nested within participants (Level 2); thus, we turned to multilevel modeling (MLM) to analyze the data and test our hypotheses. MLM is capable of handling participants with missing data (Snijders & Bosker, 2004), thus, we included participants who completed at least two daily surveys. We used random-intercept analyses, which allowed us to partition variance in a dependent variable (e.g., daily meaning/daily boredom) at the within-person and between-person levels. Within-person variance reflects the distribution of people’s daily scores relative to their overall participant average, while between-subject variance reflects the distribution of participants’ overall averages. We treated the participant-level intercept as a random effect (i.e., we included a variance component to represent the effect of participants; Singer, 1998). We entered all

predictors and covariates as fixed effects. To test our mediation hypotheses, we used the MLMED macro for SPSS (Hayes & Rockwood, 2020) because it provides a straightforward implementation of multilevel mediation models, allowing for the estimation of indirect effects and their confidence intervals in nested data structures. This approach accounts for dependencies in the data while offering robust inference through Monte Carlo confidence intervals.

Results

Within-person variability

A significant portion of the variance in all variables of interest occurred within persons (awe: 54%, gratitude: 63%, compassion: 60%, self-compassion: 56%, meaning in life: 57%, boredom: 75%). Participants experienced significant fluctuation in these constructs on a day-to-day basis, above between-person differences in the same variables; thus, an examination of within-person relationships was deemed appropriate. In separate multilevel models, the predictor variable was entered alongside a variable representing the participants average scores on that emotion across the two weeks, which allowed us to control for participants average scores and focus our analyses at the within-person level. This procedure partitions between-person variation (participants’ scores relative to one another) in the dependent variables, and the resultant level-1 regressions represent only within-person associations.

Zero-order within-person associations

As preregistered, our primary analyses concerned the within-person relationships between self-transcendent emotions, meaning in life, and boredom. Zero-order within-person associations, independent of between-person differences, are reported in Table 1. We examined overall self-transcendent emotions (aggregating scores on awe, gratitude, compassion, and self-compassion) and tested scores on awe, gratitude, compassion, and self-compassion as individual predictors. Daily awe, gratitude, compassion, and self-compassion each significantly predicted higher daily meaning in life, supporting Hypotheses 1a-1d. Further, daily awe, gratitude, compassion, and self-compassion were negatively associated with daily boredom, providing support for Hypotheses 2a-2d. Days that featured higher meaning in life than average were negatively associated with daily boredom, supporting Hypothesis 3. The composite of self-transcendent emotions had the strongest effect, reflecting a very large within-person effect. On days when participants felt more self-transcendent emotions overall than usual,

Table 1 Within-person associations among predictors and outcomes

Predictor–outcome	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	95% <i>CI</i>
Awe–meaning	0.42	0.03	15.67	<0.001	[0.37, 0.47]
Gratitude–meaning	0.47	0.03	16.53	<0.001	[0.42, 0.53]
Compassion–meaning	0.57	0.11	5.16	<0.001	[0.35, 0.79]
Self-compassion–meaning	0.44	0.03	15.68	<0.001	[0.37, 0.50]
STEs–meaning	0.79	0.04	21.79	<0.001	[0.72, 0.87]
Awe–boredom	−0.37	0.03	−10.69	<0.001	[−0.44, −0.30]
Gratitude–boredom	−0.42	0.04	−11.22	<0.001	[−0.49, −0.34]
Compassion–boredom	−0.42	0.04	−10.59	<0.001	[−0.49, −0.34]
Self-compassion–boredom	−0.38	0.04	−10.01	<0.001	[−0.45, −0.30]
STEs–boredom	−0.73	0.05	−14.95	<0.001	[−0.82, −0.63]
Meaning–boredom	−0.49	0.03	−16.14	<0.001	[−0.55, −0.43]

STEs Self-transcendent emotions, reflecting aggregate scores on awe, gratitude, compassion, and self-compassion. *b*=unstandardized coefficients. Coefficients reflect within-person bivariate associations, estimated while controlling for between-person variability.

Table 2 Within-person associations controlling for basic emotions

Covariates	Predictor–dependent variable	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	95% <i>CI</i>
Basic Emotions ^a	Awe–meaning	0.25	0.03	9.34	<0.001	[0.20, 0.31]
	Gratitude–meaning	0.28	0.03	9.61	<0.001	[0.23, 0.34]
	Compassion–meaning	0.28	0.03	9.58	<0.001	[0.22, 0.34]
	Self-compassion–meaning	0.26	0.03	9.21	<0.001	[0.21, 0.32]
	STEs–meaning	0.56	0.04	14.13	<0.001	[0.49, 0.64]
	Awe–boredom	−0.20	0.04	−5.58	<0.001	[−0.27, −0.13]
	Gratitude–boredom	−0.22	0.04	−5.53	<0.001	[−0.30, −0.14]
	Compassion–boredom	−0.30	0.04	−7.43	<0.001	[−0.36, −0.21]
	Self-compassion–boredom	−0.23	0.04	−6.03	<0.001	[−0.30, −0.15]
	STEs–boredom	−0.49	0.05	−9.00	<0.001	[−0.59, −0.38]
	Meaning–boredom	−0.35	0.03	−10.34	<0.001	[−0.41, −0.28]

^aControlling for daily pride, anger, disgust, happiness, and sadness. *STEs* Self-transcendent emotions, reflecting aggregate scores on awe, gratitude, compassion, and self-compassion. *b*=unstandardized coefficients.

All predictors and covariates are person mean-centered to control for between-person variability.

they experienced higher meaning in life and less boredom than usual. Meaning in life, in turn, predicted significantly lower boredom.

Within-person associations controlling for co-occurring emotions

Discrete emotions, like awe, often co-occur with general emotional states such as sadness or happiness (e.g., Nelson-Coffey et al., 2019). To rule out the possibility that the relationship between these emotions may be attributable to fluctuations in positive or negative co-occurring emotions, we also measured and controlled for daily pride, sadness, happiness, disgust, and anger in our multilevel models. All predictors and covariates were person mean-centered to capture day-to-day fluctuations within an individual. After controlling for these emotions, the same pattern of results persisted (Table 2). Our predictions were supported.

Interventions designed to elicit one self-transcendent emotion often elicit others (e.g., awe elicits compassion and gratitude, Nelson-Coffey et al., 2019; Sturm et al., 2022). Going beyond our preregistered analyses, we also entered all self-transcendent emotions as predictors, with daily

meaning and daily boredom as outcome variables to control for any overlapping effects of the other self-transcendent emotions. The same pattern of results persisted, indicating that each self-transcendent emotion uniquely affected meaning and boredom while controlling for the other respective self-transcendent emotions (see Supplementary Materials, Table S1).

Mediation analysis

In the final set of analyses, we tested the mediating role of daily meaning in life (Hypotheses 4a-4d) in the relationship between each daily self-transcendent emotion and daily boredom using a multilevel mediation approach with the MLMED macro for SPSS (Hayes & Rockwood, 2020). We treated paths *a* (from predictor to mediator) and *b* (from mediator to outcome) as fixed effects. Table 3 summarizes the results of the multilevel mediation models. All four daily emotions significantly predicted higher meaning in life (path *a*), which was in turn associated with lower boredom (path *b*). Direct effects (*c'*) of emotions on boredom also remained significant. The indirect effects, addressing Hypotheses 4a-4d, are reported in the text below.

Table 3 Multilevel mediation pathways predicting boredom via meaning in life

Path	<i>b</i> (<i>SE</i>)	95% <i>CI</i>	<i>t</i>	<i>p</i>
Daily awe→Meaning in life→Boredom				
Direct Effect (<i>c'</i>)	−0.19 (0.04)	[−0.26, −0.12]	−5.45	<0.001
(<i>a</i>)	0.42 (0.03)	[0.37, 0.47]	15.67	<0.001
(<i>b</i>)	−0.42 (0.03)	[−0.49, −0.36]	−12.95	<0.001
Daily gratitude→Meaning in life→Boredom				
Direct Effect (<i>c'</i>)	−0.22 (0.04)	[−0.30, −0.15]	−5.75	<0.001
(<i>a</i>)	0.47 (0.03)	[0.41, 0.53]	16.52	<0.001
(<i>b</i>)	−0.42 (0.03)	[−0.48, −0.35]	−12.63	<0.001
Daily compassion→Meaning in life→Boredom				
Direct Effect (<i>c'</i>)	−0.24 (0.04)	[−0.32, −0.16]	−6.11	<0.001
(<i>a</i>)	0.41 (0.03)	[0.35, 0.47]	13.39	<0.001
(<i>b</i>)	−0.43 (0.03)	[−0.49, −0.36]	−13.35	<0.001
Daily self-compassion→Meaning in life→Boredom				
Direct Effect (<i>c'</i>)	−0.20 (0.04)	[−0.27, −0.13]	−5.24	<0.001
(<i>a</i>)	0.42 (0.03)	[0.36, 0.47]	14.10	<0.001
(<i>b</i>)	−0.43 (0.03)	[−0.49, −0.37]	−13.41	<0.001
Daily self-transcendent emotions→Meaning in life→Boredom				
Direct Effect (<i>c'</i>)	−0.45 (0.05)	[−0.56, −0.35]	−8.31	<0.001
(<i>a</i>)	0.79 (0.04)	[0.72, 0.87]	21.79	<0.001
(<i>b</i>)	−0.35 (0.03)	[−0.41, −0.28]	−10.13	<0.001

First, we used multilevel mediation analysis to test the mediating role of daily meaning in a model with daily awe as the predictor, daily meaning in life as the mediator, and daily boredom as the outcome variable (Hypothesis 4a; Table 3 upper panel). The indirect effect of daily awe on daily boredom through daily meaning was statistically significant, $ab = -0.17$, $SE = 0.02$, $z = -9.97$, $p < .001$, 95% CI $[-0.21, -0.14]$.

Next, we examined the mediating role of daily meaning in a model with daily gratitude as the predictor, daily meaning in life as the mediator, and daily boredom as the outcome variable (Hypothesis 4b; Table 3 second panel). The indirect effect of daily gratitude on daily boredom through daily meaning was statistically significant, $ab = -0.20$, $SE = 0.02$, $z = -10.02$, $p < .001$, 95% CI $[-0.23, -0.16]$.

We examined the mediating role of daily meaning with daily compassion as the predictor, daily meaning as the mediator, and daily boredom as the outcome variable (Hypothesis 4c; Table 3 third panel). The indirect effect of daily compassion on daily boredom through daily meaning was statistically significant, $ab = -0.18$, $SE = 0.02$, $z = -9.44$, $p < .001$, 95% CI $[-0.21, -0.14]$.

We then examined the mediating role of daily meaning with daily self-compassion as the predictor, daily meaning as the mediator, and daily boredom as the outcome variable (Hypothesis 4d; Table 3 fourth panel). Importantly, the indirect effect of daily self-compassion on daily boredom through daily meaning was statistically significant, $ab = -0.18$, $SE = 0.02$, $z = -9.71$, $p < .001$, 95% CI $[-0.22, -0.14]$.

Lastly, we examined the mediating role of daily meaning between overall daily self-transcendent emotions (aggregate score) and daily boredom (Table 3, bottom panel).

Importantly, the indirect effect of daily self-transcendent emotions on daily boredom through daily meaning was statistically significant, $ab = -0.28$, $SE = 0.03$, $z = -9.18$, $p < .001$, 95% CI $[-0.34, -0.22]$. The findings suggest that awe, gratitude, compassion, and self-compassion uniquely contribute to less boredom in daily life, mediated by daily meaning in life. Similarly, self-transcendent emotions as unified construct (self-transcendent emotions aggregate) predict less boredom via daily meaning in life.

General discussion

Cross-sectional research has suggested that self-transcendent emotions predict less boredom by elevating perceptions of meaning in life (O'Dea et al., 2022; O'Dea et al., 2024). However, this past research has examined these experiences in isolation and focused on between-person differences, even though theoretical models emphasize within-person processes. The results of this preregistered 14-day diary study supported our hypotheses and advances prior research by demonstrating that self-transcendent emotions predict less boredom via meaning in life within-persons in the ecologically rich context of everyday life. Moreover, each self-transcendent emotion contributed uniquely to more daily meaning and less daily boredom. Specifically, on days when participants felt more awe, gratitude, compassion for others, and compassion for the self than they normally did, they felt greater meaning in life (Hypotheses 1a-1d). Furthermore, on days when participants felt higher levels of these self-transcendent emotions than usual, they experienced less boredom (Hypotheses 2a-2d). Consistently, days

that were higher in meaning featured less daily boredom within individuals (Hypothesis 3). Moreover, all predicted relationships remained after controlling for other relevant emotions, suggesting that each self-transcendent emotion uniquely predicted meaning and boredom. Supporting our theoretical predictions, multilevel mediation analysis indicated that elevated daily meaning in life partially explained the negative relationship between all self-transcendent emotions and daily boredom (Hypothesis 4a-4d). That is, the higher the self-transcendent emotion experience, the lower the daily boredom experience, which was partially explained by the meaning in life that self-transcendent emotions imbue. These findings underscore the importance of examining within-person dynamics to fully understand the existential functions of self-transcendent emotions in everyday life.

Theoretical and practical implications

Although external factors that elicit boredom—such as traffic delays or monotonous tasks—are often beyond our control, individuals can draw on internal psychological resources to reframe these experiences more meaningfully. In our sample, an astounding 75% of the variance of daily boredom occurred within individuals, with only 25% being attributable to stable between-person differences, aligning with research demonstrating that boredom is dynamic and highly context-dependent (Tam et al., 2021a) and underscoring the importance of within-person investigations on boredom. The current findings suggest that daily self-transcendent emotions predict less boredom via meaning in life within-persons, consistent with prior cross-sectional research (O’Dea et al., 2022; O’Dea et al., 2024). Self-transcendent emotions, by regulating meaning perceptions, may be valuable psychological resources to help individuals deal with situations that trigger boredom in everyday life.

Aligning with existing theory and empirical evidence (Chan et al., 2018; Fahlman et al., 2009; Van Tilburg & Igou, 2012), when feelings of meaning are high within an individual on a given day, boredom is less likely to occur. The findings further highlight the centrality of meaning perceptions in the emergence of boredom (Fahlman et al., 2009; Igou et al. 2024; Van Tilburg and Igou 2012; Tilburg and Igou 2017a; O’Dea et al. 2024; Westgate and Wilson 2018), showing that boredom is a dynamic signal of momentary meaning deficits. Crucially, daily meaning in life partially explained the relationship between self-transcendent emotions and boredom. This study confirms our theoretical prediction that sources of meaning can be used to regulate boredom within-persons (Igou et al., 2024; O’Dea et al., 2024).

Despite many calls for interventions to cope with boredom and its detrimental well-being and societal consequences (Fahlman et al., 2009; Seiler et al., 2023; Weybright et al., 2020), evidence-based strategies to cope with boredom in everyday life are lacking in the current literature. The high within-person variability evident in the current study demonstrates that individuals experience boredom differently across days. These results suggest that interventions should focus on fostering *daily* experiences of awe, gratitude, self-compassion, or compassion rather than attempting to alter trait-level dispositions. For example, interventions could use ecological momentary interventions to deliver brief exercises, like providing participants with an awe video or a self-compassion meditation, to induce self-transcendent emotions during the day (e.g., Study 7, Pan et al., 2024). The temporal specificity of our findings suggests that interventions should target moments when boredom is likely to occur (e.g., during repetitive work tasks) and tailor strategies to individual preferences for specific self-transcendent emotions. Future research should endeavor to test the effectiveness of these interventions in reducing boredom and its lamentable mental and physical health outcomes.

In the current study, daily self-transcendent emotions were positively associated with daily perceptions of meaning, in line with our theoretical assumptions and experimental evidence that self-transcendent emotions promote meaning (e.g., O’Dea et al., 2024; Yuan et al., 2023). Our findings demonstrate that meaning in life is a malleable daily state with significant variation across days (not just a stable trait). However, research on awe and meaning, for example, has focused on experiments that demonstrate mixed effects (Yuan et al., 2023; Rivera et al., 2020) and lack ecological validity. Self-transcendent emotions are leverage points for momentary meaning enhancement in daily life and researchers should move towards within-person methods to capture these relationships accurately.

The high within-person variance observed in all variables in this study, above and beyond between-person variance, reinforces the importance of studying within-person differences in these constructs and the need for intensive longitudinal methods, like daily diary studies, to capture emotional processes and their real-world antecedents. By employing a within-person design, this study captured dynamic, real-world processes that are often obscured in cross-sectional or between-person research. The current findings suggest that the negative relationships between self-transcendent emotions and boredom found cross-sectionally may largely reflect within-person processes.

Limitations and future directions

The daily diary design employed in this study enabled the examination of novel within-person associations among self-transcendent emotions, meaning in life, and boredom in a naturalistic and ecologically valid manner, accounting for a variety of situational contexts. Despite these strengths, several limitations warrant consideration.

First, the findings are correlational, and we cannot draw causal conclusions. Alternative explanations regarding reverse causality are possible; however, our findings corroborate with strong theoretical assumptions and prior experimental evidence (Fahlman et al., 2009; O’Dea et al. 2024; Van Tilburg and Igou 2012; Tilburg and Igou 2017a). Emotions are inherently temporary by nature and vary significantly from day to day (Verduyn et al., 2009). Thus, we did not test cross-lagged effects as we do not expect that transient emotions like awe or gratitude would have lasting effects on meaning or boredom the following day. Methods that involve multiple assessments per day, such as Ecological Momentary Assessments (Moore & Martin, 2022) may offer even deeper insight into the causal impact of these processes. Such a method can address the limitations of a daily diary design in future research.

Second, our sample was limited to young adults, and our participants were mostly female and Irish. Testing these hypotheses in a more diverse sample in terms of age, gender, and culture will be important to determine the generalizability of our findings. In terms of practically applying these findings, they are likely to have the strongest effects in an environment that also values and fosters these emotions. For example, a culture that values a collective, rather than individual, focus may enable higher self-transcendent emotions, as positive emotions can reverberate in others and spread through groups (Fredrickson, 2000). Future studies may wish to take the role of culture into account as the extent to which the environment enables these emotions is likely to play an important role.

Recent evidence suggests that there are two distinct families of self-transcendent emotions: social (i.e., gratitude and compassion) and epistemic (i.e., awe, Abatista & Cova, 2023). It’s possible that epistemic self-transcendent emotions may activate more social self-transcendent emotions (Nelson-Coffey et al., 2019), for instance, a recent study demonstrated that awe promotes self-compassion (Yuan et al., 2025). While these emotions are undoubtedly correlated and possess shared qualities, the emotions can operate distinctly (Abatista & Cova, 2023; Stellar et al., 2017). As shown in our analyses in the supplemental materials, each self-transcendent emotion elicited unique effects on meaning and boredom even while controlling for the remaining self-transcendent emotions. It may be that one

self-transcendent emotion is a catalyst for others in daily life, but the data in the current research cannot speak to the order in which they may occur. This remains an interesting avenue for further research.

Lastly, self-transcendent emotions contain a strong social component and are typically directed towards others (Stellar et al., 2017). However, we did not assess or control for the number of social interactions that participants had daily. The amount and quality of social interactions an individual has on a given day are likely to drive self-transcendent emotions and even boost meaning independently (Lin et al., 2023). We recommend that future studies take social interactions into account, as this may enhance our understanding of these within-person relationships.

Conclusion

Although boredom is highly dependent on the situational context; it is rarely studied at the situational level of analysis. Addressing the limitations of between-subjects designs, we conducted a preregistered 14-day diary study on the psychological processes that limit boredom. We found that on days participants experienced more self-transcendent emotions than usual, they reported greater daily perceptions of meaning in life and less daily boredom. Moreover, higher levels of daily meaning in life helped to explain the negative relationship between daily self-transcendent emotions and daily boredom, supporting the existential-buffering hypothesis (Igou et al., 2024) as a within-person process. Self-transcendent emotions encourage the view that life is meaningful, thereby predicting less boredom. Our findings provide actionable insights for developing interventions to boost self-transcendent emotions and mitigate the negative consequences of boredom in everyday life.

Statement of contribution

What is already known on this subject?

Theoretical models on boredom highlight the central role of boredom and suggest that affective processes that promote meaning may reduce boredom (i.e., a within-person process). Cross-sectional studies support this notion by demonstrating that self-transcendent emotions (namely awe, gratitude, and self-compassion) predict less boredom, and that this relationship is mediated by meaning in life. However, these studies focus on the between-person level of analysis, lack ecological validity, and study these emotions in isolation despite sharing a common boredom-reducing mechanism.

What does this study add?

- This study addresses the limitations of between-person designs by employing a daily diary study which demonstrates that self-transcendent emotions predict less boredom and more meaning in the ecologically valid context of daily life.
- Our study found that a significant proportion of the variation in boredom, meaning, and self-transcendent emotions occurred within-persons, enhancing our theoretical understanding of boredom and how interventions should be tailored to address it.
- Self-transcendent emotions appear to be valuable psychological resources for coping with boredom—a common experience with negative mental health and societal outcomes—in daily life.

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Data availability Data for the conducted study is available via OSF: https://osf.io/6eb35/?view_only=e6b8c70457414bac8af20b44f48c759d.

Declarations

Conflict of interest The authors declare no competing interests.

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