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

## Richard Layte and Christopher T. Whelan[*]

*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. Wilkinson, Marmot and colleagues have argued for some time that the relationship stems from the psycho-social effects of status comparisons. 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. We label this the 'status anxiety hypothesis'. If true, this would imply a structured relationship between income inequality at the societal level, individual income rank and anxiety relating to social status. This paper sets out strong and weak forms of the hypothesis and then presents three predictions concerning the structuring of 'status anxiety' at the individual level, given different levels of national income inequality and varying individual income. We then test 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 those in higher inequality countries at all points on the income rank curve. This is an important precondition of support for the status anxiety hypothesis and may be seen as providing support for the weaker version of the hypothesis. However, we do not find evidence to support a stronger version of the hypothesis which we argue requires the negative effect of income rank on status anxiety to be exacerbated by increasing income inequality.

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## 1.    Introduction

It is now well established that life expectancy and health are inversely related to measures of socio-economic advantage such as income, level of education and social class (Acheson et al, 1998; Mackenbach, 2006; Marmot, 2004). 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 et al , 1997; Marmot et al, 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) (Davey Smith, 1996; Kaplan et al, 1996; Lynch et al, 2001; Lynch et al , 1998). Recent systematic reviews have tended to support the view that the association is not artefactual (Kondo et al, 2009; Wilkinson & Pickett, 2006; Wilkinson & Pickett, 2009) but researchers are still divided as to the interpretation of this finding and the role of psycho-social processes in particular (Layte 2012).

In this paper, we contribute to this debate by directly testing whether income inequality within nation states is related to a marker of individual anxiety relating to social status within countries and the extent to which this relationship is moderated by national distribution of income. We argue that 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 would require two empirical relationships to be established: first, average levels of status anxiety should be higher in countries where income is distributed more unequally such that mean anxiety is higher at all points on the curve of ranked income. However, this is a 'weak' empirical prediction since the pattern could be explained by a number of different processes that would need to be excluded before the relationship could be accepted. The interpretation of such associations is always exposed to the general dangers associated with the ecological fallacy in moving from association of micro outcomes with macro characteristics to interpretation in terms of generative processes at the level of individual action.  It is possible to think of a variety of national attributes such as discrimination in terms of gender, age, race, ethnicity or region that could be related to both income inequality and status anxiety and consequently complicate the statistical and substantive interpretation of the association. Even if measures of such outcomes were available, disentangling the relative role of such factors with a strictly limited N of counties is a difficult practical proposition, though not impossible if longitudinal data with the requisite variables were available. In the absence of such an

analysis we argue that research into the role of psycho-social mechanism must go beyond the description of cross-country differences in degree of association by specifying generative mechanisms and associated hypotheses. Specifically, a more robust test of the status anxiety hypothesis would predict a second empirical regularity: that the curve of status anxiety with income rank would both be higher *and* steeper with increasing income inequality. In the sections that follow we establish three predictions that follow from the psycho-social explanation and test these using data on over 34,000 people from 31 countries and multi-level models.

## 2.    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 Wilkinson, 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 become more dominated by status competition (Wilkinson & Pickett, 2006; Wilkinson & Pickett, 2010b). A key mechanism linking inequality to poorer health in this hypothesis is the sense of inferiority among those lower down the status order engendered in more unequal societies. They 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 with potentially damaging consequences for all members of the society. This is linked to health outcomes through the production of 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 a range of studies including 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). More recently, a range of papers has also added weight to the status anxiety hypothesis including papers relating relative income position to mental health (Wood et al, 2012) and income inequality to trust and population health (Elgar, 2010; Elgar & Aitken, 2010).

### 2.1 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, operating from a broader social stratification perspective, Goldthorpe (2010) has offered a critical sociological perspective on the hypothesis itself. He argues that the status anxiety hypothesis presupposes the existence of

a close link between income inequality and social status. He notes that Wilkinson & Pickett (2010a) treat social stratification as being one-dimensional with class and income acting as simple proxies of an underlying social hierarchy. 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.

More generally, Goldthorpe in his work with Chan (Chan & Goldthorpe, 2004) has also shown a significant discrepancy between class and  social status measured using friendship patterns and income in British data.

In order to provide an appropriate test of the psychosocial hypotheses, we adhere to the assumption that income rank serves as an adequate proxy of within country status position and that income inequality captures between country differences in the scale of status inequalities. However, in the discussion of our results we will return to the issues involved in the conceptualisation and measurement of status.

## 3.    Some Empirical Predictions

Before testing the status anxiety hypothesis we need to establish a set of predictions which flow from the hypothesis. 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 comparisons are made on the basis of perceived status which will be linked to relative income position (Wilkinson & Pickett, 2006). 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 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 involves a more complex process. Individuals could compare their income to the national or community mean or to those in the upper part of the income distribution. 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. The key factor would be relative position within one's own society irrespective of the scale of inequality in that society. This relationship is set out diagrammatically in Figure 1.

A core element of the status anxiety hypothesis is that income inequality will increase status anxiety for all  (Wilkinson & Pickett, 2010b). This is illustrated diagrammatically in Figure 2 with status anxiety increasing with income rank in three notional societies but with the societal intercept higher in those that are more unequal. Finding higher mean anxiety at all points of the income distribution in higher inequality countries is a necessary component of any validation of the status anxiety hypothesis but we would argue that it is not sufficient. A higher intercept within more unequal countries is possible if there are factors which are

correlated with income inequality at the national level which are also associated with mean status anxiety. Given this, the finding of higher anxiety in higher inequality countries is a relatively weak validation of the hypothesis. However, if the status anxiety hypothesis is correct, greater income inequality at the level of the country should also have a further effect on status anxiety at the individual level, and one which offers a stronger test of the following hypothesis: higher income inequality increases the absolute gap between any two points on the income rank, on average, by increasing dispersion. This should mean that as income inequality increases, so too will the average 'income gap' between ranks, the consequence of which should be a steepening of the income rank/anxiety relationship slope as evidenced by a significant negative interaction between income rank at the individual level and country income inequality. This relationship is set out diagrammatically in Figure 3. Here, status anxiety decreases with income rank with the steepness of the decrease proportional to societal income inequality and lines separated vertically because of the effect of income inequality on the status anxiety intercept.

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INSERT FIGURES 1 TO 3 ABOUT HERE

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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 adjusting for absolute level of income (see Figure 1).

**H2:** Societies with higher income inequality will have higher levels of status anxiety at all points on the income rank curve (measured as a higher mean intercept) (see Figure 2).

**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 (see Figure 3).

Empirical confirmation of H1 would show that relative income has a significant impact on individual status anxiety adjusting for absolute income. Empirical confirmation of H2 is necessary for the validity of the status anxiety hypothesis to be established but, we would suggest, not sufficient when the empirical test is carried out with cross-sectional data. We would argue that empirical support for H3 is also necessary. Significant positive effects on mean status anxiety with income equality may reflect psycho-social processes at the individual level but this does not exclude a possible role for other processes. Confirmation of H3, on the other hand, would offer stronger evidence in support of the status anxiety hypothesis, since it would show that the intensity of the effect of having a lower income rank within each country is exacerbated by the country level of income inequality.

## 4.    Data and Methods

### 4.1 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. EQLS2 was conducted in the 27 EU member states plus Norway as well

as 3 candidate countries (Croatia, Macedonia and Turkey). Across countries the sample size varies from a minimum of 1000 to a maximum of 2000 cases. The survey achieved an overall response rate of 58% although national rates varied significantly, ranging from less than 40% to more than 80% (methodological and fieldwork reports are available from www.eurofound.eu). The total achieved sample was 35,634 individuals aged 18 or over.

## 4.2 Measures

### 4.2.1 Status Anxiety

Our measure of status anxiety is based on the question "*Some people look down on me because of my job situation or income*". The respondents to the survey were asked to say whether they agreed or disagreed with these statements. This variable is used as a linear scale (from 1 to 5) in descriptive analyses and as five ordinal groupings in multi-level models. Clearly, a measure of status anxiety made up of a number of question items would be preferable. Unfortunately, as far as we know no such scale is available in a cross-national survey which also includes measures of individual income. A response to this question was missing in 3.4% of cases. These were excluded reducing the sample to 34,430 cases where imputed income was used and 24,110 where cases with complete income information were used.

### 4.2.2 Income Inequality

Income inequality is measured using a GINI coefficient on household income measured in 2007 after tax attributed to each individual in the household. This is drawn from the Eurostat database[1]. GINI is used in both continuous and categorical forms in our analyses. The measure is logged before being used in continuous form. To create categories of GINI, countries were divided into groups representing low, medium and high inequality. We have no prior hypothesis as to what constitutes a medium or high GINI coefficient and so simply group countries by ranking into tertiles.

### Age and Sex

Age is entered into the analysis as a continuous variable alongside female sex. Tests showed that the quadratic of age was not a significant addition to the model and this term was dropped.

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[1] http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes

### 4.2.3 Equivalised Income

Income is measured by asking respondents to state their household's net 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. Following standard practice this variables is then logged. Information on individual income was missing from 30% of cases overall but 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 using the UVIS imputation routine as implemented in STATA by (Royston, 2004) was used to impute an income value using fourteen predictor variables. In addition, income rank was aggregated into quintiles and a sixth category constructed for missing cases.

### 4.2.4 Individual Income Rank

Hypotheses one and three centre on the role of relative income position as opposed to absolute income in determining status anxiety. We create relative income position by transforming equivalised income into the individual's income rank in each country (i.e. their position in the income distribution parameterised as percentile from >0 to 1).

### 4.2.5 Country Mean Income

As well as being influenced by the individual's absolute income and relative income position, status anxiety may also be influenced by average income in each country if individual's make comparisons across national borders when assessing their relative income position. To examine this, mean equivalised income is calculated within each country and used.

### 4.2.6 Analysis Strategy

Our data comprise 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 mean income, individual age and being female are estimated. Using standard multi-level model notation Raudenbush and Bryk 2002 the full model is thus:

$SA_{ij}=\gamma_{00}+\gamma_{10}(AGE)+\gamma_{20}(FEMALE_{ij})+\gamma_{30}(INCRNK_{ij})+\gamma_{40}(EQUIVINC_{ij})+\gamma_{01}(GINI_j)+\gamma_{02}(MEANINC_j)+\gamma_{53}(INCRNK_{ij}*GINI_j)+u_{0j}+u_{1j}(INCRNK_{ij})+r_{ij}$

The status anxiety of individual *i* nested in country *j* is estimated by a level two fixed effect for GINI and mean country equivalised income and level one fixed effects for age, being female, income rank and absolute equivalised income plus an interaction term of GINI and income rank. A random effect for income rank is 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, all level one fixed effects except (log) equivalised income are estimated so that the relationship with income rank can be examined. In the second, individual equivalised income is added. In the third, the random slope of income rank is added to the model. In the fourth and final model, the interaction of GINI and income rank are added. To examine possible non-linearities in the relationship between GINI and status anxiety, these four models are estimated using GINI in both continuous and categorical forms.

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

## 5. Results

### 5.1 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 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. Across countries Macedonia has the highest proportion agreeing to some degree with the statement that "others look down on me because of my job situation or income" (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 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. Table 1 is ranked by GINI so high income inequality countries such as Macedonia, Poland, Bulgaria and the UK are in the bottom third of the table whilst low inequality countries such as Sweden, Norway and the Netherlands are in the top third of the table. Cyprus and Spain occupy medium positions in both cases. These results are broadly supportive of H2.

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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). The highest correlations between income rank and status anxiety 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 do not support H3.

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Figure 4 plots the mean status anxiety by country income inequality and individual income decile rank. 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.

## 5.2 Multi-Level Models

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Table 2 shows the results of four multi-level mixed ordered logit models of status anxiety using non-imputed income information (thus reducing the sample to 24,110) and GINI in a continuous form. Table 2, Model 1 fits income rank, income inequality and mean country income. The results confirm the descriptive findings of Table 1 with individual income rank negatively and significantly related to status anxiety. Status anxiety increases with GINI but the parameter is not significant (P=0.27). Living in a country with higher mean income is also a significant predictor of lower status anxiety as shown by the large, significant negative coefficient (-0.79).

Model 2 fits the term for absolute income at the individual level. The parameter is not significant but is negative. Fitting absolute income reduces the significance of relative income but only marginally alters the coefficient. Crucially, the parameter for income rank remains highly significant and large whereas that for absolute income is nowhere near being significant, suggesting that relative income comparisons are a great deal more important than absolute income comparisons once we control for mean country income.

Model 3 fits the random slope effect to model 3 in preparation for the addition of the cross-level interaction of GINI and income rank in Model 4. The only change with the addition of the random slope is a marginal reduction in the coefficient for individual income rank.

Model 4 in Table 2 fits the interaction between income rank and GINI. The resulting parameter is negative which supports H3 but is insignificant (P=0.32).

To examine whether missing income information at the individual level may explain the association between income inequality, income rank and status anxiety, Table 3 gives results for four identical models to those shown in Table 2 but with the substitution of imputed values for individual income leading to an increase in the number of observations to 34,430.

The pattern of results in Table 3 is substantively identical to those found in Table 2. Income rank remains a more important predictor than absolute income, income inequality (GINI) has a positive relationship with anxiety and the interaction of income rank and GINI is negative but non-significant. The only difference found in Table 3 is that the parameter estimates for individual income rank and mean country income fall relative to those found in Table 2 and the coefficient for GINI doubles in size and becomes significant. The models of Tables 1 and 2 were also estimated with GINI and income rank parameterised in categorical form (not shown)[i]. The results substantively replicated those in Tables 2 and 3.

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Using the results of Model 4 in Table 3, 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.

## 6.    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 sufficiently strong evidence to date. This paper makes a significant contribution to this debate by setting out three empirical predictions that flow from the status anxiety literature and testing these using comparative cross-national data.

Our results give strong support to the hypothesis that status anxiety is inversely associated with income rank across countries and that relative income position is a more powerful predictor than absolute income. Analyses also suggest 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.

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. 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 high inequality countries. This provides support for a weaker version of the status anxiety hypothesis. However, the interpretation of this macro-micro relationship is problematic since there may be a large number of factors that are correlated with income inequality at the national level which may also be correlated with individual status anxiety. This means that the causal interpretation of relationships between national characteristics and individual outcomes,

even when empirically significant, can present formidable difficulties (Elgar, 2010: 2314-5; Elgar & Aitken, 2010: 244-45). The use of multi-level models can assist in controlling for a range of associated societal characteristics and help to reduce the risk of ecological fallacy. Similarly, analysis of change over time can strengthen conclusions regarding the robustness of the original coorelation. However, given the small N problem at the level of the state and related problems of multcollinearity and unoberevd heterogeneity, there is a limit to how far the current, essentially descriptive analysis can take us. As van de Werfhorst and Salverda emphasise (Van de Werfhorst & Salverda, 2012), causal interpretation of the consequences of inequality requires deductive theory building and hypothesis formulation. In the same vein Goldthorpe (2001) points to the value of understanding "*causation as a generative process*", which involves specifying hypotheses that are derived from a 'causal narrative' at the level of individual actions which can then be put to empirical test.

In pursuing this approach we sought to test the hypothesis that income inequality exacerbates the impact of income rank on status anxiety. It should be said that Wilkinson and Pickett (Wilkinson & Pickett, 2010b) have never argued that the third of our predictions should hold and advocates of their position would undoubtedly argue that the confirmation of H2 is sufficient. However, we would contend that if the status anxiety hypothesis is to be of substantial 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). In addition, it must go beyond arguing for an association between national levels of income inequality and status anxiety. It should also hold that that income inequality exacerbates the impact of income rank on status anxiety. 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 being lower down in more equal countries.

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 the issue remains a concern. We used two additional 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 and absolute income 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 so the present paper should be seen a preliminary analysis of an important question that should be given further attention in future research.

Finally, while for the purposes of testing the psychosocial hypotheses we have adhered to the assumptions that income rank serves as an adequate proxy of within country status position and that income inequality captures between country differences in the scale of status inequalities, we accept that such assumptions involve a significant oversimplification of status processes. Further progress in understanding the consequences of status differences and their impact relative to other dimensions of stratification such as class and education would be greatly facilitated by the availability of theoretically informed measures of status.[ii] Reflecting recently on the relationship between material inequality and status differentiation, Wilkinson and Pickett (2009b) concluded that health and social problems whose frequency is affected by social status are made worse by increased social differentiation. Psycho-social factors could then be additional and important routes by which material influences are mediated. If we substitute the term "social stratification" for "social status", it is perfectly possible to consider the neo-materalist and psychosocial perspectives as complementary rather than competing. This makes the need for explicit formulation of hypotheses relating to mediating and moderating mechanisms even more crucial.

This paper provides support for a weaker version of 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. On the other hand, the stronger version of the hypothesis involving the crucial implication that higher income inequality would lead to a steeper slope in the relationship between income rank and sense of inferiority was not supported.

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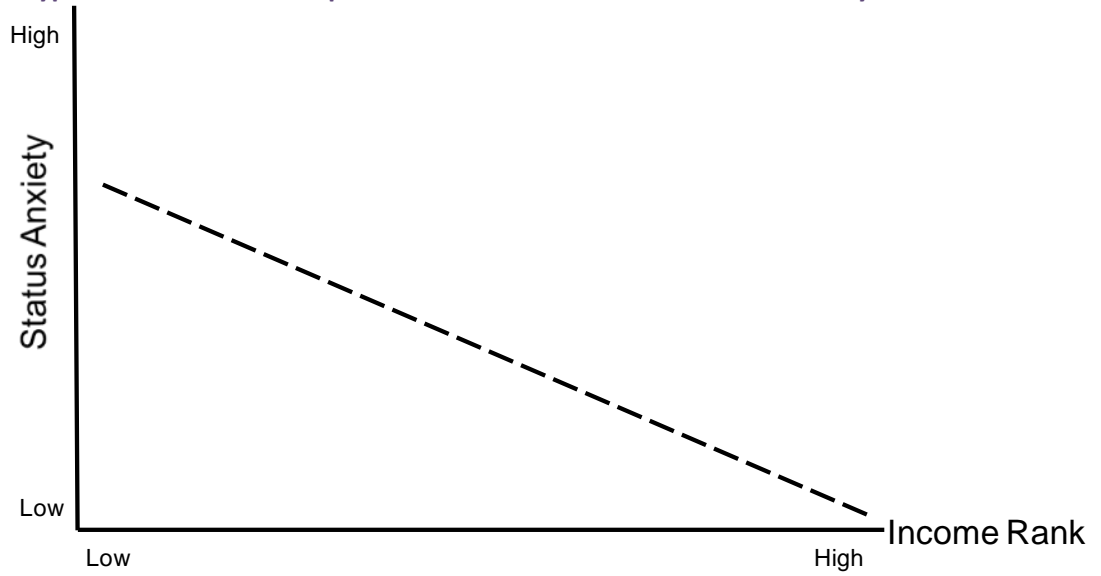**Figure 1: Hypothesised Relationship Individual Income Rank and Status Anxiety**



**Figure 2: Hypothesised Relationship Between Country GINI, Individual Income Rank and Status Anxiety if Country Income Inequality Influences the Status Anxiety Intercept.**
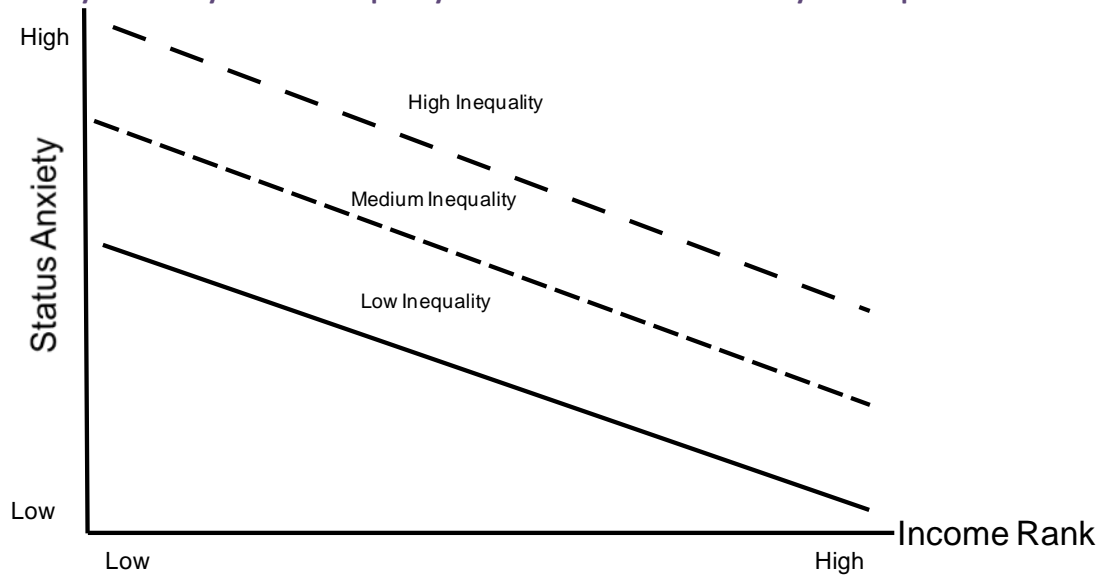
**Figure 3: Hypothesised Relationship Between Country GINI, Individual Income Rank and Status Anxiety if Country Income Inequality Influences Status Anxiety Intercept AND Income Rank Slope.**
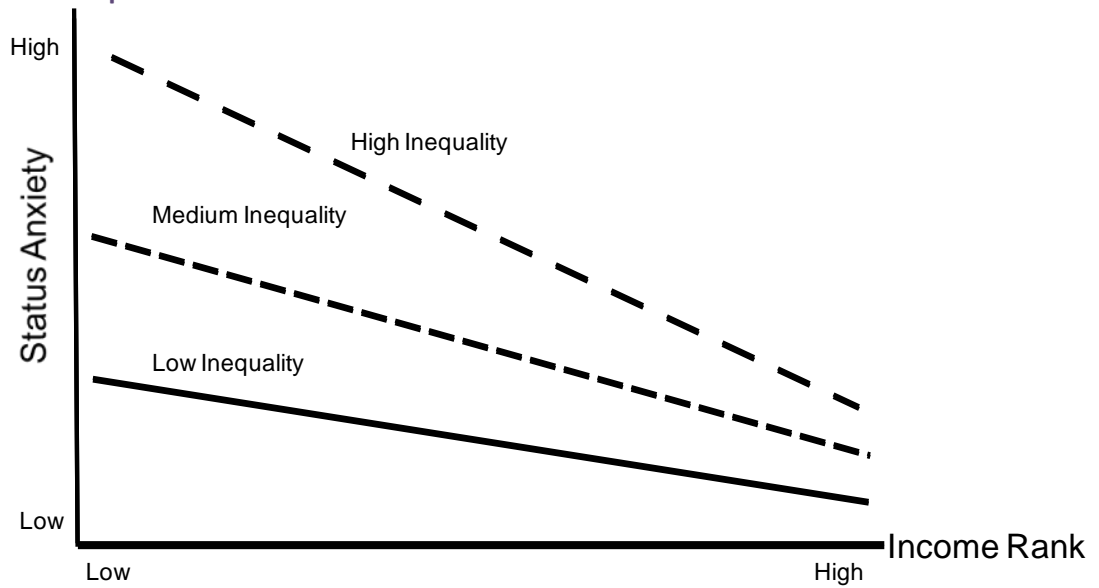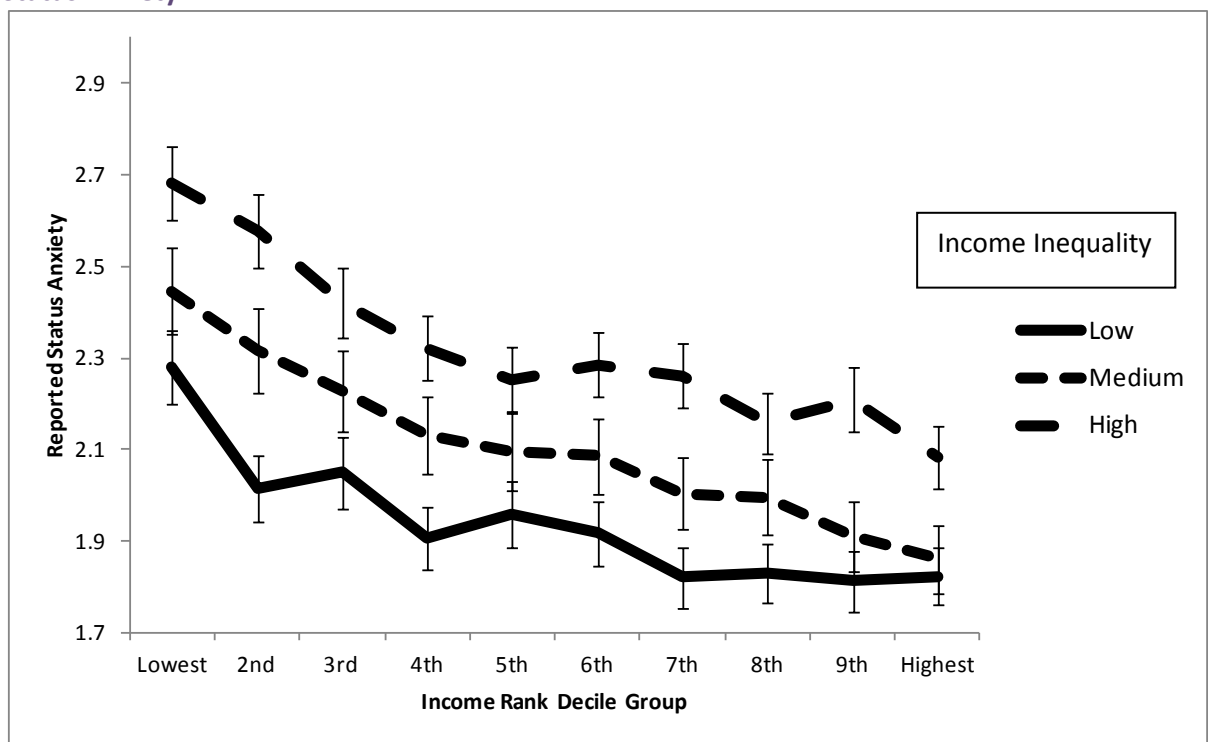


**Figure 4: Mean Status Anxiety by Country GINI, Individual Income Rank and Reported Status Anxiety**



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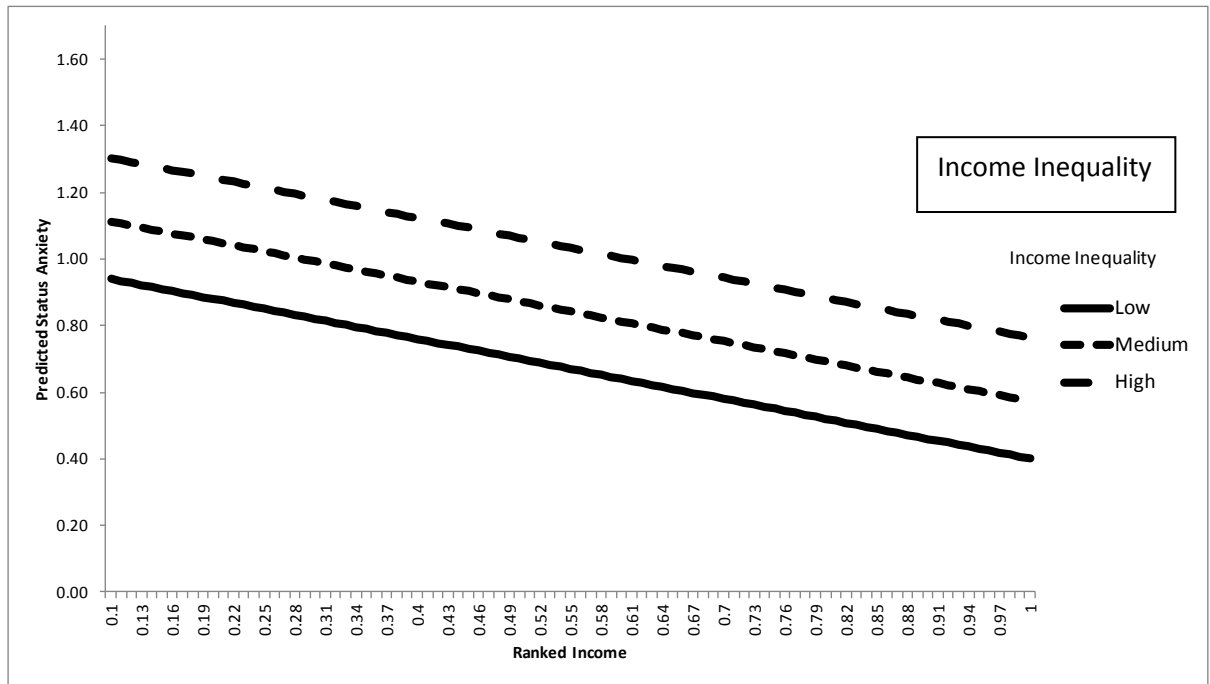
**Table 1: Distribution Categorical Status Anxiety Measure, Mean Status Anxiety, GINI Coefficient**

| 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 (Non-Imputed Individual Income)**

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|---|---|---|---|---|---|---|---|---|
| | β | t-stat | β | t-stat | β | t-stat | β | t-stat |
| Fixed Components | | | | | | | | |
| | | | | | | | | |
| Age | -0.01 | -7.0 | -0.01 | -7.0 | -0.01 | -7.0 | -0.01 | -7.0 |
| Female | -0.08 | -2.9 | -0.08 | -2.9 | -0.08 | -2.9 | -0.08 | -3.0 |
| Individual Income Rank | -0.78 | -15.5 | -0.75 | -6.9 | -0.73 | -5.4 | -0.75 | -5.5 |
| Log GINI | 0.14 | 1.1 | 0.14 | 1.1 | 0.15 | 1.3 | 0.15 | 1.3 |
| Log Mean Country Income | -0.79 | -19.7 | -0.77 | -12.5 | -0.78 | -12.2 | -0.79 | -12.3 |
| Log Individual Income | | | -0.01 | -0.3 | -0.01 | -0.1 | 0.00 | 0.1 |
| Individual Income Rank * Log GINI | | | | | | | -0.51 | -1.0 |
| Random Components | | | | | | | | |
| | | | | | | | | |
| Income Rank Variance | | | | | 0.16 | 2.7 | 0.15 | 2.6 |
| | | | | | | | | |
| 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 Individual Income)**

| | Model 1 β | Model 1 t-stat | Model 2 β | Model 2 t-stat | Model 3 β | Model 3 t-stat | Model 4 β | Model 4 t-stat |
|---|---|---|---|---|---|---|---|---|
| Fixed Components | | | | | | | | |
| | | | | | | | | |
| Age | -0.01 | -8.0 | -0.01 | -8.0 | -0.01 | -8.0 | -0.01 | -8.0 |
| Female | -0.09 | -3.7 | -0.09 | -3.7 | -0.09 | -3.7 | -0.09 | -3.7 |
| Individual Income Rank | -0.60 | -14.3 | -0.53 | -5.6 | -0.48 | -4.1 | -0.49 | -4.2 |
| Log GINI | 0.29 | 3.4 | 0.29 | 3.4 | 0.29 | 3.5 | 0.30 | 3.5 |
| Log Mean Country Income | -0.49 | -27.1 | -0.46 | -11.4 | -0.43 | -10.3 | -0.44 | -10.4 |
| Log Individual Income | | | -0.03 | -0.9 | -0.05 | -1.4 | -0.05 | -1.4 |
| Individual Income Rank * Log GINI | | | | | | | -0.46 | -1.0 |
| Random Components | | | | | | | | |
| | | | | | | | | |
| Income Rank Variance | | | | | 0.121 | 2.8 | 0.12 | 2.7 |
| | | | | | | | | |
| N Individuals | 34430 | | 34430 | | 34430 | | 34430 | |
| N Groups | 31 | | 31 | | 31 | | 31 | |

[i] Models estimated with GINI parameterised in categorical form are available from the authors on request.
[ii] For an example of such an analysis at national level see Torssander and Erikson, 2010).

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