

Whatever will bore, will bore:

The mere anticipation of boredom exacerbates its occurrence in lectures

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## Abstract

**Background:** Academic boredom is ubiquitous, and it leads to a range of adverse learning outcomes. Given that students often make estimates of how boring lectures are, does anticipating a lecture to be boring shape their actual experience of boredom?

**Aims:** The current research investigated whether anticipated boredom intensifies subsequent boredom felt in lecture.

**Samples:** We recruited undergraduate students to participate in three studies.

**Methods:** Study 1 ( $N = 121$ ) and Study 2 ( $N = 130$ ) were conducted in natural university lecture environments. We found that students who anticipated a lecture to bore them more subsequently felt more bored by it. In Study 3 ( $N = 92$ ), we experimentally manipulated anticipated boredom before participants watched a lecture video. We found that those who were led to anticipate higher levels of boredom felt more bored by the video.

**Results and Conclusions:** Results converged to indicate that the mere expectation that a lecture will be boring may be sufficient to exacerbate its subsequent occurrence. We discuss these findings in the contexts of affective forecasting and education.

**Keywords:** academic boredom, expectation, affective forecasting, anticipated emotion

**Whatever will bore, will bore:****The mere anticipation of boredom exacerbates its occurrence in lectures**

How boring do you expect this article to be? If boredom research is a topic that excites you, then perhaps you forecast the coming pages to rouse enjoyment, captivation, and inspiration. If boredom research—or research in general—leaves you cold, then you may anticipate our words to elicit dullness, ennui, and disengagement instead. People carry expectations towards future events and predict their emotional reactions (Wilson & Gilbert, 2003, 2005). Boredom is often anticipated in daily life: people predict how interesting a movie is before buying a ticket; researchers forecast how boring a paper is before reading it in full; students anticipate how tedious a lecture is before it begins. How does such anticipation affect the actual experience of boredom in classroom settings? The current research sought to address this question.

Students often feel bored in classes. It was reported that a striking 30% of university students found most or all of their lecture boring (Mann & Robinson, 2009). Boredom is an “aversive state of wanting but being unable to engage in satisfying activity” (Eastwood et al., 2012, p. 483). It is an unpleasant experience (Merrifield & Danckert, 2014; Vogel-Walcutt et al., 2012) that comes with a wide range of adverse consequences in educational settings, such as lower dedication to learning (Tze et al., 2014), lower effort (Pekrun et al., 2002, 2010), lower learning motivation (Pekrun et al., 2010; Tam et al., 2020), poorer time management (Ranellucci et al., 2015), more attention problems (Pekrun et al., 2010), and lower class attendance (Mann & Robinson, 2009; Sharp et al., 2017). Extensive evidence has demonstrated a negative impact of boredom on academic performance (e.g., Pekrun et al., 2010, 2014; Putwain et al., 2018; Sharp et al., 2017; for a meta-analysis, see Tze et al., 2016).

Considering its prevalence and the aforementioned implications, it is paramount to understand the antecedents of academic boredom. According to the control-value theory of

achievement emotions (Pekrun, 2006; Pekrun et al., 2010), boredom arises when an activity is perceived as low in value with its demand being too high or too low. Perceived autonomy (Tze et al., 2014), goal orientation (Ranellucci et al., 2015), teachers' presentation styles (Goetz et al., 2013), instruction characteristics, personality (Daschmann et al., 2014), perceived level of boredom (Tam et al., 2020), and their relationships with students (Goetz et al., 2021) are other predictors of students' boredom. It appears that students are at least partly aware of these triggers, as they would skip lectures that they think are boring (Mann & Robinson, 2009). Research suggests that people actively try to mitigate boredom when confronting a potentially boring situation, such as by bringing books (Harris, 2000), or avoiding the situation altogether (Kass et al., 2001). Presumably, anticipating such situations cause people to plan accordingly.

Indeed, people frequently forecast their emotions. Researchers have investigated people's predictions about their future feelings, as affective forecasting (Wilson & Gilbert, 2003). Yet, these affective forecasts are often biased and inaccurate. People tend to overestimate the duration and intensity of their affective reactions to future events (e.g., Buehler & McFarland, 2001; Finkenauer et al., 2007; Gilbert et al., 1998; Mellers, 2000; Wilson et al., 2000). These errors can be attributed to their tendency to overlook the potency of their psychological immune system (i.e., immune neglect, Gilbert et al., 1998), to construe the event in only one of many other possible scenarios (Gilbert et al., 1998), or to focus on the event in question while neglecting the effects of other events (i.e., focalism or focusing illusion, Schkade & Kahneman, 1998; Wilson et al., 2000).

Although these forecasts lack accuracy, they nonetheless shape people's cognition and behaviours. Anticipated emotions affect behavioural intention (e.g., De Pelsmaeker et al., 2017; Kong et al., 2011; Shepherd et al., 2013; Van Tilburg et al., 2019) and decision making (Kong et al., 2011; Kotabe et al., 2019; Leone et al., 2005; Mellers & McGraw, 2001; van der

Schalk et al., 2015). Affective expectations (e.g., how funny a video will be) and whether these expectations are confirmed (e.g., how funny the video actually is) can also influence people's subsequent evaluations of the experience (Geers & Lassiter, 1999; Klaaren et al., 1994; Wilson et al., 1989). People may assimilate the value of a stimulus to their prior expectations; for example, study participants rated a video to be more enjoyable when they held a positive expectation before watching it (Geers & Lassiter, 1999). It is noteworthy that many of the studies on affective forecasting examined the effect of expectations on people's evaluations of the experience (e.g., ratings of funniness, enjoyment, Klaaren et al., 1994; Wilson et al., 1989) rather than specific emotions. Thus far no research has examined the impact of expectation on actual emotions.

### Anticipated boredom

Appraisals are crucial determinants of boredom (Pekrun, 2006; Tam, Van Tilburg, Chan, et al., 2021). Since academic courses are usually structured in a way that the same teacher delivers a series of classes on the same subject, students could easily form an expectation for the next session from their appraisals of the previous one. In other words, it is plausible that students forecast the likelihood of classroom boredom on a regular basis. Boredom, however, has not been investigated from the perspective of affective forecasting. Does anticipated boredom shape the *actual experience* of boredom? Research has investigated the influence of expectation on cognition and behaviours; less is known about how such expectation subsequently *changes* the emotional experience. In the present research, we sought to examine the impact of anticipated boredom on felt boredom in classroom settings. We hypothesized that anticipating a lecture to be boring would intensify felt boredom later on. More specifically, we propose that anticipated boredom serves as an active agent in shaping students' cognition and behaviours, which in turn triggers the actual

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emotion. This is a novel prediction. In what follows, we unpack its potential underlying mechanism.

Why might the anticipation of boredom facilitate its subsequent experience? The answer to this could lie in the unique roles that attentional engagement and appraisals play for this emotion (Eastwood et al., 2012; Pekrun, 2006; Tam, Van Tilburg, Chan, et al., 2021; Van Tilburg & Igou, 2017). Boredom tends to arise when there is inadequate attentional engagement, that the actual level of attentional engagement fails to meet the desired level (Tam, Van Tilburg, Chan, et al., 2021; Yakobi et al., 2021). If people anticipate that a future situation is boring, then it is plausible that (1) such expectation reduces their intention to attend to the situation while their desired level of attentional engagement remains high, which thus leads to inadequate attentional engagement and thus boredom; (2) their expectation might also cause them to pick up cues in the situation that confirm their expectation, resembling a confirmation bias in information processing (Nickerson, 1998). Indeed, people's expectation may result in behaviours that make the expectation comes true (i.e., self-fulfilling prophecy, Merton, 1948). Expecting a lecture to be dull might drive students to disengage from the lecture and search for cues in the situation (e.g., lecturer speaking in monotone) to confirm their expectation; these might in turn intensify felt boredom. We therefore postulated that anticipated boredom would lead to behaviours and appraisals that elicit the feeling of boredom.

In three studies, we tested the hypothesis that merely anticipating a situation to elicit boredom intensifies the subsequent boredom felt during that situation. We tested this in Studies 1 and 2 in the context of students' anticipated and felt boredom in lectures. Specifically, students reported their expectations towards a lecture before it started and later how bored they actually felt. Study 3 adopted an experimental design in which we

manipulated participants' anticipated boredom in watching a lecture video and examined its impact on their subsequent felt boredom.

### **Study 1**

The correlational Study 1 examined anticipated and felt boredom in context of a university lecture. It served as an initial test of the hypothesized relationships between anticipated and actual levels of boredom. Collecting these data as part of an actual lecture offered external validity as well as a convenient and practically important context (Tze et al., 2016). We tested if students' anticipated boredom intensified their felt boredom during the lecture.

#### **Method**

##### ***Participants and Design***

We conducted the study in a lecture that was part of an undergraduate psychology course at [masked for review]. Students scheduled to attend the lecture were invited to participate before the lecture took place. A total of 143 participants started the study; 22 of them did not complete it. Our final sample contained 121 participants (86.8% female; age range = [17, 25],  $M = 18.6$ ,  $SD = 1.02$ ). Among them, 45.5% were Asians and 28.1% were Caucasians. A sensitivity analysis indicated that this sample allowed us to detect an effect of  $r = .25$  in size with a power of .80 ( $\alpha = .05$ , two-sided).

##### ***Procedures and Measures***

Approximately five minutes before the lecture, students gave informed consent and reported demographic information through an online survey. To disguise the purpose of the study, they were informed that the study was about "Emotion and Learning." They indicated to what extent they expected the upcoming lecture to be *boring*, *interesting* (reversed), and *engaging* (reversed). Items were rated on a seven-point scale (1 = *not at all*, 7 = *extremely*), and averaged to form a composite score for anticipated boredom ( $\alpha = .82$ ). Participants then

reported their current (pre-lecture) level of boredom on a scale from 1 (*not at all*) to 7 (*very much*) for three items: *bored*, *interested* (reversed), and *attentive* (reversed). We averaged these three items into a composite measure of pre-lecture boredom ( $\alpha = .68$ ).<sup>1</sup> Items on 9 other emotions including loneliness and happiness were also administered as fillers. After the one-hour lecture, students completed a follow-up online survey in which they reported their emotions and boredom level measured by the three items again ( $\alpha = .81$ ). They were then fully debriefed about the study along with educational information on research methods.

### *Statistical Analysis*

To test our hypothesis, that the expectation to be bored would exacerbate its actual experience, we performed a multiple regression analysis in which post-lecture boredom was estimated from pre-lecture boredom and anticipated boredom. Controlling for pre-lecture boredom allowed us to examine whether anticipated boredom intensified felt boredom during the lecture irrespective of how bored participants felt before it.

### **Results**

Table 1 displays the means, standard deviations, and correlations of the measured variables. Students who anticipated the lecture to be more boring reported higher levels of boredom before ( $r = .60, p < .001$ ) and after the lecture ( $r = .51, p < .001$ ).

The regression analysis yielded a significantly positive association between anticipated boredom and post-lecture boredom, controlling for pre-lecture boredom,  $B = .36, SE = .12, t(118) = 3.06, \beta = .29, p = .003, 95\% CI = [.126, .586]$ .<sup>2</sup> Pre- and post-lecture boredom also shared a significant positive partial association,  $B = .42, SE = .11, t(118) =$

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<sup>1</sup> We noted that pre-lecture boredom showed varying reliabilities across three studies. As such, for all the analyses, we have also reported the results without controlling for pre-lecture boredom in footnotes.

<sup>2</sup> The association between anticipated boredom and post-lecture boredom was also significant when pre-lecture boredom was not included in the model,  $B = .63, SE = .098, t(119) = 6.42, \beta = .51, p < .001$ .



3.87,  $\beta = .36$ ,  $p < .001$ , 95%  $CI = [.207, .640]$ . The model explained a significant portion of the variance in post-lecture boredom, Adjusted  $R^2 = .33$ ,  $F(2, 118) = 30.5$ ,  $p < .001$ .

### **Discussion**

Study 1 provided initial support for our hypothesis. We found that the more students expected the lecture to be boring, the more bored they subsequently felt. The finding that the association between anticipated boredom and post-lecture boredom remained significant and moderate in effect even after controlling for pre-lecture boredom illustrates that anticipated boredom exacerbated students' boredom during the lecture rather than reflecting generally higher boredom levels. However, Study 1 was correlational in nature and we could not draw concluding causal inferences based on these associations. Furthermore, we propose that the association between anticipated boredom and felt boredom is not necessarily attributed to accurate anticipation; rather, anticipated boredom serves as an active agent in shaping the experience of boredom. The correlational approach of Study 1 did not allow us to differentiate between these two alternatives and required random assignment to levels of anticipation. We therefore conducted a second study with an experimental design to further investigate our hypotheses.

### **Study 2**

In Study 2, we again tested if the expectation of being bored intensifies its subsequent experience, but this time using an experimental design. We manipulated between-subjects students' anticipated boredom and measured their felt boredom after it.

### **Method**

#### ***Participants and Design***

Study 2 was a between-subject experiment with three conditions (anticipated boredom: high vs. neutral vs. low). It was conducted in an undergraduate psychology lecture on the topic of cognitive behavioural therapy (CBT) as part of a semester-long course on

counselling and psychotherapy at [masked for review]. Participants were entered into a lucky draw in exchange for participation. A total of 66 students started the survey and six dropped out. Due to the low class-attendance and the resultant small sample size, we conducted an identical study in the same lecture in both Spring and Fall semesters a year later.<sup>3</sup> In the lecture in the Spring semester, a total of 58 students started the survey, of which 13 dropped out, resulting in a sample of 45 participants. In the lecture in the Fall semester, a total of 29 students started the survey and four dropped out, which resulted in a sample of 25 participants. Combining the three groups formed a final sample of 130 participants (77.7% female; age range = [18, 35],  $M = 20.7$ ,  $SD = 1.93$ ). Of the participants, 71.5% were Hong Kong citizens, 10.8% were Mainland Chinese, and 17.7% were from other countries. A sensitivity analysis indicated that this sample allowed us to detect effect of  $r = .24$  (or  $f = .28$ ) in size with a power of .80 ( $\alpha = .05$ , two-sided).

### ***Procedures and Materials***

Prior to the start of the lecture, students were invited to participate in a study on “Emotion and Learning;” those agreed opened an online survey where they gave informed consent and demographics information. Next, we randomly assigned them to one of the three conditions (anticipated boredom: high vs. neutral vs. low). The manipulation consisted of providing participants with either one of three articles designed to alter their anticipated boredom. Specifically, participants either read an article about the history of CBT (high anticipated boredom), radioactive pollution (neutral), or simple CBT techniques (low anticipated boredom). We expected that reading a tedious (vs. interesting) article about CBT

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<sup>3</sup> Both lectures were taught by the same lecturer on the same content. The difference between them was that the first one was conducted face-to-face, while the other two were conducted online due to the coronavirus pandemic in 2020. Other than four multiple-choice questions and a question on learning motivation that were added at the second and third data collection, the manipulation materials and questionnaires were identical. A comparison of the three samples is presented in the supplementary materials. There was no significant difference in the measured variables among the three samples.

forms an impression that the lecture on this topic would be boring (vs. not). These articles were pilot tested using a between-subjects design ( $N = 24$ ) which showed that they induced different levels of anticipated boredom (see supplementary materials).

Subsequent to reading the article, participants reported their level of felt boredom ( $\alpha = .62$ ), anticipated boredom towards the lecture (manipulation check;  $\alpha = .73$ ), and other emotions (filler items), as in Study 1. After the one-hour lecture, students reported their post-lecture boredom ( $\alpha = .71$ ) and emotions. They were then fully debriefed about the study's design with a brief lecture on research methods.

### *Statistical Analysis*

To check whether our manipulation was successful, we conducted a one-way ANOVA to compare the means of anticipated boredom across the three conditions. To test our hypothesis, we conducted a one-way ANOVA to examine if felt boredom differed significantly across experimental conditions.

### **Results**

Means, standard deviations and correlations of the measured variables are presented in Table 1. As in Study 1, anticipated boredom was positively associated with pre- ( $r = .39, p < .001$ ) and post-lecture boredom ( $r = .43, p < .001$ ).

In our manipulation check, the three conditions did not significantly differ,  $F(2, 127) = 2.15, p = .121, \eta^2 = .033, f = .18$ . The results indicate that our manipulation failed to alter boredom expectations, rendering it unusable to test our hypotheses.

Due to the unsuccessful manipulation, we collapsed the conditions and reverted to regression analysis as in Study 1, where we estimated post-lecture boredom from pre-lecture boredom and anticipated boredom (measured). Controlling for pre-lecture boredom would enable us to assess the effect of anticipated boredom on boredom felt during the lecture.

A regression analysis with anticipated boredom and pre-lecture boredom as predictors of post-lecture boredom explained a significant proportion of variance, Adjusted  $R^2 = .21$ ,  $F(2, 127) = 18.6$ ,  $p < .001$ . Anticipated boredom was significantly positively associated with post-lecture boredom,  $B = .37$ ,  $SE = .091$ ,  $t(127) = 4.04$ ,  $\beta = .34$ ,  $p < .001$ , 95%  $CI = [.188, .547]$ , controlling for pre-lecture boredom,  $B = .21$ ,  $SE = .079$ ,  $t(127) = 2.63$ ,  $\beta = .22$ ,  $p = .010$ , 95%  $CI = [.051, .363]$ .<sup>4</sup>

### Discussion

We failed to manipulate students' expectations towards the lecture in this study. Yet, the subsequent regression analysis replicated the findings from Study 1 to demonstrate a positive association between anticipated and felt boredom. Regarding the unsuccessful manipulation, various factors might have contributed to it. First, our study was conducted in the 7<sup>th</sup> lecture of the course, which meant that students would have held some expectations over how boring (or interesting) the lecture and the lecturer would be based on their experiences in previous lectures. Second, whereas we attempted to manipulate students' expectations through different articles at the start of the lecture, students might have already developed certain expectations over the lecture's topic from their weekly assigned reading material. Third, students did not partake in the study individually in a controlled setting. The first data collection was conducted in a lecture theatre; the presence of other students and the interaction between them could be confounding variables. The other two data collection was conducted online; we did not know what else students might be doing concurrently or whether they were in fact watching the lecture. To overcome these limitations, we conducted Study 3 in a controlled laboratory setting.

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<sup>4</sup> The association between anticipated boredom and post-lecture boredom was also significant when pre-lecture boredom was not included in the model,  $B = .46$ ,  $SE = .085$ ,  $t(128) = 5.39$ ,  $\beta = .43$ ,  $p < .001$ .

### Study 3

Study 3 featured a manipulation of anticipated boredom in a laboratory setting. Specifically, we manipulated participants' anticipated boredom towards watching a lecture recording on a likely unfamiliar topic, and then measured their level of felt boredom. We predicted that participants who anticipated the lecture to be boring would feel more bored by it—despite all participants being exposed to an otherwise identical activity.

#### Method

##### *Participants and Design*

Study 3 was a between-subject experiment with three conditions of anticipated boredom (high, neutral, or low). Participants were undergraduate students at [masked for review]. They received course credits in exchange for participation. With a medium effect size  $f = 0.35$ , a 0.05 alpha, and a 0.80 power, we targeted 84 participants, and we terminated the data collection once we met our planned sample size plus 15% for buffer (e.g., failing to follow procedure). A total of 98 participants completed the study. We excluded one participant as the experimenter failed to follow the protocol ( $n = 1$ ), one participant who had seen the manipulation video before ( $n = 1$ ), three participants who failed to follow the procedure ( $n = 3$ ), and one participant who fell asleep during the study ( $n = 1$ ). Our final sample consisted of 92 participants (78.3% female; age range = [17, 30],  $M = 18.7$ ,  $SD = 1.80$ ). Among them, 59.8% participants were Hong Kong citizens, 19.6% were Mainland Chinese, and 20.7% were from other countries.

##### *Procedures and Materials*

To standardize the experimental procedure across all trials, an experimental protocol with all instructions was scripted and recited by all individual experimenters.<sup>5</sup> The

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<sup>5</sup> Experimental materials, including the video, measures and experimental protocol, are included in the supplementary materials.

instructions were either given in Cantonese or English, depending on a participant's preference.

Participants were tested individually. To address demand characteristics and disguise the purpose of the study, participants were told that the study was about "Visual Stimulation and Emotion." Upon arrival to the laboratory, they were instructed to leave their personal belongings outside the experimental room, which was to reduce any distractions during the experiment. They were then seated in front of a laptop and reported their level of boredom ( $\alpha = .38$ )<sup>6</sup> along with other emotions (filler items) on an online pre-lecture survey. After that, they had to watch a 20-minute lecture video on the introduction of theory of literature.

Participants were randomly assigned to one of the three conditions (anticipated boredom: high vs. neutral vs. low). Prior to watching the lecture video, we manipulated their expectation on how boring the video was by providing them with different information. In the high anticipated boredom condition, participants were told that the video was voted as the most boring lecture by students from Yale University in 2015. On the page showing the video, the page displayed the name "Voted as the Most Boring Lecture in 2015 by Yale students," and the corresponding embedded YouTube video carried the name "Most Boring Lecture Ever." In the low anticipated boredom condition, participants were told that the video was voted as the most interesting lecture instead, and they saw a title "Voted as the Most Interesting Lecture in 2015 by Yale students," and a YouTube video named "What an Interesting Lecture." For participants in the neutral condition, they were only told that the video was a lecture from Yale University, and the titles were "A Lecture from Yale University," and "Lecture."

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<sup>6</sup> We did not use this variable (pre-lecture boredom) in our main analysis given that the internal consistency of this variable was low and that the participants were randomly assigned into the three experimental conditions.

After watching the video, participants filled out a post-lecture survey on their boredom level ( $\alpha = .81$ ), a manipulation check item (“At the beginning of the experiment, I expected the video to be...”: 1 = *not boring at all*; 7 = *extremely boring*), and other emotions as fillers. Finally, they were fully debriefed about the true purpose of the study and thanked for their participation.

### **Statistical Analysis**

We tested if the manipulation was successful by entering anticipated boredom (measured) as dependent variable into a one-way ANOVA, with expectation condition (anticipated boredom: high vs. neutral vs. low) as the independent variable. If our manipulation was successful, participants in the high anticipated boredom condition would expect the lecture video to be more boring than those in the neutral and low anticipated boredom conditions. We then tested our hypothesis, whether anticipated boredom exacerbates felt boredom with a one-way ANOVA. We predicted that participants in the high anticipated boredom condition would report a higher level of felt boredom than those in the neutral and low anticipated boredom conditions.

### **Results**

Our manipulation was successful. The three conditions significantly differed in anticipated boredom,  $F(2, 89) = 25.5, p < .001, \eta^2 = .36, f = .76$  (Figure 1). Planned comparison revealed that participants in the high anticipated boredom condition ( $M = 5.18, SD = 1.87$ ) expected the video to be more boring than those in the neutral condition ( $M = 3.23, SD = 1.57$ ),  $t(89) = 4.91, p < .001, d = 1.25, 95\% CI = [0.71, 1.78]$ , as well as those in the low anticipated boredom condition ( $M = 2.28, SD = 1.19$ ),  $t(89) = 7.00, p < .001, d = 1.85, 95\% CI = [1.26, 2.45]$ . There was also a significant difference in anticipated boredom between neutral and low anticipated boredom condition,  $t(89) = 2.42, p = .017, d = 0.61, 95\% CI = [0.10, 1.12]$ .

A one-way ANOVA revealed significant differences in levels of post-lecture boredom,  $F(2, 89) = 5.27, p = .007, \eta^2 = .11, f = .34$  (Figure 1) between the three conditions.<sup>7</sup> Boredom was higher in the high anticipated boredom condition ( $M = 5.79, SD = 0.84$ ) compared to the neutral condition ( $M = 4.86, SD = 1.42$ ),  $t(89) = 3.03, p = .003, d = 0.77$ , 95%  $CI = [0.25, 1.29]$ , and compared to the low anticipated boredom condition ( $M = 4.95, SD = 1.23$ ),  $t(89) = 2.60, p = .011, d = 0.69$ , 95%  $CI = [0.15, 1.22]$ . There was no significant difference in boredom between neutral and low anticipated boredom conditions,  $t(89) = -.32, p = .750, d = -0.08$ , 95%  $CI = [-0.58, 0.42]$ .

### Discussion

In this experiment, we successfully manipulated anticipated boredom in a controlled laboratory setting. Results suggest that expecting a lecture video to be boring leads to a higher level of boredom while watching the video. The experimental design of our study enabled us to establish causality. The findings demonstrate that the association between anticipated and felt boredom is not attributed to accurate anticipations, given that we randomly assigned participants to the three conditions and manipulated their expectations. Rather, expectation facilitated actual feelings of boredom.

### General Discussion

Three studies tested the hypothesis that anticipated boredom exacerbates felt boredom. The correlational Study 1, conducted in a university lecture, served as an initial test of our hypothesis within a context that offered high external validity. It showed that students who anticipated a lecture to be more boring experienced a higher level of boredom during the lecture. In Study 2, we sought to experimentally test our hypothesis in an actual lecture.

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<sup>7</sup> The results were replicated when we took one item from post-lecture boredom measure (i.e., “I am bored”) and ran the same one-way ANOVA. In addition, for consistency with Studies 1 and 2, we also ran a between-subjects ANCOVA with pre-lecture boredom as covariate. We found a significant main effect of anticipated boredom on post-lecture boredom. All these results are included in the supplementary materials.



Although it replicated Study 1's correlational findings, our manipulation of students' anticipated boredom towards a real lecture was not effective. We therefore conducted Study 3 with an alternative manipulation; participants were randomly assigned to one of three conditions (anticipated boredom: high vs. neutral vs. low) and instructed to watch the same lecture video. The manipulation was successful, and we found that participants who anticipated the video to be boring reported higher felt boredom than those in the neutral and low anticipated boredom conditions. Together, these three studies suggest that people who expect a lecture to be boring will get more bored.

Existing literature indicates that perceived values, control (Pekrun, 2006; Pekrun et al., 2010), autonomy (Tze et al., 2014), goal orientation (Ranellucci et al., 2015), and teachers' characteristics (e.g., Daschmann et al., 2014; Goetz et al., 2021) are some key antecedents of academic boredom. Our findings contribute to the literature by proposing another cause of boredom—expectation of how boring a lecture is. Anticipated boredom could be shaped by students' appraisals of the lectures, subjects, and teachers from previous classes, from course materials, or from other students' evaluations.

Prior work demonstrates that affective expectation influences people's cognition and behaviours, such as evaluation of stimuli (e.g., Klaaren et al., 1994; Wilson et al., 1989), behavioural intentions (e.g., De Pelsmaeker et al., 2017; Shepherd et al., 2013), and decision making (e.g., Kotabe et al., 2019; van der Schalk et al., 2015). To the best of our knowledge, our research is first in examining the effect of expectation on an actual emotion. We found that people's anticipation can shape their feelings. Our results suggest an association between expectation and subjective feelings, that the mere anticipation of an activity being boring promotes the actual experience of boredom. Why does anticipated boredom exacerbate felt boredom? One possible explanation is that participants who anticipated a stimulus to be boring had a lower intention to attend to it and thus had inadequate attentional engagement

(Tam, Van Tilburg, Chan, et al., 2021); they also tried to gather cues and make appraisals that confirm their expectation (self-fulfilling prophecy; Merton, 1948). Together these might have fuelled a heightened sense of boredom.

### **Limitations**

The following limitations should be taken into consideration when interpreting our findings. First, research has shown cultural differences in students' learning styles (Manikutty et al., 2007), expectations over classroom practices (Niehoff et al., 2001), and ways to handle emotions (Kitayama et al., 2006). Although our studies were conducted in two places, [masked for review], the findings may not be generalizable to different cultural settings. Second, we only used self-report measures for boredom in our studies. Future studies may consider using objective measures, such as observing psychophysiological reactions (Merrifield & Danckert, 2014), for assessing it. Third, given our focus on situational boredom, we did not examine boredom proneness in our studies (i.e., tendency to experience boredom frequently and intensely, as well as to perceive life as boring; Tam, Van Tilburg, & Chan, 2021). One potential future direction is to explore its influences on the relationship between situational expectation and state boredom. Fourth, as discussed, control-value appraisals were found to influence academic boredom (Pekrun, 2006; Pekrun et al., 2010; Shao et al., 2020). Since such appraisals were not the focus of the current studies, we did not examine or control for their effects. Future research could examine how perceived control, perceived value and anticipated boredom relate to one another.

### **Implications**

The present research, to the best of our knowledge, is the first to examine boredom through the lens of affective forecasting. Given that students often make estimates of how boring classes are, and that boredom leads to various negative learning outcomes (e.g., lower learning motivation, poorer academic performance, Pekrun et al., 2010, 2014), how such

anticipations influence boredom experience is an important question. We found that the mere anticipation of a situation being boring can intensify felt boredom. In terms of theory, it contributes to the burgeoning literature on boredom (Eastwood et al., 2012; Tam, Van Tilburg, Chan, et al., 2021) by providing evidence that not only external features of a situation give rise to boredom, a momentary internal factor—people’s expectation towards the situation—also influences their feelings. In terms of practice, our findings have direct implications in the educational context where the negative impact of boredom on academic outcomes is well documented (Tze et al., 2016). Preventing students from prematurely forming a biased expectation that a class is boring, or modulating the impact of such expectation, may help reduce felt boredom and hopefully its accompanying deleterious effects in class. Future research is recommended to investigate how to alter students’ expectation.

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**Table 1***Means, Standard deviations, and Correlations of Measured Variables: Studies 1 & 2*

	1	2	3	<i>M</i>	<i>SD</i>
1. Anticipated boredom	-	0.39***	0.43***	3.31	0.98
2. Pre-lecture boredom	0.60***	-	0.36***	4.12	1.13
3. Post-lecture boredom	0.51***	0.54***	-	3.82	1.05
<i>M</i>	2.46	3.17	2.82		
<i>SD</i>	0.98	1.04	1.21		

*Note.* Intercorrelations for Study 1 are presented below the diagonal, and intercorrelations for Study 2 are presented above the diagonal. Means and standard deviations for Study 1 are presented in the horizontal rows and means and standard deviations for Study 2 are presented in the vertical columns. \*\*\*  $p < .001$ .

**Figure 1**

*Means of the Measured Variables ( $\pm SE$ ) as a Function of Condition in Study 3*

