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Predicting Boredom Based on Gratitude and Integrative Self-Knowledge in Adolescents: With the Mediating Role of the Meaning of Life from Three Existential, Cognitive, and Neurological Approaches

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Abstract: Boredom signals a lack of meaning. Gratitude and self-knowledge promote feelings of meaning in life. I proposed accordingly that gratitude and self-knowledge, by engendering meaning, shield against boredom in adolescents. Specifically, I hypothesized that gratitude and self-knowledge prevent boredom by increasing perceptions of meaning in life, through existential, cognitive, and neurological approaches. A total of 238 high school students (both girls and boys) from Shiraz, Iran, participated in this study, selected through a multi-stage cluster sampling method. Participants completed questionnaires measuring trait boredom, gratitude, meaning in life, and integrative self-knowledge. Results indicated that gratitude and reflective self-knowledge significantly and positively predicted the ‘meaning presence’ component, which in turn significantly and negatively predicted trait boredom. The mediating role of the meaning presence was confirmed. These findings suggest that gratitude and reflective self-knowledge reduce boredom by enhancing meaning presence in life. To summarize, gratitude and reflective self-knowledge correspond with the cognitive, existential, and neurological functions of boredom and can predict a decrease in boredom.

Keywords: boredom, DMN, gratitude, meaning, self-knowledge.

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1. Introduction

Boredom is a phenomenon that has been discussed sporadically for centuries, being often linked to the study of melancholy (Ros Velasco, 2022, 2026). At present, attention to the experience of boredom is increasing, and researchers, scientists, and philosophers are trying to create a more comprehensive view of the phenomenon by combining practical and theoretical approaches (see, e.g., Elpidorou, 2023; Finkielstein, 2023; Ros Velasco, 2022, 2026; Svendsen, 2005). Today, boredom experts believe that we need to integrate the inescapable experience of boredom into the public discourse and to shed the prejudices and myths that prevent us from understanding and harnessing it in its multifaceted entirety, those that lead us to seek immediate escape from boredom, rather than embrace it and examine it closely to reap its benefits in social terms (Ros Velasco, 2023). In addition, correlational and experimental studies on existential, cognitive theories, and even neurological research specifically in the field of boredom are increasing (see, e.g., Csíkszentmihályi, 2000; Danckert and Merrifield, 2018; Eastwood et al., 2012; Van Tilburg and Igou, 2013, 2017b, 2019).

Throughout the history of the West, philosophers, poets, and writers have developed categories for describing different experiences of boredom (see, e.g., Doehlemann, 1991; Flaubert, 1980; Heidegger, 1976; Valéry, 1951). For example, Martin Heidegger (1976) speaks of a kind of deep boredom that includes existential boredom, where one has a mood without direction and without origin, which includes a loss of meaning in the world as a whole. Gathering the opinions and theories of thinkers in the field of boredom from the past to the present, Ros Velasco (2023) defines boredom as follows:

boredom is a state of malaise that we suffer from when the environment in which we find ourselves immersed or the activity we try to engage in does not stimulate us in line with our initial expectations, resulting in the painful experience of meaninglessness. We all suffer from this, more or less frequently, at different times and in different places, depending on both exogenous factors that stem from the possibilities of the context, and endogenous related to one's own personality and expectations. The person who is bored feels that their relationship with the present reality is damaged and they should do whatever within their grasp to return to an optimum state of stimulation, which translates into the sense of wellbeing yearned for.

She offers one of the most recent categorizations of types of boredom, taking into account historical, philosophical, psychological, and structural aspects, which include: (1) situation-dependent and transient boredom (also known as state boredom), (2) situation-dependent and chronic boredom (social approach), (3) individual-dependent and chronic boredom (cognitive and neurological approach, also known as trait boredom), and (4) profound boredom (existential approach) (Ros Velasco, 2025, 2026).

Research shows that both trait and state boredom have a strong connection to *meaning of life* (Fahlman et al., 2009; Van Tilburg et al., 2013, 2019, 2022; Van Tilburg and Igou, 2011; 2017b). *Gratitude* has been identified as a positive resource for protection against psychological challenges (Wood et al., 2010). A grateful person may not always experience gratitude, but they are likely to experience gratitude in certain situations, so grateful people have a lower threshold for boredom. Gratitude is also a psychological resource that can prevent boredom, and it does so by providing a sense of meaning in life (O'Dea et al., 2024). *Self-knowledge* provides a unique philosophy of life for each individual that can be used to make decisions about relationships,

behaviors, and valuable goals. As a result, it imbues life activities with meaning and value (Schlegel, 2009).

The present research is a correlational study which analyzes the role of gratitude and self-knowledge in predicting boredom through the mediation of meaning in life, as well as a review of the research conducted on the interaction of three of the above highlighted approaches to the phenomenon of boredom: existential, cognitive, and neurological.

1.1. Boredom Trait or State?

Boredom is often defined as the aversive experience of wanting, but being unable, to engage in satisfying activity (Eastwood et al., 2012). *State-based* (or *situation-dependent and transient boredom*) is momentary and often evoked by situations that are dull, repetitive, and unchallenging (Chan et al., 2018). But boredom is not only caused by boring situations (e.g., monotony, constraint, mismatched challenge, devalued activities [Danckert and Eastwood, 2020]) but also by psychological factors or individual differences. This notion is consistent with early theorizing on two types of boredom: one caused by external, environmental circumstances (stated-based or situation-dependent boredom) and the other caused by internal factors (boredom that comes from within, i.e., trait boredom or individual-dependent boredom [Bernstein, 1975; Neu, 1998; Todman, 2003]. Psychological factors might predispose some people to experience boredom regardless of the situation (Mercer-Lynn et al., 2014). Studies also show that boredom can also result from a situationally induced boredom that, when sustained over time, becomes chronic (situation-dependent and chronic boredom [Ros Velasco, 2025, 2026]). In such cases, even when the individual knows what they would like to do in order to meaningfully occupy their time, they are unable to pursue this occupation not due to a psychological issue, but because the environment in which boredom arises is too constrictive or limiting (Ros Velasco, 2025, 2026). Profound/existential might be the result of trait boredom (individual-dependent) and situation-dependent and chronic boredom (Ros Velasco, 2025, 2026).

While boredom can be fleeting and situationally determined, some people experience boredom more often than others. This observation gave rise to the concept of *boredom proneness* (here referred to as *trait boredom* [Farmer and Sundberg, 1986]). *Boredom proneness* is a trait-like construct representing individual differences in the frequency and intensity of boredom and the perception that one's life is boring (Tam et al., 2021). According to Gorelik and Eastwood (2024), the definition of trait boredom consists of two parts; namely they suggest that to be highly trait-bored means that one often experiences boredom (not because of constrictive or limiting situations), and that one possesses at least some of the psychological factors (individual differences) thought to cause boredom. Thus, they are proposing to define trait boredom in terms of the frequency and cause of boredom. The first component—frequently experiencing boredom—can be measured directly via self-report, and the second component—possessing the psychological factors thought to cause boredom—establishes a nomological network for demonstrating the validity of a self-report measure of trait boredom. By defining trait boredom in this manner, we can draw on existing empirical research and theory related to boredom; in particular, building on our understanding of the psychological causes of boredom. At this point, I have chosen to prioritize frequency of boredom, as opposed to other qualities of the experience

such as pervasiveness, duration, intensity, and tolerability. Trait Boredom Scale (TBS) was built on this basis (Gorelik and Eastwood, 2024).

1.2. Gratitude

Broadly defined, gratitude is a habitual focus on an appreciation of the positive aspects of life (Wood et al., 2010). It can be conceptualized as an emotional response, a mood, or a trait involving an appreciation of what is good in life (Ma et al., 2017). Gratitude is linked to ample psychological, physical, and relational benefits across the lifespan (Portocarrero et al., 2020; Wood et al., 2010). As an emotion, gratitude involves a two-stage cognitive process: a) recognizing that something positive has occurred, and b) recognizing that an external agent played a role in achieving it (Wiener, 1985). Gratitude is a strong predictor of meaning in life, possibly through positive affect (King et al., 2006). Gratitude predicts less boredom, and this relationship is mediated by presence of meaning in life (O’Dea et al., 2024).

1.3. Self-Knowledge

In all of times, self-knowledge has been considered an important stage in the life of every human being who wants to achieve security, peace, and true happiness. As Laozi, who lived in China around five hundred years before Christ during the time of Confucius, states in the book *Tao Te Ching*: “Knowing others is intelligence and awareness, knowing oneself is pure wisdom. Mastering others is power, mastering oneself is true power” (1991, v. 33). Genesis emphasizes that “God created man in His own image and for Himself. Therefore, knowing ourselves leads to knowing the reflection of God’s image” (Hamilton, 1990, Gen 1:24). This is why self-knowledge in Christianity leads to God-knowledge. In the Quran, the holy book of Muslims, it is stated: “Do not be like those who forgot God and God made them forget themselves” (Quran 59:19).

Morin (2017) compiled a comprehensive set of terms related to the self, providing definitions based on prior research to offer a practical framework for scholars. In his definition, self-knowledge refers to “an organized set of accurate self-information, a realistic self-concept, and accurate introspection about oneself” (Carlson, 2013; Gibbons, 1983; cited in Morin, 2017, p. 2). The meaning of self-knowledge in the present study is the Integrative self-knowledge that was proposed by Ghorbani (2008). He stated that Integrative self-knowledge refers to the individual’s effort to integrate his/her experience in the past, present, and future in order to adapt and improve himself/herself. Integrative self-knowledge means understanding the current mechanisms in the flow, within oneself, in a way that is temporally aligned. In this way, understanding of ongoing experiences, in the present, is integrated with stable mental reconstructions that arise from past experiences (Ghorbani 2008; Ghorbani et al., 2003). In their opinion, this model was built for the purpose of an integrated understanding of the processes within himself/herself as well as awareness of them and increased awareness of intrapsychic dynamics, and it has two aspects: experiential self-knowledge and reflective self-knowledge, which include the cognitive processing of information related to himself/herself in the present and past. Coherent self-knowledge is the capacity to understand the temporality and coherence of one’s internal processes and experiences (Ghorbani, 2008). In other words, experiential self-knowledge is the receptive processing of information related to the self that takes place in terms of its moment-to-moment and dynamic changes in the present. It provides immediate input from

personal experiences that is necessary to cope with challenges and achieve future goals, and also prevents automatic and involuntary forms of responding. On the other hand, reflective self-knowledge is the cognitive processing of information related to the self that is related to the past. In reflective self-knowledge, the individual analyzes personal experiences through higher and more complex cognitive actions and, through this, achieves more complex mental schemes that facilitate his adaptation (Ghorbani et al., 2003).

As Brodsky (1995) emphasizes, boredom has above all a formative value as it shows the self its own finitude and cultivates in it a sensitivity that has a moral effect (compassion) as well as a richer experience of life and of oneself. There is no self-deception in boredom, and this is the beginning of self-knowledge. However, Bambrah et al. (2023) examined the relationship between boredom, self-knowledge (i.e., awareness of one's internal experiences), and self-directed attention (i.e., focusing on internal states) and found that trait and state boredom is positively associated with self-directed attention but negatively associated with self-knowledge—suggesting that individuals prone to boredom frequently focus on their thoughts and feelings without clearly understanding them, leading to a sense of disconnection from their goals and desires. When an external environment fails to engage a person cognitively (because of monotony, inappropriate levels of challenge, lack of choice, or devalued activities [Elpidorou, 2018]), individuals may instead focus inward on the distress caused by a lack of cognitive engagement (Bambrah et al., 2023). This is consistent with psychodynamic theories of boredom, which posit that boredom stems from an inability to consciously decipher what one desires (e.g., Wangh, 1975).

1.4. Meaning in Life

According to the model proposed by Steger et al. (2008), meaning in life is a highly desirable psychological quality. People search meaning when they feel their lives have little meaning or when they are losing it. The first aspect, the meaning presence, indicates whether an individual sees their life as meaningful and purposeful. This term refers to the perception of oneself and the world around them, including the perception of how one fits into the world. The second aspect, the meaning search, refers to the strength, intensity, and active effort of individuals to create or increase their perception of meaning and purpose in their lives ('How can I make my life more meaningful?'). While the meaning presence implies some kind of outcome, the meaning search refers to an active and process-oriented factor (Steger et al., 2008). Accordingly, the Steger questionnaire (Steger et al., 2006), in addition to the existential aspect of meaning (meaning presence), also focuses on the cognitive aspect of meaning (meaning search).

1.4.1. Approaches of Boredom Regarding Meaning in Live

Existential Approach: From an existential approach, the absence of meaning plays a central role in boredom. Boredom is associated with a sense of meaninglessness and is linked to various psychological and physiological problems, such as symptoms of depression, anxiety, and increased stress (Goldberg et al., 2011; Lee and Zelman, 2019; O'Dea et al., 2024). However, strategies for reducing boredom and mitigating its consequences are still underexplored. Emerging evidence suggests that experiences which enhance a sense of meaning can buffer against boredom (O'Dea et al., 2022; Van Tilburg et al., 2019).

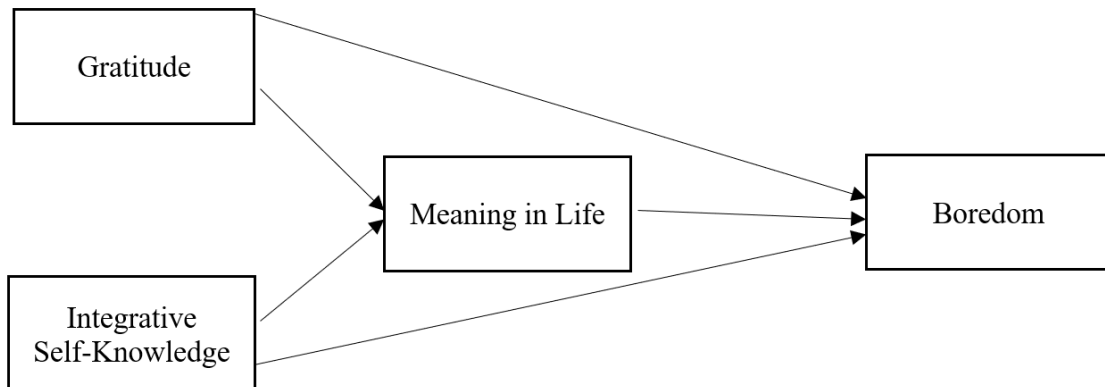
Cognitive Approach: From a cognitive approach, boredom is primarily characterized by two elements: negative appraisal of one's situation and attention difficulties (Eastwood et al., 2012; Van Tilburg and Igou, 2017a). These elements can function both as causes and as components of the experience of boredom. They are also interrelated: a negative evaluation of one's situation can lead to inattention, while a lack of attentional engagement often leads to a negative appraisal. The prevailing view is that negative appraisals linked to boredom are rooted in the perception that one's situation lacks meaning (Elpidorou, 2023). Supporting this view, studies have shown a strong association between the experience of boredom and the perception of meaninglessness (Fahlman et al., 2009; Van Tilburg and Igou, 2017b). When individuals are no longer cognitively engaged in a satisfying way, cognitive approach suggests two broad strategies to restore engagement: one option is to shift to a different topic or activity in the hope that it will be more fulfilling; the other is to re-evaluate one's relationship to the current task or situation to make it more meaningful (Elpidorou, 2023).

Neurological Approach: From a neurological approach, research has shown that activity in the default mode network (DMN) increases during experiences of boredom (Danckert and Merrifield, 2018), as well as during periods of creativity, imagination, and idea generation (Bartoli et al., 2024). EEG studies indicate that the onset of boredom does not signal a complete disengagement but rather a shift in the form of engagement, typically inward (Katahira et al., 2018; Perone et al., 2019; Tabatabaie et al., 2014; Yakobi et al., 2021). Activity in the DMN has been shown to decrease when one is actively engaged in a task and attention is externally directed (Gusnard and Raichle, 2001). Indeed, when an individual is actively engaged in a demanding task, activity in a central executive network (CEN) typically increases while activity in the DMN decreases (Greicius et al., 2003; Mason et al., 2007; Weissman et al., 2006).

According to Steger et al.'s (2008) definition of meaning, the meaning presence implies some kind of outcome, which does not require focusing on external activity but is a form of introspection. So it can activate the DMN system because it is outcome-involved and introspective. The meaning search, which is an active and process-oriented factor that focuses on external activity, can activate the CEN system. Of course, this claim is based on evidence from the activity of the two networks DMN and CEN, but it has not yet been neurologically investigated exactly which brain networks are activated by the meaning presence or the meaning search in life. Additionally, reflective self-knowledge is associated with increased activity in the brain's DMN (Schneider et al., 2008; Whitfield-Gabrieli et al., 2011). Neurological studies also show that increased gratitude modulates the connections of the DMN and improves emotion regulation and spontaneity (Kyeong et al., 2017). Although neurological variables were not measured in this study, neurological evidence and research studies were reviewed.

Figure 1 depicts the proposed model for this research.

Figure 1. Conceptual Research Model



I examined the relationship between gratitude and boredom using existential, cognitive, and neurological approaches, that is, considering and integrating perceptions of meaning in life (Steger et al., 2006). Given that boredom features low meaning in life (Van Tilburg and Igou, 2012, 2017a) and gratitude fosters feelings of meaning in life (Kleiman et al., 2013; McCullough, 2002), and studies also show that boredom trait is positively associated with egocentrism and negatively associated with self-knowledge (awareness of one's own thoughts, feelings, and memories [Bambrah et al., 2023]), I hypothesize that meaning in life instilled by gratitude and integrative self-knowledge protects against boredom experiences. This hypothesis rests on research indicating that sources of meaning in life counteract boredom (O'Dea et al., 2022; Van Tilburg et al., 2013, 2019). My hypothesis regarding the relationship between gratitude and integrative self-knowledge (as the predictor) and boredom (as the criterion) and meaning in life (as mediating variable) builds on two specific components:

Hypothesis 1: Gratitude and integrative self-knowledge predict less boredom.

Hypothesis 2: Perceptions of meaning in life mediate the relation between gratitude and integrative self-knowledge with boredom.

2. Method

This study examined gratitude and integrative self-knowledge as predictors of boredom in adolescents, with the mediating role of meaning in life, through existential, cognitive, and neurological approaches. The study is considered applied in terms of its purpose and nature. Regarding data collection and implementation, it follows a descriptive (non-experimental) and correlational design. To test that the negative association between gratitude and boredom is attributable to their shared relation to meaning in life, I employed Model 4 from PROCESS (Hayes, 2018) with 10,000 bootstraps, using gratitude and integrative self-knowledge as the predictor, meaning in life as the mediator, and boredom as the criterion.

2.1. Participants

Because of the few existing studies on the experience of boredom in adolescents carried out so far, the sample of this study was selected from a statistical population of adolescents. Despite having many opportunities for learning and recreation, they often report feelings of boredom (Drob and Bernard, 1987; Van Tilburg et al., 2013). Adolescents who experience chronic boredom are less likely to participate in hobbies and activities such as sports, and more likely to overuse the Internet or engage in risky behaviors such as substance use (Biolcati et al., 2017). Although statistics on boredom prevalence are limited, existing data suggest that boredom is most common around ages 17–18 (Danckert and Eastwood, 2020).

I aimed for power $(1 - \beta) = .80$, anticipating a moderate correlation of $\rho = .35$, adopting a Type-I error $\alpha = .05$ (two-tailed). I controlled for potential order effects by assigning participants at random to different orders of the measured constructs. This sample was selected using a cluster random method and was based on Kline's (2005) criterion of 2.5 to 5 times the number of items in the research instruments. Accordingly, I required a sample of 170 participants. Given that I used order variations studies that are prone to dropouts, I exceeded the required sample size. The statistical population consisted of high school students from Shiraz, Iran. The number of participants in this study was 250, and after eliminating those who met the exclusion criteria, the sample size reached 238, that from among the existing classes. Nine classes were randomly selected and all students of the selected classes constituted the research participants. The research participants were students in the 10th, 11th, and 12th grades of high school (143 girls, 95 boys) between the ages of 15 to 19 years ($M_{\text{age}} = 16.43$, $SD = 1.02$).

2.2. Procedure and Materials

Following data collection, SPSS-27 was used to enter data, calculate means, standard deviations, correlation coefficients, Cronbach's alpha, and to conduct multiple regression analyses. PROCESS Model 4 (Hayes, 2018) with 10,000 bootstraps was applied to assess the significance of mediating effects in the model and AMOS-24 was used for structural equation modeling, confirmatory factor analysis, and hypothesis testing.

After obtaining the students' consents, the research questionnaires were administered in groups in the randomly selected classes. After giving informed consents, participants reported demographics regarding their age and gender. Then completed the following questionnaires:

1) Trait Boredom Scale (TBS), based on the Multidimensional State Boredom Scale (MSBS), which integrates dimensions such as non-participation, high arousal, low arousal, inattention, and time perception into a single construct—agency. The scale includes 6 items such as 'I often feel bored', that from 1 (*strongly disagree*) to 7 (*strongly agree*) (coefficient alpha = .91 [Gorelik and Eastwood, 2024]). As this scale had not been standardized in Iran, I translated and adapted it for use in this study in accordance with ethical and scientific principles. Confirmatory factor analysis yielded a Cronbach's alpha of 0.77.

2) Then participants completed Meaning in Life Questionnaire (MLQ), that measured two dimensions of meaning: meaning presence (MP-MLQ) and meaning search (MS-MLQ). The MLQ consists of 10 items with scales ranging from 1 (*absolutely untrue*) to 7 (*absolutely true*). Items 1, 4, 5, 6, and 9 assess MP-MLQ (e.g., 'I understand the meaning of my life'), while items

2, 3, 7, 8, and 10 assess MS-MLQ (e.g., ‘I am always looking for the purpose of my life’). Item 9 is reverse scored (coefficient alpha values ranging from .82 to .87 for the scale and subscales [Steger et al., 2006]).

3) Afterward, participants completed the Gratitude Questionnaire (GQ-6), that measured the intensity, frequency, density, and span of gratitude experiences. GQ-6 has 6 items such as ‘I have many things in my life for which I am grateful’. Items were rated on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*) (coefficient alpha = .82 [McCullough et al., 2002]).

4) Integrative Self-Knowledge Questionnaire (ISK) measured integrative self-knowledge by combining three components: experiential self-knowledge (E-ISK), reflective self-knowledge (R-ISK), and cohesive self-knowledge (C-ISK). ISK has 12 items whose responses are rated on a 5-point scale from 1 (*mostly false*) to 5 (*mostly true*). E-ISK items include, e.g., ‘I often get so caught up in what is happening that I can’t really see how I am going to behave in that situation’; R-ISK items include, e.g., ‘Through deep reflection on myself, I have discovered what I really want in life and how I might achieve it’; and C-ISK items include, e.g., ‘I get confused whenever I try to analyze my role in a problem’. Items 1, 2, 4, 5, 7, 8, 10, 11, and 12 are reverse scored (coefficient alpha values ranging from .74 to .90 for the scale and subscales [Ghorbani, 2008]).

3. Results

This study measured four main variables: gratitude (GQ6), integrative self-knowledge (ISK), meaning in life (MLQ), and trait boredom (TBS) and their subscales. The correlation matrix of the scales and subscales is shown in Table 1.

Table 1. Correlation Matrix of Measures

Measures	1	2	3	4	5	6	7	8	9
1 TBS	1	-0/37**	-0/42**	-0/18**	-0/15*	0/35**	0/37**	-0/39**	0/46**
2 MLQ		1	0/76**	0/81**	0/39**	0/03	-0/11	0/48**	-0/22**
3 MP-MLQ			1	0/25**	0/36**	-0/12	-0/14*	0/48**	-0/30**
4 MS-MLQ				1	0/25**	0/03	0/03	0/28**	-0/06
5 GQ6					1	0/12*	0/06	-0/24**	-0/02
6 ISK						1	0/85**	0/09*	0/82**
7 E-ISK							1	0/13	0/58**
8 R-ISK								1	-0/31**
9 C-ISK									1

TBS: Trait Boredom Scale; MP-MLQ: Meaning presence from MLQ; MS-MLQ: Meaning search from MLQ; GQ6: Gratitude Questionnaire; ISK: Integrative Self-Knowledge; E-ISK: Experiential Self-Knowledge from ISK; R-ISK: Reflective Self-Knowledge from ISK; C-ISK: Cohesive Self-Knowledge from ISK.

$p \leq .001^{**}$ $p \leq .05^*$

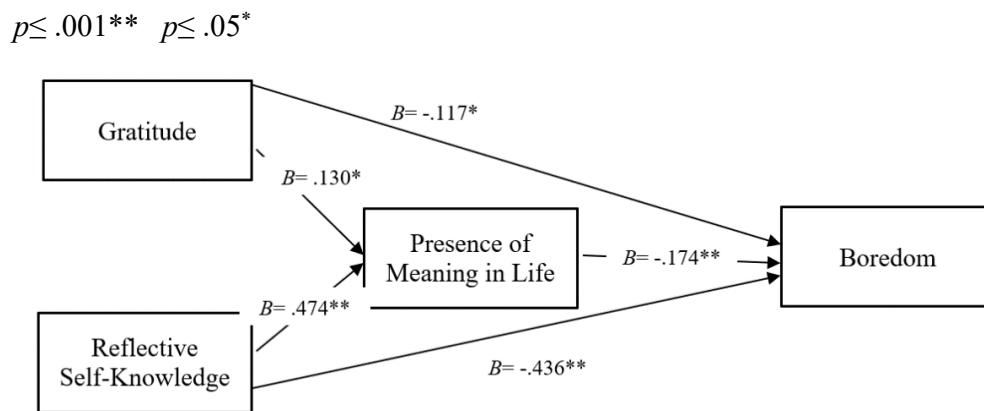
Gratitude was significantly positively correlated with meaning presence and meaning search and was significantly negatively correlated with boredom. There was a significant positive correlation between reflective self-knowledge with meaning presence and meaning search and it was significantly negatively correlated with boredom (see Table 1).

To test the role of presence and search of meaning in life, I used PROCESS Model 4 (Hayes, 2018) with 10,000 bootstraps and AMOS-24. The results indicate that gratitude directly and positively predicts the meaning presence, $B = .213$, $SE = .04$, $t(237) = 5.190$, $p < .001$, 95% CI [.129, .287]. This means that with increasing gratitude, the meaning presence also increases. Also, gratitude directly and positively predicts the meaning search, $B = .130$, $SE = .05$, $t(237) = 2.398$, $p < .05$, 95% CI [.023, .236]. This means that with increasing gratitude, the meaning search also increases.

Experiential self-knowledge was significantly and positively associated with the meaning presence, $B = -.023$, $SE = .05$, $t(237) = -.406$, $p < .05$, 95% CI [-.132, .087], and it was not significantly associated with the meaning search. Reflective self-knowledge was significantly and negatively associated with meaning presence, $B = .474$, $SE = .07$, $t(237) = 6.50$, $p < .001$, 95% CI [.330, .618], and also reflective self-knowledge was significantly and positively associated with the meaning search, $B = 0.357$, $SE = .09$, $t(237) = 3.64$, $p < .001$, 95% CI [.164, .551]. Cohesive self-knowledge was significantly and positively associated with the meaning presence, $B = -.119$, $SE = .05$, $t(237) = -2.33$, $p < .05$, 95% CI [-.218, -.019], and was not significantly associated with the meaning search. Meaning presence was significantly and negatively associated with boredom, $B = -.174$, $SE = .02$, $t(237) = -6.821$, $p < .001$, 95% CI [-1.191, -.637]. The meaning search was not significantly associated with boredom. The total effect of gratitude on boredom was significant, $B = -.267$, $SE = .08$, $t(237) = -2.489$, $p < .05$, 95% CI [-.478, -.055]. It was comprised of a significant direct effect of gratitude on boredom, $B = -.003$, $SE = .07$, $t(237) = -.030$, $p < .05$, 95% CI [-.217, -.211], and a significant indirect effect through meaning presence, $B = -.252$, $SE = .04$, $t(237) = -.103$, $p < .05$, 95% CI [-.226, -.095]. The total effect of reflective self-knowledge on boredom was significant, $B = -1.068$, $SE = .08$, $t(237) = -5.992$, $p < .001$, 95% CI [-1.419, -.717]. It was comprised of a significant direct effect of reflective self-knowledge on boredom, $B = -.638$, $SE = .07$, $t(237) = -3.182$, $p < .001$, 95% CI [-1.033, -.243], and a significant indirect effect through meaning presence, $B = -.432$, $SE = .05$, $t(237) = -4.479$, $p < .001$, 95% CI [-.102, -.124].

Gratitude was significantly and negatively associated with boredom $B = -0.117$, $SE = .07$, $t(237) = -1.98$, $p < .05$, 95% CI [-.478, -.056]. This means that with increasing gratitude, boredom decreases. Experiential self-knowledge was significantly and positively associated with boredom $B = .203$, $SE = .08$, $t(237) = 2.95$, $p < .001$, 95% CI [.517, .975]. Cohesive self-knowledge was significantly and positively associated with boredom, $B = .271$, $SE = .06$, $t(237) = 3.80$, $p < .001$, 95% CI [.622, 1.010]. That is, with an increase in experiential self-knowledge and cohesive self-knowledge, boredom also increases. But reflective self-knowledge was significantly and negatively associated with boredom $B = -.436$, $SE = .08$, $t(237) = -2.35$, $p < .001$, 95% CI [-.805, -.071]. This means that with increasing reflective self-knowledge, boredom decreases (Figure 2).

Figure 2. Sequential Path Model for Gratitude, Reflective Self-Knowledge, Meaning Presence and Boredom



As shown in Table 2, the absolute, relative, and summary fit indices indicated poor model fit prior to modification. However, following adjustments to the model, the fit indices improved and reached acceptable levels. After confirming the model fit, the analysis proceeded to examine the direct and indirect standardized coefficients. To assess the significance of the indirect paths—specifically, the effects of gratitude and integrative self-knowledge on boredom through the mediating role of meaning in life—I used PROCESS Model 4 (Hayes, 2018) with 10,000 bootstraps and a structural equation model was employed. This model was tested using maximum likelihood estimation in AMOS-24.

Table 2. Model Fit Indices

Model	df/χ^2	P	GFI	AGFI	IFI	TLI	CFI	PNFI	PCFI	RMSEA	PCLOSE
Before modification	2/14	0/001	0/89	0/85	0/89	0/87	0/89	0/68	0/74	0/07	0/05
After modification	1/86	0/001	0/91	0/87	0/92	0/90	0/92	0/68	0/74	0/60	0/10

4. Discussion

Boredom is an uncomfortable experience accompanied by perceptions of meaninglessness (Van Tilburg and Igou, 2012). Conversely, gratitude is an inherently pleasant experience that can provide enhanced meaning in life (Bono and Sender, 2018; McCullough, 2002). When people encounter the meaning threat associated with boredom, they seek to engage in hedonic and interpersonal escape behaviors that lower self-awareness and reduce feelings of meaninglessness (Moynihan et al., 2021). Seib and Vodanovich (1998) and Von Gemmingen et al. (2003) found that boredom was positively correlated with ‘self-reflectiveness’ (i.e., attempts at self-understanding—e.g., reflecting a lot about oneself).

According to Hypothesis 1, gratitude predicted a reduction in boredom, but only reflective self-knowledge component of integrative self-knowledge predicted a reduction in boredom. According to Hypothesis 2, gratitude and reflective self-knowledge predicted a reduction in boredom through meaning in life. Among the components of integrative self-knowledge, experiential self-knowledge did not predict boredom, whereas reflective and cohesive self-knowledge did—though in opposite directions. The results showed that among the two components of meaning in life—presence and search—only the meaning presence directly predicted boredom. Specifically, higher levels of meaning presence, greater gratitude, and greater reflective self-knowledge were associated with reduced boredom, while higher cohesive self-knowledge was associated with increased boredom. Additionally, gratitude, reflective self-knowledge, and cohesive self-knowledge indirectly affected boredom through the mediating role of the meaning presence. Individuals with higher gratitude and reflective self-knowledge tended to report greater meaning presence, which, in turn, reduced their experience of boredom. Conversely, those with higher cohesive self-knowledge reported lower meaning presence, which contributed to greater boredom. Gratitude and reflective self-knowledge were also found to directly and negatively predict boredom, while cohesive self-knowledge directly and positively predicted it.

These findings are consistent with those of O’Dea et al. (2024), who also identified the meaning presence as a mediating factor in the relationship between gratitude and boredom. Thus, the present study supports and extends previous research by confirming that meaning presence serves as a mediator between both gratitude and reflective self-knowledge and the experience of boredom.

Self-knowledge has been recognized as a source of life meaning (Bukowski, 2019). As Schlegel (2009) believes, discovering the self beneath the surface of social conditioning and enables individuals to find true meaning in their lives. In this context, self-knowledge provides a crucial foundation for constructing a meaningful narrative (Schlegel, 2009). Prior studies also support a negative correlation between self-knowledge and boredom. The notion that boredom is associated with enhanced self-directed attention is consistent with neurocognitive research (Bambrah et al., 2023). For example, mind-wandering and lapses in attention on behavioral tasks—which are experiences associated with boredom—are associated with increased activity in the DMN (Buckner et al., 2008; Fox et al., 2015; Gusnard and Raichle, 2001; Mason et al., 2007), a set of interconnected brain regions that support internally focused thought (e.g., thinking to oneself). Indeed, activity in DMN increases when individuals are not engaged in any externally focused activity or task (Andrews-Hanna, 2012; Buckner et al., 2008; Mason et al., 2007), but decreases when one is actively engaged in a task and their attention is externally directed (Gusnard and Raichle, 2001; Ulrich et al., 2014). Experimental work examining the state of boredom more directly (contrasted with a resting state, an induction of interest/engagement, and a sustained attention task) found that the posterior components of the DMN are active during the boredom induction, as well as that the anterior insular is anti-correlated with the DMN during the boredom induction, which is indicative of a failure to activate executive network regions that are necessary for engaging with the external world and information at hand (Danckert and Isacescu, 2017; Danckert and Merrifield, 2018). Since boredom activates the DMN, and, in such

situations, people are unable to perform external activities despite a strong desire, the most effective predictors will be in line of with introspective and self-referential processes (Menon, 2023), rather than task-oriented behaviors governed by the CEN (Bigliassi et al., 2025).

Based on cognitive, existential, and neurological approaches in this study, boredom in adolescents can be predicted through the interplay of gratitude and reflective self-knowledge, mediated by the meaning presence. This study also highlights the importance of distinguishing between the different components of integrative self-knowledge. Among them, only reflective self-knowledge aligns closely with the experience of boredom, particularly its neurological dimension. This suggests that including neurophysiological functions—alongside cognitive and existential approaches—enables the identification of more accurate and meaningful predictors of boredom. Ultimately, this study emphasizes that gratitude and reflective self-knowledge, via the meaning presence, predict reduced boredom.

5. Conclusion

If we are to develop a solution for boredom based on the function of emotions, we must first understand the experience of boredom and then identify appropriate predictors that reduce its experience.

Based on the three existential, cognitive, and neurological approaches and their interaction with each other, boredom is a sense of meaninglessness (existential) in which the person is involved in a cognitive cycle of negative attention and negative evaluation (cognitive). At the same time, because the DMN network is also activated in the brain (neurological), the person is unable to perform external activities, so in such situations the person is bored. Although no research was found that directly shows which component of meaning in life (presence and search) activates the brain's DMN, considering the definitions provided about the presence and the search for meaning, and also considering the type of activity of the DMN network, it seems that the presence of meaning—which indicates whether an individual sees their life as meaningful and purposeful, and implies some kind of outcome—is more consistent with the activity of the DMN network whereas the meaning search reflects intensity, and that active effort of individuals to create or increase their perception of meaning and purpose in their lives refers to an active and process-oriented factor associated with the CEN. However, precise proof of this alignment requires neurological and experimental studies.

In a cognitive cycle of negative appraisal and inattention, when individuals are no longer cognitively engaged in a satisfying way, cognitive approach suggests two broad strategies to restore engagement: one option is to shift to a different topic or activity in the hope that it will be more fulfilling; the other is to re-evaluate one's relationship to the current task or situation to make it more meaningful. With the descriptions made, the presence of meaning, gratitude and reflective self-knowledge can be considered a kind of re-evaluation of the situation. Therefore, among the two cognitive strategies in dealing with boredom, re-evaluation of the current situation can also be considered in line with the activity of the DMN network. Of course, this alignment needs to be confirmed with more precise neurological experiments.

Since attention to physical symptoms is always of great importance in the treatment of both physical diseases and mental disorders, the most obvious physical and bodily manifestation of boredom is the activation of the DMN network. So it seems that ignoring this important symptom in the experience of boredom is not acceptable. As we know, with increased activity in the DMN network, a person's focus on external activity reaches its minimum. In such circumstances, choosing new external goals and focusing on them does not seem correct. Perhaps this same effort to engage with external goals caused Schopenhauer to see life as a pendulum swinging between suffering and boredom.

According to this study, two examples of predictors that are in line with the activity of the DMN network are gratitude and reflective self-knowledge, which, through the presence of meaning (which is based on evidence in line with the activity of the DMN network), can predict the reduction of boredom. As in recent psychological treatments, there is a great emphasis on staying in a feeling and observing and accepting it, and in fact, acceptance is the beginning of change. This method can also be used for the emotion of boredom: that is, staying in the current situation and observing the feeling of boredom and re-evaluating the situation instead of trying to escape and get rid of boredom. In fact, gratitude and reflective self-knowledge are forms of staying in the feeling of boredom and re-evaluating the current situation.

Today, much research shows, the increasing pace of life, exposure to a high amount of information but superficial, the importance of time and planning, and, in general, the era of modernity and its characteristics have caused boredom to increase sharply. Perhaps in such situations, the body naturally warns the person by activating the DMN network: *where are you going in such a hurry???*

5.1. Limitations and Future Research

Most of the existing empirical and correlational research has studied boredom in a unidimensional manner and based on one of the existing theories (existential, cognitive, and neurological). Now the need to integrate previous findings and conduct research to integrate different perspectives and their interaction seems essential. In this regard, the lack of tools (self-assessment and neurological) appropriate for this purpose is very noticeable. Identifying and studying predictors that are based on the interaction between different approaches is very necessary in reducing boredom. Conducting these studies on a larger and more diverse target populations is very helpful in generalizing the results.

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