

REGISTERED REPORT STAGE 2

The psychology of income wealth threshold estimations: A registered report

Robin Rinn^{1,2}  | Anand Krishna¹  | Roland Deutsch¹ ¹Julius-Maximilians-Universität Würzburg,
Würzburg, Germany²Jacobs University Bremen, Bremen, Germany**Correspondence**Robin Rinn, Jacobs University Bremen gGmbH,
Campusring 1, 28759 Bremen, Germany.
Email: r.rinn@jacobs-university.de**Funding information**

Julius-Maximilians-Universität Würzburg

Abstract

How do people estimate the income that is needed to be rich? Two correlative survey studies (Study 1 and 2, $N = 568$) and one registered experimental study (Study 3, $N = 500$) examined the cognitive mechanisms that are used to derive an answer to this question. We tested whether individuals use their personal income (PI) as a self-generated anchor to derive an estimate of the income needed to be rich (= income wealth threshold estimation, IWTE). On a bivariate level, we found the expected positive relationship between one's PI and IWTE and, in line with previous findings, we found that people do not consider themselves rich. Furthermore, we predicted that individuals additionally use information about their social status within their social circles to make an IWTE. The findings from study 2 support this notion and show that only self-reported high-income individuals show different IWTEs depending on relative social status: Individuals in this group who self-reported a high status produced higher IWTEs than individuals who self-reported low status. The registered experimental study could not replicate this pattern robustly, although the results trended non-significantly in the same direction. Together, the findings revealed that the income of individuals as well as the social environment are used as sources of information to make IWTE judgements, although they are likely not the only important predictors.

KEYWORDS

affluence, anchoring, heuristics, income wealth threshold estimations, social comparisons, subjective perception of wealth, the rich, wealth estimation

This is an open access article under the terms of the [Creative Commons Attribution License](https://creativecommons.org/licenses/by/4.0/), which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2022 The Authors. *British Journal of Social Psychology* published by John Wiley & Sons Ltd on behalf of British Psychological Society.

BACKGROUND

Social and economic inequalities have existed ever since there have been people. Some of these inequalities are directly visible, for example because some individuals possess goods that another person is not able to afford (Garcia Castro et al., 2021; Kappes et al., 2021); other types of inequalities are harder to grasp because they rely on concepts that are not uniformly defined, such as wealth by income (c.f. Arndt, 2020; Grabka, 2014; Melchior & Schürz, 2015). Such types of inequalities greatly impact political preferences, increase negative emotions, and compromise the health of individuals who live in societies that they perceive to be unequal, especially in those individuals who do not profit from it (Dawtry et al., 2015; García-Castro et al., 2020; Garcia Castro et al., 2021; Pickett & Wilkinson, 2015; Ragusa, 2015; Zitelmann, 2020).

Most societies have strongly skewed income distributions, with many people earning relatively similar amounts of money and a few people who earn magnitudes of order more. In such situations, perceived inequality is likely to be considerably influenced by comparisons between ‘ordinary people’ and ‘the rich’. As such, people's estimates of who can be considered as being rich are likely to contribute to their perception of inequality in a society. Thus, the present research deals with the origins of a potential source of perceived inequality. Specifically, we investigate how individuals derive an answer to the question what income is needed for a person to be considered rich. An understanding of the cognitive mechanisms that individuals use to answer this question might help to disentangle why individuals perceive economic inequality in a society by answering the questions of what wealth—an important source of economic inequality—is and of who the rich are.

In this paper we present two correlative and one experimental study in which we asked participants what income they think is needed to be considered as being rich (*income wealth threshold estimations; IWTE*). Specifically, we are interested in cognitive processes that lead to an estimation for wealth by income and hypothesize that several heuristics may drive such estimations. Our first assumption is that the personal income of participants (*PI*) as well as the income of their social circle (*SC*; i.e., people with whom one interacts face-to-face at least twice a year, Galesic et al., 2012) serve as heuristic cues in IWTEs. We further hypothesized participants would derive IWTEs from social comparisons. On the basis of our correlative studies, we conclude that people use self-generated anchors and that people subsequently use social comparisons with others to make IWTEs. This is especially true for high income individuals. Our experimental results that aimed to validate this theory are inconclusive.

Estimating wealth

Making IWTEs is a challenging task, especially for laypeople. One reason for this is that there are many and inconsistent definitions of wealth, even in the scientific literature (e.g., Arndt, 2020; Grabka, 2014; Melchior & Schürz, 2015). For practical purposes, some researchers use distribution-based cut-offs as a definition (e.g., top 10% income of the population), whereas others plead for more complex definitions (Arndt, 2020). Research moreover suggests that the general population has various definitions of wealth (Götte, 2015). It has been found, for example, that people have various subjective wealth images in their minds and that individuals vary substantially in their perception of how rich persons can be recognized. Götte (2015) reports that in a representational sample, around 60% of the participants agreed that wealth has something to do with money, and around 50% agree that it has something to do with material goods and social participation, respectively. From such a substantial variation about how wealth can be defined and how wealthy people recognized, it seems likely that people are uncertain what wealth exactly is. In other words, when people make IWTEs, either of their own will or because they are asked to do so in a survey or research setting, they are forced to make a judgement under uncertainty. Under such conditions, people are more likely to base their judgements on easily available cues in the environment and apply judgement heuristics to these cues (Epley & Gilovich, 2001, 2006; Kahneman & Tversky, 1979; Mussweiler & Strack, 2001; Mussweiler et al., 2004).

Anchoring

One of the most pervasive and robust judgement heuristics, particularly in numerical judgements, is anchoring (Bahnik, 2020; Epley & Gilovich, 2001, 2006; Mussweiler & Strack, 2001). In anchoring, people use available numbers as starting points (i.e., anchors) and then adjust these numerical values to reach a final judgement. Such anchors may stem from the environment (e.g., Bahnik, 2020; Tversky & Kahneman, 1974), or people may generate anchors by themselves based on what comes to their mind first (Epley & Gilovich, 2001, 2006; Mussweiler & Neumann, 2000; Mussweiler et al., 2004). Such self-generated anchors are activated automatically when people are asked a question to which they have no apparent answer (Epley & Gilovich, 2001, 2006) and typically are somewhat similar to the answer that is sought. Once an anchor is generated, people make sequential decisions whether this anchor is correct. A typical outcome of this process is assimilation, that is, the final judgement is biased in the direction of the original anchor (Tversky & Kahneman, 1974). Assimilation might occur for at least two reasons. First, people might test the hypothesis that the anchor is the correct value and, as a result of positive hypothesis testing (Klayman & Ha, 1987), anchor-consistent knowledge is readily available afterwards (Mussweiler & Strack, 2001). Second, assuming that people have a relatively broad interval of intuitively plausible values and that people adjust the original value by moving it in the direction of the plausibility interval, assimilation might occur because people ‘(...) terminate once a plausible value is reached’ (Epley & Gilovich, 2006, p. 311).

While assimilation is a regular effect of anchors, under specific circumstances, anchors might also result in contrast effects. That is, the final judgement might be farther away from the anchor value when the anchor was present (e.g., Mussweiler et al., 1997). This might, for instance, occur when the final judgement is on a different subject than the anchor value (e.g., temperatures in Antarctica and Hawaii; Mussweiler et al., 1997). Such conditions, however, are less likely for self-generated anchors. When it comes to IWTEs, multiple external and internal standards possibly affect judgements, such as numbers mentioned in media reports or anecdotal income values. In the present research, we focus on two potential sources for self-generated anchors which are likely to be used when people try to answer what income is necessary to be considered as rich: the PI of a person and the typical income of a person's SC.

Self-generated anchors

For several reasons, a persons' PI can be expected to have a relatively high chance of being used as an anchor for IWTEs. First, people have more information about their own living conditions than information of living conditions of others. A persons' PI is, therefore, likely to be the most certainly known information when it comes to income and wealth. As such, it can be assumed to be high in cognitive availability and applicability. Second, there is ample evidence for people to take an egocentric perspective when they make social judgements (Gilovich et al., 1999; van Veelen et al., 2016). It is, therefore, likely that individuals ask the questions: ‘how much money do I earn?’ and ‘how much more is necessary to be rich?’. Thus, one's own financial conditions are likely to be a starting point of further processing and people might intuitively define being rich as not normal or out of the spectrum of normal life. At the same time, people typically construe normality around their own conditions (Brickman & Campbell, 1971), such that they might perceive their own income being close to a normal income. As such, it would be a likely starting point for finding a non-normally high income. Taken together, one's PI is likely to come to mind and thus exert an anchoring effect particularly while making IWTEs because it is certain, a typical starting point for social judgements, and because it defines normality for a person.

Although research has found that the PI of a person is a poor predictor of several psychological money-related outcomes (e.g., the PI is a poor predictor of the subjective wealth of a person; Gasiorowska, 2014), the particularly high availability and salience of PI as a certain income number to IWTEs makes it uniquely suitable as an anchor in this case. Indeed, existing evidence suggests that one's own income has an assimilative effect on IWTEs. For example, drawing on a representative sample of the German population, Götte (2015) reported that IWTEs increased as a function of participants' income. While

people earning less than 60% of the median income reported a IWTE for monthly income of € 7497, participants earning between 61% and 140% of the median reported a IWTE of € 9529, and participants earning more than 140% of the median reported a IWTE of € 12,585. As another example, Robeyns et al. (2021), by drawing on a representative Dutch sample, report a 'weak tendency for people with a higher income to place the riches line at a higher level' (p. 125). Thus, based on these considerations and other observations that started to examine IWTEs (Forgas et al., 1982; Glatzer et al., 2008), one might conclude that one's PI has an assimilative anchoring effect on IWTEs.

Such observations, however, are open to alternative interpretations. More specifically, there is ample evidence that perceptions of richness are impacted by peoples' social environment (e.g., Dawtry et al., 2019; Duesenberry, 1949; Galesic et al., 2018). For example, research by Galesic et al. (2012) suggests that people estimate the distribution of features (e.g., household wealth) in a population based on the distribution of that feature in their SC. In a similar vein, richer people assume a larger percentage of the population to be rich than poorer people (Dawtry et al., 2015, 2019). Indeed, just like the PI, one's immediate social environment is highly accessible and may provide a norm for normality. As such, the typical income of a person's SC also is a plausible anchor or a starting point to make IWTEs. Crucially, based on the general sociological principle of homophily (i.e., the tendency to surround oneself with others who are similar to oneself; e.g., McPherson et al., 2001), one can assume that one's PI and the typical income of one's SC are also correlated with each other, which makes this assumption even more plausible. Study 1 and Study 2 tested the relative contribution of the SC and PI to IWTEs.

Beyond anchoring: social comparisons

So far, we have argued that people can draw on two available cues when making IWTEs: the PI and the typical SC income. However, besides one's PI and the typical income of the SC, a persons' income status can also be expected to affect IWTEs judgements. Knowledge about one's income status might be available in memory and thus simply retrieved when needed (e.g., Galesic et al., 2012, 2018). At other occasions, however, people must infer their status from available information in their environment, often based on social comparisons.

Numerous studies suggest that peoples' relative economic status correlates with various money-related outcomes. For example, it has been shown that the social environment relative to one's own standing relates to various money-related outcomes such as income happiness or perceived subjective-relative-deprivation (Boyce et al., 2010; Clark & Senik, 2010; Galesic et al., 2012, 2018; Graham & Pettinato, 2001; Hirschman & Rothschild, 1973; Jackson & Payne, 2020). Furthermore, abundant research suggests that social comparisons have powerful effects on judgements and behaviours in general (e.g., Kim et al., 2017; Mussweiler, 2003; Mussweiler et al., 2004) and when it comes to responses to economic factors (e.g., Cheung & Lucas, 2016; Hill & Buss, 2006; Hirschman & Rothschild, 1973; Jetten et al., 2017; Sánchez Rodríguez et al., 2019).

Importantly, research on the perception of social status has repeatedly shown that individuals think that they belong to the middle class when they are asked to estimate their social status, even when they have a comparatively high objective income (Bussolo & Lebrand, 2017; Dineen et al., 2019; Melchior & Schürz, 2015; Ravallion & Lokshin, 2002). Thus, it seems that it is difficult for individuals to classify themselves into their correct (objective) social class. It might, therefore, follow that social comparison processes that we assume to be used to make IWTEs are not based on absolute standards (e.g., what other individuals actually have) but rather on subjective standards (i.e., one's own perceived status position within ones' SC; *SC perceived status*).

How might social comparisons affect the generation of IWTEs? In the present research, we tested the hypothesis that comparison processes modulate the anchoring processes described so far, especially those relating to the effect of a perceiver's PI. Existing evidence and theory suggest that social comparison processes can be rather complex and can be modulated by several personal and situational factors (e.g., Gerber et al., 2018; Mussweiler, 2003). Applied to the present situation, we can derive that, depending on whether people perceive themselves to be better (downward comparison) or worse off (upward compari-

son) than a relevant standard of comparison (e.g., their SC income), their own income will appear to them as being higher (contrast from downward comparison) or as being lower (contrast from upward comparison) than without such comparisons. How could such a contextualization of one's PI affect IWTEs? We hypothesize that the relative financial standing of persons moderates the anchoring effect of their PI.

Specifically, if a person believes their PI to be relatively low within their SC based on social comparisons, then this indicates that it is probably a long way to go from the PI to wealth. Accordingly, the adjustment applied to an anchor can be expected to be relatively large; the lower a person perceives the own status, the larger. That is, the subjective feeling of being lower class would then proportionally increase the IWTE compared to individuals who perceive themselves having a higher class.

This assumption is in line with theorizing of Mussweiler et al. (2004) that individuals who have standard-consistent knowledge available (e.g., 'I have a high PI and a high status within my SC, therefore I am well off') assimilate towards the evaluation standard (e.g., '...this must mean that I do not need a lot more to be rich') to make their judgements. Conversely, Mussweiler et al. (2004) theorize that individuals who have standard-inconsistent knowledge available (e.g., 'My PI may be high but I have a low status within my SC, therefore I am far away from being wealthy') are likely to contrast away from the standard to make their judgements ('...this must mean that I have to add a lot of money on top of my PI'). This reasoning suggests that, given that IWTEs are derived from comparisons of PI with the SC perceived status, then individuals with a high status and a high PI would assimilate towards the standard, resulting in a proportionally lower IWTE than individuals who have a high PI but perceive a low status.

Alternatively, a different moderation pattern may also occur. Research has shown that people are not willing or are not able to perceive themselves as being rich even when they are objectively seen in a high-income class (Bussolo & Lebrand, 2017; Dineen et al., 2019; Melchior & Schürz, 2015; Ravallion & Lokshin, 2002). One can, therefore, expect that individuals who indicate that they have a high PI and a high perceived status would assume that the IWTE is much higher than individuals who indicate a high PI and a low status because these individuals might be motivated to avoid to be seen as being rich. Individuals with a high PI and a low status would not need to think like this, because they perceive their comparison group as being rich and they can, therefore, justify that they are not rich. Our research aims to clarify which theoretical account holds true if social comparisons take place to make IWTEs.

Summary of potential mechanisms

Heuristic 1: People use their PI as an anchor for IWTEs

Multiple lines of theory and evidence suggest that individuals focus on their current life circumstances (e.g., their PI) as a basis for IWTEs. Combined with the tendency to perceive oneself as middle class rather than rich, this suggests a simple heuristic of adding an arbitrary value to one's PI to generate a IWTE. That is, a positive relationship between the PI and the IWTE can be expected if Heuristic 1 operates.

Heuristic 2: People use the income of their SC as an anchor for IWTEs

In line with SC theories, people might use the income of others around them as a self-generated anchor without actually comparing their own goods with that of others. Thus, a positive relationship between the income of the SC and the IWTEs can be expected if Heuristic 2 operates.

Heuristic 3: People use their SC perceived status as a cue during IWTEs

Theory and evidence on social comparisons suggest that people compare their PI with the income of others around them. This means that people do not merely use their own or assets of others as cues, but also use their subjective status position in their SCs while deriving IWTEs. If social comparisons affect

IWTEs, people's (subjective) relative positions within their SCs (SC perceived status) can be expected to explain variance in individuals IWTE. More specifically, if relative income status functions as a cue for assimilation or contrast, adjustment in anchoring can be either expected to be large when a person has a relatively low status or small when a person has a relatively high status. Alternatively, as argued above, the observed tendency for individuals to avoid self-categorization as rich could lead to the opposite pattern of small adjustments for relatively low status and large adjustments for relatively high-status individuals.

The present research

After an initial preliminary study with a student sample ($N = 85$; see [Supplements](#)), Study 1 was designed to examine the relative importance of Heuristic 1 and Heuristic 2 (and hence of PI and SC) for IWTEs. Study 2 replicated and extended the results of Study 1 by also examining the relative importance of Heuristic 3. Study 3 (the Registered Report Study) seeks to provide a confirmatory test of the theoretical assumptions derived from these studies.

GENERAL METHOD FOR STUDIES 1 & 2

A summary of the sample, the collected items, hypotheses and aims of the studies can be derived from [Table 1](#). In both studies, participants were asked to report their PI and the income of the SC and were then asked to make an IWTE. Afterwards, they were asked other questions (see [Table 1](#)) as well as to indicate their demographics. Lastly, participants were educated about the purpose of the study and thanked for their participation.

The data, material, and supplements can be found here: [data, material, and supplements](#). All studies were conducted with German samples. The variations between the studies allowed for different analyses addressing specific questions from study to study. In each study, we collected data about the IWTE, the PI and, the modal income of the SC, that is, the income level that is most common in the SC. IWTE was measured by asking participants for a net income (after taxation and social security contributions) that is needed to be rich.

The pre-registrations for Study 1 can be found here: [pre-registration Study 1](#); for Study 2, here: [pre-registration Study 2](#), and the pre-registration of Study 3 can be found here [pre-registration Study 3](#). Although the first and second study were pre-registered with hypotheses and planned analyses, our analytic strategy evolved over time. Thus, the analyses presented deviate from the pre-registration in some points because of feasibility and due to the interest of better applicability and comparability of the studies (see [supplements for the data and the pre-registered analyses](#)). All procedures performed involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Study 1, 2 and 3 were ethically approved by the IRB of the Julius-Maximilians-Universität Würzburg (GZEK 2020-26). Appropriate informed consent was obtained from all participants prior to the studies.

STUDY 1

Study 1 was designed to provide a sensitive test for our notion that people might base IWTE's on both Heuristic 1 and Heuristic 2. Based on existing evidence and theories, we expected both variables (the PI and modal income of the SC) to positively relate to IWTEs, but we had no reason to assume one of the two being an exclusive predictor. Descriptives for this study can be found in [Table 2](#), suggesting that we were successful in drawing a sample in which PI and SC show similar variance. Intercorrelations between the key variables are displayed in [Table 3](#). On average, participants indicated that approximately € 9550 are necessary to be rich. In this study, 18 out of 192 participants (approx. 9.38%) indicated that their PI is in the same or in a higher category as their IWTE is.

TABLE 1 Overview of the study measurements

| | Study 1 | Study 2 | Study 3 |
|-------------------------------------|--|---|---|
| N (excluded) | 192 (20) | 376 (24) | 500 (115) |
| Data collection | German mturker | German sample from prolific.co | German sample from prolific.co |
| Age | 90% were under 40 years old; median age was between 25 and 29 years old | $M = 28.74, SD = 8.13$ | $M = 31.15, SD = 9.82$ |
| Other demographics (incl. sex) | $n = 37$ female; Students (22%), apprenticeship (14%), employees (30%), freelancer (11%), unemployed (5%) | $n = 231$ female Approx. 80% had a general qualification for university entrance or a higher educational degree | $n = 188$ female, $n = 190$ male, $n = 7$ diverse Approx. 50% had a general qualification for university entrance or a higher educational degree; approx. 40% were students and 44% were |
| PI measurement | Categorical with 7 income categories (Galesic et al., 2012) | Open-ended | Open-ended |
| SC income | Estimated modal income, categorical with seven income categories (Galesic et al., 2012) | Open-ended | Manipulated |
| IWTE measurement | Open-ended | Open-ended | Open-ended |
| Other important collected variables | n.A. | <ul style="list-style-type: none"> • SC ladder question (adopted from the MacArthur ladder) • Exploratory questions (see supplements) | <ul style="list-style-type: none"> • SC ladder question (adopted from the MacArthur ladder) • Manipulation Checks |
| Aim of the study/hypotheses | Pre-registered: Tests the hypothesis that the PI and SC both are positively related to the wealth estimation | Pre-registered: Tests the comparatively the hypotheses that social comparisons are (not) used to make a IWTE | Pre-registered: Experimental manipulation of the status within ones SC to test the proposed mechanism derived from Studies 1 and 2 |

Note. PI = Personal income, SC income = modal income of the social circle; the currency was requested in Euro; Participant exclusions were carried out in line with pre-registered criteria: (1) Failing an attention check (Study 1 and 2). (2) Participants who indicated that more than € 50,000 monthly net household income is needed to be rich, which represented approximately 5% of a previous study with a representative German sample (Götte, 2015) (Study 1–3) (3) participants who showed signs of bad data quality according to (Leiner, 2019; Study 2–3). Lastly, (4) non-German residents were also excluded in Study 1–2 (if any) to ensure the comparability of the studies and the participants.

The bivariate correlations suggest that the PI as well as the modal income of the SC are positively related to the IWTE. Moreover, however, PI and SC were substantially correlated (Table 3), thereby opening up the possibility that part of the shared variance of PI and IWTEs is actually driven by variation in SC.

Regression analyses of IWTE on PI, the modal income of the SC with sex and age as control variables (Table 4) showed that the PI was a significant predictor only when the modal income of the SC was not included in the model, but modal income of the SC remained significant in all models, even after controlling for sex and age. Tests on multicollinearity show that none of the variables was redundant (all VIF < 1.4).

To provide a preliminary test of Heuristic 3, we conducted a fourth (non-pre-registered), step in the regression analysis and included the interaction term between PI and SC income. Results show that there was no significant interaction between PI and SC income.

TABLE 2 Descriptives of the study items in euro, Study 1

| | IWTE | PI | SC income |
|-----------|---------|------|-----------|
| <i>M</i> | 9553.30 | 3.52 | 4.30 |
| <i>SD</i> | 8000.00 | 4.00 | 4.00 |
| Median | 8589.30 | 1.99 | 1.53 |
| Minimum | 1000 | 1 | 1 |
| Maximum | 50,000 | 7 | 7 |

Note: *N* = 192; Categories for PI and SC income are: 1 = € 0–1000; 2 = € 1001–1500; 3 = € 1501–2000; 4 = € 2001–2500; 5 = € 2501–3000, 6 = € 3001–5000; 7 = € 5000 or more.

TABLE 3 Intercorrelation of the study items in Study 1

| | 1 | 2 | 3 | 4 |
|--------------|-------|-------|------|-------|
| 1. IWTE | – | | | |
| 2. PI | .17* | – | | |
| 3. Income SC | .24** | .48** | – | |
| 4. Sex | .01 | –.02 | –.08 | – |
| 5. Age | .05 | .26** | .08 | .24** |

Note: *N* = 192, * $p < .05$, ** $p < .01$; Sex: 1 = male; 2 = female.

Discussion

Study 1 provides important evidence for the positive relationship between PI and IWTEs, both on the level of first-order correlations and in regression analyses. This corroborates the importance of the PI and the social environment as a source for anchors that feed into the wealth threshold estimation process (e.g., Dawtry et al., 2015; Galesic et al., 2012, 2018) and thereby replicating earlier observations (e.g., Götte, 2015; Robeyns et al., 2021). At the same time, our regression analyses suggest that the relation between PI and IWTEs might rest on the shared variance with SC income. These observations are in line with the notion that people's social surroundings are an important source for judgements about economic matters (Clark et al., 2009; Duesenberry, 1949; Galesic et al., 2012). Thus, from this point of view, it seems that the PI is a less important anchor than the SC to make IWTEs.

Furthermore, we observed no significant interaction between the PI of the participants and the modal income of their SCs. The literature suggests that this absence is not due to the fact that there is a high multicollinearity between the variables. As suggested by Mayerl and Urban (2020), it is very likely that collinearities appear when calculating an interaction term and then including it into a regression model with the variables from which this interaction term has been calculated. The authors also note that this is no problem for the calculation and that no transformation is needed to overcome the high VIF values. Thus, it seems that the objective status differences based on one's PI do not play a big role in making IWTEs in individuals. Instead, it might be that the subjective status plays a much bigger role when individuals try to make IWTEs. As we argued at the beginning, it is likely that individuals have difficulties categorizing themselves into their objective social class, which might be a reason why the subjective (compared to objective) social class is more important to make IWTEs. We tested this assumption in Study 2.

What we can conclude in the interim, however, is that the results are compatible with earlier research, indicating the existence of a 'belonging to the middle-class effect' (Bussolo & Lebrand, 2017; Dineen et al., 2019; Melchior & Schürz, 2015; Ravallion & Lokshin, 2002). According to this research, it was suggested that individuals tend to assume their current life circumstances to be normal (see also Brickman & Campbell, 1971). As a consequence, when the typical SC income is used as an anchor, people will adjust their judgements in an upward direction.

TABLE 4 Stepwise regression (Study 1); with the income wealth estimation as criterion variable

| Predictors | <i>B</i> | <i>SE</i> | β | <i>t</i> | <i>p</i> | VIF | <i>R</i> ² (adj.) | <i>F</i> |
|----------------------------|----------|-----------|---------|----------|----------|-------|------------------------------|----------|
| Step 1 | | | | | | | .00(.00) | <1 |
| Sex | 33.23 | 1612.89 | 0.00 | 0.02 | .984 | 1.06 | | |
| Age | 238.16 | 371.52 | 0.05 | 0.64 | .522 | 1.06 | | |
| Step 2 | | | | | | | .03(.01) | 1.81 |
| Sex | 362.38 | 1602.85 | 0.02 | 0.23 | .821 | 1.07 | | |
| Age | 3.57 | 382.37 | 0.00 | 0.01 | .993 | 1.15 | | |
| PI | 723.86 | 324.20 | 0.17 | 2.23 | .027 | 1.08 | | |
| Step 3 | | | | | | | .06(.04) | 3.08* |
| Sex | 633.27 | 1582.37 | 0.03 | 0.40 | .689 | 1.07 | | |
| Age | 32.73 | 376.82 | 0.01 | 0.09 | .931 | 1.15 | | |
| PI | 281.49 | 362.12 | 0.07 | 0.78 | .438 | 1.39 | | |
| SC income | 1180.76 | 455.68 | 0.21 | 2.59 | .010 | 1.31 | | |
| Step 4 | | | | | | | .06(.04) | 2.49* |
| Sex | 599.74 | 1588.00 | 0.03 | .38 | .71 | 1.08 | | |
| Age | 26.39 | 377.98 | 0.01 | .07 | .94 | 1.15 | | |
| PI | -111.01 | 1020.24 | -0.03 | -.11 | .91 | 11.00 | | |
| SC income | 925.85 | 769.45 | 0.17 | 1.20 | .23 | 3.71 | | |
| PI × SC income interaction | 84.03 | 204.14 | 0.12 | .41 | .68 | 17.70 | | |

Note: *N* = 192, **p* < .05.

In sum, the results contradict our pre-registered hypothesis of an independent contribution of Heuristic 1 and Heuristic 2. If reliable, this observation would be of great importance for theory and research aimed at understanding the cognitive processes that lead to a perception of wealth by income, because it clarifies the psychological path by which PIs affect IWTEs. Furthermore, the absence of a significant interaction between participants PI and SC income so far indicates that participants most likely rely on the income of their SCs and thus take the income that is mostly common in their SCs as anchors to derive IWTEs. Study 2 aims to replicate the previous results and to test whether individuals use subjective comparisons, as opposed to objective ones (Heuristic 3), to derive IWTEs with the use of a different measurement than in Study 1.

STUDY 2

Given the unexpected nature of some results of Study 1, an important goal for Study 2 was to replicate the basic set-up of Study 1 with a large sample and a slightly different operationalization of the two predictors (see Table 1). More specifically, we collected the same variables as before; however, this time with an open-ended answer format. In addition, Study 2 was geared towards testing the operation of Heuristic 3. That is, we aimed at directly testing whether the PI has differential effect on IWTEs depending on the participants' SC perceived status. As suggested in the literature section, one's SC perceived status may be better to explain how individuals derive an IWTE than the objective status (i.e., PI in relation to others' income). Towards this end, we assessed participants' subjective income status relative to their SC with an adaptation of the MacArthur scale (Hoebel et al., 2015). More specifically, participants were asked to position themselves relative to their SCs ranging from 10 (at the top) to 1 (at the bottom) in terms of education, finances, jobs etc. As argued above, we expected the anchoring effect of participants' PI to be either stronger (based on contrast processing) or weaker (based on avoiding self-categorization as rich) the lower their position within their SC is.

Results and discussion

The descriptives are depicted in Table 5 and the intercorrelations of the variables used in this Study can be found in Table 6. We found that only a small proportion of people, namely 11 out of 376 participants (3%) indicate that they have the same amount of (or more) money as they would indicate how much money is needed to be rich. The results show that when asked to state an IWTE, participants add on average € 6554.56 to their own monthly income. In isolation, these observations support the notion that people avoid or are not able to consider themselves as being rich (Bussolo & Lebrand, 2017; Dineen et al., 2019; Melchior & Schürz, 2015; Ravallion & Lokshin, 2002).

As in Study 1, the PI of the participants correlated positively with the IWTE, which supports the assumption of the operation of Heuristic 1 (Brickman & Campbell, 1971; Kyrk, 1953). Also replicating observations from Study 1, the SC income was positively related to the IWTE, indicating that the SC is used as an anchor while generating IWTEs. Further supporting the notion that the SC serves as an anchor, the IWTEs were significantly higher ($M = 8818.68$, $SD = 6055.27$) than the perceived modal income of the SC ($M = 2600.55$, $SD = 1287.82$), $t(375) = 20.2$, $p < .001$, $d = 1.04$. Thus, participants are not simply adopting the SC value. Instead, the data suggests that the SC is used as a starting point for adjustment.

Comparing Heuristics 1 and 2

In Study 1, we unexpectedly observed that the PI had no unique predictive value for IWTEs above and beyond the SC. To test the reliability of this observation, we applied the same regression as in Study 1 to the data obtained in Study 2. The results (see Table 7) fully replicate the results from the regression in Study 1 (Table 4). More specifically, the PI had no significant predictive value for IWTEs in an analysis where it was simultaneously used with SC (Table 7, Model 3). In tandem with the reliable and positive correlation between PI and SC (Table 3), this suggests that the observed bivariate correlation between PI and IWTE might in fact be driven by SC as a proximal determinant of IWTEs.

TABLE 5 Descriptives of the study items in euro, Study 2

| | IWTE | PI | SC income |
|-----------|---------|---------|-----------|
| <i>M</i> | 8818.68 | 2285.98 | 2600.55 |
| <i>SD</i> | 6055.27 | 1701.80 | 1287.82 |
| Median | 7000.00 | 1950.00 | 2500.00 |
| Minimum | 1000 | 0 | 0 |
| Maximum | 41,000 | 11,000 | 8000 |

Note: $N = 376$.

TABLE 6 Intercorrelations of the study items in Study 2

| | 1 | 2 | 3 | 4 | 5 |
|--------------|-------|-------|-------|------|------|
| 1. IWTE | – | | | | |
| 2. PI | .16** | – | | | |
| 3. Income SC | .17** | .51** | – | | |
| 4. Ladder | –.06 | .29** | .14** | – | |
| 5. Sex | .09 | .08 | .01 | .01 | – |
| 6. Age | –.02 | .12* | .11** | –.01 | –.06 |

Note: $N = 376$, * $p < .05$, ** $p < .01$; Sex: 1 = female, 2 = male.

TABLE 7 Stepwise regression (Study 2); with the income wealth estimation as criterion variable to test heuristic 1 and 2

| Predictors | <i>B</i> | <i>SE</i> | β | <i>t</i> | <i>p</i> | VIF | <i>R</i> ² (adj.) | <i>F</i> | BIC |
|------------|----------|-----------|---------|----------|----------|------|------------------------------|----------|---------|
| Step 1 | | | | | | | .01(.00) | 1.73 | 7538.20 |
| Sex | 1176.18 | 652.75 | 0.09 | 1.80 | .072 | 1.00 | | | |
| Age | -14.46 | 38.94 | -0.02 | -0.37 | .711 | 1.00 | | | |
| Step 2 | | | | | | | .03(.03) | 4.24** | 7514.88 |
| Sex | 1013.28 | 647.82 | 0.08 | 1.56 | .119 | 1.01 | | | |
| Age | -28.30 | 38.78 | -0.04 | -0.73 | .466 | 1.02 | | | |
| PI | 0.56 | 0.19 | 0.16 | 3.03 | .003** | 1.02 | | | |
| Step 3 | | | | | | | .05(.04) | 4.38** | 7516.09 |
| Sex | 1051.51 | 644.84 | 0.08 | 1.63 | .104 | 1.01 | | | |
| Age | -32.78 | 38.64 | -0.04 | -0.85 | .397 | 1.02 | | | |
| PI | 0.33 | 0.21 | 0.09 | 1.55 | .123 | 1.37 | | | |
| SC income | 0.61 | 0.28 | 0.13 | 2.16 | .031* | 1.35 | | | |

Note. *N* = 376, **p* < .05; ***p* < .01.

Heuristic 3: Social comparison processes

While the observations so far suggest that PI might not have a unique role while people generate IWTEs, our reasoning regarding Heuristic 3 implies that effects of PI potentially occur in interaction with a person's social standing. More specifically, we predicted that PI will be positively related with IWTEs depending on a person's perceived economic standing. For a first exploration of this assumption, we calculated a difference score between one's PI and the income of the SC and correlated this difference term with IWTEs. Put differently, we explored whether one's social standing might be related to IWTEs. Results revealed that there is no significant bivariate correlation between those variables ($r = .034, p = .515$). Thus, it seems that individuals do not simply rely on their 'objective' standing within their SCs. In the following analyses, we, therefore, drew on the income of the SC and the MacArthur measure of participants' SC perceived status (high values indicate a higher status in one's SC than a lower value).¹ We further seek to examine systematically which model can explain best the cognitive process that might be at work to derive WTEs.

To do so and to examine whether social comparison processes are at work, we carried out two regression analyses on IWTE (Table 8). This first regression model tests the relevance of the objective status for IWTE. In Model 1, we used sex and age, a person's PI, the income of the SC and an interaction term between the PI and the income of the SC to predict IWTE. If participants use their objective status to contextualize their PI, the interaction term should prove significant. The second regression model tests the relevance of participants' subjective status for IWTE. Thus, Model 2 uses the interaction between PI and a person's SC perceived status (instead of the objective status) to predict IWTEs.

Results reveal that Model 2 has the best fit (BIC) out of all the regressions that we conducted in Study 2. As can be seen in Table 8, in this model, additionally to the PI, the interaction term proved to be a significant predictor of IWTEs. Figure 1 visualizes the nature of the interaction. In line with the social comparison hypothesis, the relationship between PI and IWTE proved to be different for participants with a high versus low SC perceived status. More specifically, participants with a low subjective status

¹Deviating from this approach, we pre-registered that we would calculate a numeric variable that describe among others the difference between the PI and the modal income of the SC and other differences. We furthermore pre-registered that we would then use these variables to conduct linear regression analyses with those variables to compare model fits to come closer to an answer whether participants use social comparisons to make IWTEs. Unfortunately, this approach leads predictors to correlate with each other, leads to a multicollinearity problem and redundant predictors in the model.

TABLE 8 Stepwise regression (Study 2); with the income wealth estimation as criterion variable to test heuristic 3

| | <i>B</i> | <i>SE</i> | β | <i>t</i> | <i>p</i> | VIF | $R^2(\text{adj.})$ | <i>F</i> | BIC |
|-------------|----------------------|-----------|---------|----------|----------|------------|--------------------|----------|------------|
| Model 1 | | | | | | | .04(.03) | 3.53** | 7521.83 |
| Sex | 1053.33 | 645.58 | 0.08 | 1.63 | .104 | 1.01 | | | |
| Age | -33.67 | 38.74 | -0.05 | -.87 | .385 | 1.02 | | | |
| PI | .50 | .45 | 0.14 | 1.10 | .271 | 6.00 | | | |
| SC | .72 | .40 | 0.15 | 1.82 | .070 | 2.71 | | | |
| PI × SC | -4.96E ⁻⁵ | .00 | -0.07 | -.42 | .678 | 9.50 | | | |
| Model 2 | | | | | | | .08(.06) | 5.24*** | 7514.55 |
| Sex | -35.49 | 38.11 | -0.05 | -.93 | .352 | 1.01 | | | |
| Age | 1123.71 | 636.04 | 0.09 | 1.77 | .078 | 1.02 | | | |
| PI | 2.37 | .69 | 0.66 | 3.44 | .001** | 14.58 | | | |
| SC | .49 | .28 | 0.11 | 1.78 | .077 | 1.38 | | | |
| Ladder | 226.69 | 278.53 | 0.07 | .81 | .416 | 2.55 | | | |
| PI × ladder | -.30 | .10 | -0.62 | -2.94 | .003** | 17.49 | | | |

Note: $N = 376$, * $p < .05$, ** $p < .01$.

added higher amounts to their PI while generating their IWTE than high-status participants did. This is evident in the steeper slope for low compared to high-status participants.

One can see (Figure 1) that when participants' PI was high (compared to low) and when they indicate that they have a low status within their SC, their IWTEs were much higher than for participants who indicate a high status within their SC. Furthermore, it seems that individuals with a comparatively low PI did not differ in their estimated IWTE when they indicate a comparatively high or low status. Notably, Model 1 shows no significant interaction between PI and the typical income of the SC and overall, the model fit of Model 1 is worse than that of Model 2. Unfortunately, the present research cannot explain which other factors influence the decision of individuals with a comparatively low PI to make IWTEs. In Study 3, we experimentally test whether comparatively low PI individuals consider their SC perceived status as irrelevant, which might be a reason why these individuals neglected their status, or whether such individuals just do not think about their SC perceived status while making IWTEs.

In sum, these observations are in line with Mussweiler et al. (2004) and not in line with the alternative motivational approach that we discussed at the beginning. The results, therefore, indicate that people indeed do not perceive themselves as being rich by income, but it does not seem that there is a motivational basis behind this such that people want to avoid being seen as rich. Instead, individuals with a high PI appear to compare themselves to their immediate SCs and lower their IWTE when they perceive that they have a high (compared to low) SC perceived status. Notably, this result is compatible with theorizing and results of Curtis (2013), who argues that individuals tend to perceive themselves being middle class, especially when the social environment is equal (compared to in equal). Curtis (2013) argues that individuals in societies with comparably smaller degrees of economic inequality (such as Germany) hold less distinguishing ideologies, that is, identification between 'us' and 'them' among diverse social classes. It may, therefore, be argued that being wealthy is perceived as 'not normal', which might be a further reason of the positive correlation of the PI and IWTE.

STUDY 3

The results of Study 2 suggest that Heuristic 3 (social comparison processes between one's subjective standing within ones SC and a person's PI) best explains how comparatively high-income individuals make

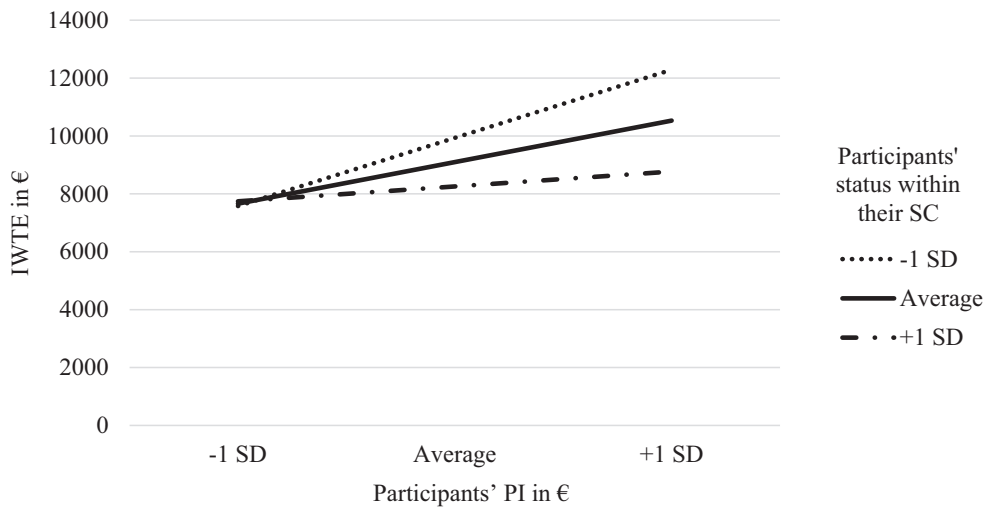


FIGURE 1 Moderation analysis from Study 2. Shows participants' IWTE judgement as a function of participants PI and their perceived status within their SCs

IWTEs while it seems that low-income individuals mainly rely on their self-generated PI anchor. But why are low-income individuals not affected by their SC perceived status within their SC when they are asked to make IWTEs? It might be that individuals who have a comparatively high PI use different—status dependent—cognitive strategies (i.e., they look at their status to derive IWTEs) compared to individuals who have a comparatively low PI, who seem to use a *neglect status strategy* to derive IWTEs. However, there are two possible explanations why people with a rather low PI neglect their SC perceived status to derive IWTEs. Accordingly, we propose and test the two competing theories on this matter: On the one hand, it may be that low-income individuals simply neglect their relative status within their SC to derive IWTEs because they consider directly experienced conditions in their lives to be more important to make IWTEs than elusive definitions such as ‘status’ (Kraus et al., 2012). Specifically, if this assumption holds true, comparatively lower PI individuals would think that their SC perceived status is irrelevant to make IWTEs. Thus, a (relative) status manipulation would not yield in differences in IWTEs, regardless of whether low-income individuals perceive a high or low relative status. We propose that these individuals would not consider the relative status as relevant for an income wealth threshold definition.

On the other hand, it might also be that some types of information are simply not accessible for comparatively low-income individuals when making IWTEs (i.e., relative social status not coming to mind) because it might be that other information is more salient to set an income wealth threshold. If this assumption holds true, a manipulation of the SC perceived status would be likely to produce differences in IWTEs in comparatively lower income individuals with regard to their SC perceived status because these individuals become aware that their SC perceived status might also be a part of the wealth concept. Importantly, as indicated in the introduction, the perception that one has a low status would yield an IWTE that contrasts away from one's own PI (i.e., a high IWTE, as individuals generally place IWTEs above their PIs), while individuals who perceive that they have a relatively high status would assimilate their IWTE towards their PI (i.e., produce a comparatively lower IWTE).

The present study

On basis of this theorizing and in order to replicate the findings for comparatively high-income individuals, in this registered report study, we will manipulate participants' SC perceived status in Study 3 to test the following comparative hypotheses:

If the theoretical account holds true that individuals with a comparatively low PI simply neglect their status because they consider their status as irrelevant to make IWTEs, we should be able to find an interaction between PI and ascribed status on IWTEs. There will be lower differences (lower effect sizes) in IWTEs in individuals with comparatively low PI than in individuals who have a comparatively high PI. In this group of individuals with comparatively low PI, individuals who perceive a low status will indicate that a higher income is necessary to be rich than individuals who perceive a high status.

If, however, the theoretical account holds true that individuals with a comparatively low PI do not spontaneously consider their SC perceived status to make IWTEs, but would be affected by them when one reminds them that status might play a role in making IWTEs, we should be able to find evidence for the following: Individuals with a comparatively high and low income will indicate that more money is needed to be rich when they perceive a low compared to a high status.

METHOD

Participants

In line with the pre-registration, we collected data from $N = 500$ German participants on Prolific.co, which is a crowdsourcing platform to gather data (see Table 1 for demographics). However, $n = 115$ participants had to be excluded due to our pre-registered criteria.

Procedure

To experimentally test our assumptions, we conducted an online experiment. First, we asked participants to indicate their PI as in Study 2 (open-ended). Afterwards, participants were randomly assigned to two experimental groups in which their social class was manipulated. The manipulation of social class was carried out in compliance with earlier research (e.g., Piff et al., 2012; Rao et al., 2021). Participants were shown a 10-rung ladder and were asked to imagine that each rung of the ladder represented a specific social class (the rung below represents the lowest class the participant has contact with in their SCs, and the rung on top represents the highest class a participant has contact with). Participants were then asked to imagine someone from their SC who is either on top or at the bottom of the ladder (experimental condition) and next to compare themselves with that person. According to the assumptions of earlier research, a comparison with individuals who are on top of the ladder should lead to a perception of themselves being comparatively low in social class, whereas a comparison with somebody on the bottom of the ladder should lead to the opposite perception of being comparatively high in social class. To strengthen this manipulation, participants were asked to qualitatively describe some differences between the imagined person and themselves with regard to lifestyle, free time and living conditions. Afterwards, participants were again reminded of the PI they had indicated at the beginning, after which they were asked to make an IWTE as in the studies before. After the exclusion of participants who did not meet the exclusion criteria, $N = 385$ participants remained in the study. Of those, $N = 171$ participants perceived themselves as having a high status versus $N = 214$ who perceived themselves as having a low status.

Data analyses: overview

As described in our pre-registration, we used a linear regression. We added sex and age as control variables and the PI, the status condition and an interaction term of PI and status condition as predictors. The IWTE served as criterion variable. We hypothesized that if the interaction term achieves significance, this result will speak in favour of our first assumption that individuals with a comparatively low PI do not spontaneously take their status into account when making IWTEs. We also expected that if the interaction term does not achieve significance but if both main effects are significant, that our second assumption

holds true, namely that there might be different cognitive strategies between individuals with comparatively high and low status to make IWTEs.

Results and discussion of study 3

The results of the regression analysis showed that neither the main effects nor the interaction achieved significance (see Table 9). Thus, in regard to the hypothesis that individuals with a comparatively low PI simply neglect their status when making WTEs because they consider their status irrelevant, the lack of a significant interaction term provided no support. Furthermore, the lack of significant main effects contradicted our theorizing that individuals with a comparatively low PI do not spontaneously consider their SC perceived status to make IWTEs, but would be affected by them when one reminds them that status might play a role in making IWTEs. It thus seems that our hypotheses failed to hold true. However, in light of several sample characteristics we noted after data collection had ended, we conducted additional exploratory analyses.

Exploratory analyses

As can be seen in Table 10 and Figure 2, there are participants who indicated having a PI of more than € 10,000 and even more than € 40,000, which seems very unlikely given the fact that individuals were recruited via a micropayment-driven crowdsourcing platform. Therefore, we carried out exploratory analyses in which we eliminated varying ranges of PIs using a multiverse approach (see the [supplement of Study 3](#)). These exploratory results show a range of PI cut-offs (€ 7500–€ 11,000) in which the interaction term approaches significance ($p < .10$), including a subset where it achieves significance (€ 9000–€ 10,000). It is to be expected that the interaction term would become weaker as the cut-off becomes lower even if the interaction hypothesis is in fact true, as the range in which the interaction difference can be expressed is curtailed with lower cut-offs. Thus, these results suggest that a small interaction effect may exist among the population of individuals who report around € 11,000 or less as their monthly PI, for which our study may have been underpowered due to the surprisingly large number of exclusions. The exploratory analyses in the supplements also show that there is no point at which exclusions lead both main effects to achieve significance. In fact, the exclusions do not lead any main effect to achieve significance at all.

Based on these analyses and the absence of significant main effects, it seems plausible to reject the hypothesis that individuals with a comparatively low PI would use status information to make IWTEs when status information is accessible to them. However, at this point it seems inappropriate to fully reject the alternative hypothesis that individuals with relatively high PIs use social comparisons to generate IWTEs, while low-PI individuals do not. It seems unlikely that individuals who report a PI of more than € 11,000 can be considered to come from the same population as our remaining sample, especially in light of their extreme leverage as outliers (see Figure 2). However, these results do not provide conclusive evidence for the hypothesis, either. While the application of specific cut-off criteria may seem plausible, they still represent *post-hoc* analyses, which may be subject to bias. In addition, the p -values in the multiverse analysis are at best conventionally significant, but do not meet more conservative alpha levels (i.e., $p < .01$).

Notably, in this study, there were also no bivariate correlations with the IWTE question in the pre-registered sample (see Table 11). This is inconsistent with our previous studies, indicating there might be random responses in the data set. A further exploratory multiverse approach (i.e., excluding single individuals by beginning with the participant with the highest PI) showed that when one excludes participants who indicate a PI that is greater than € 10,000, the bivariate correlation between IWTE and PI remains stable at a $r = .17$ to $r = .19$ level with a p value of smaller than .01, in line with results from our previous studies (see [Supplements of Study 3](#)). This further speaks for the assumption that individuals reporting very high PIs provided invalid responses. Interestingly, as in the previous studies, we found that only

TABLE 9 Regression analyses Study 3

| Predictors | <i>B</i> | <i>SE</i> | β | <i>t</i> | <i>p</i> | $R^2(\text{adj.})$ | <i>F</i> |
|-----------------------|----------|-----------|---------|----------|----------|--------------------|----------|
| Pre-registered | | | | | | .038(.023) | 2.50* |
| Dummy Sex 1 | -6666.63 | 1981.22 | -0.64 | -3.37 | <.001 | | |
| Dummy Sex 2 | -6393.38 | 1984.52 | -0.62 | -3.22 | .001 | | |
| Age | 38.07 | 27.06 | 0.07 | 1.41 | .160 | | |
| Condition | -.08 | .07 | -0.22 | -1.16 | .249 | | |
| PI | -421.14 | 568.39 | -0.04 | <1 | .459 | | |
| PI \times condition | .06 | .06 | 0.18 | <1 | .331 | | |

Note. * $p < .05$.

TABLE 10 Descriptives of the study items in euro, Study 3

| | IWTE | PI | Ladder |
|-----------|---------|-----------|--------|
| <i>M</i> | 8000.52 | 4076.96 | 5.50 |
| <i>SD</i> | 5192.67 | 14,104.50 | 1.86 |
| Median | 6000 | 2300.00 | 6.00 |
| Minimum | 0 | 0 | 1 |
| Maximum | 40,000 | 200,000 | 9 |

Note: $N = 385$.

$n = 25$ (approx. 6%) of the participants indicated to have a household net income that is higher than or equal to their IWTE. This again suggests that 'wealth' is more than most people currently have.

In sum, these results appear to contradict the idea that low-PI individuals use social comparisons within their SC when making IWTEs. While the results are not completely inconsistent with the prediction that high-PI individuals do use social comparisons, they provide only inconclusive evidence, indicating that such comparisons may play only a minor incremental role in such estimations for higher-PI individuals.

GENERAL DISCUSSION

Our studies aimed to shed light on the question what cognitive mechanisms individuals use when they are asked what income is needed to be rich (IWTEs). To answer this question, one correlative pilot study and two further correlative studies were carried out develop a theory of what mechanisms might be used. Based on earlier research (e.g., Epley & Gilovich, 2001, 2006; Mussweiler et al., 2004; Mussweiler & Strack, 2001) and our own results, we hypothesized that individuals first use their income (PI) as a self-generated anchor into account and 'offset' the derived value with an indicator of one's status within one's SC. However, the experimental support (Study 3) for this theory is inconclusive. Thus, the question arises: what have we learnt from the current study and what are directions for the future?

After conducting this series of studies, we can be certain that people use socially meaningful cues for an estimation of what is rich and what is not. Our findings indicate that these cues include one's PI, what one thinks others within one's SC earn, and one's subjective status within one's SC. The results of Study 3 suggest that social comparisons play no incremental role above anchoring for low-income individuals, but yield inconclusive evidence as to whether high-income individuals adjust their anchor based on their subjective status.

The latter possibility is in line with Duesenberry (1949). He asked people how much money they think would make them and their families happier and more comfortable. He found that as the PI of

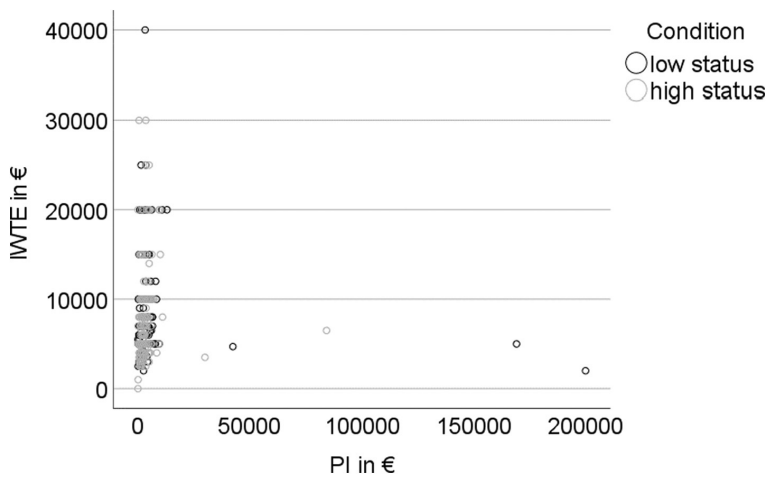


FIGURE 2 Scatterplot of the results from Study 3. Shows participants' IWTE judgement as a function of participants PI and their manipulated status

TABLE 11 Intercorrelation of the study items in Study 3

| | 1 | 2 | 3 | 4 |
|--------------|------|------|--------|-----|
| 1. IWTE | – | | | |
| 2. PI | –.04 | – | | |
| 3. SC Ladder | .02 | .10* | – | |
| 4. Condition | –.02 | –.07 | –.15** | – |
| 5. Age | .07 | .11 | .11* | .04 |

Note: * $p < .05$, ** $p < .01$; the SC ladder that was used for this correlation questioned where participants would place themselves within their SCs in general.

individuals increases, people want more and more money in percentage terms to be happy. He concludes that high-income individuals compete for social status and that they desire to own more and more money to fulfil their desire to strengthen their status. Thus, having both a high PI and high-status places an individual close to being wealthy. But having a high PI and low status might lead individuals to inflate their IWTEs comparatively.

Limitations and future directions

There are many limitations of the current studies. First and foremost: Our operationalization of the constructs that we used here are prone to error variance, which is one reason that the effect sizes that we found may underestimate the true effect size. Specifically, we asked people for their net household income, but some participants in living arrangements that might make responses to this question ambiguous might have wondered how to answer this question, such as those living with housemates. Another limitation is the presence of unexpected outliers in our data. We cannot determine whether the high PI values we observed are valid or result from typing errors. Future research might, therefore, ask participants to confirm their reported PI before continuing. Relatedly, our sample was recruited from a population likely to be biased towards lower PI, so it is possible that we had too few individuals with high PI to adequately test our hypotheses.

Lastly, our status manipulation may not have been adequate for an online sample. Participants in our study were probably motivated to finish the questionnaire as quick as possible, so it might be that they were only slightly engaged in the questions and manipulation. Future research could, therefore, incentivize the manipulation, for example by paying monetary bonuses for coming up with multiple individuals of higher or lower status or elaborating on details of the status difference. Alternatively, more immersive manipulations might address this issue; for example, Jetten et al. (2015) vividly manipulated status by telling people they would become a member of a virtual society on another planet. Participants could then build their new lives on that planet by building their own homes depending on the status condition they had. Online samples might engage more with this kind of task.

Conclusion

We found that the income of individuals as well as status indicators of others around oneself serve as proxies to estimate an income that is needed to be rich. Furthermore, our studies suggest that individuals' income wealth estimation is almost always higher than what they currently have. However, although we have proposed an idea of how such estimations are made, conclusive evidence for our theory is still missing.

AUTHOR CONTRIBUTIONS

Robin Rinn: Conceptualization; data curation; formal analysis; investigation; methodology; project administration; resources; software; supervision; validation; visualization; writing – original draft; writing – review and editing. **Anand Krishna:** Conceptualization; formal analysis; investigation; methodology; software; supervision; validation; visualization; writing – review and editing. **Roland Deutsch:** Conceptualization; formal analysis; funding acquisition; methodology; resources; supervision; validation; visualization; writing – review and editing.

ACKNOWLEDGEMENTS

The manuscript is original, not previously published and not submitted under concurrent consideration elsewhere. We would like to thank Patricia Zwikel for her language editing support. Open Access funding enabled and organized by Projekt DEAL.

FUNDING INFORMATION

We did not receive specific funding for this work.

CONFLICT OF INTEREST

No author has a potential conflict of interest.

DATA AVAILABILITY STATEMENT

The pre-registrations for Study 1 can be found here: pre-registration Study 1; for Study 2: pre-registration Study 2; for Study 3: pre-registration Study 3; The data, material and supplements can be found here: data, material, and supplements.

ETHICAL APPROVAL

Study 2 and the Study 3 were ethically approved by the IRB of the Julius-Maximilians-Universität Würzburg (GZEK 2020-26).

INFORMED CONSENT

Appropriate informed consent was and will be obtained from all participants.

ORCID

Robin Rinn  <https://orcid.org/0000-0002-2640-8325>

Anand Krishna  <http://orcid.org/0000-0003-3838-9210>

Roland Deutsch  <https://orcid.org/0000-0003-3523-7211>

REFERENCES

- Arndt, H. L. R. (2020). Varieties of affluence: How political attitudes of the rich are shaped by income or wealth. *European Sociological Review*, *36*, 136–158. <https://doi.org/10.1093/esr/jcz051>
- Bahník, Š. (2020). Anchoring without scale distortion. *Judgment and Decision Making*, *16*, 131–141.
- Boyce, C. J., Brown, G. D. A., & Moore, S. C. (2010). Money and happiness: Rank of income, not income, affects life satisfaction. *Psychological Science*, *21*, 471–475. <https://doi.org/10.1177/0956797610362671>
- Brickman, P., & Campbell, D. T. (1971). Hedonic relativism and planning the good society. In M. H. Appley (Ed.), *Adaptation level theory: A symposium* (pp. 287–302). Academic Press.
- Bussolo, M., & Lebrand, M. (2017). *Feeling poor, feeling rich, or feeling middle-class: An empirical investigation* (working paper). World Bank.
- Cheung, F., & Lucas, R. E. (2016). Income inequality is associated with stronger social comparison effects: The effect of relative income on life satisfaction. *Journal of Personality and Social Psychology*, *110*, 332–341. <https://doi.org/10.1037/pspp0000059>
- Clark, A. E., Kristensen, N., & Westergård Nielsen, N. (2009). Job satisfaction and co-worker wages: Status or signal? *The Economic Journal*, *119*, 430–447. <https://doi.org/10.1111/j.1468-0297.2008.02236.x>
- Clark, A. E., & Senik, C. (2010). Who compares to whom? The anatomy of income comparisons in Europe. *The Economic Journal*, *120*, 573–594. <https://doi.org/10.1111/j.1468-0297.2010.02359.x>
- Curtis, J. (2013). Middle class identity in the modern world: How politics and economics matter. *Canadian Review of Sociology*, *50*, 203–226. <https://doi.org/10.1111/cars.12012>
- Dawtry, R. J., Sutton, R. M., & Sibley, C. G. (2015). Why wealthier people think people are wealthier, and why it matters: From social sampling to attitudes to redistribution. *Psychological Science*, *26*, 1389–1400. <https://doi.org/10.1177/0956797615586560>
- Dawtry, R. J., Sutton, R. M., & Sibley, C. G. (2019). Social sampling, perceptions of wealth distribution, and support for redistribution. In J. Jetten & K. Peters (Eds.), *The social psychology of inequality* (pp. 381–396). Springer Nature Switzerland AG.
- Dineen, J., Robbins, M. D., & Simonsen, B. (2019). Social class: Perception and reality. *International Journal of Public Administration*, *42*, 55–65. <https://doi.org/10.1080/01900692.2017.1399419>
- Duesenberry, J. S. (1949). *Income, saving and the theory of consumer behavior*. Harvard University Press.
- Epley, N., & Gilovich, T. (2001). Putting adjustment back in the anchoring and adjustment heuristic: Differential processing of self-generated and experimenter-provided anchors. *Psychological Science*, *12*, 391–396. <https://doi.org/10.1111/1467-9280.00372>
- Epley, N., & Gilovich, T. (2006). The anchoring-and-adjustment heuristic: Why the adjustments are insufficient. *Psychological Science*, *17*, 311–318. <https://doi.org/10.1111/j.1467-9280.2006.01704.x>
- Forgas, J. P., Morris, S. L., & Furnham, A. (1982). Lay explanations of wealth: Attributions for economic success. *Journal of Applied Social Psychology*, *12*, 381–397. <https://doi.org/10.1111/j.1559-1816.1982.tb00873.x>
- Götte, S. (2015). *Perception of poverty and wealth in Germany*. Weimar. Aproxima Gesellschaft für Markt- und Sozialforschung.
- Galesic, M., Olsson, H., & Rieskamp, J. (2012). Social sampling explains apparent biases in judgments of social environments. *Psychological Science*, *23*, 1515–1523. <https://doi.org/10.1177/0956797612445313>
- Galesic, M., Olsson, H., & Rieskamp, J. (2018). A sampling model of social judgment. *Psychological Review*, *125*, 363–390. <https://doi.org/10.1037/rev0000096>
- García-Castro, J. D., Rodríguez-Bailón, R., & Willis, G. (2020). Perceiving economic inequality in everyday life decreases tolerance to inequality. *Journal of Experimental Social Psychology*, *90*, 104019. <https://doi.org/10.1016/j.jesp.2020.104019>
- García Castro, J. D., García Sanchez, E., Montoya Lozano, M., & Rodríguez Bailon, R. (2021). The perception of economic inequality in everyday life: My friends with the most and least money. *Asian Journal of Social Psychology*, *25*, 1–15. <https://doi.org/10.1111/ajsp.12476>
- Gasiorowska, A. (2014). The relationship between objective and subjective wealth is moderated by financial control and mediated by money anxiety. *Journal of Economic Psychology*, *43*, 64–74. <https://doi.org/10.1016/j.joep.2014.04.007>
- Gerber, J. P., Wheeler, L., & Suls, J. (2018). A social comparison theory meta-analysis 60+ years on. *Psychological Bulletin*, *144*, 177–197. <https://doi.org/10.1037/bul0000127>
- Gilovich, T., Kruger, K., & Savitsky, K. (1999). Everyday egocentrism and everyday interpersonal problems. In M. Kowalski & M. R. Leary (Eds.), *The social psychology of emotional and behavioral problems: Interfaces of social and clinical psychology* (pp. 69–95). American Psychological Association.
- Glatzer, W., Becker, J., Bieräugel, J., Hallein Benze, G., Nüchter, O., & Schmid, A. (2008). *Attitudes about wealth: Perception and evaluation of economic inequality and its societal consequences in Germany*. Frankfurt. Bundesministerium für Arbeit und Soziales. <https://nbn-resolving.org/urn:nbn:de:0168-ssoar-323262>
- Grabka, M. M. (2014). Distribution and structure of wealth in Germany. In W. Lauterbach, M. Hartmann, & M. Ströing (Eds.), *Wealth, philanthropy and civil society* (pp. 21–45). Springer Fachmedien Wiesbaden.
- Graham, C., & Pettinato, S. (2001). *Frustrated achievers: Winners, losers, and subjective well-being in new market economies* (working paper series no. 21). Center on Social and Economic Dynamics. The Brookings Institution.

- Hill, S. E., & Buss, D. M. (2006). Envy and positional bias in the evolutionary psychology of management. *Managerial and Decision Economics*, 27, 131–143. <https://doi.org/10.1002/mde.1288>
- Hirschman, A. O., & Rothschild, M. (1973). The changing tolerance for income inequality in the course of economic development. *The Quarterly Journal of Economics*, 87, 544. <https://doi.org/10.2307/1882024>
- Hoebel, J., Müters, S., Kuntz, B., Lange, C., & Lampert, T. (2015). Measuring subjective social status in health research with a German version of the MacArthur scale. *Bundesgesundheitsblatt, Gesundheitsforschung, Gesundheitsschutz*, 58, 749–757. <https://doi.org/10.1007/s00103-015-2166-x>
- Jackson, J. C., & Payne, K. (2020). Cognitive barriers to reducing income inequality. *Social Psychological and Personality Science*, 12, 1–10. <https://doi.org/10.1177/1948550620934597>
- Jetten, J., Mols, F., Healy, N., & Spears, R. (2017). “Fear of falling”: Economic instability enhances collective angst among societies’ wealthy class. *Journal of Social Issues*, 73, 61–79. <https://doi.org/10.1111/josi.12204>
- Jetten, J., Mols, F., & Postmes, T. (2015). Relative deprivation and relative wealth enhances anti-immigrant sentiments: The curvilinear re-examined. *PLoS One*, 10, 1–24. <https://doi.org/10.1371/journal.pone.0139156>
- Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47, 263–291. <https://doi.org/10.2307/1914185>
- Kappes, H. B., Gladstone, J. J., & Hershfield, H. E. (2021). Beliefs whether spending implies wealth. *Journal of Consumer Research*, 48, 1–21. <https://doi.org/10.1093/jcr/ucaa060>
- Kim, H., Callan, M. J., Gheorghiu, A. I., & Matthews, W. J. (2017). Social comparison, personal relative deprivation and materialism. *British Journal of Social Psychology*, 56, 373–392. <https://doi.org/10.1111/bjso.12176>
- Klayman, J., & Ha, Y. W. (1987). Confirmation, disconfirmation, and information in hypothesis testing. *Psychological Review*, 94, 211–228. <https://doi.org/10.1037/0033-295X.94.2.211>
- Kraus, M. W., Piff, P. K., Medoza Denton, R., Rheinschmidt, M. L., & Keltner, D. (2012). Social class, solipsism, and contextualism: How the rich are different from the poor. *Psychological Review*, 119, 546–572. <https://doi.org/10.1037/a0028756>
- Kyrk, H. (1953). *The family in the American economy*. University of Chicago Press.
- Leiner, D. J. (2019). Too fast, too straight, too weird: Non-reactive indicators for meaningless data in internet surveys. *Survey Research Methods*, 13, 229–248. <https://doi.org/10.18148/srm/2019.v13i3.7403>
- Mayerl, J., & Urban, D. (2020). Der mythos von der “gefährlichen” Multikollinearität bei der Schätzung von Interaktionseffekten. [*the myth of ‘dangerous’ multicollinearity in estimating interaction effects*]. In A. Mays, A. Dingelstedt, V. Hambauer, S. Schlosser, F. Berens, J. Leibold, & J. K. Höhne (Eds.), *Grundlagen - Methoden - Anwendungen in den Sozialwissenschaften. [Fundamentals - Methods - Applications in the Social Sciences]* (pp. 85–96). Springer. <https://doi.org/10.1007/978-3-658-15629-9>
- McPherson, M., Smith Lovin, L., & Cook, J. M. (2001). Birds of a feather: Homophily in social networks. *Annual Review of Sociology*, 27, 415–444. <https://doi.org/10.1146/annurev.soc.27.1.415>
- Melchior, J., & Schürz, M. (2015). Judgments of justice and wealth distribution in Austria - perceptions of reality and perceptions of inequality reality. *Wirtschaft und Gesellschaft*, 41, 199–234.
- Mussweiler, T. (2003). Everything is relative: Comparison processes in social judgment. *European Journal of Social Psychology*, 33, 719–733. <https://doi.org/10.1002/ejsp.169>
- Mussweiler, T., & Neumann, R. (2000). Sources of mental contamination: Comparing the effects of self-generated versus externally provided primes. *Journal of Experimental Social Psychology*, 36, 194–206. <https://doi.org/10.1006/jesp.1999.1415>
- Mussweiler, T., Rüter, K., & Epstude, K. (2004). The ups and downs of social comparison: Mechanisms of assimilation and contrast. *Journal of Personality and Social Psychology*, 87, 832–844. <https://doi.org/10.1037/0022-3514.87.6.832>
- Mussweiler, T., & Strack, F. (2001). The semantics of anchoring. *Organizational Behavior and Human Decision Processes*, 86, 234–255. <https://doi.org/10.1006/obhd.2001.2954>
- Mussweiler, T., Förster, J., & Strack, F. (1997). Der Ankereffekt in Abhängigkeit von der Anwendbarkeit ankerkonsistenter Information: Ein Modell selektiver Zugänglichkeit [Anchoring effects and the applicability of anchor-consistent information: A selective accessibility model]. *Zeitschrift für Experimentelle Psychologie*, 44(4), 589–615.
- Pickett, K. E., & Wilkinson, R. G. (2015). Income inequality and health: A causal review. *Social Science & Medicine*, 128, 316–326. <https://doi.org/10.1016/j.socscimed.2014.12.031>
- Piff, P. K., Stancato, D. M., Coté, S., Mendoza Denton, R., & Keltner, D. (2012). Higher social class predicts increased unethical behavior. *Proceedings of the National Academy of Sciences of the United States of America*, 109, 4086–4091. <https://doi.org/10.1073/pnas.1118373109>
- Ragusa, J. M. (2015). Socioeconomic stereotypes: Explaining variation in preferences for taxing the rich. *American Politics Research*, 43, 327–359. <https://doi.org/10.1177/1532673X14539547>
- Rao, T. T., Yang, S. L., Yu, F., Xu, B. X., & Wei, J. (2021). Perception of class mobility moderates the relationship between social class and prosocial behavior. *Asian Journal of Social Psychology*, 25, 88–102. <https://doi.org/10.1111/ajsp.12466>
- Ravallion, M., & Lokshin, M. (2002). Self-rated economic welfare in Russia. *European Economic Review*, 46, 1453–1473.
- Robeyns, I., Buskens, V., van de Rijt, A., Vergeldt, N., & van der Lippe, T. (2021). How rich is too rich? Measuring the riches line. *Social Indicators Research*, 154, 115–143. <https://doi.org/10.1007/s11205-020-02552-z>
- Sánchez Rodríguez, Á., Jetten, J., Willis, G., & Rodríguez-Bailón, R. (2019). High economic inequality makes us feel less wealthy. *International Review of Social Psychology*, 17, 1–11. <https://doi.org/10.5334/irsp.333>
- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, 185, 1124–1131. <https://doi.org/10.1126/science.185.4157.1124>

- van Veelen, R., Otten, S., Cadinu, M., & Hansen, N. (2016). An integrative model of social identification: Self-stereotyping and self-anchoring as two cognitive pathways. *Personality and Social Psychology Review*, *20*, 3–26. <https://doi.org/10.1177/1088868315576642>
- Zitellmann, R. (2020). Upward classism: Prejudice and stereotyping against the wealthy. *Economic Affairs*, *40*, 162–179. <https://doi.org/10.1111/ecaf.12407>

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Rinn, R., Krishna, A., & Deutsch, R. (2023). The psychology of income wealth threshold estimations: A registered report. *British Journal of Social Psychology*, *62*, 630–650. <https://doi.org/10.1111/bjso.12581>