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Who Feels Inferior? A Test of the Status Anxiety Hypothesis of Social Inequalities in Health

Richard Layte, Christopher T. Whelan

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Table of contents

ABSTRACT	1
1. INTRODUCTION	2
1.1 The Status Anxiety Hypothesis	3
1.2. Critical Theoretical Perspectives on the Status Anxiety Hypothesis	4
1.3. Some Empirical Predictions.....	5
2. DATA AND METHODS	8
2.1. Sample.....	8
2.2. Measures	8
2.2.1. Measuring Income Inequality and National Income	8
2.2.3. Age and Sex.....	9
2.2.4. Income Rank.....	9
2.2.5. Perceived Social Position	9
2.2.6. Analysis Strategy.....	10
3. RESULTS	12
3.1. Country Patterns of Status Anxiety	12
3.2. Multi-Level Models	16
4. DISCUSSION	23
4.2. Study Limitations	24

List of Tables

TABLE 1: DISTRIBUTION CATEGORICAL STATUS ANXIETY MEASURE, MEAN STATUS ANXIETY, GINI COEFFICIENT	13
TABLE 2: MULTI-LEVEL MIXED EFFECT ORDERED LOGIT MODEL OF STATUS ANXIETY.....	17
TABLE 3: MULTI-LEVEL MIXED EFFECT ORDERED LOGIT MODEL OF STATUS ANXIETY (IMPUTED INCOME INFORMATION)	19
TABLE 4: MULTI-LEVEL MIXED EFFECT ORDERED LOGIT MODEL OF STATUS ANXIETY (CATEGORICAL INCOME INFORMATION).....	21
TABLE 1: DISTRIBUTION CATEGORICAL STATUS ANXIETY MEASURE, MEAN STATUS ANXIETY, GINI COEFFICIENT	31
TABLE 2: MULTI-LEVEL MIXED EFFECT ORDERED LOGIT MODEL OF STATUS ANXIETY.....	32
TABLE 3: MULTI-LEVEL MIXED EFFECT ORDERED LOGIT MODEL OF STATUS ANXIETY (IMPUTED INCOME INFORMATION)	34
TABLE 4: MULTI-LEVEL MIXED EFFECT ORDERED LOGIT MODEL OF STATUS ANXIETY (CATEGORICAL INCOME INFORMATION).....	36



List of Figures

FIGURE 1: HYPOTHESISED RELATIONSHIP BETWEEN COUNTRY GINI, INDIVIDUAL INCOME RANK AND STATUS ANXIETY IF COUNTRY INCOME INEQUALITY INFLUENCES INCOME RANK SLOPE 6

FIGURE 2: HYPOTHESISED RELATIONSHIP BETWEEN COUNTRY GINI, INDIVIDUAL INCOME RANK AND STATUS ANXIETY IF COUNTRY INCOME INEQUALITY INFLUENCES STATUS ANXIETY INTERCEPT 6

FIGURE 3: HYPOTHESISED RELATIONSHIP BETWEEN COUNTRY GINI, INDIVIDUAL INCOME RANK AND STATUS ANXIETY IF COUNTRY INCOME INEQUALITY INFLUENCES INCOME RANK SLOPE AND STATUS ANXIETY INTERCEPT. 7

FIGURE 4: MEAN STATUS ANXIETY BY COUNTRY GINI, INDIVIDUAL INCOME RANK AND REPORTED STATUS ANXIETY 15

FIGURE 5: PREDICTED RELATIONSHIP BETWEEN COUNTRY GINI, INDIVIDUAL INCOME RANK AND REPORTED STATUS ANXIETY (USING RESULTS FROM TABLE 2, MODEL 4) 18

FIGURE 1: HYPOTHESISED RELATIONSHIP BETWEEN COUNTRY GINI, INDIVIDUAL INCOME RANK AND STATUS ANXIETY IF COUNTRY INCOME INEQUALITY INFLUENCES INCOME RANK SLOPE 28

FIGURE 2: HYPOTHESISED RELATIONSHIP BETWEEN COUNTRY GINI, INDIVIDUAL INCOME RANK AND STATUS ANXIETY IF COUNTRY INCOME INEQUALITY INFLUENCES STATUS ANXIETY INTERCEPT 28

FIGURE 3: HYPOTHESISED RELATIONSHIP BETWEEN COUNTRY GINI, INDIVIDUAL INCOME RANK AND STATUS ANXIETY IF COUNTRY INCOME INEQUALITY INFLUENCES INCOME RANK SLOPE AND STATUS ANXIETY INTERCEPT. 29

FIGURE 4: MEAN STATUS ANXIETY BY COUNTRY GINI, INDIVIDUAL INCOME RANK AND REPORTED STATUS ANXIETY 29

FIGURE 5: PREDICTED RELATIONSHIP BETWEEN COUNTRY GINI, INDIVIDUAL INCOME RANK AND REPORTED STATUS ANXIETY (USING RESULTS FROM TABLE 2, MODEL 4) 30



Abstract

The empirical association between income inequality, population health and other social problems is now well established and the research literature suggests that the relationship is not artefactual. Debate is still ongoing as to the cause of this association. Richard Wilkinson, Michael Marmot and colleagues have argued for some time that the relationship stems from the psycho-social effects of status comparisons on health, trust and relationships. Here, income inequality is a marker of a wider status hierarchy that provokes an emotional stress response in individuals that is harmful to health and well-being as well as being damaging to relationships and social organisation. We label this the ‘status anxiety hypothesis’. If true, the hypothesis would imply a structured relationship between income inequality at the societal level, income and concerns with or anxiety around social status. The paper presents three predictions for the structure of ‘status anxiety’ at the individual level given different levels of national income inequality and varying individual income and then tests these predictions using data from a cross-national survey of over 34,000 individuals carried out in 2007 in 31 European countries. Respondents from low inequality countries reported less status anxiety than respondents in higher inequality countries at all points on the income rank curve. This is consistent with the hypothesis that the latter could account for the relationship between the former and health outcomes. However, the impact of income rank position within country was not shown to vary by level of income inequality. As a consequence research is clearly necessary to establish the processes underlying the association between income inequality and status anxiety.

1. Introduction

It is now widely accepted that life expectancy and health are inversely related to measures of socio-economic advantage such as income, level of education and social class. The pattern of relationships varies considerably over time and place but the overall association is now well established (Acheson 1998; Mackenbach 2006; Marmot 2010). However, there is still considerable debate about whether these inequalities reflect the direct effect of differences in material living standards or the psycho-social consequences of social comparisons at the individual level. Proponents of the psycho-social hypothesis point to the fact that health varies on a gradient with social position within nations and communities (Marmot, Bosma, Hemmingway, Brunner & Stansfield, 1997; Marmot, Davey Smith, Stansfield, Patel, North & Head, 1991) and that life expectancy in rich nations is more strongly related to the level of income inequality than to gross domestic product per capita (Marmot, 2004; Wilkinson & Pickett, 2010b). On the other hand, proponents of the position that inequalities reflect material living standards argue that the association between income inequality and lower life expectancy in cross-national comparisons actually reflects systematic under investment in physical, health and social infrastructure (the ‘neo-materialist’ hypothesis) within more unequal countries that leads to lower levels of resources and differential exposure to adverse conditions among the total population and poorer members of the population in particular (Davey Smith, 1996; Kaplan, Pamuk, Lynch, Cohen & Balfour, 1996; Lynch, Davey Smith, Hillemeier, Raghunathan & Kaplan, 2001; Lynch, Kaplan, Pamuk, Cohen, Heck & Balfour, 1998). Recent systematic reviews have tended to support the view that the association between income inequality at nation, state or regional level and health and life expectancy is not artefactual (Kondo, Sembajwe, Kawachi, van Dam, Subramanian & Yamagata, 2009; Pop, I. A., van Ingen, E. and van Oorschot, W. (2012), Wilkinson & Pickett, 2006; Wilkinson & Pickett, 2009) but researchers are still divided as the extent to which the association can be generalised and with regard to the interpretation of this finding and the role of psycho-social processes in particular.

In this paper, we contribute to this debate by directly testing whether income inequality within and between nation states is related to a marker of individual concern with or anxiety around social status within countries using a multi-level analytical approach. If social comparisons and psycho-social processes are implicated in the relationship between income



inequality and poor health and social outcomes at both individual and national level, this should produce a structured relationship between income inequality and measured individual ‘status anxiety’ deriving from social comparisons. In the sections that follow we establish some predictions that flow from the arguments of the proponents of the psycho-social explanation and test these using data on over 35,000 people from 31 countries and multi-level models.

1.1 The Status Anxiety Hypothesis

The argument that psycho-social processes are an important contributor to socio-economic inequalities in health and well-being is strongly associated with the work of Richard Wilkinson, Michael Marmot and colleagues (Marmot, 2004; Marmot & Wilkinson, 2006; Wilkinson, 1996; Wilkinson & Pickett, 2006; Wilkinson & Pickett, 2009). Both use a range of anthropological evidence and psychological research to argue that income inequality is but one measure of a status hierarchy in societies which becomes more intensified and damaging the more unequal the distribution of income and other scarce resources. According to Wilkinson and Pickett, people in more unequal societies have a greater concern with social status and status competition becomes more pervasive (Wilkinson and Pickett 2006(Wilkinson & Pickett, 2010b). The key mechanism linking inequality to poorer health in this hypothesis is the sense of inferiority engendered among those lower down the status order in more unequal societies. Wilkinson and Marmot both argue that status hierarchies and differentials become more pervasive in societies with higher levels of income inequality and this produces a widespread sense of inferiority in the population. This is linked to health outcomes through its impact on psychological state as it is understood to produce negative emotions such as shame and distrust which directly damage individual health through stress reactions. We label this the *status anxiety hypothesis*. Wilkinson, Marmot and colleagues find support for this hypothesis in research on stressors, cortisol response (Dickerson & Kemeny, 2005) and primate studies of the link between social hierarchy, cortisol and health (Brunner, 1997; Brunner & Marmot, 2006). Inequality is also posited to damage health indirectly via its impact on social trust and its subsequent negative effects on social cohesion in communities and the efficacy of social institutions (Kawachi & Berkman, 2000; Kawachi, Kennedy, Lochner & Prothrow-Stith, 1997; Putnam, 1993).

Layte (Layte, 2011) has already shown that sense of inferiority is independently related to mental well-being in European countries and largely explains the relationship between income inequality measured as a GINI coefficient mental well-being. This could suggest therefore that the larger hypothesis that socio-economic inequalities in health in developed societies are related to psycho-social processes although more research is clearly necessary.

1.2. Critical Theoretical Perspectives on the Status Anxiety Hypothesis

The most sustained theoretical criticism of the status anxiety hypothesis to date has come from proponents of the neo-materialist hypothesis (Davey Smith, 1996; Kaplan et al., 1996; Lynch et al., 2001; Lynch et al., 1998) although this work concerns itself with offering an alternate hypothesis rather than presenting a critical theoretical examination of the status anxiety hypothesis itself. On the other hand, John Goldthorpe (Goldthorpe, 2010) has offered a critical sociological perspective on focusing directly on the status attainment hypothesis. He argues that the status anxiety hypothesis is dependent on the existence of a close link between income inequality and social status although the relationship between the two goes largely unexamined in the work of Wilkinson, Marmot and colleagues. He notes that (Wilkinson & Pickett, 2010a) treat social stratification as being one-dimensional treating with class and income simply proxies of an underlying social hierarchy which determines social status. However, Goldthorpe (2010) argues that social stratification research shows that the link between status and income in modern societies is a good deal weaker than Wilkinson and colleagues assume. Goldthorpe (2010, p738) gives the example of Japan which has relatively low income and particularly earnings inequality whilst at the same time having a marked status hierarchy that is unusual in the degree to which it is formalised and embodied in the language and use of honorifics. Goldthorpe quoting Harold Kerbo (2010, pp. 738) states that it is only:

“...once status-relevant markers such as age, sex, education, occupation, and place of employment have been established among all present [that] the business of eating, talking, drinking, or whatever can proceed in an orderly manner that is unlikely to offend someone who expects greater status deference”. Kerbo (2003, pp. 479–80)

There are always exceptions at the country level but Goldthorpe in his work with Tak Wing Chan (Chan & Goldthorpe, 2004) has also shown significant discrepancy between social status measured using friendship patterns and income in British data. They give the example of ‘plant, depot and site managers’, ‘protective service personnel’ and ‘skilled and related manual workers in metal trades’ who have notably low social status relative to their income using their measure while the reverse is true for ‘numerical clerks and cashiers’, ‘secretaries and receptionists’, ‘childcare workers’, ‘sales workers’ and ‘routine workers in services’. Clearly, social status in the Weberian sociological tradition at least is conceptually different from income in Britain and Chan and Goldthorpe suspect, elsewhere.

1.3. Some Empirical Predictions

Before testing the status anxiety hypothesis we need to establish a set of predictions which flow from the hypothesis that can be examined empirically. In their writings, Wilkinson, Marmot and colleagues repeatedly emphasise the importance of social comparisons or sense of inferiority as the root cause of social anxiety (Wilkinson, 1996; Wilkinson & Pickett, 2006; Wilkinson & Pickett, 2009). They argue that these social comparisons are made on the basis of perceived status which will be linked to, if not necessarily identical to material living standards and that this is proxied by level of income (Wilkinson & Pickett, 2006). The link between social status and income is a great deal less than well established. However, making the large assumption that income is a reasonable proxy of social status, there are a number of theoretical forms that the relationship between status anxiety and income distribution could take (Wagstaff & van Doorslaer, 2000). If the social comparisons that lead to status anxiety are based on position in the income/status hierarchy this would suggest that status anxiety would be proportional to income rank. If, on the other hand, social comparisons are made on the basis of the ‘income gap’ between own position and others this is more complex. For example, individuals could compare their income to the national or community mean or to those in the upper part of the income distribution (they may also compare to residents of other communities or countries). The nature of the comparison process could be crucial for the resulting status evaluation and may interact strongly with national income distribution. In the absence of a thorough theory, a working assumption could be that if status anxiety is related to rank alone it should be

inversely proportional to income rank but importantly, should not differ across societies which vary in income inequality. If instead the ‘income gap’ is important, status anxiety will still be proportional to income rank but crucially, the gradient of the income rank/anxiety relationship will be steeper because higher income inequality increases the absolute gap between any two points on the income rank, on average, by increasing dispersion. This relationship is set out diagrammatically in Figure 1. Here, status anxiety decreases with income rank with the steepness of the decrease proportional to societal income inequality.

Figure 1: Hypothesised Relationship Between Country GINI, Individual Income Rank and Status Anxiety if Country Income Inequality Influences Income Rank Slope

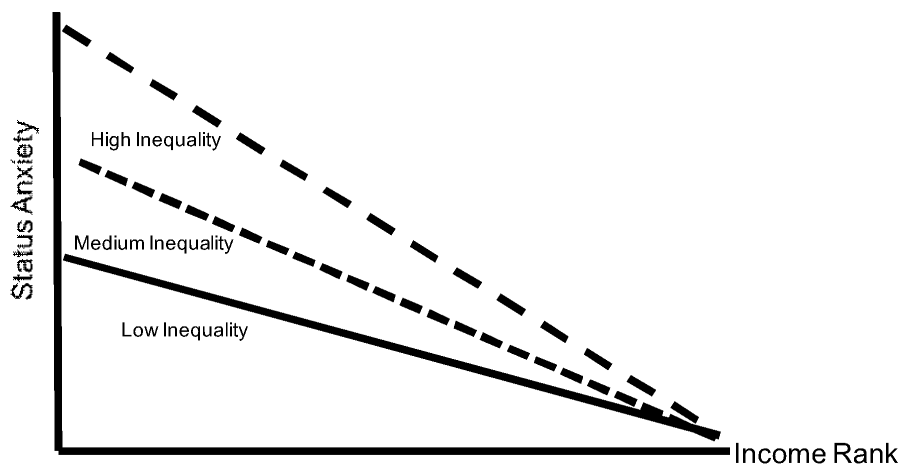


Figure 2: Hypothesised Relationship Between Country GINI, Individual Income Rank and Status Anxiety if Country Income Inequality Influences Status Anxiety Intercept

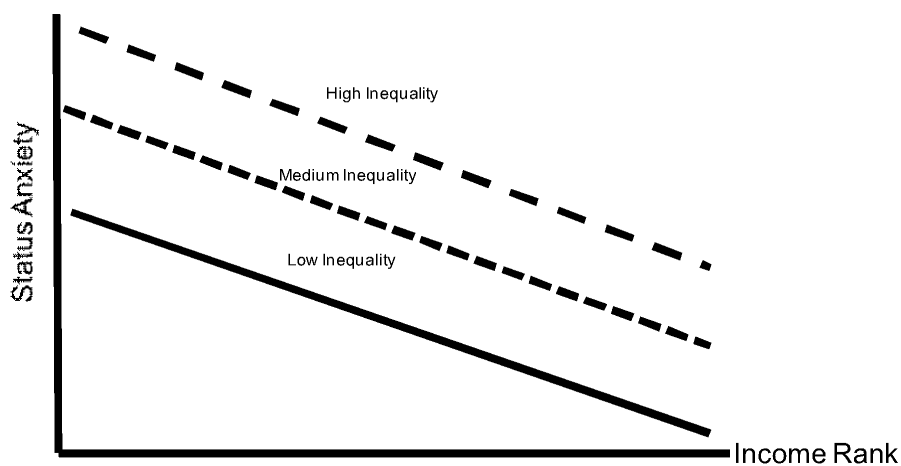
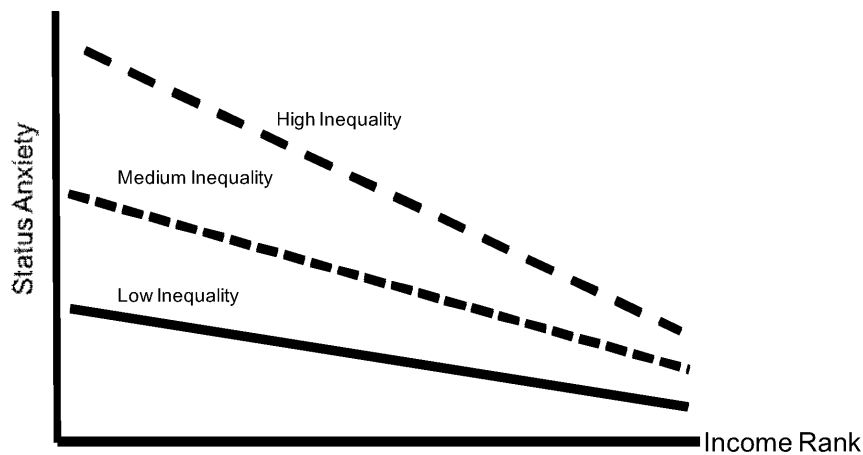


Figure 3: Hypothesised Relationship Between Country GINI, Individual Income Rank and Status Anxiety if Country Income Inequality Influences Income Rank Slope and Status Anxiety Intercept.



A core element of the status anxiety hypothesis is that income inequality is good for everyone, the corollary being that increases in income inequality will increase status anxiety for all in that society (Wilkinson & Pickett, 2010b). This is shown diagrammatically in Figure 2 with status anxiety increasing with income rank in three notional societies but the societal intercept is higher in those that are more unequal. Lastly, it is also possible that the theoretical expectations from Figures 1 and 2 will be combined as shown in Figure 3.

Figures 1 to 3 lead us to derive three empirical expectations that should flow from the status anxiety hypothesis:

H1: *Higher income rank will be negatively associated with status anxiety*

H2: *Societies with higher income inequality will have higher levels of status anxiety across the income rank distribution (measured as a higher mean intercept)*

H3: *The gradient of income rank will be significantly steeper in societies with higher income inequality as evidenced by a significant positive interaction between income rank and high country income inequality.*

2. Data and Methods

2.1. Sample

The data used in this paper are taken from the European Quality of Life Survey (EQLS2) collected by the European Foundation for the Improvement of Living and Working Conditions in 2007. This survey is the follow up to the first EQLS that was carried out in 2003. EQLS2 was conducted between September 2007 and February 2008 in thirty one countries, the twenty seven EU member states plus Norway as well as three candidate countries (Croatia, Macedonia and Turkey). Across countries the sample size varies from a 1,000 cases in countries like Romania, Norway, Ireland to a maximum of 2,000 cases in two countries: Germany and Turkey. The survey included people aged 18 years or older, resident for at least six months in the country, outside of institutions who were able to speak the national language. It achieved an overall response rate of 58% although national rates varied significantly, ranging from less than 40% in France, Greece, the Netherlands and the UK to more than 80% in Bulgaria, Ireland and Romania (methodological and fieldwork reports are available from www.eurofound.eu). The total achieved sample was 35,634 individuals.

2.2. Measures

2.2.1. Measuring Income Inequality and National Income

To control for differences in national wealth that may confound the relationship between income inequality and status anxiety national income is held constant in analyses. This is measured as Gross Domestic Product (GDP) per capita. Income inequality is measured using a Gini coefficient based on household income after tax attributed to each individual in the household. Both are measured in the latest year available, usually 2007 and are drawn from the Eurostat database¹. Countries were divided in low, medium and high inequality as measured by the GINI coefficient. We have no prior hypothesis as to what constitutes a medium or high GINI coefficient and so simply group countries by ranking into tertiles.

¹ <http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes>



2.2.3. Age and Sex

Age is entered into the analysis as a continuous variable alongside gender. A quadratic term for age was also included in models.

2.2.4. Income Rank

Income was measured by asking respondents to state their household's net (post-tax) income per month or to choose an approximate range if the exact amount was unknown. The figure generated was then equivalised using the modified OECD equivalence scale. Our hypotheses centre on the role of relative income position rather than absolute income in determining status anxiety. Given this we need to transform our equivalised income measure into the individual's income rank scored from 0 to 1. Information on individual income was missing for 30% of cases overall but this varied from 7% in Sweden to 67% in Italy. This clearly raises concerns that individual cases will not be missing at random and that this non-randomness may be related to the issues under investigation. We took two different approaches to quantify and mitigate this potential problem. First, multiple imputation was used to impute an income value using a large number of predictors and the UVIS imputation routine as implemented in STATA by (Royston, 2004). Second, income rank was aggregated into quintiles and a sixth category constructed for missing cases.

2.2.5. Perceived Social Position

The EQLS2 contained a battery of questions designed to measure social exclusion. One of these items can be used to examine the extent of social anxiety at the individual level: *“Some people look down on me because of my job situation or income”*. The question asked respondents to the survey to say whether they agreed or disagreed with these statements and the extent of this agreement/disagreement. Respondents also had the option of stating that they ‘neither agreed nor disagreed’. This variable is used as a linear scale (from 1 to 5) in descriptive analyses and as five ordinal groupings in multi-level models. We do not argue that this is a measure of ‘anxiety’ in the normal sense of indicating feelings of worry, nervousness or unease as the question asks respondents to agree or disagree with a factual

question – “some people look down on me”. The ‘status anxiety’ hypothesis of income inequality has become so called because it holds that status differentials will be more acutely observed in countries with more income inequality as people in these societies have a greater concern with social status and status competition. Structured variation in answers to the question in the EQLS survey will be a test of the hypothesis. Clearly, a measure of status anxiety made up of a number of question items would be preferable over a single item measure. Unfortunately, as far as we know no such scale is available in a cross-national survey which also includes measures of individual income.

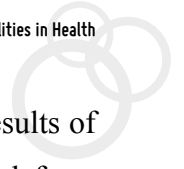
2.2.6. Analysis Strategy

Our data were sampled from country populations and so are naturally multi-level with individuals clustered within countries. To test the three empirical predictions we specify multi-level models with mixed effects. Fixed effects for level of income inequality, individual income rank, country wealth, individual age, age² and being female are estimated. Preliminary analyses showed significant variation across countries in the effects of age and income rank on status anxiety so random slope effects were estimated for these variables. Using standard multi-level model notation Raudenbush and Bryk 2002 the full model is thus:

$$SA_{ij} = \gamma_{00} + \gamma_{10}(AGE) + \gamma_{10}(AGE^2) + \gamma_{30}(FEMALE_{ij}) + \gamma_{40}(INCRNK_{ij}) + \gamma_{01}(GDP_j) + \gamma_{02}(GINI_j) + \gamma_{42}(INCRNK_{ij} * GINI_j) + u_{0j} + u_{1j}(AGE_{ij}) + u_{2j}(INCRNK_{ij}) + r_{ij}$$

The status anxiety of individual i nested in country j is estimated by level two fixed effect for Gini and GDP and level one fixed effects for age, age squared, being female and income rank plus an interaction term of GINI and income rank. Random effects for age and income rank are estimated in the second part of the model as well as a random error term r_{ij} . As our measure of status anxiety is ordinal with five levels from disagree strongly to agree strongly, we adopt a proportional odds model with a logit link which estimates the cumulative (log) probability that the individual’s level of status anxiety is at, or above a number of cut points.

Four models are estimated to facilitate examination of the three predictions set out in the last section. In the first, level one and two fixed effects are estimated. In the second, the interaction of GINI and income rank are added. In the third we fit a random slope for age and in the fourth and last, a random slope for income rank.



To examine whether missing information on the income variable influences the results of the analyses, these same four models were re-estimated using income in categorical form (quintiles plus missing category) and imputed income.

3. Results

3.1. Country Patterns of Status Anxiety

Table 1 gives the proportion in each country choosing the different levels of the variable measuring status anxiety, the mean score if the categories are ordered from 1 through 5 and the correlation between income rank and status anxiety within each country at the individual level. The table is sorted by Gini coefficient from least unequal to most. Overall 15.5% of respondents across countries agreed to some extent with the statement that “others look down on me because of my job situation or income” whilst only 3.2% agreed strongly. A further 12.8% neither agreed nor disagreed with the statement. Across countries Macedonia has the highest proportion agreeing to some degree (25.1%) followed by Romania (24.1%) and Poland (23.7%). Table 1 shows that agreement is lowest in Norway (5.4%), Sweden (7.4%) and the Netherlands (8.6%). If the categories are treated as a linear scale with strong agreement given a score of 5 and strong disagreement a score of 1 it is possible to make a descriptive assessment of the relationship between income inequality, individual income and reported status anxiety. At the country level the correlation between reported status anxiety and country GINI coefficient is 0.51. The countries with the highest mean scores (e.g. highest

Table 1: Distribution Categorical Status Anxiety Measure, Mean Status Anxiety, GINI Coefficient

Country	GINI	% Disagree Strongly	% Disagree	% Neither Agree nor Disagree	% Agree	% Agree Strongly	Mean Status Anxiety	Corr. IncRnk/ Status Anxiety
Czech Republic	0.20	34.4	40.4	13.8	9.8	1.6	2.0	-0.05
Luxembourg	0.23	43.4	26.8	7.9	15.2	6.8	2.2	-0.13
Denmark	0.24	40.7	42.9	6.4	8.5	1.6	1.9	-0.14
Slovenia	0.24	25.5	49.3	11.5	12.5	1.2	2.1	0.03
Sweden	0.24	80.7	9.2	2.8	6.1	1.3	1.4	-0.16
Slovakia	0.25	25.0	47.4	15.4	9.1	3.1	2.2	-0.05
Norway	0.25	50.6	36.4	7.6	4.4	1.0	1.7	-0.14
Finland	0.26	29.6	43.0	15.5	11.0	1.0	2.1	-0.18
Malta	0.26	30.0	52.4	4.7	11.1	1.8	2.0	-0.06
Austria	0.26	35.6	28.5	16.2	15.6	4.1	2.2	-0.16
Netherlands	0.26	39.8	45.1	6.5	7.5	1.1	1.9	-0.21
Germany	0.27	59.3	19.1	10.1	8.3	3.3	1.8	-0.28
France	0.27	38.9	27.5	11.0	15.7	6.8	2.2	-0.10
Belgium	0.28	28.0	43.9	10.5	14.1	3.6	2.2	-0.15
Croatia	0.29	26.8	34.5	21.3	13.1	4.2	2.3	-0.13

Cyprus	0.30	35.9	47.8	5.6	8.8	1.8	1.9	-0.12
Italy	0.31	33.0	37.4	14.6	12.9	2.1	2.1	-0.08
Spain	0.31	48.8	34.6	7.8	7.3	1.5	1.8	-0.05
Bulgaria	0.31	14.6	40.1	27.7	15.9	1.8	2.5	-0.16
Ireland	0.31	28.6	44.5	9.7	12.1	5.1	2.2	-0.28
UK	0.33	18.4	44.4	14.0	18.3	4.9	2.5	-0.28
Greece	0.33	38.6	27.9	14.9	15.0	3.7	2.2	-0.16
Romania	0.33	11.5	42.3	22.1	19.6	4.6	2.6	-0.10
Hungary	0.33	31.5	35.7	13.8	14.3	4.6	2.2	-0.20
Poland	0.33	15.9	47.6	12.8	20.2	3.5	2.5	-0.04
Estonia	0.33	29.5	43.5	13.0	12.5	1.5	2.1	-0.06
Lithuania	0.34	17.6	47.0	18.4	14.5	2.6	2.4	-0.12
Latvia	0.35	14.3	50.9	13.9	18.9	2.0	2.4	-0.10
Portugal	0.37	33.0	45.2	10.5	8.7	2.7	2.0	-0.15
Turkey	0.37	29.7	43.9	14.6	8.9	2.9	2.1	-0.20
Macedonia	0.44	31.8	21.3	21.9	15.2	9.9	2.5	-0.11

levels of status anxiety) are Romania followed by Macedonia, Poland, Bulgaria and the UK whilst the lowest mean scores are found in Sweden, Norway, Spain, Cyprus and the Netherlands. Macedonia, Poland, Bulgaria and the UK are all classed as high income inequality countries in our typology and in the bottom third of the table whilst Sweden, Norway and the Netherlands are classed as low inequality countries and are in the top third of

the table (see Table 1). Cyprus and Spain are classed as medium inequality countries in our typology. These results are broadly supportive of H2.

The within country correlation (Spearman's rho) between income rank (grouped as quintiles) and status anxiety score (last column Table 1) provides us with an initial assessment of H1 and H3. Across countries, the correlation between income rank and status anxiety is -0.13 suggesting that status anxiety tends to rise as income rank decreases (supporting H1). Within countries there is relatively little variation in the correlation between income rank and status anxiety with most countries clustering round the sample mean. The highest correlations (and thus steepest slopes) are found in Germany, Ireland and the UK (-0.28) followed by the Netherlands, Hungary and Turkey (-0.21, -0.2, -0.2 respectively). The lowest correlations are found in Slovenia (-0.03), Slovakia, Spain and the Czech Republic (-0.05). These results would not support H3.

Figure 4: Mean Status Anxiety by Country Gini, Individual Income Rank and Reported Status Anxiety

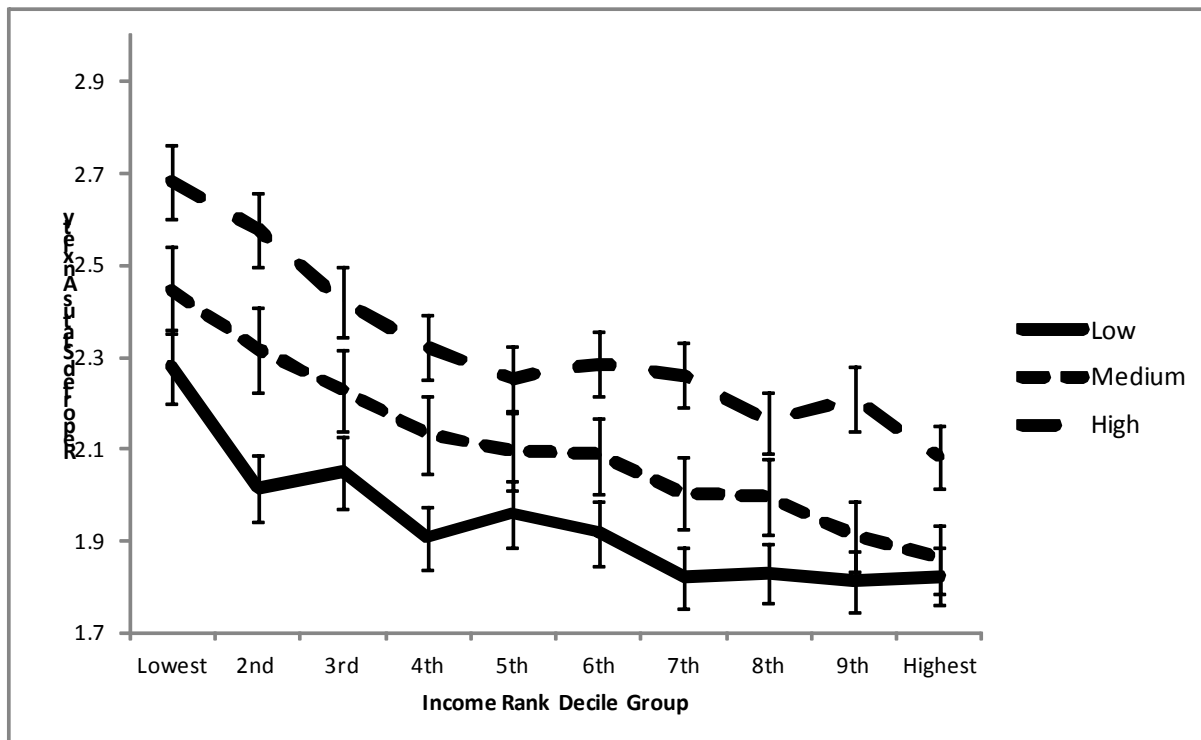


Figure 4 plots the mean status anxiety (assuming a linear form) by country income inequality and individual income rank (aggregated into deciles). This shows clearly the mean difference in status anxiety at all points on the income rank curve by country income inequality and the inverse relationship between income rank and status anxiety (supporting

H1 and H2). The interaction of income rank gradient with country income inequality is less clear in Figure 4 suggesting that H3 is not supported.

These results offer support to H1 and H2 but not to H3: income rank is important and varies inversely with status anxiety which itself is higher at all points in the income distribution in higher inequality countries in univariate analyses. However, the slope coefficient of income rank does not appear to vary significantly with country income inequality.

3.2. Multi-Level Models

Table 2 shows the results of four multi-level mixed ordered logit models of status anxiety. Initial analyses showed that the quadratic term for age and country GDP were not significant predictors and contributed little to explanation in any of the models. These variables were dropped from all models.

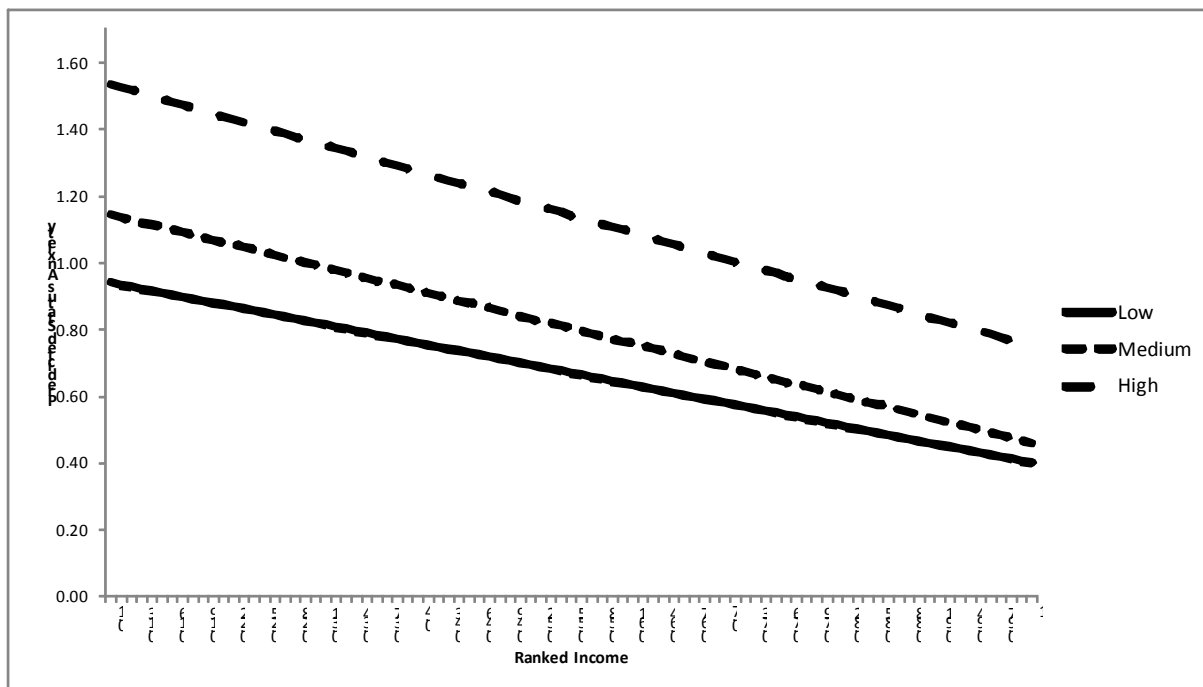
Model 1 in Table 2 fits income rank and income inequality while Model 2 fits the interaction between these variables. Controlling for other factors, income rank is significant and negatively associated with status anxiety (supportive of H1) whilst medium and high inequality are associated with higher anxiety with the effect for high inequality larger than for medium (supportive of H2). Model 2 shows that both the interaction terms between income rank and GINI are negative as hypothesized in H3 but only the interaction between medium inequality GINI countries and income rank is significant. Fitting random slope terms allows for cross country variation in age and income rank in Models 3 and 4 increases the magnitude of the main Gini terms but reduces the significance

Table 2: Multi-Level Mixed Effect Ordered Logit Model of Status Anxiety

	Model 1		Model 2		Model 3		Model 4	
	β	t-stat	β	t-stat	β	t-stat	β	t-stat
Fixed Components								
Age	-0.09	-3.14	-0.09	-3.11	-0.12	-4.10	-0.12	-4.32
Female	0.03	5.60	0.03	5.60	0.03	5.00	0.03	5.20
Income Rank	-0.83	-16.58	-0.71	-8.89	-0.72	-8.73	-0.60	-3.55
GINI Medium	0.02	0.66	0.15	2.10	0.14	1.52	0.22	2.32
GINI High	0.45	11.07	0.52	7.07	0.40	3.86	0.62	5.66
GINI Medium * Income Rank			-0.24	-2.04	-0.17	-1.38	-0.16	-0.69
GINI High * Income Rank			-0.13	-1.14	-0.06	-0.51	-0.27	-1.21
Constant	1.07	8.73	1.02	8.06	1.03	7.03	0.68	4.02
Random Components								
Age Variance					0.00	2.67	0.00	3.11
Income Rank Variance							0.31	3.13
Age Var./Inc.Rnk. Var Covar							0.00	3.54
N Individuals	24110		24110		24110		24110	
N Groups	31		31		31		31	

of the interaction terms. The significance of the income rank-Gini interaction in relation to medium inequality is supportive of H3 but this is moderated by the fact that the term with high income inequality is not significant and that controls for the random variation in the pattern of cross-country variance in the effect of income rank render the interaction insignificant.

Figure 5: Predicted Relationship Between Country GINI, Individual Income Rank and Reported Status Anxiety (Using Results from Table 2, Model 4)



Using the results of Model 4 in Table 2, Figure 5 shows the predicted relationship between country GINI, individual income rank and reported status anxiety. The positive effect of medium and high country income inequality is reflected in the vertical spacing of the lines with individuals in higher inequality countries predicted to be at a higher level of status anxiety at all levels of income rank. The small negative interaction effects between income rank and country inequality means that the medium and high inequality lines are marginally steeper than the low inequality line but the difference is not significant.



Table 3: Multi-Level Mixed Effect Ordered Logit Model of Status Anxiety (Imputed Income Informatio

	Model 1		Model 2		Model 3		Model 4	
	β	t-stat	β	t-stat	β	t-stat	β	t-stat
Fixed Components								
Age	-0.09	-3.74	-0.09	-3.78	-0.12	-5.13	-0.12	-5.13
Female	0.03	6.75	0.03	6.75	0.03	6.25	0.03	6.75
Income Rank	-0.67	-15.49	-0.64	-9.25	-0.62	-8.73	-0.60	-4.51
GINI Medium	-0.10	-3.71	-0.13	-2.32	-0.01	-0.06	0.01	0.05
GINI High	0.43	12.88	0.51	8.18	0.49	4.08	0.56	4.48
GINI Medium * Income Rank			0.05	0.56	0.05	0.46	0.11	0.57
GINI High * Income Rank			-0.16	-1.59	-0.12	-1.16	-0.19	-1.06
Constant	0.99	10.06	0.98	9.60	0.79	5.34	0.66	3.95
Random Components								
Age Variance					0.00	2.62	0.00	2.65
Income Rank Variance							0.17	3.33
Age Var./Inc.Rnk. Var Covar							0.00	2.01
N Individuals	34430		34430		34430		34430	
N Groups	31		31		31		31	

To examine whether missing income information at the individual level may explain the association between income inequality, income rank and status anxiety, models were estimated using imputed income and income quintiles with a missing category. The results for these models are shown in Tables 3 and 4. Table 3 using imputed income shows very similar results to Table 2 although the main term for medium inequality countries does not become significant and positive in Model 4 with a random income slope fitted.

The categorical models in Table 4 provide further evidence for H1 and H2 but only very tentative support for H3. The main terms for income rank and country GINI grouping are significant and positive suggesting that lower income rank and higher inequality increase status anxiety (as found in Table 2). The interaction effects between medium GINI level and categorical income rank are significant and positive whilst the income rank effects for high inequality countries are insignificant once control is made for random slope effects for age and income rank. The interaction effect of medium inequality with income rank reflects the convergence of the status anxiety means for medium and low inequality countries at higher levels of income rank. This offers some, albeit weak support for H3.

Table 4: Multi-Level Mixed Effect Ordered Logit Model of Status Anxiety (Categorical Income Information)

	Model 1		Model 2		Model 3		Model 4	
	B	t-stat	β	t-stat	β	t-stat	β	t-stat
Fixed Components								
Age	0.03	6.50	0.03	6.50	0.02	5.75	0.02	5.75
Female	-0.07	-3.22	-0.07	-3.22	-0.11	-4.57	-0.11	-4.57
Income Quintile 1	0.67	14.96	0.57	7.81	0.56	7.57	0.54	7.53
Income Quintile 2	0.41	9.30	0.27	3.79	0.25	3.53	0.21	3.48
Income Quintile 3	0.30	6.86	0.21	2.93	0.18	2.47	0.17	2.43
Income Quintile 4	0.15	3.40	0.01	0.17	0.00	0.03	0.00	0.02
Income Quintile 6	0.14	3.65	0.26	4.17	0.08	1.24	0.07	1.21
GINI Medium	0.09	3.00	0.36	7.20	0.07	0.78	0.07	0.75
GINI High	0.44	13.21	0.27	4.82	0.35	3.40	0.34	3.37
GINI Medium*Quintile 1			0.42	4.49	0.22	2.24	0.22	2.24
GINI Medium*Quintile 2			0.51	5.58	0.33	3.46	0.32	3.46
GINI Medium*Quintile 3			0.41	4.53	0.25	2.72	0.21	2.72
GINI Medium*Quintile 4			0.46	5.11	0.29	3.18	0.26	3.18
GINI Medium*Quintile Missing			0.23	2.64	0.05	0.57	0.05	0.56
GINI High*Quintile 1			0.26	2.64	0.14	1.39	0.13	1.37
GINI High*Quintile 2			0.28	2.98	0.13	1.43	0.13	1.44
GINI High*Quintile 3			0.22	2.39	0.10	1.07	0.09	1.10
GINI High*Quintile 4			0.32	3.49	0.20	2.23	0.19	2.21
GINI High*Quintile Missing			0.12	1.34	0.01	0.11	0.01	0.10
Constant	0.36	3.59	0.38	3.55	0.30	2.03	0.29	2.01
Random Components								
Age Variance					0.00	2.62	0.00	2.65
Income Rank Variance							0.20	2.13
Age Var./Inc.Rnk. Var Covar							0.00	1.66
N Individuals	34430		34430		34430		34430	
N Groups	31		31		31		31	



4. Discussion

The hypothesis that socio-economic inequalities in health in developed societies reflect the psycho-social consequences of social comparisons rather than the direct effects of material living standards has attracted increasing interest from academics, policy makers and the general public. Unfortunately, this interest has not been based on strong evidence to date. This paper makes a significant contribution in this context by setting out three empirical predictions that flow from the status anxiety literature and testing these using comparative cross-national data. The predictions are that first, across countries income rank will be inversely related to status anxiety. Second, countries with higher income inequality should have higher levels of status anxiety at all income ranks than countries with lower levels of income inequality. Third, if income gap is more important than income rank as a determinant of anxiety then countries with higher levels of income inequality will have a significant interaction between income rank and income inequality.

Our results give strong support for the first two hypotheses being tested, that is, that status anxiety is inversely associated with income rank across countries and that countries with lower levels of income inequality have lower levels of status anxiety at all points on the income rank curve relative to higher inequality countries. Only weak evidence was found that the gradient of the relationship between income rank and status anxiety increases with income inequality suggesting that income rank, not the income gap is important.

The significant inverse relationship between income rank and status anxiety across countries in the EQLS data suggests that being lower in the income distribution increases the probability that a person will perceive that they have a lower status, or feel that others perceive them as having a lower status. This supports what Wagstaff and van Doorslaer (Wagstaff and van Doorslaer 2000, p547) term the 'relative income' hypothesis, i.e. that an individual's relative position in the income hierarchy influences their health and well-being. Our results also show that the 'income inequality' hypothesis is also supported, i.e. that the mean level of status anxiety is higher at every position in the income distribution in countries with a higher level of income inequality as measured by the GINI coefficient. However, our results do not support the hypothesis that being lower down the income distribution in more unequal countries leads to a higher level of anxiety than in more equal countries. It should be said that (Wilkinson & Pickett, 2010b) have never argued that the third of our hypotheses

should hold although we would argue that if the status anxiety hypothesis is to be of any value it must propose more than that those lower down the income distribution feel more inferior about their income position (Wagstaff and van Doorslaer's 2000 'relative income' hypothesis). It has to hold that the slope of status anxiety or one's sense of inferiority increases with country level of income inequality. This is not supported by our findings.

4.2. Study Limitations

Our study has a number of limitations. First, our data had a significant level of missing values for income (around 30% overall) and tests showed that these data were not missing at random. Checks did show that the pattern of missing data across countries was not correlated with country income equality but is still a concern thus we used two different approaches to check the sensitivity of the results to this problem. The results from the different approaches were very similar and this gives us greater confidence in the analyses and conclusions drawn.

Second, our data are cross-sectional and this makes it impossible to make definitive statements about the direction of causality between income inequality and reported status anxiety. It is also possible that the relationship that we find between income inequality, individual income and status anxiety actually reflects other, unobserved factors which are not present in the analysis. We controlled for individual age and sex and it could be argued that we should have controlled for other personal characteristics such as level of education, social class or occupational level. We chose not to because these factors are strongly correlated with income and would simply have weakened the analysis of income rank without giving any more insight into the process at hand.

Third, it could be argued that our results could be dominated by the patterns within a small number of countries and that the patterns we identify do not hold across European societies. To check for this we systematically dropped each country from the models and re-ran the analyses. The results were substantively the same on each occasion giving us more confidence in the overall result.

Fourth, our measure of 'status anxiety' is based upon responses from a single social survey question and this clearly gives rise to concerns that it may be a poor measure of the underlying concept and/or measures different things across countries. Unfortunately better measures are not available at this time (as far as we know) so the present paper should be

seen a preliminary analysis of an important question that should be given further attention in future research. The structure of responses did certainly vary across counties but this variation was structured in a manner predicted by the hypotheses.

This paper provides some, though limited support for the status anxiety hypothesis in terms of the mean sense of status inferiority at all points on the income distribution in higher income inequality countries (Wagstaff and van Doorslaer's 2000 'income inequality hypothesis'). On the other hand, the crucial implication that higher income inequality would lead to a steeper slope in sense of inferiority was not sustained. One's position in the income distribution *is* important for individual feelings of anxiety, but importantly, everyone feels more anxious in more unequal societies. Consequently the question of the nature of the mechanism underlying the association between income inequality and status anxiety remains open.

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Figure 1: Hypothesised Relationship Between Country GINI, Individual Income Rank and Status Anxiety if Country Income Inequality Influences Income Rank Slope

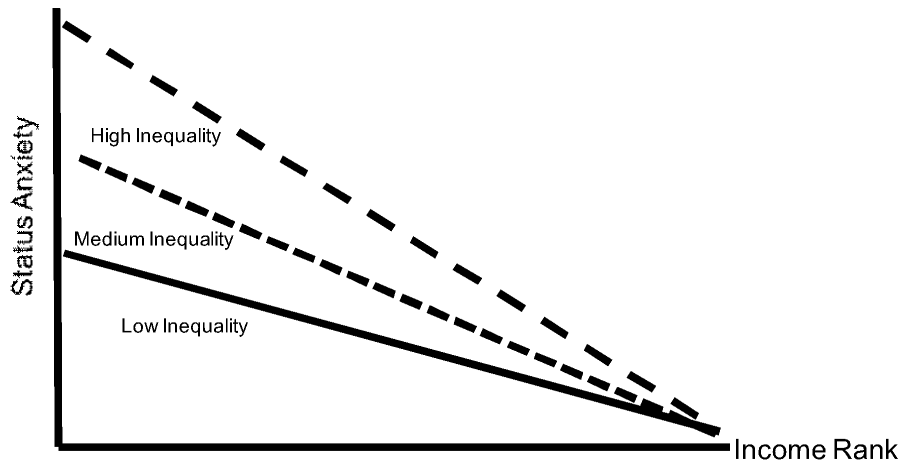


Figure 2: Hypothesised Relationship Between Country GINI, Individual Income Rank and Status Anxiety if Country Income Inequality Influences Status Anxiety Intercept.

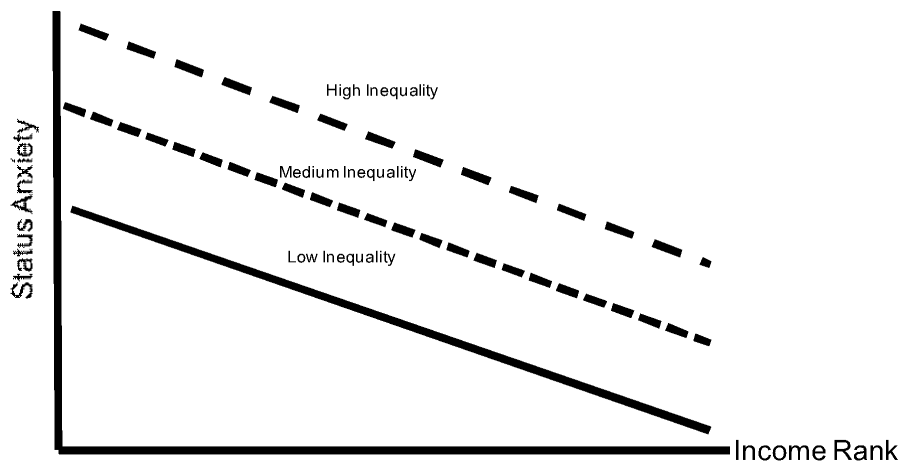




Figure 3: Hypothesised Relationship Between Country GINI, Individual Income Rank and Status Anxiety if Country Income Inequality Influences Income Rank Slope AND Status Anxiety Intercept.

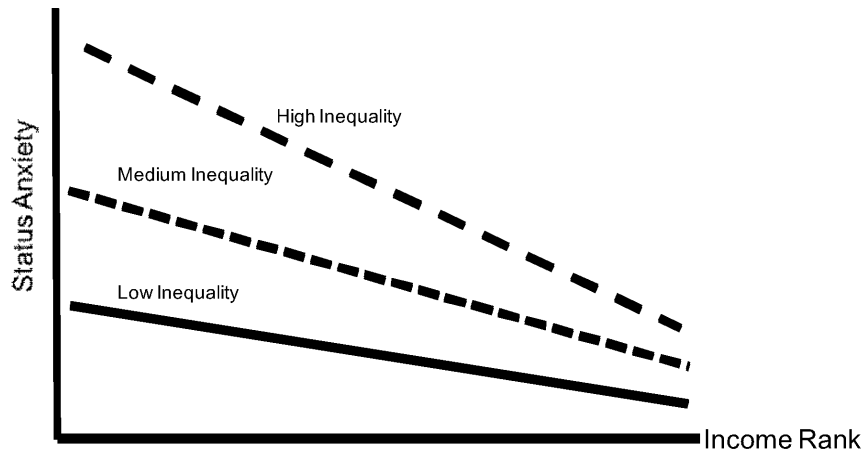
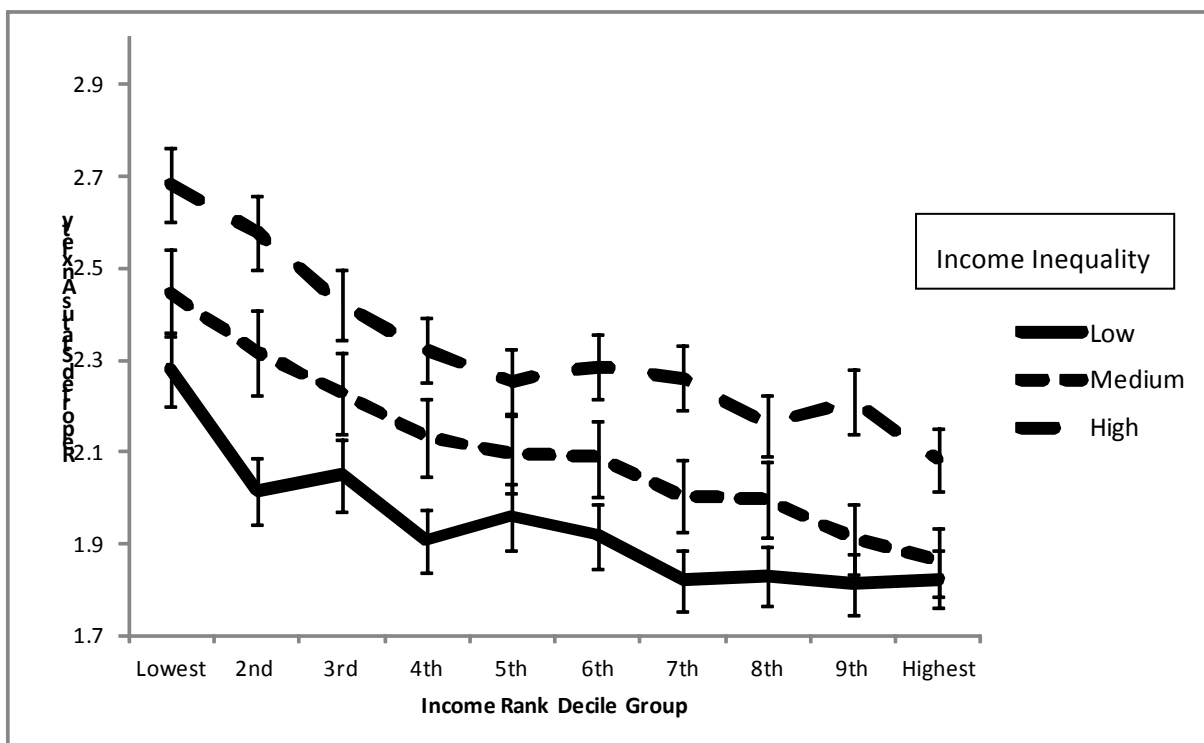


Figure 4: Mean Status Anxiety by Country GINI, Individual Income Rank and Reported Status Anxiety



Note: Error bars represent 95% confidence intervals.

Figure 5: Predicted Relationship Between Country GINI, Individual Income Rank and Reported Status Anxiety (Using Results from Table 2, Model 4)

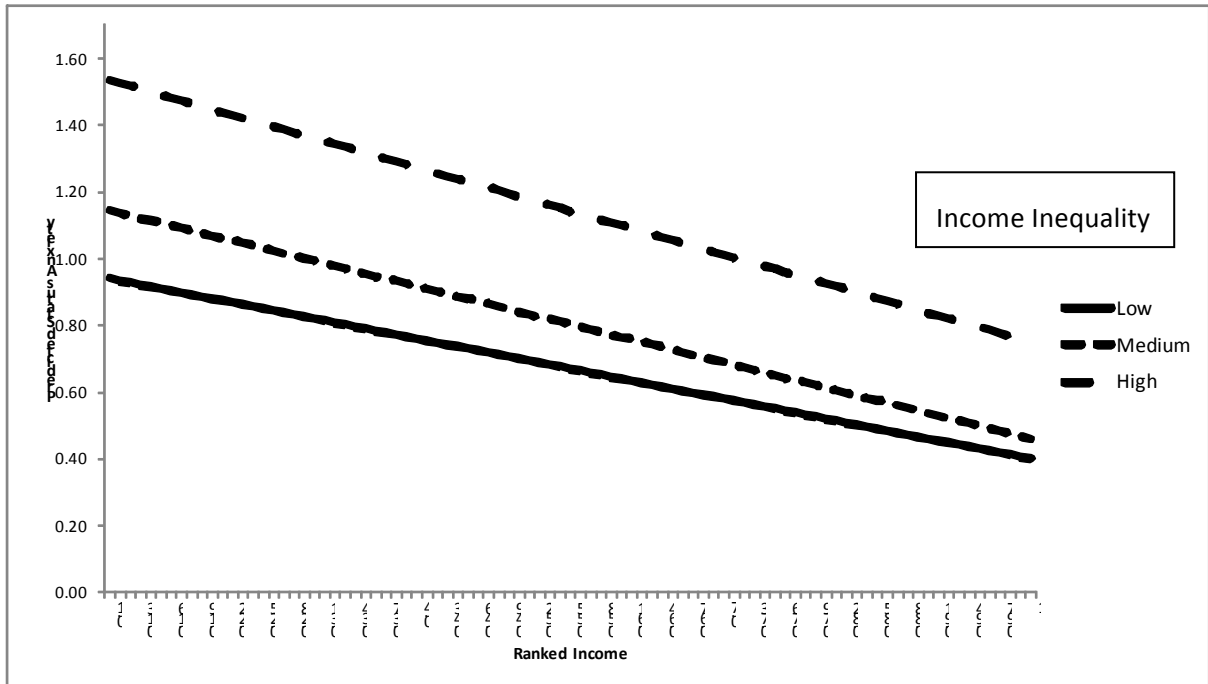




Table 1: Distribution Categorical Status Anxiety Measure, Mean Status Anxiety, GINI Coefficient

Country	GINI	% Disagree Strongly	% Disagree	% Neither Agree nor Disagree	% Agree	% Agree Strongly	Mean Status Anxiety	Corr. IncRnk/ Status Anxiety
Czech Republic	0.20	34.4	40.4	13.8	9.8	1.6	2.0	-0.05
Luxembourg	0.23	43.4	26.8	7.9	15.2	6.8	2.2	-0.13
Denmark	0.24	40.7	42.9	6.4	8.5	1.6	1.9	-0.14
Slovenia	0.24	25.5	49.3	11.5	12.5	1.2	2.1	0.03
Sweden	0.24	80.7	9.2	2.8	6.1	1.3	1.4	-0.16
Slovakia	0.25	25.0	47.4	15.4	9.1	3.1	2.2	-0.05
Norway	0.25	50.6	36.4	7.6	4.4	1.0	1.7	-0.14
Finland	0.26	29.6	43.0	15.5	11.0	1.0	2.1	-0.18
Malta	0.26	30.0	52.4	4.7	11.1	1.8	2.0	-0.06
Austria	0.26	35.6	28.5	16.2	15.6	4.1	2.2	-0.16
Netherlands	0.26	39.8	45.1	6.5	7.5	1.1	1.9	-0.21
Germany	0.27	59.3	19.1	10.1	8.3	3.3	1.8	-0.28
France	0.27	38.9	27.5	11.0	15.7	6.8	2.2	-0.10
Belgium	0.28	28.0	43.9	10.5	14.1	3.6	2.2	-0.15
Croatia	0.29	26.8	34.5	21.3	13.1	4.2	2.3	-0.13

Cyprus	0.30	35.9	47.8	5.6	8.8	1.8	1.9	-0.12
Italy	0.31	33.0	37.4	14.6	12.9	2.1	2.1	-0.08
Spain	0.31	48.8	34.6	7.8	7.3	1.5	1.8	-0.05
Bulgaria	0.31	14.6	40.1	27.7	15.9	1.8	2.5	-0.16
Ireland	0.31	28.6	44.5	9.7	12.1	5.1	2.2	-0.28
UK	0.33	18.4	44.4	14.0	18.3	4.9	2.5	-0.28
Greece	0.33	38.6	27.9	14.9	15.0	3.7	2.2	-0.16
Romania	0.33	11.5	42.3	22.1	19.6	4.6	2.6	-0.10
Hungary	0.33	31.5	35.7	13.8	14.3	4.6	2.2	-0.20
Poland	0.33	15.9	47.6	12.8	20.2	3.5	2.5	-0.04
Estonia	0.33	29.5	43.5	13.0	12.5	1.5	2.1	-0.06
Lithuania	0.34	17.6	47.0	18.4	14.5	2.6	2.4	-0.12
Latvia	0.35	14.3	50.9	13.9	18.9	2.0	2.4	-0.10
Portugal	0.37	33.0	45.2	10.5	8.7	2.7	2.0	-0.15
Turkey	0.37	29.7	43.9	14.6	8.9	2.9	2.1	-0.20
Macedonia	0.44	31.8	21.3	21.9	15.2	9.9	2.5	-0.11

Table 2: Multi-Level Mixed Effect Ordered Logit Model of Status Anxiety

	Model 1		Model 2		Model 3		Model 4	
	β	t-stat	β	t-stat	β	t-stat	β	t-stat
Fixed Components								
Age	-0.09	-3.14	-0.09	-3.11	-0.12	-4.10	-0.12	-4.32
Female	0.03	5.60	0.03	5.60	0.03	5.00	0.03	5.20
Income Rank	-0.83	-16.58	-0.71	-8.89	-0.72	-8.73	-0.60	-3.55
GINI Medium	0.02	0.66	0.15	2.10	0.14	1.52	0.22	2.32
GINI High	0.45	11.07	0.52	7.07	0.40	3.86	0.62	5.66
GINI Medium * Income Rank			-0.24	-2.04	-0.17	-1.38	-0.16	-0.69
GINI High * Income Rank			-0.13	-1.14	-0.06	-0.51	-0.27	-1.21
Constant	1.07	8.73	1.02	8.06	1.03	7.03	0.68	4.02
Random Components								
Age Variance					0.00	2.67	0.00	3.11
Income Rank Variance							0.31	3.13
Age Var./Inc.Rnk. Var Covar							0.00	3.54
N Individuals	24110		24110		24110		24110	
N Groups	31		31		31		31	

Table 3: Multi-Level Mixed Effect Ordered Logit Model of Status Anxiety (Imputed Income Information)

	Model 1		Model 2		Model 3		Model 4	
	β	t-stat	β	t-stat	β	t-stat	β	t-stat
Fixed Components								
Age	-0.09	-3.74	-0.09	-3.78	-0.12	-5.13	-0.12	-5.13
Female	0.03	6.75	0.03	6.75	0.03	6.25	0.03	6.75
Income Rank	-0.67	-15.49	-0.64	-9.25	-0.62	-8.73	-0.60	-4.51
GINI Medium	-0.10	-3.71	-0.13	-2.32	-0.01	-0.06	0.01	0.05
GINI High	0.43	12.88	0.51	8.18	0.49	4.08	0.56	4.48
GINI Medium * Income Rank			0.05	0.56	0.05	0.46	0.11	0.57
GINI High * Income Rank			-0.16	-1.59	-0.12	-1.16	-0.19	-1.06
Constant	0.99	10.06	0.98	9.60	0.79	5.34	0.66	3.95
Random Components								
Age Variance					0.00	2.62	0.00	2.65
Income Rank Variance							0.17	3.33

Age Var./Inc.Rnk. Var Covar							0.00	2.01
N Individuals	34430		34430		34430		34430	
N Groups	31		31		31		31	

Table 4: Multi-Level Mixed Effect Ordered Logit Model of Status Anxiety (Categorical Income Information)

	Model 1		Model 2		Model 3		Model 4	
	B	t-stat	β	t-stat	β	t-stat	β	t-stat
Fixed Components								
Age	0.03	6.50	0.03	6.50	0.02	5.75	0.02	5.75
Female	-0.07	-3.22	-0.07	-3.22	-0.11	-4.57	-0.11	-4.57
Income Quintile 1	0.67	14.96	0.57	7.81	0.56	7.57	0.54	7.53
Income Quintile 2	0.41	9.30	0.27	3.79	0.25	3.53	0.21	3.48
Income Quintile 3	0.30	6.86	0.21	2.93	0.18	2.47	0.17	2.43
Income Quintile 4	0.15	3.40	0.01	0.17	0.00	0.03	0.00	0.02
Income Quintile 6	0.14	3.65	0.26	4.17	0.08	1.24	0.07	1.21
GINI Medium	0.09	3.00	0.36	7.20	0.07	0.78	0.07	0.75
GINI High	0.44	13.21	0.27	4.82	0.35	3.40	0.34	3.37
GINI Medium*Quintile 1			0.42	4.49	0.22	2.24	0.22	2.24
GINI Medium*Quintile 2			0.51	5.58	0.33	3.46	0.32	3.46
GINI Medium*Quintile 3			0.41	4.53	0.25	2.72	0.21	2.72
GINI Medium*Quintile 4			0.46	5.11	0.29	3.18	0.26	3.18
GINI Medium*Quintile Missing			0.23	2.64	0.05	0.57	0.05	0.56
GINI High*Quintile 1			0.26	2.64	0.14	1.39	0.13	1.37
GINI High*Quintile 2			0.28	2.98	0.13	1.43	0.13	1.44
GINI High*Quintile 3			0.22	2.39	0.10	1.07	0.09	1.10
GINI High*Quintile 4			0.32	3.49	0.20	2.23	0.19	2.21

GINI High*Quintile Missing			0.12	1.34	0.01	0.11	0.01	0.10
Constant	0.36	3.59	0.38	3.55	0.30	2.03	0.29	2.01
Random Components								
Age Variance					0.00	2.62	0.00	2.65
Income Rank Variance							0.20	2.13
Age Var./Inc.Rnk. Var Covar							0.00	1.66
N Individuals	34430		34430		34430		34430	
N Groups	31		31		31		31	





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Information on the GINI project

Aims

The core objective of GINI is to deliver important new answers to questions of great interest to European societies: What are the social, cultural and political impacts that increasing inequalities in income, wealth and education may have? For the answers, GINI combines an interdisciplinary analysis that draws on economics, sociology, political science and health studies, with improved methodologies, uniform measurement, wide country coverage, a clear policy dimension and broad dissemination.

Methodologically, GINI aims to:

- exploit differences between and within 29 countries in inequality levels and trends for understanding the impacts and teasing out implications for policy and institutions,
- elaborate on the effects of both individual distributional positions and aggregate inequalities, and
- allow for feedback from impacts to inequality in a two-way causality approach.

The project operates in a framework of policy-oriented debate and international comparisons across all EU countries (except Cyprus and Malta), the USA, Japan, Canada and Australia.

Inequality Impacts and Analysis

Social impacts of inequality include educational access and achievement, individual employment opportunities and labour market behaviour, household joblessness, living standards and deprivation, family and household formation/breakdown, housing and intergenerational social mobility, individual health and life expectancy, and social cohesion versus polarisation. Underlying long-term trends, the economic cycle and the current financial and economic crisis will be incorporated. Politico-cultural impacts investigated are: Do increasing income/educational inequalities widen cultural and political 'distances', alienating people from politics, globalisation and European integration? Do they affect individuals' participation and general social trust? Is acceptance of inequality and policies of redistribution affected by inequality itself? What effects do political systems (coalitions/winner-takes-all) have? Finally, it focuses on costs and benefits of policies limiting income inequality and its efficiency for mitigating other inequalities (health, housing, education and opportunity), and addresses the question what contributions policy making itself may have made to the growth of inequalities.

Support and Activities

The project receives EU research support to the amount of Euro 2.7 million. The work will result in four main reports and a final report, some 70 discussion papers and 29 country reports. The start of the project is 1 February 2010 for a three-year period. Detailed information can be found on the website.

www.gini-research.org





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