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journal homepage: www.elsevier.com/locate/joepIncome and boredom: Evidence from 30 countries[☆]Sergio Pirla^{a,*,} Daniel Navarro-Martinez^{b,} Stefan Pfattheicher^{c,} Jordi Quoidbach^d^a Department of Management & IEDIS, University of Zaragoza, Spain^b Department of Economics and Business, Pompeu Fabra University, Barcelona School of Economics, Barcelona School of Management, Spain^c Department of Psychology and Behavioural Sciences, Aarhus University, Denmark^d ESADE Business School, Universitat Ramon Llull, Spain

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ABSTRACT

For decades, researchers, governments, and policymakers have sought to understand how financial scarcity affects people's well-being and quality of life. In this paper, we show that past studies have overlooked a fundamental psychological aspect of being poor: boredom. Using data from over 60,000 individuals across 30 countries, we find a robust negative association between income and daily experiences of boredom. In fact, compared with high-income earners, low-income individuals not only feel bored more often, but their experience of boredom is more closely linked to other negative states such as loneliness, worry, and anxiety. While the relationship between income and boredom does not differ between white- and blue-collar occupations, it is significantly stronger among individuals whose primary source of income consists of social transfers, such as unemployment benefits or pensions. Our results pave the way for future research and policies that take boredom into account and address the full extent of the psychological tax exerted by financial hardship.

1. Introduction

Can money make your life more interesting? When asked to describe the good life, people worldwide say they not only want a life filled with happiness and meaning but also with interesting and perspective-changing experiences (i.e., a psychologically rich life, Oishi et al., 2020; Oishi & Westgate, 2022). While decades of research have focused on the relationship between income and happiness or meaning (Frey & Stutzer, 2002; Kahneman & Deaton, 2010; Ward & King, 2016; Yeniaras et al., 2016), in the present contribution we show that money might help to avoid boredom.

Boredom is a negative emotional state that arises when we are faced with unengaging situations (Chan et al., 2018; Danckert & Elpidorou, 2023; Eastwood et al., 2012; Van Tilburg & Igou, 2011, 2012; Van Tilburg et al., 2013). Boredom is common in daily

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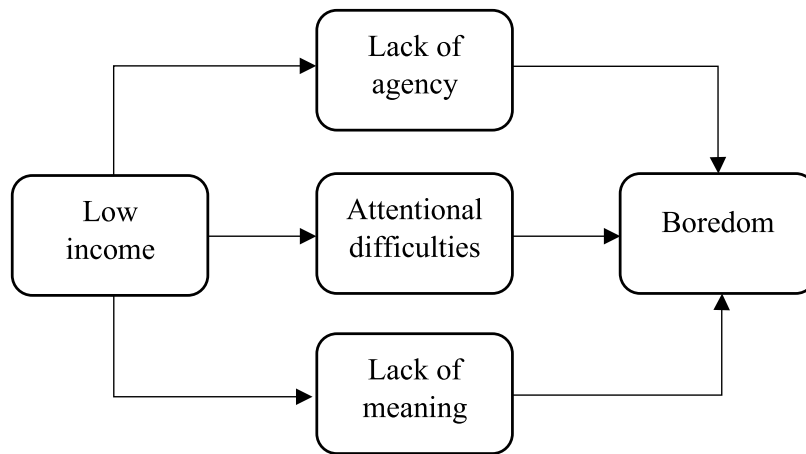


Fig. 1. Theoretical pathways linking income and boredom as proposed in Elpidorou's (2022) model.

life: over the course of a week, roughly two out of three people report feeling bored at least once (Chan et al., 2018; Goetz et al., 2014). While this transient feeling may motivate individuals to seek more fulfilling activities, the frequent experience of boredom has been related to undesirable outcomes such as impulsivity (Moynihan et al., 2017; Watt & Vodanovich, 1992), noisy decision-making (Wolff et al., 2022; Yakobi & Danckert, 2021), antisocial behaviors (Dahlen et al., 2004; Pfattheicher et al., 2023, 2021; Rupp & Vodanovich, 1997; Yucel & Westgate, 2022), and addictions (Blaszczynski et al., 1990; Iso-Ahola & Crowley, 1991; Sommers & Vodanovich, 2000). Among other things, bored individuals engage more often in risky behaviors such as gambling, unprotected sex, and risky driving (Biolcati et al., 2018; Blaszczynski et al., 1990; Dahlen et al., 2005). Boredom has also been linked to an array of mental health issues, including depression and anxiety (Farmer & Sundberg, 1986; Goldberg & Danckert, 2013; Masland et al., 2020; Sommers & Vodanovich, 2000; Todman, 2007; Vodanovich et al., 1991).

There are several reasons why some people may get bored more easily, and most of the existing research has focused on the individual rather than on external factors (Westgate & Wilson, 2018). Studies suggest, for example, that some people have a stronger need for novelty and stimulation: Individuals who score high in sensation-seeking, a personality trait linked to the dopamine system, are more prone to boredom (Zuckerman, 1994). Similarly, individuals with lower attentional capacities or those who are easily distracted, are also more prone to boredom as they may have difficulty focusing on a single task for an extended period (Danckert & Merrifield, 2018; Malkovsky et al., 2012).

Besides these individual factors, recent theorizing suggests that the experience of boredom might also be shaped by socioeconomic forces (Elpidorou, 2022; Lin & Westgate, 2022). Psychological research has identified three principal antecedents of boredom: lack of agency, perceived meaninglessness, and attentional constraints (Gorelik & Eastwood, 2024; Westgate & Wilson, 2018). Elpidorou (2022) argues that these conditions are more frequently encountered by low-income individuals. For instance, material circumstances limit the range of actions available to us. By expanding one's set of feasible alternatives, income reduces restrictions and enhances the sense of agency. Similarly, past work has shown that financial well-being is positively associated with a sense of meaning in life (Ward & King, 2016, 2019), further suggesting that low-income individuals may be more vulnerable to the meaninglessness dissatisfaction that gives rise to boredom. Finally, the scarcity mindset literature (De Bruijn & Antonides, 2022; Shah et al., 2012) argues that a lack of financial resources demands constant attention to monetary concerns, depleting attentional resources and limiting one's ability to engage with non-scarcity-related tasks—another key antecedent of boredom. Overall, these theoretical accounts suggest that individuals from low socio-economic backgrounds may be more prone to experiencing boredom due to diminished autonomy, attentional limitations, and perceived meaninglessness in their daily lives (see Fig. 1). Providing indirect evidence for this idea, research shows that boredom was more widespread in low-income countries during the 2020 COVID-19 pandemic (Westgate et al., 2023), and that the experience of boredom is particularly prevalent among homeless populations (see Marshall et al. (2020), for a review).

Yet, direct empirical tests of the relationship between boredom and income do not provide a clear picture. Some work, primarily involving small samples of young adults, suggests that low-income individuals are more prone to experiencing boredom (Jervis et al., 2003; Martz et al., 2018; Willging et al., 2014). Supporting this view, Rojas (2011) analyzed psychological well-being predictors among 12,500 Latin American participants and found that lower-income individuals were more likely to report feeling bored for much of the previous day compared to wealthier respondents. In contrast, a study by Chin et al. (2017) involving a large and diverse sample of over 3000 U.S. residents indicates that the negative relationship between income and daily boredom can be largely explained by confounding factors like age, education, and marital status.

Here, we use data from over 60,000 individuals from 30 different countries to perform a large-scale examination of the relationship between income and boredom. Specifically, we examine the relationship between income and boredom in two large samples, one of Europeans (European Social Survey, ESS) and one of individuals from six low- and middle-income countries (World Health Organization Study on Global Aging and Adult Health, WHO SAGE). Both samples contain information on the participants'

Table 1
Summary statistics (ESS).

Variable	N	Mean	Std. dev.	Min	Pctl. 25	Pctl. 75	Max
Age	34 677	48.2	18	14.8	33.8	62	97.7
Education	34 677						
... Less than lower secondary education (ISCED 0-1)	4117	11.9%					
... Lower secondary education completed (ISCED 2)	6352	18.3%					
... Upper secondary education completed (ISCED 3)	13 739	39.6%					
... Post-secondary non-tertiary education completed (ISCED 4)	1026	3%					
... Tertiary education completed (ISCED 5-6)	9411	27.1%					
... Other	32	0.1%					
Gender	34 677						
... Female	18 778	54.2%					
... Male	15 899	45.8%					
Income	34 677	23 767	22 860	600	4800	33 000	105 000
Boredom	34 677	1.45	0.671	1	1	2	4
Anxiety	34 677	1.67	0.747	1	1	2	4
Depression	34 677	1.53	0.714	1	1	2	4
Effortfulness	34 677	1.74	0.797	1	1	2	4
Lethargy	34 677	1.62	0.734	1	1	2	4
Loneliness	34 677	1.48	0.75	1	1	2	4
Sadness	34 677	1.62	0.711	1	1	2	4
Tiredness	34 677	2.05	0.746	1	2	2	4
Income source	34 354						
... Capital income	153	0.4%					
... Employment	22 960	66.8%					
... Other	480	1.4%					
... Social transfers	10 761	31.3%					
Job type	31 920						
... Blue collar	11 832	37.1%					
... White collar	20 088	62.9%					

experiences of boredom during the last week (ESS) or in the previous day (WHO SAGE). They also contain self-reported information on yearly income (ESS) and a measure of permanent income estimated using information on the participants' access to services and ownership of durable goods (WHO SAGE).

Our results show that low-income individuals experience boredom more frequently. Expanding on previous research, we demonstrate that this relationship remains robust after controlling for other negative emotions, showing that the link between income and boredom extends beyond a general negative-emotion effect. Moreover, our results reveal that low-income individuals not only experience boredom more often but also that their experience of boredom is more strongly associated with other negative emotions such as loneliness, worry, or anxiety. While the relationship between income and boredom does not differ between white- and blue-collar occupations, it is significantly stronger among individuals whose primary source of income consists of social transfers, such as unemployment benefits or pensions.

2. Data

We employ two main datasets. In this section, we first present the European Social Survey (ESS). We then move to the World Health Organization Study on Global Aging and Adult Health (WHO SAGE).

2.1. European Social Survey (ESS)

The European Social Survey (ESS, 2006) is a publicly available multi-country survey. In its 2006 wave (but not in other waves), the ESS included a measure of boredom. Our main variables are available for 34,677 participants from 25 European countries. Descriptive statistics are presented in Table 1 and the distribution of responses by country is presented in Table 2.

In 23 of the countries included in the survey, net household income (from all sources) was measured using a fixed 12-point bracket scale (see the online appendix for details). In the other two countries (Hungary and Romania) household income was measured using a different 13-point and 12-point bracket scale, respectively. Following standard approaches in the income and well-being literature (Kahneman & Deaton, 2010; Killingsworth, 2021), we used the participants' responses to the income category scale to approximate yearly income after tax (in euros) using the midpoint of each bracket. That is, if a person reported earning between €60,000 and €90,000, we assigned them a numerical value of €75,000. As we could not assign an income level to those in the top bracket (i.e., more than 120,000 euros per year), we excluded their responses. In the online appendix, we show that our main results remain unchanged when including this group of participants.

Aside from income, participants also reported how often they experienced eight negative affective states (boredom, depressed mood, effortfulness, loneliness, sadness, lethargy, anxiety, and tiredness) in the past week using a 4-point Likert scale (from 1 "None or almost none of the time" to 4 "All or almost all of the time").

Table 2
Sample distribution by country (ESS).

Country	N	% Total observations	Country	N	% Total observations
AT	1,408	4.1%	IE	1,148	3.3%
BE	1,539	4.4%	LV	1,418	4.1%
BG	921	2.7%	NL	1,642	4.7%
CH	1,359	3.9%	NO	1,577	4.5%
CY	778	2.2%	PL	1,316	3.8%
DE	2,119	6.1%	PT	1,178	3.4%
DK	1,287	3.7%	RO	1,719	5%
EE	961	2.8%	RU	1,723	5%
ES	1,103	3.2%	SE	1,745	5%
FI	1,699	4.9%	SI	1,139	3.3%
FR	1,724	5%	SK	1,001	2.9%
GB	1,782	5.1%	UA	1,164	3.4%
HU	1,227	3.5%			

Table 3
Summary statistics (WHO).

Variable	N	Mean	Std. dev.	Min	Pctl. 25	Pctl. 75	Max
Age	28 722	56.6	14.4	18	50	66	103
Education	28 722						
... Less than primary school	5996	20.9%					
... Completed primary school	6830	23.8%					
... Completed secondary school	6330	22%					
... Completed high school	6642	23.1%					
... Completed college/university	2613	9.1%					
... Completed post-graduate degree	277	1%					
... Don't know	33	0.1%					
... Not applicable	1	0%					
Gender	28 722						
... Male	13 877	48.3%					
... Female	14 845	51.7%					
Permanent Income	28 722	0.179	0.963	−4.23	−0.516	0.874	3.51
Boredom	28 722	0.101	0.301	0	0	0	1
Anger	28 722	0.0791	0.27	0	0	0	1
Depression	28 722	0.0713	0.257	0	0	0	1
Loneliness	28 722	0.095	0.293	0	0	0	1
Rush	28 722	0.138	0.345	0	0	0	1
Stress	28 722	0.119	0.324	0	0	0	1
Worry	28 722	0.112	0.315	0	0	0	1
Job type	22 157						
... Blue collar	15 121	68.2%					
... White collar	7036	31.8%					

Note: Sample distribution by country: Total N = 28,722; China = 11,235 (39.1%); Ghana = 2,513 (8.7%); India = 6,108 (21.3%); Mexico = 2,171 (7.6%); Russia = 4,151 (14.5%); South Africa = 2,544 (8.9%).

From this dataset, we also employ the participants' age, gender, country of residence, and educational attainment (reported on 6 different categories, see Table 1) as control variables.

Finally, for a subset of individuals, we had information on their occupation (classified using the ISCO-88 system) and main source of income. Based on the ISCO-88 classification, we constructed a “job type” binary variable by differentiating between white-collar (major ISCO-88 groups 1–5) and blue-collar occupations (major ISCO-88 groups 6–10). In doing so, we distinguish between occupations that typically involve managerial or clerical tasks (white collar) and occupations that generally involve manual labor and repetitive procedures (blue collar). We also constructed a set of binary variables capturing participants' main source of income. This way, we categorized respondents into those whose primary income came from employment (wages or income from self-employment), capital income (returns from investments or savings), social transfers (such as pensions, unemployment benefits, or other social support programs), or other sources.

2.2. World Health Organization study on global aging and adult health (WHO SAGE)

Next, we focus on the World Health Organization Study on Global Aging and Adult Health (WHO SAGE, Chatterji and Kowal (2013)), which gathers information on individuals from 6 low- and middle-income countries (China, Ghana, India, Mexico, Russia, and South Africa). In this case, our variables of interest were available for 28,722 individuals. We provide a full overview of our sample's main descriptive statistics (including our sample distribution by country) in Table 3.

In the WHO SAGE study, income was estimated indirectly using information on participants' access to services and ownership of durable goods. More specifically, each participant provided information on a country-specific list of 21 items (e.g., “Do you own

a refrigerator?”). Using this information, households were positioned on an “asset ladder” and a measure of permanent income was obtained using a post-Bayesian estimator. This final measure of permanent income was included in the WHO SAGE dataset (i.e., it was not estimated by our research team). In developing countries, past research shows that this measure of permanent income is more reliable than self-reported questionnaires (Ferguson et al., 2003). Since our measure of income was derived using a country-specific list of items, we standardized our income measure within each country before running our analyses.

Aside from income, participants were asked whether they experienced (or not) seven different negative emotions (bored, depressed, worried, rushed, angry, stressed, or lonely) for much of the past day. We coded these responses as a binary variable taking a value of 1 if the participant reported experiencing a given emotion for much of the day, and 0 otherwise.

As in our ESS analyses, we used the participants’ age, gender, country of residence, and educational attainment (reported on 8 different categories) as control variables.

For a subset of individuals, we had information on their occupation (classified using the ISCO-88 system). As in the ESS dataset, we used this information to construct a “job type” variable that classified individuals into those with a white-collar (ISCO major groups 1–5) and blue-collar (ISCO major groups 6–10) job. In this dataset, information on participants’ main income source was not available.

3. Empirical strategy

In the first set of analyses, we investigated the relationship between income and boredom. Next, we tested whether boredom was more closely related to other negative emotions for low-income individuals.

3.1. European Social Survey (ESS)

In line with previous research on income and emotions (Brown & Gathergood, 2020; Ferrer-i Carbonell, 2013; Quispe-Torreblanca et al., 2021), we assumed a logarithmic relationship between yearly household income and boredom. Thus, we used the logarithm of yearly income as our main predictor. Using OLS, we estimated the following regression model with robust standard errors clustered at the country level:

$$B_{ij} = \beta_0 + \beta_1 \cdot \text{Log } Y_{ij} + K'_j \cdot \delta_1 + \epsilon_{ij} \quad (1)$$

B_{ij} represents the boredom reported by individual i in country j , $\text{Log } Y_{ij}$ represents the logarithm of the respondent’s household income, K_j represents a vector of country-level binary variables, and ϵ_{ij} is a normally distributed error term.

Building on this specification, we sequentially control for participants’ demographic characteristics (age, gender, educational attainment) and other negative emotions. Specifically, we estimate the following two additional models:

$$B_{ij} = \beta_0 + \beta_1 \cdot \text{Log } Y_{ij} + K'_j \cdot \delta_1 + D'_{ij} \cdot \delta_2 + \epsilon_{ij} \quad (2)$$

$$B_{ij} = \beta_0 + \beta_1 \cdot \text{Log } Y_{ij} + K'_j \cdot \delta_1 + D'_{ij} \cdot \delta_2 + E'_{ij} \cdot \delta_3 + \epsilon_{ij} \quad (3)$$

Besides the previously defined variables, D_{ij} represents a vector of demographic variables, including age, gender, and educational attainment, while E_{ij} denotes a vector of negative emotions, including depression, effortfulness, loneliness, sadness, lethargy, anxiety, and tiredness.

To complement our main analyses, we estimated a more parsimonious model using Principal Component Analysis (PCA) to construct a composite index of negative emotions. Specifically, we extracted the first principal component from participants’ responses to all negative emotional states – excluding boredom – and used the resulting scores as a summary measure of negative emotion. In both datasets, this first component accounted for a substantial proportion of the total variance across emotion items (51.2% in the ESS and 45.6% in the WHO SAGE dataset). Using this measure of negative emotion, we estimated the following model:

$$B_{ij} = \beta_0 + \beta_1 \cdot \text{Log } Y_{ij} + \beta_2 \cdot \text{NE}_{ij} + K'_j \cdot \delta_1 + D'_{ij} \cdot \delta_2 + \epsilon_{ij} \quad (4)$$

Besides the previously defined variables, NE_{ij} represents the PCA index of negative emotion.

After establishing the relationship between income and boredom, we then evaluate the relationship between income, boredom, and other negative emotions. To test whether boredom is more closely associated with other negative emotions for low-income individuals, we estimated seven separate regression models—one for each negative emotion other than boredom in our dataset. Specifically, let A represent a given negative emotion other than boredom. We then estimated the following model using OLS with robust standard errors clustered at the country level:

$$A_{ij} = \beta_0 + \beta_1 \cdot \text{Log } Y_{ij} + \beta_2 \cdot B_{ij} + \beta_3 \cdot B_{ij} \cdot \text{Log } Y_{ij} + K'_j \cdot \delta_1 + D'_{ij} \cdot \delta_2 + E'_{ij} \cdot \delta_3 + \epsilon_{ij} \quad (5)$$

In addition to the previously defined variables, E_{ij} represents a vector of negative emotions that excludes boredom and the specific negative emotion used as the dependent variable.

To conclude this section with a more parsimonious model, we also estimated the following specification:

$$NE_{ij} = \beta_0 + \beta_1 \cdot \text{Log } Y_{ij} + \beta_2 \cdot B_{ij} + \beta_3 \cdot B_{ij} \cdot \text{Log } Y_{ij} + K'_j \cdot \delta_1 + D'_{ij} \cdot \delta_2 + \epsilon_{ij} \quad (6)$$

In doing so, we present a simplified picture of the relationship between income, boredom and other negative emotions using our PCA index.

Finally, we analyzed whether the relationship between income and boredom varies depending on the respondent's source of income and occupational type. To study the role of job type, we expanded on our main specification (Eq. (2)) and estimated the following two models:

$$B_{ij} = \beta_0 + \beta_1 \cdot \text{Log } Y_{ij} + \beta_2 \cdot BC_{ij} + K'_j \cdot \delta_1 + D'_{ij} \cdot \delta_2 + \epsilon_{ij} \quad (7)$$

$$B_{ij} = \beta_0 + \beta_1 \cdot \text{Log } Y_{ij} + \beta_2 \cdot BC_{ij} + \beta_3 \cdot \text{Log } Y_{ij} \cdot BC_{ij} + K'_j \cdot \delta_1 + D'_{ij} \cdot \delta_2 + \epsilon_{ij} \quad (8)$$

Here, BC_{ij} is a binary indicator equal to 1 if the respondent is employed in a blue-collar occupation and 0 if employed in a white-collar job. These models allow us to test not only whether job type is independently associated with boredom, but also whether the relationship between income and boredom differs between blue- and white-collar workers.

To analyze the role of income source, we replicated these two models, replacing the blue-collar indicator variable (BC_{ij}) with a set of binary variables indicating whether the respondent's main source of income is employment, social transfers, capital income, or other sources.

All variables, except for gender, educational attainment, source of income, and job type were standardized (i.e., z-score normalized) before running our analyses. For the standardized variables, the reported coefficients represent the change in the dependent variable (in standard deviations) associated with a 1 SD increase in the predictor variables. For gender, educational attainment, income source, and job type, which were not standardized, the coefficients represent the change in the dependent variable (in standard deviations) associated with reporting a specific category.

3.2. World Health Organization study on global aging and adult health (WHO SAGE)

We replicated the ESS analyses using the WHO SAGE dataset. However, in this set of analyses we introduced three changes.

First, since the income variable in this dataset does not represent yearly income, is approximately normally distributed, and is less skewed than typical monetary measures (see Table 3), we did not impose a logarithmic relationship between income and boredom. Instead, we used the income variable directly, without applying a logarithmic transformation, as the main predictor in our models.

Second, since our negative emotion variables differ from those in the ESS, we tested the relationship between income, boredom, and other negative emotions using a set of six regression models, with anger, depression, loneliness, rush, stress, and worry as the dependent variables. As in the ESS analyses, in some specifications, we summarized these negative emotion variables into a single index using Principal Component Analysis.

Third, information on respondents' main source of income was not available in this dataset. As a result, we did not conduct any analyses related to income source using this dataset.

As in our previous analyses, we standardized (z-score normalized) our numeric variables before estimating the models.

4. Results

4.1. European Social Survey (ESS)

Across model specifications, we found that a higher income is associated with experiencing boredom less often (see Table 4). For instance, on average (and controlling for demographic characteristics, Model 2) doubling one's income was associated with a reduction in boredom of 0.12 SDs (i.e., 0.08 units on a 1 to 4 scale). The logarithmic relationship between income and boredom (see Fig. 2) suggests that this relationship was stronger for lower levels of income. For example, we found a difference of 0.18 SDs in boredom (i.e., 0.12 units on a 1 to 4 scale) between those with a monthly income of less than 1000 euros and those earning between 1000 and 2000 euros per month. On the other hand, those making between 3000 and 4000 euros per month only experienced a reduction in boredom frequency of 0.06 SDs (i.e., 0.04 units on a 1 to 4 scale) compared with those making between 2000 and 3000 euros per month.

The relationship between income and boredom remains significant when controlling for demographic variables (age, gender, and educational attainment of the respondent) and other negative emotions (see Table 4, Model 3). It also remains significant when controlling for our PCA index of negative emotion (Table 4, Model 4). These results suggest that the relationship between income and boredom goes beyond a general negative-emotion effect.

Expanding our linear models to explore the relationship between income, boredom, and other negative emotions, we find that boredom is significantly associated with every negative emotion measured in the ESS dataset (Table 5), although this relationship does not reach statistical significance for effortfulness. Aside from this relationship, the standardized regression coefficients between boredom and other negative emotions range from 0.04 (for depression) to 0.17 (for loneliness)—representing very small to small-size associations.

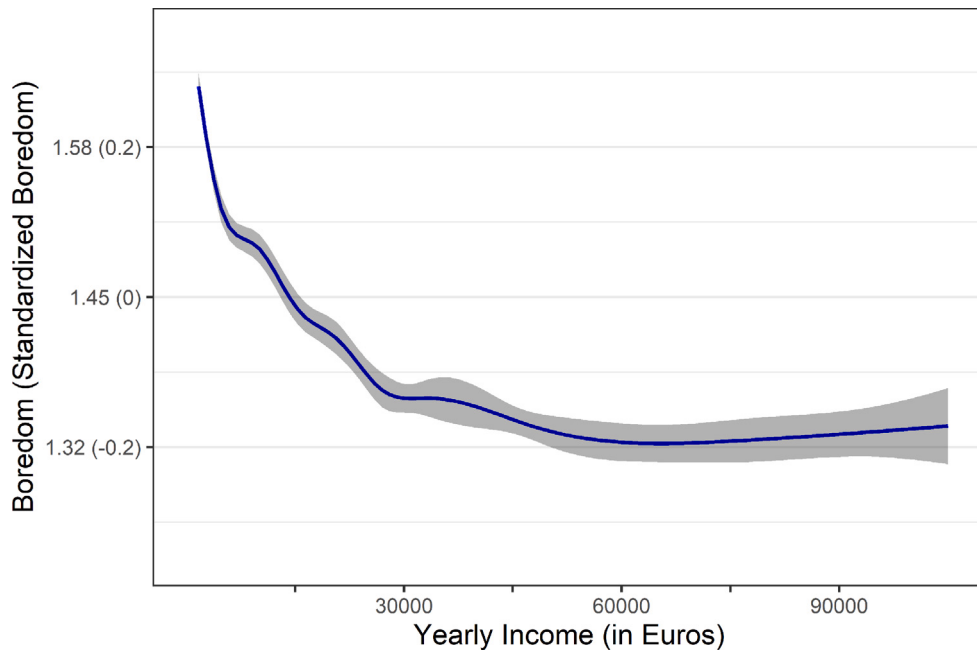


Fig. 2. Smoothed average boredom as a function of income (ESS). Smoothing obtained by Generalized Additive Models. Shaded area represents 95% confidence interval. Values on the y-axis represent boredom raw scores (given on a 4-point Likert scale from 1 “None or almost none of the time” to 4 “All or almost all of the time”). Standardized boredom values are presented in parenthesis.

Apart from this, we find significant interactions between the log of income and boredom in predicting some negative emotions. Specifically, boredom has a significantly stronger relationship with anxiety, lethargy, loneliness, and sadness for low-income individuals.

The sizes of these significant interactions are non-negligible. For instance, the standardized coefficient of boredom on sadness is 0.063 for an individual with a monthly income of approximately 1000 euros. In contrast, for individuals earning approximately 3000 euros per month, this standardized coefficient drops to 0.048, a relative reduction of more than 20% in the strength of the relationship between boredom and sadness. Looking at anxiety, lethargy, and loneliness, we find a similar relative decrease in the strength of the association between boredom and these negative emotions when comparing these two income groups.

Looking at the results from our final specification (Table 5, Model 8), we observe a similar pattern. The negative emotion index derived via PCA is significantly associated with income, boredom, and their interaction. To contextualize these findings, we estimate that for an individual earning approximately 1000 euros per month, the standardized coefficient of boredom on other negative emotions is around 0.40. In comparison, for those earning about 3000 euros per month, this coefficient decreases to approximately 0.35—a relative reduction of 15% in the strength of the association between boredom and other negative emotions. These results show that low-income earners not only feel bored more often, but that their experience of boredom is more closely associated with other negative emotions.

Finally, we evaluated whether the relationship between income and boredom varies across types of occupation or income sources. The results of these additional analyses are presented in Table 6. Model 1 replicates our baseline specification for reference (corresponding to Model 2 in Table 4). Building on this model, we first examined the role of occupational type. As shown in Models 2 and 3, we find a significant main effect of job type: individuals employed in blue-collar occupations report experiencing more boredom than those in white-collar jobs. While this effect is statistically significant, its magnitude is modest—on average, blue-collar workers report boredom levels approximately 0.04 points higher than white-collar workers on our 1 to 4 boredom scale. Importantly, the inclusion of our job-type variable does not meaningfully alter the coefficient of log income on boredom, suggesting that the income–boredom relationship cannot be explained by differences in occupational type. In Model 3, we also incorporated the interaction term between log income and our blue-collar indicator. The results demonstrate that this interaction is not statistically significant, indicating that the relationship between income and boredom does not differ across job types. Overall, while blue-collar workers experience slightly higher levels of boredom, the relationship between income and boredom is consistent across occupational categories.

Moving to the income-source analyses, in Model 4 (Table 6), we introduced a set of binary indicators denoting whether the respondent’s primary source of income was capital income, social transfers, or other sources, using individuals whose main source of income was employment as the reference category. Compared to respondents whose primary income came from employment, those who relied on social transfers reported significantly higher levels of boredom. This effect is non-negligible in magnitude,

Table 4
Main results (ESS).

	<i>Dependent variable:</i>			
	Boredom (1)	(2)	(3)	(4)
Log income	−0.183*** (0.023)	−0.166*** (0.024)	−0.038* (0.019)	−0.052** (0.020)
Age		−0.081*** (0.021)	−0.101*** (0.014)	−0.101*** (0.014)
Female		−0.043* (0.021)	−0.130*** (0.015)	−0.136*** (0.016)
Lower secondary education completed		−0.072* (0.031)	−0.021 (0.021)	−0.025 (0.022)
Upper secondary education completed		−0.206*** (0.028)	−0.104*** (0.020)	−0.110*** (0.020)
Post-secondary non-tertiary education completed		−0.274*** (0.041)	−0.143** (0.047)	−0.150** (0.048)
Tertiary education completed		−0.300*** (0.026)	−0.174*** (0.018)	−0.181*** (0.019)
Other education		0.148* (0.072)	0.311*** (0.038)	0.286*** (0.041)
Anxiety			0.077*** (0.010)	
Depression			0.061*** (0.014)	
Effortfulness			0.014 (0.008)	
Lethargy			0.157*** (0.012)	
Loneliness			0.200*** (0.014)	
Sadness			0.093*** (0.014)	
Tiredness			0.039*** (0.010)	
Negative emotion				0.452*** (0.027)
Constant	−0.007 (0.009)	0.192*** (0.032)	0.142*** (0.024)	0.177*** (0.025)
Observations	34,677	34,677	34,677	34,677
R ²	0.095	0.107	0.293	0.275
Adjusted R ²	0.094	0.106	0.292	0.274
Residual Std. Error	0.952	0.945	0.842	0.852
F Statistic	144.713***	129.548***	367.212***	398.426***

Note: *p<0.05; **p<0.01; ***p<0.001. Values in parentheses represent robust standard errors clustered at the country level. Coefficients of country dummies not presented for brevity.

corresponding to an increase of approximately 0.13 points on our 1 to 4 boredom scale. Differences between individuals relying on employment income and the other two categories – capital income and other sources – were not statistically significant.

In Model 5, we extended this analysis by adding interaction terms between each income-source indicator and log income. The interaction between income and the social transfers indicator was negative and statistically significant. That is, the relationship between boredom and income is stronger for individuals relying on social transfers. In fact, Model 5 suggests that the negative

Table 5
Additional results (ESS, Part 1).

	<i>Dependent variable:</i>							
	Anxiety	Depression	Effortfulness	Lethargy	Loneliness	Sadness	Tiredness	Negative emotion
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Boredom	0.058*** (0.008)	0.044*** (0.009)	0.014 (0.007)	0.133*** (0.011)	0.173*** (0.013)	0.062*** (0.008)	0.038*** (0.010)	0.399*** (0.016)
Log income	−0.008 (0.011)	−0.037** (0.012)	−0.040*** (0.009)	−0.030* (0.013)	−0.121*** (0.010)	−0.018 (0.010)	0.024* (0.011)	−0.177*** (0.011)
Boredom * Log income	−0.016** (0.005)	−0.002 (0.008)	0.005 (0.005)	−0.018* (0.008)	−0.032*** (0.007)	−0.017** (0.005)	0.001 (0.007)	−0.060*** (0.010)
Anxiety		0.151*** (0.010)	0.067*** (0.008)	0.069*** (0.010)	0.054*** (0.009)	0.188*** (0.009)	0.193*** (0.015)	
Depression	0.169*** (0.012)		0.273*** (0.014)	0.101*** (0.011)	0.121*** (0.012)	0.260*** (0.017)	0.056*** (0.012)	
Effortfulness	0.064*** (0.008)	0.233*** (0.019)		0.167*** (0.016)	0.036*** (0.007)	0.031*** (0.005)	0.221*** (0.012)	
Lethargy	0.064*** (0.009)	0.083*** (0.012)	0.162*** (0.011)		0.075*** (0.010)	0.129*** (0.020)	0.162*** (0.011)	
Loneliness	0.049*** (0.008)	0.097*** (0.011)	0.034*** (0.006)	0.073*** (0.008)		0.201*** (0.008)	0.015 (0.009)	
Sadness	0.214*** (0.010)	0.264*** (0.017)	0.037*** (0.006)	0.159*** (0.021)	0.255*** (0.012)		0.057*** (0.008)	
Tiredness	0.160*** (0.016)	0.041*** (0.009)	0.192*** (0.010)	0.146*** (0.012)	0.014 (0.008)	0.041*** (0.006)		
Constant	−0.019 (0.016)	0.006 (0.020)	0.083*** (0.022)	0.059* (0.024)	0.172*** (0.025)	−0.072** (0.025)	−0.282*** (0.031)	−0.052 (0.030)
Observations	34,677	34,677	34,677	34,677	34,677	34,677	34,677	34,677
R ²	0.427	0.489	0.400	0.379	0.360	0.496	0.309	0.336
Adjusted R ²	0.427	0.488	0.399	0.378	0.359	0.495	0.308	0.335
Residual Std. Error	0.757	0.715	0.775	0.789	0.800	0.710	0.832	0.815
F Statistic	646.450***	828.294***	576.915***	528.027***	487.217***	851.916***	386.317***	514.700***

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Values in parentheses represent robust standard errors clustered at the country level. Coefficients of demographic variables and country dummies not presented for brevity.

association between the log of income and boredom is approximately twice as strong for those receiving social transfers compared to those relying on employment income. The interactions between the remaining income-source categories and income were not significant.

Taken together, our results suggest that, compared to individuals who rely on employment income, those relying on social transfers experience higher levels of boredom and exhibit a stronger negative association between income and boredom.

4.2. World Health Organization study on global aging and adult health (WHO SAGE)

These results were largely replicated using the WHO SAGE dataset. Again, our analyses revealed that permanent income is associated with lower levels of boredom (see Fig. 3), a relationship that is robust to controlling for the respondents' demographic characteristics (see Table 7, Model 2). Controlling for negative emotions—either by including them individually as control variables (Table 7, Model 3) or by using the PCA-based negative emotion index (Table 7, Model 4)—does not qualitatively impact our results. On average, respondents reported experiencing boredom during much of the past day with a probability of 10.1%. Yet, a 1 standard deviation increase in permanent income (Table 7, Model 2) is associated with a 2.83 percentage point decrease in this probability, representing a relative reduction of 30% in our measure of boredom.

As in the ESS dataset, boredom is positively associated with each of the six negative emotions measured in the WHO SAGE data, though the association between boredom and feeling rushed is not statistically significant (see Table 8). Aside from this relationship, the standardized regression coefficients between boredom and other negative emotions range from 0.049 (for stress) to 0.375 (for loneliness), indicating very small to medium-size associations.

Table 6
Additional results (ESS, Part 2).

	Dependent variable:				
	Boredom (1)	(2)	(3)	(4)	(5)
Log income	−0.166*** (0.024)	−0.170*** (0.024)	−0.161*** (0.023)	−0.127*** (0.024)	−0.093*** (0.025)
Blue collar		0.065*** (0.016)	0.062*** (0.017)		
Log income * Blue collar			−0.023 (0.016)		
Income source: Capital				0.088 (0.081)	0.132 (0.096)
Income source: Other				0.088 (0.051)	0.100 (0.057)
Income source: Social transfers				0.192*** (0.024)	0.172*** (0.030)
Log income * Income source: Capital					−0.120 (0.086)
Log income * Income source: Other					−0.027 (0.045)
Log income * Income source: Social transfers					−0.091*** (0.021)
Constant	0.192*** (0.032)	0.149*** (0.029)	0.146*** (0.029)	0.096** (0.035)	0.088** (0.033)
Observations	34,677	31,920	31,920	34,354	34,354
R ²	0.107	0.108	0.108	0.111	0.113
Adjusted R ²	0.106	0.107	0.107	0.110	0.112
Residual Std. Error	0.945	0.945	0.945	0.943	0.942
F Statistic	129.548***	117.165***	113.848***	122.624***	114.855***

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Values in parentheses represent robust standard errors clustered at the country level. Coefficients of demographic variables and country dummies not presented for brevity.

In addition to finding a relationship between boredom and other negative emotions, we find significant interactions between permanent income and boredom in predicting some negative feelings. Specifically, boredom has a significantly stronger relationship with loneliness and worry for low-income individuals.

Again, the size of these interactions is far from trivial. For example, for an individual with a permanent income 1 SD above the average, reporting boredom during much of the previous day is associated with a 31.3% increased probability of also reporting loneliness. In contrast, for an individual with a permanent income 1 SD below the average, this probability rises to 43.8%, representing a relative increase of over 30% in the strength of the association between boredom and loneliness. The interaction effect is even more pronounced for worry. For an individual with a permanent income 1 SD above the average, reporting boredom during much of the previous day is associated with a 4.9% increased probability of also reporting worry. This percentage doubles for those with a permanent income 1 SD below the average, rising to 8.5%.

We obtained similar results when using our PCA index as a general measure of negative emotion (Table 8, Model 7). Boredom, permanent income, and their interaction significantly predict negative emotion, with the interaction effect size being non-negligible. For example, for an individual with a permanent income 1 SD above the average, the standardized coefficient between boredom and the PCA index of negative emotion is 0.328. In contrast, for an individual with a permanent income 1 SD below the average, this coefficient increases to 0.416, representing a relative increase of over 25% in the strength of the association between boredom and other negative emotions.

To conclude, we evaluated whether the relationship between income and boredom varies across types of occupations. These results are presented in Table 9. As in the previous section, Model 1 replicates our baseline specification for reference (corresponding to Model 2 in Table 7). Building on this model, Model 2 (Table 9) introduces a binary indicator for blue-collar workers. In line with our findings from the ESS dataset, blue-collar workers report higher levels of boredom. However, in this case, the effect is not statistically significant. Adding an interaction term between permanent income and job type in Model 3 does not affect our results. Both the main effect of the blue-collar indicator variable and its interaction with income remain statistically indistinguishable from zero.

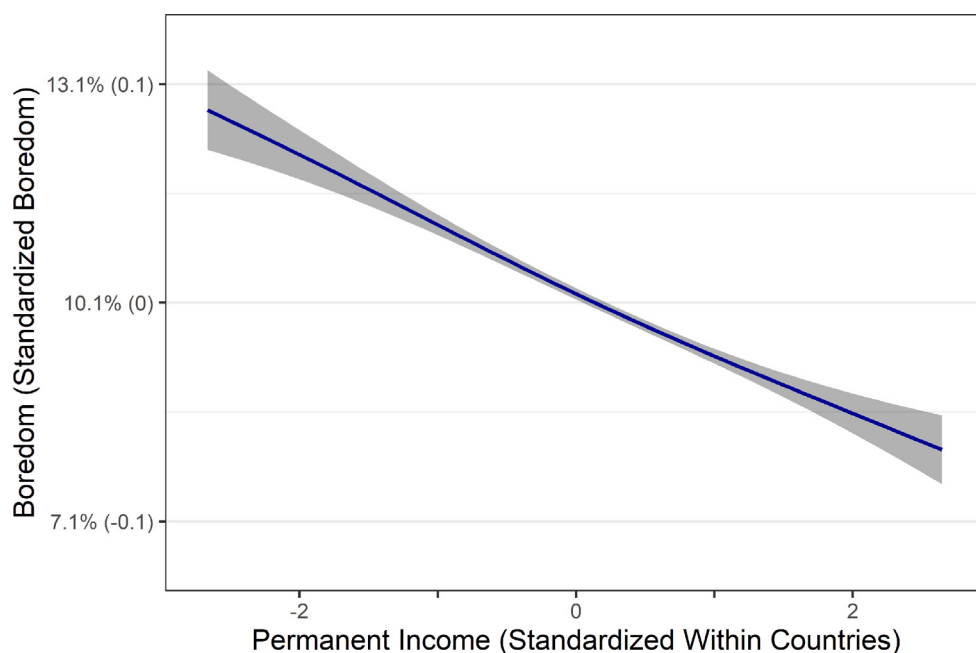


Fig. 3. Smoothed average boredom as a function of income (WHO). Smoothing obtained by Generalized Additive Models. Shaded area represents 95% confidence interval. Values on the y-axis represent the proportion of individuals that report experiencing boredom much of the past day (on a “Yes/No” scale). Standardized boredom values are presented in parentheses.

As in the ESS analyses, we find no evidence that the relationship between income and boredom differs across occupational categories. Unlike in the ESS dataset, however, blue-collar workers in the WHO SAGE sample do not report significantly higher levels of boredom. It is important to note, nonetheless, that the negative association between income and boredom remains robust – and similar in magnitude – across model specifications.

Overall, these analyses prove the generalizability of our results to non-western populations and low- or middle-income countries.

5. Discussion

Across two studies spanning 30 countries and over 60,000 individuals, we find a robust negative association between income and daily experiences of boredom. We further find that, compared with high-income earners, low-income individuals not only feel bored more often but their experience of boredom is also more closely linked to other negative states such as sadness, worry, or anxiety. While the relationship between income and boredom does not differ between white- and blue-collar occupations, it is significantly stronger among individuals whose primary source of income consists of social transfers, such as unemployment benefits or pensions.

These findings are consistent with previous theoretical accounts that link poverty and boredom. In particular, [Elpidorou \(2022\)](#) identifies three key mechanisms that connect low socio-economic status to the experience of boredom: diminished agency, lack of meaning, and attentional difficulties. Individuals relying primarily on social transfers are likely to face the first two of these conditions in especially pronounced ways. Not having a job may deprive individuals of important sources of meaning. In addition, unemployed individuals might also feel an enhanced sense of lack of control over their professional careers, translating into lower levels of agency. These factors may help explain why the relationship between income and boredom is particularly strong among those whose income depends on social transfers.

5.1. Robustness

To further assess the strength of our findings, we conducted a set of supplementary analyses examining the robustness of our main results to the inclusion of additional demographic variables (including household size, marital status, population size, and the respondent’s residential history). We also tested the robustness of our main findings to the inclusion of age-gender interactions, and quadratic income terms. These analyses, detailed in SM Note 2.2, show that including these variables does not substantively alter the direction, magnitude, or statistical significance of our main results.

In additional robustness checks, we also replicated our analyses linking income, boredom, and other negative emotions while controlling for the interaction between income and other negative emotions. That is, we not only estimate the interaction between income and boredom (controlling for other negative emotions), but also include interaction terms between income and each of the other negative emotions in our datasets. Our results (presented in SM Note 2.3) yield mixed results. Notably, our conclusions

Table 7
Main results (WHO).

	<i>Dependent variable:</i>			
	Boredom (1)	(2)	(3)	(4)
Permanent income	−0.098*** (0.014)	−0.094*** (0.013)	−0.038*** (0.006)	−0.057*** (0.008)
Age		0.041 (0.028)	0.013 (0.013)	0.046* (0.022)
Female		0.070* (0.035)	0.012 (0.022)	0.029 (0.028)
Completed primary school		0.038 (0.025)	0.021 (0.026)	0.034 (0.025)
Completed secondary school		0.036* (0.018)	0.026 (0.015)	0.043** (0.013)
Completed high school		−0.011 (0.049)	0.004 (0.042)	0.015 (0.042)
Completed college/university		−0.025 (0.041)	−0.003 (0.030)	0.003 (0.038)
Completed post-graduate degree		−0.075 (0.057)	−0.009 (0.053)	−0.017 (0.051)
Education: Do not know		−0.104** (0.039)	−0.071* (0.033)	−0.090 (0.047)
Education: Not applicable		−0.533*** (0.049)	−0.164*** (0.049)	−0.202*** (0.055)
Anger			0.074** (0.025)	
Depression			0.087*** (0.017)	
Loneliness			0.383*** (0.070)	
Rush			0.015 (0.022)	
Stress			0.051*** (0.013)	
Worry			0.078*** (0.016)	
Negative emotion				0.396*** (0.025)
Constant	−0.124*** (0.0001)	−0.178*** (0.023)	−0.041* (0.019)	−0.086*** (0.021)
Observations	28,722	28,722	28,722	28,722
R ²	0.025	0.028	0.270	0.175
Adjusted R ²	0.024	0.027	0.269	0.175
Residual Std. Error	0.988	0.986	0.855	0.908
F Statistic	120.977***	54.457***	505.440***	381.546***

Note: *p<0.05; **p<0.01; ***p<0.001. Values in parentheses represent robust standard errors clustered at the country level. Coefficients of country dummies not presented for brevity.

for the WHO SAGE sample remain unchanged. However, in the ESS analyses, the inclusion of these additional interaction terms attenuates the statistical significance of the interaction between income and boredom. This points to the need of further researching the underlying mechanisms and emotional dynamics connecting income, boredom, and other negative affective states.

Table 8
Additional results (WHO, Part 1).

	<i>Dependent variable:</i>						
	Anger	Depression	Loneliness	Rush	Stress	Worry	Negative emotion
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Boredom	0.068** (0.025)	0.074*** (0.018)	0.375*** (0.059)	0.018 (0.024)	0.049*** (0.013)	0.061*** (0.010)	0.372*** (0.014)
Permanent income	−0.007 (0.006)	−0.019*** (0.005)	−0.042*** (0.009)	0.002 (0.015)	−0.002 (0.008)	−0.018 (0.014)	−0.057** (0.021)
Boredom * Permanent income	0.0004 (0.015)	−0.011 (0.010)	−0.062*** (0.015)	0.010 (0.008)	−0.002 (0.010)	−0.017* (0.008)	−0.044*** (0.008)
Anger		0.202*** (0.023)	0.024 (0.021)	0.173*** (0.012)	0.102*** (0.022)	0.219*** (0.008)	
Depression	0.213*** (0.032)		0.125*** (0.010)	−0.019 (0.011)	0.205*** (0.026)	0.256*** (0.042)	
Loneliness	0.022 (0.020)	0.108*** (0.010)		0.001 (0.014)	0.033 (0.017)	0.025* (0.012)	
Rush	0.151*** (0.016)	−0.016 (0.009)	0.001 (0.013)		0.184** (0.059)	0.153*** (0.031)	
Stress	0.098** (0.031)	0.188*** (0.048)	0.035* (0.017)	0.202*** (0.054)		0.159*** (0.033)	
Worry	0.245*** (0.024)	0.272*** (0.048)	0.031* (0.014)	0.196*** (0.026)	0.184*** (0.029)		
Constant	0.060*** (0.012)	−0.075*** (0.017)	−0.127*** (0.027)	0.006 (0.030)	−0.036** (0.013)	−0.080*** (0.016)	−0.168*** (0.016)
Observations	28,722	28,722	28,722	28,722	28,722	28,722	28,722
R ²	0.328	0.361	0.262	0.231	0.302	0.399	0.205
Adjusted R ²	0.327	0.360	0.262	0.230	0.301	0.399	0.204
Residual Std. Error	0.820	0.800	0.859	0.877	0.836	0.775	0.892
F Statistic	635.322***	735.872***	463.800***	390.964***	564.152***	867.418***	434.524***

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Values in parentheses represent robust standard errors clustered at the country level. Coefficients of demographic variables and country dummies not presented for brevity.

In further analyses, we analyzed the differences in the income-boredom relationship across generations. To do so, we divided respondents into generational cohorts using a set of binary variables indicating whether individuals belonged to the Silent Generation (born before 1945), the Baby Boomer Generation (1945–1964), Generation X (1965–1980), or the Millennial Generation (1981–1996). Results are presented in SM Note 5. In the European sample (ESS), we find that younger generations – particularly millennials – report significantly higher levels of boredom. Moreover, the negative association between income and boredom appears weaker among these younger cohorts. These patterns, however, are not corroborated in the WHO dataset. In this sample, generational differences in boredom levels, as well as interactions between generation and income, are not statistically significant. Overall, further research is needed to fully understand cohort effects in the relationship between income and boredom.

5.2. Implications

Our findings carry important theoretical and practical implications. First, based on previous work on boredom and choice, one can argue that – through worsened decision-making – boredom might act as a poverty self-reinforcement mechanism. Although our data does not allow us to directly test this, past work has shown that boredom is linked to self-control failures (Moynihan et al., 2017; Watt & Vodanovich, 1992), an important predictor of financial well-being (Gathergood, 2012; van Raaij et al., 2023; Wang et al., 2011). Bored individuals are also more prone to make decision errors (Wolff et al., 2022; Yakobi & Danckert, 2021), behave antisocially (Dahlen et al., 2004; Pfattheicher et al., 2023, 2021; Rupp & Vodanovich, 1997; Yucel & Westgate, 2022), and develop addictions (Blaszczynski et al., 1990; Iso-Ahola & Crowley, 1991; Sommers & Vodanovich, 2000). Beyond worsened decision-making, past work has shown that boredom relates to lower workplace productivity (Cleary et al., 2016; Wan et al., 2014). All these are factors that undermine an individual's chance to escape poverty. Our findings, therefore, contribute to the literature on psychologically driven poverty traps (Haushofer, 2019; Haushofer & Fehr, 2014; Ridley et al., 2020), pointing to a promising new avenue of research.

Table 9
Additional results (WHO, Part 2).

	Dependent variable:		
	Boredom (1)	(2)	(3)
Permanent income	−0.094*** (0.013)	−0.097*** (0.012)	−0.104*** (0.017)
Blue collar		0.015 (0.011)	0.014 (0.010)
Permanent income * Blue collar			0.010 (0.009)
Constant	−0.178*** (0.023)	−0.213*** (0.025)	−0.210*** (0.026)
Observations	28,722	22,157	22,157
R ²	0.028	0.034	0.034
Adjusted R ²	0.027	0.034	0.034
Residual Std. Error	0.986	0.983	0.983
F Statistic	54.457***	52.324***	49.082***

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Values in parentheses represent robust standard errors clustered at the country level. Coefficients of demographic variables and country dummies not presented for brevity.

Second, given the productivity costs of boredom and the array of negative job outcomes associated with boredom at work – including distractive or counterproductive behaviors (Bruursema et al., 2011; van Hooft & van Hooft, 2022; Wan et al., 2014) and employee turnover (Harju et al., 2014) – our results shed light on the design of optimal workplace environments.

5.3. Limitations

Despite the substantive implications of the relationship between income and boredom, it is important to note that the present work has some limitations that need to be addressed in future work.

First, the observational nature of our data does not allow us to make causal inferences. Further research is needed to establish a causal relationship, for instance through experimental studies where people receive a large amount of direct pay (e.g., Dwyer & Dunn, 2022), or using longitudinal studies to model whether changes in income lead to changes in boredom.

Second, our main findings are based on data from 2006 (ESS) and 2013 (WHO SAGE). While the use of these somewhat aged datasets might be a source of concern, in the online appendix, we replicate our main findings using a sample of 3000 US individuals that reported a measure of boredom and their household income during the end of 2020 and the first half of 2021.

Third, while our analyses show that boredom is associated with other negative emotions, the cross-sectional nature of our data does not allow us to examine the causal pathways (if any) through which experiencing boredom might trigger other negative emotions. Further work needs to clarify the dynamic associations between boredom and other negative emotions, and their relationship to both income and outcomes related to well-being, such as mental health.

Fourth, the use of different measurement methods in the ESS and WHO SAGE datasets does not allow us to statistically compare our main relationship of interest across these two sets of countries. An important direction for future work is the development of harmonized datasets that would allow for direct comparisons of the relationship between income and boredom in high- and low-income countries.

Finally, in both of our studies, boredom and other negative emotions were assessed using situational measures (i.e., measures of boredom “yesterday” or “in the past week”). While these measures are informative of the participants’ experiences in a given time period, they represent noisy approximations to the participant’s broader lives. As the use of noisy measures mitigates effect sizes, future studies looking to expand on the relationship between income and boredom might benefit from employing both situational (i.e., “how often did you experience boredom yesterday?”) and evaluative (i.e., “in general, how often do you experience boredom in your daily life?”) measures of this emotional state.

The use of situational measures could also explain the weak relationship found between boredom and participants’ feelings of depression. In contrast to this result, past work has found a moderate to strong relationship between boredom proneness (i.e., the stable tendency to experience boredom) and depression (Goldberg & Danckert, 2013; Isacescu et al., 2017). Future research should extend our work by exploring the interplay between income, boredom proneness, and depression.

Despite these limitations, our work adds to an ongoing important discussion. For decades, researchers, governments, and policymakers have sought to understand how financial scarcity affects people’s well-being and quality of life. Our findings suggest that past studies may have overlooked a fundamental psychological aspect of being poor: boredom.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Daniel Navarro-Martinez reports financial support was provided by BBVA Foundation (Fundacion BBVAEI-2019-D.Navarro). Daniel Navarro-Martinez reports financial support was provided by Ramon Areces Foundation (Fundacion Ramon Areces 2019-Navarro). Stefan Pfattheicher reports financial support was provided by Velux Foundations (PN38727). Daniel Navarro-Martinez, Jordi Quoidbach reports financial support was provided by Spanish Ministry of Science and Innovation (Ministerio de Ciencia e Innovacion, Gobierno de España, Grants PID2019-105249GB-I00, PID2022- 137908NB-I00). Daniel Navarro-Martinez reports financial support was provided by ICREA (ICREA Academia 2024-Daniel Navarro). Jordi Quoidbach reports financial support was provided by Spanish Ministry of Economy, Industry, and Competitiveness (Ministerio de Economia, Industria y Competitividad, Gobierno de España, Grant RYC- 2016-21020). Daniel Navarro-Martinez is currently an associate editor at the Journal of Economic Psychology. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary material related to this article can be found online at <https://doi.org/10.1016/j.joep.2025.102847>.

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