

I am, therefore I preserve: Exploring middle-class imagery, biased status perceptions, and pro-environmental behaviour

Frederich Kirsten*, Mduduzi Biyase, Marinda Pretorius

School of Economics, University of Johannesburg, Johannesburg 2092, South Africa

* **Corresponding author:** Frederich Kirsten, frederichuj@gmail.com

CITATION

Kirsten F, Biyase M, Pretorius M. (2024). I am, therefore I preserve: Exploring middle-class imagery, biased status perceptions, and pro-environmental behaviour. *Journal of Infrastructure, Policy and Development*. 8(13): 8358. <https://doi.org/10.24294/jipd8358>

ARTICLE INFO

Received: 6 March 2024

Accepted: 2 September 2024

Available online: 13 November 2024

COPYRIGHT



Copyright © 2024 by author(s).

Journal of Infrastructure, Policy and Development is published by EnPress Publisher, LLC. This work is licensed under the Creative Commons Attribution (CC BY) license. <https://creativecommons.org/licenses/by/4.0/>

Abstract: Extensive research on pro-environmental behaviour (PEB) reveals a significant knowledge gap in understanding the influence of social class, perceived status and the middling tendency on pro-environmental behaviour. Using the International Social Survey Programme Environment dataset, and conducting multilevel mixed-effects linear regressions, we find that the middling tendency and biased status perceptions significantly influences pro-environmental behaviour. Those who deflate their social position have higher pro-environmental behavior and this reinforces the idea that pro-environmental behaviour is driven by a post-materialist effect rather than a status enhancement effect. Moreover, the objective middle class is still a stronger contributor to higher PEB levels compared to subjective middle class. We also find the relation between class, status and PEB vary by country. These findings provide vital insights into the intricate and heterogenous dynamics between class, status and pro-environmental behaviour among different countries and shed light on class and status as driving forces behind pro-environmental behaviour.

Keywords: post-materialist; status enhancement; pro-environmental consumption behaviour; social class

1. Introduction

Human-led climate change is leading to a surge in global average temperatures, resulting in elevated sea levels and more frequent occurrences of extreme weather events (Cook et al., 2016; Shenoy et al., 2022). With the growing speed of environmental degradation and related crises, it is vital to find ways to mitigate these climate transgressions and engage in large-scale societal change towards more sustainable ways of living. However, encouraging a more sustainable way of living is challenging, mainly because studies investigating the psychological aspects that impact pro-environmental behaviour (PEB) have not definitively identified a single construct as the predominant motivational driver. Pro-environmental behaviour is influenced by social norms and values, where individuals tend to make environmentally friendly choices out of concern for the well-being of others (Gifford and Nilsson, 2014). On the other hand, others believe that behaviour is primarily driven by self-interest suggesting that pro-environmental actions are motivated by individuals seeking to maximise their own well-being (Kollmun and Agyeman, 2002). However, this perspective raises questions regarding the self-interest aspect of pro-environmentalism, particularly because environmentally friendly consumerism has been found to be more expensive and less practical (Gomes et al., 2023; Maheshwari and Malhotra, 2011). Thus, the question remains: What type of self-interest can an individual gain from going green?

A popular explanation is the dynamics between status, class and pro-environmental behaviour, which is derived from the post-materialist theory (Inglehart, 1997). The post-materialist theory states that there is a notable transformation in the individual values of the affluent. Initially, the affluent emphasised materialist values, which is prioritised by economic stability and physical security. However, over time, these values have evolved towards post-materialist values, which place greater importance on personal autonomy, self-expression, and overall quality of life. These post-material values include having a stronger drive towards pro-environmental behaviour. For example, individuals are willing to take on more material cost and less functionality if the product satisfies their post-material needs. This depends on an individual's the post-material ability which is directly related to their objective class position.

However, pro-environmental behaviour does not depend on materialistic possession alone, a number of studies have found that status alone also plays a vital role in determining PEB (Sulemana et al., 2016; Uren et al., 2021). Since pro-environmentalism involves social action driven by individual commitment, how individuals perceive their socio-economic status can be just as vital, if not more so, in shaping their environmental perceptions (Sulemana et al., 2016). A popular explanation is within the dynamics of status enhancement and pro-environmental behaviour (Dilotsotlhe and Inseng Duh, 2021; Fuhrmann-Riebel et al., 2021; Uren et al., 2021). These studies have found that PEB can be seen as a status enhancer, and the notion of going green has been heavily connected with class and status enhancement (Griskevicius et al., 2010; Uren et al., 2021). This relates to the visibility of pro-environmental behaviour, and one is perceived by others when making pro-environmental choices (Babutsidze and Chai, 2018). Visible PEB, like driving a hybrid car, installing solar energy or buying more pro-environmental products, are all seen as status enhancements, making them desirable for those aiming for higher status positions in society.

Both class and status tend to influence pro-environmental behaviour. However, one of the unexplored areas in this field is the relation between class and status, and its impact on PEB. Class and status cannot always be treated as homogenous, and many studies have found a significant variation between the two and find that objective class positions do not perfectly align with subjective class (Evans and Kelley, 2004; Kirsten et al., 2023; Sosnoud et al., 2013). Consider the middle class; many studies have confirmed its important role in pro-environmental consumption behaviour (Dilotsotlhe and Inseng Duh, 2021; Fuhrmann-Riebel and Verschoor, 2021). However, the objective middle class in many countries have been in decline (Derndorfer and Kranzinger, 2021), while those who perceive themselves in the middle class remain high, leading to strong middling tendency (Kirsten et al., 2023; Sosnoud et al., 2013; Sudo, 2021). This leads to an intriguing question: Which is the more influential factor in fostering pro-environmental behaviour—the self-perceived middle class or the objectively defined middle class?

Moreover, the growing variation between the objective and subjective middle class causes a type of biased status perception where people misalign their status from their economically defined class position (Kirsten et al., 2023; Sosnoud et al., 2013). People can either place themselves higher than their objective class position, align

with it, or place themselves below it. These biased status perceptions have been shown to influence a broader range of social norms and values like voting behaviour (Sosnaud et al., 2013), demand for redistribution (Cruces et al., 2013) and perceived inequality (Kirsten et al., 2023). However, how these bias status perceptions influence environmental views and behaviour has not been explored.

We aim to shed more light on the relationship between biased status perceptions and pro-environmental behaviour by focusing on the relationship between middle-class imagery, biased status perceptions and pro-environmental consumption behaviour among a multitude of countries. Using the International Social Survey Programme data on environmental perceptions, our study aims to make three vital contributions. Firstly, whereas previous studies consider objective and subjective classes separately, we combine them to form a novel scheme for bias perceptions and their relationship with PEB. Secondly, by assessing the impact of the middle-class tendency and biased perceptions on environmental perceptions, we contribute to the essential yet limited body of literature examining the interplay of social perception across different spheres. On the one side, we have biased status perceptions, a vital component in the cognitive framework of demand for redistribution and political attitudes. On the other side there are the pro-environmental perceptions individuals hold that relate to environmental protection policies. These perceptions stem from the same individual cognitive constructs, yet they have contrasting impacts on various social policies. A better understanding should provide further insight into people's perceptions of status and pro-environmentalism. Finally, by exploring the relationship between bias and environmental perceptions in a multi-country analysis, this paper should provide vital insight into individuals' status perceptions and perceived environmental behaviour in different contextual environments. The findings should help policymakers better understand the dynamics behind pro-environmentalism behaviour in different countries with different environmental challenges.

2. Literature review

2.1. Biased status perception

One of the most enduring findings of status perceptions is a middling tendency, where individuals often place themselves in the middle of the social hierarchy when faced with subjective ranking dilemmas (Evans and Kelley, 2004; Hodge and Treiman, 1968; Hout, 2008; Kirsten et al., 2023; Sosnoud et al., 2013). The reason for this strong middling tendency is theoretically linked to the reference group theory, which states that individuals compare themselves to individuals around them with similar characteristics. This leads to a strong chance of seeing oneself in the middle of society, compared to this homogenous reference group (Stouffer et al., 1949). The reference group theory further explains how subjective status perceptions are somewhat delinked from objective class positions, a theory that is contractionary to the Marxist view on materialism. According to Marx, a strong relationship exists between objective and subjective class positions, mainly because of the dominating role owners of production factors play in determining class, status and power (Marx, 1972). However, according to the reference group and social comparison theorists, status, power and class are perceived as interconnected yet independently determined. Status

is influenced by various factors beyond one's economic (material) position, leading to variations between status and material wealth.

The variation between objective and subjective class positions, essentially driven by a strong middling tendency, has also been referred to as status inconsistency (Hodge and Treiman, 1986) or biased perceptions (Chen and Fan, 2015; Sosnoud et al., 2013). The concept has been shown to influence political attitudes like demand for redistribution (Cruces et al., 2013), perceived inequality (Kirsten et al., 2023) and voting behaviour (Sosnoud et al., 2013). Given the importance of bias perceptions, a novel class scheme has been developed by the likes of Chen and Fan (2015), Kirsten et al. (2023), and Sosnoud et al. (2013) that classifies individuals into either inflated, deflated or concordant class positions. While inflated refers to individuals whose objective class position is above their subjective position, deflated is the opposite and concordant refers to individuals whose subjective class position aligns with their objective class positions.

Although a lot is still to be understood about these biased perceptions, their impact on the cognitive process of social perceptions and how individuals view social struggles have caught the eye of many researchers. Sosnoud et al. (2013) found that these biased class perceptions influence Americans voting behaviour through the lens of what type of social policy they would support. For example, those who inflate their social position might demand less redistributive right-wing policies, even though objectively they would benefit from more leftist policies. Similarly, Cruces et al. (2013) found that those who inflate their social position tend to demand less redistribution, mainly because they perceive themselves as high enough up the social ladder that they believe redistributive policies would negatively influence them, while in truth, the redistribution policies would actually benefit them. Moreover, Kirsten et al. (2023) discovered similar findings in a study conducted in South Africa. They observed correlations between biased status perceptions, demands for redistribution, perceived inequality and perceived class conflicts. Overall, biased status perceptions tend to have a significant impact on various social perceptions, highlighting the importance of studying them in a broader framework of social norms and values.

2.2. Biased status perceptions and pro-environmental behaviour

The link between biased status perceptions and other social norms and values is growing stronger. However, there is still a lack of knowledge on how biased status perceptions could be linked to individuals' pro-environmentalism nature. In order to link biased status perceptions and pro-environmental behaviour, a deeper understanding of the theory of social class and pro-environmental behaviour is needed.

2.2.1. Objective social class and PEB

Social class, derived from holding a certain position in a society defined usually by materialistic possessions or life chances, can be connected to PEB through the postmaterialist theory popularised by Inglehart (1997). This positive correlation states that higher social classes have greater environmental engagement due to their economic ability to satisfy post-material needs. This means that the higher an individual is positioned on the social ladder, as defined by their economic status, the more likely they are to exhibit pro-environmental behaviour.

However, the affluence theory may oversimplify the complexities of how social class influences environmental behaviour. Research shows that while higher social classes may engage more in visible pro-environmental actions such as purchasing organic foods or driving hybrid vehicles, these PEBs might not always reflect a deeper commitment to environmental sustainability but rather align with an intensive resource-consuming lifestyle (Clapp and Dauvergne, 2011). In contrast, lower social classes may participate more in resource-saving behaviour like using public transportation and reducing household energy use, driven by economic necessity rather than environmental concern. A study by Echegaray and Hansstein (2017) found a higher intention for e-waste recycling among lower-income individuals in Brazil. Fang et al. (2021) showed that individuals from lower classes in China exhibit stronger recycling behaviour than those from higher-income households. This tendency is mainly due to economic survival and a sense of community solidarity, rather than environmental conservation motivations (Waquil, 2014).

Based on community solidarity, a study by Domazet and Marinović Jerolimov (2014) further explores how economic and social dynamics in semi-peripheral regions shape environmental practices. These insights demonstrate that environmentalism in these areas often diverges from the consumer-oriented models prevalent in more affluent Western societies and is instead characterised by community-based and less resource-intensive practices. Moreover, the democratic degrowth theory challenges the affluence theory by advocating for a reduction in consumption and a focus on sustainability that transcends individual actions (Domazet and Ančić, 2017).

2.2.2. Subjective social class and PEB

Looking at the relationship between subjective class and PEB, studies have found that those who have higher perceived socio-economic status also have higher pro-environmental behaviour (Sulemana et al., 2016). Here, the link between subjective class and PEB can again be derived from the post-materialist theory, and similar to objective class positions, the higher individual perceives themselves on the social ladder, the more their post-materialist resources allow them to commit to pro-environmental behaviour. However, the relationship between status and PEB is more entangled and needs more than a pure post-materialistic view. Conspicuous conservation is a relatively new concept to explain the relationship between PEB and status (Griskevicius et al., 2010; Uren et al., 2021). This is where individuals engage in PEB to gain higher status, which refers to status-driven environmentalism. Historically, there has always been a strong link between the consumption of certain products and status, however with the issue of climate and environmentalism moving to the forefront of society's problems it has also led to PEB becoming more cultural and symbolic in meaning (Brooks and Wilson, 2015). Studies found that people are willing to sacrifice financial and functionality losses at the expense of engaging in PEB if it leads to a higher status that can be seen by the people around them (Brick and Lai, 2018; Griskevicius et al., 2010).

From this point, we can connect the concept of biased status perceptions with PEB. Firstly, considering that biased status perceptions stem from a pronounced middling tendency, we hypothesize that individuals who inaccurately perceive themselves as belonging in the middle class would demonstrate heightened pro-

environmental behaviour. Therefore, despite their objective class status and economic position not aligning with the middle class, their strong perception of being in this social stratum is influential enough to promote PEB, driven by a desire for status enhancement.

Hypothesis 1: Individuals who inaccurately perceive themselves as belonging to the middle class exhibit stronger pro-environmental behaviour.

Secondly, since status is associated with PEB through higher status levels, individuals who perceive themselves as high status, regardless of their objective class position, may exhibit greater PEB. So, for example, even if a person's objective class position is relatively low, if they still perceive themselves as high status, due to their homogenous reference group, it could lead to strong pro-environmental behaviour. This then means that PEB is strongly dependent on an individual's status regardless of their objective position. This leads to our second hypothesis:

Hypothesis 2: Those who have inflated status beliefs tend to have higher PEB, regardless of their objective class position.

Moreover, the relationship between PEB, objective class and subjective class status could vary by country. Social class and status are social constructs with different interpretations and meanings in varying societies. We assume that status would be a more significant driver for PEB than objective class for some countries, while in others, the post-materialist factor dominates individuals PEB.

Hypothesis 3: The relationship between PEB, objective and subjective class varies by country level.

Overall, these findings could reinforce the importance of status-driving PEB and should provide policymakers with further incentives to adopt subjective measures in policy discussions and focus on status perception as a target for social change. The following section provides further details on how biased perceptions might influence individuals' PEB by first describing the dataset, method and variables used in the study, followed by the results of the study and a discussion of the main findings.

3. Method

In this study, we use the International Social Survey Programme (ISSP) Environment III dataset. The dataset was collected for multiple countries in 1993, 2000, 2010 and 2020 and consists of questions associated with environmental issues (ISSP Research Group. 2023). The ISSP dataset has been widely used to assess individuals' attitudes towards science, nature and pro-environmental attitudes (Franzen and Meyer, 2010; Hunter et al., 2004; Oreg and Katz-Gerro, 2006). The ISSP surveys were drawn using a systematic random sampling method applied to national population registries, from citizens of at least 15 years of age. For this study, we use the 2020 survey, which consists of the most sampled countries (34) and the highest observation number (44,100) relative to the other ISSP surveys. We use a multilevel mixed-effects linear regression that accounts for country differences using random effects.

3.1. Pro-environmental behaviour

The dependent variable for this study is pro-environmental behaviour (PEB). PEB is measured using various questions in the ISSP survey that capture the extent to which people engage in pro-environmental behaviour. These questions include asking respondents about their PEB behaviour of (1) How often do you make a special effort to sort glass or tins or plastic or newspapers and so on for recycling, (2) how often do you avoid buying certain products for environmental reasons (3) In the last five years, have you given money to an environmental group. The participants were then asked to respond on a five-point scale for questions 1 and 2, and a binary yes/no response for question 3. The mean score of these responses was then used to construct the PEB measure, taking a maximum value of 16 and a minimum value of 4. Although the ISSP Environment IV is the most recent ISSP survey on environmental perceptions, it does not include several key items for measuring PEB (Ančić et al., 2019).

Notably, the 2020 survey omits questions related to (i) making a special effort to buy fruits and vegetables grown without pesticides and chemicals; (ii) cutting back on driving a car for environmental reasons; (iii) reducing energy or fuel consumption at home to protect the environment; (iv) reducing water consumption for environmental protection. To ensure robustness in our analysis, we also utilised data from the 2010 survey, which provides a more complete measure of PEB. This approach allows us to compare the results for both surveys and affirm the consistency of our findings across different versions of the survey. This comparative analysis helps to address any potential concerns regarding the comprehensiveness of the PEB measure in the 2020 survey.

3.2. Biased status perceptions

Our first step was to establish a unified framework that incorporates both objective and subjective class distinctions to measure biased status perceptions.

3.2.1. Objective class measure

For the objective class, we utilised the Erikson-Goldthrope-Portocarero (EGP) class scheme, proposed by Erikson and Goldthrope in 1992. This scheme classifies individuals based on their market and work situations, ensuring equal life chances within each group. It primarily focuses on employment relations, distinguishing between employees, employers, and the self-employed. Further distinctions are made among employees based on their specific employment contracts, differentiating labour contracts and service relationships. This classification enables us to group individuals with similar market and work conditions, such as economic opportunities, security, and income levels, as well as common work situations involving supervision and control.

In our study, we adopted the European Socioeconomic Classification (ESEC) scheme, a simplified version of the EGP scheme and implemented through the `iskoep` command in Stata, providing a nuanced 10-class framework. We utilised data from the ISSP survey, specifically individual occupation levels, in conjunction with self-employment and supervisory variables to determine this system. This allowed us to construct a ten-class EGP scheme, which we then condensed into three occupational-based class groups. The resulting three-class scheme comprises the higher class

(consisting of higher controllers and low controllers), the middle class (including routine non-manual workers, self-employed individuals with and without employees, and self-employed farmers), and the lower class (comprising manual supervisors, skilled workers, unskilled workers, and farm labourers). We excluded individuals not in the labour force (e.g., students, retired, discouraged workers, stay-at-home parents, and disabled individuals) from our analysis to maintain consistency, focusing solely on the working population.

One reason for this exclusion was that many unemployed individuals placed themselves on higher social steps due to mediated class positions. Including the unemployed could lead to an overestimation of certain upward-biased perceptions. We aim to avoid this potential bias by focusing on the working population. To verify the validity of our occupation-based class measure, we conducted an Alpha Cronbach test to assess the correlation among covariates, including education and income, as alternative measures of class. The results indicated a strong correlation among these three covariates, which supports our decision to use the occupation-based EGP three-class measure.

We deliberately chose a narrow definition of a three-class system to ensure comparability with the subjective identification's three-class system. This approach enhances the accuracy of our findings when examining biased status perceptions between objective and subjective class distinctions.

3.2.2. Subjective class measure

In our assessment of subjective class, we utilised the MacArthur Scale of Subjective Social Status which is a rank-based measure that allows individuals to place themselves on a ladder in relation to others within a resource-based social hierarchy. Various studies have reported different versions of this ladder, ranging from three to eleven rungs (Evans and Kelly, 2004; Oddsson, 2018; Posel and Casale, 2011). For this study, we employed a 10-step measure incorporating question from the ISSP that states: In our society, there are groups which tend to be towards the top and groups which tend to be towards the bottom. Below is a scale that runs from the top to the bottom. The 10-scaled response, is recoded into three subjective class groups: the lower class (rung 1, 2, and 3), middle class (rung 4, 5, and 6), and upper class (rung 7, 8, 9, and 10). To ensure the robustness of our subjective class measure, we also considered individuals' specific class positions based on their responses to a question about their class identification.

3.2.3. Biased status perception measure

Once we identified both objective and subjective class positions, measuring the variation between them was straightforward. We calculated the difference between individuals' objective and subjective class positions. This method aligns with similar approaches used by Kirsten et al. (2023) and Sosnaud et al. (2013) and is supported by research by Cruces et al. (2013) and Karadja (2017). The difference between objective and subjective class positions can fall into one of three categories:

- **Inflated social positions (overestimated):** When an individual's subjective class position is higher than their objective class position, indicating a perception of belonging to a more privileged class than their actual position suggests.

- Concordant social positions (subjective objective aligned): When an individual's subjective class position closely matches their objective class position, indicating an accurate perception of their social standing.
- Deflated social positions (underestimated): When an individual's subjective class position is lower than their objective class position, reflecting a perception of being in a less privileged class than their actual position.

This approach creates a novel class scheme for assessing biased status perceptions, providing valuable insights into how individuals' perceptions of their social status may deviate from their actual objective class positions.

3.3. Control variables

The study also includes various sociodemographic characteristics as control variables. These include education, marital status, gender, age and religion, which are all in line with the literature (Nui et al., 2023; Sherkat and Ellison, 2007; Xiao and McCright, 2012). Firstly, education was coded as a categorical variable that was split into four groups, namely no formal education, primary education, secondary education, and tertiary education. Secondly, marital status, religion and gender were measured using a dummy variable (0 = not married, not religious and male; 1 = married, religious and female). Age was used as a continuous variable.

3.4. Method

In this study, we use multilevel mixed-effect linear and random effects regressions. Table A1 in the appendix presents the PEB levels by country, illustrating substantial variation in PEB across countries. This variation supports the use of a multilevel mixed-effects model, which allows us to account for the hierarchical structure of the data, with individuals nested within countries.

3.5. Robustness

In order to check the robustness of our results, we make use of an alternative measure for pro-environmental behaviour by using a PEB index instead of the PEB mean score measure (Table A3) and perform various post-estimation tests like the interclass correlations and estimated random-effects covariance matrices.

4. Results

Table 1 shows a descriptive overview of the variables used in this study. For pro-environmental behaviour, the mean is 3.69 out of a maximum of 7. Looking at the mean PEB level by country, developing countries like South Africa, Russia and China have the lowest PEB mean scores. Meanwhile, developed countries like France, Germany and Switzerland have the highest mean scores. For social class, the mean for subjective class placement is above the objective class mean score, meaning people tend to place themselves higher than their objective class position. This is confirmed when looking at the mean score for biased status perceptions (2.02), which is slightly above the central tendency of 2, and shows a higher tendency to inflated status perceptions amongst respondents in the sample. Observing education level, we find a

relatively middling mean of 3.00, while the mean age is 48 for the sample. Moreover, 53% are married and 52% female.

Table 1. Descriptive statistics of all studied variables.

Variables	N	Mean
Pro-environmental behaviour	41,792	3.69
Objective class	17,548	2.09
Subjective class	41,430	2.13
Biased status perceptions	16,619	2.02
Education	43,267	3.00
Age	44,100	48.03
Marital status	42,727	0.53
Gender	44,027	0.52

Next, we observe the bivariate relationship between class, status, bias perceptions and PEB for the sampled respondents. **Figure 1** below reports the different mean PEB scores for the objective and subjective class schemes. The PEB score is slightly higher than the subjective class schemes at each objective class scheme. The higher PEB scores among the objective class groups point to the post-material impact on PEB, where pro-environmental behaviour is driven by material resources rather than status.

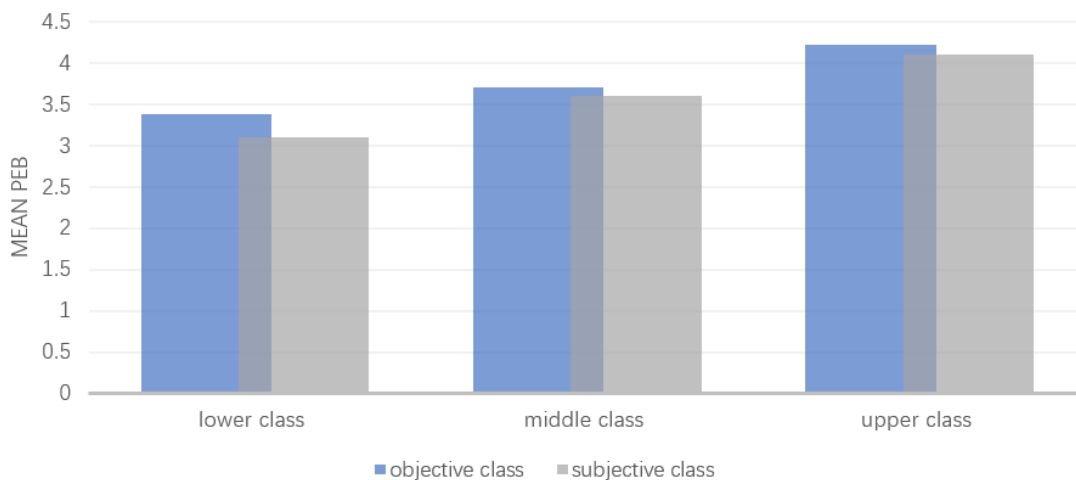


Figure 1. PEB mean levels by subjective and objective class.

The variation between objective and subjective class positions promotes the need for a deeper understanding of biased status perceptions using a scheme derived from these variations. The biased status perception scheme is a three-class scheme that places individuals either in an inflated, deflated or concordant scheme based on their individual status and class variation. **Figure 2** below reports the mean level of PEB for each one of these biased perception schemes and shows that those who deflate their subjective class position, meaning placing themselves below their objective class position, tend to have stronger pro-environmental behaviours, followed by those with concordance between their objective and subjective class position and those with inflated status perceptions. Since inflated perceptions have the lowest PEB scores, it

suggests we might reject our second hypothesis that individuals will demand higher PEB as a status enhancer, regardless of their objective class position. In fact, the initial trend shows those who place themselves below their class position tend to have the highest level of PEB, reinforcing the impact of post-materialism in driving PEB. Also, those who place themselves above their objective class position have the lowest PEB, possibly because they would rarely engage in PEB, mainly because they do not have the material resources to do so.

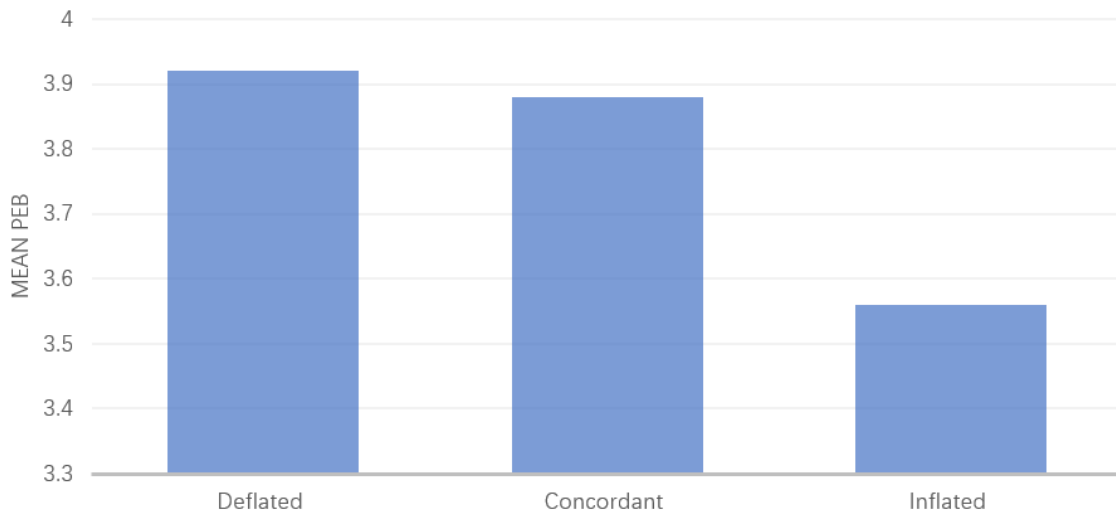


Figure 2. Biased status perceptions and PEB.

In the following section, we test the empirical significance of the subjective class, objective class biased status perceptions and PEB among the grouped countries using multilevel mixed effect linear regression models. Thereafter we conduct linear regressions for each country to assess the impact of status, class and biased status perceptions on PEB in different countries further. The results should present clear evidence of the role of status and class in driving pro-environmental behaviour among different countries.

Table 2 below shows the multilevel mixed-effects linear regression results and reports on the impact of biased status perceptions and other covariates on PEB. Model 1 shows the impact of subjective and objective classes on PEB with a set of control variables. With the objective and subjective lower class as the reference category, the objective middle class, subjective upper class and objective class are significant in driving PEB. Only the subjective middle class is insignificant in driving PEB, confirming that we can reject our first hypothesis that PEB scores are higher among the subjective middle class relative to the objective middle class. Secondly, model 2 shows that biased status perceptions are insignificant determinants of PEB. With the deflated group as the reference category, those with concordant status perceptions and those who inflate their status tend to have lower PEB, but not significant. Therefore, we can reject our second hypothesis that those with higher status beliefs tend to have higher PEB, regardless of their objective class position. Again, this reinforces the importance of one’s materialistic position in engaging in PEB. These results are also confirmed when using an alternative measure for PEB, a PEB index score.

Table 2. Multilevel mixed-effects linear regression (random effects).

	(1)	(2)
VARIABLES		
Subjective middle class	0.104 (0.0748)	
Subjective upper class	0.248*** (0.0889)	
Objective middle class	0.0759** (0.0370)	
Objective upper class	0.206*** (0.0468)	
Education	0.134*** (0.0169)	0.181*** (0.0184)
Female	0.213*** (0.0325)	0.232*** (0.0328)
Age	0.0103*** (0.00131)	0.0107*** (0.00125)
Marital status	0.150*** (0.0245)	0.169*** (0.0261)
Religion	-0.100** (0.0474)	-0.100** (0.0472)
Underestimate		0.00503 (0.0287)
Overestimate		-0.0365 (0.0297)
Constant	2.429*** (0.164)	2.486*** (0.154)
Observations	15,341	15,341
Number of groups	28	28

Robust standard errors in parentheses;

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Observing the impact of the control variables also shows some interesting findings. Firstly, education is positive and significantly related to PEB, meaning the higher the individual's education level, the higher their PEB. These results align with literature that supports a strong positive relationship between PEB and education status (Babutsidze and Chai, 2018; Fuhrmann-Riebel et al., 2021). Secondly, gender is a significant driver of PEB, with the reference category being males. Being female increases PEB by 0.49%, which supports the literature on the association between gender and environmental behaviour (Fuhrmann-Riebel et al., 2021). Thirdly, age is significant and positive, meaning older individuals tend to engage in higher PEB. Fourthly, being married is also associated with higher PEB, with those being married having a higher PEB level of 0.28% compared to the unmarried (Niu et al., 2023). Lastly, religion was found to be a significant predictor of PEB, where being religious

decreases PEB.

For robustness, we make use of an alternative measure for pro-environmental behaviour by using a PEB index instead of the PEB mean score measure (Table A3). The results remained consistent. We also performed various post-estimation tests like the interclass correlations (0.1957442) and estimated random-effects covariance matrices (0.4452224). Moreover, we ran the same model using the 2010 survey and included additional items to get a more comprehensive measure of PEB (Table A4). The results remained consistent with the findings from the 2020 survey indicating consistency in the results using different versions of the ISSP survey.

The third hypothesis states that the relationship between biased status perceptions will differ among countries. To test this, we estimate separate linear regressions for each country and report the coefficients and significance of objective and subjective classes in separate regressions. Observing the result of **Table 3**, we find heterogeneous results for different countries in terms of the impact of objective and subjective class on PEB. Only objective class is significant for some countries, like Australia, Norway, Russia, Sweden, and Switzerland, which points to a stronger link between post-material needs and PEB. In other countries, subjective class is more significant than objective class and points to smaller post-material links of PEB and supports the role of status in driving PEB. These countries include Germany, Japan, and Slovakia. For most of the other countries, there is a mix between status and class that influences PEB. This is expected as the dynamics behind objective and subjective classes are linked. Overall, the results provide evidence of the heterogeneous dynamics behind PEB in different countries where country differences play a vital role in explaining how class, status and PEB interact. We also found similar heterogeneous results when assessing the impact of biased status perceptions by country (Table A2).

Table 3. Linear regressions coefficients of the class by country level.

Country	SMC	SUC	OMC	OUC	Country	SMC	SUC	OMC	OUC
Australia	-0.3	-0.36	-0.01	0.38*	New Zealand	-0.33	-0.01	0.13	0.28
Austria	0.29	0.52**	0.34**	0.84***	Norway	-0.27	-0.11	0.23	0.53***
China	0.26**	0.61***	0.46***	0.84***	Philippines	0.08	0.03	-0.03	0.25
Croatia	0.83**	0.81**	0.51***	0.65***	Russia	0.06	-0.04	0.58***	0.37**
Denmark	0.2	0.13	-0.19	0.14	Slovakia	0.88**	1.8***	0.26	0.28
Finland	-0.11	0.2	0.45**	0.63***	Slovenia	-0.42**	-0.19	0.09	0.1
France	0.25*	0.41**	-0.25	0.02***	South Africa	0.62***	0.89***	0.25	0.45***
Germany	0.26*	0.37***	0.15	0.16	South Korea	0.06	0.24	0.09	0.11
Hungary	0.17	0.54**	0.01	0.7***	Spain	0.1	0.24***	-0.02	0.24
Iceland	-0.06	-0.12	0.26	0.42**	Sweden	0.12	0.28	0.09	0.36***
India	0.39	0.81***	0.34	0.78**	Switzerland	0.04	0.1	0.25***	0.29***
Italy	0.17	0.42	-0.01	0.24	Taiwan	0.26**	0.61***	0.46***	0.84***
Japan	0.17	0.36**	0.06	0.05	Thailand	-0.18	0.09	0.17	0.48*
Lithuania	0.45**	0.63***	0.3*	0.51***	United States	0.92***	1.48***	0.26	0.59***

Notes: Subjective middle class (SMC), Subjective upper class (SUC), Objective middle class (OMC), Objective upper class (OUC).

5. Conclusion

The aim of this paper was to assess the relationship between class, status and pro-environmental behaviour by observing the impact of biased status perceptions. We developed three hypotheses to test the relationship between biased status perceptions and PEB. Firstly, we hypothesised that individuals who inaccurately perceive themselves as belonging to the middle class exhibit stronger pro-environmental behaviour. We reject this hypothesis and confirm that being part of the objective middle class leads to higher PEB compared to being part of the subjective middle class. This strongly supports the post-materialist effect, where material resources drive individuals to PEB. Secondly, we hypothesised that those who have higher status beliefs tend to have higher PEB, regardless of their objective class position. Our results find this hypothesis to be rejected, mainly because of the findings that inflated status perceptions are negatively associated with PEB. Since those with inflated status perceptions have higher status relative to their objective class position, having lower PEB confirms that material possession rather than status drives PEB, which again supports the post-materialist view on PEB and objective class positions. Centrally, status cannot be seen as a separate driver for PEB but rather reinforced by a class defined by material possessions. Lastly, we hypothesised that the relationship between PEB, objective and subjective class varies at the country level. We find that the relationship between class, status and PEB varies by country and that the first two hypotheses depend upon the country of analysis. For some countries, the first and second hypotheses hold and PEB has a stronger status enhancement effect than in other countries. However, in most countries, status is still heavily linked to class and material resources, confirming the importance of post-materialism in pro-environmental behaviour.

Overall, our findings highlight the importance of country-level differences in the biased perceptions of PEB relationships. However, for most countries, while the perceived middle is larger than the objective middle class, it is still the objective middle class that has higher PEB and where individuals place themselves matter less than what they possess, —reinforcing the importance of affluence in the PEB model. While status cannot be separated from class as an enhancer for PEB, these results vary by country and, in some countries, status plays a vital role in driving PEB. These results do not come without limitations. The results are based on a cross-sectional analysis, and therefore, we cannot assess the changing behaviour between status, class and PEB. Moreover, the relationship between status and PEB needs a deeper understanding, and additional survey questions are needed to uncover the relationship between status enhancement and PEB. Lastly, while we find heterogeneous results among countries, we do not explore the dynamics behind status, class and PEB in different countries further. This is beyond the scope of this paper and opens the door for future studies to explore the dynamics behind PEB, status and class within the constructs of countries at different stages of development further.

However, these results still hold significant value for policymakers as they show the importance of class, status and status inconsistency in pro-environmental behaviour within the scope of post-materialism. The role of status is driven by country-specific dynamics and reinforces the importance of understanding different cultural,

societal and historical dynamics in countries to gain insight into biased status perceptions and PEB. Ultimately, how we see ourselves, the class we belong to and the cultural context we reside in all play a vital role in our pro-environmental behaviour. Understanding the behaviour required for environmental sustainability and gaining insight into the formation of pro-environmental behaviour are essential for catalysing significant societal change towards a greener tomorrow.

Author contributions: Study conception and design, FK, MB and MP; material preparation, MP and MB; data collection, MP and MB; analysis, MP and MB; writing—original draft preparation, FK, MB and MP; writing—review and editing, FK. All authors have read and agreed to the published version of the manuscript.

Ethical approval: The study was conducted in accordance with the International Social Survey Programme (ISSP). We make use of secondary data in the ISSP. This dataset is fully anonymized and collected under the ethical standards set by the ISSP, ensuring participants' privacy and confidentiality. The ethical statement of the ISSP has been attached as a supplementary document.

Consent to participate: The paper used secondary data published by the International Social Survey Programme (ISSP). The ISSP source questionnaires are developed and pretested by international teams and discussed and approved by the ISSP General Assembly (G.A.), the main deliberative, decision-making, and representative organ of the ISSP. The GA approves questions based on their scientific merit, sociopolitical relevance, and ethical appropriateness.

Data availability: The datasets generated during and/or analysed during the current study are available in the gesis repository. [<https://doi.org/10.4232/1.14153>]

Conflict of interest: The authors declare no conflict of interest.

References

- Babutsidze, Z., & Chai, A. (2018). Look at me Saving the Planet! The Imitation of Visible Green Behavior and its Impact on the Climate Value-Action Gap. *Ecological Economics*, 146, 290–303. <https://doi.org/10.1016/j.ecolecon.2017.10.017>
- Brick, C., & Lai, C. K. (2018). Explicit (but not implicit) environmentalist identity predicts pro-environmental behavior and policy preferences. *Journal of Environmental Psychology*, 58, 8–17. <https://doi.org/10.1016/j.jenvp.2018.07.003>
- Brooks, J. S., & Wilson, C. (2015). The influence of contextual cues on the perceived status of consumption-reducing behavior. *Ecological Economics*, 117, 108–117. <https://doi.org/10.1016/j.ecolecon.2015.06.015>
- Chen, Y., & Fan, X. (2015). Discordance between subjective and objective social status in contemporary China. *The Journal of Chinese Sociology*, 2(1), 1–20. <https://doi.org/10.1186/s40711-015-0017-7>
- Clapp, J., & Dauvergne, P. (2011). *Paths to a Green World: The Political Economy of the Global Environment*. MIT Press
- Cook, J., Oreskes, N., Doran, P. T., Anderegg, W. R. L., Verheggen, B., et al. (2016). Consensus on consensus: a synthesis of consensus estimates on human-caused global warming. *Environmental Research Letters*, 11(4), 048002. <https://doi.org/10.1088/1748-9326/11/4/048002>
- Cruces, G., Perez-Truglia, R., & Tetaz, M. (2013). Biased perceptions of income distribution and preferences for redistribution: Evidence from a survey experiment. *Journal of Public Economics*, 98, 100–112. <https://doi.org/10.1016/j.jpubeco.2012.10.009>
- Derndorfer, J., & Kranzinger, S. (2021). The Decline of the Middle Class: New Evidence for Europe. *Journal of Economic Issues*, 55(4), 914–938. <https://doi.org/10.1080/00213624.2021.1982338>
- Domazet, Mladen and Ančić, Branko (2017) How far for the money? affluence and democratic degrowth potential in Europe. In: *Green European: environmental behaviour and attitudes in Europe in a historical and cross-cultural comparative perspective*.

- Studies in European Sociology. Routledge, Abingdon, pp. 157-181. ISBN 978-1-138-12395-3 (Print), 978-1-315-64849-1 (Online)
- Domazet, Mladen and Marinović Jerolimov, Dinka, eds. (2014) Sustainability perspectives from the European semi-periphery. Edition Science and society (35). Institute for Social Research, Zagreb. ISBN 978-953-6218-58-5
- Dilotsotlhe, N., & Duh, H. I. (2021). Drivers of Middle-Class Consumers' Green Appliance Attitude and Purchase Behavior: A Multi-Theory Application. *Social Marketing Quarterly*, 27(2), 150–171. <https://doi.org/10.1177/15245004211013737>
- Echegaray, F., & Hansstein, F. V. (2017). Assessing the intention-behavior gap in electronic waste recycling: the case of Brazil. *Journal of Cleaner Production*, 142, 180-190.
- Erikson, R., & Goldthorpe, J. H. (1992). *The Constant Flux*. Oxford, UK: Clarendon Press.
- Evans, M. D. R., & Kelley, J. (2004). Subjective Social Location: Data From 21 Nations. *International Journal of Public Opinion Research*, 16(1), 3–38. <https://doi.org/10.1093/ijpor/16.1.3>
- Fang, X., Wang, L., Sun, C., Zheng, X., & Wei, J. (2021). Gap between words and actions: Empirical study on consistency of residents supporting renewable energy development in China. *Energy Policy*, 148.
- Fuhrmann-Riebel, H., D'Exelle, B., & Verschoor, A. (2021). The role of preferences for pro-environmental behaviour among urban middle class households in Peru. *Ecological Economics*, 180, 106850. <https://doi.org/10.1016/j.ecolecon.2020.106850>
- Gifford, R., & Nilsson, A. (2014). Personal and social factors that influence pro-environmental concern and behaviour: A review. *International Journal of Psychology*, 49(3), 141–157. <https://doi.org/10.1002/ijop.12034>
- Gomes, S., Lopes, J. M., & Nogueira, S. (2023). Willingness to pay more for green products: A critical challenge for Gen Z. *Journal of Cleaner Production*, 390, 136092. <https://doi.org/10.1016/j.jclepro.2023.136092>
- Griskevicius, V., Tybur, J. M., & Van den Bergh, B. (2010). Going green to be seen: Status, reputation, and conspicuous conservation. *Journal of Personality and Social Psychology*, 98(3), 392–404.
- Hodge, R. W., & Treiman, D. J. (1968). Class identification in the United States. *American Journal of Sociology*, 73(5), 535–547. <http://www.jstor.org/stable/2775556>
- Hout, M. (2008). How Class Works: Objective and Subjective Aspects of Class Since the 1970s. In Lareau, A. & Conley, D. (Eds.), *Social Class: How Does It Work?* (pp. 25–64). New York: Russell Sage Foundation.
- Hunter, L. M., Hatch, A., & Johnson, A. (2004). Cross-national gender variation in environmental behaviors. *Social Science Quarterly*, 85, 677-694. <https://doi.org/10.1111/j.0038-4941.2004.00239.x>
- Inglehart, R. (1997). *Modernisation and Postmodernisation: Cultural, economic, and political change in 43 societies*. Princeton, NJ: Princeton University Press.
- ISSP Research Group (2023). *International Social Survey Programme: Environment IV - ISSP 2020*. GESIS, Cologne. ZA7650 Data file Version 2.0.0, <https://doi.org/10.4232/1.14153>.
- Karadja, M., Mollerstrom, J., & Seim, D. (2017). Richer (and Holier) Than Thou? The Effect of Relative Income Improvements on Demand for Redistribution. *The Review of Economics and Statistics*, 99(2), 201–212. https://doi.org/10.1162/REST_a_00623
- Kirsten, F., Biyase, M., Pretorius, M., & Botha, I. (2023a). Determinants of Bias Perceptions in South Africa: The Case of a Highly Unequal Society. *Sociological Inquiry*, 93(4), 701-722. <https://doi.org/10.1111/soin.12536>
- Kirsten, F., Botha, I., Biyase, M., & Pretorius, M. (2023b). Determinants of Subjective Social Status in South Africa. *Social Indicators Research*, 168(1-3), 1–24. <https://doi.org/10.1007/s11205-023-03122-9>
- Marx, K. (1972). Economic and philosophic manuscripts of 1844: Selections. In Tucker, R. C. (Ed.), *The Marx-Engels Reader* (pp. 52-103). New York: WW Norton
- Maheshwari, A., & Malhotra, G. (2011). Green marketing study on Indian youth. *International Journal of Management Strategy*, 2(3), 31–46.
- Niu, L., Lu, C., & Fan, L. (2023). Social class and private-sphere green behavior in China: The mediating effects of perceived status and environmental concern. *International Journal of Environmental Research and Public Health*, 20(5), 4329. <https://doi.org/10.3390/ijerph20054329>
- Oddsson, G. (2018). Class imagery and subjective social location during Iceland's economic crisis, 2008–2010. *Sociological Focus*, 52(1), 14–30.
- Oreg, S., & Katz-Gerro, T. (2006). Predicting proenvironmental behavior cross-nationally: Values, the theory of planned behavior, and value-belief-norm theory. *Environment and Behavior*, 38, 462–483. <https://doi.org/10.1177/0013916505286012>

- Posel, D. R., & Casale, D. M. (2011). Relative standing and subjective well-being in South Africa: The role of perceptions, expectations, and income mobility. *Social Indicators Research*, 104(2), 195–223. <https://doi.org/10.1007/s11205-010-9740-2>
- Shenoy, S., Gorinevsky, D., Trenberth, K. E., & Chu, S. (2022). Trends of extreme US weather events in the changing climate. *Proceedings of the National Academy of Sciences*, 119(47). <https://doi.org/10.1073/pnas.2207536119>
- Sherkat, D. E., & Ellison, C. G. (2007). Structuring the religion-environment connection: Identifying religious influences on environmental concern and activism. *Journal for the Scientific Study of Religion*, 46, 71–85.
- Sosnaud, B., Brady, D., & Frenk, S. M. (2013). Class in name only: Subjective class identity, objective class position, and vote choice in American presidential elections. *Social Problems*, 60(1), 81–99.
- Stouffer, S. A., Suchman, E. A., de Vinney, L. C., Star, S. A., & Williams Jr., R. M. (1949). *The American soldier: Adjustment during army life*. Princeton, NJ: Princeton University Press.
- Sudo, N. (2021). Two latent groups influencing subjective social status: Middle class tendency and clear class consciousness. *Social Indicators Research*. <https://doi.org/10.1007/s11205-021-02731-6>
- Sulemana, I., James, H. S., Jr., & Valdivia, C. B. (2016). Perceived socio-economic status as a predictor of environmental concern in African and developed countries. *Journal of Environmental Psychology*, 46, 83-95. <https://doi.org/10.1016/j.jenvp.2016.04.002>
- Uren, H. V., Roberts, L. D., Dzidic, P. L., & Leviston, Z. (2019). High-status pro-environmental behaviors: Costly, effortful, and visible. *Environment and Behavior*. <https://doi.org/10.1177/0013916519882773>
- Waquil, H.D., (2014). Challenges of sustainable consumption in the popular classes in Brazil: study of the relationship between everyday consumption practices and their levels of sustainability. Unisinos Library Digital Repository
- Xiao, C., & McCright, A. M. (2012). Explaining gender differences in concern about environmental problems in the United States. *Society & Natural Resources*, 25, 1067–1084.

Appendix

Table A1. Pro-environmental behaviour by country.

Country	PEB
Australia	4.26
Austria	4.39
China	2.62
Taiwan	3.92
Croatia	3.22
Denmark	4.03
Finland	4.08
France	4.63
Germany	4.57
Hungary	3.4
Iceland	4.2
India	2.89
Italy	4.05
Japan	4.13
South Korea	3.51
Lithuania	3.17
New Zealand	4.41
Norway	4.19
Philippines	3.14
Russia	2.25
Slovakia	3.79
Slovenia	4.18
South Africa	1.61
Spain	3.81
Sweden	4.38
Switzerland	4.74
Thailand	2.63
United States	3.62

Table A2. Linear regressions by country (only biased status perception reported).

Country	concordant	inflated	Country	concordant	inflated
Australia	0.084	-0.37	Lithuania	-0.16	-0.35*
Austria	-0.1	-0.54***	New Zealand	0.27	-0.1
China	-0.33	-0.53	Norway	-0.13	-0.36
Croatia	0.13	-0.26	Philippines	-0.21	-0.2
Denmark	0.16	-0.19	Russia	-0.23	-0.32*
Finland	0.35**	-0.37**	Slovakia	-0.19	0.3
France	-0.03	0.06	Slovenia	0.03	-0.12
Germany	0.2**	-0.05	South Africa	0.27	0.07

Table A2. (Continued).

Country	concordant	inflated	Country	concordant	inflated
Hungary	0.05	-0.04	Spain	-0.06	-0.13
Iceland	0.01	-0.26	Sweden	0.03	-0.23**
India	-0.3	-0.06	Switzerland	0.07	-0.17**
Italy	-0.11	-0.09	Thailand	-0.33	-0.31
Japan	0.05	0.13	United States	0.01	-0.04
South Korea	0.19	0.03			

Table A3. Multilevel mixed-effects linear regression (random effects) robust dependent measure.

	(1)	(2)
VARIABLES		
Subjective middle class	0.0421 (0.0286)	
Subjective upper class	0.107*** (0.0350)	
Objective middle class	0.0329** (0.0151)	
Objective upper class	0.0855*** (0.0192)	
Education	0.0568*** (0.00690)	0.0769*** (0.00740)
Female	0.0848*** (0.0138)	0.0926*** (0.0137)
Age	0.00396*** (0.000567)	0.00413*** (0.000539)
Marital status	0.0537*** (0.00925)	0.0620*** (0.00986)
Religion	-0.0419** (0.0196)	-0.0417** (0.0195)
Underestimate		-0.00348 (0.0116)
Overestimate		-0.0179 (0.0123)
Constant	-0.525*** (0.0616)	-0.499*** (0.0579)
Observations	15,341	15,341
Number of groups	28	28

Robust standard errors in parentheses;
 *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A4. Multilevel mixed-effects linear regression (random effects) ISSP 2010 survey.

	(1)	(2)
VARIABLES		
Subjective middle class	0.00689 (0.0120)	
Subjective upper class	0.0188 (0.0140)	
Objective middle class	-0.00201 (0.0104)	
Objective upper class	0.0476*** (0.0102)	
Education	0.0219*** (0.00328)	0.0280*** (0.00563)
Female	0.128*** (0.00770)	0.123*** (0.0149)
Age	0.000560*** (9.01e-05)	0.000638*** (0.000221)
Marital status	0.0702*** (0.00769)	0.0703*** (0.0120)
Religion	0.00996 (0.00915)	0.0117 (0.0173)
Underestimate		0.0308** (0.0126)
Overestimate		-0.00412 (0.0123)
Constant	2.097*** (0.0452)	2.090*** (0.0565)
Observations	26,202	26,202
Number of groups	34	34

Standard errors in parentheses;
 *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.