

NBER WORKING PAPER SERIES

SOCIAL POSITIONS AND FAIRNESS VIEWS ON INEQUALITY

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Working Paper 28099
<http://www.nber.org/papers/w28099>

NATIONAL BUREAU OF ECONOMIC RESEARCH

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November 2020, Revised November 2021

This paper is a substantially revised version of a working paper previously circulated under the title “Social Position and Fairness Views.” We thank Beatrice Ferrario, Leonardo D’Amico, Ida Maria Hartmann and Isabel Skak Olufsen for excellent research assistance. We are also grateful for comments by seminar participants in the Deaton workshop on Attitudes Towards Inequality and Redistribution, the Selten Lecture in Bonn, IFN in Stockholm, NHH in Bergen, LSE, UCSD, UC Berkeley, UCLA, the NBER Public Economics Meetings, and Zurich. We thank Ingvild Almås, Asger Andersen, Richard Blundell, Dietmar Fehr, Ernst Fehr, Søren Leth-Petersen, Andreas Peichl, Ricardo Perez-Truglia, Emmanuel Saez, Julien Senn, David Seim, Krishna Srinivasan, Bertil Tungodden, Andrea Weber, Roberto Weber, and Matthew Weinzierl for feedback and suggestions. The activities of CEBI are financed by the Danish National Research Foundation grant DNR134. We are also grateful for financial support from the Candys Foundation. The use of the data for this project complies with Danish legislation (persondataforordningen, forordning 2016/679 om persondataskyttelse) and has been approved by the Danish Data Protection Agency (File No. 514-0018/2018-2000 at the University of Copenhagen). The project includes a randomized information treatment and was preregistered in the AER RCT Registry (AEARCTR-0003923). The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

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Social Positions and Fairness Views on Inequality
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NBER Working Paper No. 28099
November 2020, Revised November 2021
JEL No. D1,D63,D8,H20,H31

ABSTRACT

We link survey data on Danish people's perceived income positions and views on inequality within various reference groups to administrative records on their reference groups, income histories, and life events. People are, on average, well aware of the income levels of their reference groups, but lower-ranked respondents in all groups tend to overestimate their own position among others because they believe others' incomes are lower than is the case, while higher-ranked respondents underestimate their position. People view inequalities within co-workers and education group as most unfair, yet underestimate inequality the most exactly within these groups. Perceived fairness of inequalities is strongly related to current individual position, moves with shocks like unemployment or promotions, and changes when experimentally showing people their actual positions.

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People care about inequalities and their social position among others. This underlies fairness considerations and motives for redistribution in policy debates and in economic theory.¹ But how much do people know about income inequalities and their own position relative to others in various reference groups, such as their neighbors, their co-workers, their cohort, or people with the same level of education? How does their social position in these groups affect their views on the fairness of inequality? Are they less or better informed about inequality and social position where it matters the most to them?

Studying these questions is challenging because of the data requirements. To understand how accurately people rank themselves among others in a reference group – say, their neighbors – we need to know all people in that group and their income levels. If we find that people misperceive their position, we would need to know whether this is due to misperceptions of the income distribution among their neighbors, erroneous assessment of their own income, or misunderstanding of the income concept. Comparing people’s perceptions across key reference groups further necessitates homogeneous information on all people in all the groups. Studying how changes in social position affect people’s views also requires knowledge about people’s income histories including shocks that have shifted their position.

To overcome these challenges, we leverage a unique dataset constructed by linking responses from a custom survey of a large sample of people in Denmark to detailed administrative data on their full income histories, life events, and true positions in the income distributions of different reference groups. The reference groups vary by domain, size, and proximity to the respondent. They include large groups such as people from the same cohort and of the same gender, living in the same municipality, having the same education level, or working in the same sector, as well as smaller groups such as neighbors, co-workers in the same firm, former schoolmates, or siblings. In the survey, we ask people about their knowledge of the income distributions in these reference groups, how fair they think income inequalities within these groups are, and where they rank themselves within the various groups (i.e., their income or “social” position within each group). The respondents are sampled randomly among 45- to 50-year-old people, who are well into their working years, but still far from retirement.

The link between survey and administrative data enables us to explore how well people know their positions in various reference groups and the relationship between social positions and fairness views. It also allows us to pinpoint where misperceptions come from, because we can verify the accuracy of perceptions of own income by using the respondent’s own

¹Alesina and Angeletos (2005); Almås et al. (2010); Bénabou and Ok (2001); Blanchflower and Oswald (2004); Boskin and Sheshinski (1978); Clark and Oswald (1996); Duesenberry (1949); Easterlin (1974, 1995, 2001); Easterlin et al. (2010); Fehr and Schmidt (1999); Meltzer and Richard (1981)

tax return, as well as of the income distributions and positions in each group, which we can compute from the tax returns of all people in the reference groups. The link further enables us to study how changes in social positions over many years, including changes due to unemployment, health shocks, and promotions, affect fairness views. Finally, we can inform individuals of their true social positions and experimentally assess how this information shapes these views.

Our results can be grouped into three main sets of findings. The first set of findings relates to people’s perceptions of inequality and their own position within reference groups. On average, people perceive the overall income level (the median, which we call P50) of their reference groups correctly and, therefore, are well aware of core income differences across different groups of people. At the same time, we observe systematic misperceptions that vary in magnitude across the reference groups.

A common misperception we uncover for all reference groups is that people think they are closer to the center of the income distribution of each group than is the case. We call this “center bias.” Thus, within all reference groups, people in the upper part of the distribution believe they are ranked lower than they really are, while people in the lower part of the distribution believe they are ranked higher. We show that this occurs because those with higher incomes tend to overestimate others’ incomes, while those with lower incomes tend to underestimate others’ incomes. Our data allows us to rule out an alternative possible explanation for the center bias pattern, namely misperceptions of one’s own income.²

An important baseline reference group is one’s cohort, as it captures the overall income distribution in the country, while controlling for life-cycle effects. On average people are quite accurate about both the P50 income level and the P95 (the 95th percentile) income level of their cohort, and many respondents have relatively small misperceptions. For instance, 45% of the respondents perceive the median income level of their cohort correctly, with at most 10% error. For comparison, 70% report their own income within a 10% error band. However, because of the center bias, people in the lower part of the distribution underestimate both the P50 and the P95, while people in the upper part of the distribution overestimate the P50 and the P95. The further away respondents are from the center, the larger their misperceptions.

²We use the term “center bias” as opposed to “middle-class bias” in Fehr et al. (2021) and “median bias” in Hoy and Mager (2021) for related patterns. In our case, the patterns observed are not driven by people thinking they are all middle-class. Instead, the bias appears in all reference groups, some of which have low average incomes while others have high average incomes. The “center” positions in these groups are different and cannot all be considered middle-class. Furthermore, “center bias” better describes the patterns we observe in the data than “median bias” since people do not only misperceive the median. Our results suggest that *the entire perceived distribution* is shifted relative to the actual income distribution. The shift is such that people perceive the center of each distribution – but not necessarily every point of the distribution – to be closer to themselves than is the case.

Most strikingly, people at the very top of the distribution (above P95) overestimate P95 by 50%.

The relatively small misperceptions within the cohort apply to some but not all of the other reference groups. In particular, respondents systematically underestimate the P95 income level among their co-workers in their sector and among people with the same level of education. Furthermore, lower-ranked individuals overestimate their social position most within their sector of work and education group. For example, people at the 20th percentile among their co-workers on average think they are well above the 40th percentile, while people at the 20th percentile in their municipality believe they are around the 30th percentile. This pattern also holds if we zoom in on smaller reference groups, namely co-workers within a firm instead of within a sector, and if we look at neighbors in the respondent's immediate vicinity instead of people living in the same municipality. Respondents are even better at predicting where they rank relative to former schoolmates than relative to current co-workers.

In summary, people are on average well informed about income differences across their various reference groups, but they have the tendency to perceive themselves as closer to the center of each of their groups than is the case, and they misperceive the extent of inequalities between people in the same education group, sector, or firm.

The second set of findings relates to how views on the fairness of inequality vary by reference groups. People believe that inequality within peers working in the same sector or with the same education level is more unfair than inequality among peers of the same age, same gender, or living in the same municipality. This suggests that the inequality which remains conditional on core economic characteristics that people believe shape earnings, such as education and sector, is perceived as more unfair than inequalities conditional on characteristics that are not perceived as relevant for income, such as municipality, age, or gender. Yet, as described above, the education and sector groups are exactly the reference groups within which respondents tend to underestimate the degree of inequality the most, and within which lower-income people strongly overestimate their own positions. In this sense, people are less informed about inequality and social position where it matters the most to them.

Our third set of results centers around the relationship between social position and fairness views on inequality across all the reference groups. First, we show that fairness views are more strongly correlated with current social position than with historical (past) social positions. In contrast, political views are more weakly correlated with current social position and more strongly correlated with respondents' past positions, and even significantly correlated with the social position of their fathers when they were growing up. Second,

changes in social positions due to life events shift people’s fairness views on inequality. Conditional on a detailed array of individual-level controls and starting social position, we find that the perceived fairness of inequality significantly declines with negative shocks (unemployment spells, hospitalization episodes, or disability) and increases with positive income shocks (promotions at work). Third, individuals who overestimate their own social position in the reference groups and are informed about their actual (lower) social position in our experiment start viewing inequalities in these groups as more unfair. In line with the overall correlation patterns, people’s political views respond much less than fairness views to the information treatment and to the real-life events. These findings suggest that fairness views on inequality are strongly related to current social positions, which are composed of both permanent and idiosyncratic variations in income, while political views are more related to permanent income.

Related Literature. The main novelty of our paper is to provide systematic and comprehensive evidence across the key *reference groups* of people. We elicit their perceptions of inequality, own social positions, and fairness views for each of these groups. The existing literature described below studies perceptions of people related to the *national income distribution* or consider within-employer perceptions for specific firms or employers.

For our study of reference groups, it is crucial to link survey data on people’s perceptions to information from administrative records on their real-life outcomes. Recent research has started to combine subjective information from surveys with objective information from administrative records to answer different questions (Almås et al., 2017; Andersen and Leth-Petersen, 2020; Bastani and Waldenström, 2021; Epper et al., 2020; Kreiner et al., 2019). Related to our agenda of studying perceptions about inequality and social position, one previous study (Karadja et al., 2017) has merged survey data and administrative data in Sweden and used it to check the reported income of respondents against actual income, but without studying reference groups. We further use the administrative records to obtain information on people in the reference groups of the respondents, full income histories over their life cycle, and experience of major life events.

Related to our first set of findings regarding people’s perceptions of inequality and their own social position, existing studies mainly focus on people’s perceived ranking in the national income distribution while a few also consider the global income distribution (Bublitz, 2020; Cruces et al., 2013; Fehr et al., 2021; Feichtmayer and Gründler, 2021; Hoy and Mager, 2021; Karadja et al., 2017; Nair, 2018). These studies document large misperceptions. For instance Karadja et al. (2017) find that almost 86% of the 1,242 Swedish respondents in their sample underestimate their position in the national income distribution. In a survey of about

1,000 households in Buenos Aires, [Cruces et al. \(2013\)](#) find that 55% underestimate their position, 30% overestimate their position, and only 15% placed themselves in the correct income decile. Using a representative sample of 1,392 Germans, [Fehr et al. \(2021\)](#) find that people in the bottom of the national income distribution overestimate their own position while people in the top underestimate it and similar patterns arise for people’s perceived positions in the global income distribution.

We contribute by considering many of people’s key reference groups. Interestingly, people are on average well aware of the income differences across reference groups. We show that there are systematic misperceptions of own position across all reference groups (resembling findings for the national distribution described above) but the degree of misperceptions is relatively small in some groups and larger in others. Furthermore, since we ask respondents in the survey about their income as it appears on their last tax return and elicit their perceptions of P50 and P95 in the reference groups, we can pinpoint where these misperceptions come from: People mistakenly believe that others’ incomes are lower if they have a low income themselves, and that others’ incomes are higher if they have a high income. This is what we call “center bias.” Finally, our sample is an order of magnitude larger than existing studies and includes many respondents at the top of the income distribution – a group that is notoriously difficult to reach through surveys – which implies that we can provide more precise evidence and study differences between reference groups.

Related to our second main finding on fairness views within different reference groups, recent papers have analyzed how wage differences affect satisfaction and effort focusing on a single employer or sector. For instance [Cullen and Perez-Truglia \(2018, 2021\)](#) show that privacy norms keep employees from revealing their salaries and that there are large misperceptions about others’ salaries. Regarding university faculty, [Baker et al. \(2019\)](#) find that salary disclosure in Canada reduces the gender pay gap and [Card et al. \(2012\)](#) show that it reduces job satisfaction for employees with incomes below median for their pay unit and occupation in California. We complement these studies by using the many employers, firms, and sectors in which our representative sample of respondents work, to show that people care more about income differences within co-workers in their firm or sector, as compared to other reference groups, and that they strongly misperceive inequality and their own income position within this particular reference group.

Also related to our second finding, [Ferrer-i-Carbonell \(2005\)](#) show that people report being happier when their income is above the average income of people of a similar age, education level, and in the same region. [Luttmer \(2005\)](#) finds that those who live in localities³

³Public Use Microdata Areas (“PUMAs”).

with higher average earnings report lower levels of happiness. We contribute to this strand of literature by showing that relative position in reference groups is not only important for well-being but also for fairness views. Because we have data on all people in various reference groups and their incomes, we can also study people’s actual position in the groups and document their understanding of it.

Related to our third main finding on the link between social position and fairness views, previous literature has studied how people’s views on inequality are affected by the environment in which they grew up (Roth and Wohlfart, 2018; Giuliano and Spilimbergo, 2014; Malmendier and Nagel, 2011) or their exposure to a more socioeconomically diverse group of individuals (Londoño-Vélez, 2021). In a recent study, Andersen et al. (2020) show that winning a housing lottery in Ethiopia does not change respondents’ views on inequality, but reduces their willingness to tax homeowners and increases their likelihood to attribute poverty to character traits. Similar to our information experiment for the reference groups, earlier work provided respondents with information on the national income distribution (Bublitz, 2020; Cruces et al., 2013; Fehr et al., 2021; Hoy and Mager, 2021; Karadja et al., 2017; Kuziemko et al., 2015). The findings from these information provision experiments are mixed: Cruces et al. (2013) finds that those who are told they rank *lower* than they thought demand more redistribution, while Hoy and Mager (2021) find they demand less; Karadja et al. (2017) find that only those informed that they rank *higher* demand less redistribution.

We contribute to the literature by exploiting the unique combination of information on individual income histories back in time, individual income shocks that shift their social positions, and randomized information treatments for the same sample of people to document how changes in actual and perceived positions affect fairness views.

Our paper is also broadly related to empirical work documenting that people care about relative income and that their social positions shape their well-being, as referenced in the introduction. It is also related to more recent papers on relative position and fairness views. Kuziemko et al. (2014) highlight the role of “last-place aversion,” a particular form of relative position concerns whereby individuals particularly fear being ranked last. Charité et al. (2015) point out the importance of reference points, while we highlight the need to consider specific reference groups. Fisman et al. (2021) show that people care about inequality in a nonlinear way relative to their own position, putting weight both on their nearest neighbors and on the top of the distribution. Using online surveys, Weinzierl (2014) demonstrates that people do not hold utilitarian preferences, but rather have other mixed fairness views.

Organization. Section 1 describes our survey, the administrative data, and our sample. Section 2 analyzes respondents’ perceptions and misperceptions about the distributions of income and their own positions in various reference groups. Section 3 studies the relationship between social position and fairness views. Section 4 offers concluding remarks.

1 Data Collection, Survey, and Administrative Data Linkage

1.1 Survey Sample and Link to Administrative Data

Target Sample. Assisted by Statistics Denmark, we conducted a large-scale survey in February and March 2019. We sent out survey invitations to a representative sample of 50,100 respondents, born in Denmark in the years 1969-1973, randomly selected by Statistics Denmark. The respondents were aged 45 to 50 at the time of the survey and, hence, for the most part no longer enrolled in formal education, well into their careers with a large share of their lifetime income realized, but still quite far from retirement. We excluded immigrants because we use data on people’s income histories, schoolmates, and parental positions in the analyses, and this information is only available for Danish-born respondents.

Survey Method. Our survey method is original and leverages an official channel of communication between the Danish public authorities and citizens. The invitations were sent out through the secure website Digital Post, used to receive and read mail from public authorities. By law, all citizens older than 15 have to have an electronic mailbox where they receive information from public institutions – for example tax and health authorities. Communications may also come from private companies, such as salary statements from employers or account statements from banks. The use of this official channel of communication, together with the University of Copenhagen’s stamp, likely increased the credibility of our survey and experiment, and of the information provided to respondents, which sets it apart from lower-stakes survey environments. To incentivize respondents further, they were told that those who completed the full survey would be enrolled in a lottery for 100 gift cards with a value of 1,000 DKK (\$150) each to be used in more than 150 store chains in Denmark.

The average time for completion of the survey was 33 minutes, with a median time of 25 minutes (the full distribution of time spent on the survey can be seen in Appendix Figure A-5). Responses were linked by Statistics Denmark to the register data using the Social Security number assigned to all Danes at birth, which ensures a precise and unique match.

TABLE 1: SUMMARY STATISTICS: SAMPLE COMPARED TO POPULATION

	Analysis sample (1)	Started survey (2)	Full population (excl. immigrants) (3)	Full population (4)
Demographics				
Male	0.51	0.47	0.51	0.50
Age	47.0	47.0	47.0	47.0
Married	0.63	0.61	0.57	0.58
Immigrant	0.00	0.00	0.00	0.13
Descendant	0.00	0.00	0.01	0.00
Income Position				
Income position	64.2	59.6	53.3	50.5
Bottom 50%	0.29	0.36	0.46	0.50
Middle 40%	0.54	0.50	0.43	0.40
Top 10%	0.17	0.14	0.11	0.10
Education				
Primary education	0.08	0.10	0.16	0.17
Upper secondary edu.	0.06	0.06	0.05	0.06
Vocational education	0.31	0.34	0.39	0.38
Short cycle higher edu.	0.09	0.08	0.07	0.07
Bachelor's programs	0.27	0.26	0.20	0.20
Master's programs	0.19	0.17	0.13	0.13
Socioeconomic Status				
Self-employed	0.04	0.04	0.06	0.06
Employee	0.90	0.87	0.80	0.77
Unemployed	0.01	0.02	0.02	0.02
Not in work force	0.05	0.07	0.12	0.14
Private sector	0.66	0.65	0.69	0.70
Regions				
Copenhagen	0.31	0.30	0.30	0.32
Sealand	0.16	0.16	0.16	0.15
Southern Denmark	0.21	0.21	0.21	0.21
Middle Jutland	0.23	0.23	0.23	0.22
North Jutland	0.09	0.09	0.10	0.10
Parents' Income				
Mother's income position	53.1	52.1	50.5	50.2
Father's income position	53.3	52.4	50.8	50.5
Observations	9415	13686	339231	389863

Notes: Full Population is the full Danish population born in 1969-1973. *Full population (excl. immigrants)* is the population our contact sample was drawn from. This sample was provided by Statistics Denmark and is the full population excluding immigrants. *Started survey* are the respondents who began the survey. *Analysis sample* are the respondents who completed the survey and are used in the analysis. All variables are indicators, except for the income positions, which are based on the percentile rank position within the cohort of the respondent.

Testing for Selection into the Survey and Attrition. Thanks to the register data, we can analyze selection into the survey. Indeed, we know the characteristics of the respondents who entered the survey, of those who completed it, of those who were sent an invitation but chose not to participate, and of those who were not sent an invitation at all. Table 1 shows summary statistics for our sample of people who received an invitation and completed the survey (column 1), and compares it to the characteristics of those who received an invitation to participate and started the survey, regardless of whether they completed it or not (column 2), the characteristics of the full Danish-born population in these cohorts, excluding non-Danish born people (column 3) and the full population in these cohorts, including immigrants (column 4). The invitee group of people who received an invitation to participate, regardless of whether they did start the survey or not, is not shown here, as it is almost perfectly identical to the full Danish-born population excluding immigrants (column 3) in these cohorts, as should be the case given that they were randomly drawn from this group by Statistics Denmark. The final analysis sample of respondents who completed the survey has on average somewhat higher income and education levels than the full target population in column 3, but is representative in terms of region of residence, age, and gender. Compared to other surveys, the top of the income distribution is very well-represented. People from the top 5% of the income distribution make up almost 8% of our analysis sample, and those from the top 10% make up 17% of the sample. The use of the official Digital Post channel is perhaps the reason we are able to sample extensively from the top of the income distribution, a group that is typically very hard to reach with standard survey methods.

Out of the 50,100 people invited from the population, 13,686 clicked on the personal link in the invitation (column 2) and 10,089 completed the survey. After dropping respondents for whom the reported birth year or gender do not match the register data (19 respondents), who spent less than 10 minutes answering the survey (50), who did not report their income as instructed in the survey, for example by reporting monthly instead of annual income (343), had zero or negative income according to the register data or missing background register data (61), or who skipped one of our key questions (201), we have 9,415 respondents in total (column 1).⁴ The response rate of 20% ($=10,089/50,100$) is reasonably high when contacting

⁴The completion rate of 74% ($=10,089/13,686$) may seem low, but our invitees are not people who have signed up in advance to participate in survey panels, as is the case in other settings. Instead, our potential respondents receive an invitation through the official Digital Post, which probably leads many to click on the survey link in order to learn more about this somewhat unusual for them invitation. Once people realize it is a research survey they are not obliged to answer and they have to report personal information, some of them drop out. In regular survey settings where respondents have signed up to receive survey links, those not interested do not even click on the link to start with, as there is no element of surprise for them. In our

a representative sample of new potential respondents who have never expressed a particular interest in taking surveys.⁵

Appendix Table A-1 highlights which characteristics predict the drop out rate and at which point respondents drop out. Out of those who start the survey, 6% dropped out at the consent page or are screened out for the reasons listed above; 10% drop out when having to report their income. Only 1% drop out after the treatment. This means that attrition is not selectively driven by the treatment, as confirmed by the insignificant coefficient on treatment status. Men, non-married, higher-income, and more educated respondents are less likely to drop out.

1.2 Survey Outline

The survey consists of five blocks of questions and is available in full in Appendix A.1. In addition, a consent page informs respondents about the use of their responses in accordance with the General Data Protection Regulation of the European Union and a conclusion section asks respondents whether they thought that the survey was left- or right-wing biased. 81% think the survey is neutral, 14% that it is left-wing biased, and 5% that it is right-wing biased.

Background and Political Views block. This block contains questions on birth year, gender, educational attainment, and sector of employment. These answers are later used to inform respondents about their positions relative to other people in the same large reference groups (see Table 2 for a definition of each reference group). We also ask about voting behavior and attitudes toward economic policy:

“Which party did you vote for in the last general election (in 2015)? [10 parties; Other; Did not vote; Do not wish to answer]”

“How would you describe your attitude on economic policy? [Very left-wing; Left-wing; Moderate; Right-wing; Very right-wing]”

Income block. This block asks about the income of the respondent one year ago (earned in 2017) and includes wage income, self-employment income, and taxable income benefits and transfers (composed mainly of unemployment insurance benefits, disability benefits, and

case this will appear as attrition, while in other settings, we will never get to see who did not click on the survey link to start with.

⁵For comparison, a recent study in Denmark invited similar cohorts by ordinary mail and reports a response rate of 13% (Epper et al., 2020).

social assistance). We ask separately about these three income components and with the sum of the components appearing on the screen (see an image of the exact formulation in Appendix Figure A-1). The breakdown of total income into smaller parts is done to help people report the correct income and to highlight that self-employment income and taxable benefits are included in total income. We include taxable benefits and transfers to reflect the fact that they contribute to income and leaving them out may lead us to wrongly rank individuals, e.g., individuals receiving UI benefits are in general better off economically both in the short run and in the long run than individuals receiving social assistance. Respondents are informed that it is important to report the income correctly and that they can see the amounts on their annual tax statement (available online). Our rationale for asking about income as it appears on the tax statement is to be able to base the analysis on a well-defined income concept that is both clear to the respondent and for which the true value can be verified in the register data. With the exception of self-employment income, the income components are third-party reported to the tax agency and pre-populated on the tax return. Tax evasion is in general low in Denmark and close to nil on third-party reported income components (Kleven et al., 2011).

To avoid making the survey too complicated and time-consuming, we exclude capital income, deductions, and tax payments. This is not an important issue for our analysis for two reasons. First, our narrower income definition makes up almost all of total income as calculated by Statistics Denmark for most respondents, which includes capital income. Thus, the average across individuals of our narrower income concept relative to average total income, according to Statistics Denmark, is 96.0%; the median income according to our definition represents 98.5% of the median total income, according to Statistics Denmark.

Second, and crucially, Appendix Figure A-6 shows that the income rank positions based on total income line up almost perfectly with the positions based on our income definition. In fact, this remains the case if we instead used a third definition of income, namely Statistics Denmark’s measure of “disposable income” that includes the imputed value of housing, interest deductions, and tax payments.

Perceptions block. This block elicits people’s perceptions about the median (hereafter, P50), the 95th percentile (hereafter, P95), and their own position in the distribution of each of the five large reference groups. The block starts with a video that uses a ladder and 100 stick people to explain the different positions in the income distribution. It states and illustrates, for instance, that P50 is the income level for which 50% have a lower income and 50% have a higher income. The full script for and link to the video are in Appendix A.2. After this video, we elicit respondents’ perception of the P50 and P95 incomes for

TABLE 2: DEFINITION OF REFERENCE GROUPS

Reference group	Definition
Large reference groups	
Cohort	People born the same year.
Gender	People born the same year with the same gender.
Municipality	People born the same year currently living in the same municipality.
Educational level	People born the same year with the same level of education: basic school, upper secondary education, vocational education and training, short-cycle higher education, bachelor’s degree and master’s or PhD. Uses the Danish DISCED education classification, which follows the international education classification ISCED.
Sector of work	People born the same year and working in the same sector: Construction, real estate, business services, finance and insurance, trade and transport, manufacturing, information and communication, culture, agriculture, public work. Uses the Danish Sector Codes DB07, which is a sub-classification of the NACE classifications of the EU.
Small reference groups	
Schoolmates	People born the same year who went to the same school the year they turned 15.
Co-workers	People working in the same workplace. Workplace is defined as a single address entity, e.g., for a firm with multiple locations, each location is a separate workplace.
Neighbors	For people living in an apartment, the neighbors are people from age 25 to 65 who live in the same stairwell. For people living in a house, the neighbors are people from age 25 to 65 who live on the same road.

their cohort (see Appendix Figure A-2). We then ask the respondents to use a horizontal slider to indicate their perceived P50 and P95 income levels for their municipality, education group, gender group, and sector (see Appendix Figure A-3). Respondents are subsequently prompted to place themselves within each of the five large reference groups using a vertical slider next to the illustrative ladder that was also used in the explanatory video (see Panel A of Figure 1). We also ask respondents to compare their own income to that of their sibling(s).

For neighbors, co-workers, and former schoolmates, we first asked the respondent about the perceived number of individuals in these reference groups (denoted by N) and then asked them to report their perceived income position on a horizontal slider going from 1 to N (see e.g., Figure A-4 for the co-worker question). For these small reference groups, it does not

make sense to ask about moments of the distribution such as P50 and P95 as we do for the large reference groups.

Treatment block. This part is presented for the treatment group at this point in the survey and for the control group at the very end of the survey (so that it does not affect any of their answers). The treatment informs respondents about their true social positions. Based on the respondents' earlier answers to the questions in the background and income blocks, we interactively calculate their true positions in each of the five large reference groups.

For each of these five reference groups, the treatment reminds people which position they had earlier responded to be in, shows them their actual position, and highlights how much higher or lower they are in the distribution compared to where they thought they were. Panel B of Figure 1 shows a screenshot from one of the treatment screens (in English, and only for the cohort reference group) for a fictitious respondent with a positive misperception of her own position within her cohort. In this example, the respondent indicated that she thought she was ranked at position 70; the treatment informs her that she is, in fact, ranked at position 57 and points out the misperception gap in red on the ladder and numerically in the text above. The misperceptions of the positions within the other four reference groups are shown in the same way.

An alternative treatment could construct many sub-samples and inform respondents about their true position in only a single group. However, informing respondents of their position in only one reference group may still make them update their beliefs about their position in the other groups, but in a way we do not control. By telling them their actual positions in each group, we are certain about the information provided. Due to Danish rules of conduct, we cannot show respondents their true position in the small reference groups (co-workers, neighbors, former schoolmates).

Appendix Table A-2 shows that the treatment and control groups are balanced in terms of observable respondent characteristics.

Outcomes block. This sequence asks about views on fairness of inequality within the respondent's cohort and (large) reference groups, and also about the role of effort versus luck, and political view. For each reference group, we asked a standard question about fairness of inequality and a standard question about the role of effort versus luck. We only asked two questions to avoid increasing the length of the survey too much, and selected questions that could be applied with the same formulation across all reference groups. However, we also asked a few questions related to general well-being and views on inequality and show results for these outcomes in Appendix D.

The main questions are as follows:

“On a scale from 1 to 7 where 1 is “Completely fair”, 4 is “Neither fair nor unfair” and 7 is “Completely unfair”, indicate to what extent you think that it is fair or unfair that there are differences in income among people born the same year as you WITHIN the following groups that you are yourself a part of?”

[The screen then lists five reference groups, filling out their labels directly with the respondent’s information from the earlier block, as can be seen in Panel C of Figure 1.]

“Now, think about people born the same year as you WITHIN these groups (indicated below). On a scale from 1 to 7 where 1 is “Only luck”, 4 is “Equally important”, and 7 is “Only effort”, indicate to what extent you think that differences in income are caused by differences in people’s efforts over their lifetime or rather by luck? By luck, we mean conditions, which you have no control over. By effort, we mean conditions, which you can control.”

“Which party would you vote for if there was a general election today? [11 parties; Other; Do not wish to answer]”

1.3 Response Quality

Reported incomes in the survey match the actual incomes on tax returns well. The average percentage difference between reported and actual income is less than 0.5%. More than 25% of the respondents report an income that is within 1% of their actual income and more than 70% of the respondents report an income that differs by at most 10%. Appendix Figure A-7 shows the full distribution of differences between reported and actual income.

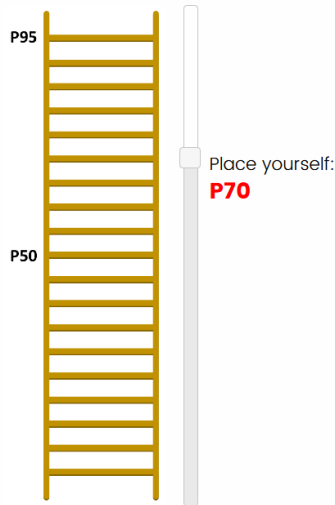
Next, we describe how the reference groups reported by the respondents align with the official classifications in the administrative data and how we can account for possible discrepancies in the analysis. Appendix Table A-3 shows that information on gender and cohort are aligned and that 98% of the respondents report living in the correct municipality. Respondents are also relatively precise when they report educational level and sector of work, and the mismatches can be explained and dealt with in a consistent manner. Overall, for 74% of respondents, education levels reported in the survey match the register data, and for 72% the sector reported matches. In fact, on education, 93% of the respondents with a bachelor’s or master’s program as their highest level of education, according to the registers, report the correct level of education. Almost half of the respondents who report an incorrect educational level have a vocational education and training program as their highest level of education. The majority of these respondents report their highest level of education as either

FIGURE 1: EXAMPLE SURVEY PAGES

(A) ELICITING PERCEIVED POSITION

Rank among all people **born in 1970**

You previously reported that you had a yearly income in 2017 of 400000 DKK before tax. We will now ask you to report where you think this income placed you on the income ladder in 2017 for people who were born in 1970. Use the slider to select your position. Later, we will inform you about your true position.



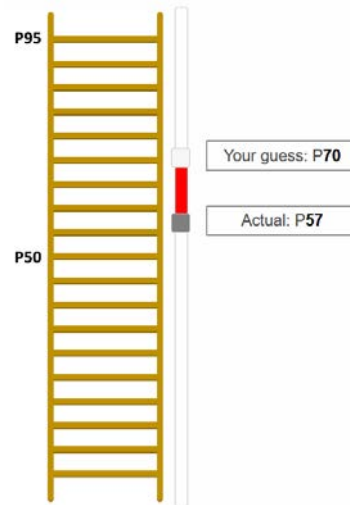
(B) INFORMATION TREATMENT

Rank among all people born in 1970

You GUESSED that you were on position **P70**.

Based on the income you reported, your TRUE position is **P57**.

You are actually 13 positions lower on the ladder than you thought.



(C) QUESTION ON UNFAIRNESS OF INEQUALITY

On a scale from 1 to 7 where 1 is "Completely fair", 4 is "Neither fair or unfair" and 7 is "Completely unfair", indicate to what extent you think that is fair or unfair that there are differences in income among people born the same year as you **WITHIN** the following groups that you are yourself a part of?

	Completely fair		Neither fair or unfair			Completely unfair	
	1	2	3	4	5	6	7
Differences in income among people born in 1970	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Differences in income among men born in 1970	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Differences in income among people, living in Københavns municipality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Differences in income among people with the educational level Master or PhD program	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Differences in income among people working in the sector Finance and insurance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Notes: Panel A shows the question eliciting the perceived position in the income distribution. In this example, a respondent, born in 1970 with an income of 400,000 DKK, perceives to be in position 70. The slider is initialized at P1. Panel B shows part of the information treatment this respondent receives, i.e., on the cohort reference group. The bottom panel shows a screenshot of the fairness of inequality question and illustrates how the reference groups are adapted (in bold) based on the respondent's earlier answers.

upper secondary school or short-cycle higher education. The explanation for the first group is that many consider upper secondary school as a higher level than vocational education, but according to the standard education classification, this is not the case. For the second group, the majority have an education within *Office, commercial and business services*, and therefore plausibly think they have a short-cycle higher education, but according to the education classification these are also categorized as vocational educations.

For the sector dimension, it is understandable that some respondents have difficulties in knowing the correct *label* of their sector, which is based on the standard classification and labeling of sectors as described in Table 2. For two of the large and well-defined sectors, such as *Finance and insurance* and *Public administration, education, health and social activities*, 89% and 91% of people correctly report working in those sectors. In the smaller and less well-defined sectors such as *Culture, leisure and other services* and *Real estate activities*, only 50% and 56% of people correctly report working in those sectors. For instance, for *Real estate activities* more than half of those who report an incorrect sector, report working in either *Construction* or *Business services*. The discrepancies are thus likely attributable to genuine ambiguity rather than to careless answers or misunderstandings.

The benchmark results we present use the reference groups that respondents believe they belong to. Appendix E shows that the conclusions are unchanged if we instead use their actual reference groups or only include respondents who perceive their reference group correctly. This reflects that, to start with, the differences are not large across the groups that are difficult for respondents to differentiate between.

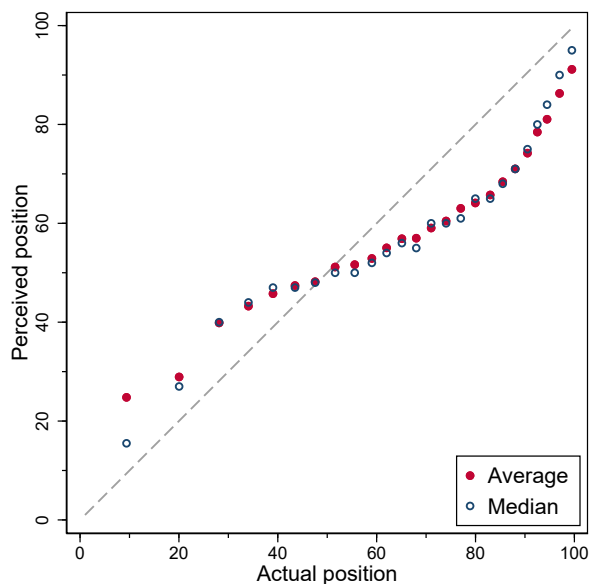
2 Perceptions of Social Positions

In this section, we describe people’s perceptions and misperceptions of their own position in their cohort and their various large and small reference groups.

2.1 In the Cohort Reference Group

We start with people’s cohort. Our approach of asking about perceptions at the cohort level neutralizes life-cycle effects. This is both practically convenient and normatively important. Arguably, large income variations due to life-cycle effects are less relevant from a normative perspective than large income differences across similar working-age people. Respondents in

FIGURE 2: PERCEIVED VS. ACTUAL POSITION IN THE COHORT



Notes: The figure shows a bin scatter of the average and median perceived position by actual position in 25 equally sized bins. Actual position is based on the income from the tax return.

our chosen target cohorts are close to the peak of their career paths and income trajectories, with much of their permanent income already realized.⁶

Perception of own position within the cohort. Respondents who are ranked lower in their cohort tend to think they are ranked higher, while those that are ranked higher tend to think they are ranked lower. We call this pattern “center bias.”

This can be seen in Figure 2, which shows the relation between respondents’ actual position in their cohort and their average or median perceived positions.⁷ The two curves both have a horizontal, inverted S-shape, whereby people below the median income level overestimate their position, while people above the median tend to underestimate it. Respondents who are close to the very top of the income distribution – a group that is typically missing from traditional surveys, as discussed in Section 1 – quite accurately estimate their position.

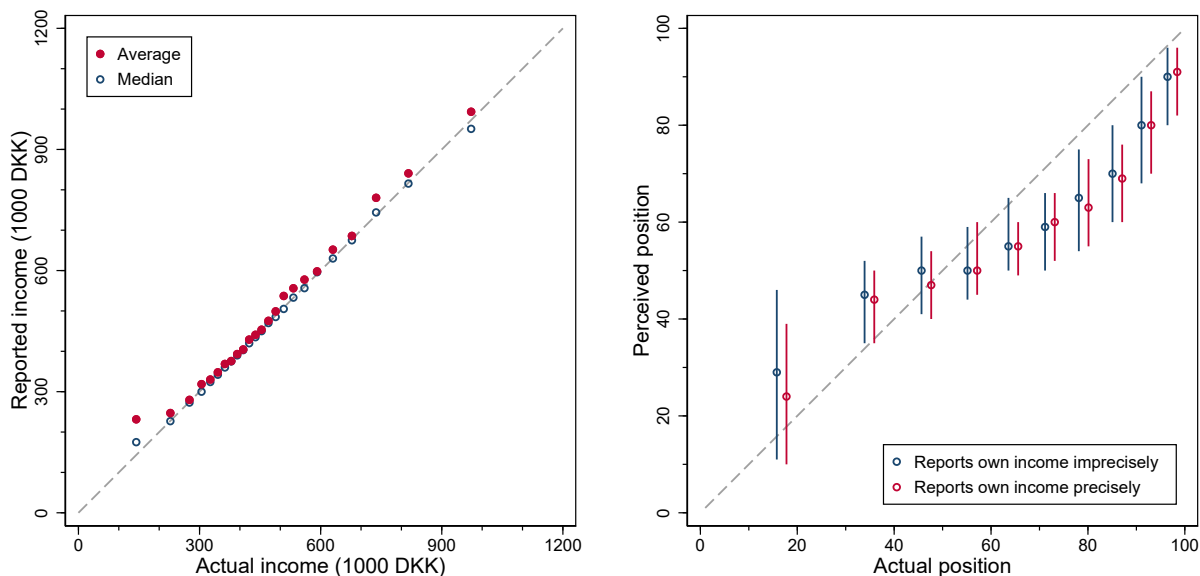
⁶Appendix F highlights the pitfalls of asking about the full income distribution without specifying proper age limits. Both the P50 and P95 income by cohort varies drastically across different ages or by excluding or including some cohorts.

⁷Appendix Figure A-8, Panel A shows that if we compute the actual position in different ways using the average income on the tax return over the last three years (to reduce the role of potential noise and large fluctuations in actual position) or the reported income in the survey, the pattern is the same. Panel B of Appendix Figure A-8 depicts the 25th percentile and the 75th percentile by actual position. It reveals more variation in perceived position of people in the very bottom of the distribution relative to those at the very top.

FIGURE 3: MISPERCEPTIONS OF OWN INCOME

(A) ACTUAL VS. REPORTED INCOME

(B) PERCEIVED VS. ACTUAL POSITION



Notes: The left panel shows binned scatter plots of the average and median reported income against actual income (measured in 1000 DKK). The 25 bins have approximately the same number of respondents. The right panel replicates the plot in Figure 2 by showing the median perceived position by actual position, but splits the sample into people whose perceived income is within a 5% error band of their actual income, *Reports own income precisely*, and those whose perceived income is more than 5% above or below their actual income, *Reports on income imprecisely*. The intervals show the interquartile range.

Center bias is conceptually different from “middle-class bias,” i.e., the idea that people tend to think they belong to the middle-class. As we will see below, center bias appears for all reference groups, and the middle positions in those groups correspond to very different income levels and are not all representative of a middle-class income.

In principle, misperceptions about one’s position among others can stem from underlying misperceptions of one’s own income or of the incomes of others. We discuss the role of misperceptions of others’ incomes below, but we can first rule out that misperceptions of own income play a major role. Respondents do not perfectly know their income (see Appendix Figure A-7), and those who misperceive their income are more likely to make larger errors in estimating their position (see Panel A of Appendix Figure A-10). However, Panel A of Figure 3 shows that there are no systematic misperceptions of income that vary by actual income. Furthermore, idiosyncratic misperceptions of own income are also not main drivers of the misperception of positions, as can be seen in Panel B of Figure 3. The figure shows that the relationship between perceived and actual positions is similar for those who perceive their income accurately (i.e., are within a 5% error band of the income observed in the

administrative data) and those who do not. The interquartile range represented by the intervals in the figure is only slightly larger for those with inaccurate income perceptions.⁸

Perceptions of the cohort income distribution. We now turn to respondents' perceptions of the cohort income distribution. Our first finding is that people are good at estimating median incomes, but less accurate in estimating top incomes. Panel A of Figure 4 plots respondents' misperceptions about the P50 income level (red curve) and the P95 income level (blue curve) relative to the actual levels. For the P50 income level, errors are symmetric around zero and bell-shaped. 45% of respondents estimate the median with at most a 10% error; 75% estimate it with at most a 25% error. For comparison, the errors when people report their own income (black curve) are such that 70% (respectively, 90%) percent report correctly within a 10% (respectively, 25%) error band.⁹ Against this benchmark, people seem reasonably well aware of the P50 income level in their cohort. As compared to the perceived P50, there is larger variance of the perceived P95 level and a small majority of people underestimating its level.

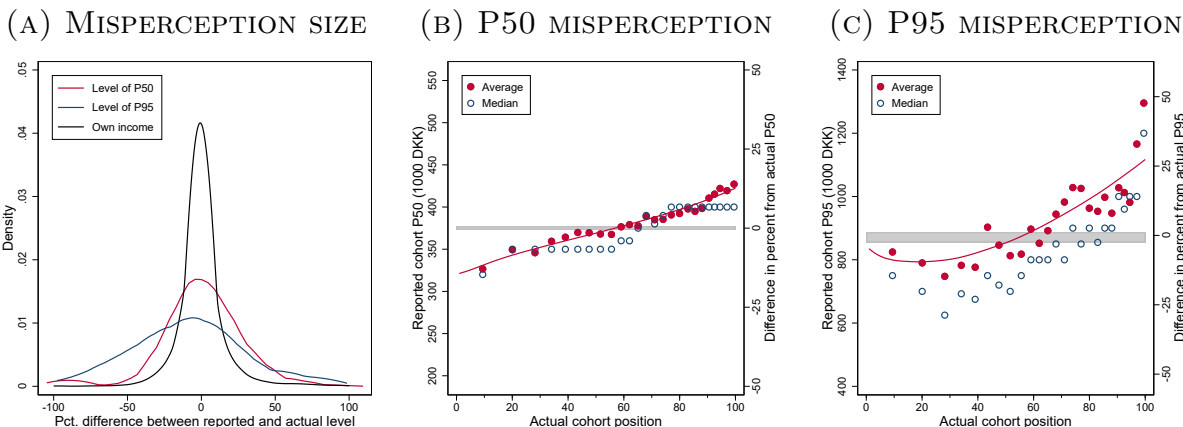
Our second finding is that people's own income influences their views on the incomes of others: those who have lower income tend to think that the P50 and P95 are lower, while those with higher income tend to think the P50 and P95 are higher. To see this, consider Panels B and C, which reveal an increasing relationship between the average perceived P50 and P95 income levels and the respondent's own position in the distribution. Higher-income respondents tend to overestimate both P50 and P95 and lower-income people to underestimate them. Except for respondents in the very top and the very bottom of the distribution, the average prediction errors at each percentile are within 5% of the actual P50 value.¹⁰ The average perception error for the P95 is below 20% at all percentiles with the exception of people at the very top who starkly overestimate P95 by 50%. Note that people do not systematically think that others are closer to themselves than in reality, since people placed between P50 and P95 in the cohort distribution tend to believe that P95 is further away from them than it actually is.

⁸Panel B of Appendix Figure A-10 shows that respondents who report a 10,000 DKK higher income (than their actual income) on average report a 1000 DKK higher median income in the cohort. Panel C then shows that respondents who report an income that would imply they are 10 positions higher than their actual position overestimate their actual rank by 6 positions. Therefore, these misperceptions tend to cancel out. Furthermore, idiosyncratic errors in own income would not, in general, generate the distribution of perceived positions observed in Panel A of Appendix Figure A-9.

⁹Regarding this comparison, note that the spike at exactly zero in Appendix Figure A-7 suggests that many of the respondents have checked their actual income on the tax return when answering the survey. It is not possible to similarly easily find information about the median of a cohort.

¹⁰Equivalently, in terms of positions, an income level 5% below the actual median (DKK 350,000) corresponds to a percentile position of 44-45 within the cohorts and an income level 5% above (DKK 400,000) corresponds to a percentile position of 56-57.

FIGURE 4: PERCEIVED P50 AND P95 OF THE COHORT



Notes: Panel A shows the distribution across respondents of the misperception in percent of the level of P50 and P95 (i.e., the percent difference between perceived and actual levels). For comparison, we plot the misperception of the respondent’s own income as reported in the survey and their actual income on the tax return. The distributions are smoothed using Epanechnikov kernels with a bandwidth of 5 for *Own income*, 10 for *Level of P50* and 15 for *Level of P95*. Panel B (respectively, Panel C) is a bin scatter with 25 bins of the average and median perceived P50 (respectively, P95) reported in DKK (left scale) and the corresponding misperception in percent (right scale) by actual position in the within-cohort income distribution. The perceived P50 and P95 are winsorized at the 5th and 95th percentiles within each bin (the median is unaffected by this). The local linear polynomials have a bandwidth of 20.

What explains misperceptions of own position? Returning to the question of what causes respondents’ systematic misperceptions of their own position in Figure 2, we can see that systematic errors in assessing others’ incomes play an important role. Respondents’ misperceptions of others’ incomes are correlated with their own income: they tend to think others’ incomes are higher when their own income is higher. In short, people who are in lower positions rank themselves higher relative to others not because they misperceive their own income, but because they tend to underestimate the incomes of others. Conversely, people who are higher-ranked tend to place themselves at lower positions because they overestimate the incomes of others.¹¹ “Center bias” thus arises because people’s perceived distribution of incomes in their cohort is shifted relative to the actual distribution of incomes, in a way that makes them think they are closer to the center than they actually are.

Which respondents are most accurate? In addition to actual cohort position, what are the characteristics that drive respondents’ perceptions and misperceptions? Table A-4 regresses measures of accuracy and inaccuracy of perceived position, P50, and P95 on indicator variables capturing the respondents’ gender, political views, area of residence, education

¹¹Note that the large misperceptions of P95 in Panel C of Figure 4 by people in the top of the distribution is consistent with their quite accurate perceptions of own rank in Figure 2 because of the large distance between percentiles in the top of the distribution.

level, and sector of work as well as cohort fixed effects and actual income position fixed effects. We find that more educated respondents and male respondents are significantly more likely to be accurate across all domains (own position, P50, and P95). Other characteristics, such as where people work, are not strongly associated with misperceptions.

2.2 In Large Reference Groups

Perceptions of the income distributions of large reference groups. On average, respondents estimate the median income level of their various reference groups – cohort, education, sector, municipality, gender – very well. They also assess the P95 of their cohort, gender, and municipality accurately, but significantly underestimate the P95 of their education group and their sector of work. Thus, respondents are not well aware of the extent of income differences among people with the same education and among those working in the same sector.

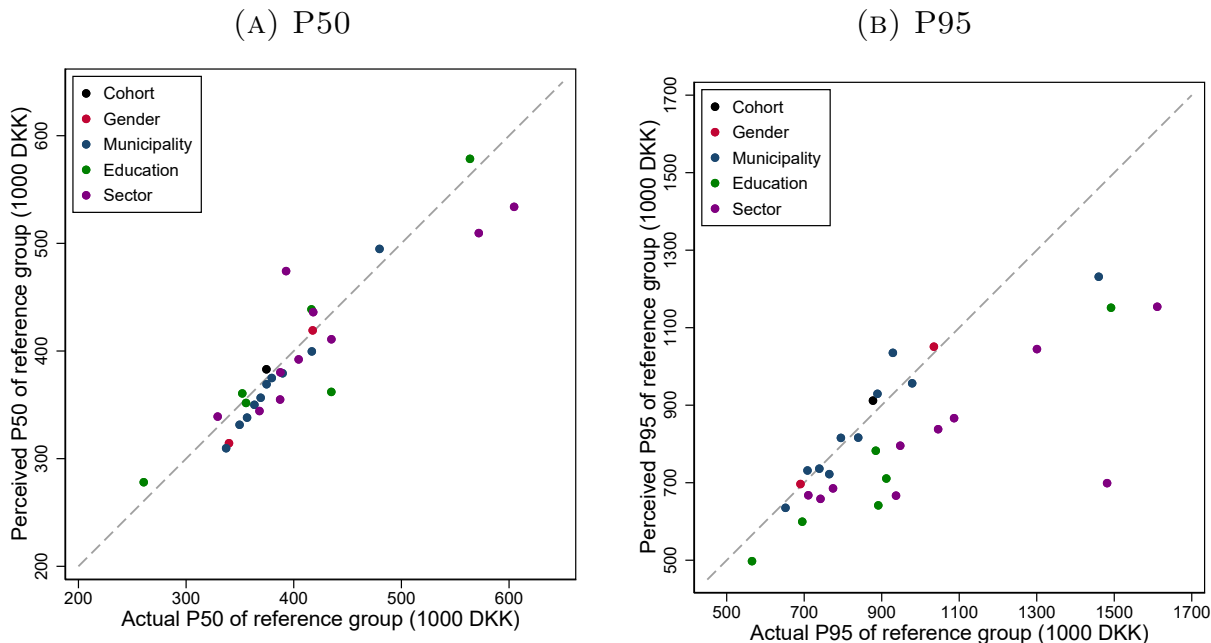
To see these results, consider Panel A of Figure 5, which plots the average perceived P50 for different reference groups of respondents in those groups against the actual P50. Each point represents either the overall cohort, a gender group, an education group, a sector, or a set of municipalities. For example, the two red dots show how men perceive the P50 of men and how women perceive the P50 of women. Municipalities, which are too numerous to be plotted individually, are grouped into ten bins defined by median municipality income. Most points are closely aligned with the 45-degree line, suggesting that individuals are well aware of the overall income levels of their reference groups. Misperceptions of the P50 are largest for the two sectors with the highest median income levels, *Finance and insurance* and *Information and communication*. In those sectors, respondents tend to underestimate the median income.¹²

Panel B shows the perceived P95 levels for the different reference groups. The points representing the gender, cohort, and municipality groups are overall close to the 45-degree line. However, the green and purple points, representing individuals' sectors and education groups, are all below the 45-degree line. Thus, respondents underestimate the degree of inequality within their education groups and within their sectors.¹³ Panels B and C of Appendix Figure A-11 show that these patterns also hold if we use group medians instead

¹²The *Information and communication* sector covers a wide range of industries, from computer programming to the publication of newspapers. It does not include advertising or marketing.

¹³The outlier in the lower-right corner is the *Agriculture, forestry and fishing* sector. This is a small sector in Denmark measured by the number of employed people in the sector with only 80 respondents in our sample. It is also a sector with large income inequality: the P50 income level is the lowest of the ten sectors, yet it has the second highest P95 income level.

FIGURE 5: PERCEIVED AND ACTUAL P50 AND P95 LEVELS OF LARGE GROUPS



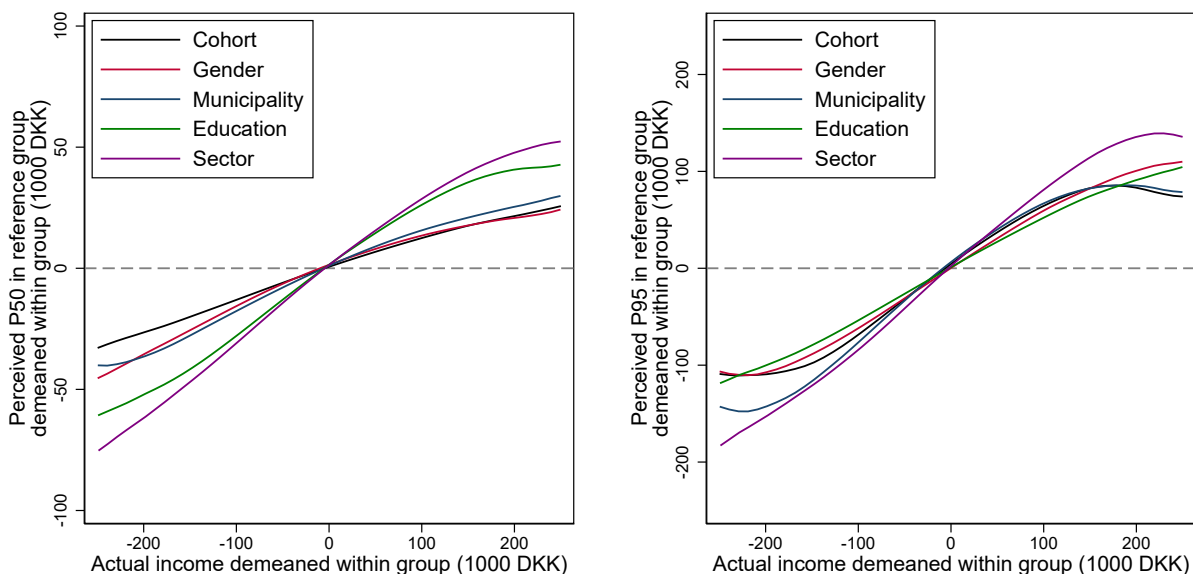
Notes: For gender, we show one point for men and one for women. For municipality, we divide the respondents into 10 similar-sized groups based on the actual municipality P50 and P95 income and plot one point for each group. Each education level and sector are also represented by one point. The points show the means of the reported P50 or P95 by respondents in that group, winsorized at the 5th and 95th percentiles within the group.

of averages. The full distributions of P50 misperceptions can be seen in Panel A of Appendix Figure A-11. They are similar across reference groups and mirror the distribution of misperceptions of the cohort P50 from Figure 4.

How do people’s perceptions of their reference groups depend on their own income? The average perceptions just described obscure significant heterogeneity by income level. For each reference group, lower-income respondents have lower perceptions of the median and top-income level of the group, and higher-income respondents have higher perceptions.

To zoom in on these findings, Figure 6 shows the relationship between perceived P50 levels and own income in Panel A, and the relationship between perceived P95 levels and own income in Panel B. These graphs display the heterogeneity underlying the group averages of the different reference groups in Figure 5. To do this for each reference group, we need to aggregate the sub-groups within each reference groups, i.e., aggregate men and women into one “gender” group. We do this by demeaning the perceived P50 and P95 as well as own income within each sub-group. We then plot the relationship between de-meaned percep-

FIGURE 6: PERCEIVED P50 AND P95 BY INCOME
 (A) P50 (B) P95

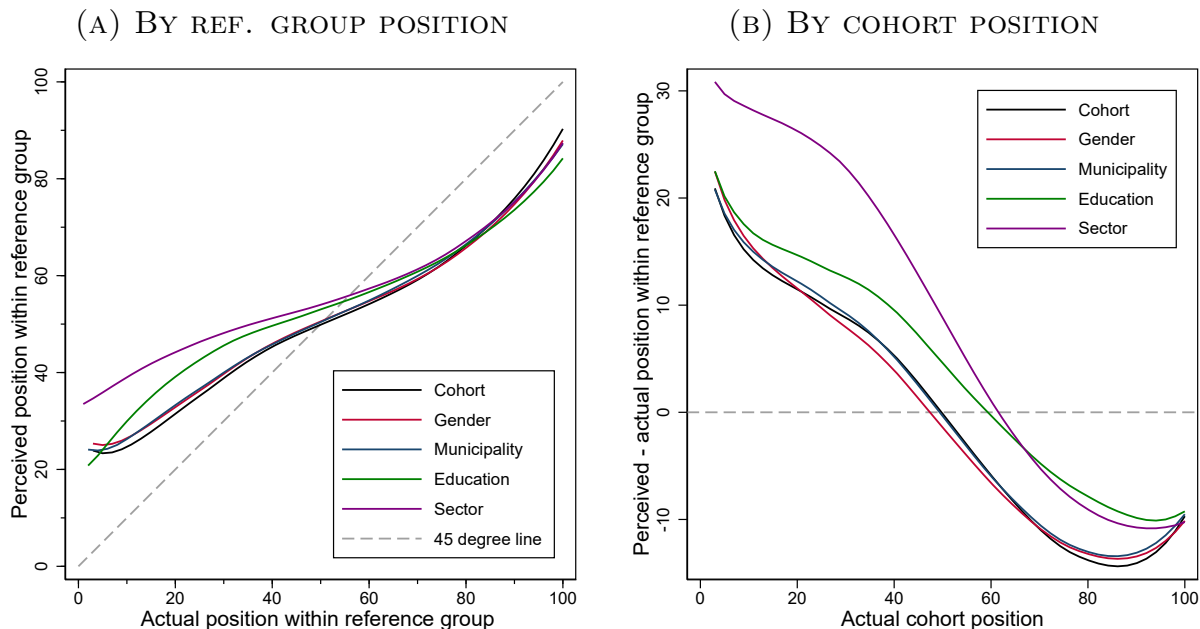


Notes: For each group, e.g. women within gender, we use respondents who have an income that is within 250.000 DKK of the mean income within the group. First, we winsorize perceived P50 and P95 at the 5th and 95th percentile within the respondents in the group. Second, we demean P50 in the left panel (P95 in the right panel) by subtracting the average perceived P50 (P95) among the respondents in the group from the respondent’s perceived P50 (P95) level. Similarly, we demean the respondent’s income by subtracting the average income among respondents in the group. Finally, we plot the demeaned P50 and P95 perceptions against demeaned income using local linear polynomials with a bandwidth of 100,000 DKK.

tions and de-meaned income for each reference group using local linear polynomials. Panel A of Figure 6 shows an increasing relationship between perceived P50 in a group and the respondents’ own incomes implying that respondents with income below (above) the average in a group perceive the P50 level of the group to be lower (higher) than the average perception. This relationship is strongest for the sector and education groups, which, together with the findings below, shows that the center bias is strongest in these groups compared with cohort, gender and municipality. Panel B shows a similar increasing relationship between own income and the perceived P95 levels and, in this case, without major differences across the reference groups.

Perceptions of own position in different reference groups. In all reference groups, people’s perceptions exhibit center bias. Respondents in the lower part of the income distribution tend to overestimate their positions, while people in the upper part tend to underestimate their positions. The misperceptions are largest for the sector and education groups, in which people ranked in the lower part starkly overestimate their positions.

FIGURE 7: PERCEIVED AND ACTUAL POSITION WITHIN LARGE REFERENCE GROUPS



Notes: Panel A plots perceived position within each reference group as a function of actual position in that reference group. Panel B plots misperception of position in reference group by cohort position. The local linear polynomials have a bandwidth of 10. We use reported reference groups both for actual and perceived positions.

Figure 7 illustrates these findings. Panel A plots respondents' perceptions of their own position within each reference group as a function of their actual position within that group. To better compare the different reference group positions, we show local linear polynomials for each group in the same plot. The familiar S-shaped curve is visible here too. Panel B recasts this information in a different way, by plotting respondents' misperception of their reference group positions for given overall position *in the cohort*. At all income levels, people tend to be most overoptimistic about their position in their education group and their sector. For example, people at the 20th percentile among their co-workers on average think they are well above the 40th percentile, while people at the 20th percentile in their municipality believe they are around the 30th percentile.

These patterns of misperceptions of own position are in line with our finding that people in general tend to underestimate the inequality in their sector (as reflected by their underestimation of the P95), and that people in the lower part of the distribution significantly understate the P50 income level of their sector.

Extensions. Two additional pieces of evidence support the descriptive findings in this section. First, we may wonder to what extent respondents report similar positions across

different reference groups. They may do so out of carelessness, fatigue, or because they do not appreciate the distinctions between the groups. Appendix Figure A-12 shows that this is not the case. For each perceived position in the overall cohort distribution, we observe significant variation in perceived reference group positions. The bottom row also shows that for any given misperception of the cohort position, the misperceptions of positions in the other groups vary substantially.

Second, there is a positive correlation between actual positions in the various reference groups and, hence, it is to be expected that respondents' perceptions of their positions are also correlated across groups. However, respondents' perceptions systematically exhibit the center bias pattern described above, and hence, perceived positions are more correlated across reference groups than actual positions. Consider Appendix Figure A-13, which shows respondents' actual position for each large reference group (top panels) and perceived position (bottom panels) as a function of their actual positions within the cohort. We split respondents into high-income reference groups (blue dots) and low-income reference groups (red dots), which both represent roughly half of the sample.¹⁴ Take the example of gender groups. The top left panel shows that men's position in the cohort is higher than their position among other men, while the women's position is lower than their position among other women. The bottom left panel shows that the differences in the perceptions of men and women about their positions in the respective reference groups are smaller than the actual differences. For the other reference groups, we see a similar pattern. The differences in perceptions between high- and low-income groups are most compressed for education and sector in line with the result for the perceived median. Furthermore, the differences in perceptions of own position in a group are more compressed than perceptions of the P50, consistent with the center bias highlighted.

2.3 In Small Reference Groups

In this section, we study perceptions related to smaller reference groups that may be close to a respondent's daily life and potentially easy to relate to: co-workers at the same workplace, neighbors living on the same road (if living in a house) or stairwell (if living in an apartment), former schoolmates, and siblings. The center bias is also apparent for small reference groups and is of varying magnitude. Respondents misperceive their position among their current co-workers more strongly than among their neighbors, which is reminiscent of their misperceptions related to their sector of work being larger than that related to their

¹⁴This is reminiscent of Figure 6, which focuses on the P50 of the reference group, while the current figure focuses on the individual's own position.

municipality. They even tend to make smaller errors when ranking themselves among their former schoolmates during their teenage years than when ranking themselves among their current co-workers.

Recall from Section 1 that for each group, we first asked the respondent about the perceived number of individuals in the group (N) and then asked them to report their perceived income position (X) on a horizontal slider going from 1 to N . We compute the perceived percentile rank as $\frac{X}{N} \cdot 100$ and the actual percentile rank using the true X and N from the register data. Panels A through C in Figure 8 show how people rank themselves among co-workers, neighbors, and former schoolmates. We also asked respondents whether they thought that they earn the same, less than, or more than their siblings.

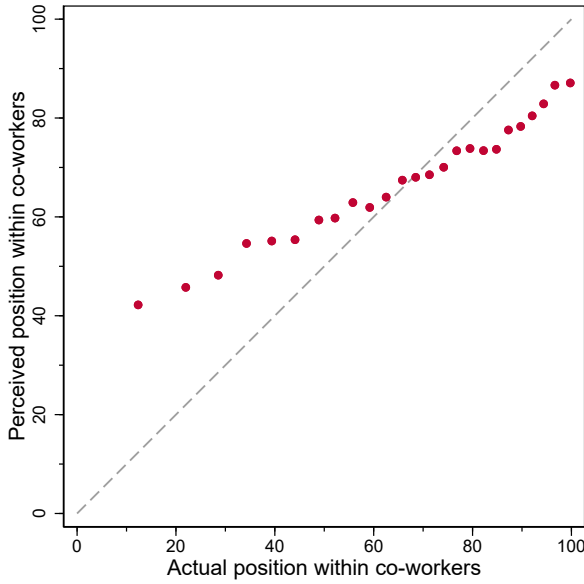
The graph of the perceived position among co-workers at the same workplace in Panel A is very similar to the result for perceived position among co-workers in the same sector in Figure 7. In both cases, people who are in the bottom of the distribution believe that they are much higher up than they truly are, e.g., respondents at the 20th percentile among co-workers in the same firm or sector on average believe that they are above the 40th percentile in those groups. In the upper part of the distribution, people underestimate their positions, but the misperceptions are smaller than in the bottom. The graph of the perceived position among neighbors in Panel B shows smaller misperceptions at the lower part of the distribution. The conclusions are thus consistent for large and small reference groups: misperceptions at the bottom are larger when people compare themselves to co-workers in either their sector or firm than when they compare themselves to people living in their area, either in their city or immediate vicinity. The graph of the perceived position among schoolmates in Panel C also has the same shape and exhibits lower errors than the graph for co-workers.¹⁵

Panel D shows the share of respondents who report having income higher than, lower than, or the same as their siblings as a function of the actual difference between their own and their siblings' incomes. In general, respondents are well aware of their ranking relative to their siblings. However, information is far from perfect even among siblings and in line with the center bias evidence above. Among those who earn 25% more than their siblings,

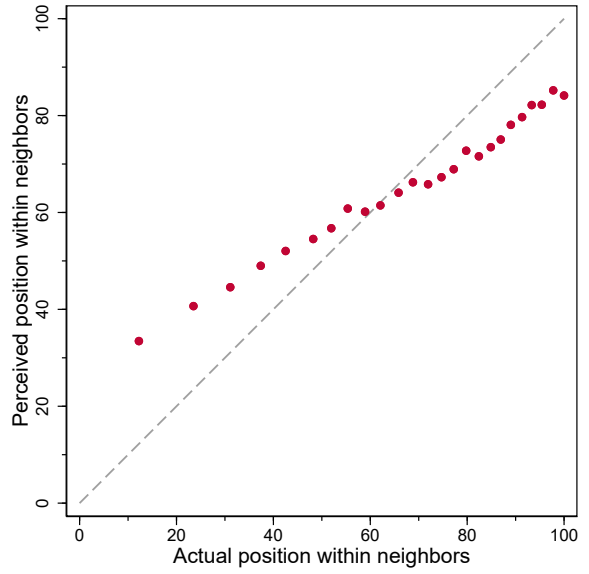
¹⁵A deviation between perceived and actual rank could reflect that people misperceive the number of people belonging to their reference group rather than their own position within the group. In Appendix Figure A-14, we show that respondents are well aware of the size of their reference groups. The exception is a small share of respondents who have more than 100 neighbors and underestimate that number. Appendix Figure A-15 shows that we obtain similar results if we restrict the analysis to respondents whose reported number of people in the small reference group matches the number observed in the register data within a 10% error band or if we use bin medians instead of bin averages. In addition, Appendix Figure A-15 shows similar patterns for co-workers and for neighbors if we split the respondents into people working in small firms versus large firms and into those living in apartments versus houses.

FIGURE 8: PERCEIVED POSITION WITHIN SMALL REFERENCE GROUPS

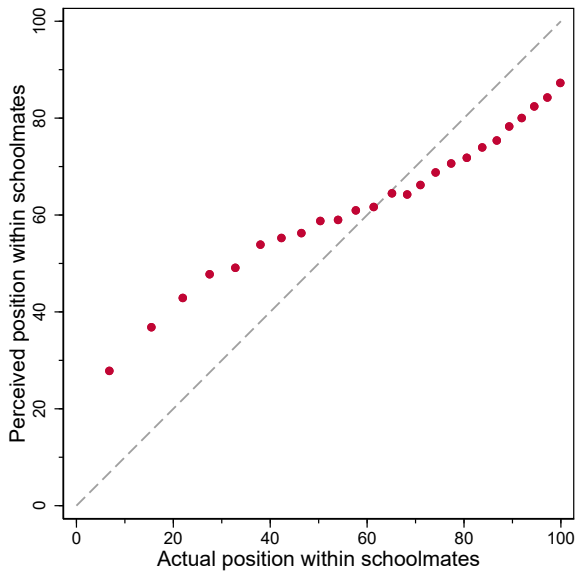
(A) CO-WORKERS



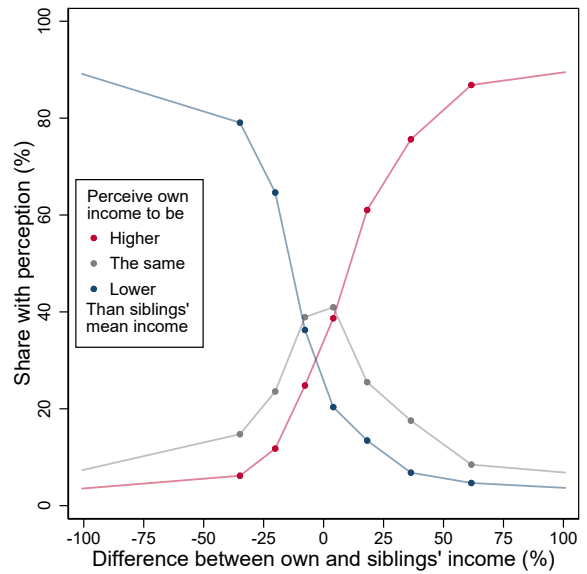
(B) NEIGHBORS



(C) SCHOOLMATES



(D) SIBLINGS



Notes: Panels A, B, and C depict the average perceived position of respondents among their co-workers in the same firm, their neighbors, and their former schoolmates, as a function of their actual position within these groups. There are 25 equally sized bins in each panel. Panel D shows the share of respondents who answer that they have a higher, the same, or a lower income than their siblings' mean income (averaged over all siblings of the respondents) as a function of the actual percent difference between their own income and their siblings' mean income.

more than 30% think they earn the same or less. Conversely, among those that earn 25% less than their siblings, more than 30% think they earn the same or more.

3 Relationship Between Social Positions and Fairness Views

How do views on fairness vary with social position? We approach this question in four ways. First, we study the contemporaneous correlations between social position and fairness views within and across reference groups. We then leverage our data on respondents’ past income histories to relate fairness views to overall changes in social position over a lifetime and to specific changes in social position caused by major life events such as unemployment, health shocks, disability, and promotions. Finally, we analyze how fairness views are causally affected by changes in perceived social positions induced by our information treatment.

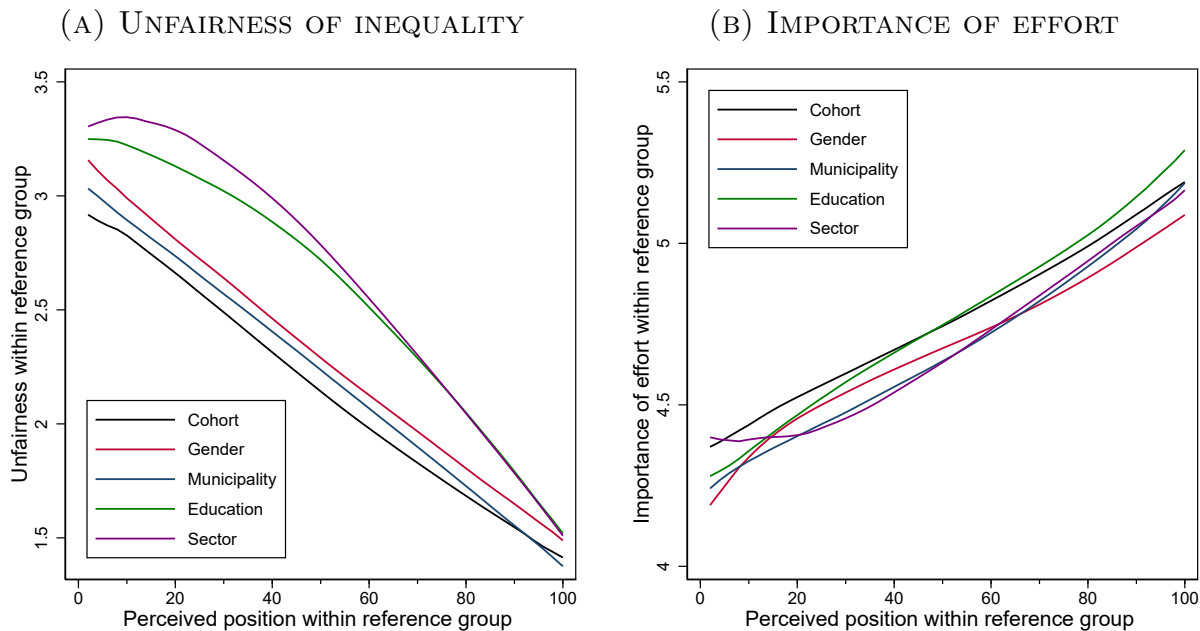
As described in Section 1.2, we study three types of outcomes: views on the fairness of inequality within each reference group, the belief that effort matters more than luck for differences in income within a reference group, and right-wing support represented by support for political parties that vary from left-wing to right-wing. The “unfairness (of inequality)” variable for each reference group ranges from 1 (inequality within the group is considered completely fair) to 7 (inequality within the group is considered completely unfair). The perceived “importance of effort (relative to luck)” variable measures to what extent a respondent believes that differences in income are caused by differences in people’s effort or rather by luck on a scale of 1 (only luck matters) to 7 (only effort matters).

The “right-wing” variable is based on the party that the respondent plans to vote for if there was a general election today. They could choose among 11 parties and the two other options, “Other” and “Do not wish to answer”, for a total of 13 options. To classify parties into left- and right-wing in an objective, data-driven way, we take the control group respondents and use their answers to the economic policy view question to rank these 13 options based on the average economic policy views of respondents. The party ranked 1 has voters in the survey who on average report to be most left-wing while the party ranked 13 has voters in the survey who on average report to be most right-wing.¹⁶

In our benchmark regressions, we standardize the outcome variables into z-scores by subtracting the control group mean and dividing by the standard deviation. As a robustness

¹⁶This data-driven ranking of parties aligns almost perfectly with the subjective ranking of the Danish parties by fourteen experts in [Green-Pedersen and Kosiara-Pedersen \(2020\)](#). For robustness, we verify that our results hold if we directly use the answers to the question on economic policy views rather than party support where this is possible (see Appendix H for the full set of tables and figures).

FIGURE 9: UNFAIRNESS OF INEQUALITY AND IMPORTANCE OF EFFORT ACROSS LARGE REFERENCE GROUPS



Notes: The left panel plots the unfairness of inequality variable (locally linear polynomials with bandwidth 20), which is on a scale of 1 (completely fair) to 7 (completely unfair). The right panel plots the perceived importance of effort on a scale of 1 (only luck matters) to 7 (only effort matters). The sample is restricted to respondents in the control group only.

check, we show the results are similar if we use indicator outcome variables throughout instead of categorical ones (see Appendix G). We also consider additional outcomes such as life satisfaction or support for redistribution in Appendix D.

3.1 Fairness Views Within and Across Reference Groups

How fair do people think income differences within the various reference groups are, and how do their views vary with their own position in those reference groups? Panel A of Figure 9 plots the perceived unfairness of inequality for each reference group against the perceived position in that reference group. Those who think that they are ranked higher in a given reference group believe that inequality within that group is less unfair. Furthermore, views on how fair inequality is for the cohort, gender, and municipality reference groups are similar and exhibit an analogous relation to respondents' position. On the contrary, income inequalities within education and sector groups are considered more unfair at all positions in the distribution. Panel B shows that those positioned higher within the different reference groups also tend to believe that income differences in these groups are the result of effort rather than luck. In this dimension, there is no major difference between reference groups on

TABLE 3: UNFAIRNESS, IMPORTANCE OF EFFORT AND POLITICAL VIEW BY ACTUAL POSITION AND POSITION MISPERCEPTION

	Unfairness of inequality					Importance of effort	Right-wing
	Cohort	Gender	Mun.	Edu.	Sector		
Panel A: No controls							
Position	-1.18*** (0.07)	-1.13*** (0.07)	-1.27*** (0.07)	-1.36*** (0.07)	-1.42*** (0.07)	0.82*** (0.07)	0.90*** (0.07)
Misperception	-0.38*** (0.10)	-0.61*** (0.09)	-0.48*** (0.09)	-0.38*** (0.08)	-0.86*** (0.09)	0.44*** (0.10)	0.49*** (0.10)
Panel B: With controls							
Position	-1.09*** (0.09)	-1.01*** (0.08)	-1.09*** (0.08)	-1.03*** (0.08)	-1.19*** (0.08)	0.92*** (0.09)	0.99*** (0.08)
Misperception	-0.40*** (0.10)	-0.41*** (0.10)	-0.42*** (0.09)	-0.30*** (0.09)	-0.61*** (0.09)	0.47*** (0.10)	0.54*** (0.10)
<i>N</i>	4692	4692	4692	4692	4452	4692	4692
Outcome mean	2.01 (0.02)	2.16 (0.02)	2.09 (0.02)	2.54 (0.03)	2.53 (0.03)	4.81 (0.02)	7.10 (0.05)

Notes: The sample is restricted to control group respondents. All outcomes are as defined in the text, but standardized to z-scores. *Position* denotes the actual position within the reference group from percentile 1 to 100 divided by 100. A coefficient of 1 means that going from the bottom of the distribution to the top increases the outcome by one standard deviation. Similarly, *Misperception* is the difference between perceived and actual position within the reference group divided by 100. In the last two columns, the position and misperception are computed in the distribution of the cohort. *Controls* are cohort, municipality, education, gender, and sector fixed effects (including unemployed/not in workforce). *Outcome mean* is the mean of the non-standardized outcome variable. Standard errors on the estimates are reported in the parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

either the level or the slope.¹⁷ The same patterns hold if we plot the outcomes against actual (rather than perceived) position within each reference group on the x-axis (see Appendix Figure A-16, which also shows the distribution of the outcomes by reference group).

Figure A-18 shows the relationship of several other outcome variables with perceived position. Respondents who are ranked higher in their cohort tend to think inequality in Denmark as a whole is less of a problem, support less redistribution, are more satisfied with their life, believe their own work has paid off, and think that high-income earners deserve their income.

Table 3 confirms the graphical analysis in Figure 9 without controls (Panel A) and with fixed effects for cohort, gender, municipality, educational level, sector of work, and employ-

¹⁷Appendix Figure A-17 shows the distribution of responses to these questions and other outcomes.

ment status (Panel B). The last column shows the third main outcome, i.e., right-wing political views. Outcome variables are standardized into z-scores by subtracting the mean and dividing by the standard deviation of the control group sample. The “Outcome mean” row shows the average, non-standardized fairness views by reference group and highlights the different levels of perceived unfairness across reference groups. The means confirm that education and sector-level income differences are considered significantly more unfair than inequality overall within cohort or within other reference groups.

The inclusion of controls does not substantially affect the results. A higher position in the cohort and a higher positive misperception of it significantly correlate with weaker perceived unfairness of inequality, a stronger belief in the role of effort over luck, and a higher likelihood of voting for a right-wing party. The precisely estimated coefficients on actual position show that, across reference groups, moving up by 10 positions in the income distribution is correlated with a 0.12-0.14 standard deviation increase in perceived unfairness. These are substantial effects, equal to around one-third of the gap in perceived fairness between respondents who voted for left-wing parties (In Danish *Rød blok*) and those who voted for right-wing parties (in Danish *Blå blok*) in 2015. The effects of moving up in misperceived position across the reference groups are smaller, i.e., 30% to 60% of the effects of moving up in actual position, but they are still significant and sizable.¹⁸

3.2 Historical Variation in Social Positions

What is the relative importance of current social position and social positions back in time in shaping views on fairness, the role of effort, and political affiliation? To address this question, we make use of the rich register data to reconstruct people’s income and economic histories for the last 20 years and correlate them with their views today. We first focus on their overall income path and then consider the effects of changes in social position due to specific negative and positive shocks.

Figure 10 plots respondents’ views against their position in their cohort, measured at different points in time in five-year intervals, as well as against their father’s position relative to other fathers in the cohort, measured when the individual was 15 years old. Panel A depicts the standardized (z-score) unfairness variable, i.e., the extent to which within-cohort income differences are considered unfair. This association between current fairness views and social position becomes weaker when measuring social position at more distant points back

¹⁸See Appendix Table A-5 for other outcomes related to inequality views.

in time. Their father’s social position is essentially uncorrelated with respondents’ current fairness views.¹⁹

Panels B and C show how the perceived importance of effort relative to luck and support for right-wing parties relate to social positions over time. These links appear more stable regardless of the time at which social position is considered, suggesting that these are stickier outcomes.²⁰

To understand whether one’s history of social positions over time is correlated with fairness view conditional on current position, each column in Table 4 shows the regression coefficients of the variables in the columns on positions 20, 15, 10 and 5 years ago, as well as current position, and controlling for cohort, gender, education, sector, and treatment fixed effects. The table shows that current social position has a larger correlation with fairness views than with political views. Some of the historical positions are also significantly related to fairness views, but less strongly than current positions. Political views are related to current and past positions and even the position of the father, conditional on the individual’s own historical positions. Views on the importance of effort are correlated most strongly with current position, and more weakly so with past positions. Appendix Tables A-8 and A-9 show that these findings are unchanged if we omit the controls or use average positions over five-year intervals instead of positions in a given past year.

3.3 Variation in Social Positions due to Life Events

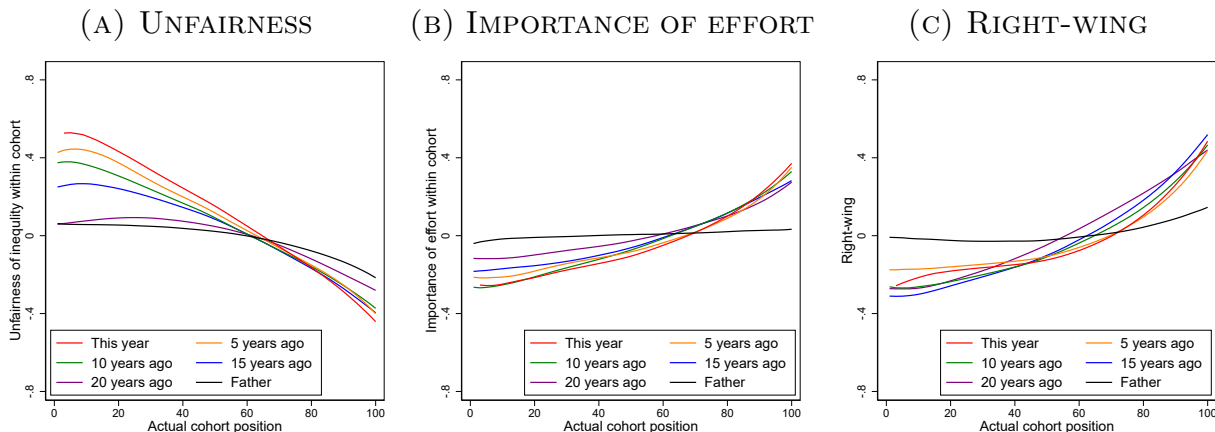
We now consider four life events – negative and positive – that can affect people: unemployment spells, disability, unexpected health conditions that require hospitalization, and promotions at work.

We focus on the last 10 years before the survey and split those years into two: the “pre-shock period” is defined as the first four years (2008-2011) and the “shock period” comprises the six most recent years (2012-2017). For each of the four shocks, we perform the analysis on the subsample of individuals who did not experience this shock in the pre-shock period and define an indicator variable equal to 1 if an individual experienced the shock at some

¹⁹Recall from Section 2 that perceived and actual position are relatively closely aligned for most respondents. Thus, although we do not have respondents’ history of perceived positions (as opposed to actual positions), it is likely that these have co-moved to a significant extent over the lifetime.

²⁰These results need to be interpreted in light of the degree of income mobility over different time spans. Appendix Tables A-6 and A-7 show that, naturally, the correlation between the current social position and past positions decreases as we move back in time. If we think of position as having a permanent and a transitory component, then the results are consistent with political views being mostly related to the permanent component and fairness views mainly being related to the current position, i.e., the sum of the permanent component and the current transitory component.

FIGURE 10: HISTORY OF PAST SOCIAL POSITIONS, UNFAIRNESS, IMPORTANCE OF EFFORT, AND POLITICAL VIEWS



Notes: Bandwidth for local linear polynomials is 20. For *Father*, the x-axis is the father’s position among fathers when the respondent was 15 years old. The outcomes are standardized z-scores of the unfairness variable, perceived importance of effort relative to luck, and right-wing political views. Sample restricted to the control group.

point during shock period. We regress our outcome variables on each shock indicator (one at a time) and detailed individual level controls including fixed effects for cohort, gender, municipality, education, sector, and percentile cohort position prior to the shock.²¹ Thus, the question we are asking is: conditional on starting from the same position 10 years ago, and conditional on an array of personal characteristics, do respondents who experienced one of these four shocks shifting their social position hold different views today from those who did not?

Table 5 shows the results. Each row represents a separate regression, one for each of the four shocks. Column 1 presents the effect of the shock on current social position; columns 2 through 8 show the impacts on our usual outcomes; column 9 reports the size of the sample in each regression; and column 10 indicates the share of respondents affected by the shock during the shock period. The shocks differ in their frequency and impact. Unemployment

²¹The unemployment shock is defined as three or more months of unemployment in at least one year in the shock period. To study its effect, we focus on respondents who were in the workforce for the entire ten-year period. A disability shock is defined as a respondent starting to receive disability insurance benefits (without having received it before) in one of the years in the shock period (according to the official Integrated Database for Labour Market Research, IDA, from Statistics Denmark). Hospitalization refers to at least one emergency room visit or hospital visit by referral from a general practitioner, excluding visits due to congenital diseases, pregnancy, or routine checks, which do not reflect unexpected health shocks. Finally, a promotion is defined as a respondent switching from a job as a regular employee in the pre-shock period to a management position in the following period. Note also that we do not include the vote in the last general election (2015) in the benchmark table, as it is not measured in the pre-shock period and is, hence, a bad control. Since it can nevertheless serve as a proxy for past political views, we show the results controlling for party fixed effects in Table A-12.

TABLE 4: HISTORY OF PAST SOCIAL POSITIONS, UNFAIRNESS, IMPORTANCE OF EFFORT, AND POLITICAL VIEW

	Unfairness of inequality					Importance of effort	Right-wing
	Cohort	Gender	Mun.	Edu.	Sector		
Position father	-0.059 (0.037)	-0.051 (0.037)	-0.068 (0.037)	-0.081* (0.036)	-0.075* (0.037)	0.025 (0.037)	0.147*** (0.035)
Position -20 yr.	-0.122** (0.042)	-0.097* (0.041)	-0.108** (0.041)	-0.113** (0.040)	-0.131** (0.041)	0.061 (0.042)	0.263*** (0.039)
Position -15 yr.	-0.203*** (0.048)	-0.169*** (0.048)	-0.148** (0.048)	-0.126** (0.047)	-0.139** (0.048)	0.131** (0.049)	0.268*** (0.046)
Position -10 yr.	-0.085 (0.058)	-0.100 (0.057)	-0.117* (0.057)	-0.186*** (0.056)	-0.162** (0.057)	0.206*** (0.058)	0.163** (0.055)
Position -5 yr.	-0.108 (0.070)	-0.096 (0.068)	-0.152* (0.069)	-0.108 (0.067)	-0.130 (0.069)	0.037 (0.070)	-0.015 (0.066)
Position this yr.	-0.655*** (0.074)	-0.618*** (0.073)	-0.647*** (0.073)	-0.678*** (0.071)	-0.761*** (0.074)	0.540*** (0.074)	0.479*** (0.070)
Observations	9046	9046	9046	9046	8575	9046	9046
Controls	✓	✓	✓	✓	✓	✓	✓

Notes: All outcomes are z-scores. *Position* denotes the cohort position from percentile 1 to 100 divided by 100. A coefficient of 1 means that going from the bottom of the distribution to the top increases the outcome by one standard deviation. *Importance of effort* is for income differences within cohort. *Position father* is the respondent's father's income rank when the respondent was 15 years old compared to other fathers of 15-year-olds. *Controls* includes a treatment indicator, cohort, municipality, gender, education, and sector fixed effects (including unemployed/not in workforce). Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

and promotions affect 5-7% of the sample and are related to relatively large changes in social position (in opposite directions). Disability shocks are rare but entail very large drops of around 22 percentiles in social position. By contrast, half of the sample visited the hospital unexpectedly during the shock period, and this is associated with a small 2-percentile drop in social position.

Respondents who have experienced any of the negative shocks (unemployment, disability, and hospitalization) are significantly more likely to consider inequality within various reference groups unfair. Conversely, those who have been promoted are less likely to consider inequality unfair, especially within sector, which is the domain most closely related to work promotions. The shocks that move social positions the most (i.e., disability and unemployment) have the largest effects on fairness views. Consistent with our previous results, the effects of the shocks are weaker and less significant on the perceived importance of effort relative to luck and on right-wing views.

Of course, these effects are not necessarily causal, since these life events may be correlated with other unobservable characteristics of the respondents that also affect their views. Nevertheless, the detailed controls and fixed effects (including for the starting position ten years ago) likely absorb a substantial share of heterogeneity. In fact, we obtain similar effects if we omit individual level controls except for starting position (see Appendix Table A-13), suggesting that there is no systematic correlation between these individual characteristics and life events. It is also informative that we are able to study four different types of shocks, with some that could be perceived as more exogenous to individual choice, conditional on a detailed set of controls (e.g., hospitalization or disability).

We can also do an IV-type analysis, in which we instrument for current position using the occurrences of these shocks. The exclusion restriction needed for this strategy to correctly identify the effect of social position on fairness views is that the life events only affect fairness views through social position, which is a strong assumption. Appendix Table A-14 shows that the pooled IV results that use all four shocks at once are close in magnitude to the baseline OLS estimates from Table 3. Using the individual shocks as instruments one by one yields broadly consistent effects as well. The exception is the hospitalization shock, which is at the same time very common and shifts income position only by a little (the “first stage” is weak).

3.4 Survey Experimental Variation in Social Position: Correction of Misperceptions

In this section, we analyze the causal impact of changes in perceived position on fairness views. As described in Section 1.2, we informed a random half of the sample (the treatment group) about their true social positions in the five large reference groups before asking about their views on fairness, effort versus luck, and political attitudes.²²

Table 6 shows the main experimental results. The outcome variables are the same as in Tables 3 to 5. The rows show the coefficients on an indicator variable for having a positive misperception of one’s position within the given reference group (i.e., overestimating one’s position), and on the interactions of treatment status with having a positive or a negative misperception for the reference group under consideration. In line with the correlations in Table 3, respondents with positive misperceptions of their position in any given reference group believe inequality to be less unfair, conditional on position fixed effects. When they

²²In our effort to treat all respondents fairly, the other half of the sample (the control group) was informed about their true positions only *after* these outcome questions, with no possibility to go back and change their answers. Hence, their answers to the outcome questions cannot be affected by this information.

TABLE 5: CORRELATION OF LIFE EVENTS WITH PERCEIVED UNFAIRNESS, IMPORTANCE OF EFFORT AND POLITICAL VIEWS

	Current	Unfairness of inequality					Importance	Right-	N	Affected
	position	Cohort	Gender	Mun.	Edu.	Sector	of effort	wing		%
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Unemployment	-12.2*** (0.78)	0.20*** (0.051)	0.23*** (0.050)	0.21*** (0.050)	0.18*** (0.049)	0.20*** (0.052)	-0.11* (0.052)	-0.061 (0.049)	7537	5.03
Disability	-21.9*** (2.31)	0.30* (0.13)	0.54*** (0.13)	0.42** (0.13)	0.27* (0.13)		-0.31* (0.13)	-0.25* (0.13)	9246	0.61
Hospitalization	-1.83*** (0.49)	0.093** (0.029)	0.079** (0.028)	0.089** (0.028)	0.060* (0.028)	0.039 (0.028)	-0.010 (0.029)	-0.018 (0.028)	4749	55.5
Promotion	8.51*** (0.74)	-0.12** (0.045)	-0.11** (0.044)	-0.12** (0.045)	-0.17*** (0.044)	-0.21*** (0.044)	0.14** (0.045)	0.19*** (0.043)	7970	6.66
Pre-shock position FE	✓	✓	✓	✓	✓	✓	✓	✓		
Controls	✓	✓	✓	✓	✓	✓	✓	✓		

Notes: All outcomes z-scores. Each cell in the table is a separate regression of the column outcome on the row regressor and the controls indicated in the bottom part of the table. The explaining variables are all indicators that equal 1 if the respondent experienced the shock between 2012 and 2017. In each row, we exclude respondents who already experienced this type of shock in the pre-period (2008-2011). For *Unemployment*, we only use respondents who were in the workforce in the entire period. For *Disability*, we do not estimate the effect on fairness within sector, because very few disabled people work. *Controls* included in all regressions are a treatment indicator, cohort, gender, municipality, education, and sector fixed effects (incl. unemployed/not in workforce), all measured in 2008. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE 6: SURVEY INFORMATION EXPERIMENT AND UNFAIRNESS, IMPORTANCE OF EFFORT AND POLITICAL VIEW

	Unfairness of inequality					Importance of effort	Right-wing
	Cohort	Gender	Mun.	Edu.	Sector		
Positive misperception	-0.132*** (0.034)	-0.131*** (0.033)	-0.133*** (0.033)	-0.108*** (0.031)	-0.267*** (0.034)	0.112** (0.034)	0.117*** (0.034)
T × Positive	0.154*** (0.037)	0.082* (0.036)	0.099** (0.035)	0.060* (0.030)	0.089** (0.031)	-0.010 (0.038)	-0.013 (0.037)
T × Negative	0.023 (0.024)	0.022 (0.024)	0.028 (0.025)	0.044 (0.027)	0.005 (0.028)	0.006 (0.024)	-0.027 (0.024)
N	9331	9331	9331	9331	8854	9331	9331
Position FE	✓	✓	✓	✓	✓	✓	✓

Notes: All outcomes are z-scores. *Positive misperception* is an indicator that equals 1 if the perceived position is larger than the actual position within the reported reference group specified in each column. For the *Importance of effort* and *Right-wing* outcomes, we use cohort misperception. *T × Positive* is an interaction of the treatment indicator and the *Positive misperception* indicator. *T × Negative* is an interaction of the treatment indicator and an indicator for having a misperception ≤ 0 . In the regressions we also include a constant term.* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

are informed about their misperception, they think inequality is more unfair. In fact, their fairness views tend to become aligned with those of respondents at the same income position who do not overestimate their position. To see this, note that for all shocks the coefficient on the treatment indicator interacted with the indicator for having a positive misperception is of the opposite sign from the coefficient on the indicator for having a positive misperception (its magnitude ranges from being close to identical for the cohort group to three times smaller for the sector group).

For the respondents who start with a negative misperception for a given reference group, we do not detect any significant changes in fairness views after they are informed about their actual rank position. This might reflect that “bad news” weigh more heavily than “good news”.

The last two columns show that the treatment has no significant effects on the role of effort versus luck and on political preferences. Similarly, we do not detect any significant effects on other views and attitudes (see Appendix Table A-18). Overall, these results suggest that changes in perceived social position have stronger effects on fairness than on other normative views.

Extensions and robustness checks. Since the treatment shows respondents their positions within all reference groups, the estimated treatment effect is the result of learning about all these positions at once. If a respondent overestimates their position in some groups, but underestimates it in others, the treatment may be pulling them in different directions

at the same time. Therefore, Appendix Table A-15 restricts the sample to respondents who had either consistently positive misperceptions (i.e., overestimated their position in all reference groups) or consistently negative ones. The treatment effects for those with consistently positive misperceptions are larger and more significant, since the treatment corrected their misperceptions in the same direction for all reference groups.

Appendix Table A-16 studies different treatment “intensities” based on the magnitude of the individual’s misperceptions pre-treatment. Treatment effects are stronger for respondents with larger positive misperceptions. There is again no effect on respondents who had large negative misperceptions.

The Appendix reports several robustness checks: The results are unaffected if we include controls (see Appendix Table A-19). The treatment information is based on people’s reported income, not on their actual income, so one may potentially worry that the treatment effects could be affected by errors in people’s reported income. However, this is not the case. As Appendix Table A-20 shows, restricting the sample to respondents who reported their own income accurately gives similar results. We also check that the heterogeneous treatment effect is indeed driven by the misperception, rather than by income per se. Appendix Table A-21 shows that the results are unchanged if we also include treatment-income interactions in the regressions. Finally, we adjust for multiple hypothesis testing in Appendix Table A-22.

4 Concluding remarks

Standard theories of policy preferences and optimal policy design are typically based on the idea that the extent of inequality is common knowledge. But how much do people know about inequalities among different groups and how do fair do they perceive them to be?

The literature points to substantial misperceptions when asking people about inequality and income positions in the national distribution. Our paper systematically studies perceived inequality and social positions across people’s different reference groups. A key finding is that people are, on average, well informed about the overall income levels of their different reference groups.

However, we also detect important misperceptions. Across all reference groups, we observe center bias, whereby lower-ranked people tend to position themselves higher than they truly are because they underestimate others’ incomes. The reverse occurs for higher-ranked people. The fact that people in the lower part of the income distribution systematically overestimate their position could perhaps be one of the explanations for the puzzle why people sometimes support policies against their self-interest, as pointed out by Bartels (2016).

People consider inequalities conditional on the same level of education or work sector as most unfair. Exactly in these dimensions, where it matters most to them, people are least informed about inequality and lower-income people strongly overestimate their positions. One reason could be that people see education and type of work as key determinants of income. Another reason could be that people have different aspirations across reference groups and admitting that they have a low position within education group or sector could lead to more resentment. In any case, these different views on the fairness of inequality in various reference groups highlight the importance of decomposing changes in inequality into those happening within sectors or firms and those happening across, as done by, e.g., [Song et al. \(2019\)](#). Furthermore, the lack of information within firms and sectors could have important implications for wage setting and career dynamics.

It is interesting to understand whether people’s views on the fairness of inequality are related to fixed characteristics or to variable ones, such as their incomes and social positions. In the latter case, policy changes can also change fairness views, and this can lead to multiple equilibria as in [Alesina and Angeletos \(2005\)](#). We provide a number of results suggesting that people’s fairness views are strongly related to their social position and change when their positions change. In particular, fairness views correlate more strongly with current social positions than with past positions, and movements up or down in social positions caused by real-life events are also related to changes in people’s fairness views. Furthermore, informing people about their true positions in their reference groups changes their fairness views.

Are our results generalizable to other countries? Clearly, Denmark is one of the most equal countries in the world ([Atkinson and Søjgaard, 2016](#); [Boserup et al., 2016](#); [Jakobsen et al., 2020](#)) and attitudes vary across countries ([Alesina et al., 2001, 2018](#); [Almås et al., 2020](#)). Yet, because we analyze rank positions, relative inequality perceptions (e.g., differences between perceived and actual P95 levels compared to corresponding P50 levels), and relative fairness views across reference groups, it is not *a priori* clear that our results should be different in one direction or the other.

Key to our analyses and findings is the linking of large-scale survey data on perceived social positions and fairness across many reference groups to administrative records on actual social positions across time, life events, and reference groups. We see this combination of subjective and objective information as a promising avenue to learn more about the determinants of perceptions and attitudes.

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APPENDIX

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A Survey

A.1 Survey link and questions in English

Link: https://cebi.eu.qualtrics.com/jfe/form/SV_6PcXP1t0Mw89iqp

Background and Political views

1. What is your birth year?

Dropdown menu with years. Only 1969-1973 accepted.

2. What is your gender?

Male; Female

3. How many siblings do you have with the same biological mother and father as you?

0; 1; 2 or more

4. Which municipality did you live in at the beginning of 2017? Note that in the following options, some of the municipalities are grouped together.

Dropdown menu with Danish municipalities

5. Which of the following categories best describes your highest educational level?

Primary education; Upper secondary education; Vocational education and training; Short cycle higher education; Bachelor program or vocational bachelor education; Master program or PhD program

6. What was your employment status at the beginning of 2017?

Full-time employment; Part-time employment; Self-employed; Unemployed; Not in the workforce

7. Which sector did you work in at the beginning of 2017? Note that we mean the sector which your workplace belongs to. For example, if you work with PR in a bank you should choose the sector “Finance and insurance” and not the sector “Information and communication”.

Construction; Real estate activities; Business services; Finance and insurance; Trade and transport; Manufacturing, raw material extraction and utilities; Information and communication; Culture, leisure and other services; Agriculture, forestry and fishing; Public administration, education, health and social work activities

8. Which party did you vote for in the last general election (in 2015)?

Socialdemokratiet; Venstre, Danmarks Liberale Parti; Radikale Venstre; Enhedslisten - De Rød-Grønne; Det Konservative Folkeparti; Alternativet; SF - Socialistisk Folkeparti; Liberal Alliance; Kristendemokraterne; Dansk Folkeparti; Other; Did not vote; Do not wish to answer

9. How would you describe your attitude on economic policy?

Very left-wing; Left-wing; Moderate; Right-wing; Very right-wing

Income

1. We will now ask you about your total income BEFORE tax in 2017. You should NOT include contributions to employer-managed pension schemes or mandatory pension contributions. When we later will inform you about your own position, it is important that you state your total income as precisely as possible. If you are in doubt about the amounts, you can view them on your annual statement for 2017 from SKAT under *Opgørelse af indkomst* below *Før AM-bidrag*. You can also see a description of the different categories below. Note: In the scheme below we ask you to please state the yearly amounts in entire thousand DKK. If you enter 1 this corresponds to 1,000 DKK. *Salary and fees; Net profit from self-employment; Unemployment benefits, social assistance, study grants and pension payments*

Perceptions

1. Instruction video

2. We will now ask you a question to see if you have understood the video's explanation of the ladder's different positions. Think about a person with an income where 73 out of 100 people have an income that is the same as or lower than this person's income. 27 out of 100 people have an income which is higher than this person's income. Select this person's position on the income ladder using the slider below.

3. What do you think the income for P50 was in 2017 for individuals born in [PIPED BIRTH YEAR]? Remember that P50 is the income, where half have an income that is the same as or lower than this income, and half have an income that is higher than this income. Remember also that income is before tax for the whole of 2017 and consists of salary, net profit from self-employment, other business income, unemployment benefits,

transfers and payments from private and public pensions. Note: Please state your answer in entire thousand DKK. If you enter 1 it corresponds to 1,000 DKK

4. We will now ask you what you think the before tax income for P50 was in 2017 for the groups below which you are a part of. The first slider shows your answer from the previous question. You can use the other sliders to select what you think the income was for P50 for the different groups of people who were born the same year as you.
One horizontal slider for each reference group. The slider for cohort is locked at the amount entered in the previous question.
5. What do you think the income for P95 was in 2017 for individuals born in [PIPED BIRTH YEAR]? Remember that P95 is the income where 95 out of 100 have an income that is the same as or lower than this income, and 5 out of 100 have an income that is higher than this income. Please state your answer in entire thousand DKK. If you enter 1 it corresponds to 1,000 DKK
6. We will now ask you what you think the before tax income for P95 was in 2017 for the groups below which you are a part of. The first slider shows your answer from the previous question. You can use the other sliders to select what you think the income was for P95 for the different groups of people who were born the same year as you.
One horizontal slider for each reference group. The slider for cohort is locked at the amount entered in the previous question.
7. Rank among all people born in [PIPED BIRTH YEAR]. You previously reported that you had a yearly income in 2017 of [PIPED INCOME] DKK before tax. We will now ask you to report where you think this income placed you on the income ladder in 2017 for people who were born in [PIPED BIRTH YEAR]. Use the slider to select your position. Later, we will inform you about your true position.
8. Rank among [PIPED GENDER]. Now, think about all [PIPED GENDER] born in [PIPED BIRTH YEAR]. Use the slider to select where you think you were placed on the income ladder in 2017 for this group of people. Later, we will inform you about your true position.
9. Rank within [PIPED MUNICIPALITY] municipality. Now, think about people who also lived in [PIPED MUNICIPALITY] municipality at the beginning of 2017 and were born in [PIPED BIRTH YEAR]. Use the slider to select where you think you were placed on the income ladder in 2017 for this group of people. Later, we will inform you about your true position.

10. Rank within the educational level [PIPED EDUCATION]. Now, think about people whose educational level also was [PIPED EDUCATION] at the beginning of 2017 and were born in [PIPED BIRTH YEAR]. Use the slider to select where you think you were placed on the income ladder in 2017 for this group of people. Later, we will inform you about your true position.
11. Rank within the sector [PIPED SECTOR]. Now, think about people who also worked in the sector [PIPED SECTOR] at the beginning of 2017 and were born in [PIPED BIRTH YEAR]. Use the slider to select where you think you were placed on the income ladder in 2017 for this group of people. Later, we will inform you about your true position.
12. Think about your [FOR WOMEN: mother's. FOR MEN: father's] total income in the year where you turned 15. Compared to [FOR WOMEN: mothers. FOR MEN: fathers] of children, who were also born in [PIPED BIRTH YEAR], where do you think your [FOR WOMEN: mother. FOR MEN: father] was placed on the income ladder in the year where you turned 15?
13. Is your income higher or lower than [FOR RESPONDENTS WITH ONE SIBLING: your brother's/sister's income? FOR RESPONDENTS WITH 2 OR MORE SIBLINGS: the average income of your siblings?]
Higher; The same; Lower
14. Think about your co-workers at the beginning of 2017. By co-workers, we mean the people who had the same workplace as you at the beginning of 2017. A workplace usually has the same address so if you for instance worked in a chain store then your co-workers are those who worked in the same store as you and not all the people, who were employed in the same firm. How many people worked at your workplace at the beginning of 2017 incl. you? If you do not remember the exact number then report your best guess.
15. Imagine that we rank you and your colleagues by your income in 2017 such that the person with the lowest income is number 1 and the person with the highest income is number [PIPED # COWORKERS]. What do you think your position was in this rank in 2017?
16. Think about your neighbors at the beginning of 2017. By neighbors, we mean the people who lived on the same road as you, if you lived in a house, or the people living

on the same stairwell as you, if you lived in an apartment. Think only about the people, who were between 25 and 65 years old. How many people lived on the same road or on the same stairwell as you, including your own household, at the beginning of 2017? If you do not remember the exact number then report your best guess.

17. Imagine that we rank you and your neighbors by your income in 2017 such that the person with the lowest income is number 1 and the person with the highest income is number [PIPED # NEIGHBORS]. What do you think your position was in this rank in 2017?
18. Think about your schoolmates when you were 15 years old. By schoolmates, we mean everybody at your school who was born in [PIPED BIRTH YEAR], and not just the people in your class. How many schoolmates were you including yourself? If you do not remember the exact number then report your best guess.
19. Imagine that we rank you and your schoolmates by your income in 2017, such that the person with the lowest income is number 1 and the person with the highest income is number [PIPED # SCHOOLMATES]. What do you think your position was in this rank in 2017?

Treatment

For the treatment group this block appears here. For the control group it appears after the block "Outcomes".

For each reference group, cohort/gender/municipality/educational level/sector, we provide the following information on separate pages along with a visualization of the difference:

You GUESSED that you were on position PXX.

Based on the income you reported, your TRUE position is PXX.

You are actually X positions higher/lower on the ladder than you thought.

Outcomes

1. On a scale from 1 to 7 where 1 is "Completely fair", 4 is "Neither fair nor unfair" and 7 is "Completely unfair", indicate to what extent you think that it is fair or unfair that there are differences in income among people born the same year as you WITHIN the following groups that you are yourself a part of?
 - (a) Differences in income among people born in [PIPED BIRTH YEAR]

- (b) Differences in income among [PIPED GENDER] born in [PIPED BIRTH YEAR]
 - (c) Differences in income among people living in [PIPED MUNICIPALITY] municipality
 - (d) Differences in income among people with the educational level [PIPED EDUCATION]
 - (e) Differences in income among people working in the sector [PIPED SECTOR]
2. Now, think about people born the same year as you WITHIN these groups (indicated below). On a scale from 1 to 7 where 1 is “Only luck”, 4 is “Equally important”, and 7 is “Only effort”, indicate to what extent you think that differences in income are caused by differences in peoples’ efforts over their lifetime or rather by luck? By luck, we mean conditions, which you have no control over. By effort, we mean conditions, which you can control.
- (a) Reason for different incomes among people born in [PIPED BIRTH YEAR]?
 - (b) Reason for different incomes among [PIPED GENDER] born in [PIPED BIRTH YEAR]?
 - (c) Reason for different incomes among people living in [PIPED MUNICIPALITY] municipality?
 - (d) Reason for different incomes among people with the educational level [PIPED EDUCATION]?
 - (e) Reason for different incomes among people working in the sector [PIPED SECTOR]?
3. Which party would you vote for if there was a general election today?
Socialdemokratiet; Venstre, Danmarks Liberale Parti; Radikale Venstre; Enhedslisten - De Rød-Grønne; Det Konservative Folkeparti; Alternativet; SF - Socialistisk Folkeparti; Liberal Alliance; Kristendemokraterne; Dansk Folkeparti; Nye Borgerlige; Other; Do not wish to answer
4. Below, you see six statements which you can agree or disagree with. On a scale from 1 to 7 where 1 is ”Completely agree”, 4 is ”Neither agree nor disagree”, and 7 is ”Completely disagree”, indicate to what extent you agree or disagree with each statement.
- (a) Income inequality is a problem in Denmark

- (b) The government should increase redistribution of income by increasing taxes and transfers to reduce inequality
- (c) I am generally satisfied with my life
- (d) My work has generally paid off
- (e) People with high incomes have worked hard for their income and deserve it
- (f) If a person is poor this is mainly due to lack of effort from his or her side

Outro

1. It is important for our study that we only use responses from people, who have given the survey their full attention. You will automatically participate in the lottery no matter what you answer, but we would like to know how much attention you have given the survey.
1 I barely gave the survey any attention; ... ; 7 I gave the survey my full attention
2. Do you think that the survey was biased?
Yes, it was right-winged; Yes, it was left-winged; No, it was neutral
3. If you have any comments about the survey, then you are welcome to write them here:

A.2 Instruction video link and script

Link: <https://www.dropbox.com/s/ya1z0nlmii5tkpo/Instruktionsvideo.m4v?dl=0>

We will now ask you some questions regarding the distribution of income between Danes born the same year as you.

It may be difficult to answer, but we ask you to try your best.

There are differences between peoples' incomes. Some people have a high income, others have a low income.

The ladder to the left illustrates **how the incomes are distributed between Danes** born the same year as you.

This is also called the income distribution.

Think of 100 people born the same year as you.

They are ranked according to their income such that the person with the lowest income is at the bottom of the ladder and the person with the highest income is at the top of the ladder.

Look at the person next to the first rung of the ladder.

5 out of 100 people (i.e. 5 %) have an income which is the same as or **lower** than the income of this person.

We call this P5, because the person has position 5 on the income ladder.

The person on the middle rung has position 50.

Exactly half of all people (i.e. 50 %) born the same year as you have an income which is the same as or **lower** than the income of this person and **exactly half** have an income which is **higher** than the income of this person.

We call the position in the middle for P50.

Remember that P50 is the position in the middle since we will use this several times in the following questions.

The person next to the top rung has position 95.

95 out of 100 (i.e. 95 %) have an income which is the same as or **lower** than the income of this person and only 5 out of 100 people born the same year as you (i.e. 5 %) have an income which is higher than the income of this person.

Remember what P95 indicates since we are going to use this several times.

Shortly, we will now ask you what you think the income is for P50 and P95, respectively, for Danes born the same year as you

Next, we will ask you what you think **your position** is on the ladder.

You are welcome to watch the video again if you are not sure of the meaning of the different positions.

A.3 Survey screenshots

FIGURE A-1: INCOME QUESTION

We will now ask you about your **total income BEFORE tax in 2017**. You should **NOT** include contributions to employer-managed pension schemes or mandatory pension contributions. When we later will inform you about your own position, it is important that you state your total income as precisely as possible. If you are in doubt about the amounts, you can view them on your annual statement for 2017 from SKAT under *Opgørelse af indkomst* below **Før AM-bidrag**. You can also see a description of the different categories below.

Note: In the scheme below we ask you to please state the **yearly** amounts in **entire thousand DKK**. If you enter 1 this corresponds to 1,000 DKK.

Salary and fees	<input type="text"/>	thousand DKK
Net profit from self-employment	<input type="text"/>	thousand DKK
Unemployment benefits, social assistance, study grants and pension payments	<input type="text"/>	thousand DKK
Total	<input type="text" value="0"/>	thousand DKK

Examples

Salary and fees: Taxable wage income before tax and before labor market contribution and fees. You should include:

- Value of fringe benefits
- Taxable foreign wage
- Wage during sickness and maternity/paternity leave
- Fees from board duties, consultancy work, talks etc.
- Value of stock options, severance pay and anniversary bonus

On your tax statement this corresponds to box 11 + 12 + 14.

Net profit from self-employment: Net profit from self-employment after capital income and expenses. On your tax statement this corresponds to box 111 minus box 112.

Unemployment benefits, social assistance, study grants and pension payments: Unemployment benefits, cash benefits, sickness benefits, maternity/paternity benefits, study grants, payments from private pensions, public pensions and disability pensions. On your tax statement this corresponds to box 16.

FIGURE A-2: ELICITATION OF COHORT P50 PERCEPTION

What do you think the income for **P50** was in 2017 for individuals born in 1970?

Remember that P50 is the income, where half have an income that is the same as or lower than this income, and half have an income that is higher than this income.

Remember also that income is before tax for the whole of 2017 and consists of salary, net profit from self-employment, other business income, unemployment benefits, transfers and payments from private and public pensions.

Note: Please state your answer in **entire thousand DKKs**. If you enter 1 it corresponds to 1,000 DKK.

thousand DKK

Notes: The figure shows a screenshot from the survey for a person who reported being born in 1971.

FIGURE A-3: ELICITATION OF LARGE REFERENCE GROUP P50 PERCEPTIONS

We will now ask you what you think the before tax income for **P50** was in 2017 for the groups below, which you are a part of. The first slider shows your answer from the previous question. You can use the other sliders to select, what you think the income was for P50 for the different groups of **people who were born the same year as you**.

P50 for people **born in 1970**

400.000

P50 for **men** born in 1970

20.000

P50 for people who also lived in **Københavns municipality**

20.000

P50 for people who also had the educational level **Master or PhD program**

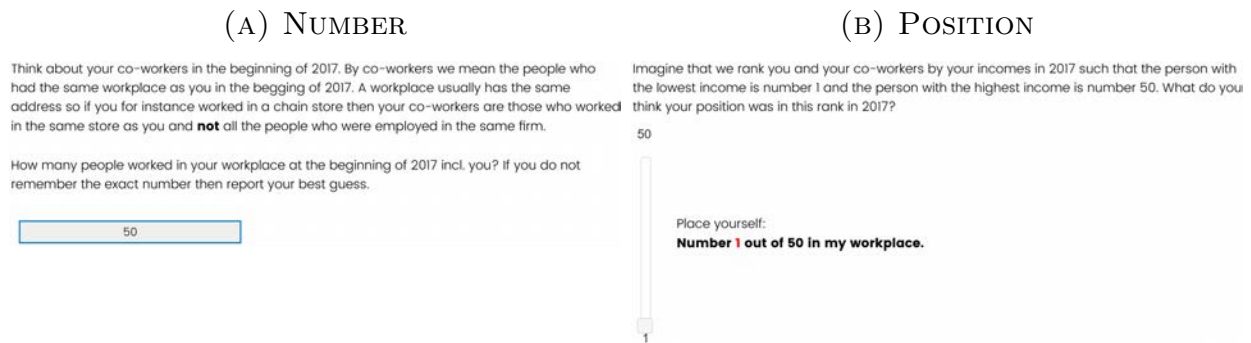
20.000

P50 for people who also worked in the sector **Finance and insurance**

20.000

Notes: The top slider shows the piped answer to the question in figure A-2 and cannot be moved. The sliders go from 20,000 to 8,069,000 in 200 steps according to $Y = 20000 * EXP(0.03 * Step)$. In the middle position the slider has the value 402,000.

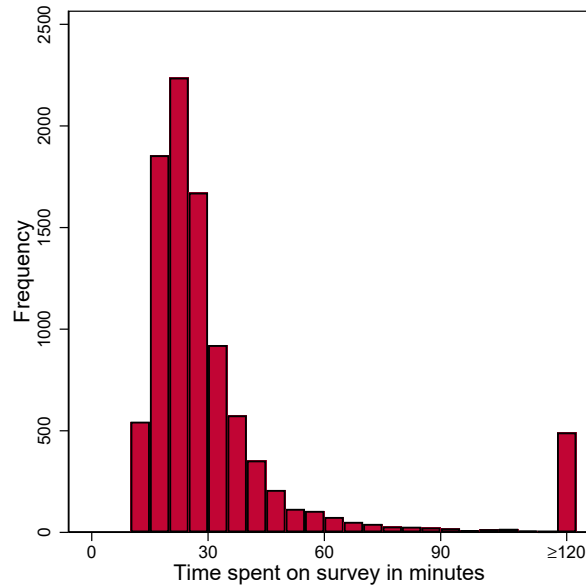
FIGURE A-4: ELICITATION OF NUMBER OF CO-WORKERS AND POSITION AMONG CO-WORKERS



Notes: The panels show screenshots from two pages in the survey. On the first page in this example, the respondent reports having 50 co-workers (the box is empty as default). On the second page, this number is piped as the max of the slider, and when the respondent moves the slider with the cursor the red position number changes accordingly.

B Data Collection, Survey Design and Administrative Data

FIGURE A-5: FULL DISTRIBUTION OF TIME SPENT ON ANSWERING THE SURVEY



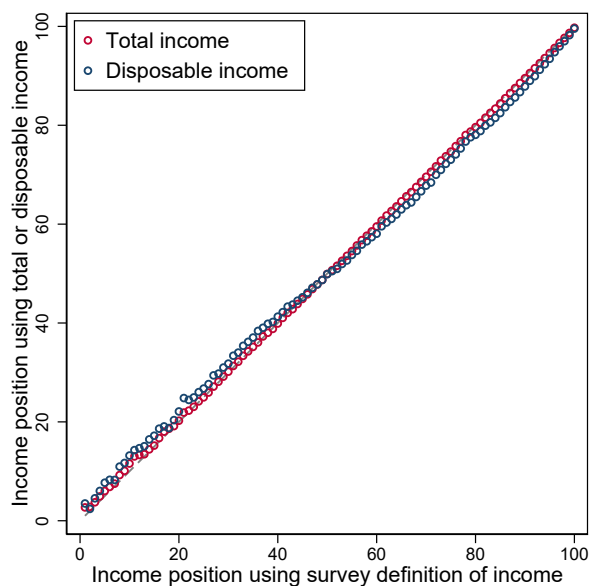
Notes: The figure shows the distribution of time spent on the survey for the analysis sample. The bin width is 5 minutes and the distribution is censored above 120 minutes.

TABLE A-1: ATTRITION ANALYSIS

	Not in sample	
Panel A		
Treatment	0.011	(0.008)
Male	-0.083***	(0.008)
Age	0.001	(0.003)
Married	-0.021**	(0.008)
Ref.: Middle 40%		
Bottom 50 %	0.149***	(0.009)
Top 10 %	-0.060***	(0.012)
Ref.: Master's programs		
Primary education	0.157***	(0.017)
Upper secondary edu.	0.017	(0.019)
Vocational education	0.086***	(0.012)
Short-cycle higher edu.	0.014	(0.017)
Bachelor's programs	0.026*	(0.012)
Ref.: Northern Jutland		
Copenhagen	0.016	(0.015)
Sealand	-0.000	(0.016)
Southern Denmark	0.007	(0.015)
Middle Jutland	-0.014	(0.015)
Observations	13667	
Panel B		
Not in the final sample		Share
Drop out at consent question		0.312
Drop out at income question		0.010
Drop out before treatment		0.102
Drop out after treatment		0.242
Drop out after treatment		0.012
Screened out		0.049

Notes: Respondents who dropped out before the treatment, were not assigned to either the treatment or control group. We randomly assign these individuals to one of the groups. The number of observations in the regression in Panel A is 19 less than total number of people who started the survey. This is because we miss educational information for these individuals. The sum of *Drop out before treatment*, *Drop out after treatment* and *Screened out* is 30.3%. The last 0.9% are people who are assigned to the control but do not complete the survey. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

FIGURE A-6: COMPARISON OF POSITION USING DIFFERENT INCOME DEFINITIONS



Notes: The figure uses all individuals born from 1969 to 1973 observed in the income register data. N=389,759. For each percentile position in the income distribution based on the survey definition of income, we plot the average percentile position in the income distribution based on either total income or disposable income of the individuals at that position. We use total income and disposable income as defined by Statistics Denmark.

TABLE A-2: TREATMENT BALANCING

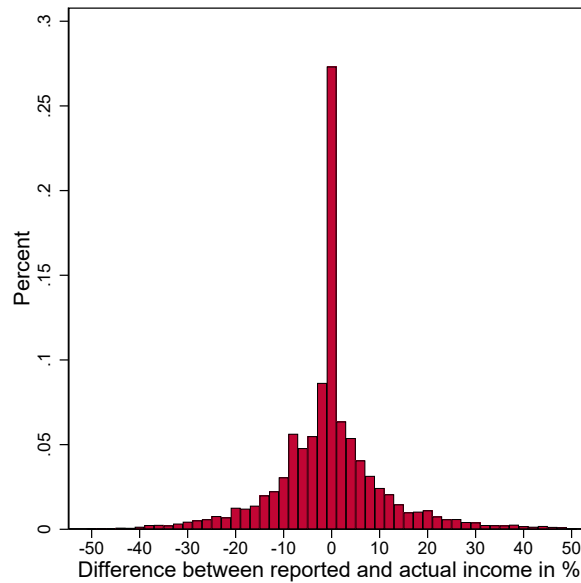
	Control	Treatment	Difference
Actual cohort position	64.003	64.370	-0.367 (0.513)
Treatment information	-5.812	-6.048	0.237 (0.335)
Cohort misperception	-5.767	-6.064	0.297 (0.353)
Left-wing	0.219	0.222	-0.003 (0.009)
Right-wing	0.236	0.241	-0.004 (0.009)
Male	0.511	0.518	-0.007 (0.010)
Age	47.058	46.998	0.060* (0.029)
Primary education	0.077	0.075	0.001 (0.005)
Upper secondary education	0.061	0.054	0.007 (0.005)
Vocational education	0.317	0.312	0.005 (0.010)
Short-cycle higher education	0.090	0.091	-0.001 (0.006)
Bachelor's programs	0.264	0.274	-0.010 (0.009)
Master's programs	0.190	0.193	-0.003 (0.008)
Self-employed	0.038	0.036	0.003 (0.004)
Employee	0.902	0.904	-0.001 (0.006)
Unemployed	0.011	0.013	-0.001 (0.002)
Private sector	0.660	0.657	0.003 (0.010)
Not in work force	0.048	0.048	-0.000 (0.004)
Copenhagen	0.087	0.086	0.001 (0.006)
Sealand	0.237	0.229	0.008 (0.009)
Southern Denmark	0.199	0.215	-0.016 (0.008)
Middle Jutland	0.312	0.308	0.004 (0.010)
Northern Jutland	0.164	0.161	0.003 (0.008)
<i>N</i>			9415

Notes: Column 1 and 2 show the group means of the variables. Column 3 shows the difference. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE A-3: MATCH BETWEEN SURVEY RESPONSE AND REGISTER DATA

	N	Share
Correct cohort	9,415	1.00
Correct gender	9,415	1.00
Correct municipality	9,239	0.98
Correct level of education	6,958	0.74
Correct sector	6,768	0.72
All correct	4,952	0.53

FIGURE A-7: RELATIVE DIFFERENCE BETWEEN REPORTED AND ACTUAL INCOME



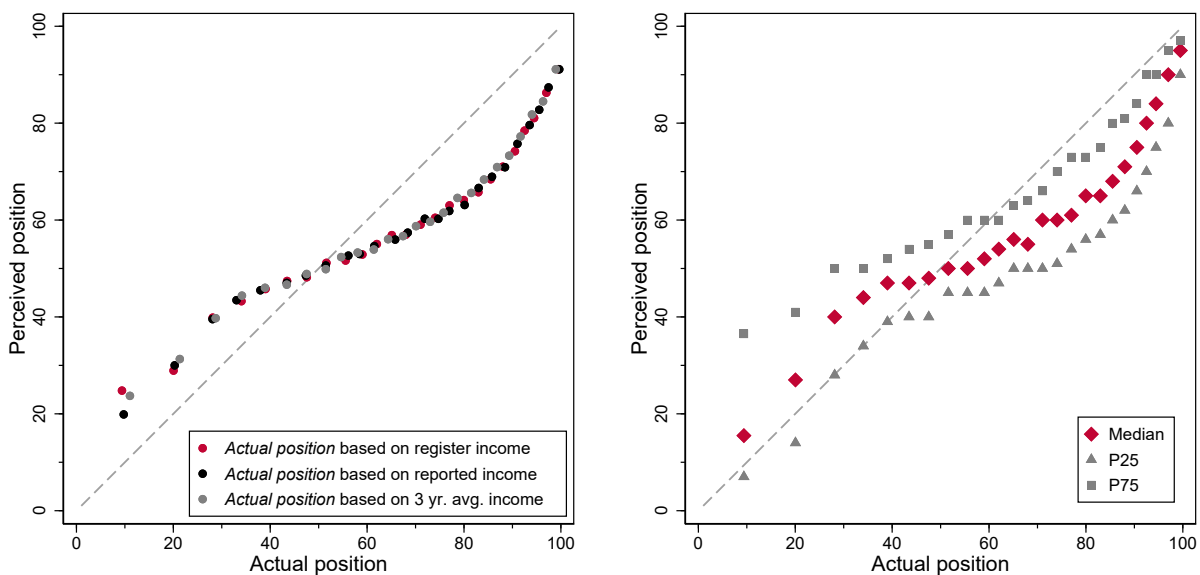
Notes: The panel shows a histogram of the relative difference between reported and actual income in %. The bin width is 2 and the plot is truncated at ± 50 . We see a small spike at a reported income 8-9% below actual income. Respondents are asked to report their income including labor-market contribution, which is 8% of income before taxes; a few respondents seem to report their income excluding these contributions. The spike at zero suggests that some of the respondents have checked their actual income on the tax return when answering the survey.

C Perceptions and Misperceptions about Social Positions

FIGURE A-8: PERCEIVED POSITION WITHIN COHORT

(A) ACTUAL INCOME MEASURES

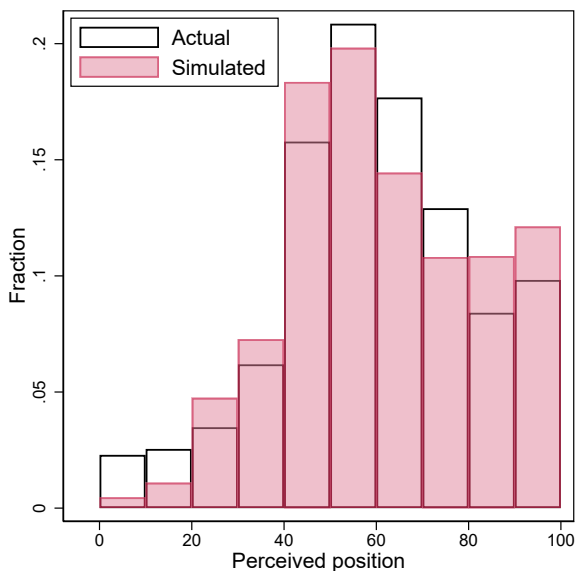
(B) MOMENTS



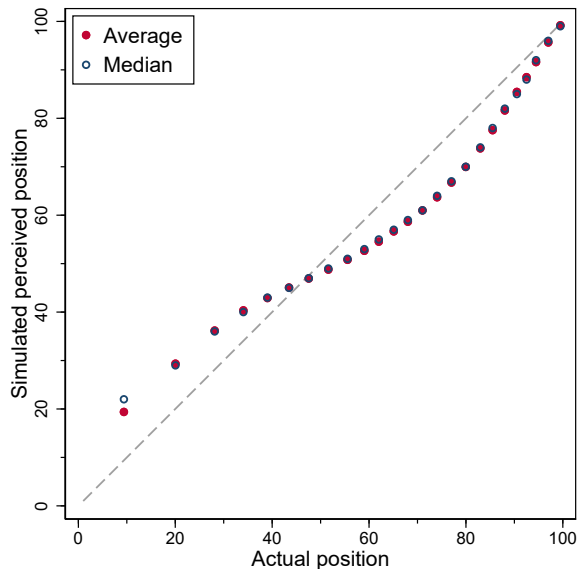
Notes: The left panel is a bin scatter of the average perceived position by actual position (in 25 equal-sized bins). Actual position is either based on the actual income observed on the tax return, the income reported in the survey, or a three-year average of actual income. The right panel shows the 25th, 50th and 75th percentile of perceived position by bins of actual income position.

FIGURE A-9: SIMULATION: LINK BETWEEN MISPERCEPTIONS OF THE INCOME DISTRIBUTION AND MISPERCEPTION IN OWN POSITION

(A) DISTRIBUTION OF ACTUAL AND SIMULATED PERCEPTIONS

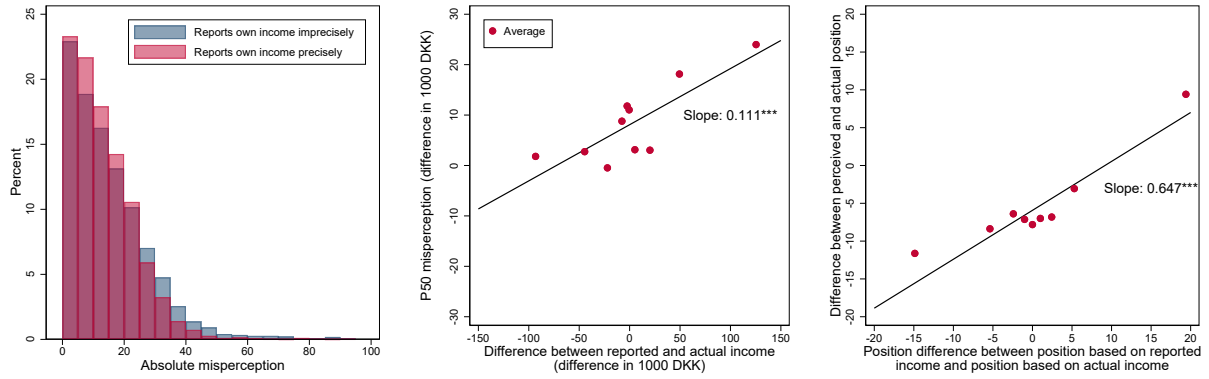


(B) RELATION TO ACTUAL POSITION



Notes: This figure illustrates how misperceptions of the income distribution (P50 and P95) lead to misperceptions of own income position. To generate the simulated perceived position, we first generate a noise term from the actual data, $\varepsilon = 0.5Misperception_{P50} + 0.5Misperception_{P95}$, where $Misperception_{P50}$ and $Misperception_{P95}$ are the misperceptions of P50 and P95 in the cohort in DKK (both winzorized at the 5th and 95th percentile within actual position percentile). We then estimate the systematic part of the noise by predicting $\hat{\varepsilon}_i$ from the following OLS regression: $\varepsilon_i = \beta_0 + \beta_1 Actual\ position_i + \mu$. Finally, we generate the respondents' (simulated) perceived positions by assuming they know their incomes perfectly and add $\hat{\varepsilon}_i$ to the actual percentile limits in the cohort income distribution and use this “noisy” distribution to place the respondents in the distribution. The left panel shows the distribution of perceived positions among the respondents (*Actual*) and the distribution of perceived positions based on the simulated perceptions (*Simulated*). The right panel shows a bin scatter of the average and median perceived position by actual position in 25 equally sized bins as in Figure 2. *Actual position* is based on the income from the tax return and *Perceived position* is based on the simulation. The simulated perceptions exhibit the center bias pattern.

FIGURE A-10: MISPERCEPTION OF OWN INCOME AND OWN POSITION
 (A) DISTRIBUTION (B) P50 MISPERCEPTION (C) OWN POSITION



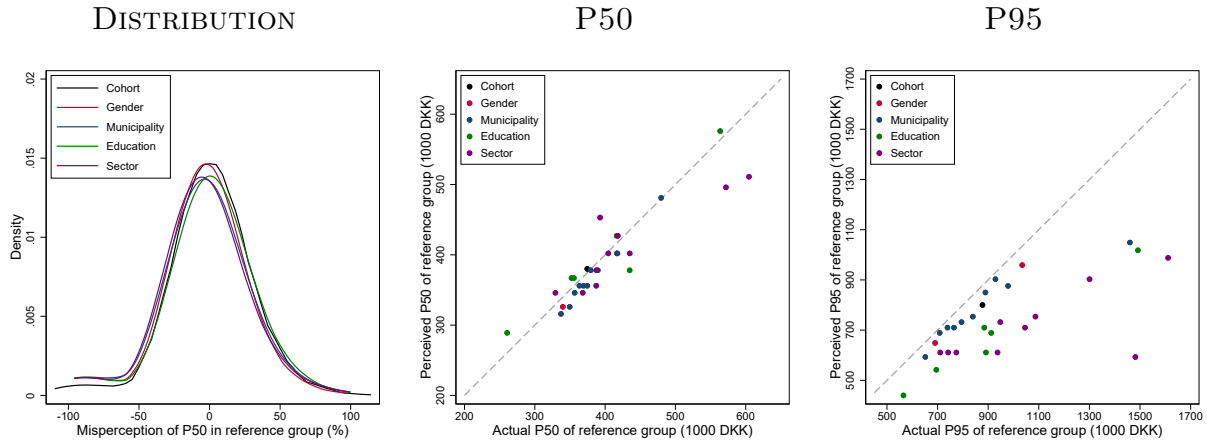
Notes: Panel A shows the distribution of absolute misperceptions. We split the sample into people whose perceived income is within a 5% error band of the actual income, *Reports own income precisely*, and those whose perceived income is more than 5% above or below the actual income, *Reports own income imprecisely*. Panel B shows a binned scatter of the average misperception in P50 by difference between reported and actual income. The line illustrates the predicted relationship from an OLS regression. Panel C shows a binned scatter of the average misperception of cohort position by the difference between actual position based on reported income and actual position based on actual income. The line illustrates the predicted relationship from an OLS regression.

TABLE A-4: ACCURACY OF PERCEPTIONS REGRESSED ON INDIVIDUAL CHARACTERISTICS

	A. Top 20% most inaccurate			B. Top 20% most accurate		
	Position	P50	P95	Position	P50	P95
Male	-0.04*** (0.01)	-0.06*** (0.01)	-0.04*** (0.01)	0.04*** (0.01)	0.02* (0.01)	0.05*** (0.01)
Left-wing	-0.02* (0.01)	0.00 (0.01)	0.03** (0.01)	0.01 (0.01)	0.00 (0.01)	0.01 (0.01)
Right-wing	-0.03** (0.01)	-0.01 (0.01)	-0.00 (0.01)	0.03** (0.01)	0.01 (0.01)	0.00 (0.01)
Middle Jutland	-0.02 (0.02)	0.01 (0.02)	0.03 (0.02)	-0.01 (0.02)	0.00 (0.02)	0.00 (0.02)
Southern Denmark	-0.03 (0.02)	0.01 (0.02)	0.03 (0.02)	0.00 (0.02)	-0.01 (0.02)	-0.02 (0.02)
Sealand	-0.01 (0.02)	0.04** (0.02)	0.02 (0.02)	0.01 (0.02)	-0.00 (0.02)	0.01 (0.02)
Copenhagen Area	-0.02 (0.02)	0.02 (0.02)	0.01 (0.02)	-0.01 (0.02)	-0.01 (0.02)	0.01 (0.02)
Vocational education	-0.06** (0.02)	-0.04 (0.02)	-0.00 (0.02)	0.01 (0.02)	-0.00 (0.02)	0.04 (0.02)
Upper secondary edu.	-0.03* (0.02)	-0.03* (0.02)	-0.02 (0.02)	0.01 (0.02)	0.03 (0.02)	0.01 (0.02)
Short-cycle higher edu.	-0.05** (0.02)	-0.07*** (0.02)	-0.04 (0.02)	0.02 (0.02)	0.02 (0.02)	0.06** (0.02)
Bachelor's programs	-0.08*** (0.02)	-0.06** (0.02)	-0.02 (0.02)	0.04* (0.02)	0.02 (0.02)	0.04* (0.02)
Master's programs and PhD	-0.15*** (0.02)	-0.11*** (0.02)	-0.01 (0.02)	0.10*** (0.02)	0.05** (0.02)	0.06** (0.02)
Construction	0.03 (0.03)	-0.01 (0.03)	-0.01 (0.03)	0.00 (0.03)	-0.04 (0.03)	0.01 (0.03)
Real estate activities	0.04 (0.04)	-0.03 (0.04)	-0.07 (0.04)	-0.00 (0.04)	-0.06 (0.04)	0.02 (0.04)
Business service	0.06* (0.02)	0.01 (0.02)	-0.01 (0.02)	-0.04 (0.03)	-0.02 (0.03)	0.01 (0.03)
Finance and insurance	-0.01 (0.03)	-0.02 (0.03)	-0.06* (0.03)	0.05 (0.03)	-0.05 (0.03)	0.04 (0.03)
Trade and transport	0.06* (0.02)	0.01 (0.02)	-0.02 (0.02)	-0.02 (0.02)	-0.03 (0.02)	-0.01 (0.02)
Manufacturing	0.04 (0.02)	0.00 (0.02)	-0.03 (0.02)	-0.02 (0.02)	-0.03 (0.03)	0.00 (0.02)
Information and communication	-0.02 (0.03)	-0.02 (0.03)	-0.03 (0.03)	0.00 (0.03)	-0.02 (0.03)	0.00 (0.03)
Culture and leisure	0.01 (0.03)	-0.03 (0.03)	-0.04 (0.03)	0.07* (0.03)	0.02 (0.03)	0.02 (0.03)
Agriculture	0.08 (0.05)	-0.10* (0.05)	-0.06 (0.05)	-0.04 (0.05)	0.04 (0.05)	0.07 (0.05)
Public adm., edu. and health	0.03 (0.02)	-0.02 (0.02)	-0.03 (0.02)	-0.01 (0.02)	-0.01 (0.02)	0.02 (0.02)
<i>N</i>	9415	9415	9415	9415	9415	9415
<i>R</i> ²	0.087	0.034	0.025	0.079	0.036	0.029
Cohort FE	✓	✓	✓	✓	✓	✓
Actual position FE	✓	✓	✓	✓	✓	✓

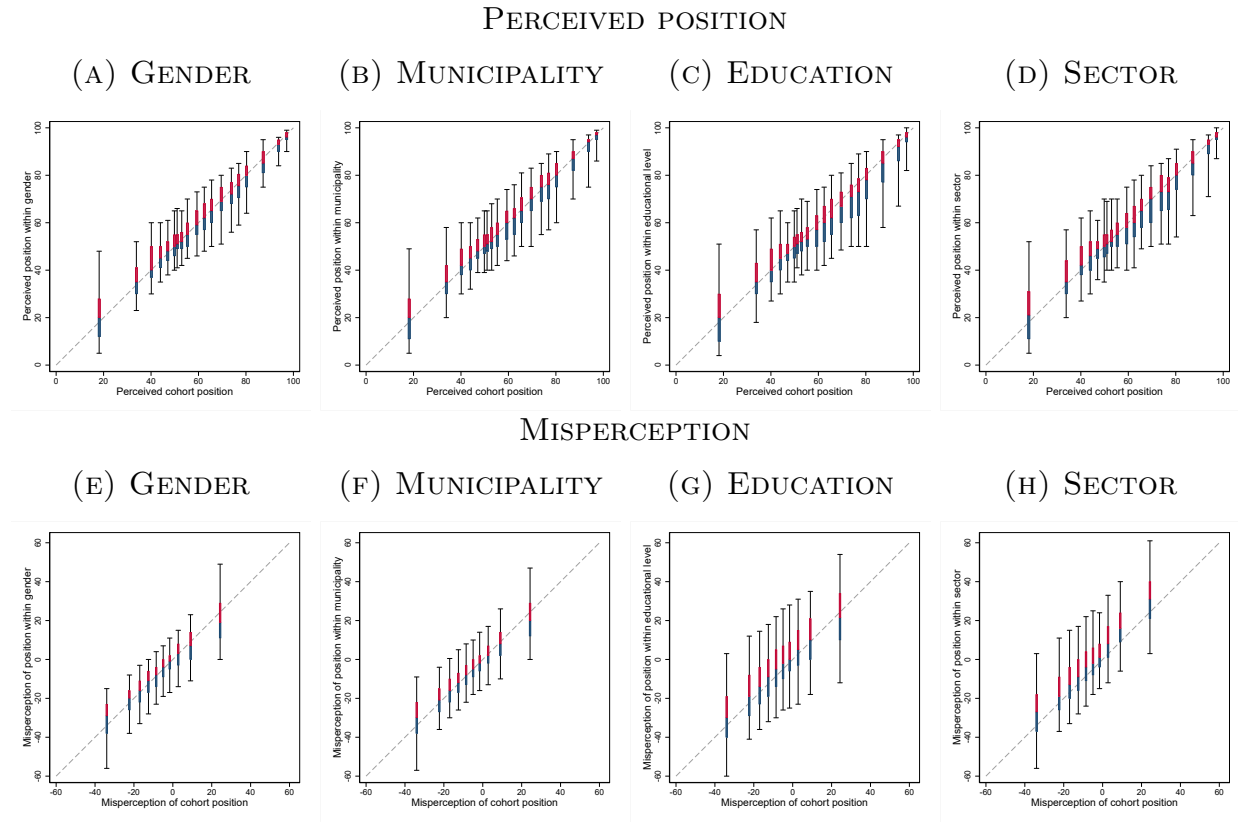
Notes: In Panel A (respectively, Panel B), the outcomes are indicator variables equal to 1 if the respondent is among the 20% of respondents with the largest (respectively, smallest) misperceptions for each variable. The 20% most inaccurate respondents misperceive their position by more than 22 percentiles, the P50 by more than 33%, and P95 by more than 66%. The 20% most accurate ones misperceive their position by less than 5 percentiles, the P50 by less than 6%, and P95 by less than 10%. The *Actual position FE* is fixed effects for all 100 positions in the income distribution. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

FIGURE A-11: DISTRIBUTION OF P50 MISPERCEPTIONS AND MEDIAN PERCEIVED P50 AND P95 INCOMES FOR LARGE REFERENCE GROUPS



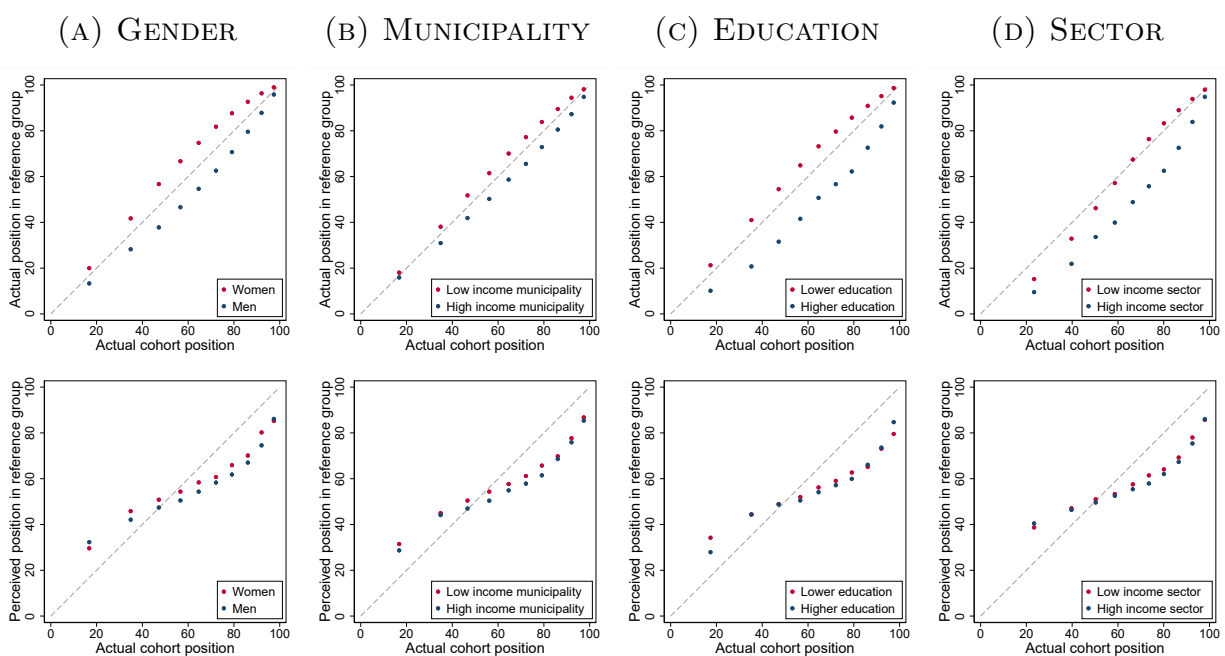
Notes: In the left panel, we show the distributions of P50 misperceptions in the large reference groups. The distributions are smoothed using Epanechnikov kernels with a bandwidth of 15. In the middle and right panels, we show bin medians instead of bin means using the same sample as in figure 5. For gender, we show one scatter for men and one for women. For municipality we divide the respondents into 10 similar-sized groups based on the actual municipality P50 and P95 income and plot one scatter for each group. For education and sector we show one scatter for each educational level or sector.

FIGURE A-12: VARIATION IN PERCEIVED POSITION AND MISPERCEPTION ACROSS LARGE REFERENCE GROUPS



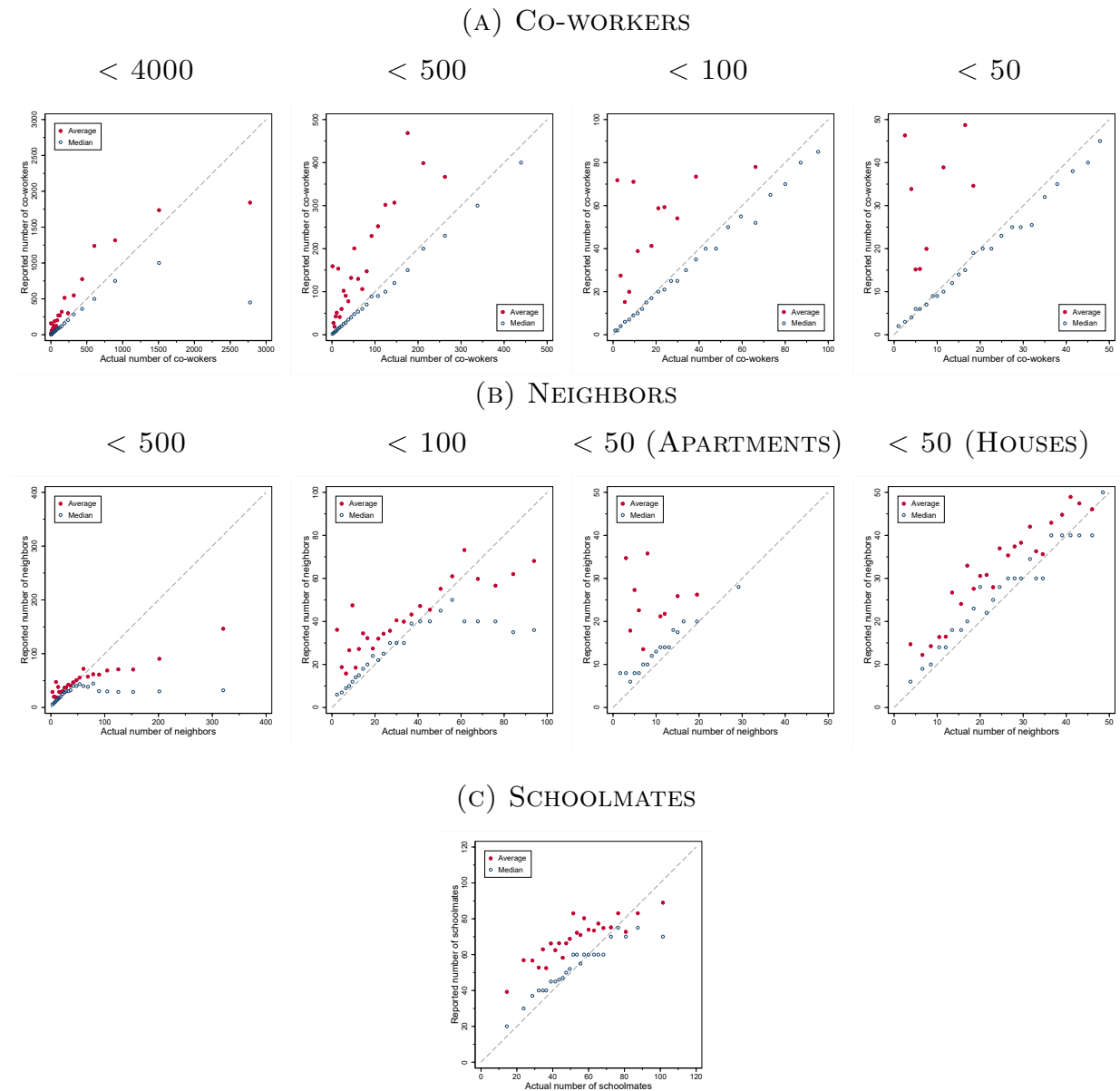
Notes: This figure shows 5th, 25th, 50th, 75th and 95th percentile of reported position within the large reference group by bins of perceived cohort position in the top row, and misperception of own position within the large reference group by bins of misperception of cohort position in the bottom row.

FIGURE A-13: CORRELATION BETWEEN ACTUAL COHORT POSITION AND ACTUAL VERSUS PERCEIVED POSITION WITHIN REFERENCE GROUPS



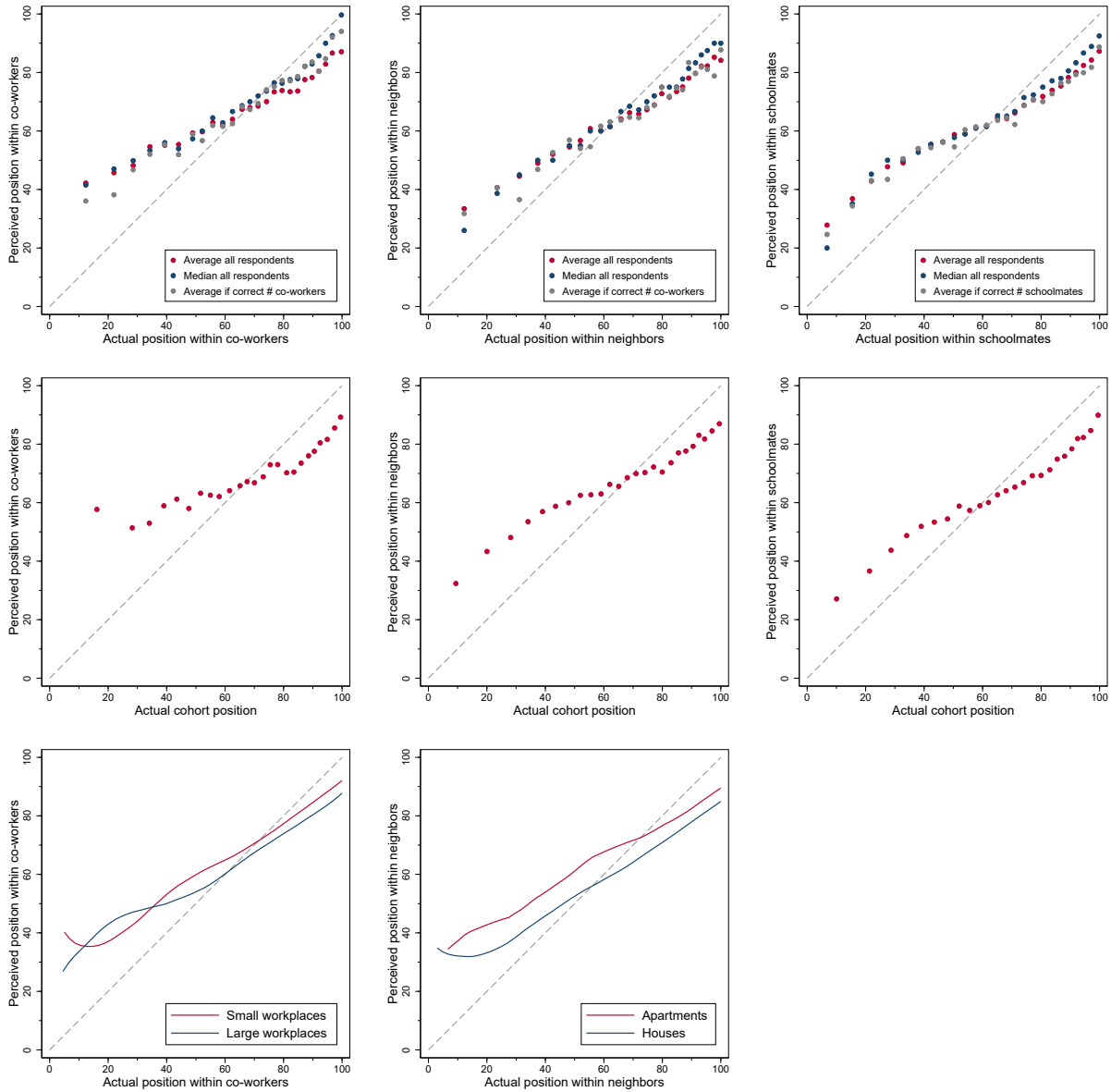
Notes: The top panels plot *actual* reference group positions by actual cohort positions, while the bottom panels plot *perceived* reference group positions by actual cohort positions. The high/low income split for municipality is based on the median of within cohort in sample actual municipality P50 income. This is also the case for sector. For education, *Higher education* is short-cycle higher education and bachelor's and master's degree programs.

FIGURE A-14: ACTUAL AND REPORTED NUMBER OF PEOPLE IN SMALL REFERENCE GROUPS



Notes: The figures show bin scatters of the reported number of co-workers by the actual number of co-workers. In each panel, the sample is restricted to observations where the *Actual number of co-workers* is below a certain threshold. All observations are used to calculate the bin averages but the panels only show the averages if they are smaller than the threshold. There are 25 bins in each panel and there are the same number of observations behind each bin. The bin averages are only plotted if they are lower than the maximum actual number. For *Schoolmates*, the figure is based on respondents enrolled in Basic School at age 15. The figure excludes observations from one very large school.

FIGURE A-15: PERCEIVED POSITION IN SMALL REFERENCE GROUPS

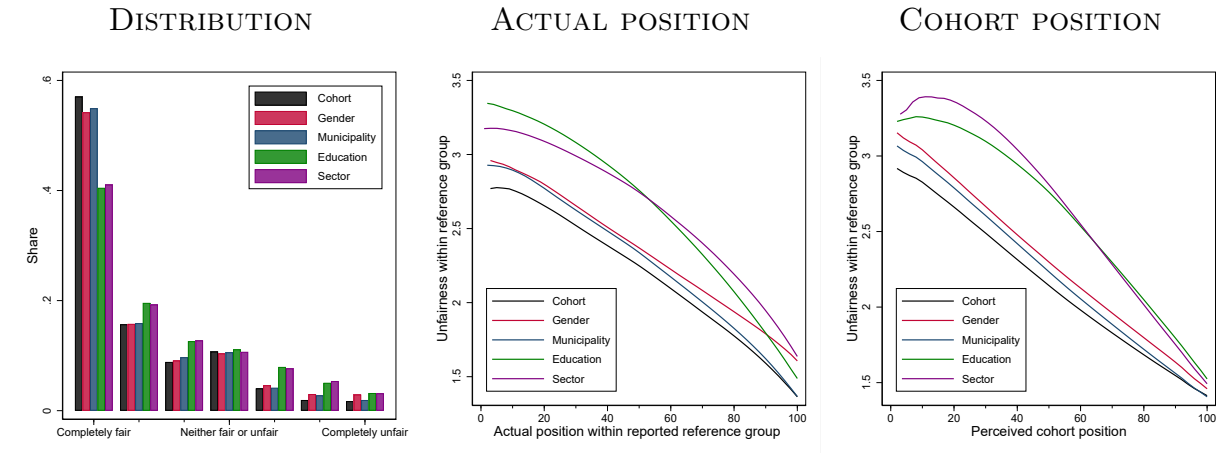


Notes: There are 25 bins in each panel. They are of equal size, except the top bin for co-workers and neighbors in the top panels, which have more observations. The top panels show similar patterns as in figure 8, using medians instead of averages or restricting the sample to respondents who report a number of people in the small reference group that matches the number observed in the register data $\pm 10\%$. In the middle panels, we use actual cohort position instead of actual position within the small reference group. Again, we see a pattern similar to figure 8. In the bottom panels, the local linear polynomials have a bandwidth of 10 and are based on the respondents who report the correct number of people in the reference group $\pm 10\%$. Small workplaces have 10 to 100 employees. Large workplaces have more than 100 employees.

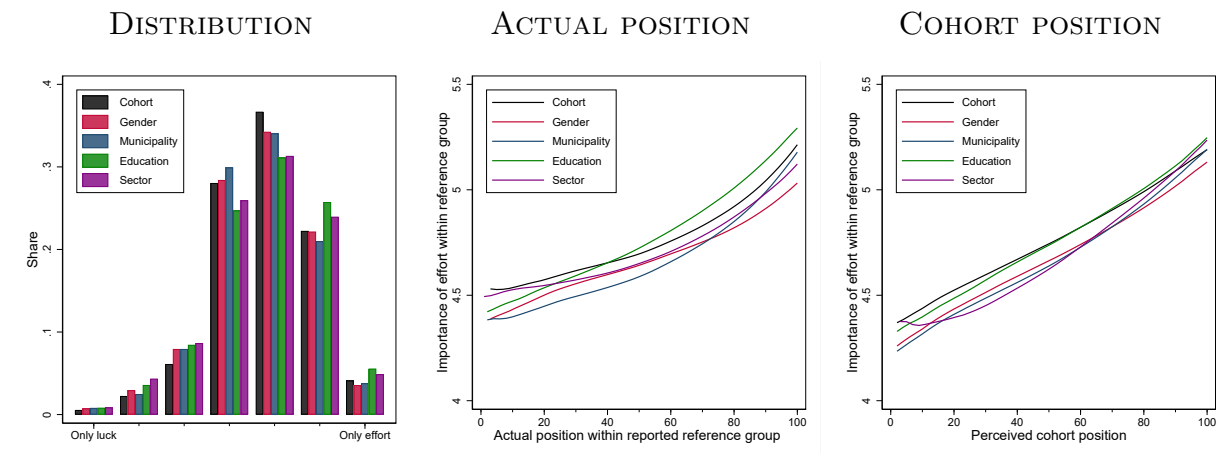
D Relationship Between Social Positions and Fairness Views

FIGURE A-16: UNFAIRNESS OF INEQUALITY AND IMPORTANCE OF EFFORT WITHIN LARGE REFERENCE GROUPS: DISTRIBUTION AND BY POSITION

(A) FAIRNESS

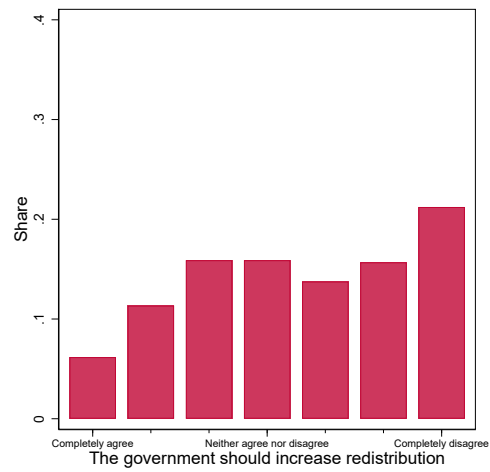
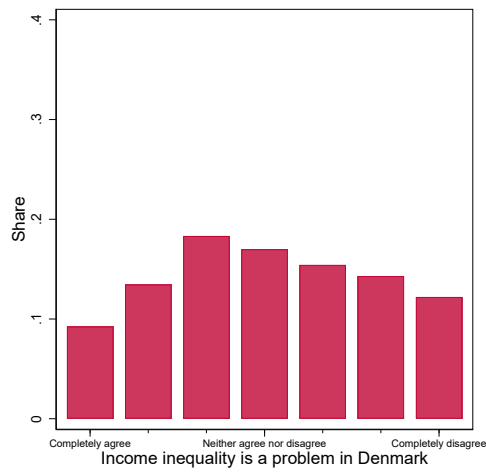


(B) LUCK VS. EFFORT

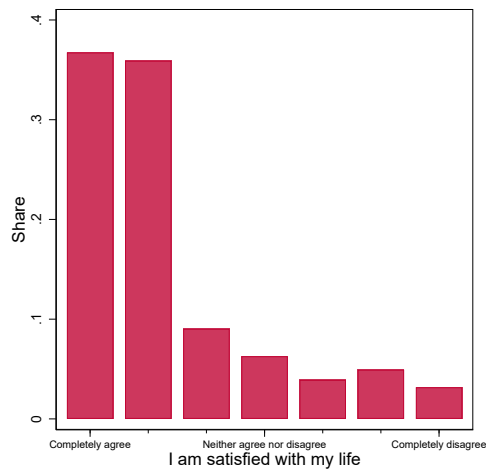


Notes: The figure uses only responses from the control group. The local linear polynomials have a bandwidth of 20. The left column panels show the raw distribution of the answers on the 7-point scale. In the middle column panels, we use actual position within each reference group instead of perceived position as in Figure 9. In the right column panels, we use perceived cohort position.

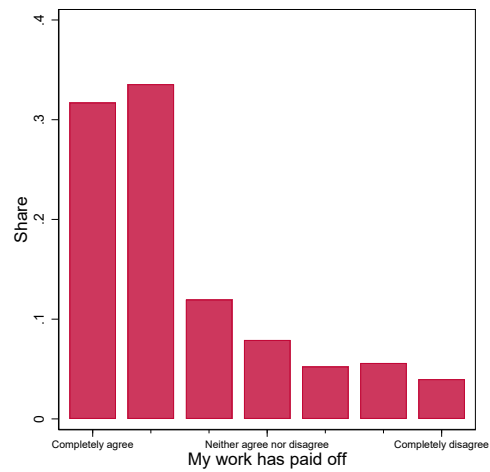
FIGURE A-17: DISTRIBUTIONS OF INEQUALITY VIEWS
 (A) INCOME INEQUALITY (B) REDISTRIBUTION



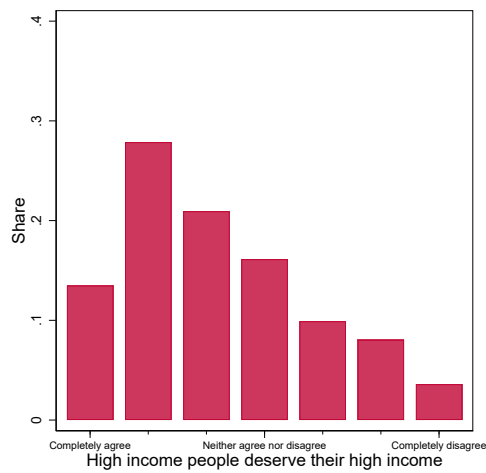
(C) LIFE SATISFACTION



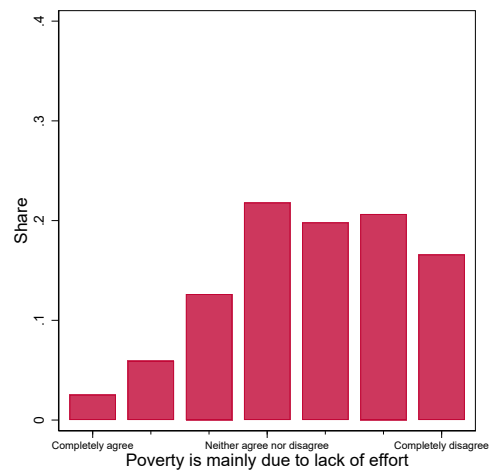
(D) WORK PAID OFF



(E) HIGH INCOME DESERVED



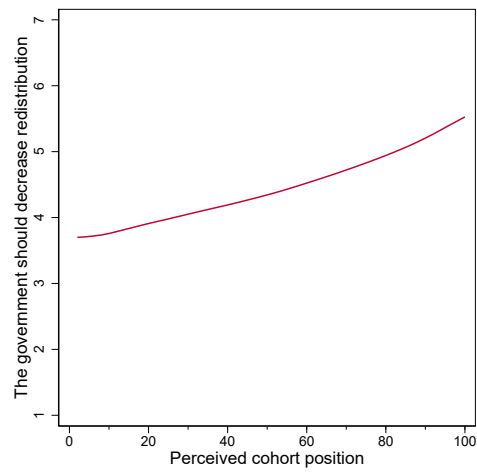
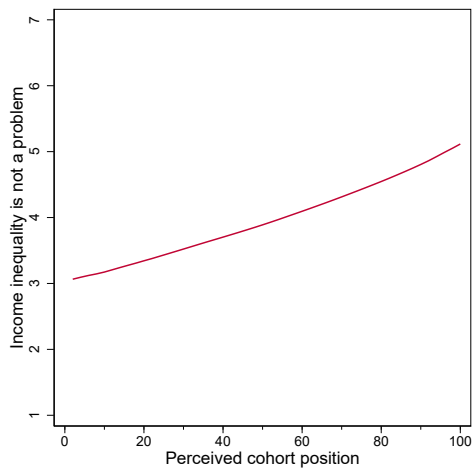
(F) POVERTY AND EFFORT



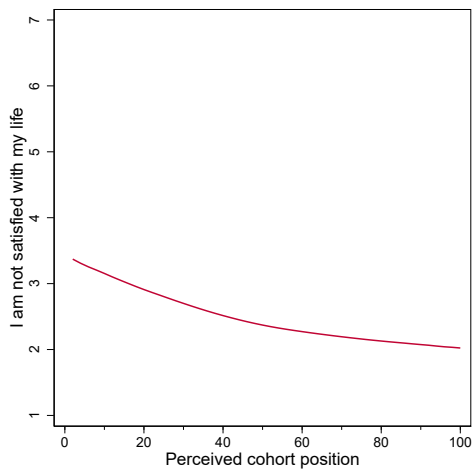
Notes: The figure uses only responses from the control group.

FIGURE A-18: INEQUALITY VIEWS BY PERCEIVED POSITION

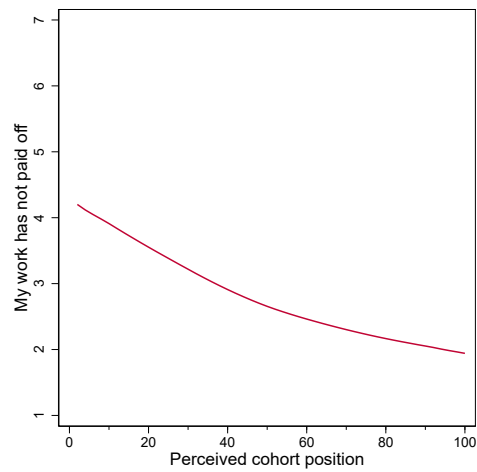
(A) INEQUALITY IS NOT A PROBLEM (B) DECREASE REDISTRIBUTION



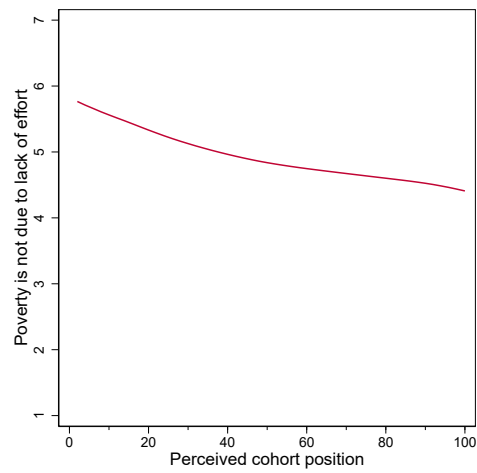
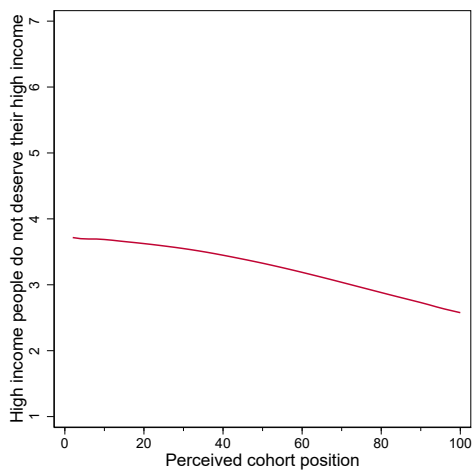
(C) NOT SATISFIED WITH LIFE



(D) WORK HAS NOT PAID OFF



(E) HIGH INCOME NOT DESERVED (F) POVERTY NOT DUE TO LOW EFFORT



Notes: The figure uses only responses from the control group. The local linear polynomials have a bandwidth of 20.

TABLE A-5: INEQUALITY VIEWS BY ACTUAL POSITION AND POSITION MISPERCEPTION

	Inequality is not a problem	Decrease redistribution	Not satisfied with life	Work has not paid off	High inc. people do not deserve inc.	Poverty not due to lack of effort
Panel A: No controls						
Position	2.32*** (0.12)	2.07*** (0.13)	-1.22*** (0.11)	-2.20*** (0.11)	-1.45*** (0.11)	-1.08*** (0.11)
Misperception	0.95*** (0.18)	0.78*** (0.19)	-0.38* (0.16)	-1.08*** (0.16)	-0.83*** (0.16)	-0.69*** (0.16)
Panel B: With controls						
Position	1.17*** (0.08)	1.15*** (0.09)	-0.83*** (0.09)	-1.36*** (0.09)	-1.07*** (0.09)	-0.57*** (0.09)
Misperception	0.50*** (0.10)	0.46*** (0.10)	-0.32** (0.10)	-0.70*** (0.10)	-0.60*** (0.10)	-0.44*** (0.10)
<i>N</i>	4690	4690	4690	4690	4690	4690
Outcome mean	4.08 (0.03)	4.52 (0.03)	2.32 (0.02)	2.53 (0.02)	3.19 (0.02)	4.78 (0.02)

Notes: In the table we only use the control group respondents. All outcomes are z-scores. *Position* denotes the actual cohort position from percentile 1 to 100 divided by 100. A coefficient of 1 means that going from the bottom of the distribution to the top increases the outcome by one standard deviation. Similarly, *Misperception* is the difference between perceived and actual cohort position divided by 100. *Controls* includes cohort fixed effects, an indicator for men, municipality fixed effects, educational level fixed effects and sector (incl. unemployed/not in workforce) fixed effects. *Outcome mean* is the mean of the non-standardized outcome variable. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE A-6: PAIRWISE CORRELATIONS OF HISTORIC INCOME POSITIONS

	-20 yr.	-15 yr.	-10 yr.	-5 yr.	This yr.
-20 yr.	1.00	0.41	0.29	0.22	0.22
-15 yr.	0.41	1.00	0.62	0.54	0.51
-10 yr.	0.29	0.62	1.00	0.70	0.65
-5 yr.	0.22	0.54	0.70	1.00	0.78
This yr.	0.22	0.51	0.65	0.78	1.00

Notes: Based on the full cohorts born in 1969-1973. We only include individuals we observe in all years. N=356,556.

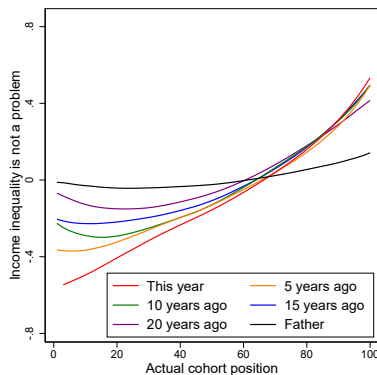
TABLE A-7: TRANSITION MATRIX OF INCOME POSITION 20 YEARS AGO AND TODAY

	Quintile today					Total
	1	2	3	4	5	
Quintile 20 years ago						
1	5.2	3.2	3.1	3.9	4.4	19.8
2	5.2	4.7	3.5	3.3	3.2	19.9
3	3.4	6.0	4.9	3.4	2.3	20.1
4	2.0	4.0	5.5	5.0	3.5	20.1
5	1.5	2.1	3.8	5.4	7.3	20.1
Quintile 10 years ago						
1	9.5	4.4	2.0	1.5	1.0	18.3
2	4.0	8.7	4.8	1.9	0.7	20.1
3	1.9	4.4	8.0	4.9	1.3	20.5
4	1.2	1.8	4.7	8.6	4.2	20.6
5	0.8	0.7	1.3	4.2	13.4	20.5
Total	17.4	20.1	20.8	21.1	20.7	100.0

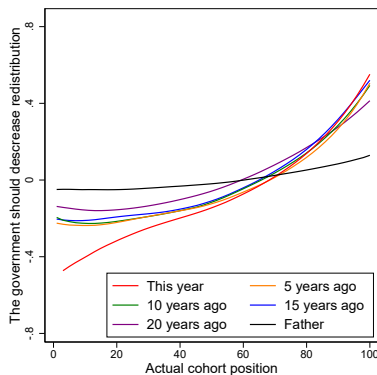
Notes: Based on the full cohorts born in 1969-1973. We only include individuals we observe in all years. The columns do not sum to 20% each because immigrants are included when the income percentiles are generated but not in the table, since we do not observe them historically. N=356,556.

FIGURE A-19: HISTORY OF PAST SOCIAL POSITIONS AND INEQUALITY VIEWS

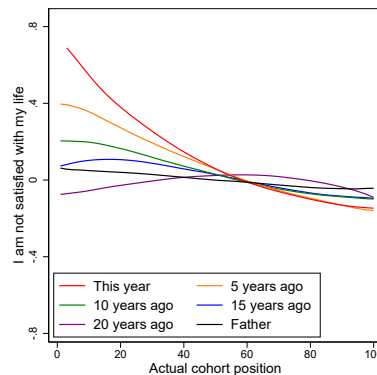
(A) INCOME INEQUALITY



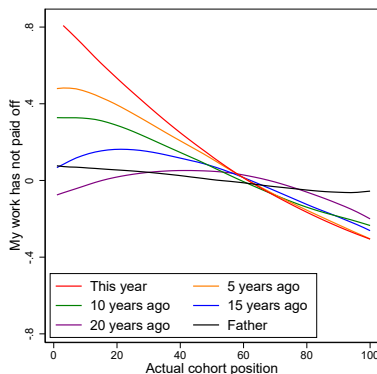
(B) REDISTRIBUTION



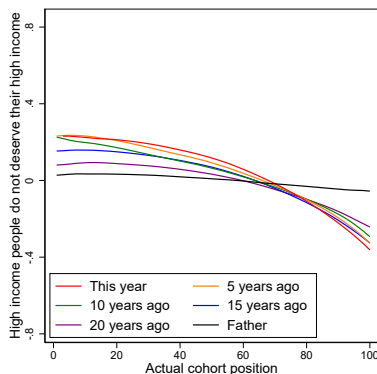
(C) LIFE SATISFACTION



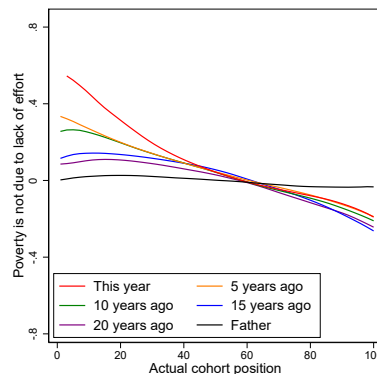
(D) WORK PAID OFF



(E) HIGH INC. DESERVED



(F) POVERTY AND EFFORT



Notes: Bandwidth for local linear polynomials is 20. For *Father*, the x-axis is the father's position among fathers when the respondent was 15 years old. In all panels, the y-axis is the z-score for the survey answers. Sample restricted to the control group.

TABLE A-8: HISTORY OF PAST SOCIAL POSITIONS, UNFAIRNESS, IMPORTANCE OF EFFORT AND POLITICAL VIEW WITHOUT CONTROLS

	Unfairness of inequality					Importance of effort	Right- wing
	Cohort	Gender	Mun.	Edu.	Sector		
Position father	-0.050 (0.036)	-0.027 (0.036)	-0.063 (0.036)	-0.040 (0.035)	-0.047 (0.036)	-0.023 (0.036)	0.052 (0.035)
Position -20 yr.	-0.153*** (0.037)	-0.183*** (0.037)	-0.150*** (0.037)	-0.308*** (0.036)	-0.265*** (0.037)	0.169*** (0.037)	0.557*** (0.036)
Position -15 yr.	-0.228*** (0.048)	-0.217*** (0.047)	-0.182*** (0.047)	-0.228*** (0.047)	-0.236*** (0.048)	0.171*** (0.048)	0.376*** (0.047)
Position -10 yr.	-0.099 (0.057)	-0.155** (0.057)	-0.145* (0.057)	-0.290*** (0.056)	-0.269*** (0.057)	0.205*** (0.058)	0.197*** (0.056)
Position -5 yr.	-0.110 (0.069)	-0.093 (0.068)	-0.159* (0.068)	-0.077 (0.068)	-0.113 (0.070)	-0.009 (0.069)	-0.094 (0.068)
Position this yr.	-0.739*** (0.068)	-0.725*** (0.068)	-0.764*** (0.068)	-0.716*** (0.067)	-0.858*** (0.071)	0.527*** (0.069)	0.406*** (0.067)
Observations	9046	9046	9046	9046	8575	9046	9046
Controls							

Notes: All outcomes are z-scores. *Importance of effort* is in the cohort dimension. *Position father* is the respondent's father's income rank when the respondent was 15 years old compared to other fathers of 15-year-olds. All positions used as explaining variables have been re-scaled to go from 0.1 to 1. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE A-9: HISTORY OF PAST SOCIAL POSITIONS, UNFAIRNESS, IMPORTANCE OF EFFORT AND POLITICAL VIEW USING 5-YEAR AVERAGE INCOME POSITIONS

	Unfairness of inequality					Importance of effort	Right- wing
	Cohort	Gender	Mun.	Edu.	Sector		
Pos. -20 to -16	-0.224*** (0.058)	-0.188** (0.057)	-0.187** (0.058)	-0.205*** (0.056)	-0.198*** (0.057)	0.197*** (0.059)	0.566*** (0.055)
Pos. -15 to -11	-0.143 (0.073)	-0.145* (0.072)	-0.131 (0.072)	-0.132 (0.070)	-0.121 (0.072)	0.143 (0.074)	0.130 (0.070)
Pos. -10 to -6	-0.097 (0.091)	-0.096 (0.089)	-0.137 (0.089)	-0.161 (0.087)	-0.145 (0.089)	0.084 (0.091)	0.034 (0.086)
Pos. -5 to -1	-0.264* (0.113)	-0.205 (0.112)	-0.266* (0.112)	-0.263* (0.109)	-0.259* (0.113)	0.129 (0.114)	-0.000 (0.108)
Position this yr.	-0.515*** (0.092)	-0.509*** (0.090)	-0.513*** (0.090)	-0.528*** (0.088)	-0.634*** (0.092)	0.460*** (0.092)	0.470*** (0.087)
Observations	9388	9388	9388	9388	8895	9388	9388
Controls	✓	✓	✓	✓	✓	✓	✓

Notes: All outcomes are z-scores. *Importance of effort* is in the cohort dimension. *Pos. -20 to -16*, *Pos. -15 to -11*, *Pos. -10 to -6* and *Pos. -5 to -1* are 5-year average cohort positions. All positions used as explaining variables have been re-scaled to go from 0.1 to 1. *Controls* includes a treatment indicator, cohort fixed effects, an indicator for men, municipality fixed effects, educational level fixed effects and sector (incl. unemployed/not in workforce) fixed effects. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE A-10: HISTORY OF PAST SOCIAL POSITIONS AND INEQUALITY VIEWS

	Inequality is not a problem	Decrease redistribution	Not satisfied with life	Work has not paid off	High inc. people do not deserve inc.	Poverty not due to lack of effort
Position father	0.087* (0.035)	0.115** (0.036)	-0.006 (0.038)	0.009 (0.037)	-0.029 (0.037)	-0.019 (0.037)
Position -20 yr.	0.142*** (0.040)	0.136*** (0.041)	0.000 (0.042)	-0.017 (0.041)	-0.147*** (0.042)	-0.110** (0.041)
Position -15 yr.	0.087 (0.046)	0.190*** (0.047)	-0.103* (0.049)	-0.114* (0.048)	-0.169*** (0.049)	-0.077 (0.048)
Position -10 yr.	0.112* (0.055)	0.040 (0.057)	0.061 (0.059)	-0.021 (0.058)	0.023 (0.058)	0.070 (0.058)
Position -5 yr.	0.062 (0.066)	0.012 (0.068)	-0.206** (0.071)	-0.282*** (0.069)	-0.208** (0.070)	-0.051 (0.069)
Position this yr.	0.694*** (0.070)	0.700*** (0.072)	-0.455*** (0.075)	-0.714*** (0.073)	-0.551*** (0.074)	-0.261*** (0.073)
Observations	9036	9036	9036	9036	9036	9036
Controls	✓	✓	✓	✓	✓	✓

Notes: All outcomes are z-scores. *Position father* is the respondent's father's income rank when the respondent was 15 years old compared to other fathers of 15-year-olds. All positions used as explaining variables have been re-scaled to go from 0.1 to 1. *Controls* includes a treatment indicator, cohort fixed effects, an indicator for men, municipality fixed effects, educational level fixed effects and sector (incl. unemployed/not in workforce) fixed effects. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE A-11: HISTORIC SHOCKS AND INEQUALITY VIEWS

	Inequality is not a problem	Decrease redistribution	Not satisfied with life	Work has not paid off	High inc. people do not deserve inc.	Poverty not due to lack of effort	N	Affected %
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Unemployment	-0.16** (0.050)	-0.12* (0.050)	0.15** (0.052)	0.17*** (0.051)	0.11* (0.052)	-0.029 (0.051)	7531	5.03
Disability	-0.29* (0.13)	-0.44*** (0.13)	0.29* (0.14)	0.37** (0.13)	0.26 (0.14)	0.50*** (0.13)	9238	0.60
Hospitalization	-0.035 (0.028)	-0.012 (0.028)	0.076** (0.029)	0.075** (0.029)	0.057* (0.029)	0.066* (0.028)	4746	55.6
Promotion	0.19*** (0.043)	0.20*** (0.044)	-0.13** (0.045)	-0.10* (0.045)	-0.17*** (0.045)	-0.052 (0.045)	7964	6.65
Pre-shock position FE	✓	✓	✓	✓	✓	✓		
Controls	✓	✓	✓	✓	✓	✓		

Notes: All outcomes are z-scores. Each cell in the table is a separate regression of the column outcome on the row regressor and the controls indicated in the bottom part of the table. The explaining variables are all indicators that equal 1 if the respondent experienced the shock between 2012 and 2017. In each row, we exclude respondents who experienced the shock between 2008 and 2011. For *Unemployment*, we only use respondents who were in the workforce in the entire period. *Controls* includes cohort fixed effects, an indicator for men, municipality fixed effects, educational level fixed effects, and sector (incl. unemployed/not in workforce) fixed effects, all measured in 2008, and a treatment indicator. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE A-12: HISTORIC SHOCKS, UNFAIRNESS, IMPORTANCE OF EFFORT AND POLITICAL VIEWS WITH LAST VOTE FIXED EFFECTS

	Unfairness of inequality					Importance of effort (6)	Right- wing (7)	N (8)	Affected % (9)
	Cohort (1)	Gender (2)	Mun. (3)	Edu. (4)	Sector (5)				
Unemployment	0.17*** (0.050)	0.20*** (0.049)	0.18*** (0.049)	0.15** (0.048)	0.18*** (0.050)	-0.088 (0.051)	-0.036 (0.034)	7537	5.03
Disability	0.15 (0.13)	0.40** (0.13)	0.28* (0.13)	0.13 (0.12)		-0.19 (0.13)	0.030 (0.087)	9246	0.61
Hospitalization	0.090** (0.028)	0.076** (0.028)	0.086** (0.028)	0.059* (0.027)	0.039 (0.027)	-0.0093 (0.029)	-0.021 (0.019)	4749	55.5
Promotion	-0.068 (0.044)	-0.066 (0.044)	-0.066 (0.044)	-0.11** (0.043)	-0.16*** (0.043)	0.098* (0.045)	0.072* (0.030)	7970	6.66
Pre-shock position FE	✓	✓	✓	✓	✓	✓	✓		
Controls	✓	✓	✓	✓	✓	✓	✓		
Last vote FE	✓	✓	✓	✓	✓	✓	✓		

Notes: All outcomes z-scores. Each cell in the table is a separate regression of the column outcome on the row regressor and the controls indicated in the bottom part of the table. The explaining variables are all indicators that equal 1 if the respondent experienced the shock between 2012 and 2017. In each row, we exclude respondents who already experienced this type of shock in the pre-period (2008-2011). For *Unemployment*, we only use respondents who were in the workforce in the entire period. For *Disability*, we do not estimate the effect on fairness within sector, because very few disabled people work. *Controls* included in all regressions are cohort, gender, municipality, education, and sector fixed effects (incl. unemployed/not in workforce), all measured in 2008, and a treatment indicator. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE A-13: HISTORIC SHOCKS, UNFAIRNESS, IMPORTANCE OF EFFORT AND POLITICAL VIEW WITHOUT CONTROLS

	Current	Unfairness of inequality					Importance	Right-	N	Affected
	position	Cohort	Gender	Mun.	Edu.	Sector	of effort	wing		%
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Unemployment	-12.3*** (0.81)	0.17** (0.051)	0.19*** (0.050)	0.18*** (0.050)	0.098 (0.050)	0.13* (0.052)	-0.069 (0.051)	0.024 (0.051)	7537	5.03
Disability	-24.8*** (2.40)	0.32* (0.13)	0.56*** (0.13)	0.44*** (0.13)	0.26* (0.13)		-0.31* (0.13)	-0.17 (0.13)	9246	0.61
Hospitalization	-2.20*** (0.51)	0.11*** (0.029)	0.098*** (0.028)	0.11*** (0.028)	0.080** (0.028)	0.065* (0.028)	-0.022 (0.029)	-0.046 (0.029)	4749	55.5
Promotion	8.86*** (0.77)	-0.13** (0.045)	-0.12** (0.044)	-0.13** (0.045)	-0.16*** (0.044)	-0.22*** (0.045)	0.15** (0.045)	0.20*** (0.045)	7970	6.66
Pre-shock position FE	✓	✓	✓	✓	✓	✓	✓	✓		
Controls										

Notes: All outcomes are z-scores. Each cell in the table is a separate regression of the column outcome on the row regressor and the controls indicated in the bottom part of the table. The explaining variables are all indicators that equal 1 if the respondent experienced the shock between 2012 and 2017. In each row, we exclude respondents who experienced the shock between 2008 and 2011. For *Unemployment*, we only use respondents who were in the workforce in the entire period. For *Disability*, we do not estimate the effect on fairness within sector, because very few disabled people work. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE A-14: HISTORIC SHOCKS, UNFAIRNESS, IMPORTANCE OF EFFORT AND POLITICAL VIEW USING 2SLS

	Unfairness of inequality					Importance of effort	Right- wing	N	Affected %
	Cohort	Gender	Mun.	Edu.	Sector				
	(1)	(2)	(3)	(4)	(5)				
Unemployment	-1.60*** (0.41)	-1.77*** (0.39)	-1.71*** (0.41)	-1.34*** (0.37)	-2.34*** (0.60)	0.87* (0.42)	0.50 (0.39)	7537	5.03
Disability	-1.35* (0.60)	-2.31*** (0.58)	-1.84** (0.57)	-1.27* (0.59)		1.42* (0.61)	1.14* (0.57)	9246	0.61
Hospitalization	-5.11** (1.93)	-3.84* (1.55)	-4.81* (1.87)	-3.45 (1.77)	-2.64 (2.32)	0.55 (1.56)	0.97 (1.48)	4749	55.5
Promotion	-1.45** (0.52)	-1.31** (0.50)	-1.36** (0.50)	-1.69*** (0.43)	-1.99*** (0.43)	1.69** (0.53)	2.28*** (0.52)	7970	6.66
Pooled	-1.61*** (0.34)	-1.93*** (0.33)	-1.75*** (0.33)	-1.49*** (0.30)	-2.15*** (0.35)	1.25*** (0.31)	1.08*** (0.31)	29502	12.2
Pre-shock position FE	✓	✓	✓	✓	✓	✓	✓		
Controls	✓	✓	✓	✓	✓	✓	✓		

Notes: All outcomes are z-scores. Each cell in the table is a separate 2SLS regression of the column outcome on current position instrumented using the row regressor and the controls indicated in the bottom part of the table. The instruments are all indicators that equal 1 if the respondent experienced the shock between 2012 and 2017. In each row, we exclude respondents who experienced the shock between 2008 and 2011. For *Unemployment*, we only use respondents who were in the workforce in the entire period. For *Disability*, we do not estimate the effect on fairness within sector, because very few disabled people work. *Controls* includes cohort fixed effects, an indicator for men, municipality fixed effects, educational level fixed effects, and sector (incl. unemployed/not in workforce) fixed effects, all measured in 2008, and a treatment indicator. Standard errors in parentheses. In the pooled regression we cluster the standard errors at the individual level. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE A-15: SURVEY INFORMATION EXPERIMENT AND UNFAIRNESS, IMPORTANCE OF EFFORT AND POLITICAL VIEW WITH SAME TREATMENT DIRECTION ACROSS ALL REFERENCE GROUPS

	Unfairness of inequality					Importance of effort	Right- wing
	Cohort	Gender	Mun.	Edu.	Sector		
Positive misperception	-0.149** (0.053)	-0.065 (0.052)	-0.134** (0.052)	-0.229*** (0.051)	-0.186*** (0.056)	0.146** (0.054)	0.120* (0.052)
T × Positive	0.205*** (0.050)	0.112* (0.050)	0.159** (0.050)	0.134** (0.048)	0.150** (0.051)	-0.027 (0.051)	-0.027 (0.049)
T × Negative	0.038 (0.035)	0.013 (0.035)	0.032 (0.035)	0.037 (0.034)	0.010 (0.035)	0.029 (0.036)	-0.044 (0.035)
<i>N</i>	4701	4701	4701	4701	4385	4701	4701
Position FE	✓	✓	✓	✓	✓	✓	✓

Notes: All outcomes are z-scores. *Positive misperception* is an indicator that equals 1 if the perceived position is larger than the actual position. *T × Positive* and *T × Negative* are interactions of the treatment indicator and the positive and 0 or negative misperception indicators. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE A-16: SURVEY INFORMATION EXPERIMENT AND UNFAIRNESS, IMPORTANCE OF EFFORT AND POLITICAL VIEW BY TREATMENT INTENSITY

	Unfairness of inequality					Importance of effort	Right- wing
	Cohort	Gender	Mun.	Edu.	Sector		
Negative misperception	-0.025 (0.035)	-0.088* (0.035)	-0.083* (0.036)	-0.118** (0.039)	-0.152*** (0.040)	0.019 (0.035)	-0.020 (0.035)
Positive misperception	-0.167*** (0.046)	-0.147** (0.045)	-0.176*** (0.044)	-0.150*** (0.042)	-0.318*** (0.044)	0.083 (0.046)	0.041 (0.046)
Large positive misperception	-0.112* (0.051)	-0.225*** (0.050)	-0.187*** (0.047)	-0.221*** (0.046)	-0.434*** (0.050)	0.174*** (0.051)	0.206*** (0.050)
T × Large negative	0.014 (0.035)	0.023 (0.035)	0.033 (0.035)	0.050 (0.038)	0.013 (0.040)	0.031 (0.035)	-0.034 (0.035)
T × Negative	0.031 (0.033)	0.021 (0.034)	0.020 (0.035)	0.033 (0.037)	-0.005 (0.038)	-0.018 (0.034)	-0.023 (0.033)
T × Positive	0.137** (0.052)	-0.017 (0.050)	0.091 (0.049)	0.022 (0.041)	0.038 (0.043)	0.014 (0.052)	-0.014 (0.051)
T × Large positive	0.175** (0.054)	0.187*** (0.052)	0.107* (0.050)	0.099* (0.042)	0.140** (0.044)	-0.035 (0.055)	-0.009 (0.054)
<i>N</i>	9331	9331	9331	9331	8854	9331	9331
Position FE	✓	✓	✓	✓	✓	✓	✓

Notes: All outcomes are z-scores. First, we divide respondents into those who have positive and negative misperceptions. For each of these groups we divide the respondents into two similar sized groups based on how large their misperceptions are. The baseline group is respondents with large negative misperceptions. This for instance means that within cohort, they think their position is more than 12 positions lower than it really is (for the other groups, the intervals are $[-12, 0]$, $[1, 10]$ and larger than 10). For the *Importance of effort* and *Right-wing* outcomes, we use cohort misperception. “*T* ×” are interactions of the treatment indicator and the different group indicators. In the regressions we also include a constant term. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE A-17: SURVEY INFORMATION EXPERIMENT AND UNFAIRNESS, IMPORTANCE OF EFFORT AND POLITICAL VIEW BY ECONOMIC POLICY VIEW

	Unfairness of inequality					Importance of effort	Right- wing
	Cohort	Gender	Mun.	Edu.	Sector		
Negative misperception of left-wing	0.397*** (0.043)	0.345*** (0.043)	0.348*** (0.044)	0.338*** (0.050)	0.431*** (0.049)	-0.198*** (0.043)	-0.755*** (0.037)
Negative misperception of right-wing	-0.263*** (0.041)	-0.290*** (0.042)	-0.285*** (0.042)	-0.284*** (0.044)	-0.290*** (0.046)	0.270*** (0.041)	0.774*** (0.036)
Positive misperception of left-wing	0.224*** (0.060)	0.218*** (0.059)	0.284*** (0.056)	0.345*** (0.049)	0.193*** (0.053)	-0.210*** (0.060)	-0.734*** (0.052)
Positive misperception of moderate	-0.083 (0.044)	-0.083 (0.043)	-0.131** (0.042)	-0.125** (0.039)	-0.243*** (0.042)	0.113** (0.044)	0.087* (0.038)
Positive misperception of right-wing	-0.380*** (0.062)	-0.415*** (0.058)	-0.416*** (0.057)	-0.463*** (0.053)	-0.553*** (0.054)	0.424*** (0.063)	0.821*** (0.054)
T × Positive left-wing	0.102 (0.078)	0.026 (0.076)	-0.086 (0.071)	0.006 (0.057)	0.028 (0.064)	0.032 (0.079)	0.032 (0.068)
T × Positive moderate	0.175*** (0.048)	0.081 (0.047)	0.157*** (0.046)	0.082* (0.039)	0.128** (0.040)	-0.009 (0.049)	-0.022 (0.042)
T × Positive right-wing	0.168* (0.082)	0.161* (0.075)	0.144 (0.076)	0.126* (0.064)	0.116 (0.063)	-0.078 (0.082)	-0.088 (0.071)
T × Negative left-wing	-0.047 (0.050)	-0.009 (0.051)	-0.027 (0.052)	-0.030 (0.059)	-0.076 (0.057)	-0.051 (0.051)	0.017 (0.044)
T × Negative moderate	0.031 (0.033)	0.038 (0.033)	0.034 (0.033)	0.076* (0.035)	0.028 (0.037)	0.042 (0.033)	-0.032 (0.029)
T × Negative right-wing	0.060 (0.047)	0.012 (0.048)	0.056 (0.048)	0.005 (0.050)	-0.008 (0.052)	-0.015 (0.047)	-0.046 (0.041)
<i>N</i>	9331	9331	9331	9331	8854	9331	9331
Position FE	✓	✓	✓	✓	✓	✓	✓

Notes: All outcomes are z-scores. We divide the respondents into six groups based on whether they have positive or negative misperceptions and their economic policy view, i.e. whether they are Very left-wing/Left-wing, Moderate or Right-wing/Very-right-wing. We include an indicator for each group and the baseline group is respondents who have a moderate economic policy view and a negative misperception. “*T* ×” are interactions of the treatment indicator and the different group indicators. In the regressions we also include a constant term. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE A-18: SURVEY INFORMATION EXPERIMENT AND INEQUALITY VIEWS

	Inequality is not a problem	Decrease redistribution	Not satisfied with life	Work has not paid off	High inc. people do not deserve inc.	Poverty not due to lack of effort
Positive misperception	0.121*** (0.033)	0.113*** (0.034)	-0.082* (0.035)	-0.155*** (0.034)	-0.148*** (0.034)	-0.125*** (0.034)
T × Positive	-0.021 (0.036)	0.027 (0.037)	-0.007 (0.038)	0.031 (0.037)	0.047 (0.038)	0.016 (0.037)
T × Negative	-0.012 (0.023)	0.013 (0.024)	0.016 (0.024)	0.015 (0.024)	-0.008 (0.024)	0.020 (0.024)
<i>N</i>	9323	9323	9323	9323	9323	9323
Position FE	✓	✓	✓	✓	✓	✓

Notes: All outcomes are z-scores. *Positive misperception* is an indicator that equals 1 if the perceived position is larger than the actual position. *T × Positive* and *T × Negative* are interactions of the treatment indicator and the positive and 0 or negative misperception indicators. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE A-19: SURVEY INFORMATION EXPERIMENT AND UNFAIRNESS, IMPORTANCE OF EFFORT AND POLITICAL VIEW WITH CONTROLS

	Unfairness of inequality					Importance of effort	Right- wing
	Cohort	Gender	Mun.	Edu.	Sector		
Positive misperception	-0.134*** (0.034)	-0.070* (0.033)	-0.107** (0.033)	-0.081** (0.031)	-0.184*** (0.033)	0.118*** (0.034)	0.122*** (0.033)
T × Positive	0.170*** (0.037)	0.082* (0.035)	0.103** (0.035)	0.065* (0.029)	0.091** (0.030)	-0.020 (0.037)	-0.036 (0.035)
T × Negative	0.022 (0.024)	0.029 (0.024)	0.025 (0.024)	0.041 (0.026)	0.005 (0.027)	0.007 (0.024)	-0.023 (0.023)
<i>N</i>	9331	9331	9331	9331	8854	9331	9331
Position FE	✓	✓	✓	✓	✓	✓	✓
Controls	✓	✓	✓	✓	✓	✓	✓

Notes: All outcomes are z-scores. *Positive misperception* is an indicator that equals 1 if the perceived position is larger than the actual position. *T × Positive* and *T × Negative* are interactions of the treatment indicator and the positive and 0 or negative misperception indicators. *Controls* includes cohort fixed effects, an indicator for men, municipality fixed effects, educational level fixed effects and sector (incl. unemployed/not in workforce) fixed effects. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE A-20: SURVEY INFORMATION EXPERIMENT AND UNFAIRNESS, IMPORTANCE OF EFFORT AND POLITICAL VIEW IF ACTUAL AND REPORTED INCOME MATCH

	Unfairness of inequality					Importance of effort	Right- wing
	Cohort	Gender	Mun.	Edu.	Sector		
Positive misperception	-0.065 (0.041)	-0.111** (0.040)	-0.120** (0.039)	-0.077* (0.037)	-0.221*** (0.041)	0.016 (0.042)	0.057 (0.042)
T × Positive	0.137** (0.046)	0.137** (0.045)	0.106* (0.043)	0.036 (0.036)	0.078* (0.038)	0.053 (0.046)	-0.055 (0.046)
T × Negative	0.027 (0.027)	0.001 (0.028)	0.023 (0.027)	0.013 (0.031)	-0.010 (0.032)	0.017 (0.027)	-0.030 (0.027)
N	6660	6537	6539	6272	5873	6660	6660
Position FE	✓	✓	✓	✓	✓	✓	✓

Notes: In this table, we only use respondents whose reported income generate treatment information that is at most five positions from the information they would have received if the reported and actual income exactly matched. All outcomes are z-scores. *Positive misperception* is an indicator that equals 1 if the perceived position is larger than the actual position. *T × Positive* and *T × Negative* are interactions of the treatment indicator and the positive and 0 or negative misperception indicators. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE A-21: SURVEY INFORMATION EXPERIMENT AND UNFAIRNESS, IMPORTANCE OF EFFORT AND POLITICAL VIEW WITH INTERACTION OF TREATMENT AND HIGH INCOME

	Unfairness of inequality					Importance of effort	Right- wing
	Cohort	Gender	Mun.	Edu.	Sector		
Positive misperception	-0.130*** (0.036)	-0.134*** (0.035)	-0.121*** (0.034)	-0.091** (0.034)	-0.253*** (0.037)	0.070 (0.036)	0.112** (0.036)
T × Positive	0.157*** (0.042)	0.076 (0.041)	0.123** (0.041)	0.082* (0.033)	0.105** (0.035)	-0.076 (0.042)	-0.021 (0.042)
T × Negative	0.029 (0.051)	0.008 (0.051)	0.077 (0.050)	0.101* (0.049)	0.051 (0.055)	-0.150** (0.051)	-0.047 (0.051)
T × High income	-0.006 (0.052)	0.016 (0.052)	-0.058 (0.050)	-0.068 (0.048)	-0.051 (0.053)	0.181*** (0.052)	0.023 (0.052)
<i>N</i>	9331	9331	9331	9331	8854	9331	9331
Position FE	✓	✓	✓	✓	✓	✓	✓

Notes: All outcomes are z-scores. *Positive misperception* is an indicator that equals 1 if the perceived position is larger than the actual position. *T × Positive* and *T × Negative* are interactions of the treatment indicator and the positive and 0 or negative misperception indicators. *T × High income* is an interaction of the treatment indicator and an indicator that equals 1 if the individual has a position in the group above 50. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

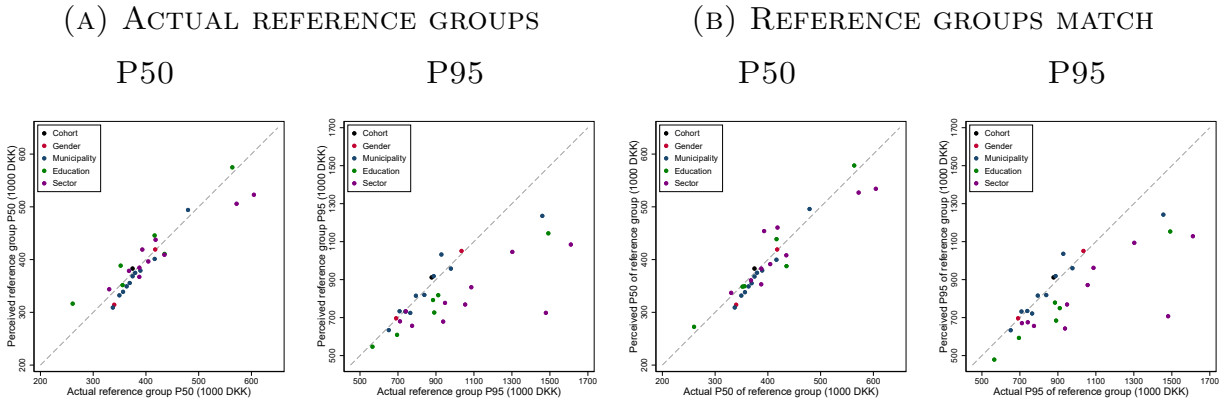
TABLE A-22: ALL OUTCOMES AND SHARPENED Q-VALUES

	Unfairness of inequality					Importance of effort					Inequality is	Decrease	Not satisfied	Work has not	High inc. people	Poverty not due	Right-
	Cohort	Gender	Mun.	Edu.	Sector	Cohort	Gender	Mun.	Edu.	Sector	not a problem	redistribution	with life	paid off	do not deserve inc.	to lack of effort	wing
Positive misperception	-0.13	-0.13	-0.13	-0.11	-0.27	0.11	0.11	0.05	0.07	0.13	0.12	0.11	-0.08	-0.15	-0.15	-0.13	0.12
p-value	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.002)	(0.108)	(0.022)	(0.000)	(0.000)	(0.001)	(0.019)	(0.000)	(0.000)	(0.000)	(0.001)
T × Positive	0.15	0.08	0.10	0.06	0.09	-0.01	0.01	0.04	0.02	0.03	-0.02	0.03	-0.01	0.03	0.05	0.02	-0.01
p-value	(0.000)	(0.023)	(0.005)	(0.042)	(0.004)	(0.790)	(0.832)	(0.329)	(0.583)	(0.374)	(0.563)	(0.477)	(0.876)	(0.394)	(0.214)	(0.639)	(0.731)
sharpened q-value	[0.001]	[0.217]	[0.059]	[0.337]	[0.059]	[1.000]	[1.000]	[1.000]	[1.000]	[1.000]	[1.000]	[1.000]	[1.000]	[1.000]	[1.000]	[1.000]	[1.000]
T × Negative	0.02	0.02	0.03	0.04	0.00	0.01	0.01	-0.01	0.01	0.05	-0.01	0.01	0.02	0.02	-0.01	0.02	-0.03
p-value	(0.336)	(0.371)	(0.258)	(0.099)	(0.857)	(0.805)	(0.762)	(0.785)	(0.843)	(0.061)	(0.632)	(0.569)	(0.515)	(0.508)	(0.717)	(0.411)	(0.252)
sharpened q-value	[1.000]	[1.000]	[1.000]	[0.656]	[1.000]	[1.000]	[1.000]	[1.000]	[1.000]	[0.419]	[1.000]	[1.000]	[1.000]	[1.000]	[1.000]	[1.000]	[1.000]
N	9331	9331	9331	9331	8854	9331	9331	9329	9331	8854	9329	9328	9328	9326	9328	9329	9331
Position FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes: All outcomes are z-scores. The *sharpened q-value* are sharpened two-stage q-values as introduced by Benjamini et al. (2006) and described by Anderson (2008).

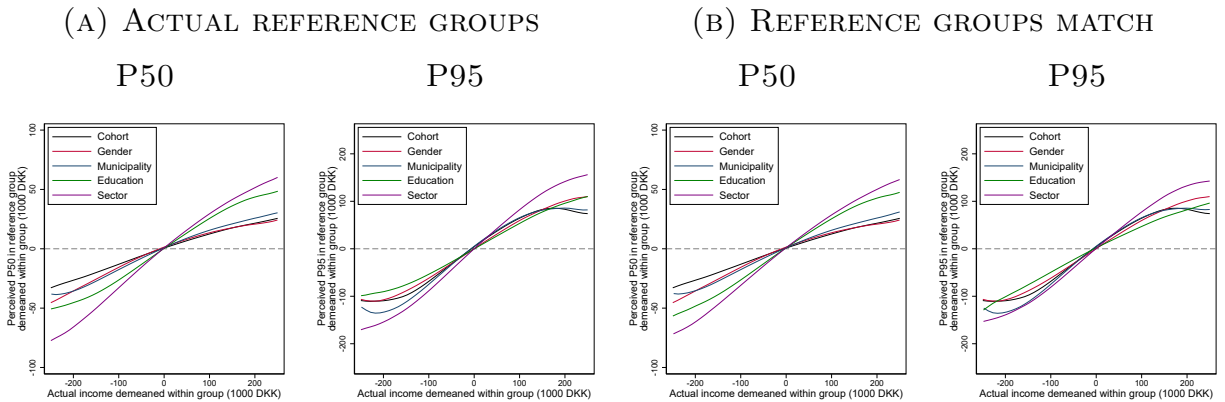
E Large Reference Groups: Using Actual Groups and Restricted Sample

FIGURE A-20: PERCEIVED P50 AND P95 INCOMES FOR LARGE REFERENCE GROUPS USING ACTUAL GROUPS AND RESTRICTED SAMPLE



Notes: As Figure 5 but we use actual reference groups in Panel A instead of reported reference group, and in Panel B, we restrict the sample and only include respondents in each reference group if the reported group matches the group observed in the register data.

FIGURE A-21: PERCEIVED P50 AND P95 BY INCOME USING ACTUAL GROUPS AND RESTRICTED SAMPLE

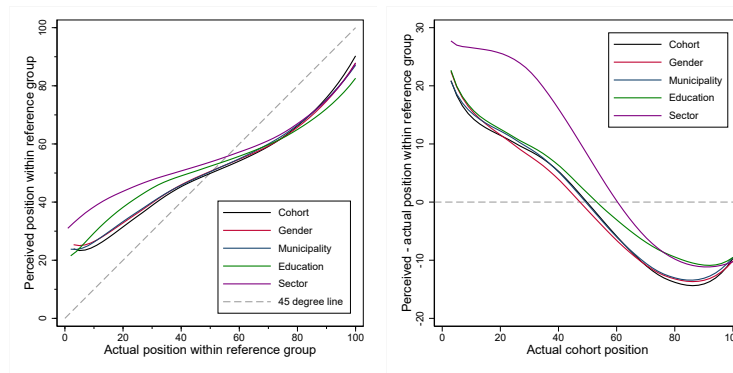


Notes: As Figure 6 but we use actual reference groups in Panel A instead of reported reference group, and in Panel B, we restrict the sample and only include respondents in each reference group if the reported group matches the group observed in the register data.

FIGURE A-22: PERCEIVED AND ACTUAL POSITION FOR LARGE REFERENCE GROUPS USING ACTUAL GROUPS AND RESTRICTED SAMPLE

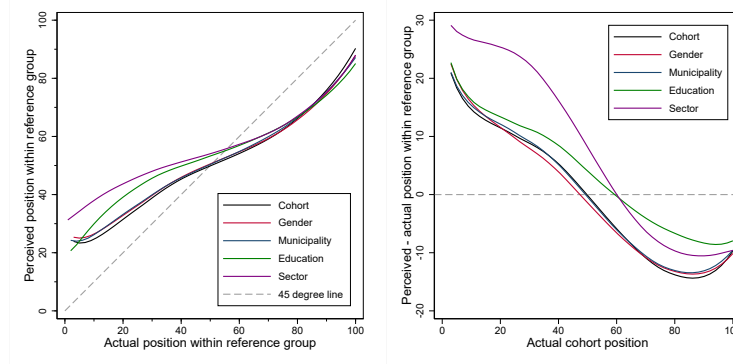
(A) ACTUAL GROUP

BY REF. GROUP POSITION BY COHORT POSITION



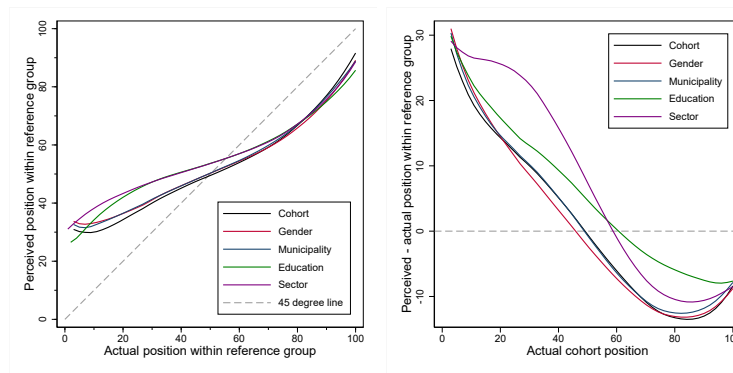
(B) EACH GROUP MATCHES

BY REF. GROUP POSITION BY COHORT POSITION



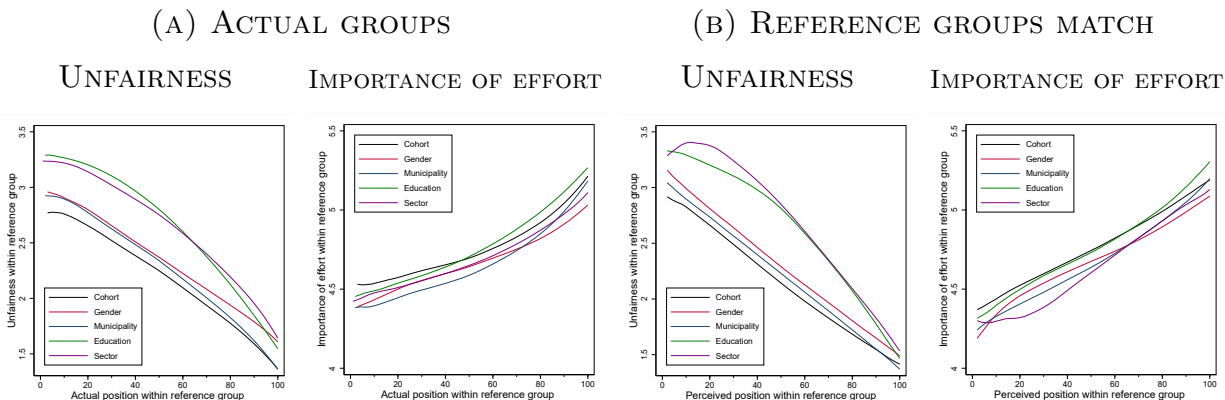
(C) ALL GROUPS MATCH

BY REF. GROUP POSITION BY COHORT POSITION



Notes: As Figure 7 but in Panel A, we use actual reference groups instead of reported reference groups. In Panel B, we only use respondents in each reference group if the reported group matches the group observed in the register data. In Panel C, only respondents where all reported groups match the groups in the register data are included and the sample is the same across groups.

FIGURE A-23: VIEW ON FAIRNESS AND EFFORT VS. LUCK WITHIN LARGE REFERENCE GROUPS USING ACTUAL GROUPS AND RESTRICTED SAMPLE



Notes: As Figure 9 but in Panel A, we use actual reference groups instead of reported reference groups. In Panel B, we only use respondents in each reference group if the reported group matches the group observed in the register data.

TABLE A-23: UNFAIRNESS, IMPORTANCE OF EFFORT AND POLITICAL VIEW BY ACTUAL POSITION AND POSITION MISPERCEPTION USING ACTUAL REFERENCE GROUPS

	Unfairness of inequality					Importance of effort	Right-wing
	Cohort	Gender	Mun.	Edu.	Sector		
Panel A: No controls							
Position	-1.18*** (0.07)	-1.13*** (0.07)	-1.27*** (0.07)	-1.38*** (0.07)	-1.44*** (0.07)	0.82*** (0.07)	0.90*** (0.07)
Misperception	-0.38*** (0.10)	-0.61*** (0.09)	-0.48*** (0.09)	-0.43*** (0.08)	-0.83*** (0.09)	0.44*** (0.10)	0.49*** (0.10)
Panel B: With controls							
Position	-1.09*** (0.09)	-1.01*** (0.08)	-1.10*** (0.08)	-1.04*** (0.08)	-1.22*** (0.08)	0.92*** (0.09)	0.99*** (0.08)
Misperception	-0.40*** (0.10)	-0.41*** (0.10)	-0.41*** (0.09)	-0.28*** (0.09)	-0.54*** (0.09)	0.47*** (0.10)	0.54*** (0.10)
<i>N</i>	4692	4692	4692	4692	4332	4692	4692

Notes: As Table 3 but we use actual reference groups instead of reported reference groups. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE A-24: UNFAIRNESS, IMPORTANCE OF EFFORT AND POLITICAL VIEW BY ACTUAL POSITION AND POSITION MISPERCEPTION USING RESTRICTED SAMPLE

	Unfairness of inequality					Importance of effort	Right- wing
	Cohort	Gender	Mun.	Edu.	Sector		
Panel A: No controls							
Position	-1.18*** (0.07)	-1.13*** (0.07)	-1.28*** (0.07)	-1.45*** (0.08)	-1.46*** (0.09)	0.82*** (0.07)	0.90*** (0.07)
Misperception	-0.38*** (0.10)	-0.61*** (0.09)	-0.48*** (0.09)	-0.52*** (0.10)	-0.93*** (0.11)	0.44*** (0.10)	0.49*** (0.10)
Panel B: With controls							
Position	-1.09*** (0.09)	-1.01*** (0.08)	-1.10*** (0.09)	-1.12*** (0.09)	-1.19*** (0.10)	0.92*** (0.09)	0.99*** (0.08)
Misperception	-0.40*** (0.10)	-0.41*** (0.10)	-0.41*** (0.09)	-0.39*** (0.10)	-0.58*** (0.11)	0.47*** (0.10)	0.54*** (0.10)
<i>N</i>	4692	4692	4600	3453	3218	4692	4692
Outcome mean	2.01 (0.02)	2.16 (0.02)	2.08 (0.02)	2.60 (0.03)	2.58 (0.03)	4.81 (0.02)	7.10 (0.05)

Notes: As Table 3 but we only use respondents in each reference group if the reported group matches the group observed in the register data. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE A-25: HISTORY OF PAST SOCIAL POSITIONS, UNFAIRNESS, IMPORTANCE OF EFFORT AND POLITICAL VIEW USING RESTRICTED SAMPLE

	Unfairness of inequality					Importance of effort	Right- wing
	Cohort	Gender	Mun.	Edu.	Sector		
Position father	-0.059 (0.037)	-0.051 (0.037)	-0.070 (0.037)	-0.112** (0.042)	-0.025 (0.044)	0.025 (0.037)	0.147*** (0.035)
Position -20 yr.	-0.122** (0.042)	-0.097* (0.041)	-0.118** (0.041)	-0.103* (0.046)	-0.148** (0.049)	0.061 (0.042)	0.263*** (0.039)
Position -15 yr.	-0.203*** (0.048)	-0.169*** (0.048)	-0.147** (0.048)	-0.143** (0.053)	-0.081 (0.058)	0.131** (0.049)	0.268*** (0.046)
Position -10 yr.	-0.085 (0.058)	-0.100 (0.057)	-0.119* (0.058)	-0.195** (0.066)	-0.177* (0.071)	0.206*** (0.058)	0.163** (0.055)
Position -5 yr.	-0.108 (0.070)	-0.096 (0.068)	-0.143* (0.069)	-0.109 (0.078)	-0.205* (0.086)	0.037 (0.070)	-0.015 (0.066)
Position this yr.	-0.655*** (0.074)	-0.618*** (0.073)	-0.646*** (0.073)	-0.683*** (0.085)	-0.729*** (0.094)	0.540*** (0.074)	0.479*** (0.070)
Observations	9046	9046	8878	6698	6164	9046	9046
Controls	✓	✓	✓	✓	✓	✓	✓

Notes: As Table 4 but we only use respondents in each reference group if the reported group matches the group observed in the register data. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE A-26: HISTORIC SHOCKS, UNFAIRNESS, IMPORTANCE OF EFFORT AND POLITICAL VIEW USING RESTRICTED SAMPLE

	Unfairness of inequality					Importance of effort	Right- wing
	Cohort	Gender	Mun.	Edu.	Sector		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Unemployment	0.20*** (0.051)	0.23*** (0.050)	0.21*** (0.051)	0.18** (0.059)	0.24*** (0.069)	-0.11* (0.052)	-0.061 (0.049)
Observations	7537	7537	7397	5599	5498	7537	7537
Affected %	5.03	5.03	4.96	4.80	3.62	5.03	5.03
Disability	0.30* (0.13)	0.54*** (0.13)	0.42** (0.14)	0.36* (0.15)		-0.31* (0.13)	-0.25* (0.13)
Observations	9246	9246	9073	6841		9246	9246
Affected %	0.61	0.61	0.57	0.61		0.61	0.61
Hospitalization	0.093** (0.029)	0.079** (0.028)	0.091** (0.029)	0.054 (0.033)	0.0084 (0.034)	-0.010 (0.029)	-0.018 (0.028)
Observations	4749	4749	4662	3543	3257	4749	4749
Affected %	55.5	55.5	55.5	55.5	54.3	55.5	55.5
Promotion	-0.12** (0.045)	-0.11** (0.044)	-0.12** (0.045)	-0.19*** (0.051)	-0.21*** (0.054)	0.14** (0.045)	0.19*** (0.043)
Observations	7970	7970	7832	5950	5622	7970	7970
Affected %	6.7	6.7	6.7	6.7	6.4	6.7	6.7
Pre-shock position FE	✓	✓	✓	✓	✓	✓	✓
Controls	✓	✓	✓	✓	✓	✓	✓

Notes: As Table 5 but we only use respondents in each reference group if the reported group matches the group observed in the register data. Since the number of observations and share of respondents affected by the shock varies between reference groups, we show these for each column-by-row regression instead of for each row as in Table 5. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE A-27: SURVEY INFORMATION EXPERIMENT AND UNFAIRNESS, IMPORTANCE OF EFFORT AND POLITICAL VIEW USING ACTUAL REFERENCE GROUPS

	Unfairness of inequality					Importance of effort	Right-wing
	Cohort	Gender	Mun.	Edu.	Sector		
Positive misperception	-0.132*** (0.034)	-0.131*** (0.033)	-0.131*** (0.033)	-0.140*** (0.032)	-0.249*** (0.034)	0.112** (0.034)	0.117*** (0.034)
T × Positive	0.154*** (0.037)	0.082* (0.036)	0.097** (0.035)	0.079* (0.031)	0.087** (0.032)	-0.010 (0.038)	-0.013 (0.037)
T × Negative	0.023 (0.024)	0.022 (0.024)	0.030 (0.025)	0.033 (0.026)	0.013 (0.027)	0.006 (0.024)	-0.027 (0.024)
<i>N</i>	9331	9331	9331	9331	8647	9331	9331
Position FE	✓	✓	✓	✓	✓	✓	✓

Notes: As Table 6 but we use actual reference groups instead of reported reference groups. Standard errors in parentheses. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

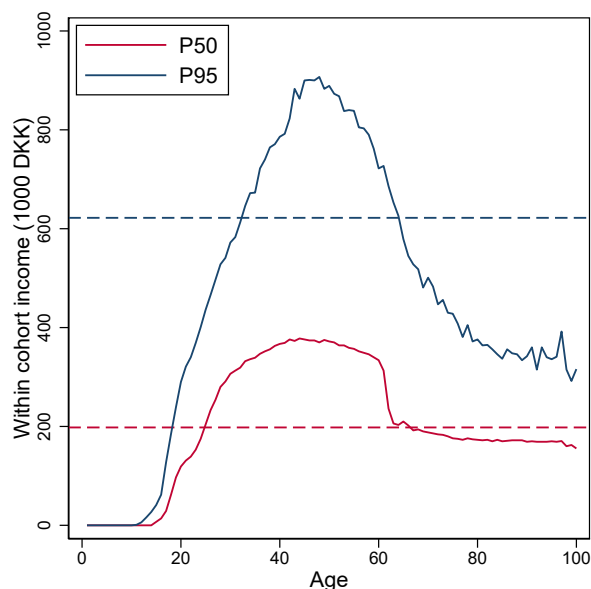
TABLE A-28: SURVEY INFORMATION EXPERIMENT AND UNFAIRNESS, IMPORTANCE OF EFFORT AND POLITICAL VIEW USING RESTRICTED SAMPLE

	Unfairness of inequality					Importance of effort	Right-wing
	Cohort	Gender	Mun.	Edu.	Sector		
Positive misperception	-0.132*** (0.034)	-0.131*** (0.033)	-0.131*** (0.033)	-0.168*** (0.036)	-0.277*** (0.040)	0.112** (0.034)	0.117*** (0.034)
T × Positive	0.154*** (0.037)	0.082* (0.036)	0.100** (0.035)	0.058 (0.034)	0.098** (0.038)	-0.010 (0.038)	-0.013 (0.037)
T × Negative	0.023 (0.024)	0.022 (0.024)	0.034 (0.025)	0.019 (0.031)	0.001 (0.033)	0.006 (0.024)	-0.027 (0.024)
<i>N</i>	9331	9331	9156	6901	6356	9331	9331
Position FE	✓	✓	✓	✓	✓	✓	✓

Notes: As Table 6 but we only use respondents in each reference group if the reported group matches the group observed in the register data. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

F Moments in the Income Distribution

FIGURE A-24: WITHIN COHORT P50 AND P95 BY AGE



Notes: This figure shows the within cohort P50 and P95 income based on a 10% sample of the full population in Denmark. We use the same income definition as in the survey which excludes early retirement benefits, since the cohorts surveyed are not yet eligible for this benefit. The age cut-off for early retirement benefits is 60 and therefore we see a sharp drop at this age. We include pension payments, since we cannot disentangle old-age pension and disability pension.

TABLE A-29: MOMENTS IN THE FULL INCOME DISTRIBUTION

	Income distribution percentiles				
	P5	P25	P50	P75	P95
Full population	0	57	198	358	622
Adult population	36	158	261	394	670
Working age population	39	217	333	447	751
45- to 50-year-olds	112	262	373	502	896

Notes: This table shows different moments of the income distribution in 1,000 DKK based of different definitions of the population. The moments are based on a 10% sample of the full population in Denmark in 2017. *Adult population* are individuals from age 18 and up. *Working age population* are from age 25 to 65.

G Using Indicator Outcome Variables

TABLE A-30: UNFAIRNESS, IMPORTANCE OF EFFORT AND POLITICAL VIEW BY ACTUAL POSITION AND POSITION MISPERCEPTION USING INDICATOR OUTCOMES

	Unfairness of inequality					Importance of effort	Right- wing
	Cohort	Gender	Mun.	Edu.	Sector		
Panel A: No controls							
Position	-0.52*** (0.03)	-0.51*** (0.03)	-0.57*** (0.03)	-0.65*** (0.03)	-0.69*** (0.04)	0.45*** (0.03)	0.32*** (0.03)
Misperception	-0.18*** (0.04)	-0.25*** (0.04)	-0.22*** (0.04)	-0.20*** (0.04)	-0.42*** (0.04)	0.24*** (0.05)	0.18*** (0.05)
Panel B: With controls							
Position	-0.51*** (0.04)	-0.48*** (0.04)	-0.52*** (0.04)	-0.52*** (0.04)	-0.59*** (0.04)	0.45*** (0.04)	0.35*** (0.04)
Misperception	-0.19*** (0.04)	-0.18*** (0.04)	-0.19*** (0.04)	-0.16*** (0.04)	-0.30*** (0.04)	0.25*** (0.05)	0.19*** (0.05)
<i>N</i>	4692	4692	4692	4692	4452	4692	4692
Outcome mean	.27 (0.01)	.30 (0.01)	.29 (0.01)	.40 (0.01)	.40 (0.01)	.63 (0.01)	.41 (0.01)

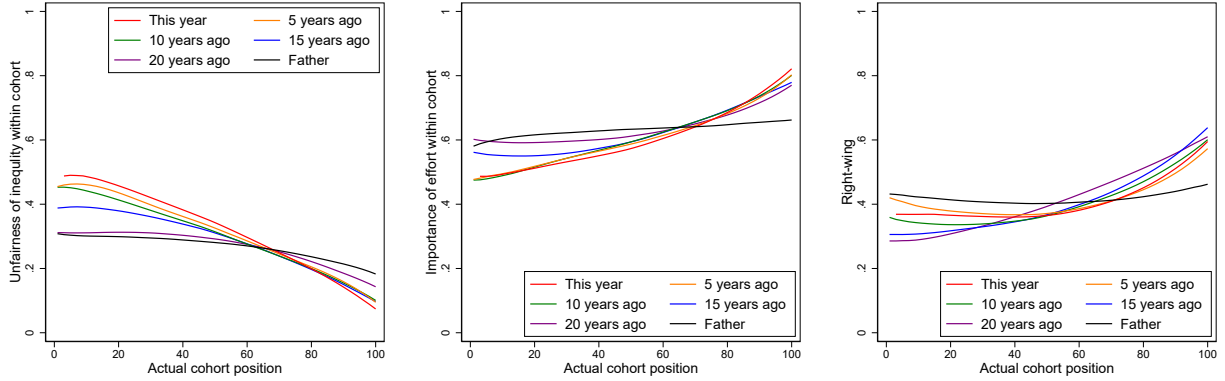
Notes: As Table 3 but the outcomes are indicators that equal 1 if the outcome z-score is larger than 0. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

FIGURE A-25: HISTORY OF PAST SOCIAL POSITIONS, UNFAIRNESS, IMPORTANCE OF EFFORT, AND POLITICAL VIEWS USING INDICATOR OUTCOMES

(A) UNFAIRNESS

(B) IMPORTANCE OF EFFORT

(C) RIGHT-WING



Notes: As Figure 10 but the outcomes are indicators that equal 1 if the outcome z-score is larger than 0. Standard errors in parentheses.

TABLE A-31: HISTORY OF PAST SOCIAL POSITIONS, UNFAIRNESS, IMPORTANCE OF EFFORT, AND POLITICAL VIEW USING INDICATOR OUTCOMES

	Unfairness of inequality					Importance of effort	Right- wing
	Cohort	Gender	Mun.	Edu.	Sector		
Position father	-0.023 (0.016)	-0.021 (0.017)	-0.028 (0.017)	-0.051** (0.018)	-0.047** (0.018)	0.021 (0.018)	0.060*** (0.018)
Position -20 yr.	-0.038* (0.018)	-0.035 (0.019)	-0.028 (0.019)	-0.062** (0.020)	-0.062** (0.020)	0.027 (0.020)	0.132*** (0.020)
Position -15 yr.	-0.089*** (0.021)	-0.075*** (0.022)	-0.068** (0.022)	-0.059** (0.023)	-0.061** (0.023)	0.064** (0.023)	0.093*** (0.023)
Position -10 yr.	-0.045 (0.026)	-0.054* (0.026)	-0.072** (0.026)	-0.080** (0.028)	-0.088** (0.028)	0.069* (0.028)	0.075** (0.028)
Position -5 yr.	-0.035 (0.031)	-0.027 (0.032)	-0.038 (0.031)	-0.032 (0.033)	-0.036 (0.034)	0.056 (0.034)	-0.053 (0.033)
Position this yr.	-0.311*** (0.033)	-0.314*** (0.034)	-0.322*** (0.033)	-0.356*** (0.035)	-0.397*** (0.036)	0.246*** (0.036)	0.202*** (0.035)
Observations	9046	9046	9046	9046	8575	9046	9046
Controls	✓	✓	✓	✓	✓	✓	✓

Notes: As Table 4 but the outcomes are indicators that equal 1 if the outcome z-score is larger than 0. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE A-32: HISTORIC SHOCKS, UNFAIRNESS, IMPORTANCE OF EFFORT AND POLITICAL VIEWS USING INDICATOR OUTCOMES

	Unfairness of inequality					Importance of effort	Right- wing	N	Affected %
	Cohort	Gender	Mun.	Edu.	Sector				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Unemployment	0.082*** (0.023)	0.093*** (0.023)	0.074** (0.023)	0.073** (0.025)	0.070** (0.026)	-0.068** (0.025)	-0.0048 (0.025)	7537	5.03
Disability	0.090 (0.059)	0.15* (0.061)	0.17** (0.060)	0.11 (0.063)		-0.16* (0.065)	-0.049 (0.064)	9246	0.61
Hospitalization	0.036** (0.013)	0.031* (0.013)	0.033* (0.013)	0.028* (0.014)	0.017 (0.014)	-0.0080 (0.014)	-0.011 (0.014)	4749	55.5
Promotion	-0.057** (0.020)	-0.056** (0.021)	-0.057** (0.021)	-0.089*** (0.022)	-0.13*** (0.022)	0.072** (0.022)	0.070** (0.021)	7970	6.66
Pre-shock position FE	✓	✓	✓	✓	✓	✓	✓		
Controls	✓	✓	✓	✓	✓	✓	✓		

Notes: As Table 5 but the outcomes are indicators that equal 1 if the outcome z-score is larger than 0. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE A-33: SURVEY INFORMATION EXPERIMENT AND UNFAIRNESS, IMPORTANCE OF EFFORT AND POLITICAL VIEW USING INDICATOR OUTCOMES

	Unfairness of inequality					Importance of effort	Right- wing
	Cohort	Gender	Mun.	Edu.	Sector		
Positive misperception	-0.056*** (0.015)	-0.049** (0.015)	-0.069*** (0.015)	-0.052*** (0.015)	-0.135*** (0.016)	0.051** (0.017)	0.040* (0.017)
T × Positive	0.061*** (0.017)	0.030 (0.017)	0.036* (0.016)	0.027 (0.015)	0.039** (0.015)	-0.001 (0.018)	-0.003 (0.019)
T × Negative	0.001 (0.011)	0.010 (0.011)	0.001 (0.011)	0.035** (0.013)	0.007 (0.013)	0.003 (0.012)	-0.001 (0.012)
<i>N</i>	9331	9331	9331	9331	8854	9331	9331
Position FE	✓	✓	✓	✓	✓	✓	✓

Notes: As Table 6 but the outcomes are indicators that equal 1 if the outcome z-score is larger than 0. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

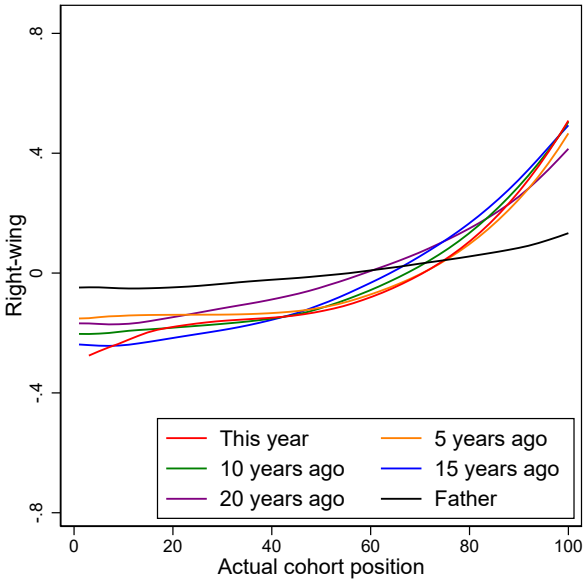
H Using Economic Policy View as the “Right-wing” Outcome

TABLE A-34: UNFAIRNESS, IMPORTANCE OF EFFORT AND POLITICAL VIEW BY ACTUAL POSITION AND POSITION MISPERCEPTION USING ECONOMIC POLICY VIEW AS RIGHT-WING OUTCOME

	Unfairness of inequality					Importance of effort	Right-wing
	Cohort	Gender	Mun.	Edu.	Sector		
Panel A: No controls							
Position	-1.18*** (0.07)	-1.13*** (0.07)	-1.27*** (0.07)	-1.36*** (0.07)	-1.42*** (0.07)	0.82*** (0.07)	0.91*** (0.07)
Misperception	-0.38*** (0.10)	-0.61*** (0.09)	-0.48*** (0.09)	-0.38*** (0.08)	-0.86*** (0.09)	0.44*** (0.10)	0.45*** (0.10)
Panel B: With controls							
Position	-1.09*** (0.09)	-1.01*** (0.08)	-1.09*** (0.08)	-1.03*** (0.08)	-1.19*** (0.08)	0.92*** (0.09)	0.86*** (0.09)
Misperception	-0.40*** (0.10)	-0.41*** (0.10)	-0.42*** (0.09)	-0.30*** (0.09)	-0.61*** (0.09)	0.47*** (0.10)	0.43*** (0.10)
<i>N</i>	4692	4692	4692	4692	4452	4692	4692
Outcome mean	2.01 (0.02)	2.16 (0.02)	2.09 (0.02)	2.54 (0.03)	2.53 (0.03)	4.81 (0.02)	3.01 (0.01)

Notes: As Table 3 but the *Right-wing* outcome is based on the respondents’ economic policy views. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

FIGURE A-26: HISTORY OF PAST SOCIAL POSITIONS AND POLITICAL VIEWS USING ECONOMIC POLICY VIEW AS RIGHT-WING OUTCOME



Notes: As Panel C of Figure 10 but the *Right-wing* outcome is based on the respondents' economic policy views.

TABLE A-35: HISTORY OF PAST SOCIAL POSITIONS, UNFAIRNESS, IMPORTANCE OF EFFORT, AND POLITICAL VIEW USING ECONOMIC POLICY VIEW AS RIGHT-WING OUTCOME

	Unfairness of inequality					Importance of effort	Right- wing
	Cohort	Gender	Mun.	Edu.	Sector		
Position father	-0.059 (0.037)	-0.051 (0.037)	-0.068 (0.037)	-0.081* (0.036)	-0.075* (0.037)	0.025 (0.037)	0.122*** (0.036)
Position -20 yr.	-0.122** (0.042)	-0.097* (0.041)	-0.108** (0.041)	-0.113** (0.040)	-0.131** (0.041)	0.061 (0.042)	0.141*** (0.041)
Position -15 yr.	-0.203*** (0.048)	-0.169*** (0.048)	-0.148** (0.048)	-0.126** (0.047)	-0.139** (0.048)	0.131** (0.049)	0.268*** (0.047)
Position -10 yr.	-0.085 (0.058)	-0.100 (0.057)	-0.117* (0.057)	-0.186*** (0.056)	-0.162** (0.057)	0.206*** (0.058)	0.197*** (0.057)
Position -5 yr.	-0.108 (0.070)	-0.096 (0.068)	-0.152* (0.069)	-0.108 (0.067)	-0.130 (0.069)	0.037 (0.070)	-0.030 (0.068)
Position this yr.	-0.655*** (0.074)	-0.618*** (0.073)	-0.647*** (0.073)	-0.678*** (0.071)	-0.761*** (0.074)	0.540*** (0.074)	0.358*** (0.072)
Observations	9046	9046	9046	9046	8575	9046	9046
Controls	✓	✓	✓	✓	✓	✓	✓

Notes: As Table 4 but the *Right-wing* outcome is based on the respondents' economic policy views. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE A-36: HISTORIC SHOCKS, UNFAIRNESS, IMPORTANCE OF EFFORT AND POLITICAL VIEWS USING ECONOMIC POLICY VIEW AS RIGHT-WING OUTCOME

	Current	Unfairness of inequality					Importance	Right-	N	Affected
	position	Cohort	Gender	Mun.	Edu.	Sector	of effort	wing		%
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Unemployment	-12.2*** (0.78)	0.20*** (0.051)	0.23*** (0.050)	0.21*** (0.050)	0.18*** (0.049)	0.20*** (0.052)	-0.11* (0.052)	-0.049 (0.050)	7537	5.03
Disability	-21.9*** (2.31)	0.30* (0.13)	0.54*** (0.13)	0.42** (0.13)	0.27* (0.13)		-0.31* (0.13)	-0.26* (0.13)	9246	0.61
Hospitalization	-1.83*** (0.49)	0.093** (0.029)	0.079** (0.028)	0.089** (0.028)	0.060* (0.028)	0.039 (0.028)	-0.010 (0.029)	-0.0082 (0.028)	4749	55.5
Promotion	8.51*** (0.74)	-0.12** (0.045)	-0.11** (0.044)	-0.12** (0.045)	-0.17*** (0.044)	-0.21*** (0.044)	0.14** (0.045)	0.17*** (0.044)	7970	6.66
Pre-shock position FE	✓	✓	✓	✓	✓	✓	✓	✓		
Controls	✓	✓	✓	✓	✓	✓	✓	✓		

Notes: As Table 5 but the *Right-wing* outcome is based on the respondents' economic policy views. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.