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# Why Income Inequality Is Dissatisfying—Perceptions of Social Status and the Inequality-Satisfaction Link in Europe

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## Abstract

This study proposes subjective social status—a person's perception of his/her standing in the social hierarchy—is an important psychological mechanism driving the inequality-satisfaction link. Building on sociological and social-psychological research, it argues (i) the contextual effect of income inequality on subjective well-being is mediated by social status perceptions, and (ii) income inequality moderates the relationship between subjective social status and well-being. The empirical analysis is based on data from the 2012/2013 European Social Survey. Applying multi-level modelling techniques, the study finds income inequality lowers the self-perception of social status and, in turn, the overall well-being of individuals (the mediation argument). It also finds that income inequality increases the importance of subjective social status to life satisfaction (the moderation argument). The results are limited to the European context and should encourage researchers to test the hypotheses in other geographic regions and to dig deeper into the underlying mechanisms explaining if and why income inequality matters to the well-being of individuals.

## Introduction

In their book, *The Spirit Level: Why Equality is Better for Everyone*, [Wilkinson and Pickett \(2010\)](#) use empirical data to show that income inequalities harm both the individual and society at large: the higher the income inequality, the lower the mental and physical health, the lower the trust in others and in social institutions, and the higher the crime rate—to name a few examples. Importantly, income inequality is harmful for all—not just for those at the bottom of the social ladder; if we reduce income disparities, they say, the well-being of all members of society will improve.

The work of Wilkinson and Pickett has fuelled a debate on the consequences of the rising levels of income inequality experienced by many countries over recent decades ([OECD, 2011, 2015a](#)).<sup>1</sup> Specifically, scholars have criticized Wilkinson and Pickett's methodological approach, claiming, for example, that results will vary with the selection of countries and the use of more advanced statistical analysis ([Saunders, 2010; Snowdon, 2010](#)). Indeed, several studies show that the consequences of income inequality are not as straightforward as Wilkinson and Pickett suggest. For example, research on subjective well-being, often measured by life satisfaction and happiness, has produced mixed results; income

inequality has been found to have a positive, a negative or no effect whatsoever (for a review, see Schneider, 2016a). This is particularly puzzling, as subjective well-being is closely related to a number of positive outcomes, including better health, employment, and income (Lyubomirsky, King and Diener, 2005; Pressman and Cohen, 2005; Diener and Chan, 2011). At the same time, subjective well-being is often described as the ultimate objective of human behaviour and welfare and is thus of socio-political importance (Kahneman *et al.*, 2004; Diener, 2006; Stiglitz, Sen and Fitoussi, 2009).

While the inconsistencies in research findings on the inequality–well-being link may be caused by different methodologies, including the selection of countries, the measurement of income inequality, the definition of the geographic unit, and the accuracy of statistical analysis (see Schneider, 2016a), they also raise fundamental questions about the underlying *mechanisms* that translate income inequality into subjective well-being—and these have rarely been empirically tested (exceptions are Oishi, Kesebir and Diener, 2011; Delhey and Dragolov, 2014; Cheung, 2016). To determine *if* and *why* income inequality matters to the subjective well-being of individuals, more empirical research and more nuanced statistical analyses of the potential mechanisms linking income inequality to life satisfaction within different research contexts are certainly warranted.

Further, complex conceptual and theoretical reasoning is required to connect two analytically distinct phenomena: a socially based outcome, i.e. the dispersion of income on a larger societal level, and an individual-based outcome, i.e. self-reports on life satisfaction. This conceptual distinction and its theoretical implications are frequently overlooked in the literature, with *relative deprivation arguments* (also called *relative income arguments*; see Verme, 2011) used to theoretically back up empirical research (Neckerman and Torche, 2007). Based on the assumption that individuals compare their income with the income of others and are less satisfied if their own is lower than the average, higher income inequality should reduce the average well-being. Using the simple aggregation formula of relative income expectations to explain the ‘contextual effect’ of inequality on an individual’s well-being across countries is problematic, however. Research remains trapped in *ecological fallacy* if no explanation is given for how and why societal characteristics are connected to the individual in the first place (van de Vijver, van Hemert and Poortinga, 2008). At the same time, why *all* individuals—not just those at the lower end of the income distribution—report lower well-being if income inequality is high must be explained.

This study underlines the importance of *relative deprivation theory* to explain the inequality-satisfaction link, but argues that further theoretical reasoning is required to understand how and why societal characteristics, such as income inequality, are related to the individual (Evans, Hout and Mayer, 2004). Departing from Coleman’s classic model of macro–micro–macro relations (Coleman, 1986) and in the tradition of methodological individualism (Merton, 1968), I suggest macro-relations can be explained by their micro-foundations, with psychological processes constituting the basic link at the individual level. These micro-foundations have to be embedded within the larger context to understand how events or conditions at the macro level affect these processes at the individual level (Hedström and Ylikoski, 2010). In other words, we have to clarify how income inequality becomes significant to the individual, influencing the psychological processes through which individuals enhance their subjective well-being.

By positing *self-perceptions of social status* as a key psychological mechanism, this study explores a potential pathway through which income inequality affects subjective well-being. Firstly, following relative deprivation theory, it argues that how individuals rank themselves in a social hierarchy is related to life satisfaction. If this argument holds, *self-evaluation processes* based on social comparison constitute an important *micro foundation* of the inequality-satisfaction link. Secondly, the study proposes two paths whereby income inequality becomes an important contextual factor in self-evaluation. In the first, income inequality may lower an individual’s perception of his/her social status (i.e. the individual sees him/herself as lower in the social hierarchy) by providing referential standards for social comparison; this, in turn, may reduce his or her subjective well-being. In this case, subjective social status functions as an important *mediator* linking income inequality with life satisfaction. In the second path, income inequality acts as a *moderator*, enhancing the salience of social comparison and increasing the importance of social status characteristics for the production of life satisfaction. In this case, subjective social status will have a stronger effect on life satisfaction if income inequalities are high.

In what follows, I discuss each of these possible links before making a first attempt to test them empirically in the European context using data from the sixth round of the European Social Survey (ESS) 2012/2013 (individuals:  $N = 39,756$ ; countries:  $N = 22$ ) applying multilevel (mediation) analysis. I test the robustness of the empirical results using different inequality measures (i.e. top and bottom sensitive inequality measures), subpopulations (i.e. working-age population), and region-specific

analysis (i.e. Western Europe). Further, I replicate the empirical findings using a larger set of European countries (individuals:  $N = 46,172$ ; countries:  $N = 26$ ).

This study theoretically and empirically contributes to work on the psychological mechanisms underlying the inequality–well-being link (Buttrick and Oishi, 2017). By positing subjective social status as a key explanation of the inequality-satisfaction link, it complements and adds to previous research identifying perceptions of fairness, trust, hope, and status anxiety as important explanations (Oishi *et al.*, 2011; Delhey and Dragolov, 2014; Cheung, 2016). It also contributes to the literature on the *status anxiety hypothesis* (Wilkinson and Pickett, 2006, 2009; Layte and Whelan, 2014) by proposing subjective social status as an alternative measure for experienced status inferiority. The empirical study is clearly limited to the European context, but other researchers should be encouraged to test its hypotheses in other research contexts and geographic regions around the world.

## Theoretical Background

### Relative Deprivation Argument: A Micro Foundation

The argument—the higher a person’s social status in society, the higher his/her life satisfaction—is supported by both sociological and social psychological research. It has roots in the early work on *relative deprivation theory* (Davis, 1959; Runciman, 1966; Merton and Rossi, 1968; Crosby, 1976) and in the even earlier findings of Stouffer and his colleagues (1949) that not just material standards matter to well-being—how individuals compare themselves to others and rank themselves in relation to them is equally important.

*Relative deprivation theory* ties in with *social comparison theory*, which considers social comparisons to be a fundamental psychological process (Corcoran, Crusius and Mussweiler, 2011). Festinger (1954) proposes, ‘To the extent that objective, non-social means are not available, people evaluate their opinions and abilities by comparison respectively with the opinions and abilities of others’ (118). Put otherwise, social comparisons form a primary point of reference for self-evaluation of performance and beliefs. Social comparisons with those higher up the social hierarchy are assumed to produce negative feelings, such as grievance, resentment, dissatisfaction, anger, disappointment, unhappiness, and felt injustice (Bernstein and Crosby, 1980).

Empirical studies confirm the importance of relative standards for subjective well-being. If individuals have

less income than their co-workers (Clark and Oswald, 1996; Card *et al.*, 2012; Wolbring, Keuschnigg and Negele, 2013), neighbours (Luttmer, 2005; Shields, Wheatley Price and Wooden, 2009; Dittmann and Goebel, 2010; Knies, 2012), others living in the same region/state (Blanchflower and Oswald, 2004; Diener *et al.*, 2010; Wolbring, Keuschnigg and Negele, 2013) or others with whom they share certain characteristics (McBride, 2001; Ferrer-i-Carbonell, 2005), they will be less satisfied than those earning as much as or more than a particular reference group. Relative income effects are also observed at the national level. Asking respondents in the United States how they perceive their income in comparison to other US families, Layard, Mayraz and Nickell (2010) find relative income has a positive effect on life satisfaction, comparable in size to the effect of the absolute household income.

Researchers encounter problems when analysing the relative deprivation effect, as they often use objective, relative income measures. Inter-individual differences in the frequency with which individuals compare themselves with others (Schneider and Schupp, 2014) and the inherent difficulties involved in the selection of comparison referents (Clark and Senik, 2010) make it difficult to measure the effect of relative deprivation on life satisfaction without bias. At the same time, relative income measures (including subjective ones) often leave out other status characteristics that make individuals feel better or worse off in society; for example, they rarely address the person’s rank on the income ladder or reflect on status hierarchies.

This study proposes the use of *subjective social status*—a person’s perception of his/her social standing in the social hierarchy—measured by a self-anchoring scale, to circumvent these biases (Kraus, Piff and Keltner, 2011). This instrument evokes what Kilpatrick and Cantril (1960) call individuals’ ‘first person view’ of the social world and themselves within it. People mark their position on a ladder, with those on the top and bottom rungs representing those at the top and bottom of the social stratum, respectively (Adler *et al.*, 2000). Unlike class identifications, perceptions of relative standing do not rest on predefined social sub-categories (such as middle or working class). Rather, it is left to the individual to define the social hierarchy. Social comparisons (How does my status compare to others?) and self-appraisal (How do others perceive me in the social hierarchy?) are important to these self-perception processes. In other words, subjective status rankings imply a dual cognitive process in which the individual places him/herself within a subjectively defined social hierarchy.

Despite its theoretical relevance, cross-country comparative research into subjective well-being, life satisfaction in particular, has paid little attention to subjective social status, but instead has been investigated in epidemiological studies on health outcomes (see e.g. Präg, Mills and Wittek, 2016). Some researchers say subjective status indicators accurately depict subtle aspects of social standing (Franzini and Fernandez-Esquer, 2006) and are more strongly associated with physical and mental health outcomes than objective socio-economic characteristics.

As stated above, and following the prior theoretical reasoning and research findings, I expect individuals who rank themselves higher in society will report higher levels of life satisfaction than those who rank themselves lower. Thus, the first hypothesis reads as follows:

H1: *The higher the subjective social status, the higher the reported life satisfaction.*

### The Contextual Effect of Income Inequality

How does income inequality at the larger societal level influence a person's well-being? And what role does subjective social status play? This study argues that, in principle, income inequality can influence subjective status and life satisfaction in two different ways: (i) subjective social status *mediates* the relationship between income inequality and life satisfaction, because income inequality may reduce social status perceptions (i.e. an individual sees him/herself as lower on the social ladder) by determining the referential standards for social comparison as described by the *differentiation argument*; (ii) income inequality *moderates* the relationship between subjective social status and life satisfaction by increasing the significance of social comparison and social status characteristics for the production of life satisfaction, as specified by the *salience argument*. Both arguments are based on the expectation that income inequality forms a significant contextual category that systematically influences social comparison processes, how individuals position themselves in the social hierarchy, and the importance individuals attribute to social status characteristics for the production of life satisfaction.

#### Differentiation argument: subjective social status as a mediator

What I call the *differentiation argument* suggests that the higher the income inequality, the stronger the feeling of relative deprivation and, thus, the lower the perceived social status. The argument is central to the explanation

of the inequality-satisfaction link, because, together with the relative deprivation argument, it suggests how characteristics of the social context, here income inequality, affect individual well-being. In other words, subjective social status functions as a *mediator* between income inequality and life satisfaction.

A key mechanism through which income inequality contributes to lower status perception is *social comparison*. From a *reference group perspective*, income inequality may define the frames of reference for social comparison (i) by expanding income differentials and shifting incomes further apart, especially at the upper end of the income stratum, and (ii) by increasing the relevance and frequency of individuals' comparisons of themselves to those in upper income groups. If individuals not only compare themselves with the average income, as often assumed,<sup>2</sup> but also engage in upward comparisons using top incomes as an *upper anchor* for their status comparison (Boyce, Brown and Moore, 2010), income inequality will contribute to lower subjective social status. At the same time, and in line with this reasoning, it is plausible that the selection of referential standards changes with larger income inequalities, and that income inequality increases the salience of high incomes as anchors (Cheung and Lucas, 2016). If so, higher income inequality may increase the frequency of upward social comparison, contributing to lower status perceptions. Either way, individuals living in more unequal settings will rank themselves lower in the social hierarchy than individuals living in more equal societies, and this will be independent of other status characteristics, such as income or education.

However, little empirical research is available on how characteristics of the social context, notably income inequality, influence people's perceptions of their status in society. In a recent study of European countries, Lindemann and Saar (2014) find status perceptions are lower in countries with higher income inequality. The effect also interacts with personal income; however, individuals with higher income feel better off, if income inequality is high. Examining respondents' feelings on whether other people look down on them because of their job situation or income, Layte and Whelan (2014) find income inequality enhances status inferiority for all income groups. They find no empirical support for an interaction effect between income inequality and household income, suggesting individuals of *all* income groups feel more inferior in European societies with high inequality than in societies with low inequality. Results reported by Delhey and Dragolov (2014) echo these findings; when they measure status anxiety using an additional indicator of respondents' feelings on whether

their activities are recognized by others, they find status inferiority functions as a significant mediator of income inequality and subjective well-being (i.e. life satisfaction and happiness), a finding more pronounced in less affluent European societies. Surprisingly, in research on class identification measures using a broader sample from the World Values Survey, Andersen and Curtis (2012) discover no direct effect of income inequality; however, a positive and significant interaction effect between income inequality and household incomes indicates class identification is more strongly related to income if income inequalities are high. Further, and also contrary to my expectations, the findings of Loughnan and colleagues (2011) suggest that residents of more unequal countries try to self-enhance and view themselves, on average, as better than the average person than do residents of more equal countries. In sum, research findings on the consequences of income inequality for self-evaluations are mixed, but research findings on income inequality and subjective social status and status inferiority point in the expected direction.

In line with the theoretical reasoning, the second hypothesis reads as follows:

*H2: The higher the income inequality, the lower the subjective social status and the lower the life satisfaction.*

This hypothesis should hold for all income groups if top anchors are considered the dominant comparison standard. Effects should also be more pronounced for inequality measures sensitive to the upper half of the income distribution (e.g. 90/50 dispersion ratio) than for measures sensitive to the lower half (e.g. 50/10 dispersion ratio).

#### **Salience argument: income inequality as a contextual moderator**

The *salience argument* requires a different theoretical reasoning. In this view, income inequality functions as a *moderator* and enhances the importance of social status characteristics for the production of life satisfaction: the higher the income inequality in a society, the stronger the impact of subjective social status on life satisfaction (Wilkinson and Pickett, 2006, 2009; Pickett and Wilkinson, 2015). Thus, income inequality is assumed to influence what Lindenberg (2001) calls ‘individual specific production functions’ of an individual’s well-being. Methodologically speaking, income inequality will increase the ‘slope’ of the effect of subjective social status on life satisfaction.

Important mechanisms are *social comparison* and *value formation processes*. For example, Cheung and Lucas (2016) claim income inequality may increase both

the frequency and the consequence of comparison processes; more specifically, it will foster social comparisons and increase the value of subjective social status for the production of life satisfaction, with relative incomes having a stronger effect on life satisfaction if income inequality is high. Income inequality may also enhance the value of social status characteristics by fostering status competition and class differentiation (Kraus, Tan and Tannenbaum, 2013). If this is the case, income inequality increases the salience of and the identification with socio-economic status characteristics, and individuals will regard these characteristics as more important when evaluating their lives and overall well-being (Wilkinson and Pickett, 2006, 2009; Pickett and Wilkinson, 2015).

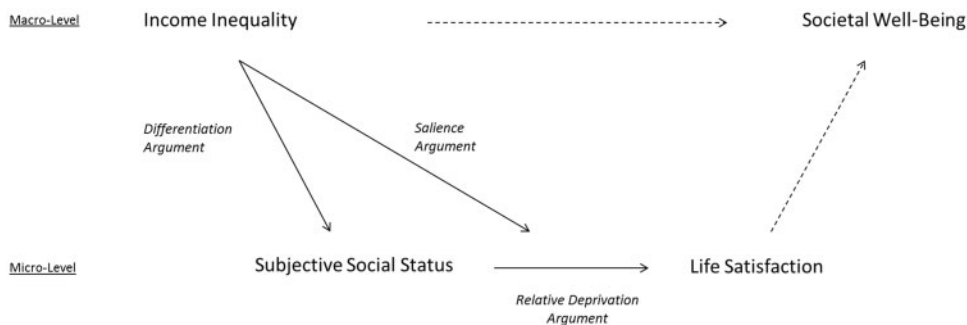
Providing empirical support for this reasoning, researchers find income inequality is associated with a stronger work ethic when income inequality is high (Corneo and Neher, 2012). This suggests that income inequality incites people to work harder, to accept jobs with difficult working conditions, and to work longer hours (Bell and Freeman, 2001; Bowles and Park, 2005)—behaviours that can also be interpreted as signals of social competition if resources are scarce and unequally distributed. Recent work by Walasek and Brown (2015) finds that Google searches related to status-oriented goods are higher in US states with higher income inequality, suggesting that high-income inequality increases the importance of the possession of high-status goods. The phenomenon is not limited to the United States; data from the ESS from 2002 to 2010 show, for example, Europeans attribute more importance to societal status and increase status-seeking processes if income inequalities are high (Paskov, Gërçhani and van de Werfhorst, 2013). Extending the observed time period and adjusting the empirical analysis, the researchers discover a negative relationship between income inequality and status-seeking, however (Paskov, Gërçhani and van de Werfhorst, 2017). This suggests that individuals may sometimes feel too far behind when income inequality is high and adjust their preferences accordingly, striving for less social status.

Given the above considerations, the third hypothesis reads as follows:

*H3: The higher the income inequality, the higher the effect of subjective social status on life satisfaction.*

#### **Research Model**

Figure 1 illustrates the research model. If *subjective social status* is an important psychological mechanism in the inequality–well-being link, I will be able to empirically establish the following three relationships: (i)



**Figure 1.** The research model.

subjective social status increases life satisfaction at the individual level (micro foundation); (ii) income inequality reduces the status individuals assign themselves which, in turn, leads to lower life satisfaction (multi-level mediation); and (iii) income inequality increases the effect of subjective social status on life satisfaction (contextual moderation of micro foundation). I test these links empirically within the European context.

### Research Context

Addressing the specific research context is particularly relevant for research on the inequality-satisfaction link, as findings vary considerably (Schneider, 2016a). Although recent research suggests income inequality is not related to well-being in economically advanced societies (Kelley and Evans, 2017a), scholars often find a *negative* relationship between income inequality and subjective well-being when studying (Western) European countries (Alesina, Di Tella and MacCulloch, 2004; Fahey and Smyth, 2004; Layte, 2012; Delhey and Dragolov, 2014; Ravazzini and Chavez-Juarez, 2018). Only a few studies do not find a statistically significant association between income inequality and well-being in Europe; this is surprising, as they use similar data sources and statistical techniques (Kelley and Evans, 2017a, results on EQLS survey; Zagorski *et al.*, 2014).

Particularly relevant for the study of the inequality-satisfaction link within the European context are the differences between Eastern and Western European countries; while salient, these differences are often insufficiently addressed. For example, Berg and Veenhoven (2010) observe that income inequality and life satisfaction are positively correlated in Eastern Europe, while others find that life satisfaction in transition countries (i.e. post-communist states) is higher when income inequality is low (Sanfey and Teksoz, 2007; Hajdu and Hajdu, 2015). Layte (2012) reports an

interesting interaction effect of inequality and the gross domestic product (GDP) per capita for European countries: the strongest decline in mental well-being is observed for those living in high-GDP countries, while income inequalities reduce well-being in low- and medium-GDP countries less strongly. As Eastern European countries are often those with lower GDP, these findings suggest that the inequality-well-being link is negative—although less strong—for Eastern European countries. Further, Kelley and Evans (2017b) show that income inequality lowers the well-being of Eastern Europeans, particularly older cohorts, i.e. those who experienced communism, while the effect on younger generations is either positive or non-significant.

Research findings on Eastern European societies suggest that socio-political conditions of the larger context affect how individuals interpret and respond to other persons' incomes. For example, using Russian panel data, Senik (2004) finds others' income is positively related to life satisfaction, interpreting this as a confirmation of the *Hirschman tunnel effect* (Hirschman and Rothschild, 1973) whereby people use others' incomes as information to form expectations about their own future. In the early stages of a country's economic development, often accompanied by a political transition process, rapid economic growth and a widening of the income gap, individuals, on average, feel good about themselves. This feeling evolves from the expectations they form about their own future living conditions as they watch others climb the social ladder. Instead of feeling left behind, they assign others' gratification to themselves in the near future. In 2008, Senik (2008) replicated the study using a larger data set, comparing 'old' and 'new' European states and the United States. She finds reference incomes are positively related in the 'new' transition countries and the United States and negatively related in 'old' European countries. These findings suggest that income inequalities may not affect

the well-being of Eastern Europeans via social comparison, as proposed by relative deprivation theory. Instead others' incomes may become relevant information triggering ambition.

However, empirical research on subjective social status and status anxiety suggests the opposite, proposing that relative deprivation theory also applies to Eastern European countries. While Eastern Europeans report, on average, lower subjective well-being (Sanfey and Teksoz, 2007), they also perceive themselves as lower in the social status hierarchy than Western Europeans—a finding attributed by researchers to the prevailing differences in economic prosperity between the two regions (Evans and Kelley, 2004). Research on status anxiety suggests that social status may be an even more important explanation of the inequality–well-being link in transition contexts. The above-mentioned study by Delhey and Dragolov (2014) shows that status anxiety fully explains the link between inequality and well-being in less affluent European countries, i.e. mostly Eastern European countries (with the exception of Cyprus and Malta). Further, research in the German context finds East Germans view overall economic disparities as less justified than West Germans, and they support egalitarian beliefs more strongly. Differences in belief systems cannot be fully explained by economic factors; cultural factors related to the legacy of communism should be added to the explanation (Gerlitz *et al.*, 2012; Schneider and Castillo, 2015).

Overall, interpretations of social and/or economic differences are surely affected by the economic and socio-political context. Therefore, given the above argumentation, I assume hypotheses apply specifically to the Western European context. Findings on Eastern European countries seem to be more diverse, suggesting that inequality effects may be less straightforward in this region. Subjective social status may be more or less relevant for life satisfaction and the explanation of the inequality-satisfaction across Eastern European countries. Unfortunately, the low number of Eastern European countries in the sample does not allow us to test all hypotheses separately for this specific group of countries.

## Methodology

### Data

The study's empirical analyses were based on the sixth round of the ESS from 2012/2013. The ESS is a high-quality, cross-comparative data set containing biennial information representative of the European population aged 15 and above living in private households.<sup>3</sup> The special module on personal and social well-being in the

sixth round of the ESS is the only wave to include questions on both subjective social status and life satisfaction and was therefore selected for this study. Russia and Israel were excluded *a priori* as they are not considered part of Europe. Albania, Bulgaria, Cyprus, Ukraine, and Kosovo were excluded because of lack of comparable data on income inequality from the OECD database (OECD, 2015b). Ultimately, the empirical analysis included 39,756 individuals living in private households within 22 European countries for whom information on all variables was available.<sup>4</sup>

As a robustness check, I conducted subgroup-specific analyses on a selected group of countries (i.e. Western European countries) and individuals (i.e. working age 18–65). In general, results were assumed to be more straightforward for Western European countries and individuals of working age (as perceptions of social status may follow different criteria for retired individuals or students). The reduced sample of all 22 European countries embraces 30,330 individuals of working age (18–65 years). For Western European countries ( $N = 15$ ), sample size ranges from 20,370 (aged 18–65) to 26,819 (all ages). Further, results were replicated using a larger set of European countries (individuals:  $N = 46,172$ ; countries:  $N = 26$ ) based on inequality data from the World Bank.

## Measures

### Dependent variable

Life satisfaction was the main outcome variable. It is a subjective evaluation of whether an individual is happy, content, and satisfied with his/her life (Cheung and Lucas, 2016). Respondents were asked on an 11-point scale 'all things considered, how satisfied are you with your life as a whole nowadays', with responses ranging from 0, extremely dissatisfied, to 10, extremely satisfied.

### Mediator

Subjective social status was the key mediating variable. Respondents were asked to place themselves in a social hierarchy ranging from 10, 'top of our society', to 0, 'bottom of our society'. They were asked the following question: 'There are people who tend to be towards the top of our society and people who tend to be towards the bottom. On this card there is a scale that runs from top to bottom. Where would you place yourself on this scale nowadays?'

### Independent variables—country level

Income inequality was the main independent variable at the macro level. Information on inequality was retrieved

from the OECD database on income distribution; it provides new measures based on more sensitive household income data (for more information, see [OECD, 2015b](#)).<sup>5</sup> The main inequality variable was the Gini coefficient, based on the household disposable income per equivalent household member for 2012. The Gini ranges from 0 (perfect equality) to 1 (perfect inequality). For the present analysis, I recoded the variable into a scale ranging from 0 to 100. To check the robustness of findings ([Kawachi and Kennedy, 1997](#)), I re-ran the analysis for Gini coefficients based on market incomes, as well as other inequality dispersion measures, such as the 90/10 dispersion ratio, the 90/50 dispersion ratio, and the 50/10 dispersion ratio. Dispersion measures are, like the conventional Gini measure, based on the equivalized disposable household income; they allowed me to test for polarization effects at the upper and lower end of the income distribution. All inequality measures were available for the total population and the working age (18–65 years) population. All inequality measures refer to 2012, with the exception of Switzerland, for which inequality measures from 2013 were used, as no information on 2012 was available.

To ensure the effects of income inequality are not spurious, I controlled for the level of economic prosperity by including a measure for real GDP per capita measured as purchasing power parity (real GDP/capita in \$1,000, PPP). This economic indicator is available in the Penn World Table (PWT 9.0) ([Feenstra, Inklaar and Timmer, 2015](#)) and correlates highly with GDP indicators retrieved from other databases, such as from the OECD and the World Bank. To ensure a correct specification of the relationship between economic wealth and life satisfaction across European countries, I used the logarithmic function of GDP. Here, I followed previous research suggesting a linear-log relationship between GDP and life satisfaction ([Stevenson and Wolfers, 2008, 2016](#)). Indeed, models showed a better model fit when GDP was log-transformed—specifically, if differences between Eastern and Western European countries were not controlled for in the analysis. The use of the absolute GDP did not change the main results of this study (see [Supplementary material, Section B](#)). An overview of all macro-level variables appears in the [Supplementary material \(Table A1\)](#).

#### Independent variables—individual level

I controlled for additional demographic and socio-economic characteristics of the individual that potentially influence life satisfaction. The respondent's sex and age functioned as standard control variables. To test for

the u-shaped relationship between age and life satisfaction I included the squared term of age. Further, I distinguished between three educational groups: respondents with completed lower secondary education or less (ISCED1/2, 'lower educated'), upper secondary education and post-secondary non-tertiary education (ISCED 3/4, 'middle educated'), and tertiary education (ISCED 5, 'higher educated'). The empirical analysis was complemented by the inclusion of socio-economic characteristics, including the current status of employment (full/part-time employed, unemployed, not in labour force) and household income quintiles (Ref.: first quintile). To include respondents for whom information on income was missing, I created an extra dummy variable. I further controlled for household characteristics, such as living with a partner and children in the household. All metric variables were grand mean centred. Table A2 in the [Supplementary material](#) provides an overview of the independent variables at the individual level.

#### Methods

I applied multi-level modelling techniques to estimate the effects of both individual and country level characteristics, and their interaction. Unlike conventional regression analysis, multi-level models account for hierarchical or nested data structure, whereby observations at the lower (individual) level are nested in higher order units (countries). Considering the multiple levels in the computation process allows researchers to take into account the interdependency of observations within countries. With an intra-class correlation of 0.14 and a design effect of 250.2 for the main dependent variable (life satisfaction), the use of multi-level models for the present analysis is highly recommended.

*Random intercept models* allow for the variation of intercepts across countries. Variations in intercepts can be explained (i) by country level predictor variables (income inequality) that explain the contextual variation in the outcome variable (life satisfaction) and (ii) by individual level variables that explain the compositional variations and micro-level processes. *Random slope models* allow for the variation of slopes across countries. Variations in slopes can be explained by country-level predictor variables modelled as cross-level interactions between a country level variable and an individual level attribute, whose effect is allowed to vary between countries (subjective social status on life satisfaction) ([Heck and Thomas, 2015](#)).

*Multilevel mediation analysis* (MMA) offers the opportunity to model complex relationships and to estimate direct and indirect relationships between variables



within a multilevel framework. Mediator variables change from being dependent to being independent (i.e. subjective social status) and, as such, are treated as endogenous in path models. I applied a 2–1–1 MMA with random slopes, following Preacher, Zyphur and Zhang (2010) and Preacher, Zhang and Zyphur (2011), given that the independent variable, income inequality, was located at level 2, while perceptions of social status and life satisfaction, individual level characteristics, were located at level 1. I measured the mediation at the between level, partitioning the variances of the individual level variables into a between and within level component. The mediation effect is the product of (i) the effect of income inequality on the mediator and (ii) the sum of (a) the effect of the mediator (i.e. subjective social status) on the outcome variable (life satisfaction) at the macro level and (b) the mean of the random slope of the same effect on the micro level [see e.g. Delhey and Dragolov (2014) for an application of this method].

As estimator, I used maximum likelihood with robust standard errors for all models and made computations with Mplus, version 8 (Muthén and Muthén, 2015). To ensure representative estimations for the country populations, I applied post-stratification weights following the recommendation of the ESS.

### Analytic Strategy

Firstly, I ran multi-level random intercept models to empirically test the effects of income inequality on life satisfaction. I subsequently included demographic and socio-economic characteristics at the individual level and economic prosperity at the macro level step-wise in the model. Secondly, and to test the relative deprivation argument (H1), I included subjective social status at the micro level in the analysis with and without micro-level controls. Thirdly, I conducted 2–1–1 MMA with random slopes to explore the mediating effect of subjective social status on the inequality-satisfaction link (H2). Lastly, I ran a multilevel random-slope model to test for the moderating effect of income inequality on the relationship between subjective social status and life satisfaction (H3).

The analyses used the full sample of 22 European countries covering individuals of all ages, with the Gini coefficient based on the equalized disposable household incomes as the main independent variable. I replicated all analyses for different inequality measures (Gini coefficient based on market incomes, and inequality dispersion measures), subpopulations (full population vs. working age), and countries (full sample vs. Western European countries). To ensure that the empirical results

were not driven by specific countries (outliers), I re-ran the analyses excluding countries one-by-one from the analysis. Then I conducted additional robustness checks, including the addition of a variable on East/West differences (see Supplementary material, Section C) and using inequality data from the World Bank (i.e. Gini coefficient based on disposable income). The use of these data allowed me to test all hypotheses on a larger sample of European countries ( $N=26$ ) (see Supplementary material, Section D). Please note that the low number of Eastern European countries ( $N=7$  in study sample;  $N=10$  in Supplementary sample) did not allow separate analysis.

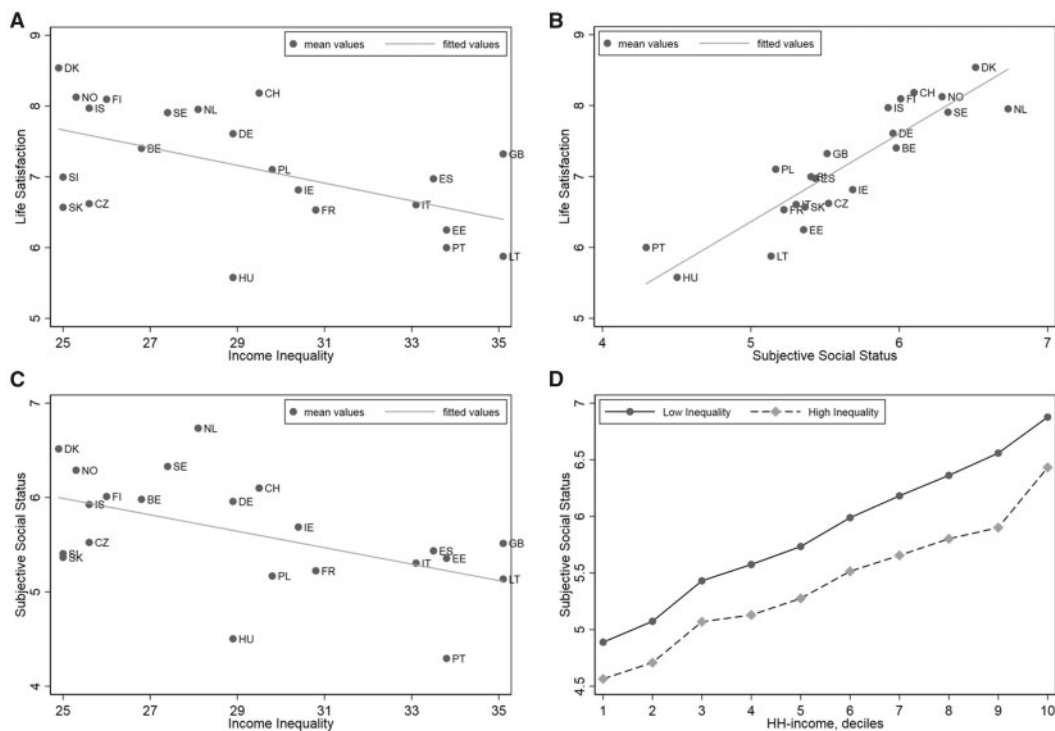
## Results

### Inequality–Satisfaction Link

This study finds income inequality is negatively linked to life satisfaction. The descriptive analysis reveals a significant and negative correlation of  $-0.53$  ( $P < 0.05$ ) at the country level, indicating that the higher the income inequality, the lower, on average, the life satisfaction (Figure 2A). This relationship is even stronger and more pronounced for Western European countries, with a correlation coefficient of  $-0.78$  ( $P < 0.001$ ).

The results of the multi-level regression models in Table 1 support the descriptive statistics and reveal a significant and negative effect of income inequality ( $\beta = -0.13$ ,  $SE = 0.04$ ; see Model 1). After controlling for individual and country characteristics, the effect decreases, but remains significant ( $\beta = -0.11$ ,  $SE = 0.04$ , see Model 2;  $\beta = -0.06$ ,  $SE = 0.02$ , see Model 3).

Table 2 shows the results are robust for the measurement of income inequality (Gini vs. ratio measures, Gini disposable vs. market income) and the selection of subpopulations (total vs. working age) and countries (all countries vs. Western European countries). With one exception (i.e. 50/10 dispersion ratio), all coefficients remain negative and significant even after controlling for individual and country characteristics and only vary in the size of the effect. Overall, stronger effects are observed (i) for Western European countries, in particular for the working-age population, compared with the overall sample and (ii) for Gini coefficients based on disposable household income compared with market household incomes. Further, (iii) a comparison of dispersion ratios reveals that measures sensitive to inequalities at the upper end of the income distribution (90/50 dispersion ratio) are more strongly related to life satisfaction than measures sensitive to the lower end (50/10 dispersion ratio).



**Figure 2.** (A–D) Life satisfaction, subjective social status, and income inequality

Source: ESS round 6; descriptive statistics; figures report country averages in life satisfaction, subjective social status and income inequality.

### Relative Deprivation Argument: Testing the Micro Foundation

In my search for an explanation of the inequality-satisfaction link, and in line with the theoretical model, I tested the *relative deprivation hypothesis* (H1) on whether subjective social status is positively associated with life satisfaction. Figure 2B reports a strong positive association between the country's average subjective status and average life satisfaction (correlation: 0.89,  $P < .001$ ): countries in which individuals report, on average, a higher social standing also show higher average scores of life satisfaction. Correlations are evidently lower at the individual level comprising a larger and more heterogeneous group of observations (correlation = 0.43,  $P < 0.001$ ).

The results of the multilevel random intercept models in Table 1 provide further support for the *relative deprivation hypothesis* (H1), with a positive and significant association at the micro level ( $\beta = 0.45$ ,  $SE = 0.03$ , see Model 4) that remains robust after controlling for other demographic and socio-economic characteristics ( $\beta = 0.39$ ,  $SE = 0.02$ , see Model 5). Country-specific regression analyses reveal that subjective social status has a positive and significant effect on life satisfaction in all

European countries included in the analysis (see Table A3–1/A3–2 in [Supplementary material](#)). Multilevel analysis with a random slope specification shows that slopes of subjective social status vary significantly across European countries [Variance ( $\beta$ ) = 0.01,  $SE = 0.01$ , see Table A4 in [Supplementary material](#)]. Overall, the effect of subjective social status is slightly weaker if only Western European countries are selected (see Table 4).

### Differentiation Argument: Testing the Mediation Effect

Following the *differentiation argument* (H2), I tested whether income inequality is negatively associated with subjective social status and, thus, mediates the relationship between income inequality and life satisfaction. Figure 2C reports a negative relationship between income inequality and subjective social status, with a correlation coefficient of  $-0.51$  ( $P < 0.05$ ), indicating that the higher the income inequality in a country, the lower the average perceived social status. This relationship is slightly stronger among the working-age population ( $-0.53$ ,  $P < 0.05$ ) and in Western European countries ( $-0.75$ ,  $P < 0.001$ ). Further evidence substantiating the

**Table 1.** Income inequality and life satisfaction in Europe: results of the multilevel random intercept analysis

	Model 1		Model 2		Model 3		Model 4		Model 5	
	b	SE	b	SE	b	SE	b	SE	b	SE
Intercept	7.06***	0.14	5.92***	0.17	5.92***	0.12	7.08***	0.08	6.30***	0.10
Between level										
Gini coefficient (0–100)	–0.13**	0.04	–0.11**	0.04	–0.06**	0.02	–0.05*	0.02	–0.05*	0.02
GDP/C (log)					1.95***	0.37	1.39***	0.31	1.40***	0.30
Within level										
Subj. social status (SSS)							0.45***	0.03	0.39***	0.02
Female (Ref.: male)			0.02	0.04	0.02	0.04			0.03	0.03
Age (years)			–0.01***	0.00	–0.01***	0.00			–0.01***	0.00
Age squared			0.00***	0.00	0.00***	0.00			0.00***	0.00
Education (Ref. low)										
Education—middle			0.10*	0.04	0.10*	0.04			–0.01	0.04
Education—high			0.31***	0.07	0.31***	0.07			0.00	0.05
Employment (Ref. empl.)										
Unemployed			–1.05***	0.08	–1.05***	0.08			–0.84***	0.08
Not in labour force			–0.06 <sup>+</sup>	0.03	–0.06 <sup>+</sup>	0.03			–0.04	0.03
HH-income (Ref. 1st quintile)										
2nd quintile			0.42***	0.06	0.42***	0.06			0.27***	0.06
3rd quintile			0.61***	0.07	0.61***	0.07			0.38***	0.07
4th quintile			0.81***	0.07	0.81***	0.07			0.48***	0.07
5th quintile			1.13***	0.09	1.13***	0.09			0.67***	0.07
No income information			0.58***	0.08	0.58***	0.08			0.33***	0.07
Living with partner			0.46***	0.05	0.46***	0.05			0.39***	0.05
Children in HH			–0.15***	0.03	–0.15***	0.03			–0.12***	0.03
Variance components										
Variance (within)	4.16***	0.27	3.81***	0.24	3.81***	0.24	3.62***	0.23	3.44***	0.21
Variance (between)	0.48***	0.12	0.43***	0.11	0.16***	0.04	0.13***	0.03	0.12***	0.03
AIC	169,625		166,108		166,089		164,106		162,040	
BIC	169,659		166,263		166,252		164,157		162,212	

Notes: ESS round 6; N(individual) = 39,756; N(country) = 22; table reports unstandardized  $\beta$  coefficients (b) and standard errors (SE) of multilevel random intercept models with fixed coefficients; <sup>+</sup> $P < 0.10$ , \* $P < 0.05$ , \*\* $P < 0.01$ , \*\*\* $P < 0.001$  (two-sided tests).

differentiation argument is provided in Figure 2D, which shows the average social status by income groups for countries with higher and lower income inequality. Across all income groups, individuals living in more equal societies report, on average, a higher social status than individuals who live in more unequal societies.

These descriptive findings, together with those on the relative deprivation argument, raise the question of whether subjective social status functions as a mediator and helps to explain how income inequality is linked to life satisfaction. Figure 3 reports the results of the MMA (based on Model 1, Table A4 in Supplementary material) when also controlling for GDP/capita; here, we see a negative and significant effect of income inequality on subjective social status ( $\beta = -0.05$ , SE = 0.02) and a positive effect of subjective social status on life satisfaction ( $\beta = 0.94$ , SE = 0.19; see Figure 3A). The significant indirect effect ( $\beta = -0.05$ , SE = 0.02) and the drop in

size and significance of the direct effect ( $\beta = -0.01$ , SE = 0.02) indicate that subjective social status fully explains the inequality-satisfaction link. The results of the MMA are similar for the working-age population (see Figure 3B) and Western European countries (see Figure 3C and D).

Results slightly vary with the inequality measure (Table 3). While all models predict a significant and negative indirect effect of subjective social status on life satisfaction, the direct effect of income inequality sometimes remains significant (e.g. with the Gini coefficient based on market incomes for Western European countries, and with the dispersion ratio sensitive to the lower end of the income distribution if no other individual level characteristics are controlled for). These findings indicate that in some conditions, subjective social status only partly explains the relationship between income inequality and life satisfaction.

**Table 2.** Results of the multilevel random intercept analysis for different inequality measures and subsamples

	Model 1		Model 2		Model 3		Model 4		Model 5	
	b	SE	b	SE	b	SE	b	SE	b	SE
<u>European sample</u>										
Full sample (all ages)										
Gini coefficient—disposable income	-0.13**	0.04	-0.11**	0.04	-0.06**	0.02	-0.05*	0.02	-0.05*	0.02
Gini coefficient—market income	-0.09***	0.03	-0.08**	0.03	-0.05***	0.01	-0.04**	0.01	-0.04**	0.01
P90P10—disposable income	-0.82***	0.19	-0.73***	0.20	-0.35*	0.16	-0.30*	0.13	-0.27*	0.14
P90P50—disposable income	-2.79***	0.65	-2.54***	0.62	-1.38**	0.48	-1.14*	0.45	-1.09*	0.43
P50P10—disposable income	-2.49**	0.87	-2.11*	0.90	-0.95	0.61	-0.90 <sup>+</sup>	0.48	-0.75	0.51
Working-age sample (age 18–65)										
Gini coefficient—disposable income	-0.13**	0.04	-0.11**	0.04	-0.07**	0.02	-0.06**	0.02	-0.05*	0.02
Gini coefficient—market income	-0.09***	0.03	-0.08**	0.03	-0.05***	0.01	-0.04***	0.01	-0.04**	0.01
P90P10—disposable income	-0.69***	0.15	-0.61***	0.17	-0.32*	0.13	-0.29**	0.10	-0.25*	0.12
P90P50—disposable income	-3.05***	0.57	-2.78***	0.57	-1.54**	0.48	-1.28**	0.45	-1.21**	0.44
P50P10—disposable income	-1.76**	0.54	-1.53*	0.60	-0.83*	0.37	-0.74*	0.29	-0.65 <sup>+</sup>	0.34
<u>Western European sample</u>										
Full sample (all ages)										
Gini coefficient—disposable income	-0.17***	0.04	-0.14***	0.03	-0.10**	0.04	-0.09*	0.04	-0.08*	0.04
Gini coefficient—market income	-0.10***	0.02	-0.09***	0.02	-0.06***	0.01	-0.06***	0.01	-0.05***	0.01
P90P10—disposable income	-0.92***	0.19	-0.75***	0.17	-0.55*	0.23	-0.50*	0.20	-0.43*	0.20
P90P50—disposable income	-3.33***	0.67	-2.78***	0.55	-2.00**	0.67	-1.71*	0.72	-1.57*	0.65
P50P10—disposable income	-2.57***	0.68	-2.10**	0.64	-1.29 <sup>+</sup>	0.71	-1.27*	0.55	-1.09 <sup>+</sup>	0.58
Working-age sample (age 18–65)										
Gini coefficient—disposable income	-0.18***	0.03	-0.14***	0.03	-0.11**	0.03	-0.10**	0.04	-0.09**	0.03
Gini coefficient—market income	-0.11***	0.02	-0.09***	0.02	-0.07***	0.01	-0.06***	0.01	-0.06***	0.01
P90P10—disposable income	-0.86***	0.17	-0.67***	0.16	-0.52*	0.21	-0.50**	0.17	-0.42*	0.18
P90P50—disposable income	-3.70***	0.65	-2.97***	0.56	-2.34**	0.79	-2.04*	0.80	-1.85*	0.72
P50P10—disposable income	-2.31***	0.47	-1.81***	0.45	-1.17*	0.55	-1.14**	0.43	-0.97*	0.46

Notes: ESS round 6; number of observations—country level: total European sample  $N=22$ ; Western European sample  $N=15$ ; number of observations—individual level: total European sample  $N=39,756$ ; European working-age sample  $N=30,330$ ; Western European sample  $N=26,819$ ; Western European working-age sample  $N=20,370$ ; table reports unstandardized  $\beta$  coefficients (b) and standard errors (SE) of multilevel random intercept models with fixed coefficients; analyses control for individual and country characteristics according to models presented in Table 1; abbreviations of inequality measures refer to the following: P90P10 = 90/10 dispersion ratio; P90P50 = 90/50 dispersion ratio; P50P10 = 50/10 dispersion ratio; <sup>+</sup> $P < 0.10$ , \* $P < 0.05$ , \*\* $P < 0.01$ , \*\*\* $P < 0.001$  (two-sided tests).

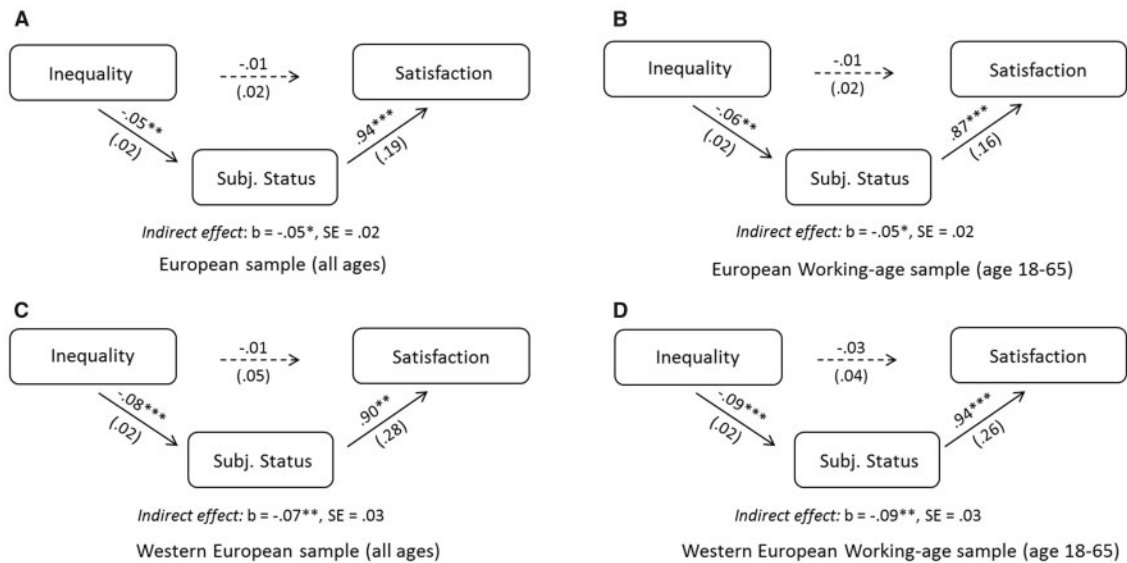
Further, and in line with the theoretical reasoning, the comparison of results using different dispersion ratios shows subjective social status has a stronger indirect effect in models based on inequalities at the upper end of the income distribution (90/50 dispersion ratio) than at the lower end (50/10 dispersion ratio), especially for Western European countries. The results also suggest a stronger direct effect of income inequality on subjective social status for upper dispersion measures [90/50 dispersion ratio; total sample:  $\beta = -0.97$ ,  $SE = 0.42$ ; working-age sample (18–65):  $\beta = -1.07$ ,  $SE = 0.48$ ; Western Europe:  $\beta = -1.63$ ,  $SE = 0.32$ ; Western Europe working-age sample (18–65):  $\beta = -1.92$ ,  $SE = 0.38$ ] than lower dispersion measures [50/10 dispersion ratio; total sample:  $\beta = -0.88$ ,  $SE = 0.35$ ; working-age sample (18–65):  $\beta = -0.62$ ,  $SE = 0.28$ ; Western Europe:  $\beta = -0.87$ ,  $SE = 0.48$ ;

Western Europe working-age sample (18–65):  $\beta = -0.83$ ,  $SE = 0.36$ ]. In other words, discrepancies at the upper end reduce the perceived social status to a larger degree than discrepancies at the lower end of the income distribution.

Overall, the results for different inequality measures and subpopulations demonstrate that subjective social status is highly relevant and mediates the relationship between income inequality and well-being across European countries. Results vary only slightly with the inclusion of additional control variables at the individual level (see Table A5 in Supplementary material).

### Salience Argument: Testing the Moderation Effect

To test whether income inequality also functions as a moderator and influences the production of life



**Figure 3.** (A–D) The mediation effect. Results of the MMA for different population sub-samples

Sources: ESS round 6; income inequality measure: Gini coefficient based on the equalized disposable household income; number of observations—country level: total European sample  $N=22$ ; Western European sample  $N=15$ ; number of observations—individual level: total European sample  $N=39,756$ ; European working-age sample  $N=30,330$ ; Western European sample  $N=26,819$ ; Western European working-age sample  $N=20,370$ ; table reports unstandardized  $\beta$  coefficients and standard errors in brackets of the MMA with random slopes; all analyses control for log GDP/C on subjective social status and life satisfaction; based on Table 1, Model 4 with random slope specification (see also Model 1, Table A4 in Supplementary material);  $^+P < 0.10$ ,  $^*P < 0.05$ ,  $^{**}P < 0.01$ ,  $^{***}P < 0.001$  (two-sided tests).

satisfaction by subjective social status—as predicted by the *saliency hypothesis* (H3)—I modelled the effect of income inequality (and GDP/capita) on the random slope of subjective social status using multi-level regression analysis (Model 1, Table A4 in Supplementary material). The results in Table 4 show a positive cross-level interaction effect, indicating that increasing income inequality is associated with an increasingly pronounced effect of subjective social status on life satisfaction.

Results vary for the inequality measure and for sub-populations. The cross-level interaction effects are not always significant if the total sample is selected for the analysis. Instead, the cross-level interaction effects between economic prosperity and subjective social status seem to be dominant, indicating that the higher the GDP, the weaker the influence of subjective social status on life satisfaction. These effects are sensitive to the inclusion of an additional variable that controls for differences between Eastern and Western European countries. In fact, results show a clearly positive and significant cross-level interaction effect of income inequality for almost all inequality measures (remaining exception: 50/10 dispersion ratio) and subpopulations, if East–West differences are controlled for in the analysis (see Table C4 in Supplementary material).

The cross-level interaction effects between income inequality and subjective social status are more pronounced and straightforward for the working-age population and for Western European countries, thereby suggesting income inequality strengthens the link between subjective social status and life satisfaction for these particular subgroups. Furthermore, results for different inequality measures show a more consistent and clearly significant positive interaction effect for dispersion ratios related to inequalities at the upper end of the income distribution. The results based on the 90/50 dispersion ratio reinforce the hypothesis that inequalities towards the upper end may be particularly influential. Results vary only slightly with the inclusion of additional control variables at the individual level (see Table A6 in Supplementary material).

### Additional Robustness Checks

#### Step-wise deletion of countries

To ensure that the results were not driven by specific countries (outliers), I re-ran the analyses excluding countries one-by-one from the analysis. The results show that findings are largely robust and are not dependent on particular outlier effects (results for selected models are reported in Table A7 in the Supplementary material).

**Table 3.** Results of the MMA for different inequality measures and subsamples

	European sample		Western European sample	
	Direct effect	Indirect effect	Direct effect	Indirect effect
Full sample (all ages)				
Gini coefficient—disposable income	-0.01 (0.02)	-0.05* (0.02)	-0.01 (0.05)	-0.07** (0.03)
Gini coefficient—market income	-0.01 (0.01)	-0.03* (0.01)	-0.03 (0.02)	-0.03** (0.01)
P90P10—disposable income	-0.08 (0.09)	-0.27* (0.12)	-0.15 (0.17)	-0.39** (0.15)
P90P50—disposable income	-0.14 (0.39)	-0.91* (0.46)	-0.16 (0.91)	-1.48** (0.52)
P50P10—disposable income	-0.51 <sup>+</sup> (0.28)	-0.77* (0.34)	-0.64 <sup>+</sup> (0.38)	-0.74 <sup>+</sup> (0.39)
Working-age sample (age 18–65)				
Gini coefficient—disposable income	-0.01 (0.02)	-0.05* (0.02)	-0.03 (0.04)	-0.09** (0.03)
Gini coefficient—market income	-0.02 (0.01)	-0.04** (0.01)	-0.04** (0.01)	-0.04** (0.01)
P90P10—disposable income	-0.11 (0.09)	-0.21* (0.10)	-0.22 (0.15)	-0.37** (0.12)
P90P50—disposable income	-0.47 (0.41)	-0.91 <sup>+</sup> (0.47)	-0.72 (0.93)	-1.76** (0.59)
P50P10—disposable income	-0.37 (0.23)	-0.53* (0.27)	-0.57 <sup>+</sup> (0.31)	-0.78* (0.32)

Notes: ESS round 6; number of observations—country level: total European sample  $N = 22$ ; Western European sample  $N = 15$ ; number of observations—individual level: total European sample  $N = 39,756$ ; European working-age sample  $N = 30,330$ ; Western European sample  $N = 26,819$ ; Western European working-age sample  $N = 20,370$ ; table reports unstandardized  $\beta$  coefficients and standard errors in brackets of the MMA with random slopes; all analyses control for log GDP/C on subjective social status and life satisfaction; based on Table 1, Model 4 with random slope specification (see also Model 1, Table A4 in Supplementary material); abbreviations of inequality measures refer to the following: P90P10 = 90/10 dispersion ratio; P90P50 = 90/50 dispersion ratio; P50P10 = 50/10 dispersion ratio; <sup>+</sup> $P < 0.10$ , \* $P < 0.05$ , \*\* $P < 0.01$ , \*\*\* $P < 0.001$  (two-sided tests).

### Inclusion of East–West variable

To test whether results are robust with respect to contextual differences between Eastern and Western Europeans (unrelated to economic prosperity), I re-ran the analysis including a dummy variable for East–West differences (1 = Eastern Europe, 0 = Western Europe) (see Supplementary material, section C).<sup>6</sup> The main results are largely similar, but the effects of income inequality are even more pronounced if East/West differences are controlled for in the analysis. Importantly, and as stated above, we observe a significant and positive cross-level interaction effect for income inequality that remains robust across subpopulations and most inequality measures (exception: P50P10). This is mainly because subjective social status seems to be more important for the production of life satisfaction in Eastern than Western Europe—a finding that cannot be attributed to economic differences (in GDP/capita) between the two regions.

### Enlarging the sample size

Further, and to ensure that results were not biased by the selection of European countries, I re-ran all models using different inequality data from the World Bank (i.e. Gini coefficient based on disposable income). This allowed me to test the robustness of findings on a larger sample with information on 46,172 individuals (all ages) from 26 European countries (Supplementary material, Section D). The results support the main findings. They also show that enlarging the set of European countries by adding mainly Eastern European countries makes it even more important to control for differences in economic prosperity, not to mention differences between Eastern and Western Europeans more generally, to ensure findings on the inequality-satisfaction link are not spurious. Furthermore, our results indicate analyses using the enlarged data set require a critical check for outliers. For example, I find Albania is an important outlier in the MMA. Subjective social status only partly

**Table 4.** Results of the multilevel random slope analysis for different inequality measures and subsamples

	Within level		Between level							
	Subj. social status (SSS) (random)		Inequality (IE)		Cross-level interaction Inequality *		GDP (log)		Cross-level interaction GDP (log) *	
	b	SE	b	SE	b	SE	b	SE	b	SE
<b>European sample</b>										
Full sample (all ages)										
Gini coefficient—disposable income	0.43***	0.02	-0.06*	0.02	0.01	0.01	1.45***	0.30	-0.17*	0.07
Gini coefficient—market income	0.44***	0.02	-0.05***	0.01	0.01**	0.00	1.40***	0.29	-0.16*	0.06
P90P10—disposable income	0.43***	0.02	-0.33*	0.13	0.04	0.04	1.31***	0.33	-0.16*	0.08
P90P50—disposable income	0.44***	0.02	-1.27**	0.46	0.26*	0.11	1.37***	0.33	-0.14*	0.07
P50P10—disposable income	0.43***	0.02	-1.00*	0.50	0.04	0.12	1.42***	0.29	-0.20**	0.08
Working-age sample (age 18–65)										
Gini coefficient—disposable income	0.45***	0.02	-0.06**	0.02	0.01*	0.01	1.36***	0.29	-0.16*	0.06
Gini coefficient—market income	0.45***	0.02	-0.05***	0.01	0.01*	0.00	1.36***	0.28	-0.17**	0.07
P90P10—disposable income	0.45***	0.02	-0.31**	0.11	0.06 <sup>+</sup>	0.03	1.23***	0.30	-0.14*	0.07
P90P50—disposable income	0.45***	0.02	-1.40**	0.47	0.28*	0.13	1.21***	0.32	-0.13*	0.06
P50P10—disposable income	0.45***	0.02	-0.79**	0.30	0.09	0.10	1.37***	0.27	-0.18*	0.07
<b>Western European sample</b>										
Full sample (all ages)										
Gini coefficient—disposable income	0.39***	0.02	-0.09*	0.04	0.02***	0.00	0.82	0.52	0.07	0.12
Gini coefficient—market income	0.39***	0.02	-0.06***	0.01	0.01***	0.00	0.73*	0.31	0.10	0.10
P90P10—disposable income	0.39***	0.02	-0.52*	0.20	0.07*	0.03	0.65	0.55	0.05	0.13
P90P50—disposable income	0.39***	0.02	-1.79*	0.73	0.34***	0.10	0.87	0.54	0.06	0.12
P50P10—disposable income	0.39***	0.02	-1.31*	0.56	0.12	0.08	1.05**	0.35	-0.04	0.13
Working-age sample (age 18–65)										
Gini coefficient—disposable income	0.42***	0.02	-0.10**	0.04	0.02***	0.00	0.62	0.43	0.06	0.12
Gini coefficient—market income	0.42***	0.02	-0.06***	0.01	0.01***	0.00	0.72**	0.23	0.00	0.11
P90P10—disposable income	0.42***	0.02	-0.51**	0.17	0.08**	0.03	0.44	0.44	0.05	0.15
P90P50—disposable income	0.42***	0.02	-2.10*	0.84	0.34**	0.12	0.55	0.53	0.04	0.12
P50P10—disposable income	0.42***	0.02	-1.18**	0.44	0.13	0.09	0.90**	0.35	-0.06	0.14

Notes: ESS round 6; number of observations—country level: total European sample  $N=22$ ; Western European sample  $N=15$ ; number of observations—individual level: total European sample  $N=39,756$ ; European working-age sample  $N=30,330$ ; Western European sample  $N=26,819$ ; Western European working-age sample  $N=20,370$ ; table reports unstandardized  $\beta$  coefficients and standard errors in brackets of multilevel random slope models; based on Table 1, Model 4 with random slope; (see also Model 1, Table A4 in Supplementary material); abbreviations of inequality measures refer to the following: P90P10 = 90/10 dispersion ratio; P90P50 = 90/50 dispersion ratio; P50P10 = 50/10 dispersion ratio; <sup>+</sup>  $P < 0.10$ , \*  $P < 0.05$ , \*\*  $P < 0.01$ , \*\*\*  $P < 0.001$  (two-sided tests).

mediates the relationship between income inequality and life satisfaction, if Albania is included in the analysis. Albania shows a surprisingly high level of subjective social status given its low level of life satisfaction.

## Discussion

The consequences of income inequality are a hotly debated topic. Despite the increasing number of research studies, empirical findings on subjective well-being are mixed (see Schneider, 2016a). Further, the psychological mechanisms through which income inequality influences life satisfaction remain unclear and are seldom studied empirically. Based on sociological and social

psychological reasoning, I posited *self-perception of social status* is a key mechanism through which income inequality affects subjective well-being. More specifically, I argued higher subjective social status is likely to increase life satisfaction at the individual level (*relative deprivation argument*), and I proposed two paths whereby income inequality becomes an important contextual factor for self-evaluations. Firstly, the contextual effect of income inequality on life satisfaction is mediated by self-perceptions of status (*differentiation argument*), and secondly, income inequality moderates the relationship between subjective social status and well-being (*salience argument*). The study explored these links empirically in

the European context using data from the ESS 2012/2013, matched with information from the OECD database on income distribution. The final sample comprised 39,756 individuals in 22 European countries. I applied multi-level modelling techniques to test the proposed hypotheses and used different inequality measures, sub-populations and region-specific subsamples to test the robustness of empirical findings. I then replicated the findings using a larger set of European countries comprising 46,172 individuals in 26 European countries. The following four general findings emerge from the study.

Firstly, the study provides supportive data for the assumption that income inequality harms the well-being of Europeans. Although recent studies claim income inequality only lowers the well-being of Eastern Europeans who have experienced communism and has no effect in economically affluent countries, such as Western Europe (Kelley and Evans, 2017a,b), the results of this study support earlier work on European societies (Alesina, Di Tella and MacCulloch, 2004; Fahey and Smyth, 2004; Layte, 2012; Delhey and Dragolov, 2014; Ravazzini and Chavez-Juarez, 2018) finding income inequality is associated with lower life satisfaction. To test the sensitivity of the empirical results, I included control variables, multiple inequality measures, and different subpopulations; the findings confirm the robustness of prior results and show a particularly strong association between inequality and well-being for the working-age population in Western Europe. Interestingly, measures sensitive to inequalities at the upper end (90/50 dispersion ratio) seem more strongly related to subjective social status and life satisfaction than measures sensitive to the lower end of the income distribution (50/10 dispersion ratio). This finding may indicate that individuals are particularly harmed by inequalities at the top end of the distribution. However, more detailed analyses are certainly necessary to support this assumption and to test for any methodological artefacts caused, for example, by higher cross-country variation at the top than the bottom end of the income distribution.

Secondly, the study provides supportive data for the *relative deprivation argument* using subjective social status as an alternative measure to test relative deprivation processes. This study finds subjective social status is strongly and positively related to life satisfaction at the individual level. Results confirm prior research on specific countries (Zhao, 2012; Schneider, 2016b), showing the relationship between subjective social status and life satisfaction is valid for a large number of European societies and the European population more broadly. The strong positive association also suggests that relative

deprivation processes form an important micro foundation for the inequality-satisfaction link, in particular for the working-age population in Europe.

Thirdly, findings of the MMAs support what I have called the *differentiation hypothesis*; individuals tend to report a lower subjective status in countries with higher income inequality, and this results in lower levels of life satisfaction. This suggests that subjective social status is a key mechanism in the inequality-satisfaction link. It also complements and adds to previous research identifying perceptions of fairness, trust, hope, and status anxiety as important explanations (Oishi *et al.*, 2011; Delhey and Dragolov, 2014; Cheung, 2016).

Fourthly, in support of the *salience argument*, income inequality affects the degree to which life satisfaction depends on status perceptions. The results of the random-slope models reveal that the higher the level of inequality in the country, the more important social status is for the production of life satisfaction. These findings are more pronounced for Western European countries, notably among the working-age population, and if East–West differences are controlled for in analyses based on the total sample population. Inequalities, especially those observed at the upper half of the income distribution (P90P50), significantly and consistently increase the salience of subjective social status for life satisfaction. It is plausible to assume that social comparison and value formation processes are important explanations, but more empirical research is needed on the specific mechanisms that explain why income inequality is a significant contextual characteristic for the ‘production processes’ of life satisfaction (Lindenberg, 2001). This study’s findings support prior reasoning on the relationship of economic inequality, subjective social status and life satisfaction (Kraus *et al.*, 2013); they also complement research on the moderating effects of income inequality on the determinants of subjective well-being (Zhao, 2012; Cheung and Lucas, 2016), subjective social status (Lindemann and Saar, 2014), and class identification (Andersen and Curtis, 2012).

#### Limitations and Implications for Future Research

This study has some limitations that need to be addressed. Firstly, like previous studies on the underlying mechanisms of the inequality-satisfaction link (Oishi *et al.*, 2011; Delhey and Dragolov, 2014), ours used cross-sectional survey data. This calls for caution, and any causal interpretation of the presented results is based on theoretical rather than empirical reasoning. This is particularly important, as we cannot reject arguments on reversed causality between life satisfaction and subjective social status, even though the theoretical



model and psychological research suggest this is not the case (Taylor and Brown, 1994). Longitudinal survey data on subjective social status and life satisfaction are required to empirically test the causal relationship and to empirically prove this study's causal assumptions. Although changes in income inequality and life satisfaction are increasingly studied (Schröder, 2016, 2017; Cheung, 2017), future research needs to look more closely at changes in the underlying psychological mechanisms. Importantly, time-effects have to be considered explicitly in the empirical analysis, if comparative longitudinal survey data are used (Fairbrother, 2014; Schmidt-Catran and Fairbrother, 2016). This study's findings can be considered the first step in a larger research enterprise on the consequences of income inequality for subjective well-being and the mechanisms driving this relationship.

Secondly, and largely due to the availability of data, the main empirical analyses are based on 22 European countries (15 Western European countries). Although I replicated all findings on an enlarged sample based on 26 European countries, doubts on the accuracy and reliability of the presented results may remain, given the rather small number of clusters (countries) at the macro level (Mills and Präg, 2016). Research suggests that biases in maximum likelihood estimates of macro effects and their confidence intervals (in linear multilevel random intercept models) are only marginal if more than 15 to 20 countries are available at the macro level (Stegmüller, 2013). However, variability in the point estimates of macro-level effects may still be high and lead to inaccurate conclusions (Bryan and Jenkins, 2016). Concerns of biased estimates and lack of statistical power are even more likely if model specifications are more complex, including, for example, random slopes. Therefore, the empirical results can only be considered preliminary; future research should test the proposed hypotheses on a larger set of countries and in different research contexts. This will require the inclusion of reliable indicators of well-being and subjective social status in country-comparative (at best longitudinal) survey studies.<sup>7</sup>

At the same time, future research needs to include more Eastern European countries to ensure the inequality-satisfaction link can be studied separately in different socio-political contexts within Europe. Given the limited number of Eastern European countries in the sample, I was not able to test the specific impact of subjective social status on the inequality-satisfaction link for this specific group of countries. Like others before me, I suggest future research needs to be sensitive to the geographic region (Cheung, 2016) and socio-political

context, especially former communist societies (Kelley and Evans, 2017b).

Thirdly, I measured subjective social status using a one-item measure, and this is prone to measurement bias. Although one-item measures are often used in epidemiological research (Präg *et al.*, 2016), future research on the topic is advised to complement one-item measures by adding other items to ensure the valid measurement of status perception across countries and population groups and to minimize potential measurement bias (Cundiff *et al.*, 2013). Multi-item measures will also help to clearly distinguish between the two conceptually distinct outcomes, subjective social status and subjective well-being.

Fourthly, by proposing subjective social status as a potential mechanism explaining the inequality-satisfaction link, the study opens a black-box on the relationship between income inequality and subjective social status. Whether income inequality affects subjective social status by shifting the frames of reference for social comparison towards the upper end of the income stratum and/or by increasing the frequency with which individuals compare themselves to upper income groups remains unclear. I encourage future research to look more closely into the consequences of income inequality on social comparison, in particular, upward comparisons (Boyce *et al.*, 2010) and the use of referential standards, ideally using experimental research designs (Kraus *et al.*, 2013). More research is also needed on the determinants of social status perceptions more broadly (Powdthavee, 2009). Subjective social status implies a dual cognitive process, one comprising the perceptions of social hierarchies in society, and the other featuring social comparison, i.e. the individual's rating of his/her social standing in comparison to others, and self-appraisal, i.e. the individual's perception of how others perceive him/her in the social hierarchy. Prior research has shown that income inequalities are often not accurately perceived (Osberg and Smeeding, 2006; Norton and Ariely, 2011; Hauser and Norton, 2017; Gimpelson and Treisman, 2018), and they vary with the socio-economic circumstances and ideological background of the individual (Schneider, 2012; Chambers, Swan and Heesacker, 2014; Shariff, Wiwad and Akin, 2016). Previous research also points to perceptual biases in self-evaluations, showing individuals position themselves around the middle ranks of the social hierarchy (Evans and Kelley, 2004), a trend sometimes more prevalent for those holding (objectively speaking) below-average positions (Wegener, 1990). As individuals are likely to assess their own standing by comparing themselves to those around them, who often share similar socio-economic background characteristics due to segregation processes,

they will view themselves as average (Evans, Kelley and Kolosi, 1992; Evans and Kelley, 2004). These biases have to be addressed by future research on the processes by which contextual characteristics shape status perceptions.

Lastly, while the study has focused on societal differences in income inequality and their consequences for life satisfaction, I encourage other researchers to consider the consequences of other related society characteristics for subjective well-being, such as status differentiation (Goldthorpe, 2010), inequality polarization (Esteban and Ray, 1994), social mobility and social closure (Sen, 1973), and to test whether subjective social status may function as a potential mediator. Furthermore, previous research claims that the visibility of inequality is important to individual behaviour (Nishi *et al.*, 2015), and perceptions of inequality rather than objective inequality influence subjective well-being (Schneider, 2012; Schalembier, 2018). While this study used objective inequality measures, more research is needed on the relationship between subjective inequality measures, subjective social status, and life satisfaction.

## Conclusion

This study concludes by noting social status—as it is perceived by the individual—is an important psychological factor informing our understanding of why in European societies with higher income inequality, individuals more often report lower levels of subjective well-being. This study's findings are necessarily limited to the European context and can only be considered a first step in a larger research enterprise probing the consequences of income inequality for subjective well-being. I want to use this opportunity to encourage researchers to test the proposed hypotheses in other geographic regions and to dig deeper into the underlying mechanisms that explain if and why income inequality matters to the well-being of individuals.

## Notes

- 1 For example, economists are often interested in the effect of inequality on economic growth (e.g. Aghion, Caroli and Garcia-Peñalosa, 1999; Forbes, 2000; Gomez and Foot, 2003), while epidemiologists focus on outcomes, such as health, trust, and mortality (e.g. Kawachi *et al.*, 1997; Kawachi and Kennedy, 1999; Wilkinson, 1999, 2000; Lynch *et al.*, 2001; Beckfield, 2004; Babones, 2008; Chetty *et al.*, 2016).
- 2 Note that the theoretical reasoning on top incomes goes against the general assumption that individuals compare themselves with the 'average other' (= mean income) and income is normally distributed

(mean income = median income; Jasso, 1978). In this case, income inequality should not affect status perceptions. Status perceptions will be proportional to the income rank, but not affected by the larger distribution of incomes in society. Even if the income distribution is *right skewed*, in other words, if the median income is lower than the mean income, income inequalities will not affect the subjective social status of all individuals (Layte and Whelan, 2014). Since the number of individuals below the mean income increases relative to the number of individuals above it, more individuals will feel relatively deprived if they keep comparing themselves to the average income, resulting, on average, in lower status perceptions. However, those above the mean income will feel better off. Thus, this condition fails to explain why those above the average income should feel more deprived in more unequal societies.

- 3 More information can be found at <http://www.europeansocialsurvey.org>
- 4 Note that Mplus does not allow me to use full maximum likelihood estimation for MMA models. Thus, and for reasons of comparability, I did not apply full information maximum likelihood in any of the analyses.
- 5 The database can be found at <http://stats.oecd.org>. Inequality indicators used in this study were downloaded from the website on 2 January 2017.
- 6 Please note that I partly controlled for East–West differences related to economic prosperity by including GDP/capita in the original analysis. I did not control for East–West differences in the original analysis to (i) reduce the number of parameters at the country level and (ii) avoid estimation biases caused by high inter-correlations between the effects of the East–West dummy and GDP/capita on life satisfaction and subjective social status.
- 7 Unfortunately, to the best of my knowledge, only some waves of the International Social Survey Programme (ISSP) include questions on both happiness and subjective social status. Differences in the wording of the question on subjective social status across countries may limit its use for comparative research purposes, however.

## Supplementary Data

Supplementary data are available at *ESR* online.

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