Emotion

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Online First Publication, October 24, 2016. http://dx.doi.org/10.1037/emo0000232

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1528-3542/16/$12.00 http://dx.doi.org/10.1037/emo0000232

Bored in the USA: Experience Sampling and Boredom in Everyday Life

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We report new evidence on the emotional, demographic, and situational correlates of boredom from a rich experience sample capturing 1.1 million emotional and time-use reports from 3,867 U.S. adults. Subjects report boredom in 2.8% of the 30-min sampling periods, and 63% of participants report experiencing boredom at least once across the 10-day sampling period. We find that boredom is more likely to co-occur with negative, rather than positive, emotions, and is particularly predictive of loneliness, anger, sadness, and worry. Boredom is more prevalent among men, youths, the unmarried, and those of lower income. We find that differences in how such demographic groups spend their time account for up to one third of the observed differences in overall boredom. The importance of situations in predicting boredom is additionally underscored by the high prevalence of boredom in specific situations involving monotonous or difficult tasks (e.g., working, studying) or contexts where one's autonomy might be constrained (e.g., time with coworkers, afternoons, at school). Overall, our findings are consistent with cognitive accounts that cast boredom as emerging from situations in which engagement is difficult, and are less consistent with accounts that exclusively associate boredom with low arousal or with situations lacking in meaning.

Keywords: boredom, trait boredom, state boredom, emotions, experience sampling

"*When you pay attention to boredom it gets unbelievably interesting.*"
—Jon Kabat-Zinn

Although popularly regarded as a common, but perhaps inconsequential, source of distress, over the last several years boredom has become an active topic of research by psychologists. This research has sought to identify the theoretical mechanisms underlying boredom, as well as the functions boredom serves. For example, one perspective sees boredom as resulting from settings that lack meaning (e.g., Barbalet, 1999; Davies, 1926; Fahlman, Mercer, Gaskovski, Eastwood, & Eastwood, 2009; Maddi, 1970; Perkins & Hill, 1985; Van Tilburg & Igou, 2011), whereas more cognitive perspectives conceptualize boredom as emerging from situations perceived as monotonous or otherwise unengaging (e.g., Eastwood, Frischen, Fenske, & Smilek, 2012; Fisher, 1993; Wyatt, 1929). Alternatively, physiological accounts attribute boredom to low levels of arousal or stimulation (e.g., de Chenne, 1988; Fisher, 1987; O'Hanlon, 1981), particularly when compared to the demands of one's internal state (e.g., Eastwood et al., 2012). Theorists have also asserted a range of functions served by boredom, such as motivating the search for novelty or meaning (e.g., Bench & Lench, 2013; Berlyne, 1960; Van Tilburg & Igou, 2011), or ensuring efficient use of scarce cognitive resources (e.g., Kurzban, Duckworth, Kable, & Myers, 2013).

Empirical research on boredom, for its part, has focused on three main issues. A significant line of research has focused on measuring differences in susceptibility to, or propensity to experience, boredom across individuals—that is, "trait" boredom (for a review, see Vodanovich, 2003). Existing scales designed to capture trait boredom include the Boredom Susceptibility Scale (Zuckerman, 1979) and the Boredom Proneness Scale (Farmer & Sundberg, 1986). Other research has sought to identify the prevalence of boredom in situ—that is, "state" boredom—and its causes, such as monotony (e.g., London, Schubert, & Washburn, 1972; Perkins & Hill, 1985; Van Tilburg & Igou, 2011) or constraints on freedom of thought or action (e.g., Conrad, 1997; Fisher, 1987). A third and large body of research has explored the consequences of boredom. Despite the fact that most theories recognize boredom as serving useful functions, much of the research on its consequences has focused on adverse effects (for exceptions, see Bench & Lench, 2013; Elipdorou, 2014). Negative outcomes that have been linked to boredom include depression and anxiety (e.g., Farmer & Sundberg, 1986; Rupp & Vodanovich, 1997; Sommers & Vodanovich, 2000; Vodanovich, Verner, & Gilbride, 1991), gambling (Blaszczynski, McConaghy, & Frankova, 1990; Elpidorou, 2014), substance abuse (Iso-Ahola & Crowley, 1991), adverse employment outcomes such as absenteeism and decreased job satisfaction

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This article is the result of the authors' independent research and does not necessarily represent the views of the Consumer Financial Protection Bureau or the United States.

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(Kass, Vodanovich, & Callender, 2001), deficits in educational attainment (Fogelman, 1976; Mann & Robinson, 2009; Maroldo, 1986; Robinson, 1975), and a more general absence of life satisfaction or meaning (e.g., Fahlman et al., 2009).

Despite this recent scholarly attention, there have been few naturalistic investigations of how individuals experience boredom in everyday life. We contribute to the theoretical and descriptive understanding of boredom by providing, to the best of our knowledge, the most comprehensive empirical account of the experience of boredom. Specifically, we analyze an experience sample in which a diverse set of 3,867 adults report their experience of boredom every waking half-hour for 7 to 10 days, generating over 1.1 million observations. These subjects additionally report details about their time-use, including what they were doing, who they were with, and their location, as well as their experience of 16 other emotions. These data permit us to uniquely address several questions whose answers should inform our understanding of the theoretical foundations of boredom.

We first address the basic question of how often people experience boredom. Assessing the prevalence of boredom, both across and within individuals, promises to help clarify the practical importance of boredom and to inform theoretical distinctions between trait and state boredom. Existing survey estimates have found that between 30% and 90% of American adults experience boredom at some point in their daily lives (Campbell, 1981, as cited in Harris, 2000; Klapp, 1986), as do 91% to 98% of youth (The National Center on Addiction and Substance Abuse, 2003; Yazzie-Mintz, 2007, respectively). A smaller set of experience sampling method (ESM) studies indicate varying amounts of boredom. For example, a study that asked 94 adults to record their mood in a diary every 15 min over a single day found that participants reported experiencing boredom in 0.5% of reports (Stone, Smyth, Pickering, & Schwartz, 1996, p. 1291). In a second example, researchers asked middle school students to report their activities and emotions seven times per day for a week. This study found that students felt at least "somewhat" bored in 23% of reports (Larson & Richards, 1991, p. 429). We report the share of subjects who express any boredom during their time in the study as well as the average frequency with which individuals experience boredom during the entirety of their waking day.

Our second contribution is to describe the phenomenology of boredom by documenting the co-occurrence of boredom with other emotions. Competing theories differ in their predictions of whether boredom should co-occur with low or high arousal emotions. Specifically, although the majority of theoretical accounts suggest that boredom is a low arousal state (e.g., Mann & Robinson, 2009; Mikulas & Vodanovich, 1993), others suggest that efforts to maintain attention in the face of boredom can lead to high arousal (e.g., Eastwood et al., 2012). For its part, the trait boredom literature implies that individuals prone to feel boredom are also prone to experience other negative emotions, including both low arousal emotions like loneliness and depression and high arousal emotions like anger (e.g., Dahlen, Martin, Ragan, & Kuhlman, 2004; Farmer & Sundberg, 1986; Gordon, Wilkinson, McGown, & Jovanoska, 1997; Rupp & Vodanovich, 1997; Sommers & Vodanovich, 2000; Vodanovich, Verner, & Gilbride, 1991). Finally, accounts of boredom that see it as stemming from a lack of meaning interpret it as occurring in the absence of other emotions (Maddi, 1970). Our study provides some of the first evidence regarding the emotional experience of boredom outside of the lab.

Our third focus is the demographic correlates of boredom. A number of previous studies have reported relationships between boredom and demographic characteristics. This research has consistently found a negative relationship between boredom and age using both state (Drory, 1982; Harris, 2000; Hill, 1975; Smith, 1955; Stagner, 1975) and trait (Levin & Brown, 1975; Vodanovich & Kass, 1990) measures. Studies of trait boredom have consistently found that men score higher than women (Farmer & Sundberg, 1986; Sundberg, Latkin, Farmer, & Saoud, 1991; Vodanovich & Kass, 1990; Wallace, Vodanovich, & Restino, 2003; Zuckerman, 1979; Zuckerman, Eysenck, & Eysenck, 1978; cf. Watt & Vodanovich, 1992) and that Blacks register higher in boredom than Whites (Wegner, Flisher, Muller, & Lombard, 2006; Watt & Vodanovich, 1992; cf., see Kurtz & Zuckerman, 1978). The association between boredom and educational attainment is inconsistent, but tends to show that boredom prone individuals have lower academic achievement (Fogelman, 1976; Mann & Robinson, 2009; Maroldo, 1986; Robinson, 1975), including higher dropout rates (Wegner, Flisher, Chikobvu, Lombard, & King, 2008). Our data, which features an extensive set of demographic characteristics including income, education, and family status, permits us to estimate the association of boredom with marginal demographic differences, conditioned on a rich set of controls.

A fourth area of focus is the situational correlates of boredom, a topic which, in contrast to the extensive literature on the demographic correlates of boredom, has received little attention. Our analysis of situational context is driven by time-use data whereby individuals reported, in every half-hour period, what they were doing (e.g., relaxing, chores, work), where they were (e.g., school, airport, home), and who, if anyone, they were with (e.g., partner, children, friends). These reports enable us to examine situations that are conducive to boredom. Prior research using surveys and experience sampling techniques has found that boredom is associated with school- and work-related activities along with "doing nothing" (Fisher, 1987; Harris, 2000; Larson & Richards, 1991), but many other situations have not been examined. Relatedly, there is relatively little research documenting whether boredom is more frequent at certain times of day, beyond one ESM study asserting that boredom peaks at noon (Stone et al., 1996). Our analysis provides clarity on how situations influence boredom from a large and diverse sample of individuals who report their experience of boredom in real time and across the entire waking day.

Finally, in order to further investigate the role of situational context in predicting boredom, we integrate the prior two analyses to estimate the extent to which differences in average boredom across demographic groups (specifically subgroups differing on gender, marital status, income, and age) can be explained through differences in situational time-use. We perform a linear decomposition in order to understand whether the gap in reported boredom across subgroups, such as gender, can be explained by average differences in the way in which such subgroups spend their time.

Measuring Boredom Through Experience Sampling

Our exploration of boredom relies entirely on analysis of a large experience sample. Although we are not the first to apply the ESM to boredom (e.g., see Larson & Richards, 1991; Nett, Goetz, & Hall, 2011; Stone et al., 1996), we are the first to use it in the context of a large, diverse sample of adults, and the first to use it in conjunction with hundreds of variables describing time-use and individual-level characteristics. We see several advantages to the use of ESM to investigate boredom. First, experience samples capture in-the-moment assessments of boredom, thus avoiding recall biases that can compromise retrospective or global evaluations (Sudman, Bradburn, & Schwarz, 1996; Tourangeau, Rips, & Rasinski, 2000). Second, our data captures experiences across a heterogeneous population in naturalistic settings. By contrast, it is difficult to simultaneously manipulate location, social setting, and activity in a laboratory study using a broad population of participants. Finally, the large amount of data at our disposable affords us the opportunity to explore heterogeneity in boredom across individuals and situational context and decompose observed differences in a manner not possible with other approaches. We present data whose scope and richness adds to the existing understanding of when and why individuals experience boredom.

Study Overview

In the present study, we analyze a large experience sample collected by a marketing firm for commercial purposes. Our aim is to estimate the prevalence of boredom, document the co-occurrence of boredom with other emotions, identify the demographic and situational factors associated with boredom, and explore whether differences in prevalence across demographic groups can be attributed to differences in how groups allocate their time.

Method

Participants

Participants ($N = 3{,}867$) were recruited either in person or over the phone from a larger, nationally representative study, in which they completed extensive demographic and psychographic questionnaires (results from this dataset are reported elsewhere; see Bhargava, Kassam, Morewedge, & Loewenstein, 2016a, 2016b). There were four recruitment waves with approximately 1,000 participants each. Participants were paid $150 (first wave), $125 (second wave), or $100 (third and fourth waves) for their participation. Participants were not told the purpose of the study.

The final sample, although not nationally representative, was diverse in terms of age ($M \approx 44$, $SD \approx 12$[1]), gender (50.9% male), race (75.5% White, 13.4% Black, 11.1% other/multiracial), marital status (55.4% currently married, 44.6% single/engaged/ widowed/ divorced), parental status (46.7% parents), employment status (57.9% employed full-time, 42.1% employed part-time/not employed), education (4.7% less than high school degree, 42.5% high school but no college degree, 52.7% college degree), and household income (median = $60,000–$75,000/year, $SD \approx$ $59,006).

Procedure

Participants enrolled in the study were asked to answer questions on a custom-made iPhone app. To ensure a diverse sample, participants without an iPhone were provided a phone that was locked to the app for the duration of the study. Participants reported their time use (i.e., what they were doing, who they were with, and where they were), mood, alertness, and a range of emotions (anger, boredom, confidence, contentedness, excitement, exhaustion, frustration, happiness, hopefulness, indifference, interestedness, loneliness, love, overwhelmingness, relief, sadness, and worry) every waking half-hour for a period of 7 to 10 days from 2011 to 2013. For each time-use question, the app presented a set of options in a fixed order. Each entry was made on successive screens, and some entries had follow-up questions to probe for additional information (e.g., a participant who indicated that he was listening to the radio would be subsequently asked what kind of music he was listening to). The emotion measures were selected by the firm administering the study, and we remain agnostic as to whether these measures reflect specific emotions as characterized by academic research. Participants reported their emotions by selecting emotion pictograms (boredom was indicated with the word "bored" accompanied by a face with furrowed brows and pursed lips). With the exception of mood and alertness, responses were binary (coded 1 if indicated, 0 otherwise), and participants could select one or more. Finally, a large set of individual characteristics were collected during a baseline recruitment survey prior to the onset of data collection.[2]

Compliance was generally very high but this was, at least in part, due to complicated editing rules used by the firm. Participants failed to make entries on only 374 (0.98%) of the 37,982 total days observed, resulting in a total of 1,126,113 half-hour reports, an average of 291.21 per person ($SD = 34.21$). The editing rules eliminated a modest fraction of participants or Participant × Days for which a participant failed to engage their device above a minimum threshold each day or across the 10-day sample.

Results

Prevalence and Co-Occurrence With Other Emotions

We found that 63% percent of the participants in our sample reported boredom at least once over the study period. Boredom was recorded in 31,395 (2.8%) of the half-hour reports and, among those who reported being bored at least once, 4.6% of reports ($SD = 8.2\%$; Max = 91.1%).

Of the 17 emotional measures captured, boredom was the seventh most frequently reported. Boredom was more rarely reported than any positive emotion with the exception of "relieved" and more frequently reported than any other negative emotion with the exceptions of exhaustion, frustration, and indifference.

[1] A precise mean age for the full sample is not available because age was reported only as a categorical variable for one of the four waves. For the 3041 people who reported age numerically, mean age was 44.2, with a standard deviation of 12.2. The median age category for the fourth wave was 40 to 44.

[2] As our participants were recruited from a much larger original survey panel, additional individual-level characteristics were available by matching study participants to data collected at the time of panel enrollment.

Table 1 provides insights into how boredom co-occurs with other emotions. Overall, we found that boredom is far more likely to occur in the presence of another negative, as compared to a positive, emotion (difference: $p < .01$). Expressed in another way, boredom was 4.2 times more likely to occur in the presence of another negative emotion (mean: 0.033) than a positive emotion (mean: 0.008). Among specific negative emotions, we found that boredom was most predictive of loneliness, anger, sadness, and worry, and least associated with exhaustion and indifference; whereas among positive emotions, boredom was most strongly predictive of (the absence of) happiness and contentedness, and least predictive of hope and relief.

Demographic Correlates of Boredom

We examined the relationship between boredom and demographic characteristics by estimating a regression model of the following form:

$$Boredom_{it} = \alpha + X\gamma + \varepsilon_{it},$$

where $Boredom_{it}$ indicates the presence of boredom at time t for person i, while X is a vector of the demographic covariates of interest (age, age squared, gender, race, education, household income, employment status, marital status, and parental status). Robust standard errors were clustered at the respondent level to account for the dependence of multiple observations from the same individual. The results of this estimation, reported in Table 2, capture the average marginal differences across boredom and each demographic variable, holding other characteristics fixed. To better understand these estimates, the table additionally reports each coefficient relative to the average rate of boredom across the entire sample of 2.8%.

Table 1
Expression of Other Emotions Conditioned on Expressing Boredom

	Boredom not expressed	Boredom expressed	% change	*p*-value
Positive Emotions				
Confidence	.11	.04	−64%	.00
Contentedness	.45	.12	−74%	.00
Excitement	.08	.03	−59%	.00
Happiness	.30	.06	−80%	.00
Hope	.08	.05	−36%	.00
Interest	.07	.03	−62%	.00
Love	.03	.01	−66%	.00
Relief	.02	.02	−30%	.00
Any Positive Emotion	.79	.22	−72%	.00
Negative Emotions				
Anger	.01	.03	126%	.00
Exhaustion	.13	.15	18%	.01
Frustration	.05	.09	67%	.00
Indifference	.09	.08	−15%	.01
Loneliness	.01	.05	496%	.00
Overwhelmingness	.02	.03	58%	.07
Sadness	.01	.02	89%	.01
Worried	.02	.04	79%	.02
Any Negative Emotion	.29	.31	6%	.23

Note. This table reports the conditional likelihood of expressing each emotion given the presence, and absence, of boredom. To roughly account for compositional differences across columns, estimates are restricted to the 707,431 observations from the 2,447 participants who expressed boredom at least once (patterns for the entire sample look similar). *p*-values report results of a t-test of the statistical equivalence of the two means where standard errors are clustered by subject to account for non-independence of observations.

Table 2
Experienced Boredom and Demographic Characteristics

Demographic factor	*B* (*SE*)	Relative marginal change
Age	−.005** (.001)	—
Age^2	.000** (.000)	—
Male	.009** (.002)	31.4%
Black	−.006† (.003)	−22.6%
Other/Multiracial	−.011** (.003)	−40.6%
High school degree	−.023** (.008)	−80.8%
College degree	−.003 (.002)	−9.8%
Ln(Inferred household income)	−.003* (.002)	−12.0%
Working full-time	−.005† (.003)	−18.0%
Currently married	−.009** (.002)	−31.6%
Parent	.000 (.002)	1.0%
Constant	.230** (.025)	
R^2	.02	
n (observations)	1,123,751	
N (subjects)	3,867	

Note. This table reports regression results at the Participant × Half-Hour Level of experienced boredom on demographic variables, with robust standard errors clustered by participant. *B* values represent unstandardized regression coefficients. Household income and age are inferred by taking the midpoint of survey response categories (e.g., 22 to 24 was converted to 23, and $50,000 to $59,999 was converted to $55,000). We combined respondents giving one of the following responses into a single Other/Multiracial category: Asian, American Indian or Alaska Native, Other, and participants who reported more than one race. We coded education into three non-exclusive categories: did not graduate high school, graduated high school, graduated college. Relative Marginal Change, reported in the last column, reflects the magnitude of the marginal effects as a share of average experienced boredom across the entire sample.
† $p < .10$. * $p < .05$. ** $p < .01$.

The estimates suggest that, among demographic characteristics, the two largest differences in reported boredom are associated with gender and marital status. Men were significantly more likely to report being bored than women ($b_{male} = 0.009$, $p < .001$, 95% CI [0.005, 0.013]) such that the typical male in the sample would be predicted to experience, after adjusting for other covariates, approximately 33% more boredom (3.2%) than a woman (2.4%). Married respondents were less likely to be bored than those who were not married ($b_{married} = -0.009$, $p < .001$, 95% CI [−0.013, −0.004]; $M_{married} = 0.020$, $SD_{married} = 0.139$; $M_{unmarried} = 0.039$, $SD_{unmarried} = 0.193$).

We also found significant differences in the propensity to report boredom by age, education, income, and employment. With respect to age, our analysis also indicates that older respondents were less likely to report being bored ($b_{age} = -0.005$, $p < .005$, 95% CI [−0.007, −0.004]), but at a declining rate ($b_{agesq} = 0.00005$, $p < .001$, 95% CI [0.00003, 0.00007]). As an illustration of these dynamics, the predicted level of boredom for a 25-year-old in our sample (6.1%) was nearly 4 times as high as that of a 45-year-old (1.6%), but a 45-year-old had a comparable level of boredom to a 60-year-old (1.7%). We found that high school graduation is associated with significantly less boredom than dropping out ($b_{HS} = -0.023$, $p = .004$, 95% CI [−0.04, −0.01]; $M_{noHS} = 0.062$, $SD_{noHS} = 0.242$; $M_{HS} = 0.026$, $SD_{HS} = 0.160$). However,

there was no further reduction in boredom associated with a college degree relative to a high school degree ($b_{\text{college}} = -0.003$, $p = .16$, 95% CI [−0.007, 0.001]; $M_{\text{college}} = 0.022$, $SD_{\text{college}} = 0.146$). Relatedly, we find a negative relationship between boredom and income ($b_{\ln(\text{inc})} = -0.003$, $p = .03$, 95% CI [−0.006, −0.0003]). Full-time employees also experience marginally less boredom, although this result is only weakly significant ($b_{\text{fulltime}} = -0.005$, $p = .055$, 95% CI [−0.010, 0.0001]).

Finally, our analysis points to no significant differences in reported boredom across Black and White participants ($b_{\text{Black}} = -0.006$, $p = .07$, 95% CI [−0.013, 0.0004]; $M_{\text{Black}} = 0.028$, $SD_{\text{Black}} = 0.164$; $M_{\text{White}} = 0.028$, $SD_{\text{White}} = 0.166$) or by parental status ($b_{\text{children}} = 0.000$, $p = .91$, 95% CI [−0.004, 0.004]); $M_{\text{children}} = 0.025$, $SD_{\text{children}} = 0.156$; $M_{\text{nochildren}} = 0.030$, $SD_{\text{nochildren}} = 0.171$).

Situational Correlates of Boredom

We turn next to a within-subject examination of the situational correlates of boredom through five separate regressions. Each corresponds to a distinct category of time-use variables: activity, social setting, location, day-of-week, and time-of-day. Although we recognize the likely collinearity in time-use and potential interactions across these categories, for tractability we report conditional expectations for experienced boredom separately by time-use category. Specifically, for each k set of time-use variables, we estimate a regression of the following form:

$$Boredom_{it} = \alpha + Z^k\gamma + \eta_i + \varepsilon_{it},$$

where Z^k is a vector of the included time-use covariates, and η_i is a set of respondent fixed effects.[3] This specification captures the correlates of boredom after adjusting for idiosyncratic variation in the propensity to be bored across each respondent. Again, robust standard errors are clustered at the respondent level. Figures 1 to 4 plot the predicted boredom implied by these estimates.[4]

Activity. We found that the activities associated with the highest rates of boredom were studying, doing nothing in particular, and working (Figure 1; $b = .045$, $p < .001$, 95% CI [0.031, 0.059]; $b = .020$, $p < .001$, 95% CI [0.016, 0.025]; $b = .016$, $p = .016$, 95% CI [0.013, 0.018], respectively, relative to an excluded mean of .029).[5] The least boring activities were personal grooming or dressing, sleeping/napping, and sports or exercise ($b = -0.011$, $p < .001$, 95% CI [−0.012, −0.009]; $b = -0.014$, $p < .001$, 95% CI [−0.018, −0.011]; $b = -0.014$, $p < .001$, 95% CI [−0.018, −0.011], respectively). As depicted in Figure 1, the differences across these activities were large as respondents were 3 to 6 times more likely to express boredom while working and studying than while playing sports or exercising.

Social setting. The analysis suggests similarly large differences in the propensity to report boredom depending on one's social setting. As shown in Figure 2, respondents were most likely to exhibit boredom in the presence of strangers, coworkers, or alone ($b = 0.014$, $p < .001$, 95% CI [0.010, 0.019]; $b = 0.012$, $p < .001$, 95% CI [0.009, 0.016]; $b = 0.003$, $p < .003$, 95% CI [0.001, 0.005], respectively, relative to an excluded mean of .029). They were rarely bored when with children, a partner or spouse, or friends ($b = -0.005$, $p < .001$, 95% CI [−0.007, −0.003]; $b = -0.008$, $p < .001$, 95% CI [−0.010, −0.006]; $b = -0.013$, $p < .001$, 95% CI [−0.016, −0.011], respectively). These differences imply that respondents were approximately 2.5 times more likely to report boredom when with coworkers or friends.

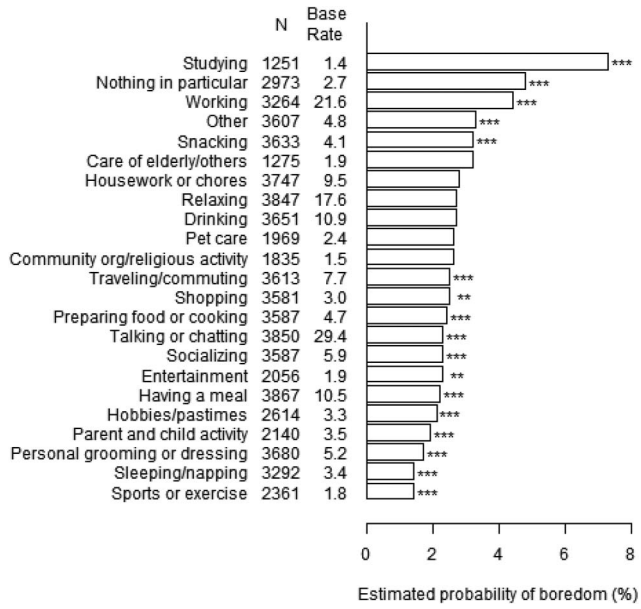

Figure 1. Predicted boredom by activity. *N* designates the number of respondents (out of 3,867) who ever reported doing that activity, whereas the base rate is the percent of reports (out of 1,126,116) where respondents reported that activity. Respondents could indicate more than one activity per report. Predicted boredom rates and significance levels were derived from a regression with categorical activity variables, respondent-level fixed effects, and robust standard errors clustered at the respondent level. ** $p < .01$, *** $p < .001$.

Location. With respect to location, we found that respondents were most frequently bored in schools/colleges, medical facilities, airports, and at work (Figure 3; $b = 0.046$, $p < .001$, 95% CI [0.034, 0.058]; $b = 0.030$, $p < .001$, 95% CI [0.018, 0.043]; $b = 0.022$, $p < .001$, 95% CI [0.004, 0.040]; $b = 0.014$, $p < .001$, 95% CI [0.011, 0.017], respectively, relative to an excluded mean of .031). They were least bored in a fast food restaurant, restaurant or bar, or a gym/health club ($b = -0.012$, $p < .001$, 95% CI [−0.016, −0.008]; $b = -0.018$, $p < .001$, 95% CI [−0.021, −0.015]; $b = -0.021$, $p < .001$, 95% CI [−0.027, −0.015], respectively). These differences, reported in Figure 3, imply that participants were seven times more likely to report boredom when at school or college than when at a gym or health club.

Temporal variation. We find that boredom was experienced with modestly higher frequency during the week than during the weekend ($b_{\text{weekend}} = -0.002$, $p = .01$, 95% CI [−0.004, −0.001], relative to an excluded mean of .028), but there were no statistically significant differences among weekdays or weekend days. With respect to the time-path of boredom within a day, Figure 4

[3] The regressions were estimated with the constraint that $E(\eta) = 0$.

[4] Because of limited data collected between midnight and 6 a.m., these times are excluded from the analysis.

[5] The constant (excluded mean) in each regression reflects the average boredom rate among subjects if all situational values (Z^k) were 0.

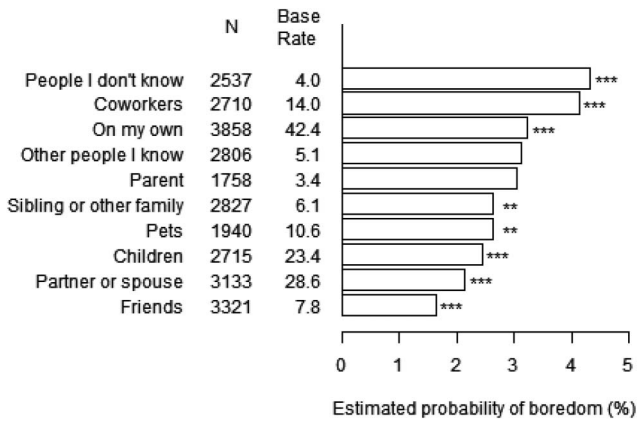

Figure 2. Predicted boredom by social setting. *N* designates the number of respondents (out of 3,867) who ever reported being in that social setting, whereas the base rate is the percent of reports (out of 1,126,116) where respondents reported that social setting. Respondents could indicate more than one social setting per report. Predicted boredom rates and significance levels were derived from a regression with categorical social setting variables, respondent-level fixed effects, and robust standard errors clustered at the respondent level. ** $p < .01$, *** $p < .001$.

shows that boredom peaked in the afternoon (noon to 6 p.m.; $b_{\text{morning}} = -0.005$, $p < .001$, 95% CI [−0.006, −0.004], relative to an excluded mean of 0.032 for midnight to 6 a.m.) and the evening (6 p.m. to midnight; $b_{\text{evening}} = -0.009$, $p < .001$, 95% CI [−0.011, −0.008]). This time-path in boredom exists for both weekdays and weekends but is compressed on weekends.

Analysis of within- and between-subjects variation. Finally, to gain further insight into the relative importance of situational and dispositional variation in predicting the onset of boredom, we decomposed the total variance in boredom to that which occurs between and within subjects. We implemented this test by estimating the above equation, with individual fixed effects, after excluding the time-use coefficients. We found that the share of total variation in boredom due to between-subjects variance is 17.3% whereas the remaining variation is within-subject. Although this decomposition does not unambiguously inform the state versus trait distinction, it underscores the substantial role of situation in predicting reports of boredom.

Decomposition of Sub-Group Differences by Time-Use

Our analysis outlines differences in boredom across demographic groups and situations with particularly pronounced demographic differences by age, gender, income, and marital status. One question that arises from these findings is the extent to which differences in demographic groups can be explained by differences in how, where, and with whom each group spends their time. It is possible, for instance, that men report higher levels of boredom than women because they tend to spend more time participating in boring activities. To explore this question, we used a linear decomposition technique, widely used by economists to understand group differences in economic outcomes (e.g., Neumark, 1988; Oaxaca, 1973), to estimate how much of the mean difference in boredom across demographic groups is attributable to average group differences in time-use, holding fixed time-use coefficients (for recent examples of this technique in psychology, see Bhargava et al., 2016a, 2016b).

We analyzed the four demographic variables that significantly predicted boredom in our data, after excluding differences in race and education due to insufficient sample. Because the exercise involves decomposing a mean difference across two groups into component parts, for age and income, we dichotomized the variables. Participants were divided into income groups using a median split and into age groups using 30 years as a cutoff (the beginning of "young adulthood"; Arnett, 2007). As a point of comparison to time-use, we additionally assessed the share of the overall difference in boredom attributable to group differences in other demographic characteristics. This permitted us to estimate the extent to which differences in reported boredom across each subgroup can be explained through differences in age, employment, and other demographic factors within that group.

We report the results of the analysis in Table 3. The exercise suggests that differences in time-use predict anywhere from 9% to 30% of differences in boredom across the subgroups. Specifically, time-use differences account for 10% of the difference between younger and older individuals, 30% of the difference in reported boredom by gender, 9% of the difference for those of high and low income, and 18% of the difference between those who are married and unmarried. For gender and marital status, the most important set of situational factors were those associated with social setting.

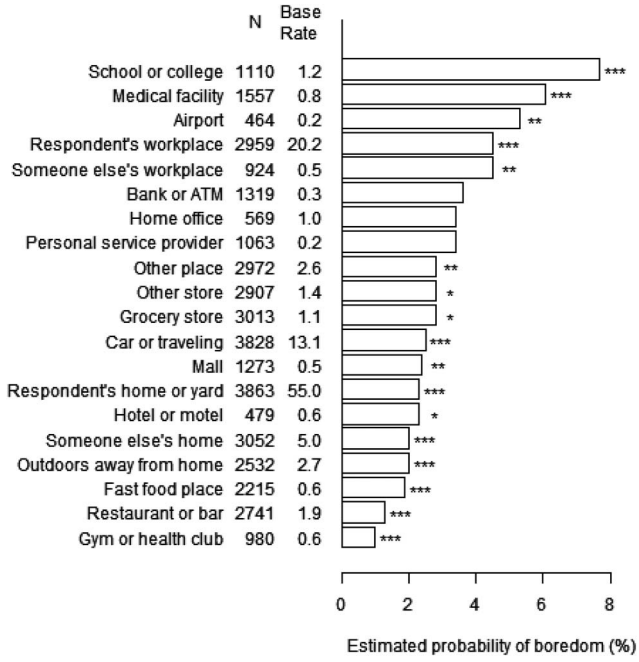

Figure 3. Predicted boredom by location. *N* designates the number of respondents (out of 3,867) who ever reported being in that location, whereas the base rate is the percent of reports (out of 1,126,116) where respondents reported that location. Respondents could indicate more than one location per report. Predicted boredom rates and significance levels were derived from a regression with categorical location variables, respondent-level fixed effects, and robust standard errors clustered at the respondent level. * $p < .05$, ** $p < .01$, *** $p < .001$.

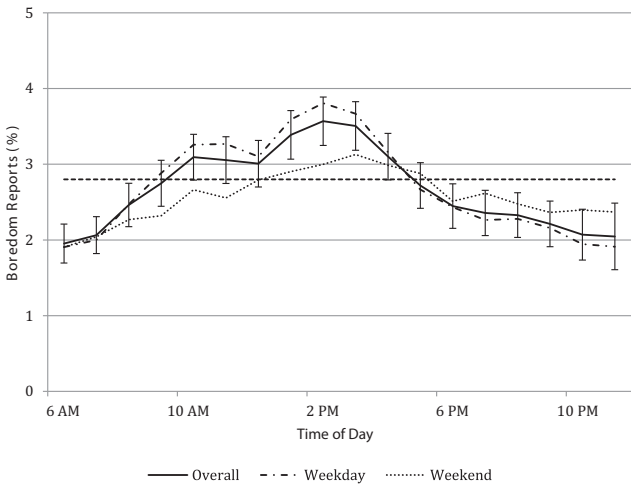

Figure 4. Boredom by time of day. Estimated boredom rates were derived from three regressions (overall, weekday, weekend) with categorical time variables, respondent-level fixed effects, and robust standard errors clustered at the respondent level, excluding reports from midnight to 6 a.m. Around each overall mean, 95% confidence intervals are plotted. The average boredom rate (2.8%) is indicated by the dashed horizontal line.

The table further suggests that these differences in time-use would account for much larger shares of the subgroup differences after conditioning on other demographic factors, particularly in the cases of income and marital status.

Discussion

We address a gap in the existing research on boredom by providing a rich empirical account of the experience of boredom including its emotional, demographic, and situational correlates, and insights into the role of time-use in explaining differences across demographic subgroups. Our initial estimates of the prevalence of boredom suggest that, although 63% of individuals reported experiencing at least one instance of boredom, the average frequency of reported boredom was modest (2.8% of waking half-hours across all subjects, and 4.6% for those reporting any boredom). These estimates situate boredom near the midpoint of prior estimates for prevalence across subjects, which range from 30% to 90% (Campbell, 1981, as cited in Klapp, 1986; Harris, 2000), and on the low end of existing estimates for the average frequency of experiencing boredom, which range from .5% to 23% (Stone et al., 1996; Larson & Richards, 1991, respectively). Our data implies that boredom is rarer than all but one positive emotion, and near the median frequency of negative emotions. Furthermore, a simple comparison of between- and within-subject variance in boredom indicates that only 17% of the total variation in boredom can be explained by differences between individuals. Although only suggestive, these findings are consistent with the importance of situations in explaining variation in boredom.

Perhaps not surprisingly, given that boredom is commonly viewed as a negative emotion, we find that boredom rarely co-occurs with positive emotions, but does co-occur with several negative ones. We find that boredom is closely associated with loneliness, anger, sadness, and worry. The strong association be-

Table 3
Situational and Demographic Decomposition of Mean Differences In Boredom by Age, Gender, Income, and Marital Status

	Demographic Category			
	Young (< 30 years) vs. Old (≥ 30 years)	Male vs. Female	High vs. Low Income	Married vs. Unmarried
Unconditioned mean difference (first—second)	**.045**	**.008**	**−.012**	**−.019**
Proportion explained by differences in:				
Situational factors	**10%**	**30%**	**9%**	**18%**
Activity	5%	8%	6%	4%
Social setting	1%	16%	6%	14%
Location	4%	6%	0%	1%
Other demographic factors	**27%**	**<0%**	**73%**	**26%**
Age	—	—	26%	15%
Gender	1%	—	<0%	<0%
Race	<0%	—	<0%	<0%
Education	9%	—	23%	0%
Income	3%	—	—	18%
Employment	1%	—	19%	0%
Marital status	25%	—	24%	—
Parental status	<0%	—	<0%	<0%

Note. The table reports results of a series of participant-level mean decompositions in experienced boredom across key demographic categories (following Oaxaca, 1973). The first row reports the unconditional mean difference, whereas remaining rows indicate the share of such difference explained by other either demographic or situational factors. Income categories are defined by whether a participant is above or below the sample median household income of $67,500. For example, the first column indicates that youth (<30) report boredom in 4.5% more periods than non-youth. Variation across other demographic categories explains 27% of this difference, whereas differences in time-use explain 10% of the overall mean difference.

tween anger and boredom contradicts previous speculations that, for instance, "as a general rule, a person does not feel bored and frustrated or angry at the same time" (Mikulas & Vodanovich, 1993, p. 7), or that "the environmental conditions that result in boredom and anger are actually quite different" (Bench & Lench, 2013, p. 463). Moreover, our findings are contrary to accounts that boredom is isolated from other emotions (Maddi, 1970).

Our analysis of the demographic and situational correlates of boredom offer evidence on where and when boredom occurs and who is most likely to experience it. This analysis confirms prior work in finding that men are significantly more likely to report boredom than are women, even conditional on other observed demographics, and in finding a negative correlation between age and boredom. We also offer new evidence on the positive link between very low educational attainment and boredom, the negative association between income and boredom, and strong differences in boredom by marital status. Our analysis of situational correlates suggests that the propensity toward boredom varies significantly as a function of one's social surroundings, location, activity, and the time of day. School, work, studying, spending time with strangers or coworkers, and afternoons all rank very high in boredom, whereas sports, spending time with friends and family, being at a restaurant/bar, and mornings and evenings all rank low in boredom.

The importance of situations in predicting boredom is underscored by our inquiry into explanations for the mean differences in boredom observed across demographic subgroups, defined by marital status, age, employment, and gender. Using linear models, we found that a significant share of the average differences in boredom is predicted by differences in average time-use across these groups. For instance, about 30% of the difference in predicted boredom across men and women appears attributable to differences in social time-use, implying that, if the typical male were to spend his time like the typical female, nearly one third of the gap in boredom would be extinguished. The role of situational factors is even larger after accounting for compositional differences between these subgroups across other demographic characteristics.

Overall, we interpret the collective evidence as consistent with cognitive accounts of boredom in which individuals experience boredom due to an inability to engage with or attend to an environment perceived to be uninteresting (Eastwood et al., 2012). Boredom is strongly predicted by certain situations, such as work, study, and time alone, where focus may be difficult to maintain, and during times, such as the afternoon on workdays, when individuals might feel particularly constrained or lacking in agency (Fenichel, 1951; Fisher, 1987). Our findings regarding the situational correlates of boredom fail to support theories of boredom that cast it as emerging from situations lacking in perceived meaning (Barbalet, 1999; Klapp, 1986; Van Tilburg & Igou, 2011), as time spent studying or at work is not obviously less meaningful than time at a gym, restaurant, or outdoors. The evidence for arousal theories of boredom is more mixed but is inconsistent with homogeneous characterizations of boredom as exclusively high or low arousal. In particular, the data reveal a significant co-occurrence of boredom with both anger, which is a high arousal emotion, and sadness, which is a low arousal emotion. Additionally, many situations, such as studying and working, may produce boredom due to an incongruity in desired and experienced arousal.

Despite the advantages of our data for understanding the natural experience of boredom, there are limitations to our approach. Foremost among these limitations is that our data are correlational. Although we are able to exploit high-frequency, within-person variation across a wide range of contexts, it is ultimately unclear whether particular situational contexts lead to boredom, or whether boredom leads individuals toward certain types of time-use. Second, our measure of boredom relies on a single-item pictogram labeled "bored." Without any additional explanation, respondents may have defined boredom in different ways or may have been prompted to think of boredom more narrowly than it is otherwise understood. Partially mitigating such concerns is prior laboratory research that finds that a more complicated multiitem scale yields similar expressions of boredom to single-item measures ("I feel bored"; Markey, Chin, VanEpps, & Loewenstein, 2014). Finally, it is possible that the differences in boredom we observed reflect differences in reported boredom as opposed to the actual experience of it. However, it is reassuring that many of the patterns we observed persist after conditioning analyses to participants with a demonstrated willingness to report boredom at least once.

We see our findings as encouraging several future directions of research. First, additional investigations should be aimed at enriching our understanding of the prevalence and correlates of boredom in the field. Conducting analyses in the context of plausibly exogenous shocks would permit one to identify the causal influence of events in triggering boredom. Second, the use of alternative elicitations of boredom may help to clarify the existence of distinct types of boredom as well as heterogeneity in its interpretation across individuals. Finally, although some have posited that boredom promotes creativity (e.g., Belton & Priyadharshini, 2007), boredom is more notoriously known for its role in leading to adverse outcomes, epitomized by the memorable moniker "the root of all evil" (Kierkegaard, 1843/1987, p. 286). Studying the downstream effects of boredom can help to clarify these relationships. In the end, we hope that such research can be used to inform our understanding of boredom across both laboratory studies and everyday experiences.

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Received July 8, 2014
Revision received August 23, 2016
Accepted August 24, 2016 ■