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# The map of cognitive processes in boredom: multiple mediation models

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## Abstract

**Background:** Trait boredom is associated with several internalizing and externalizing problems. Addressing existing research gaps in the field, the present study investigated the map of cognitive processes for boredom, based on the rational emotive behaviour therapy model (REBT).
**Aims:** The general aim of the study was to investigate the organization of irrational and rational evaluative cognitions related to boredom, and the association between boredom and depression symptoms and state/trait anxiety.
**Methods:** The 233 participants (84% women) completed online scales of evaluative cognitions, trait boredom, trait/state anxiety and depression. Multiple mediation models via the SPSS extension PROCESS were employed.
**Results:** The REBT psychopathology and psychological health models were partially confirmed, as the evaluative primary cognitions predicted positively and significantly the secondary ones in both cases. Low frustration tolerance (LFT) and global evaluations (GE), and frustration tolerance (FT), respectively, had significant effects. We found a positive significant association between boredom proneness and the negative dysfunctional emotions investigated.
**Conclusions:** Both results offer further support for the hierarchy of cognitions and the distinction between the level of irrationality and rationality in REBT. This is the first attempt to assess a cognitive map of boredom, underlining the importance of (L)FT in relation to boredom. The significance of GE in boredom suggests that people might see themselves responsible, or even blame themselves, others or life itself while bored. The associations of boredom with anxiety and depression are relevant, as its role in those contexts is not yet fully understood.

**Keywords:** anxiety; boredom; cognitive map; depression; REBT

## Introduction

Boredom is one of the most prevalent affective states one could experience, according to experience sampling studies (Chin *et al.*, 2017; Goetz *et al.*, 2014; Nett *et al.*, 2011). Almost two-thirds of the general population (63%) frequently report feeling bored and more than 90% (especially among youth) have experienced boredom at some point (Chin *et al.*, 2017; Yazzie-Mintz, 2007).

Despite its high frequency, the concept of boredom is rather neglected in scientific research. Less than one paper per year was published on boredom between 1926 and 1981 (Smith, 1981), but it has recently gained more popularity, as 326 papers were published in 2015 alone, a growth of

more than 3200% (Martz *et al.*, 2016). It was argued that boredom research was still in incipient stages, as it was more preoccupied with defining the concept and analyses of individual differences than with ardent topics, such as the role of boredom in burnout, psychotherapeutic interventions or creativity (Piotrowski, 2013).

This might be of concern, as trait boredom is positively associated with a number of negative emotions and behaviours. The former category includes anxiety (Fahlman *et al.*, 2009), apathy, guilt, anger and depression (Vodanovich, 2003), and the latter involves compulsive eating (Havermans *et al.*, 2015), reckless driving (Steinberger *et al.*, 2016), adult attention deficit hyperactivity disorder (ADHD) symptoms, learning problems, low school performance (Tze *et al.*, 2016), internet and gaming addiction (Chou *et al.*, 2018), under-age alcohol consumption (Windle and Windle, 2018), low job performance (Watt and Hargis, 2010), problematic smartphone use (Elhai *et al.*, 2017), phubbing (Al-Saggaf *et al.*, 2019), gambling, alcohol and drug abuse, and addiction (LePera, 2011). Moreover, some people even prefer the experience of self-inflicted pain (electric shocks) rather than allow themselves to stay bored (Nederkoorn *et al.*, 2016). It is well understood that the associations do not imply causality, but the mere fact that a plethora of them are found in two reviews (Vodanovich, 2003; Vodanovich and Watt, 2016) should seriously be taken into account. Therefore, we argue that it is best to further investigate boredom, its connections and possible predictors and consequences.

While the thinkers at various historical time points (Heraclitus, B. Pascal, A. Schopenhauer, L. Svendsen; see Svendsen, 2005) have approached boredom in a theological, philosophical or practical manner, contemporary scientists adopt definitions and scientific methods to study this complex topic. As Piotrowski (2013) indicated, boredom research is still developing, and the concept lacks an unanimously accepted definition.

In their comprehensive review, Vogel-Walcutt *et al.* (2012) go through a large number of definitions, attempting to categorize them. A first group of definitions considers boredom as the opposite of flow, a state of optimal motivation (Nakamura and Csikszentmihalyi, 2014), emphasizing low arousal and sub-optimal stimulation or (acute) under-stimulation (Mastro *et al.*, 2002) components. Another category of definitions indicate boredom as a negative emotion: 'aversive and counter-productive' (Green-Demers, 1997); 'unpleasant and transient affective state' (Fisher, 1993). Mostly based on self-report assessment methods, those definitions anticipate some associations between boredom and negative emotions, such as discomfort or anxiety, a research direction that has yielded significant results (Vodanovich and Watt, 2016).

Some experts offer a two-dimensional definition of boredom, in terms of both its quality and level of activation. In this context, definitions such as 'low arousal and dissatisfaction' (Azizi, 2009) or 'under-stimulation, under-arousal, and dissatisfaction' (Mikulas and Vodanovich, 1993) stand out as examples of conceptual integration. Building on the idea that boredom was made up of more than negative state and arousal (Elpidorou, 2017a,b), some researchers proposed a definition of boredom in terms of attention: the unpleasant state that occurs when attention cannot be successfully engaged to participate in satisfactory activity, is focused on this inability, and the environment is considered the cause of this state (Eastwood *et al.*, 2012).

Other researchers emphasize the adaptive nature of emotions, and the work of Elpidorou (2014, 2015, 2017a, 2018) is especially effective in presenting boredom as a process that leads to well-being, by promoting personal development and a meaningful life. In an ingenious parallel with pain, the author wonders how a lack of boredom might shape the world (Elpidorou, 2015), showing it acts like an alarm signal. Boredom warns individuals that their current (lack of) activity does not offer the necessary or expected stimulation or meaning. As absence of pain does not mean lack of harm, the absence of boredom cannot keep people away from boring situations, and some might find themselves in monotonous situations, without opportunities for growth or a sense of interest. Boredom itself might be the one providing both a warning and the motivation to avoid such situations, moving towards more

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productive, stimulating and rewarding activities. However, boredom is still far from being a universal solution, as Elpidorou (2018) mentions instances when it is maladaptive, rather than beneficial. The situations include monotony as part of the task, such as waiting in line or being stuck in traffic, or examples of harmful over-stimulation, such as substance abuse or risky driving (Dahlen *et al.*, 2005).

Elpidorou (2018) admits that boredom represents a strong emotion, capable of disengaging people from the current situation, conveying the idea that there might be alternatives, and offering the motivation to explore them. Therefore, not boredom itself, but someone's knowledge about boredom and its benefits might be helpful. Like any instrument, it is not useful by itself, but it might become purposeful when it is properly handled and directed towards self-motivation and experiences that are congruent with someone's goals. In this context, the research pertaining to meaninglessness as a component of boredom is worth mentioning. Lack of meaning and challenge is considered a key component of both state (Chan *et al.*, 2018; van Tilburg and Igou, 2012, 2016) and trait boredom (Todman, 2003). When boredom (and therefore meaninglessness) is high, impulsiveness might be elevated, as an attempt to restore meaning (Moynihan *et al.*, 2017).

Similarly, other studies conceptualize boredom as an emotion (Darden, 1999; Pekrun *et al.*, 2010), and present it as a different notion to related experiences, such as apathy, anhedonia or depression (Goldberg *et al.*, 2011), as well as sadness, anger, frustration, fear, disgust, shame, guilt, regret and disappointment (van Tilburg and Igou, 2017). Additionally, a physiological signature of boredom (Jang *et al.*, 2015; Merrifield and Danckert, 2014; Seo *et al.*, 2019) is proposed.

Boredom proneness – or trait boredom – is the susceptibility to feel boredom frequently and in a variety of situations, and is typically measured by self-report scales (Vodanovich, 2004). There are clear distinctions between state and trait boredom in terms of duration, continuity, situation susceptibility and concreteness (Elpidorou, 2017). Whereas state boredom is argued to have an adaptive nature, trait boredom is quite the opposite. The alarming number of studies connecting it to a series of major negative consequences is the main reason why this research is focused on trait boredom.

Several boredom alleviation techniques have been attempted (Weinerman and Kenner, 2016), but only few of them have proven to be effective. These include living nostalgia (van Tilburg *et al.*, 2013), cognitive reinterpretations (Nett *et al.*, 2011), adding meaning (van Tilburg and Igou, 2012) and using humour (Loukidou *et al.*, 2009). The common ground of those strategies is the cognitive mechanism of change. In their approach to emotions, the theories in the cognitive behavioural theory (CBT) family have the importance they grant to cognition in common. Starting from the insights of Albert Ellis (Ellis, 1962; Ellis, 1995), who observed that not the external events, but their interpretation caused emotions, rational emotive behaviour therapy (REBT) was developed. This CBT theory states that emotional, behavioural or physiological consequences (C) do not directly appear at the interaction with an event in the internal/external environment (A – activating event), but are the results of one's evaluative beliefs (B) regarding that event. The ABC model (Ellis, 1962; Beck, 1976; David and Szentagotai, 2006) is used as a frame for the entire theory. It states that evaluation, the cognitive processing of internal or external activating events, is the only causal element leading to C (Ellis, 1962; Ellis and Dryden, 1997).

According to the same theory (Ellis, 1995), the evaluations may be rational (e.g. flexible, accepting) or irrational (e.g. rigid, extreme). The latter lack logical, empirical and pragmatic support and predict dysfunctional emotional consequences and maladaptive behaviours, while the former have logical, empirical and pragmatic support, and promote a healthy life, adaptive consequences and functional emotions.

The adaptive nature of emotions is also highlighted in an REBT theory framework (David, 2003; Spörrle *et al.*, 2006), linking them to specific goals or a general sense of purpose. Functional emotions, as opposed to dysfunctional ones, are a more suitable response to life events, enabling adaptive behavioural responses, while containing maladaptive approaches

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towards a goal. Functional negative emotions after a loss (e.g. sadness, offering the opportunity to process the loss and receive emotional support) or before an important event (e.g. worry, providing the motivation to double check important aspects) prepare the individual and enable the appropriate responses rather than their alternatives. Dysfunctional emotions in the same contexts (e.g. depression or anxiety) could offer the same benefits, but with higher costs in terms of physiological arousal, cognitive load and intensity of negative feelings.

As several studies indicate (Bench and Lench, 2013; Elpidorou, 2018), boredom might be seen as a functional emotion in relation to goals. It signals that the current activity (or lack of activity) is neither useful in the long run, nor satisfying enough. However, when boredom interferes with current activity and is detrimental to long-term goal attainment (e.g. academic boredom interfering with academic results), arises too frequently or in a wide array of contexts, it could be considered a dysfunctional emotion as well.

Contemporary REBT theory (David *et al.*, 2009) specifies four types of irrational evaluative beliefs, and four rational alternatives. Therefore, demandingness (DEM) is the irrational primary evaluative cognition and represents the formulation of goals in an inflexible manner, as they 'must' take place (e.g. 'I must succeed'). When an event does not match the absolute requirements, a second wave of information processes appears – secondary evaluative beliefs. They are catastrophizing (CAT – e.g. 'This is the worst thing that could have happened'), low frustration tolerance (LFT – e.g. 'I cannot stand this situation') and global evaluation (GE – e.g. in case of self-evaluations: 'I am bad and worthless'). The psychopathological model of REBT predicts that, in a certain situation (A), the irrational primary evaluative cognition will set in motion the secondary irrational ones, triggering dysfunctional emotional or behavioural responses (C).

In opposition, the rational primary evaluative cognition, preference (PRE), allows for more flexibility and is open to other outcomes, despite the best efforts (e.g. 'I would like to succeed, but I do not have to succeed'). Furthermore, the realistic evaluation of badness (REB – e.g. 'This is bad, but certainly not the worst'), high frustration tolerance (HFT – e.g. 'This situation is very difficult and hard to stand, but I can stand it'), and unconditional acceptance (UA – e.g. 'Her behaviour is bad, but she is not less worthy than another person').

When, in the same situation, DEM is turned into PRE, the modification changes secondary cognitions, and then the behavioural/emotional consequences change into adaptive and functional ones (David *et al.*, 2009), as the psychological health model of REBT would predict. It is noteworthy that the mere absence of irrationality does not necessarily equal the presence of rationality.

While the link between primary, secondary cognitive evaluations (Bs) and emotional consequences (Cs) is a rather theoretical one, there are studies attempting to test the models in various contexts, for different outcomes, such as post-traumatic stress disorder (PTSD; Hyland *et al.*, 2014), anxiety and depression (Oltean *et al.*, 2017), and even happiness and optimism (Oltean *et al.*, 2019). As expected, the model underlines distinct configurations for the outcomes investigated, suggesting specific intervention patterns. In PTSD, for instance, the REBT theory was confirmed, as DEM was found to affect the PTSD symptom groups (intrusions, avoidance, dysphoria, hyper-arousal), both directly and indirectly, through the secondary belief processes (Hyland *et al.*, 2014). All the outcomes investigated were considered consequences (C) with regard to the ABC model.

As the diverse and rather frequent associations between boredom and several behaviours and emotions have been explored, we feel it is high time research in this area moved forward. The role of boredom in the emergence and manifestation of those psychological outcomes has not been explained beyond its correlational nature, in spite of the ever-growing need. Taking into account those aspects, as well as the necessity to further test the REBT framework, we consider it relevant to further examine the cognitive configuration of both the psychopathology and psychological health models of trait boredom, as a first step towards the development of intervention strategies.

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### Overview of the present study

This paper aims to investigate the cognitive architecture of trait boredom, testing both the psychopathology and psychological health REBT models. In those models, the investigated cognitions play the role of beliefs (B), while boredom is regarded as a consequence (C). Furthermore, this study investigates the association between trait boredom and internalizing problems (anxiety, depression) in a Romanian sample. This latter aspect is valuable, especially because studies regarding the associations of boredom have largely been conducted in the western world or Asia. This study is among the first to investigate an East-European sample.

Based on the REBT psychopathology model, we expect DEM to directly and positively predict secondary evaluative cognitions (CAT; LFT; GE) and expect LFT to be the main significant predictor of trait boredom in the psychopathology model. The connection between boredom and frustration has already been investigated in educational contexts (D'Mello *et al.*, 2007; D'Mello and Graesser, 2010), and frustration has been found as both a consequence and a predictor of boredom.

Based on the REBT psychological model, we expect PRE to directly and positively predict secondary evaluative cognitions (REB; HFT; UA), and expect HFT to be the main significant predictor of trait boredom in the psychological health model. Even though low irrationality does not equal high rationality (David *et al.*, 2009), the importance of frustration tolerance in previous studies (D'Mello *et al.*, 2007; D'Mello and Graesser, 2010) is expected to be confirmed.

Based on previous research data, which showed a connection between trait boredom and depressive and anxiety symptoms (Goldberg *et al.*, 2011; Isacescu et al., 2017; LePera, 2011; Vodanovich, 2003; Vodanovich and Watt, 2016), we expect trait boredom to be positively and significantly associated with depressive and anxiety symptoms.

## Method

### Instruments

Rational and irrational beliefs levels were measured using the Abbreviated Version of Attitudes and Beliefs Scale (ABS-2-AV; Hyland *et al.*, 2013). This self-report Likert scale has 24 items, measuring each of the eight rational and irrational evaluative beliefs, in accordance with REBT theory. The total score is a composite of each item, while the rationality and irrationality levels, as well as a score for each subscale, are computed. Cronbach's alpha for this research was $\alpha = .89$ for the total score, $\alpha = .85$ for PRE, $\alpha = .63$ for REB, $\alpha = .63$ for FT, $\alpha = .68$ for UA, $\alpha = .76$ for DEM, $\alpha = .76$ for LFT, $\alpha = .78$ for CAT, $\alpha = .82$ for GE, $\alpha = .84$ for the rationality subscale, and $\alpha = .77$ for the irrationality subscale.

Depressive symptoms were analysed using the Beck Depression Inventory II (BDI-II; Beck *et al.*, 1996). This scale has 21 self-report items, measuring the severity of depressive symptoms. Each item represents a symptom, and is evaluated from 0 (absent) to 3 (very severe). The score can vary between 0 and 63, with a cut-off score of around 20 indicating moderate depression, and a score above 29 being considered high. Cronbach's alpha for this research was $\alpha = .92$.

State and trait anxiety levels were measured using State-Trait Anxiety Inventory (STAI; Spielberger *et al.*, 1970). This self-report Likert scale has 40 items, half measuring state anxiety (X1), and the other half evaluating trait anxiety (X2). Each item is given a score from 1 (not at all) to 4 (very much), including reverse scoring. The score is reported on each subscale, making it vary between 20 and 80. A score of around 40 might be an indicator of clinically relevant symptoms. Cronbach's alpha for this research was $\alpha = .94$ for X1 and $\alpha = .92$. for X2.

We used the Boredom Proneness Scale (BPS; Farmer and Sundberg, 1986) to measure trait boredom levels. This self-report scale has 28 items, measuring trait boredom (boredom proneness). Although the original scale required dichotomous answers (yes/no), it is now

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employed as a Likert scale from 1 (strongly oppose) to 7 (strongly agree). The scores vary between 28 and 196, with a higher score suggesting a higher boredom proneness. Cronbach's alpha for this research was $\alpha = .88$.

### Participants and procedure

An *a priori* analysis run through G*Power software (Faul *et al.*, 2007) indicated that a sample size of at least 191 participants is necessary to underline a small effect size ($f^2 = .1$, $\alpha = .05$, $1–\beta = 0.95$). Therefore, the sample consisted of 232 participants (84.05% female), with a mean age of 24.03 years ($SD = 6.97$; range 18–66), who registered online. They followed a link on the study poster that was advertised on a social platform, signed the informed consent, and filled in the questionnaires. After submitting their answers, the participants were reminded about the confidentiality policy and the email address they could use to redeem the incentives and ask further questions. Potential participants were offered an interpretation of their results, while psychology students could opt to receive five student practice hours

In order to test the first two *a priori* hypotheses, a multiple mediation model (Hayes, 2009) was employed. The PROCESS extension (Hayes, 2012) was added to the SPSS 20 program specifically for this purpose. This type of analysis permitted the use of several mediators, and the results indicated the impact of each mediator on the criterion variable, while controlling for all the others. Such a model included covariates, and the effect was considered to be a significant one, provided that the 95% confidence interval did not include 0. Therefore, the mediation model was able to compute the association between variables, controlling for indirect effects.

We used model 4, which allows the mediation effect between two variables *X* and *Y* to be realized by up to 10 mediator variables. Thus, the three secondary evaluative cognitions were considered to be mediators, while the primary evaluative cognition was the predictor, and the trait boredom level was the criterion. This method was selected, as this analysis highlighted both the direct effect of the primary evaluative cognition on the trait boredom level, and the indirect one, through the three secondary evaluative cognitions (mediators). Two separate analyses were conducted, taking into account the REBT psychopathological model and the psychological health model.

The other two *a priori* hypotheses were approached using three separate Pearson correlations, between trait boredom levels and depressive symptoms, and state/trait anxiety levels, respectively.

## Results

According to the descriptive data (see Table 1), the mean levels reported for trait boredom and rational and irrational cognitions are moderate, the levels for state and trait anxiety are rather high (both averages above the cut-off point), while the level of depressive symptoms is low to moderate. No significant gender differences were found regarding the levels of cognitions, boredom or anxiety.

In accordance with our *a priori* hypothesis, Pearson correlations showed a significant negative association between trait boredom and rationality ($r = –.37$; $p < .01$), a positive one between boredom and irrationality ($r = .41$; $p < .01$), as well as between boredom and the total score ($r = .46$; $p < .01$). In addition, all the variables in the mediation analysis correlated between them (see Table 2).

In order to test the REBT psychopathology model, the components were added in a mediation model, with DEM subscale score as predictor, the BPS score as *Y*, and CAT, LFT and GE subscales scores as the three multiple mediators. The coefficients were significant for the connection between DEM and CAT ($b = .47$; $p < .01$ [.32 to .62]), DEM and LFT ($b = .67$; $p < .01$ [.53 to .80]), as well as DEM and GE ($b = .17$; $p < 0.01$ [.04 to .29]). For the further prediction of boredom score, the coefficients were not statistically significant for DEM ($b = –1.13$; $p < .78$ [–2.38 to .13]) or

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**Table 1.** Descriptive data for BPS, STAI X1, STAI X2 and BDI-II scales

| | Mean | *n* | *SD* |
|---|---|---|---|
| Participant age | 24.02 | 232 | 6.96 |
| Trait boredom | 102 | 232 | 23.49 |
| Irrationality | 59.87 | 232 | 14.08 |
| Demandingness (DEM) | 11.47 | 232 | 2.59 |
| Catastrophizing (CAT) | 7.85 | 232 | 3.24 |
| Low frustration tolerance (LFT) | 9.78 | 232 | 3.19 |
| Global evaluation (GE) | 4.97 | 232 | 2.51 |
| Preference (PRE) | 6.87 | 232 | 2.96 |
| Realistic evaluation of badness (REB) | 6.30 | 232 | 2.38 |
| High frustration tolerance (HFT) | 7.03 | 232 | 2.53 |
| Unconditional acceptance (UA) | 5.56 | 232 | 2.28 |
| State anxiety (STAI X1) | 41.06 | 232 | 12.54 |
| Trait anxiety (STAI X2) | 45.61 | 232 | 11.43 |
| Depression symptoms level | 11.99 | 232 | 10.15 |

*SD*, standard deviation; *n*, number of participants.

**Table 2.** Pearson correlations between trait boredom and ABS-2-AV subscales

| | | Trait boredom | PRE | REB | HFT | UA | ABS rational total | ABS irrational total |
|---|---|---|---|---|---|---|---|---|
| Trait boredom | Pearson correlation | 1.00 | | | | | | |
| | Significance (2-tailed) | | | | | | | |
| | *n* | 232 | 232 | | | | | |
| PRE | Pearson correlation | −.250* | 1.00 | | | | | |
| | Significance (2-tailed) | .000 | | | | | | |
| | *n* | 232 | 232 | 232 | | | | |
| REB | Pearson correlation | −.324* | .526* | 1.00 | | | | |
| | Significance (2-tailed) | .000 | .000 | | | | | |
| | *n* | 232 | 232 | 232 | 232 | | | |
| HFT | Pearson correlation | −.324* | .468* | .568* | 1.00 | | | |
| | Significance (2-tailed) | .000 | .000 | .000 | | | | |
| | *n* | 232 | 232 | 232 | 232 | 232 | | |
| UA | Pearson correlation | −.232* | .325* | .386* | .336* | 1.00 | | |
| | Significance (2-tailed) | .000 | .000 | .000 | .000 | | | |
| | *n* | 232 | 232 | 232 | 232 | 232 | 232 | |
| ABS rational total | Pearson correlation | −.370* | .794* | .809* | .780* | .649* | 1.00 | |
| | Significance (2-tailed) | .000 | .000 | .000 | .000 | .000 | | |
| | *n* | 232 | 232 | 232 | 232 | 232 | 232 | |
| ABS IRATIONAL TOTAL | Pearson correlation | .415* | −.282* | −.315* | −.441* | −.376* | −.460* | 1.00 |
| | Significance (2-tailed) | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| | *n* | 232 | 232 | 232 | 232 | 232 | 232 | 232 |

*Correlation is significant at the 0.01 level (2-tailed).

CAT ($b = 1.00$; $p < .68$ [−.78 to 2.09]). However, they are significant for LFT ($b = 2.34$; $p < 0.01$ [.99 to 3.27]) and GE ($b = 2.08$; $p < .01$ [.84 to 3.31]) as predictors of BPS score. Thus, the direct effect of primary evaluative cognitions *X* on *Y* (trait boredom) is not significant, while the indirect one reaches significance with an effect of .25 [.15 to .35] (see Fig. 1).

The components of the psychological health model were input in the mediation analysis. *X* was the PRE (primary rational evaluative cognition) subscale score of ABS-2-AV, *Y* was the BPS score, while the three mediators were REB, HFT and UA subscale scores. The coefficients are significant for the connections between PRE and REB ($b = .42$; $p < .01$ [.33 to .51]), HFT ($b = .40$; $p < .01$, interval [.30 to .50]) and UA ($b = .33$; $p < .01$, interval [.16 to .35]). Furthermore, the boredom score was negatively predicted by HFT, with a coefficient of $b = -1.66$ ($p < .02$ [−3.07 to −.23]).

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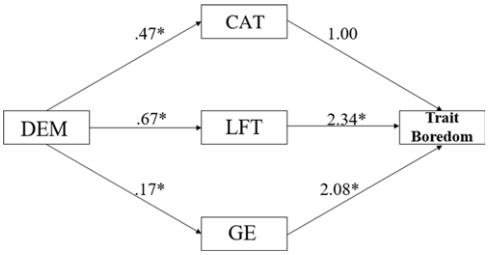


**Figure 1.** A multiple mediation model of the REBT psychopathological model of trait boredom; *$p < .05$.

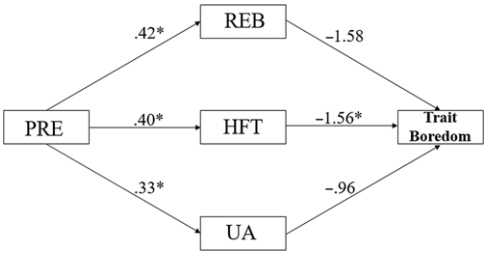


**Figure 2.** A multiple mediation model of the REBT psychological health model of trait boredom; *$p < .05$.

The other coefficients were not significant for PRE ($b = -.41$; $p < 0.49$ [−1.59 to .76]), REB ($b = -1.58$; $p < .51$ [−.316 to .01]), or UA ($b = -.96$; $p < .17$ [−2.33 to .42]). Thus, the direct effect of PRE is not significant, while the indirect one reaches significance with an effect of −.66 [−1.39 to −.04]. It is worth mentioning that the significant effects are in accordance with the REBT model, both in the case of rational, and irrational primary and secondary evaluative cognitions, respectively (see Fig. 2).

The other two *a priori* hypotheses were confirmed, as trait boredom had a correlation of $r = .62$ ($p < .01$) with depressive symptoms, an $r = .58$ ($p < .01$) with state anxiety, and an $r = .67$ ($p < .01$) with trait anxiety, respectively. Therefore, trait boredom is strongly, significantly and positively associated with depressive symptoms, state and trait anxiety (see Table 3).

## Discussion

This study was meant to enrich a continuously developing subject of psychological investigation: boredom. As this concept was analysed in relation to internalization and externalization problems and defined as emotion, an important step was to connect it to the REBT theory and open new ways to approach boredom, its alleviation or prevention. The significant connections between boredom, anxiety and depression that were identified once more in this study might be interpreted as warning signs, highlighting the responsibility and care this domain would require, as it could prove to be especially relevant in the near future.

Although the *a priori* hypotheses were only partially confirmed, the theoretical and practical implications of this research might prove valuable.

To the best of our knowledge, this is the first paper to investigate the map of REBT cognitive processes specifically for boredom. Whereas the connection between boredom and frustration (as observed cognitive-affective state) had already been addressed in a different psychological paradigm (D'Mello *et al.*, 2007; D'Mello and Graesser, 2010), this study attempted to approach boredom as emotion, and to analyse its underlying cognitions. While confirming the important role of LFT in the psychopathological model of trait boredom, the role of HFT in the psychological health model was underlined. HFT might represent a resilience factor in the face of the possible, negative dysfunctional consequences of boredom, and LFT could stand out as a vulnerability.

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**Table 3.** Pearson correlations between trait boredom, anxiety and depression

| | | Trait boredom | State anxiety | Trait anxiety | Depression symptoms level |
|---|---|---|---|---|---|
| Trait boredom | Pearson correlation | 1.00 | | | |
| | Significance (2-tailed) | | | | |
| | *n* | 232 | | | |
| State anxiety (STAI X1) | Pearson correlation | .576* | 1.00 | | |
| | Significance (2-tailed) | .000 | | | |
| | *n* | 232 | 232 | | |
| Trait anxiety (STAI X2) | Pearson correlation | .665* | .739* | 1.00 | |
| | Significance (2-tailed) | .000 | .000 | | |
| | *n* | 232 | 232 | 232 | |
| Depression symptoms level | Pearson correlation | .620* | .720* | .819* | 1.00 |
| | Significance (2-tailed) | .000 | .000 | .000 | |
| | *n* | 232 | 232 | 232 | 232 |

*Correlation is significant at the 0.01 level (2-tailed).

Several definitions of boredom (Eastwood *et al.*, 2012; Vogel-Walcutt *et al.*, 2012) point out that the bored individual blames the environment for lack of relevant stimulation. Therefore, the role of frustration tolerance in boredom makes sense, but the emergence of GE is more difficult to integrate with previous conceptualizations. If GE as a mediating evaluative cognition between DEM and boredom could mean one holds themselves responsible, or blames the others or life itself, is rather unclear at the moment. Future studies should investigate this aspect.

The strong associations between trait boredom and depressive symptoms, and anxiety, respectively, provide evidence that the connection between boredom and internalizing problems is more than a western world issue (Martz *et al.*, 2016). As a consequence, the silent alarm of boredom is to be taken seriously, with additional resources dedicated to research in this field.

The identification of LFT and GE as evaluative cognitions positively associated with trait boredom, as well as the identification of HFT as negatively associated with boredom, might indicate the path towards the development of interventions for boredom reduction, prevention or efficient coping. We feel that the approach of boredom through the lens of CBT/REBT could lead to results consistent with the traditions of this family of interventions, especially as no context or activity is intrinsically boring.

The evaluation of boredom in future studies, both before and after interventions, as well as the development and testing of prevention programmes for people working in monotonous environments, or even in schools or other companies are bold, but important future steps. Such interventions could not only prevent boredom, but as studies (Caserta *et al.*, 2010; Popa and Predatu, 2019) pinpoint, a rational thinking style could offer even further protection against negative and stressful life events (medical procedures, workplace change, personal loss). As the present study suggests, such endeavours should be particularly attentive to the role of HFT and GE, the significant negative predictors of boredom.

### Limitations

This research is based on internet surveys conducted online, using self-report instruments. The influences of unsystematic errors, such as subjectivity, social desirability or momentary affective dispositions cannot be completely ruled out. While offering some valuable advantages, the online nature of this study made it impossible for people not using social platforms to be included, and the lack of exclusion criteria other than the minimum age of 18 could have under- or over-estimated the population levels of trait boredom. The research team did not control for levels

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of anger, impulsivity and sensation seeking, which are known to have a connection with boredom (Dahlen *et al.*, 2004). The high percentage of female participants in our sample might provide an explanation of the lack of gender differences, as opposed to other studies (Dahlen, 2005; Isacescu *et al.*, 2017; Sundberg *et al.*, 1991).

As David *et al.* (2019) indicate, several instruments that are frequently used in CBT are affected by contamination with distress items. This might be detrimental to a measurement where the cognition level is the main interest. Even the ABS-2-AV scale we have employed seems to be affected by contextual factors (Hyland *et al.*, 2014). Certain problems associated with the measurement of beliefs in REBT exist, regardless of the scale (Hyland *et al.*, 2017). We sought to use an instrument that would allow a low level of distress and context contamination, while keeping a reasonable number of items – too lengthy a scale could have impaired our chances of gathering the required sample. Moreover, as the ABS-2-AV has constantly been used in similar studies regarding PTSD (Hyland *et al.*, 2014), anxiety and depression (Oltean *et al.*, 2017) or loneliness (Hyland *et al.*, 2019), we opted to employ it, in spite of its documented flaws (DiGiuseppe *et al.*, 2020; Hyland *et al.*, 2017). Nevertheless, future studies should adopt different measures of (ir)rationality, in order to contain possible errors associated with this particular instrument.

Furthermore, the ABC model (Ellis, 1962; Ellis and Dryden, 1997) requires the presence of an activating event, in order to emphasize the underlying cognitions of certain behavioural or emotional outcomes. The nature of this study did not allow the control of activating events, and they were not even recorded. It is possible that certain beliefs might not have been active in the case of some participants. This important limitation could be addressed by conducting a study in which the testing conditions and levels of state boredom are held constant.

Boredom stands out as a concept related to dysfunctional emotions and maladaptive behaviours, but as a useful emotion, as well. Although the causal connections have not been underlined, the relevance of boredom in the context of mental health is almost unquestionable. Both state and trait boredom are subjects for further scientific investigations that could further clarify their influence, the underlying processes and consequences.

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