

Why Boredom is Interesting

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*****PREPRINT*****

Final accepted version currently in press at *Current Directions in Psychological Science*

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Abstract

Is boredom bad? It's certainly common: most everybody gets bored. There's a sense that boredom sometimes causes bad things to happen (e.g., substance use, self-harm), and sometimes good things (e.g., daydreaming, creativity), but it's hard to understand what boredom does, without first understanding what it is. According to the Meaning and Attentional Components (MAC) model of boredom and cognitive engagement, the emotion of boredom signals deficits in attention and meaning. Much like pain, it may not be pleasant, but boredom critically alerts us that we're unable or unwilling to successfully engage attention in meaningful activities. Whether that's good or bad rests ultimately on how we respond.

Keywords: boredom, meaning, attention, motivation, emotion

When a Russian man stole an army tank and drove it into a local supermarket (Kiryukhinia & Coleman, 2018), you'd be forgiven for thinking he had good reason. Nope, reported journalists. He was just bored.

Tales of bored trouble-makers abound. From the odd – bored shopworkers cremating a mouse (“Bored Workers Cremated Mouse”, 2019) - to the disturbing – an Irish man caught aiming his pellet gun at drivers (Ferguson & McLean, 2019) – these news stories appear regularly, and the explanation “I was bored” resonates and perplexes. What is it about boredom that drives people to steal military equipment, watch movies on the job, and lay mice to rest? Is boredom really that nefarious?

It's certainly common: most everybody gets bored (e.g., Chin et al., 2017). Boredom is especially common at work, where it's linked to productivity loss and burnout (Fisher, 1993), and in schools – students get bored, and bored students don't do very well (Pekrun et al., 2010). Indeed, there's growing suspicion that boredom lies behind many socially destructive behaviors, including self-harm, compulsive gambling, and substance use (Mercer & Eastwood, 2010; Weybright et al., 2015). Yet, at the same time, there are calls from public intellectuals for people to experience *more* boredom, in the belief that it leads to greater well-being (Paul, 2019).

Who's right? To understand when boredom is good (and when it's bad), we first need to understand what boredom is.

ATTENTION AND MEANING: BOREDOM'S KEY INGREDIENTS

If you're reading this, you've almost certainly had the lamentable experience of reading a boring paper. We all know the feeling: dread and irritation build, your mind wanders, you check

the clock and remaining page count, or even surrender and sneak a glimpse at your phone. In short, you're bored. But why?

There could be something amiss with the environment— too much constraint, or too little stimulation or arousal (Berlyne, 1960). According to attentional theories, such environmental features foster understimulation that make it difficult to focus (Csikszentmihalyi, 2000; Eastwood et al., 2012). There's excellent evidence that difficulty paying attention translates into feelings of boredom, and that understimulation can cause inattention. But such theories don't account for times when inattention is the result of overstimulation – too much going on, rather than too little – and overlook a greater problem: sometimes attention isn't the issue.

Many functional approaches to boredom set attention aside to consider its underlying purpose; they argue that boredom is a signal meant to alert people to underlying problems, most often concerning goals, meaning, or opportunity costs (e.g., van Tilburg & Igou, 2012). If inattention results in boredom, such theories argue, it's because inattention is an indirect signal that what you're doing lacks value or meaning. But that doesn't explain instances when people are bored during otherwise meaningful activities.

Which is it then? Is boredom caused by inattention, resulting from understimulation? Or is boredom caused by a lack of meaning? Both are (partially) right². The Meaning and Attentional Components (MAC) model of boredom and cognitive engagement unifies past work that has examined attention, meaning, and their environmental correlates in isolation and brings these ideas together to explain what boredom is and why we experience it.

THE MAC MODEL OF BOREDOM

Like all emotions, boredom conveys information (Clore et al., 2001). Just as anger tells us when someone has violated important boundaries, boredom alerts us when we're not able to

pay attention or find meaning in what we're doing. Boredom's underlying message? There's no value in continuing the current course of action, at least "as is". Boredom comes in many variants, from low arousal to high, from fatigue to agitation. While some theories have defined boredom as a low-arousal state, boredom is just as often associated with high as low physiological arousal (e.g., Chin et al., 2017, Merrifield & Danckert, 2014). Instead, what matters in defining boredom, as with all emotions, is its causes. Just as diseases are defined not by their outward symptoms (e.g., fever, cough), which may be shared by many illnesses, but rather by the unique pathogens that cause them (e.g., influenza virus), so too are emotions defined by their unique inputs, rather than their outputs (Barrett, 2006).

According to the MAC model, boredom is an affective indicator of unsuccessful attentional engagement in valued goal-congruent activities (Westgate & Wilson, 2018). Put simply: we get bored when we aren't able to pay attention or can't find meaning in what we are doing. How do people successfully pay attention? The answer comes from aligning cognitive demands with cognitive resources, which can happen in one of two ways: both can be low, as in *low-level engagement*, which results in feelings of enjoyment (e.g., a tired commuter playing *CandyCrush*), or both can be high, as in *high-level engagement*, which results in feelings of interest (e.g., a caffeinated scientist reading a groundbreaking new paper). Attentional difficulties can result from both under-challenge and over-challenge; people can be bored because something is too hard or too easy, because both make it difficult to sustain attention (Westgate, Wilson, & Gilbert, 2017). Likewise, meaning deficits occur when what we're doing doesn't match up with currently active relevant goals. It feels *subjectively* meaningless, and thus boring (regardless of however objectively meaningful it may be).

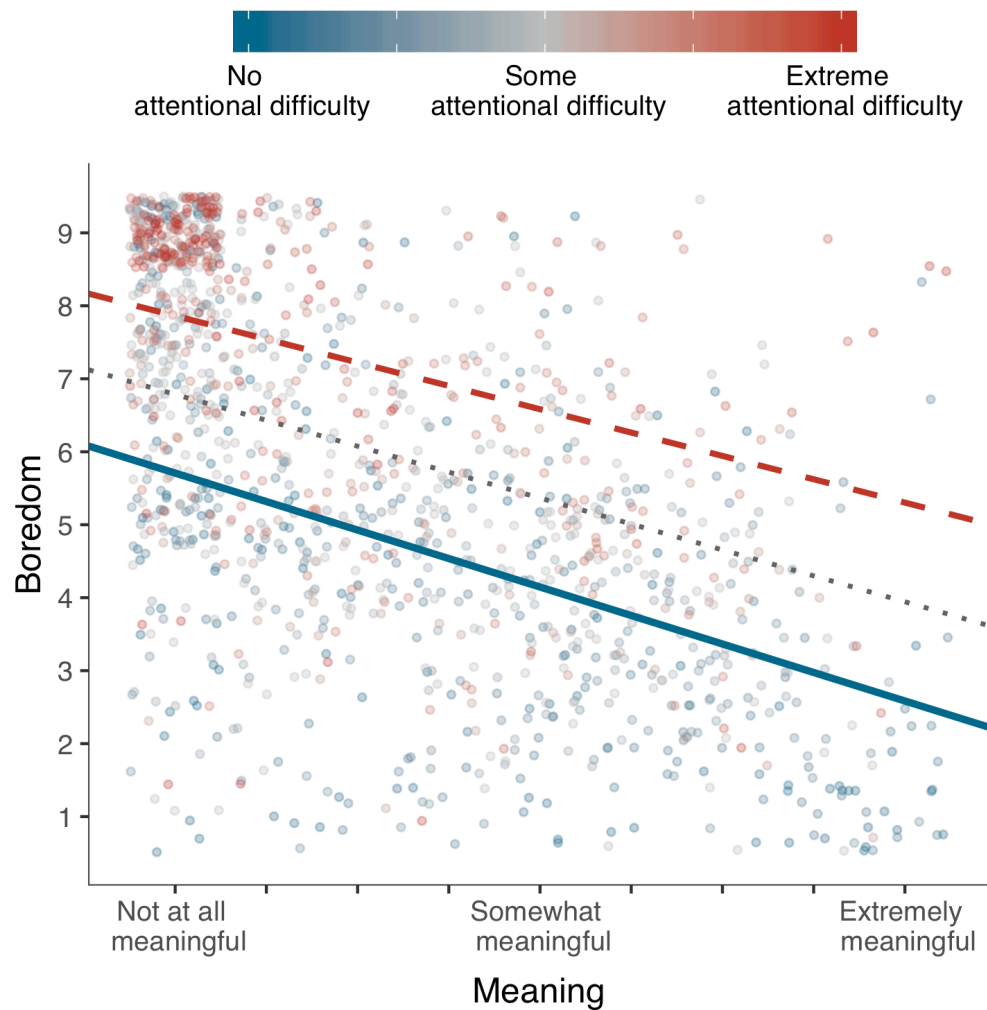


Figure 1. Meaning and attention deficits predict boredom equally, and stack when combined. Across 14 studies (online, in the lab, and in the field), 1364 participants reported how bored they were, how much difficulty they had concentrating, and how personally meaningful (all on 9-point scales, from 1 = Not at all, 5 = Somewhat, 9 = Extremely) it felt to complete a variety of activities, from air traffic control simulations to trying to think for pleasure. People were most bored when they weren't able to pay attention *and* didn't find it meaningful, and least bored when they were both able to pay attention *and* did find it meaningful. Similar results are found when meaning and attention are manipulated experimentally. Adapted from Westgate & Wilson (2018).

In other words, it's not enough to be able to pay attention – and it's not enough to find meaning. Both are necessary; a deficit in either one is sufficient to cause boredom. Attention and meaning act as independent predictors of boredom, don't interact or depend on each other, and are not themselves highly related, according to correlational evidence from over 14 studies and over a thousand participants, (see Fig. 1; Westgate & Wilson, 2018). The same is true when attention and meaning are manipulated experimentally: inducing meaning deficits by offering (or withholding) charitable contributions makes the same mundane task feel more (or less) meaningful – and doing so results in boredom. Likewise, inducing attention deficits by experimentally manipulating cognitive demands creates under-challenge and over-challenge – and again, doing so results in boredom (see Fig. 2; Westgate & Wilson, 2018). These ways in which attention and meaning combine to produce boredom, versus enjoyment or interest, are shown in Table 1.

This assumption – that people must have both the capacity to act and the desire to do so - underpins many psychological theories (e.g., persuasion, Petty & Cacioppo, 1986; suicide, Van Orden et al., 2010; controlled vs automatic processing, Olson & Fazio, 2008). Even flight attendants routinely ask passengers seated in exit rows of the aircraft whether they are “willing and able” to assist in the event of an emergency (F.A.A. Exit Seating, 2017). This makes boredom a special case of a broader ability-motivation framework that applies to psychology more generally, a kind of psychological “exit row,” where people's thoughts, feelings, and behavior are determined by their perceptions (or “construals”) of what they are willing and able to do.



Figure 2. *Attentional* boredom can occur because a task is too hard or too easy. Participants completed an ambiguously difficult version of a simulated air traffic control task for ten minutes, and reported how subjectively difficult it was for them (from 1 = Too Easy, 5 = Just Right, 9 = Too Hard), as well as how bored and frustrated they felt (from 1 = Not at all, 5 = Somewhat, 9 = Extremely). People were most bored when it was too hard or too easy, because both under- and over-challenge make it hard to pay attention. In contrast, the same people felt more frustrated the harder the task was, because increasing difficulty decreases the likelihood of a successful outcome. Similar results are found when difficulty is manipulated experimentally. Adapted from Westgate & Wilson (2018).

DIFFERENT CAUSES, DIFFERENT CONSEQUENCES

Attention and meaning deficits not only both cause boredom; they cause different experiences of boredom. *Attentional boredom*, caused by attention deficits, is often characterized by difficulty concentrating, mindwandering, and inattention. *Meaningless boredom*, on the other hand, is caused by meaning deficits and often characterized by high arousal, feelings of sadness and loneliness, and distorted time perceptions— but most of all by the desire to disengage. And, of course, people can experience *mixed boredom*, if both meaning and attention are missing (Westgate & Wilson, 2018).

Just as *attentional boredom* feels different from *meaningless boredom*, we can distinguish between two attentional subtypes: attentional boredom resulting from *under-challenge* and attentional boredom resulting from *over-challenge*. Attentional boredom due to over-challenge is characterized by feelings of agitation, accompanied by frustration. Indeed, it may seem strange to label it boredom, rather than frustration, but the two emotions have different causes: people feel bored when they do not have the cognitive resources to pay attention, but frustrated to the extent those attentional difficulties block a desired outcome. Thus, whereas boredom is about the process, frustration is about the outcome of that process (Westgate & Wilson, 2018).

While these many types of boredom may feel different, people spontaneously label them all as boredom, because they signal the same underlying problem: an inability to successfully engage in meaningful activity. That signal, and those feelings, have value.

WHAT BOREDOM DOES: THE FOUR ROADS TO BOREDOM REGULATION

By understanding what boredom is, we can better understand what boredom does. Boredom generates a wide range of behaviors, some positive (e.g., prosocial intentions,

daydreaming), some negative (e.g., self-induced electric shock, substance use), and some neutral (e.g., snacking).

According to the MAC model, the state of boredom provides people with information about their current attentional and meaning states – or sum value of continued cognitive engagement - which they then use to form judgments and make decisions (Baumerister et al., 2007). If meaning and attention deficits cause boredom, there are four primary routes to effectively alleviating boredom: 1) regulating cognitive demands, 2) regulating cognitive resources, 3) regulating goal value, and 4) switching activities. The first three address problems with underlying attention and meaning deficits, respectively; the final route alleviates boredom by changing activities entirely, and potentially resolves attention and meaning deficits simultaneously.

Route #1: Regulate cognitive demands

One simple remedy to *attentional boredom* is to regulate cognitive demands. In other words: making the task harder (or easier), until it's a good fit. Simple tasks can be combined into more complex ones, and almost any task can be made harder by adding a time limit. Indeed, people spontaneously adopt time limits or other “rules” to add complexity to what they're doing (Sansone et al., 1992) and increase interest, thereby reducing boredom. Video games ramp up difficulty for this reason, increasing complexity to keep pace with gamers' growing ability, and gamifying driving does the same for drivers on the road (Steinberger et al., 2017).

Or, instead of tweaking the task, people can add external attentional demands – listening to the radio, snacking, creative mind-wandering, and electric shocks are an odd assortment, but all have been found to increase cognitive load and reduce boredom (Moynihan et al., 2015;

Table 1

*The Meaning and Attention Components (MAC) model of boredom and cognitive engagement. Attention and meaning combine in different ways to produce different types of boredom (in **bolded italics**) versus feelings of enjoyment or interest (low boredom). These different types of boredom, in turn, lead to different predictions for downstream behaviors and outcomes (in italics)*

		Meaning	
		Low Meaning: Task is INCONGRUENT with Valued Goals	High Meaning: Task is CONGRUENT with Valued Goals
Attention	Understimulation: Demand < Resources	<i>A</i> / Mixed State: Meaningless + Attentional Boredom <i>Seek Interesting Activity</i>	<i>E</i> / Attentional Boredom <i>Increase Cognitive Demand</i>
	Low-Level Engagement Low Demand + Low Resources	<i>B</i> / Meaningless Boredom <i>Seek Enjoyable Activity</i>	<i>F</i> / Enjoyment (Low Boredom)
	High-Level Engagement High Demand + High Resources	<i>C</i> / Meaningless Boredom <i>Seek Interesting Activity</i>	<i>G</i> / Interest (Low Boredom)
	Overstimulation: Demand > Resources	<i>D</i> / Mixed State: Meaningless + Attentional Boredom <i>Seek Enjoyable Activity</i>	<i>H</i> / Attentional Boredom <i>Increase Cognitive Resources</i>

Wilson et al., 2014). In one study (Havermans, 2015), over 90% of people randomly assigned to watch an 85-second video of an indoor tennis game on repeat for an hour chose to self-administer electric shocks, an average of 22 times!

Conversely, in cases of over-challenge, one remedy is to lower demands – to make it easier. Complex tasks can be broken down into simpler chunks, and reducing external distractions (e.g., distracting music) can aid concentration. In other words, we can make hard tasks less boring by making them easier, just as we make easy tasks less boring by making them harder.

Route #2: Regulate cognitive resources

A more challenging remedy for *attentional boredom* is regulating cognitive resources – what we bring to the table. Short-term physiological options include caffeine and sleep to aid attention, and reduce boredom, or other substances (e.g., alcohol, marijuana) to reduce cognitive capacity. Indeed, drinking on the job is a common problem in understimulating work environments (Walsh et al., 1993). Long-term, more adaptive approaches to increasing cognitive resources involve sustained practice and skill development: scaffolded approaches to teaching employ this strategy, by using simpler tasks to build up learners' ability to tackle bigger challenges down the road.

Route #3: Regulate goal value

Regulating attention isn't helpful when attention deficits aren't the cause. Fixing *meaningless boredom* requires adjusting activities or goals until both come into alignment: either by switching goals, reconstruing activities to better fit current goals, or increasing perceived

value in cases where goals and activities already align. Mentally reframing activities to be more meaningful, as in story-editing approaches, offers one approach (Wilson, 2011), as do utility-value interventions in education, which encourage students to consider their long-term goals and how current schoolwork contributes to them (Hulleman, et al. 2010). Introducing new goals, such as “speed coasting” challenges, may likewise reduce boredom and risky driving on otherwise monotonous drives (Steinberger et al., 2017).

Route #4: Switch activities

The previous routes tweak activities to be less boring; the final option is to switch entirely. Activity switching serves the dual purpose of fixing attention and meaning deficits simultaneously, assuming one chooses wisely. But which activities do bored people choose?

That depends on what they want to feel instead: interest or enjoyment. Though similar in many ways, interest and enjoyment are distinct: interest requires cognitive resources to make sense of complex situations, while enjoyment results from simple familiar things that have been rewarding in the past. So something can be interesting but not enjoyable (e.g., a Holocaust documentary), or enjoyable but not interesting (e.g., mindless cellphone games). Novelty and complexity likewise increase interest, and reduce enjoyment; while certainty increases enjoyment and reduces interest (Silvia, 2006).

Because interest is cognitively demanding, people should most likely pursue interesting activities when they feel they have the resources to spare, as in *attentional boredom* due to under-challenge. This kind of boredom spurs novelty-seeking, even when the novel options are bad ones (Bench & Lench, 2019; Kapoor et al., 2015). Electric shocks, for instance, while not enjoyable, might be interesting, and bored people in understimulating environments readily

shock themselves (Havermans, 2015; Nederkoorn et al., 2016; Wilson et al., 2014). Likewise, bored police officers often turn to traffic stops when they have nothing to do (Phillips, 2016), and participants in fMRI studies are willing to pay more to listen to music to avoid boring repetitive landscape photos (Dal Mas & Wittmann, 2017). Interesting activities may be particularly suited to resolving meaning deficits: mixed states involving *meaningless boredom*, for instance, increase people's willingness to donate to charity (van Tilburg & Igou, 2017).

In contrast, enjoyment may be more appealing when people feel they have relatively few resources, such as when bored because something is too hard. People may also pursue low-effort enjoyable alternatives, simply because they work (temporarily) and are easily accessible. Boredom increases reward sensitivity (Milyavaskaya et al., 2019), which may make such enjoyable pay-offs, including alcohol/marijuana use (Weybright et al., 2015), particularly alluring.

In the end, these choices matter. Seeking out enjoyable activities, instead of interesting ones, may ultimately lead to more boredom in the long run. The cognitive work required by interest goes into building new schemas and knowledge – exactly the things needed to make sense of (and feel interest in) complex topics. In this sense, enjoyable activities are like junk food, offering short-term satisfaction at the cost of long-term well-being. Switching to an easy enjoyable activity (e.g., *CandyCrush*) instead of a more demanding but interesting one (e.g., a Holocaust documentary) alleviates boredom - but doesn't foster the cognitive work needed to build resources and prevent boredom upon encountering similar situations again in the future.

SUMMARY

Much like pain, boredom may not be pleasant, but it serves an important function in alerting us to instances where we're not able to successfully engage in meaningful activity. Specifically, boredom provides two critical pieces of information - first, whether we're successfully engaged in our current task (*attentional* component) and second, whether our current task, regardless of engagement, is meaningful (*meaning* component).

In short, is boredom good? Or is it bad? It's neither. Boredom is a signal: it's what we do with that signal that counts. Stifling boredom may work, temporarily, to feel better, but the only lasting solution is to solve the underlying attention and meaning deficits that bored us to begin with.

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² For details of alternative approaches, please see recommended readings

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