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Bored gamers: applying the Meaning and Attentional Components model of boredom to digital game selection

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Introduction: Communication research has typically examined boredom as a negative emotion characterized by low arousal or understimulation. However, this one-dimensional approach to boredom does not resonate with more recent psychological insights, as summarized in the Meaning and Attentional Components (MAC) model. This model proposes several boredom types based on individuals' attention levels (low versus high cognitive resources) and how meaningful an activity is to them. The model predicts that, depending on the boredom type, individuals switch to either enjoyable or interesting activities to regulate their boredom. Explicating these hypotheses in a communication research context, enjoyable activities could be linked to hedonic and interesting activities to eudaimonic media experiences. Although switching to media seems like an obvious choice when people experience boredom, the MAC model has yet to be empirically tested in a media context.

Methods: Using an online vignette-style survey among 581 players, we tested the aforementioned hypotheses in the context of digital games, examining how gaming serves as a positive way to regulate the negative emotion of boredom.

Results: Findings indicated that 74% of respondents were likely to switch to a digital game while experiencing boredom. Furthermore, bored individuals with low cognitive resources selected games offering hedonic experiences (i.e., fun, psychological detachment, and relaxation), consistent with the MAC model. However, bored individuals with high cognitive resources also preferred games with hedonic experiences over eudaimonic ones (i.e., appreciation, mastery, and control), contradicting our hypotheses.

Discussion: Since few differences in game selection were observed across boredom profiles, we further discuss the MAC model's usefulness in media content selection, the specific context of game selection, and the study's limitations.

KEYWORDS

boredom, digital games, eudaimonia, hedonia, media selection

1 Introduction

By the time you have finished reading this paper, you will likely have glanced out the window or stared at your screen, debating whether to keep reading or do something more engaging. If so, you might have experienced some form of boredom. In communication research, boredom has mainly been studied as a key motivator for media use through the Uses and Gratifications theory (Katz et al., 1973)—such as consuming media to pass the time (Sherry et al., 2006)—and the Mood Management theory (Bryant and Zillmann, 1984), where media like digital games are selected to experience positive emotions and alleviate negative ones such as boredom (Bowman and Tamborini, 2012). However, this approach to boredom is fairly limited, as it primarily defines boredom as a state[1] of understimulation or low arousal.

Several studies in psychology research showed that boredom can also occur in highly arousing situations (Eastwood et al., 2012; Raffaelli et al., 2018). These insights led to the development of the Meaning and Attentional Components (MAC) model by Westgate and Wilson (2018), an innovative model that identifies six types of boredom, or boredom profiles, based on two factors: how much attention an activity requires, which depends on an activity's demands and a person's available resources, and how meaningful the activity is to the individual. The model also formulates predictions of how each boredom profile can be regulated, including the strategy to switch to other activities, such as media use (Poels et al., 2022). Although the original model does not specify media to regulate boredom, Westgate and Wilson (2018) specifically hypothesized that bored people with limited cognitive resources tend to select enjoyable activities that provide pleasure and easy distraction, while those with plenty of resources are expected to switch to more interesting, challenging, or meaningful activities. From a media entertainment perspective, this differentiation shows a clear alignment with the distinction between hedonic (i.e., enjoyable) and eudaimonic (i.e., interesting, complex) entertainment experiences (Vorderer and Reinecke, 2015).

Westgate and Wilson (2018) provided empirical support for the MAC model in a non-mediated context. Fourteen correlational studies supported the model's underlying attentional and meaning components, while three experimental studies demonstrated not just the contribution of both components to feelings of boredom, but also that switching to enjoyable and interesting activities serves as a regulation strategy for different types of boredom. However, the integration of the MAC model into communication research, particularly to study media selection processes, seems to be currently lacking. Poels et al. (2022) already established some conceptual foundations by applying the MAC model to the specific context of mobile media use. At the same time, they emphasized the need for empirical research to test the MAC model's predictions in a media context. This study therefore aims to build on Poels and colleagues by empirically testing the MAC model's hypotheses on how individuals with different boredom profiles select enjoyable or interesting media, with a focus on digital games. Games offer an ideal testing ground for studying the relationship between boredom profiles and media selection, as previous research has revealed that they are effective tools for emotion regulation (Rieger et al., 2015; Hemenover and Bowman, 2018). Their interactive nature, potential for immersive storytelling, and feedback-based mechanisms make them especially suited for this purpose. By examining how different types of boredom, often understood as a negative emotional state, can be regulated by switching to different game experiences, this study contributes to ongoing research showing that games can positively affect people (Kosa and Uysal, 2020).

1 Note that this paper discusses state boredom, the situational and temporary boring feelings of individuals. We will not focus on individuals' more stable proneness to boredom, or trait boredom.

We conducted an online vignette survey with 581 players to test hypotheses on boredom and game selection derived from the MAC model. After presenting respondents with scenarios of boring situations aligning with the model's different profiles, we subsequently asked them to vividly imagine themselves in these situations (cf. Tam and Inzlicht, 2024) and indicate the game type (related to hedonic or eudaimonic experiences) they were likely switching to when regulating their boredom.

2 Literature overview

2.1 A communication research perspective on boredom

Boredom has previously been studied in communication research, most prominently as a motive for media selection following the Uses and Gratifications (U&G) theory (Katz et al., 1973) or as an emotion that needs to be regulated in the context of Mood Management theory (MMT; Bryant and Zillmann, 1984). As U&G explains individuals' actions as seeking gratification for certain needs, such as the need for diversion (Katz et al., 1973), feeling bored could activate people's need for diversion and drive them to seek out specific media activities to gratify this need. Playing games could be such a media activity, as prior research shows that gaming can be an activity to regulate emotions (Hemenover and Bowman, 2018), including boredom. Previous scholarship has shown that people are motivated by boredom to play games, often as a form of diversion or escapism (i.e., "to fill time," "because there is nothing else to do"; Sherry et al., 2006) and pastime (i.e., "play because you are bored"; De Grove et al., 2016).

Mood Management theory explains individuals' behavior as being motivated to seek out positive emotions and regulate negative ones (Bryant and Zillmann, 1984). Bryant and Zillmann showed that bored individuals (i.e., people scoring low on arousal) prefer stimulating media content such as thrillers or action games that lead to a more desirable emotional state (see also Vandebosch and Poels, 2021), while stressed individuals (i.e., people scoring high on arousal) tend to choose more calming media activities, like nature documentaries (Keltner et al., 2017). In the context of digital games, several studies have found that games, a medium inherently designed to provide players with fun and enjoyment (Ivory, 2016), are prime media activities to regulate boredom (Villani et al., 2018). For instance, Rieger et al. (2015) demonstrated that games, due to their highly demanding nature and ability to increase players' arousal experiences, were better at repairing people's negative moods (i.e., sadness) than non-interactive media. Bowman and Tamborini (2012) found that increasing games' attentional or cognitive demand to moderate levels (i.e., making the controls more complex) reduced players' boredom. Replicating these findings, Bowman and Tamborini (2015) showed that stressed and bored players (i.e., individuals scoring high and low on arousal, respectively) were more likely to prefer moderate over low and high levels of demand in a game. In other words, both stressed and bored players preferred moderately difficult games, although a highly demanding game resulted in the most mood repair among bored players.

These findings are also inherently linked to the notion of escapism, or seeking distraction from often unpleasant situations to seek out new activities. Healthy escapism through games has been associated with emotion regulation, mood management, adaptive coping behavior, and recovery experiences (Kosa and Uysal, 2020). Furthermore, Pyszkowska et al. (2025) recently found that playing games can lead to two types of escapism: "self-suppression escapism", which involves avoiding negative emotions like boredom (related to Mood Management theory), and "self-expansion escapism," which entails mastering one's own skills to improve their mood (reflecting ideas of eudaimonia and personal growth).

These two theories (U&G and MMT) provide essential insights into the relationship between boredom, emotion regulation, and media selection. However, one key limitation lies in their one-dimensional understanding of boredom. While studies like Bryant and Zillmann (1984) and Bowman and Tamborini (2012) define boredom as feeling understimulation or as a low arousal state, recent psychological research shows that boredom can also occur among individuals who are overstimulated, meaning that the demand of the situation exceeds their available resources, a state of high arousal (Raffaelli et al., 2018; Westgate and Wilson, 2018). The integration of this insight into communication research seems to be currently lacking, which provides new opportunities to study how this affects individuals' media selection processes (Poels et al., 2022). Before considering how this fits in the context of digital games, we first take a step back and provide a brief introduction of initial and recent conceptualizations of boredom in psychology scholarship, to later explain why and how these are worthwhile to test in a communication research context.

2.2 Early psychological conceptualizations of boredom and the MAC model

Mikulas and Vodanovich (1993) were one of the first psychology studies to provide a concrete definition of boredom, conceptualizing it as "a state of relatively low arousal and dissatisfaction, which is attributed to an inadequately stimulating situation" (p. 3). This focuses solely on the (low) arousal component as the cause of feeling bored, similar to boredom in communication research (Bryant and Zillmann, 1984). Similarly, Flow theory (Csikszentmihalyi, 1975)—a perspective commonly used in psychology, communication and games research (e.g., Sherry, 2004) to describe the optimal human experience as a balance effort between a task's difficulty level and a person's skills—can also be associated with boredom. This framework suggests that boredom in particular occurs when a person's skill level exceeds the difficulty of a task, resulting in the task feeling too easy and offering too little stimulation or arousal. However, recent studies revealed that boredom can also occur when individuals are highly aroused (Westgate and Wilson, 2018). Additionally, there seems to be a lack of understanding of how boredom relates to other core psychological phenomena such as attention, arousal, or meaning (Eastwood et al., 2012; Raffaelli et al., 2018). Both of these aspects lead to the oftentimes complex conceptualization of boredom.

The Meaning and Attentional Components or MAC model, developed by psychologists Westgate and Wilson (2018), aimed to address the complexity of boredom by integrating prior perspectives into a comprehensive framework. They build their model based on three major groups of state boredom theories: environmental theories that focus on external causes of boredom, such as insufficient external simulation (e.g., Mikulas and Vodanovich, 1993; O'Hanlon, 1981)—relating to the idea that boredom is caused by repetitive, easy or non-challenging, low arousing activities (cf. Flow theory; Csikszentmihalyi, 1975); attentional theories emphasizing the importance of internal causes of boredom, more in particular a person's inadequate attention toward and engagement with an activity (e.g., Damrad-Frye and Laird, 1989; Eastwood et al., 2012); and functional theories that pinpoint the underlying value of an activity—whether the activity is useful, purposeful, or meaningful to someone's valued, long-term goals—as a factor leading to boredom (e.g., Bench and Lench, 2013; van Tilburg and Igou, 2012). Combining these insights, the MAC model posits that different types of boredom, or *boredom profiles*, arise from the interaction of two key components: attention and meaning. The attention component refers to a person's cognitive ability to focus on an activity, which depends on the demanding nature of an activity and the resources available to engage with it. The meaning component relates to how aligned an activity is with a person's values and salient goals (cf. evaluative meaning: Possler, 2024). The MAC model identifies six boredom profiles based on these two components (Table 1 provides an overview). *Understimulation* boredom occurs when activity demands are lower than a person's cognitive resources (similar to the boredom conceptualization in early psychological frameworks, such as Flow theory; Csikszentmihalyi, 1975), such as listening to a monotonous presentation. *Overstimulation* boredom happens when activity demands exceed available resources, like solving overly difficult math problems. Both profiles can be meaningless (e.g., struggling with math problems when you have little affection for math: meaningless overstimulation boredom) or meaningful (e.g., listening as a communication scholar to a conference talk about their research topic given in a slow-paced manner: meaningful understimulation boredom). Additionally, two more profiles emerge when individuals'

TABLE 1 Boredom profiles identified by Westgate and Wilson (2018).

Attention component		Meaning component	
		Low meaning (activity ≠ goals)	High meaning (activity = goals)
Low resources	Demand > resources	**Overstimulation** meaningless boredom	Overstimulation meaningful boredom
	Low demands and resources	**Low engagement** meaningless boredom	No boredom
High resources	Demand < resources	**Understimulation** meaningless boredom	Understimulation meaningful boredom
	High demands and resources	**High engagement** meaningless boredom	No boredom

The four "low meaning" boredom profiles used in the current study are mentioned in bold.

resources and activity demands are on the same level, but the activity is meaningless: *low engagement* meaningless boredom, when resources and demands are low, and *high engagement* meaningless boredom, when both are high. Overall, the MAC model distinguishes between boredom profiles driven by a lack of attention, lack of meaning, or both.

In addition to identifying different boredom profiles, the MAC model offers various strategies to regulate[2] these profiles. One such strategy is switching from a boring activity to another activity (for other strategies, see Westgate and Wilson, 2018). This approach is especially relevant to the present study, as switching from a boring activity to a media-related activity connects to how boredom affects media selection. While some scholars suggest switching activities is the default response to boredom, the MAC model proposes this specific strategy is most effective for meaningless boredom profiles (Westgate and Wilson, 2018). While bored individuals engaged in meaningful activities are less likely to switch activities, the four meaningless profiles where people are in a situation that does not match their goals will be more likely to switch activities. Therefore, the current study will focus on these four meaningless boredom profiles specifically.

Media selection in the context of switching activities here implies that bored people choose to engage in a new activity, such as scrolling through social media feeds on their smartphone (Poels et al., 2022) or playing digital games. The MAC model (Westgate and Wilson, 2018) poses specific hypotheses about what type of activities the four different boredom profiles are likely to switch to, depending on their available cognitive resources: profiles where individuals' resources are low (i.e., overstimulation and low engagement boredom) will select more enjoyable activities, while profiles with high resources (i.e., understimulation and high engagement boredom) will select more interesting, novel, and complex activities.

In summary, the current study intends to empirically test these hypotheses within the specific context of digital game selection. Not only is games research dealing with boredom scarce (Bowman and Tamborini, 2015). Communication research on boredom more broadly focuses on a single type of boredom, namely low arousal or understimulation boredom, instead of drawing on a more refined conceptualization of state boredom. Finally, although Poels et al. (2022) already conceptually translated the MAC model to a media selection context—suggesting predictions of how different boredom profiles might influence the selection of mobile media activities, interpreting the outlined enjoyable versus interesting activities to a media context, and linking these activities to hedonic versus eudaimonic media choices (cf. Vorderer and Reinecke, 2015)—this translation has yet to be empirically tested, particularly in the context of media or game selection.

2 Important to note here is that dealing with boredom, often addressed as an emotion that requires conscious regulation, could actually be a natural response (or action tendency) to boredom itself. Gross (1998) suggested that action tendencies are unconscious reactions to emotions, while emotion regulation involves consciously managing (or even suppressing) certain detrimental action tendencies. For instance, you might feel the urge to play a game to avoid boredom caused by studying for a test (i.e., action tendency), but you try to resist because you know the test is important (i.e., regulation). According to this perspective, switching activities to relieve boredom might not be a deliberate regulatory strategy but rather an automatic tendency connected to boredom.

2.3 Testing the MAC model: game selection based on hedonic and eudaimonic experiences

Westgate and Wilson (2018) proposed that when people switch activities due to boredom (as emotion regulation strategies, or as a form of healthy escapism behavior; Kosa and Uysal, 2020), they seek out either enjoyable or interesting activities depending on their boredom profile. Individuals with limited cognitive resources (i.e., overstimulation and low engagement boredom; see Table 1) tend to choose enjoyable, familiar, and easy activities that require minimal mental effort. These activities can be considered hedonic, a concept rooted in Aristotelian philosophy focused on seeking pleasure and comfort (Huta and Waterman, 2014). In media entertainment, content that elicits hedonic experiences will evoke fun, enjoyment, and positive emotions (Vorderer et al., 2004). As previously mentioned, digital games were initially designed to primarily provide hedonic experiences of enjoyment and distraction (Ivory, 2016). Based on the MAC model's assumptions for overstimulation and low engagement boredom, we formulated the following hypothesis (see Figure 1 for an overview of all hypotheses):

> *H1*: Players experiencing meaningless overstimulation and low engagement boredom are more likely to select a game that is expected to be *fun* compared to players experiencing meaningless understimulation (H1a, H1b respectively) and high engagement boredom (H1c, H1d respectively). Other significant differences between these boredom profiles are not expected to emerge.

Additionally, the MAC model predicts that individuals with plenty of available mental resources (i.e., understimulation and high engagement meaningless boredom; see Table 1) are more likely to switch to interesting activities or activities that are novel, complex, and require significant cognitive effort and attention (Silvia, 2006). These complex and effortful activities can be linked to eudaimonic entertainment experiences (Poels et al., 2022), a concept that describes content that leads to reflection, self-realization, feeling emotionally moved, and personal meaningfulness (Oliver and Bartsch, 2010; Possler et al., 2023). Important to note here is that meaningfulness in the context of eudaimonic entertainment, which relates to either a more existential understanding of meaning (i.e., experiences that are associated with the subjective purpose of life and essential values; Oliver et al., 2016) or to experiences where people make cognitive connections between media entertainment content and their own life (Daneels et al., 2021), differs from meaningful activities in the MAC model, which refers to an evaluative understanding of meaning where meaningful activities are activities that are valuable to individuals (Westgate and Wilson, 2018; see also Possler, 2024 for the complex meaning of "meaning"). To avoid confusion, and since meaningfulness is just one of several aspects within the broader notion of eudaimonia, this study uses eudaimonia and eudaimonic appreciation (Oliver and Bartsch, 2010) instead of

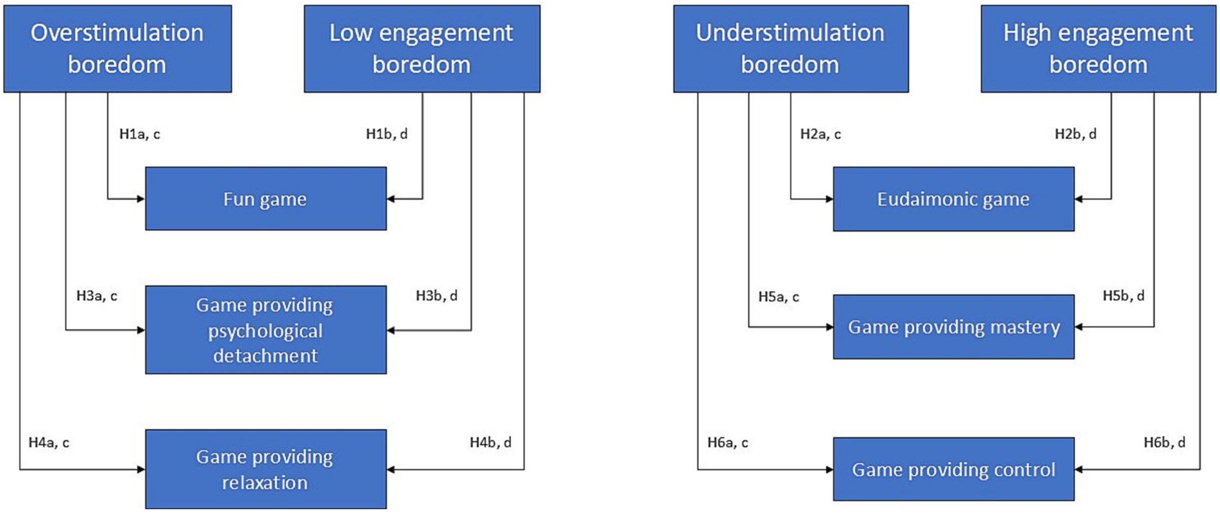

FIGURE 1
Visual representation of the study's hypotheses.

meaningful(ness) when addressing the interesting activities hypothesized based on the MAC model, reserving meaning to address the MAC model's component to distinguish between different boredom profiles.

Previous research on eudaimonia and games has found that players not only experience these complex, eudaimonic moments of self-reflection or intense emotions during gameplay (Daneels et al., 2021; Oliver et al., 2016). They also choose to play games for eudaimonic reasons, such as personal growth and striving to reach their full potential (Possler et al., 2024). Testing whether specific boredom profiles drive the selection of eudaimonic entertainment also answers existing critiques of the Mood Management theory, as this perspective only focuses on the hedonic valence of media content during media selection (Reinecke, 2017). Based on the MAC model's proposal regarding meaningless understimulation and high engagement boredom, we pose the following hypothesis (see Figure 1):

> *H2*: Players experiencing meaningless understimulation and high engagement boredom are more likely to select a game that is expected to be *eudaimonic* compared to players experiencing meaningless overstimulation (H2a, H2b respectively) and low engagement boredom (H2c, H2d respectively). Other significant differences between these boredom profiles are not expected to emerge.

To further test the MAC model's predictions regarding hedonic and eudaimonic game selection, the current study examines additional game types beyond fun and eudaimonia-inducing games by applying the Recovery and Resilience in Entertaining Media Use (R^2EM) model (Reinecke and Rieger, 2021). This model explains how hedonic and eudaimonic entertainment experiences from media exposure contribute to short-term recovery and long-term resilience, particularly for individuals in need of recovery from, for instance, stress. In this study, we will focus solely on the short-term recovery elements, as these are directly linked to hedonic and eudaimonic entertainment exposure. R^2EM argues that hedonic entertainment experiences promote recovery through psychological detachment (i.e., mentally disengaging from work or school; Sonnentag and Fritz, 2007) and relaxation, while eudaimonic entertainment experiences foster recovery through mastery (i.e., being intellectually challenged) and control (i.e., being able to make autonomous decisions; Sonnentag and Fritz, 2007). Additionally, these recovery elements can be understood as a form of (healthy) escapism through games (Kosa and Uysal, 2020; Pyszkowska et al., 2025), where escaping from a stressful situation (i.e., self-suppression escapism) specifically relates to the elements of psychological detachment, or escaping "mentally" from a situation, and relaxation, while self-expansion escapism can be associated with recovery experiences of mastery and control; all potentially through escaping into gaming activities (Reinecke, 2009).

Based on the MAC model (Westgate and Wilson, 2018), we can expect that bored individuals with low resources will select games that provide psychological detachment and relaxation (as hedonic experiences). Conversely, those experiencing boredom with high resources are more likely to select games that offer mastery and control (as eudaimonic experiences) (see Figure 1):

> *H3*: Players experiencing meaningless overstimulation and low engagement boredom are more likely to select a game that is expected to provide more *psychological detachment* compared to players experiencing meaningless underestimation (H3a, H3b respectively) and high engagement boredom (H3c, H3d respectively). Other significant differences between these boredom profiles are not expected to emerge.
>
> *H4*: Players experiencing meaningless overstimulation and low engagement boredom are more likely to select a game that is expected to provide more *relaxation* compared to players experiencing meaningless underestimation (H4a, H4b respectively) and high engagement boredom (H4c, H4d respectively). Other significant differences between these boredom profiles are not expected to emerge.

> *H5*: Players experiencing meaningless understimulation and high engagement boredom are more likely to select a game that is expected to provide more *mastery* compared to players experiencing meaningless overstimulation (H5a, H5b respectively) and low engagement boredom (H5c, H5d respectively). Other significant differences between these boredom profiles are not expected to emerge.
>
> *H6*: Players experiencing meaningless understimulation and high engagement boredom are more likely to select a game that is expected to provide more *control* compared to players experiencing meaningless overstimulation (H6a, H6b respectively) and low engagement boredom (H6c, H6d respectively). Other significant differences between these boredom profiles are not expected to emerge.

3 Materials and methods

3.1 Procedure

As a first empirical test of the MAC model (Westgate and Wilson, 2018), we conducted an online vignette-based survey (Vargas, 2008) among a gaming population to examine how different boredom profiles relate to players' selection of different game types. Before data collection started, respondents confirmed they were at least 18 years old and offered their informed consent. We received approval from the university's Ethics Committee for the Social Sciences and Humanities [SHW_2024_59]. After completing several background questions, respondents were randomly assigned to one of four scenarios (i.e., between-subjects design), each representing a situation where one of the four meaningless boredom profiles should occur (see *3.2 Stimulus material*). After reading the scenario closely and imagining this situation as vividly as possible, respondents indicated how bored they would feel in this situation and were asked how likely they would switch from the described boring activity toward playing a digital game—testing whether respondents adopt this regulation strategy of switching activities described in the MAC model. After determining whether they were willing to switch to a gaming activity, respondents were asked what type of experiences that gaming activity should evoke, focusing on how the game should make them feel (valence), how arousing[3] the game should be, how entertaining (i.e., fun, eudaimonic appreciation), and how much the game should offer experiences of psychological detachment, relaxation, mastery and control (cf. R²EM model). Surveys took on average 7 min 25 s to complete (SD = 4 min 16 s). Participants were recruited through Prolific, a web-based survey platform purposefully designed to conduct scientific research that pays respondents a small proportional participation fee (Palan and Schitter, 2018). The questionnaire and all analysis files can be found on OSF.

3 Note that arousal here is a type of game (i.e., how arousing a game should be), which differs from how arousal is understood within the MAC model as a cause for specific types of boredom.

3.2 Stimulus material

Based on recent research involving scenarios to assess individuals' switching behavior toward digital media when experiencing boredom (Tam and Inzlicht, 2024), respondents were presented with scenarios in which the different meaningless boredom profiles typically happen. Departing from the conceptualization for each profile in the MAC model (Westgate and Wilson, 2018), we asked ChatGPT 3.5 to provide an example for each boredom profile with the following prompt (example for understimulation boredom): "Can you provide a brief example of a situation where people would be experiencing understimulation boredom, which means that people are doing a low demanding task and have a lot of cognitive resources available?." These AI-generated scenarios were reviewed and shortened, working toward a scenario of three sentences to avoid respondent fatigue and to boost clarity.

These scenarios were then pre-tested in two focus groups ($N = 11$ with prior game experience), to adjust the wording of the scenarios, and via an online within-subjects survey ($N = 110$; Mean age = 28.57; 69.1% male), to assess all four scenarios on experienced boredom, mental effort required (cf. demanding nature of activity), fatigue (cf. available resources), meaningfulness, and perceived realism of the scenarios. All scenarios were rated low on meaningfulness and high on realism, and followed the profile types on activity demands and available resources as conceptualized by the MAC model. The study's OSF page includes more detailed info on these pre-tests, including the scales used as well as the full analyses and results. Additionally, Figure 2 illustrates how the four meaningless boredom profiles from the MAC model were operationalized into the final scenarios for the main survey, positioning each within the model's frame of a person's available cognitive resources and an activity's demanding nature.

3.3 Measurements

Demographic data including respondents' age, gender, and nationality were automatically gathered by Prolific and were merged with respondents' survey data after data collection. We asked additional background questions related to respondents' game behavior, assessing their *play frequency* (i.e., how many hours a day on average they spend playing digital games, distinguishing between a weekday and a weekend day) and *game genre preferences* [i.e., how much they liked playing different genres of games, such as action-adventure, role-playing, and racing games; on a slider scale ranging from 1 ("Not at all") to 10 ("My favorite genre")].

3.3.1 Boredom assessment

To measure how bored respondents would feel in the described situation (cf. pre-test; see OSF), we employed one self-created item using a Likert scale ranging from 1 ("Very slightly or not at all bored") to 5 ("Extremely bored"), based on the scoring options of the validated PANAS scale (Watson et al., 1988). This measurement was chosen over other multi-item scales, like the Multidimensional State Boredom scale (Fahlman et al., 2013), because these instruments conceptualize state boredom differently than the MAC model (e.g., focusing on

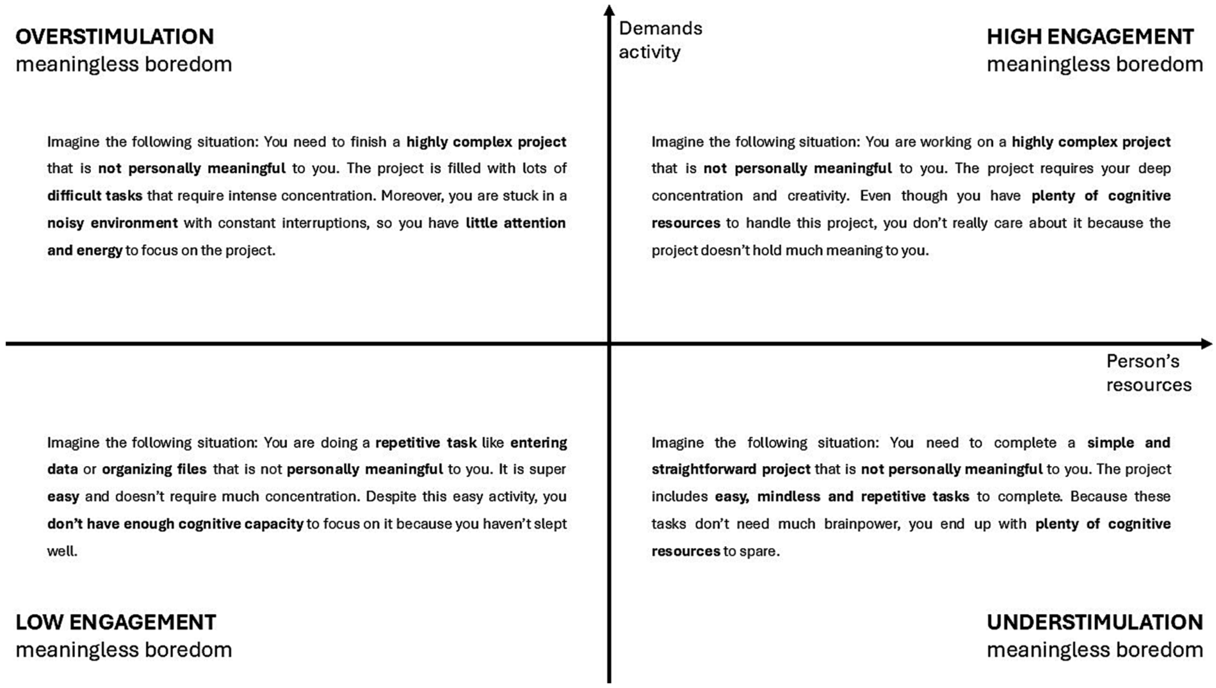

FIGURE 2
Visual representation of the study's stimulus material (i.e. the final scenarios of the four boredom profiles).

inattention or time perceptions rather than on people's cognitive resources or the activity's demands and meaningfulness).

3.3.2 Activity switch

To test the MAC model's hypotheses on respondents' switching activities when experiencing meaningless boredom, we assessed how likely they would switch to an activity involving playing a digital game if they could switch. A Likert scale ranging from 1 ("Very unlikely") to 5 ("Very likely") was used.

3.3.3 Valence and arousal

As a control variable, we first asked respondents how the hypothetical game they would switch to should make them feel (valence) and how arousing the game should be. We employed the non-verbal, pictorial Self-Assessment Manakin (SAM) scale, developed and validated by Bradley and Lang (1994), ranging from 1 (very positive valance and very arousing) to 5 (very negative valence and not arousing at all).

3.3.4 Game type: entertainment experience

To measure what type of game respondents would switch to, they were asked how much they agreed that the game they would switch to should elicit entertainment experiences of fun (hedonic) and appreciation (eudaimonic). We used the scale developed by Oliver and Bartsch (2010), cross-culturally validated by Schneider et al. (2019), and adapted to a game context by Possler et al. (2020), which includes three items on fun and three items on appreciation. A Likert scale ranging from 1 ("Strongly disagree") to 7 ("Strongly agree") was used, for this scale and the next game type scale questions. Internal consistency was measured using McDonald's omega (ω) values and their confidence intervals (CI). These values ranged between $\omega = 0.66$ and 0.80, showing decent internal consistency. All values can be found in Table 2, reported per boredom profile.

3.3.5 Game type: R^2EM model

To measure what type of game respondents would switch to, they were asked how much they agree that the game they would switch to should provide them psychological detachment and relaxation (hedonic recovery components) as well as mastery and control (eudaimonic recovery components), based on the R^2EM model (Reinecke and Rieger, 2021). We used the validated Recovery Experience Questionnaire (Sonnentag and Fritz, 2007), previously used in media entertainment research (Rieger et al., 2014), which includes four items each for psychological detachment, relaxation, mastery, and control. Similar to the fun and appreciation scales, McDonald's omega values and their confidence intervals for each boredom profile can be found in Table 2. Omega values ranged between 0.71 and 0.88, reflecting good internal consistency.

3.4 Sample

Participants for both the pre-test and the main survey were recruited through Prolific. We used several prescreening criteria through Prolific to include respondents that (1) had prior experience playing video games, (2) played a specific type of game (computer games, console games, etc.; no board or casino games), (3) that had a history of high-quality responses via Prolific (i.e., an approval rate of 90% or above) and (4) originated from the United Kingdom, the United States or Canada to ensure respondents understood the nuances within the boredom scenarios. For the main survey, we also excluded the respondents who participated in the pre-test.

TABLE 2 Internal consistency values of measured game types per boredom profile, using McDonald's omega (ω) and confidence intervals (CI).

Boredom profile	Overstimulation boredom		Understimulation boredom		Low engagement boredom		High engagement boredom	
Game type	ω	CI	ω	CI	ω	CI	ω	CI
Fun	0.72	0.63–0.81	0.74	0.65–0.81	0.78	0.71–0.85	0.66	0.52–0.79
Appreciation	0.80	0.73–0.86	0.66	0.56–0.78	0.73	0.65–0.81	0.72	0.64–0.81
Psychological detachment	0.87	0.82–0.91	0.88	0.83–92	0.79	0.71–0.86	0.86	0.80–0.91
Relaxation	0.79	0.71–0.84	0.82	0.78–0.86	0.78	0.69–0.84	0.78	0.70–0.84
Mastery	0.79	0.69–0.86	0.79	0.69–0.85	0.71	0.54–0.81	0.80	0.71–0.85
Control	0.86	0.81–0.90	0.82	0.72–0.89	0.83	0.77–0.88	0.85	0.79–0.89

ω, McDonald's omega value; CI, confidence intervals.

TABLE 3 Mean scores and ANOVA for experienced boredom and likeliness to switch to a digital game.

Boredom profile	Boredom	Likeliness to switch			
	Mean (SD)	Yes[a]	Neutral[b]	No[c]	Mean (SD)
Overall ($N = 581$)	3.43 (1.04)	74%	13%	13%	3.91 (1.02)
Overstimulation boredom ($N = 147$)	3.38 (1.21)	76%	10%	14%	3.88 (1.07)
Low engagement boredom ($N = 146$)	3.86 (0.87)	74%	15%	11%	4.00 (1.00)
Understimulation boredom ($N = 143$)	3.31 (0.92)	76%	13%	11%	3.96 (0.95)
High engagement boredom ($N = 145$)	3.19 (0.99)	72%	13%	15%	3.79 (1.07)
ANOVA (*F*-value)	12.200***	1.142			

[a]Respondents indicating "likely" (4) or "very likely" (5). [b]Respondents indicating "neither unlikely, nor likely" (3). [c]Respondents indicating "very unlikely" (1) or "unlikely" (2); $p < 0.05$*, < 0.01**, < 0.001***.

We recruited 600 respondents through Prolific. This sample size was determined based on an a-priori power analysis using G*Power 3.1 (Faul et al., 2009). Previous research by Bowman and Tamborini (2012) comparing boredom and stress experiences in games used an expected effect size of $f = 0.31$ to determine their sample size. Given that our study makes more subtle comparisons between different types of boredom, we adopted a more conservative effect size of $f = 0.20$, leading to a minimum sample size of $N = 436$ (with $\alpha = 0.05$, $\beta = 0.95$). Recognizing the potential individual variability between players in our between-subjects design, we sought to exceed this minimum sample size by recruiting a larger sample, specifically aiming for a sufficient number of respondents within each boredom profile group. During data cleaning, we removed $N = 2$ respondents who did not give their consent, $N = 1$ minor, $N = 1$ respondent who failed two out of three attention check questions, $N = 8$ respondents who answered the survey in less than 3 min, $N = 3$ 'straight liners' who indicated the same answers for at least one of two clusters of scales (i.e., one cluster on fun and eudaimonic experiences, and one on R^2EM components), and $N = 4$ who indicated zero play hours or had missing data for their play frequency.

The final sample consisted of 581 respondents, equally spread across the four boredom profiles (overstimulation boredom: $N = 147$; understimulation boredom: $N = 143$; low engagement boredom: $N = 146$; high engagement boredom: $N = 145$). The mean age was 35.23 years (SD = 9.92 years), with 61.4% male and 38.4% female respondents (0.2% preferred not to say). Most respondents reported the UK as their country of residence (73%), with 15% living in Canada and 12% in the US. Regarding gaming behavior, respondents played on average 2 h 12 min (SD = 1 h 38 min) during a weekday and 3 h 34 min (SD = 2 h 11 min) on a weekend day. They mostly preferred to play role-playing games (Mean: 6.46; SD = 2.89) and action-adventure games (Mean: 6.43; SD = 2.44) over other game genres.

In assessing the level of homogeneity across the four boredom profiles (via one-way ANOVAs), there were no statistically significant differences for demographic and game-related background variables, except for respondents' preference for racing games [$F(3, 555) = 4.076$, $p = 0.007$; high engagement boredom profile > overstimulation boredom profile].

4 Results

4.1 Descriptive analyses

Descriptive analyses of self-reported boredom and likeliness to switch activities toward playing a digital game are presented in Table 3. Regarding *self-reported boredom*, respondents across the four different boredom profiles indicated feeling between "moderately bored" and "very bored" (Overall mean = 3.43, SD = 1.04) in the described situations. An ANOVA showed a significant difference between the boredom profiles [$F(3, 576) = 12.20$, $p < 0.001$, $\eta^2 = 0.060$]. As the Levene's test was significant [$F(3, 576) = 11.593$, $p < 0.001$] and equal variances between groups are not assumed, we used a Games-Howell pairwise comparisons test revealing that respondents in the low engagement boredom group (Mean = 3.86) scored significantly higher on boredom compared to the other three boredom profiles (Means

TABLE 4 Mean scores and ANCOVA for valence and arousal in switched to game type.

Boredom profile	Valence	Arousal
	Mean (SD)	Mean (SD)
Overall (*N* = 580)	4.25 (0.77)	3.16 (0.95)
Overstimulation boredom (*N* = 147)	4.23 (0.84)	3.01 (0.98)
Low engagement boredom (*N* = 145)	4.34 (0.65)	3.29 (0.99)
Understimulation boredom (*N* = 143)	4.17 (0.84)	3.21 (0.83)
High engagement boredom (*N* = 144)	4.25 (0.74)	3.10 (0.97)
ANCOVA (*F*-value)	0.762	1.930

$p < 0.05$*, < 0.01**, < 0.001***.

between 3.19 and 3.38). To account for this difference, we included self-reported boredom as a control variable in all subsequent analyses by using ANCOVAs.

Regarding the *likeliness to switch activities*, respondents across four boredom profiles indicated they are likely to switch (Overall mean = 3.91, SD = 1.02) from the described boring activities to playing a digital game. An ANOVA showed no significant differences between boredom profiles [$F(3, 557) = 1.142$, $p = 0.331$, $\eta^2 = 0.006$], implying that all four boredom profiles are equally likely to select a digital game to regulate their boredom experience. Aggregating the answering options, 74% of respondents mentioned they would switch activities to playing a digital game, while 13% mentioned they would not switch (13% neutral).

Additionally, we calculated mean indices assessing how the game respondents would switch to should make them feel (valence) and how arousing the game should be, as well as conducting two one-way ANCOVAs to examine potential differences between boredom profiles, with self-reported boredom as a covariate (see Table 4). Focusing on *valence*, respondents were more likely to switch to a game that would make them experience positive emotions rather than negative ones (Overall mean = 4.25, SD = 0.77). Levene's test and normality checks were carried out and the assumptions were met. The ANCOVA revealed no significant differences between boredom profiles [$F(3, 575) = 0.762$, $p = 0.516$, partial $\eta^2 = 0.004$], meaning that respondents in all profiles were equally likely to switch to a digital game that elicits positive emotions.

In terms of *arousal*, respondents were more likely to switch to a game that was between neutral and arousing (Overall mean = 3.16, SD = 0.95). Levene's test and normality checks were carried out and the assumptions were met. The ANCOVA showed no significant differences between boredom profiles [$F(3, 574) = 1.930$, $p = 0.124$, partial $\eta^2 = 0.010$], implying that respondents across all boredom profiles were equally likely to switch to a digital game that evokes some arousal.

4.2 Hedonic and eudaimonic game selection between boredom profiles

The main analysis attempts to answer which game type different boredom profiles would select in terms of how entertaining they are (i.e., hedonic and eudaimonic) and how they provide hedonic or eudaimonic recovery (i.e., psychological detachment, relaxation, mastery, and control). Six one-way ANCOVAs were conducted, one for each game type, controlling for self-reported boredom (see Table 5). Levene's test and normality checks were carried out and the assumptions were met.[4] No significant differences were found for the selection of a *fun* game (rejecting H1a-d), a game providing *eudaimonic appreciation* (rejecting H2a-d), and a game providing *control* (rejecting H6a-d). This means that respondents across the four boredom profiles are equally likely to select these three types of games.

Significant differences between boredom profiles were found for the selection of a game that provides *psychological detachment* [$F(3, 573) = 7.624$, $p < 0.001$, partial $\eta^2 = 0.038$], *relaxation* [$F(3, 574) = 3.472$, $p = 0.016$, partial $\eta^2 = 0.018$] and *mastery* [$F(3, 570) = 2.744$, $p = 0.042$, partial $\eta^2 = 0.014$]. Bonferroni pairwise comparison tests showed that respondents in the overstimulation boredom group were more likely to select a game that provides *psychological detachment* than respondents in the understimulation group ($p < 0.001$), providing support to H3a. However, respondents in the high engagement boredom group were also more likely to select a game that provided psychological detachment compared to the understimulation group ($p = 0.025$), which we did not expect. No other significant differences were found for psychological detachment, thus rejecting H3b-d. Respondents in the overstimulation boredom group were more likely to select a game that provides *relaxation* compared to respondents in the understimulation group ($p = 0.011$), supporting H4a. No other significant differences were found for relaxation, thus rejecting H4b-d. Furthermore, while the ANCOVA revealed a weak significant difference between boredom profiles regarding *mastery* ($p = 0.042$), the Bonferroni test showed no significant pairwise comparisons, likely due to the weak global significant *p*-value (Field, 2009). Conducting a less conservative test, pairwise comparisons based on LSD (Least Significant Differences) did show that the understimulation boredom group was more likely to select a game that provides mastery compared to the overstimulation respondents ($p = 0.043$; supporting H5a), and that respondents in the high engagement group were more likely to select this game type over both the understimulation respondents ($p = 0.026$; supporting H5b) and low engagement group ($p = 0.044$; supporting H5d). No other significant differences were found for relaxation, thus rejecting H5c.

4 All Levene's test were not significant ($p > 0.05$), assuming equal variances between boredom profiles, except for the ANCOVA of the psychological detachment game type: $F(3, 574) = 3.905$, $p = 0.009$.

TABLE 5 Mean scores and one-way ANCOVA's for entertainment responses and R²EM components in switched to game type.

Boredom profiles	Overall	Overstimulation boredom	Low engagement boredom	Understimulation boredom	High engagement boredom	ANCOVA
Game type	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	*F*-value
Entertainment						
Fun	6.17 (0.70)	6.23 (0.72)	6.18 (0.70)	6.15 (0.67)	6.12 (0.71)	0.653
Eudaimonic appreciation	4.14 (1.13)	3.94 (1.21)	4.21 (1.11)	4.17 (1.04)	4.24 (1.12)	2.073
R^2 EM components						
Psychological detachment	5.78 (1.01)	6.03 (0.85)	5.85 (0.94)	5.47 (1.16)	5.78 (0.99)	7.624***
Relaxation	5.76 (0.82)	5.89 (0.79)	5.81 (0.81)	5.58 (0.86)	5.77 (0.79)	3.472*
Mastery	4.49 (1.04)	4.36 (1.05)	4.40 (1.00)	4.60 (1.02)	4.62 (1.07)	2.744*
Control	5.55 (0.90)	5.56 (0.89)	5.59 (0.91)	5.44 (0.92)	5.59 (0.88)	0.859

$p < 0.05$*, < 0.01**, < 0.001***. Sample sizes per ANCOVA differ slightly, with Overall sample ($N = 575$), Overstimulation ($N = 144$), Understimulation ($N = 142$), Low engagement ($N = 144$), High engagement ($N = 143$).

4.3 *Post hoc* analysis: game selection within each boredom profile

The previous analyses presented how likely respondents would select each game type across boredom profiles (i.e., between-group comparisons). However, it may be relevant to conduct an additional analysis examining how likely respondents within each boredom profile select one game type compared to others (i.e., within-subjects comparisons), as it could inform us whether the identified differences between game types (see Table 5) are statistically significant.

To test this, we conducted a mixed ANCOVA with the six game types as within-subjects factors and the four boredom profiles as between-group factors, with self-reported boredom as a covariate. Mauchly's test indicated that the assumption of sphericity had been violated [$\chi^2(14) = 505.166$, $p < 0.001$] and the Greenhouse–Geisser estimate of sphericity was below 0.75 ($\varepsilon = 0.66$). Therefore, we used the Greenhouse–Geisser corrections for the within-subjects test (Field, 2009). The overall model was significant: $F(3.307, 1845.412) = 3.152$, $p = 0.020$, partial $\eta^2 = 0.006$, indicating significant differences between the selected game types.

Bonferroni pairwise comparisons revealed multiple differences between game types respondents would select (Figure 3 shows a visual representation of these differences; a detailed overview of all pairwise comparisons can be found on OSF). Respondents were significantly more likely to switch to a *fun* game over all other game types in each boredom profile ($p \leq 0.011$), except for the selection of a psychologically detaching game among the overstimulation respondents ($p = 0.225$). Second, respondents preferred to select a game that provides *psychological detachment* and *relaxation* (i.e., hedonic experiences) in each boredom profile over the game types providing eudaimonic experiences (i.e., eudaimonic appreciation, mastery, and control; $p \leq 0.018$), except for the selection of a game that provides control compared to psychological detachment (understimulation: $p = 1.00$; low engagement: $p = 0.116$; high engagement: $p = 0.070$) and control compared to relaxation (understimulation: $p = 0.949$; high engagement: $p = 0.383$). No significant differences were found between psychological detachment and relaxation in each boredom profile ($p = 1.00$ for all comparisons). Third, respondents preferred a game that provides them with *control* over mastery and eudaimonic appreciation experiences in all boredom profiles ($p < 0.001$). Fourth and final, respondents preferred a game that provides them with *mastery* over eudaimonic appreciation experiences in all boredom profiles ($p < 0.001$), except for respondents in the low engagement boredom group ($p = 0.576$).

5 Discussion

5.1 Bored individuals with low resources select hedonia-eliciting games

According to the MAC model (Westgate and Wilson, 2018), individuals with low cognitive resources who are conducting a boring meaningless activity (i.e., overstimulation and low engagement boredom profiles) would be likely to switch to enjoyable activities that are easy to process, and which offer mindless distraction (Poels et al., 2022). The current study supports this hypothesis, to some extent, in the specific context of digital game selection. Despite not finding significant differences in terms of respondents' selection of a fun game, results showed that individuals in the overstimulation boredom group were more likely to switch to a game that provides them with psychological detachment and relaxation (i.e., related to hedonic experiences) compared to the understimulation respondents. The *post hoc* within-subjects analysis did reveal that respondents in each boredom profile were most likely to select a fun game over all other game types in the study. Games that offered hedonic recovery experiences (i.e., psychological detachment and relaxation) were a close second in preference. This explains the limited differences observed between boredom profiles in terms of digital game selection: regardless of their profile, all respondents tended to select games that provide enjoyable or hedonic experiences, which is in line with recent research on hedonic and eudaimonic game selection (Bowman et al., 2024; Possler et al., 2024; see also the next section on eudaimonic selection).

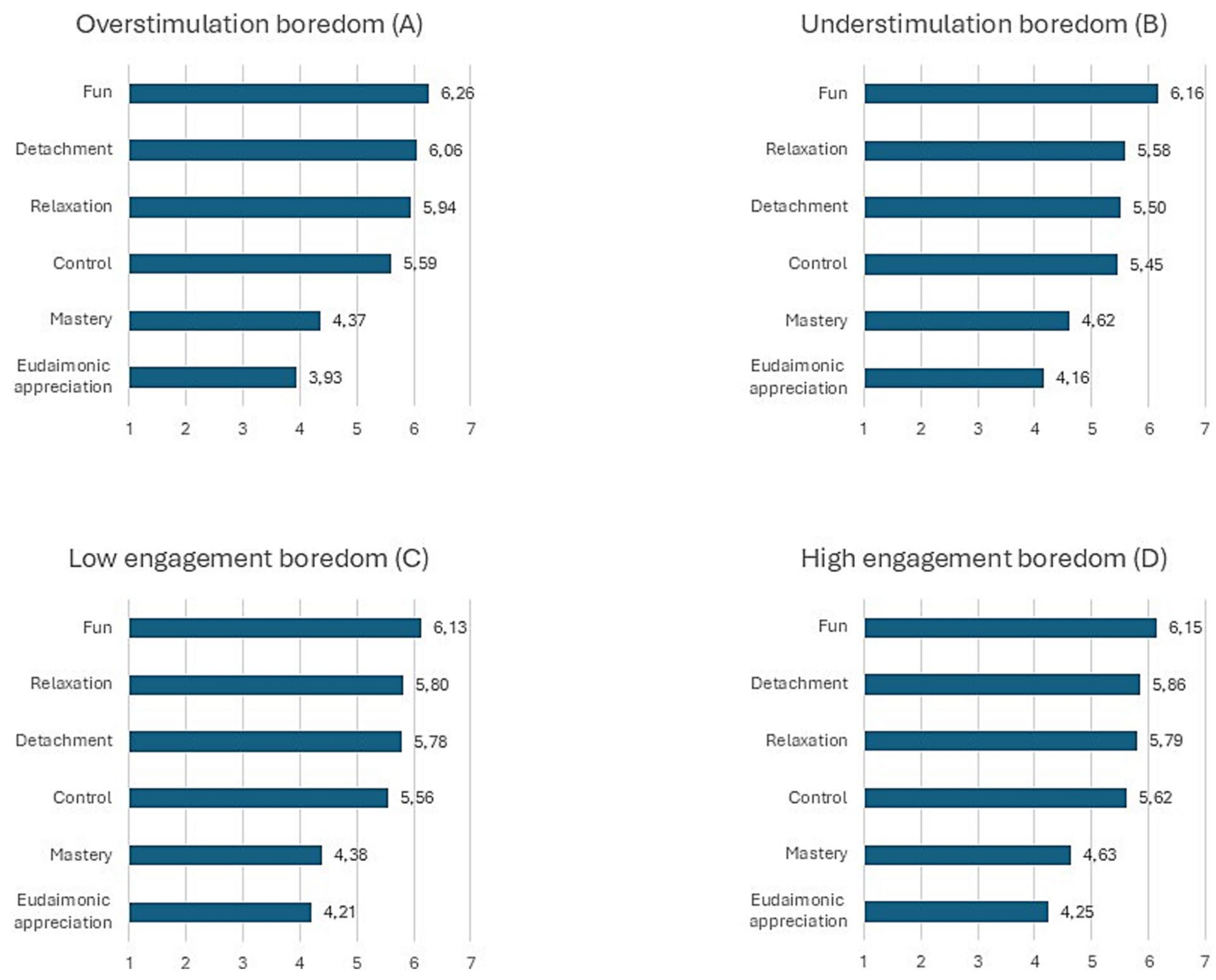

FIGURE 3
Mean scores for likeliness to switch to each game type within each boredom profile: meaningless overstimulation **(A)**, understimulation **(B)**, low engagement **(C)**, and high engagement boredom **(D)**.

Bored individuals with limited cognitive resources tend to choose games they expect to be fun and relaxing (i.e., providing hedonic experiences) while avoiding more complex or eudaimonic gaming experiences. In addition to supporting the MAC model (Westgate and Wilson, 2018), these findings align with prior scholarship on digital games. Games are inherently designed to offer enjoyable experiences (Ivory, 2016) and are often chosen to pass the time when feeling bored (De Grove et al., 2016; Sherry et al., 2006).

5.2 Bored individuals with high resources do not select eudaimonia-eliciting games

The MAC model (Westgate and Wilson, 2018) suggests that individuals with high cognitive resources who are engaged in a meaningless and boring activity (i.e., understimulation and high engagement boredom profiles) would likely switch to more challenging and mentally effortful activities, which can be associated with eudaimonic entertainment and game experiences (Daneels et al., 2021; Oliver and Bartsch, 2010; Poels et al., 2022). However, our findings do not support this hypothesis in the context of game selection. There were no significant differences between boredom profiles in respondents' selection of a eudaimonic game and in their selection of a game that provides the eudaimonic recovery experience of control. The difference in the selection of mastery-inducing games between boredom profiles was statistically significant, though it approached the $p < 0.05$ threshold. Significant differences between profiles were found only through the use of LSD pairwise comparisons—which should be interpreted with caution as it is the least conservative test that does not account for Type I error (Field, 2009). Further post hoc analysis indicated that, overall, respondents in each boredom profile were more likely to select games providing them with hedonic experiences (i.e., fun, detachment, and relaxation) over eudaimonia-eliciting games (i.e., appreciation, mastery, and control). This suggests that contrary to our hypotheses based on the MAC model, individuals with understimulation and high engagement boredom did not seek out more complex or eudaimonic activities, instead preferring games that elicited hedonic experiences—similar to the other two low resources boredom profiles.

There are at least two possible explanations for why these findings go against what we would predict based on the MAC model. First, limitations in the study design could have led to these results (see *5.3*

Limitations and Future Research section). Not only did we induce boredom by letting respondents read a scenario of a boring situation in a vignette-style survey, which may not have been strong enough to differentiate between boredom profiles. We also abstractly operationalized game selection, asking respondents how entertaining (fun, appreciation) they wanted their game to be and whether it should provide them with detachment, relaxation, mastery, or control, rather than allowing them to choose existing games. Second, the specific context of digital games could have impacted the study's outcome as well. As mentioned earlier, games are inherently designed to provide enjoyable experiences (Ivory, 2016).

While players may have eudaimonic motives for selecting games—for instance, the motivational dimension of "Skill," or being "motivated to grow and enhance one's own abilities" (p. 31073) in Holl et al., 2024; "Eudaimonia" in Possler et al., 2024; or "Utility" as "learning new things" (p. 13) and "Nostalgia" as motivational factors in Vahlo and Tuuri, 2025—these reasons are generally less common than traditional hedonic motives, such as becoming absorbed by the game or enjoying its story and aesthetics (Possler et al., 2024; Vahlo and Tuuri, 2025). This aligns with the ongoing argumentation in eudaimonic game research suggesting that players generally do not actively seek out eudaimonic experiences in games but rather stumble upon eudaimonic moments while initially looking for enjoyment (Possler et al., 2020), implying that players primarily seek out fun and enjoyment when selecting games. An important caveat to mention here is that recent research (e.g., Holl et al., 2024) argued that eudaimonic motives might matter more to specific types or profiles of players, perhaps those that seek out more involvement and value in their gaming activities. Thus, while the current study's findings reject our hypotheses based on the MAC model, they seem to align with recent scholarship on hedonic and eudaimonic game selection (Bowman et al., 2024; Possler et al., 2024).

5.3 Limitations and future research

The first limitation of this study relates to how we induced boredom. As the MAC model's hypotheses regarding switching activities (Westgate and Wilson, 2018) had not yet been empirically tested in a media context (Poels et al., 2022), we conducted an online survey to set a baseline for more targeted future experimental research. In this study, respondents received a scenario of a boring activity—imagining they were in this situation as vividly as possible—matching the boredom profile they were randomly assigned to, similar to a vignette-style survey (Vargas, 2008). Although the scenarios were thoroughly pre-tested and linked to real-life situations, which made them more ecologically valid compared to the typical boredom induction tasks in psychology research (Tam and Inzlicht, 2024), reading about a boring situation is not the same as actually experiencing it. This may have resulted in insufficient differentiation between boredom profiles and finding few significant differences between boredom profiles regarding game selection. Future research should therefore employ an experimental design with various tasks to induce different boredom profiles. This could involve classic boredom induction tasks (e.g., crossing out letters on a page following simple or complex rules for several minutes: Westgate, 2018) or attempts to mimic real-life boring situations. To examine the impact of boredom on digital game selection and usage in a real-life setting, future research should additionally use experience sampling and ambulant assessment methods (e.g., short, daily surveys to minimize recall bias combined with psychophysiological tracking of boredom markers, such as arousal, via Empatica wristbands) to assess boredom and game preferences in a longitudinal research design. While previous research on boredom in general (Goetz et al., 2014) or mobile media and boredom in particular (Decorte et al., 2025) have adopted these methods, research on gaming and boredom is currently lacking this approach.

Second, and related to the first limitation, is that our choice of a between-subjects research design is a methodological constraint. Each respondent being randomly assigned to only one of four boredom descriptions or profiles means our findings are susceptible to potential individual variability between respondents across profiles. This choice was driven by two larger considerations. First, this design allowed us to circumvent the anticipated difficulty respondents might face in discerning subtle differences between the boredom descriptions if all four were presented to all respondents within the limited exposure time of the survey, despite the extensive pre-testing of the stimulus material. Second, practical considerations informed this choice, including wanting to avoid respondent fatigue and other known disadvantages associated with within-subjects research designs, and the extensive recruitment costs related to implementing a lengthier within-subjects survey through platforms such as Prolific. Future research should therefore benefit from using a within-subject design to account for these limitations, thereby replicating our findings in a more robust setting. Additionally, this limitation means that the findings from the *post hoc* analysis should be interpreted with caution. Since we did not measure respondents' baseline game type preferences before exposure to the boredom scenario, it is hard to make any meaningful conclusions about the impact of boredom on preferring one game type over other types. While our post hoc analysis aimed to examine how players rank their game type preferences within and between boredom profiles, future scholarship should include baseline game type preference measurements to ensure valid within-subjects comparisons.

Third, the way game selection was measured in this study involved asking respondents to hypothetically choose the experiences and elements they wanted in a game. This approach aimed to take into account both the complex nature of games (i.e., some parts of a game can be fun and relaxing, while others may elicit eudaimonia) and the idiosyncratic nature of entertainment experiences (i.e., what is eudaimonic to some might not be eudaimonic to others: Raney et al., 2021). However, this method may have been too abstract for respondents compared to choosing concrete games, which could have influenced their decision-making. To address this, future studies should present respondents with concrete examples of games (or other media) that are clearly defined in terms of their potential for eliciting hedonic or eudaimonic experiences, leading to more accurate reflections of game selection.

Fourth, the MAC model itself (Westgate and Wilson, 2018) has some limitations that could spark future scholarship. For instance, some concerns might exist that the broader conceptualization of boredom within the MAC model potentially conflates this negative emotion with other distinctly affective experiences, such as frustration (in high arousal, overstimulating situations) or apathy (in low arousal, understimulating situations). These concerns are built on established psychological approaches, such as Flow theory (Csikszentmihalyi, 1975), which argue that understimulating situations are the only occurrences where people can experience boredom—with other situations resulting in experiences different from boredom, like apathy or frustration and anger. However, Westgate and Wilson (2018) both theoretically and empirically distinguished boredom from frustration in a non-mediated context. Additionally, van Tilburg and Igou (2012) suggested that boredom differs from emotions like frustration or sadness because it stems from a lack of meaning that prompts bored people to seek out new activities (a drive not necessarily present in frustrated or sad people). This shows that the MAC model is a valuable theoretical perspective to consider when studying boredom, including a more complete understanding of the concept compared to other approaches such as Flow theory, which seems to neglect, for instance, the meaning component of state boredom (i.e., whether the activity is valuable or meaningful to a person). Related to games research, the MAC model is useful to study how different types of boredom motivate game selection by regulating boredom emotions (i.e., focus on the pre-play phase), while Flow theory focuses specifically on players' experiences while gaming (i.e., focus on the actual play phase). This distinction, however, does not mean that both perspectives cannot support each other: for instance, players who reach a state of flow by playing games might in this way adequately regulate their previous state of (a specific type of) boredom, as described by the MAC model. Despite these arguments, more empirical evidence is required to distinguish boredom as conceptualized under the MAC model from related emotional states in a mediated and game-related context, simultaneously testing the differences between and the complementarity of the MAC model and Flow theory.

Another limitation of the MAC model lies in how it proposes switching from a boring activity to enjoyable or interesting activities. The model does not clearly differentiate between understimulation and high engagement boredom, or between overstimulation and low engagement boredom, which weakens its ability to explain how individuals manage their emotions by selecting activities such as media or games. To address this, future research could explore other ways to distinguish between the types of activities individuals might switch to. For example, Poels et al. (2022) proposed that those experiencing understimulation boredom may seek sensational or thrilling media content, while those with high engagement boredom might prefer more complex, eudaimonic experiences. Another way to further expand the MAC model, particularly in the context of digital games, is to examine how the demanding or challenging nature of a game influences selection processes. Future work on boredom could integrate Bowman's (2018) framework, which identifies four types of game demands: cognitive, emotional, physical, and social. Alternatively, game challenge typologies, for example, Bopp et al.'s (2018) notion of emotional game challenges or Vahlo and Karhulahti (2020) validated video game challenge inventory—based on physical, analytical, socioemotional, and insight/solving challenges—could also help refine the MAC model's predictions within a gaming context. A good starting point for this investigation would be the recent work by Flint et al. (2023), who compared the game demand and challenge approaches.

This study offers a critical first empirical test of the MAC model in a media selection context, providing more insight into game selection processes among players experiencing boredom. Doing this, our study contributes to scholarship on the intersection of boredom, media selection, eudaimonic entertainment, and digital games. These findings also contribute to ongoing scholarship showcasing how games can have a positive impact on players, by illustrating that selecting hedonic, eudaimonic, and recovery game experiences can be used as emotion regulation strategies to alleviate the negative emotion of boredom, and to regain meaning or resources. We encourage scholars to test the MAC model further and engage in replication efforts examining the role of different boredom profiles in the selection of both digital games and other forms of media entertainment.

Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found at: Open Science Framework (https://osf.io/yd9t2/).

Ethics statement

The studies involving humans were approved by Ethics Committee for the Social Sciences and Humanities (University of Antwerp) under approval number (SHW_2024_59). The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

RD: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Software, Visualization, Writing – original draft, Writing – review & editing. KP: Conceptualization, Funding acquisition, Methodology, Project administration, Supervision, Writing – review & editing. HV: Conceptualization, Funding acquisition, Methodology, Project administration, Supervision, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The authors declare that Gen AI was used in the creation of this manuscript. During the preparation of this paper, the author used GPT-3.5 and Gemini 2.5 Flash for grammar and spelling check, never to generate new sentences, arguments, or academic sources. After using these tools, the author critically reviewed and edited the generated content as needed, taking full responsibility for the paper's final content. Moreover, GPT-3.5 was used in the initial creation of the boredom scenarios, after which we reviewed, shortened, and pre-tested these scenarios (see also 3.2 Stimulus material).

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