Running head: INCOME REDISTRIBUTION AND LIFE SATISFACTION

Income Redistribution Predicts Greater Life Satisfaction across Individual, National, and

Cultural Characteristics

Felix Cheung

University of Hong Kong

Author Note

Felix Cheung, School of Public Health, Li Ka Shing Faculty of Medicine, University of Hong Kong.

Correspondence concerning this article should be addressed to Felix Cheung, The School of Public Health, University of Hong Kong, 1/F Patrick Manson Building (North Wing), 7 Sassoon Road, Pokfulam, Hong Kong. Email: spcfelixckc@gmail.com

Abstract

The widening income gap between the rich and the poor has important social implications. Governmental-level income redistribution through tax and welfare policies presents an opportunity to reduce income inequality and its negative consequences. The current longitudinal studies examined whether within-region changes in income redistribution over time relate to life satisfaction. Moreover, I examined potential moderators of this relationship to test the strong vs. weak hypotheses of income redistribution. The strong hypothesis posits that income redistribution is beneficial to most. The weak hypothesis posits that income redistribution is beneficial to some and damaging to others. Using a nationally-representative sample of 57,932 German respondents from 16 German states across 30 years (Study 1) and a sample of 112,876 respondents from 33 countries across 24 years (Study 2), I found that within-state and within-nation changes in income redistribution over time were associated with life satisfaction. The models predicted that a 10% reduction in Gini through income redistribution in Germany increased life satisfaction to the same extent as an 37% increase in annual income (Study 1), and a 5% reduction in Gini through income redistribution increased life satisfaction to the same extent as a 11% increase in GDP (Study 2). These associations were positive across individual, national, and cultural characteristics. Increases in income redistribution predicted greater satisfaction for tax-payers *and* welfare-receivers, for liberals *and* conservatives, and for the poor *and* the rich. These findings support the strong hypothesis of income redistribution and suggest that redistribution policies may play an important role in societal well-being.

Keywords: life satisfaction; income inequality; income redistribution; subjective well-being; societal well-being

Income Redistribution Predicts Greater Life Satisfaction across Individual, National, and

Cultural Characteristics

Subjective well-being refers to the affective feelings and cognitive assessment of the quality of one's life. Life satisfaction is an integral part of subjective well-being, and it captures the overall cognitive assessment of whether one is satisfied, content, and happy with one's life. Life satisfaction has gained increasing attention as a policy indicator (Diener, Oishi, & Lucas, 2015). Since the United Kingdom started measuring population-level life satisfaction in 2009, over 40 countries now have measures of citizens' subjective well-being (Diener et al., 2015).

With the emerging policy relevance of subjective well-being, it is important to understand how it relates to other social indicators. The widening income gap has led to growing concerns about its economic and social implications. Income inequality has risen in recent decades (e.g., Xie & Zhou, 2014). The recent increase in income inequality may have contributed to the onset of the Occupy Wall Street Movement and the continuing public discourse on income inequality. Indeed, in 2013, President Barack Obama identified income inequality as "the defining challenge of our time." There is an escalating global interest in addressing the causes and consequences of income inequality.

In developed societies, income inequality has been linked to negative outcomes such as worse physical health (Kawachi & Kennedy, 1999), lowered social capital, more violent crime (Kennedy et al., 1998), social comparison (Cheung & Lucas, 2016), and status-seeking behaviors (Walasek & Brown, 2015). These outcomes may contribute to lower societal well-being. Governmental-level income redistribution represents an opportunity to reduce income inequality through tax and welfare policies. To the extent that income redistribution reduces actual levels of income inequality, it may help alleviate the negative effect of income inequality. The

overarching goal of this paper was to examine whether, when, and for whom income

redistribution predicts life satisfaction using a nationally-representative sample of over 50,000

German respondents tracked up to 30 years (Study 1) and a world-wide sample of over 100,000

respondents from 33 countries across 24 years (Study 2).

Income Inequality and Subjective Well-being

Past research on income inequality and subjective well-being has found mixed results (for

a review, see Schneider, 2016). While several studies showed negative associations between

income inequality and life satisfaction (e.g., Alesina, Di Tella, & MacCulloch, 2004; Hargerty,

2000; Verme, 2011), others have found the counterintuitive result that greater income inequality

was associated with *greater* subjective well-being (e.g., Cheung, 2016; Knight, Song, &

Gunatilaka, 2009; Rözer & Kraaykamp, 2013; Tomes, 1986). Moreover, some studies found

little to no association between income inequality and life satisfaction (e.g., Berg & Veenhoven,

2010; Zagorski, Evans, Kelley, & Piotrowska, 2014). These differences could potentially be

explained by methodological differences across studies.

Methodological differences in past studies. Methodological concerns about the

measurement of income inequality may contribute to the mixed findings on income inequality

and subjective well-being. Past studies have commonly operationalized income inequality as the

Gini coefficient (e.g., Alesina et al., 2004; Zagorski et al., 2014). Gini is calculated by comparing

the actual distribution of income to a completely equal distribution (for a detailed comparison

between Gini and other income inequality measures, see Kawachi & Kennedy, 1997). Figure 1a

illustrates the Gini index. In this Figure, the cumulative percent of income is plotted against the

cumulative percent of people in a sample. The diagonal line (labeled the line of equality)

represents a completely equal income distribution (i.e., the bottom 20% of the sample account

for 20% of the income; the bottom 40% of the sample account for 40% of the income; and so on). The Lorenz curve represents the actual income distribution. Using point Q as an example, in this hypothetical income distribution, the bottom 80% account for only 20% of the income (roughly similar to the level of income inequality in Manhattan, NY). Therefore, the further the Lorenz curve is from the line of equality, the greater the level of income inequality. Gini is calculated as the proportion of the area between the line of equality and the Lorenz curve (area A in Figure 1a) and the total area under the line of equality (area A+B). Gini ranges from 0 (complete equality; the Lorenz curve overlaps completely with the line of equality) to 1 (complete inequality; one person obtains all the income and everyone else makes no income).

Notably, Gini can be calculated using pre-government income (i.e., before tax and government transfer; an index known as *market* Gini) or using post-government income (i.e., after tax and government transfer; an index known as *net* Gini). However, past research has not consistently documented the type of Gini used for analyses. For example, among the studies on income inequality and subjective well-being that were cited above (i.e., Alesina et al., 2004; Cheung, 2016; Cheung & Lucas, 2016; Knight et al., 2009; Oishi, Kesebir, & Diener, 2011; Rözer and Kraaykamp, 2013; Verme, 2011; Walasek & Brown, 2015; Zagorski et al. 2014), only Alesina and his colleagues (2004) and Verme (2011) clearly specified that they used net Gini in their analyses.

Crucially, the psychological consequences of income inequality may depend on whether income inequality is calculated as market Gini or net Gini. For example, in a society with great differences in wages (high level of market Gini) but small differences in disposable income (lower level of net Gini), the large differences in wages may provide incentives for people to strive in the workplace while the small differences in disposable income may reduce the

tendency for conspicuous consumption, and this combination of market and net Gini could

potentially be beneficial. Therefore, past research with inconsistent findings could be a result of

the incomparable definitions of income inequality across studies.

Measuring income redistribution. Although the two measures of income inequality are

potentially a problem leading to the mixed results in the literature, the current studies took

advantage of the two different measures of income inequality to create a measure of income

redistribution (Kakwani, 1977; Solt, 2009). In Figure 1b, the solid Lorenz curve represents the

distribution of pre-government income. In this example, the distribution is unequal: richer

individuals have higher pre-government income than low-income individuals. The income gap

between the two groups reflects market Gini. Due to taxation, richer individuals tend to have

lower post-government income than pre-government income; due to government transfer, low-

income individuals have higher post-government income than pre-government income.

Therefore, after tax and welfare, the income gap between the two groups, which reflects net Gini,

typically shrinks relative to the income gap before tax and welfare. The distribution of post-

government income is illustrated with the dotted Lorenz curve. The distance from the line of

equality is shorter after tax and welfare (i.e., the dotted Lorenz curve is closer to the line of

equality when compared to the solid Lorenz curve). The difference in market Gini and net Gini

thus represents the extent to which government-level income redistribution changes income

inequality through tax and welfare (Kakwani, 1977; Solt, 2009).

Income redistribution can be quantified by examining the difference between market and

net Gini. The proportion of income inequality that is reduced through income redistribution can

be quantified through the following equation: $(MarketGini - NetGini)/MarketGini$ (Kakwani,

1977; Solt, 2009; 2016). The resulting index (referred to as income redistribution below) can be

interpreted as % reduction in income inequality through tax and welfare.[1] For example, if a state

has a market Gini of 0.5 and a net Gini of 0.3, it means that income inequality is reduced by 40%

((0.5-0.3)/0.5=0.4) through income redistribution. The current studies aimed to elucidate the

extent to which income redistribution relates to life satisfaction and the moderating factors

concerning this relation.

Income Redistribution and Subjective Well-being

Income redistribution refers to governmental effort towards reducing income inequality

through tax and welfare transfer. Income redistribution may increase subjective well-being for a

number of reasons. First, because of diminishing returns, the same amount of income may matter

more for low-income individuals relative to high-income individuals. Thus, redistributing a

constant amount from the richest members of a society to the poorest may lead to a greater

benefit to those who receive that additional income than it would have to those from whom it

was taken. Second, in societies where income inequality is negatively associated with subjective

well-being, income redistribution reduces relative difference in income among people, which

could potentially lead to positive effects on overall well-being.

These potential consequences of income redistribution can be understood through both

absolute income and relative income hypotheses. The absolute income hypothesis is the idea that

income improves well-being by fulfilling needs, whereas the relative income hypothesis posits

that relative position in income matters to well-being. Past research on absolute income has

consistently shown a log-linear association between income and life satisfaction (e.g., Cheung &

Lucas, 2015; Clark, Frijters, & Shields, 2008; Diener, Ng, Harter, & Arora, 2010; Kahneman &

Deaton, 2010; Luhmann, Schimmack, & Eid, 2011). A log-linear association means that the

same proportional increase in income predicts life satisfaction linearly. This reflects the idea that

income has diminishing returns on happiness such that the same amount of income buys more happiness for low-income individuals. For example, assume every 100% increase in income is associated with 1 unit increase in life satisfaction, then a $10,000 increase in income would increase the satisfaction of individuals making $10,000 by 1 unit, but the same $10,000 increase would only buy .1 unit of happiness for individuals making $100,000. Given the log-linear association, redistributing $10,000 income from someone making $100,000 (a 10% loss; a .1 unit decrease in satisfaction) to someone making $10,000 (a 100% gain; a 1 unit increase in satisfaction) should increase the overall satisfaction of the aggregate of low- and high-income individuals. This example suggests that based on the absolute income hypothesis, an idealized version of income redistribution (that redistributes income effectively with an appropriate tax rate and benefits exactly those in needs) should lead to greater societal well-being, but it may have a small negative effect on high-income individuals who paid relatively high proportion of tax (if taxation is experienced in a similar way as loss of disposable income).

In addition to the absolute income hypothesis, the relative income hypothesis can also explain why income redistribution may improve subjective well-being by reducing income comparison. The relative income hypothesis suggests that satisfaction decreases to the extent that one's income compares less favorably to others (Blanchflower & Oswald, 2004; Cheung & Lucas, 2016; Di Tella, MacCulloch, & Oswald, 2003; Luttmer, 2005). To the extent that income redistribution reduces discrepancies in income, it may also reduce the negative effect of income comparison on subjective well-being. Therefore, based on the absolute and relative income hypotheses, there are good reasons to expect that income redistribution improves societal well-being.

When examining the association between income redistribution and life satisfaction, it is important to consider the appropriate level of analysis. The current studies focused on testing whether *over-time change* in income redistribution in a *state* or *country* is related to life satisfaction. The focus on *over-time change* tests whether individuals become more satisfied as income redistribution in a state or country increases over time. This is the most relevant level of analysis for public policy because redistribution policies lead to an over-time change (or a within-state change) in income inequality. For example, state policies that redistribute income from wealthier individuals in State A to poorer individuals in State A and federal policies that redistribute income from a wealthier State B to a poorer State A can both reduce income inequality in State A. In effect, the current approach is interested in whether residents in State A become more satisfied, as income inequality in State A is reduced over time through income redistribution. The association between over-time change in income redistribution and life satisfaction is referred to as the time varying effect of income redistribution in the current study. The word "effect" is used in this paper to be consistent with prior usage of the similar wording by methodologists who developed the statistical models used in the current studies (Allison, 2009; Neuhaus & Kalbfleisch, 1998). It refers to whether changes in a predictor over time is linked to the outcome, and it does not imply a causal relationship.

This focus on over-time change can be contrasted with a between-regions focus, which tests whether life satisfaction is higher in states or countries that, on average, have higher levels of income redistribution. A between-regions approach tests whether residents in State X with high income redistribution were more satisfied than residents in State Y with low income redistribution. This approach is less informative for policy. Redistribution policies can change State Y with low income redistribution to State Y with high income redistribution (hence the

focus on the time-varying effect of redistribution). However, policies cannot change State Y with low income redistribution to State X with high income redistribution because even if policies increase income redistribution in State Y to the same level as State X, State Y is still a fundamentally different state from State X. The current studies used a hybrid effect model that separates the time-varying effect from the between-regions effect (Allison, 2009; Neuhaus & Kalbfleisch, 1998; also known as a between-within model, Sjölander, Lichtenstein, Larsson, & Pawitan, 2013). It should be noted that findings on the time-vary effects should not be assumed to generalize to the between-regions level, and vice versa. This between- and within-unit distinction has been shown to be an important difference (e.g., Cheung & Lucas, 2015).

Moreover, the time-varying effect of income redistribution was examined at the *state or country* level because these broader geographical regions typically have stronger influence over social policies than smaller regions. Recent findings suggest that results from one level of analysis (e.g., county) should not be assumed to generalize to another level of analysis (e.g., state). For example, Luhmann, Murdoch, and Hawkley (2014) found that while county-level poverty and unemployment rate predicted lower subjective well-being, state-level poverty and unemployment were not significant predictors of well-being. Therefore, the emphasis on the time-varying effect of income redistribution at the state and country level should inform the effectiveness of state and national polices on income redistribution.

Two past studies have examined the association between income redistribution and life satisfaction. Schwarze and Härpfer (2007) examined the association between income redistribution (defined as % reduction in Gini through tax and welfare) and life satisfaction using data from the 1985 – 1998 German Socioeconomic Panel (SOEP). The level of analysis in this

study was spatial planning regions (SPRs) which are geographical regions smaller than states.

The authors did not find a significant time-varying effect of income redistribution.

Notably, the SPR-level of analysis in the study conducted by Schwarze and Härpfer

(2007) may not have provided the strongest test for the effect of income redistribution. Estimates

of income redistribution were based on relatively small samples. For example, in 1998, the

minimum number of households surveyed by the SOEP in a SPR was 13 (Knies & Spiess, 2007).

In addition, relative to the federal or state level, SPRs may not have as strong of an influence on

redistribution policies. For instance, in Germany, "the Federal Spatial Planning Law of 1965 …

outlined a broad aim to develop and spatially organize the country to ensure equal conditions,

regardless of geography, and gave primary responsibility for doing so to the Länder [which is the

German word for state]" (Hall, 1992 as cited in Schmidt & Buehler, 2007, p. 61). Therefore,

while this study provided preliminary evidence that over-time change in income redistribution

does not increase subjective well-being, the results may not generalize to state- or country-level

analyses. Methodologically, larger samples are often obtained at the state or national level, which

provide better estimates of income inequality and income redistribution. Moreover, states and

nations may have more influence over income redistribution policies relative to smaller regions.

Hajdu and Hajdu (2014) also studied the link between income redistribution and life

satisfaction in a sample of 29 European countries using data from the 2002 to 2008 European

Social Survey. They found that respondents reported greater life satisfaction in countries with

greater income redistribution. It is noteworthy that although the dataset covered multiple years,

changes in income redistribution over time are very small over this relative short time frame. The

level of income redistribution (as expressed as % reduction in Gini through tax and welfare)

changed less than 1% in 14 out of the 29 countries. Therefore, the finding was likely driven by

between-country differences in income redistribution, rather than the time-varying effect (i.e., within-country change) of income redistribution. In sum, there is some preliminary evidence that living in a European country with greater income redistribution is beneficial to subjective well-being, but it is unclear whether an increase in income redistribution over time is linked to an increase in subjective well-being. These two studies represented an initial step towards understanding the role of redistribution policies on subjective well-being.

To extend beyond the overall main effect of income redistribution, it is also important to consider whether the association between income redistribution and life satisfaction may be positive for some people and negative for others. In the current studies, I tested the strong vs. weak hypotheses of income redistribution by examining potential moderators of the link between income redistribution and life satisfaction. The strong hypothesis posits that income redistribution is beneficial (or at least not detrimental) to the subjective well-being of most people. The weak hypothesis posits that income redistribution may simply redistribute happiness such that it is beneficial to some and damaging to others. The strong vs. weak hypotheses of income redistribution were tested through identifying the boundary conditions of the association between income redistribution and life satisfaction. Individual and national factors may moderate the effect of income redistribution.

At the individual level, the amount of tax paid, income mobility, egalitarian values, and political leanings may be important moderators. First, the association between income redistribution and life satisfaction may be moderated by individual-level tax and government transfer (e.g. welfare). By redistributing income from high-income individuals to low-income individuals (or those in need), the effect of income redistribution may be positive for those on the receiving end but negative for those on the giving end. In other words, the effect of income

redistribution may be conditional on the amount of taxes one paid and/or the amount of government transfer one received.

Second, income mobility may also change the association between income redistribution and life satisfaction. For individuals experiencing upward income mobility, the prospect of giving up larger proportions of their income to taxation may be unappealing. Indeed, individuals with greater potential for upward income mobility tended to oppose policies towards income redistribution (Alesina & La Ferrara, 2005). For individuals experiencing downward income mobility, however, income redistribution can become more appealing because a stronger welfare program may provide security for these individuals with declining income.

Third, the association between income redistribution and life satisfaction may depend on egalitarian values, which refers to beliefs in equality for all people. For example, imagine that an individual is choosing to move to State A and State B. State A has low income inequality, and 95% of residents have incomes between $30,000 and $70,000. State B has high income inequality, and 95% of residents have incomes between $10,000 and $100,000. An individual who holds egalitarian value should prefer State A over State B because income is distributed more equally. Therefore, individuals who endorse egalitarian values may benefit from income redistribution. However, income redistribution may be detrimental to people who prefer a stronger social hierarchy (perhaps people who are high in social dominance orientation, an individual difference measure of people's preference for unequal relations between social groups; Pratto, Sidanius, Stallworth, & Malle, 1994).

Fourth, income redistribution may be differentially associated with well-being depending on where one stands on the political spectrum. A common way to classify political views is to use the left-right political continuum. Because individuals on the political left tend to support

egalitarianism and social welfare, income redistribution aligns more closely to left-wing ideologies. Past research showed that the negative effect of income inequality is particularly salient for left-wing individuals (Alesina et al., 2004) and the positive effect of income redistribution was stronger for left-wing individuals (Hajdu & Hajdu, 2014). Therefore, I hypothesized that the time-varying effect of income redistribution may be stronger for people on the political left than people on the political right.

At the national level, economic growth and power distance may moderate the link between income redistribution and life satisfaction. Economic growth and power distance were conceptualized to be analogous to upward income mobility and egalitarian values at the individual level. In countries with a growing economy, larger income difference may signal greater hope for income mobility. Witnessing a rags-to-riches story from a fellow villager may improve one's perception of the future financial state. In this context, income redistribution may temper motivation to make more money. Therefore, income redistribution may not be beneficial in countries with a growing economy. The effect of income redistribution may also depend on cultural differences. A particularly relevant cultural aspect is called power distance, which is "the extent to which the less powerful members of institutions and organizations with a country expect and accept that power is distributed unequally" (Hofstede et al., 2010, p. 61). To the extent that income redistribution reduces inequality, it may not be beneficial in cultures that expect and accept a stronger hierarchy.

To summarize, I predicted that changes in income redistribution over time are associated with changes in societal well-being. Moreover, I tested the strong vs. weak hypotheses of income redistribution. The strong hypothesis predicts that income redistribution improves subjective well-being for all, whereas the weak hypothesis predicts that income redistribution is detrimental

to the subjective well-being of individuals who pay higher taxes, experience upward income mobility, do not hold egalitarian values, endorse right-wing ideologies, live in countries experiencing economic growth, and live in cultures that expect inequality.

Since more and more societies (e.g., Great Britain, France, Bhutan) are creating official measures of subjective well-being, it is becoming increasingly important to understand how subjective well-being links to objective characteristics (e.g., income inequality and income redistribution) and how these associations may vary as a function of individual, national, and cultural differences. The current studies contributed to this area of research by using cross-national and within-country approaches to understand the connections between income inequality, income redistribution, and subjective well-being. The current studies informed our understanding of 1) the longitudinal links between change in income redistribution over time and subjective well-being, 2) the individual-level boundary conditions of these associations, and 3) the roles of national characteristics and cultural values.

Study 1: Investigating the Link between Income Redistribution and Life Satisfaction Using a Within-Country Approach

Study 1 uses a within-country approach and analyzes data from the 1984-2013 SOEP. The SOEP was selected because it is the largest on-going panel study with sufficient information to estimate state-level income inequality and income redistribution. Although a prior study on income redistribution has been conducted on the SOEP (Schwarze & Härpfer, 2007), the current study was a significant improvement with twice the number of waves (30 waves compared to 14 waves) and a different level of analysis (SPRs compared to states). In Study 1, I tested the time-varying effect of state-level income redistribution on life satisfaction using 30 years of data in

Germany. In addition, I tested whether the time-varying effect of state-level income redistribution depended on the amount of tax paid and income mobility.

To provide some context, Germans pay tax at the federal, state, and municipality levels, and person income tax, corporate income tax, and value-added tax (VAT; which is a consumption-based tax placed on goods and services and is a shared tax between federal government and states) are the major sources of government revenue. Germany has a progressive tax structure. According to a cross-national comparison of tax and welfare (De Nardi, Ren, & Wei, 2000), for an average German working age household, the average tax rate was 17% (compared to 16% in the US, 21% in Canada, 23% in Finland, and 25% in Sweden; p. 3), and 6% of the household income comes from government transfer (compared to 3% in the US, 8% in Canada, 15% in Finland, and 19% in Sweden; p.3).

There is a complex system for intergovernmental transfer across states. According to Ma (1997), to redistribute income from richer states to poorer states, three separates steps are used: 1) VAT sharing, where a portion of VAT is shared with priority to poorer states, 2) an interstate equalization system, which redistributes income based on states' fiscal needs, and 3) supplementary grants (which at times, included grants that were specific to certain Western states as well as grants that targeted Eastern states). In 1996, before intergovernmental transfer Western states' per capita revenue was 11% above national average, whereas Eastern states' per capita revenue was 39% below national average (Ma, 1997, p. 14). After all three steps of intergovernmental transfer, Western states' per capita revenue was 1% above national average, whereas Eastern states' per capita revenue was 5% below national average.

Institutional Review Board Statement

Both Studies 1 and 2 involved the use of de-identified secondary data, and the author had no interaction with any respondents included in the analyses. The secondary analyses of the data were conducted in the United States (U.S.). According to Title 45 in the Code of Federal Regulations Part 46 set forth by the U.S. Department of Health and Human Services, these studies did not constitute human subject research, and Institutional Review Board reviews were not needed.

Method

Participants. The current study used data from the SOEP. The sample size was determined based on the availability of data from the SOEP. The sample included 57,932 participants from 16 German states tracked up to 30 years with 448,440 total observations (183,108 out of a total of 631,548 observations were excluded due to incomplete data; i.e., listwise deletion). The sample was 51.4% women, 57.7% married, and 55.4% employed. Ten states had 30 years of data, five states had 22 years of data, and one state had 14 years of data. Therefore, there were a total of (10 * 30 + 5 * 22 + 1 *14) 424 state-years. Detailed descriptive statistics are presented in Tables S1-S2.

Measures.

Life satisfaction. Participants reported their life satisfaction on an 11-point scale (0 "very dissatisfied" to 10 "very satisfied") to a single-item "All things considered, how satisfied are you with your life as a whole?" The psychometric properties of single-item life satisfaction measures (including this specific measure in this specific sample) have been shown to be satisfactory (Cheung & Lucas, 2014; Lucas & Donnellan, 2012).

Pre- and post-government income. The SOEP Cross National Equivalent File provides data on participants' pre- and post-government annual household income (Frick, Jenkins, Lillard,

Lipps, & Wooden, 2007). Both income variables were calibrated for inflation to reflect Euros in 2011 using the Consumer Price Index. Post-government income (i.e. disposable income) was used as a measure of financial resources. It was log-2 transformed to reduce skewness. After transforming the income variable, a unit increase equals twofold increase in income.

Individual-level tax and government transfer. Individual-level government tax and government transfer was calculated by subtracting post-government income (log) from pre-government income (log) to capture the change in income from taxes, welfare, and other sources of government transfer. A positive number means that participants had higher pre-government income than post-government income, indicating that the amount of tax paid was greater than the amount of government transfer received.

Income mobility. Income mobility was operationalized as the time-varying effect of individual-level household income. The time-varying effect of income tests whether as household income increases over time, participants report greater life satisfaction.

Income inequality and income redistribution. Pre- and post-government incomes were used to calculate income inequality as indexed by Gini coefficients. Market Gini and net Gini by states were calculated using the R package reldist based on pre- and post-government income respectively (Handcock, 2015; Handcock & Morris, 2006). Income redistribution was calculated using: $(MarketGini - NetGini)/MarketGini$ ($M = 0.18$, $SD = 0.04$). Income inequality in the average German state was reduced by 18% through income redistribution. The over-time changes in these variables by states are presented in Figure S1.

Analytical Strategy.

Multilevel modeling was used to account for the nonindependence of the data with year (level-1) nested within person (level-2) nested within states (level-3). The residual error structure

was specified as a fixed-order autoregressive structure (known as AR1; Jennrich & Schluchter, 1986). This means that the residual correlations between time points decreased as time lag increased. The analyses were conducted in R using the nlme package (Pinheiro, Bates, DebRoy, Sarkar, & R Core Team, 2015).[2]

In the following analyses, a hybrid effect model was used to isolate the time-varying effects of post-government household income, state-level net Gini, and state-level income redistribution from the between-state effects (Allison, 2009). These three variables were recoded using a group-mean centering procedure, which provided estimates of the time-varying effects of predictors (e.g., whether changes in income redistribution over time are associated with life satisfaction) controlling for all time-invariant individual and state characteristics (Allison, 2009).[3]

With the time-varying effect of household income, I can place a monetary value on the effect of other predictors in terms of changes in annual income. As a hypothetical example, assume that a one-unit increase in logged household income over time is associated with a one-unit increase in life satisfaction. If a 10% reduction in Gini through income redistribution is also associated with a one-unit increase in life satisfaction, then a 10% reduction in Gini through income redistribution has about the same effect on life satisfaction as a twofold increase in income over time.

Results

The purposes of the analyses were to test the time-varying effect of state-level income redistribution on life satisfaction and the potential moderating roles of individual-level tax and welfare and income mobility on income redistribution. The correlations among continuous variables aggregated across waves are presented in Table 1.

[Insert Table 1 here]

To test the time-varying effect of income redistribution, a multilevel model was estimated with life satisfaction as the outcome. The time-varying effects of state-level net Gini, state-level income redistribution, and individual-level post-government income were the main predictors of interest. The state-specific means of net Gini, income redistribution, and individual- and state-specific means of post-government household income were also included as predictors. Gender, employment status, marital status, number of household adults, number of household children, years of education, age, survey year, years of participation were also included as covariates. Years of participation referred to the number of times respondents had participated in SOEP. This variable was included to control for the panel conditioning effect that has been previously documented in the SOEP dataset (Baird, Lucas, & Donnellan, 2010). Aside from the time-varying effects (which were group-mean centered), all continuous predictors were grand-mean centered.

Table 2 presents a summary of the results (full regression tables are presented in Table S3). The associations between the key predictors and life satisfaction (i.e., time-varying effects of income redistribution and income inequality) did not differ with and without covariates. Therefore, the following discussion focused on the analysis with covariates.

[Insert Table 2 here]

The associations between individual-level covariates and life satisfaction were mostly consistent with past research. For example, married and higher income individuals tended to be more satisfied. For state-level covariates, respondents living in richer states reported significantly higher life satisfaction than those living in states with lower income, $b = 1.75$, $SE = 0.18$, $p < .001$. State differences in income redistribution did not significantly predict life satisfaction, b

= 0.39, *SE* = 0.48, *p* = .41. State differences in net Gini significantly predicted life satisfaction, *b*

= 1.41, *SE* = 0.45, *p* = .002, such that respondents living in more unequal states reported *greater*

life satisfaction. This positive association between state differences in net Gini and life

satisfaction was found with and without covariates, and this counterintuitive finding is consistent

with some prior research (Cheung, 2016; Knight et al., 2009; Rözer & Kraaykamp, 2013; Tomes,

1986).

The Time-Varying Effects of Income Inequality and Income Redistribution on Life

Satisfaction. The time-varying effect of post-government household income was significant, *b*=

0.15, *SE* = 0.005, *p* < .001. Every twofold increase in household income was associated with

0.15 unit increase in life satisfaction. This association was used as a benchmark to quantify the

effects of income inequality and income redistribution in terms of income. As income inequality

increased over time, respondents tended to report being less satisfied, *b*= -0.45, *SE* = 0.17, *p*

= .007. A 10% increase in net Gini (from 0.30 to 0.33) lowered life satisfaction to the same

extent as a decrease of €2,102 (or about USD$3,006) in household income. More importantly,

changes in income redistribution over time were positively associated with life satisfaction, *b* =

0.67, *SE* = 0.12, *p* < .001. The model predicted that a 10% reduction in Gini through income

redistribution would increase life satisfaction to the same extent as an increase of €12,715 (or

about USD$18,185) in annual income.

The Moderating Roles of Tax and Welfare and Income Mobility. Next, I tested

whether the positive time-varying effect of income redistribution was moderated by individual-

level tax and government transfer and income mobility. Specifically, the weak hypothesis

predicted that income redistribution may be beneficial to the well-being of individuals on the

receiving end of redistribution and detrimental to the well-being of individuals on the giving end

of redistribution. It also predicted that income redistribution may be beneficial to those experiencing downward income mobility but detrimental to those experiencing upward income mobility. An interaction term between the time-varying effect of state-level income redistribution and individual-level tax and welfare and an interaction term between the time-varying effects of state-level income redistribution and individual-level household income were added to the model.

The positive time-varying effect of income redistribution remained significant in this model, $b = 0.71$, $SE = 0.12$, $p < .001$. Tax and welfare showed a significant main effect, $b = 0.014$, $SE = 0.001$, $p < .001$, suggesting that participants who paid more tax reported greater life satisfaction. Income mobility (as reflected by the time-varying effect of household income) was associated with greater life satisfaction, $b = 0.14$, $SE = 0.005$, $p < .001$. That is, given two individuals with the same average income, the individual who experienced an increase in income over time reported greater life satisfaction. With regards to the interactions, the positive time-varying effect of income redistribution was not moderated by tax and welfare, $b = 0.02$, $SE = 0.03$, $p = .51$, or income mobility, $b = -0.16$, $SE = 0.14$, $p = .26$. These results suggested that the association between time-varying income redistribution and life satisfaction did not differ significantly for participants who paid tax and participants who received government transfer, and the association also did not differ for participants with increasing income and participants with decreasing income. In sum, the moderation analyses provided support for the strong hypothesis of income redistribution that income redistribution is beneficial to the subjective well-being of most people.

An Exploratory Analysis on Eastern and Western Germany. The SOEP spanned from 1984-2013, and Germany underwent the reunification in 1990. Because of its historical

significance, as an exploratory analysis, I tested whether the time-varying effect of income redistribution held in both the Western states and the reestablished Eastern states (namely, Brandenburg, Mecklenburg-Vorpommern, Saxony, Saxony-Anhalt, Thuringia). Eastern states were dummy-coded as 1, and Western states were coded as 0. The results showed that changes in income redistribution over time were positively associated with life satisfaction in the Western states, $b = 0.72$, $SE = 0.12$, $p < .001$ (full regression table is presented in Table S4). The interaction suggested that this positive association was even stronger in Eastern states, $b = 1.37$, $SE = 0.10$, $p < .001$. Therefore, the positive time-varying effect of income redistribution was present in both East and West Germany.

Study 1 Discussion

Using a longitudinal sample of 57,932 Germans covering 30 years, Study 1 found evidence of the positive effect of time-varying income redistribution on life satisfaction. In other words, in German states that redistributed income to an increasing extent over the years, respondents became more satisfied with their life. Based on the model, the magnitude of the time-varying effect of income redistribution was comparable to an increase of a considerable amount of household income. Moreover, consistent with the strong hypothesis of income redistribution, the redistribution-happiness link appeared to be similar in magnitude for individuals on both the receiving and giving ends of income redistribution and for individuals experiencing upward and downward mobility.

Study 1 isolated the time-varying effects of income redistribution and income inequality from the between-state effects of income redistribution and income inequality using a hybrid effect model. As discussed in the introduction, the decision to focus on the time-varying effects was made a priori because it is a more appropriate level of analysis that can more directly inform

theory and policy. In the current study, the two levels of analysis (within- and between-state) yielded different results.

Income redistribution had a positive time-varying effect but a null between-state effect (at least when covariates were controlled). That is, participants reported greater life satisfaction in years with a greater level of income redistribution, but participants living in states with higher income redistribution did not report greater life satisfaction than those living in states with lower income redistribution. Income inequality (measured as net Gini) had a negative time-varying effect but a positive between-state effect.

The differences in the time-varying and between-state effects offers another explanation for why past research that did not use a group-centering procedure (including cross-sectional research) found ambiguous results. The estimates for income inequality and income redistribution in these studies were an average of the within-unit and between-unit effects. To the extent that these effects differ in both magnitude and direction (like in Study 1), this may have contributed to the mixed and sometimes contradictory findings in past research.

However, the between-state effects should be interpreted with caution because of the small sample size of states (there were only 16 German states in total). Given this potential concern, I also tested the time-varying and between-state effects separately in Study 2 to ensure that the discrepancy is a robust finding before speculating on *why* such differences exist (which is revisited in the General Discussion).

Study 1 used a within-country approach and found that increases in income redistribution over time predicted greater life satisfaction. A within-country approach has limited generalizability. Therefore, in Study 2, I aimed to generalize results from Study 1 to a cross-national sample. Specifically, I examined the time-varying effect of income redistribution on life

satisfaction, and the strong vs. weak hypotheses using a cross-national approach based on WVS

and SWIID data.

Study 2: Investigating the Link between Income Redistribution and Life Satisfaction Using

a Cross-National Approach

Study 2 uses a cross-national approach and analyzes data from the 1981-2014 World

Value Survey (WVS). The WVS was selected because it contains data from many countries and

covers a long timeframe, which may capture more variability in income redistribution across

countries and over time. Study 2 also makes use of the Standardized World Income Inequality

Database Version 5.0 (SWIID; Solt, 2016), which is a promising development in cross-national

research on income inequality and income redistribution. Past cross-national research has

sometimes used datasets that did not have standardized measures of income inequality. For

example, in the World Income Inequality Database, income inequality is sometimes calculated

with household income and sometimes calculated with personal income. In other cases, market

Gini and net Gini are not distinguished. These limitations add noise to analyses. The SWIID

provides standardized measures of income inequality and income redistribution across countries.

In Study 2, I tested the time-varying effect of country-level income redistribution and life

satisfaction and examine egalitarian values, political leanings, economic growth, and power

index as moderators.

Method

Participants. Study 2 used data from the 1981 to 2014 WVS. A listwise deletion is used

to exclude respondents with incomplete data and respondents that cannot be match to societies

with complete data on GDP, income inequality, and income redistribution. Because the focus

was on the time-varying effect of income redistribution, only countries with 2 or more waves of

data on income redistribution were included in the analyses. The sample included 112,876

respondents from 33 countries from 1989 – 2012 (out of a total of 341,271 respondents). Among

those excluded, the main reason was that the SWIID only provides the redistribution index for

countries with reliable data on income inequality (Solt, 2016). The sample was 51.8% women,

56.6% married, and 56.4% employed (including part-time, full-time, and self-employed). Means,

standard deviations, and correlations are presented in Table 3 (detailed descriptive statistics by

countries are presented in Table S5-S7). There were a total of 90 country-years.

[Insert Table 3 here]

Measures.

Life satisfaction. Participants reported their life satisfaction on a 10-point scale (1

"Dissatisfied" to 10 "Satisfied") to a single-item "All things considered, how satisfied are you

with your life as a whole these days?"

Income. Participants reported their income using deciles based on income data from their

residing country at the time of survey.[4]

Individual-level moderators. In Study 2, political leaning and egalitarian values were

tested as moderators of the association between income redistribution and life satisfaction.

Political leaning was measured by asking participants "In political matters, people talk of 'the

left' and 'the right.' How would you place your views on this scale, generally speaking?" from 1

 "Left" to 10 "Right." Respondents reported their level of egalitarian values by responding to a

10-point scale where 1 was "Income should be made more equal" and 10 was "We need larger

income differences as incentives." This measure was reverse-coded such that a greater number

indicated stronger endorsement of egalitarian values.

Income inequality and income redistribution. Estimates of country-level income inequality and income redistribution from 1989-2012 were obtained from the SWIID (Solt, 2016). Consistent with Study 1, Study 2 used net Gini (post-tax and post-welfare) as the measure of income inequality and income redistribution was expressed as % reduction in income inequality through tax and welfare. The SWIID integrates multiple existing datasets to improve the coverage and comparability of measures of income inequality and income redistribution across nations.

GDP. GDP per capita for countries from 1989-2012 was obtained from the World Economic Outlook published by the International Monetary Fund (2017). GDP was log-2 transformed such that 1 unit change represented a twofold increase in GDP.

Economic growth. Economic growth was operationalized as the time-varying effect of GDP, which tests whether as GDP within a country increases over time, residents in the country become more satisfied.

Power distance. Power distance refers to the extent to which inequality in hierarchy is expected in a society. Data on power distance were retrieved from the book *Cultures and Organizations: Software of the Mind* (Hofstede et al., 2010). The measure was developed based on survey questions asking respondents about their reactions and preferences towards interacting with more powerful individuals.

Analytical Strategy. Multilevel modeling was used to account for the nested structure of the data with respondents (level-1) nested within countries (level-2).[5] Multilevel modeling was carried out using the R packages lme4 and lmerTest (Bates, Maechler, Bolker, & Walker, 2015; Kuznetsova, Brockhoff, & Christesen, 2014). Similar to Study 1, a hybrid effect model was used

to separate the time-varying effects of GDP, income inequality, and income redistribution from

the between-region effects.[6]

Results

The purposes of the analyses were to test the time-varying effect of country-level income

redistribution on life satisfaction and the potential moderating role of political leaning,

egalitarian values (individual-level or level-1 moderators), economic growth, and power distance

(country-level or level-2 moderators). To test the time-varying effect of income redistribution, a

multilevel model was estimated with life satisfaction as the outcome. The time-varying effects of

country-level net Gini and income redistribution were the main predictors. In addition, at the

country level, the time-varying effect of GDP and the state-specific means of GDP, net Gini, and

income redistribution were included as predictors. At the individual level, gender, employment

status, marital status, educational attainment, income decile, age, and survey year were included

as covariates. Aside from the time-varying effects (which were group-mean centered), all

continuous predictors were grand-mean centered.

Key results from the multilevel models are presented in Table 4 (full regression tables are

represented in Table S8). The associations between the key predictors and life satisfaction (i.e.,

time-varying effects of income redistribution and income inequality) did not differ with and

without covariates. Therefore, the following discussion focused on the analysis with covariates.

[Insert Table 4 here]

Similar to Study 1, married and higher income individuals tended to be more satisfied.

For country-level covariates, respondents living in richer countries tended to have higher life

satisfaction, $b = 0.43$, $SE = 0.12$, $p < .001$. State differences in income redistribution were

positively associated with life satisfaction, $b = 0.040$, $SE = 0.013$, $p = .005$. Respondents living in

more unequal states reported *greater* life satisfaction, $b = 0.094$, $SE = 0.018$, $p < .001$. These

results were consistent with Study 1.

The Time-Varying Effects of Income Inequality and Income Redistribution on Life

Satisfaction. The time-varying effect of GDP was a significant predictor of life satisfaction, $b =$

0.76, $SE = 0.03$, $p < .001$. Every twofold increase in GDP was associated with 0.76 unit increase

in life satisfaction. This association between increase in GDP and life satisfaction was used to

interpret the time-varying effects of country-level income inequality and income redistribution in

terms of increase in GDP. As net Gini increased over time, respondents reported lower life

satisfaction, $b = -0.064$, $SE = 0.004$, $p < .001$. A 5% increase (1SD) in net income inequality

lowered life satisfaction to the same extent as a \$1,207 (10.5%) decrease in GDP per capita.

More importantly, the time-varying effect of income redistribution was linked to greater life

satisfaction, $b = 0.023$, $SE = 0.003$, $p < .001$. A 5% reduction in income inequality through

income redistribution increased life satisfaction to the same extent as a \$1,262 (11.1%) increase

in GDP per capita. These results suggested that respondents living in countries that experienced

increases in income redistribution over time became more satisfied with their life.

The Moderating Roles of Individual and Country Characteristics. In addition to

examining the main effect of income redistribution, I tested the boundary conditions of the time-

varying effect of income redistribution. To recap, the strong hypothesis predicted that income

redistribution was beneficial or at a minimum not detrimental to subjective well-being, whereas

the weak hypothesis posited that income redistribution was beneficial to some people but

damaging to others. At the individual level, the weak hypothesis of income redistribution

predicted that the time-varying effect of country-level income redistribution may be detrimental

to life satisfaction for individuals on the political right, individuals who do not hold egalitarian

values strongly, and individuals with low income. At the country level, the weak hypothesis predicted that the time-varying effect of income redistribution may be detrimental to life satisfaction in countries experiencing economic growth and in countries where inequality in power is expected.

Each moderator was tested in a separate model (Table 4; full results in Table S8). The time-varying effect of income redistribution was not moderated by political leaning ($b = 0.001$, $SE = 0.002$, $p = .47$). The time-varying effect of income redistribution on life satisfaction was significantly moderated by egalitarian values ($b = -0.003$, $SE = 0.001$, $p < .001$; Figure 2), income ($b = -0.004$, $SE = 0.001$, $p < .001$; Figure 3), economic growth ($b = -0.02$, $SE = 0.009$, $p = .014$; Figure 4), and power distance ($b = 0.001$, $SE = 0.0002$, $p < .001$; Figure 5).

At the individual level, egalitarian value and income emerged as significant moderators. Simple slope analyses showed that the time-varying effect of income redistribution was linked to greater life satisfaction for individuals with high egalitarian values ($b = 0.018$, $SE = 0.004$, $p < .001$), and this positive association was stronger for people with low egalitarian values ($b = 0.033$, $SE = 0.004$, $p < .001$). The association between income redistribution and life satisfaction was weaker for high-income individuals ($b = 0.013$, $SE = 0.004$, $p = .001$) relative to low-income individuals ($b = 0.032$, $SE = 0.004$, $p < .001$). Although these interactions were significant, both simple slopes were positive. That is, even though the time-varying effect of income redistribution was weaker for individuals with high egalitarian value and high-income individuals, increases in income redistribution were nevertheless associated with increases in life satisfaction.

[Insert Figures 2 & 3 here]

At the national and cultural level, economic growth and power distance emerged as significant moderators. Regarding economic growth, a simple slope analysis showed that changes in income redistribution over time positively predicted life satisfaction in societies with slower economic growth, $b = 0.033$, $SE = 0.005$, $p < .001$, but this positive effect was smaller in societies with more rapid economic growth, $b = 0.012$, $SE = 0.006$, $p = .034$. This suggests that increasing income redistribution may be particularly beneficial to life satisfaction when economic growth is slow.

Contrary to the weak hypothesis' prediction that income redistribution may be detrimental in cultures that expected greater social hierarchy, income redistribution was more positively linked to life satisfaction in cultures that scored higher on the power distance index. A simple slope analysis showed that increases in income redistribution over time significantly predicted greater life satisfaction in cultures low in power distance index (1SD below mean), $b = 0.028$, $SE = 0.006$, $p < .001$, but especially in cultures high in power distance index (1SD above mean), $b = 0.075$, $SE = 0.009$, $p < .001$.

<center>[Insert Figures 4 and 5 here]</center>

To summarize the moderation analyses, there were significant variations in the positive time-varying effect of income redistribution on life satisfaction. Nonetheless, all simple slope analyses suggest that the effect of income redistribution on life satisfaction is consistently positive across individual, national, and cultural characteristics.

Study 2 Discussion

Using cross-national data from 112,876 participants covering 24 years, I found evidence for the positive link between time-varying income redistribution and life satisfaction. Participants were more satisfied in countries that experienced increases in income redistribution over time.

To test the strong vs. weak hypotheses of income redistribution, egalitarian values, political leaning, income, economic growth, and power distance were examined as potential moderators. The association between time-varying income redistribution and life satisfaction was stronger for low-income individuals, people with lower egalitarian values, societies experiencing slower economic growth, and cultures that expect and accept inequality in power. Political leaning showed no evidence of its moderating role. The results supported the strong hypothesis of income redistribution such that over-time reduction in income inequality through income redistribution was associated with greater life satisfaction across individual, national, and cultural characteristics.

Similar to Study 1, Study 2 also used a group-mean centering procedure to estimate the time-varying and between-country effects of income redistribution and income inequality. Income redistribution had both a positive time-varying effect and a positive between-country effect, suggesting that increases in income redistribution over time was linked to greater satisfaction and the mean level of income redistribution was also positively associated with greater life satisfaction. Net income inequality had a negative time-varying effect and a positive between-country effect, meaning that decreases in income inequality lowered life satisfaction, but living in countries with higher average level of income inequality was linked to greater satisfaction. These differential results at the two different levels of analysis for income inequality appeared to be robust across Studies 1 and 2.

General Discussion

The recent increase in income inequality in modern societies has led to a growing body of empirical research on income inequality and well-being. Using a measure of income redistribution calculated based on market and net Gini, I examined the overall main effect of

change in income redistribution on life satisfaction and the moderating roles of individual,

national, and cultural characteristics across two studies totaling over 150,000 participants.

Increases in Income Redistribution over Time Predicted Greater Life Satisfaction

I found that increases in income redistribution over time predicted increases in life

satisfaction by using an analytical approach that isolated the time-varying effects of income

redistribution. This finding corroborated earlier research on European countries (Hajdu & Hajdu,

2014). The results suggest that over-time reduction in income inequality through tax and welfare

policies is linked to greater subjective well-being. Based on the models, the time-varying effects

of income redistribution were linked to increases in life satisfaction that were similar to the

predicted effects of increases in a substantial amount of household income and GDP. The current

studies provided a starting point for estimating whether social policies aimed at reducing

inequality may be worth the expense from a life satisfaction perspective.

There are several reasons why increases in income redistribution may improve life

satisfaction. First, income redistribution may improve overall life satisfaction because income

has diminishing returns on life satisfaction (e.g. Diener et al., 2010; Kahneman & Deaton, 2010).

Due to diminishing returns, the same amount of income should improve the well-being of low-

income individuals more than the well-being of high-income individuals. Therefore,

redistributing income from the rich to the poor should have a net positive effect on life

satisfaction for the society as a whole. Second, by reducing the gap in disposable income among

the rich and the poor, income redistribution may help reduce certain negative consequences of

income inequality, such as greater income comparison, perception of unfairness, and social

disharmony (Cheung & Lucas, 2016; Luttmer, 2005; Oishi et al., 2011). These explanations are

not meant to be exhaustive or mutually exclusive, and there may be multiple mechanisms

through which income redistribution influences citizens' well-being. Future research should further assess the merits of these plausible explanations.

A Strong Hypothesis of Income Redistribution

In addition to testing the time-varying effect of income redistribution, I tested the strong hypothesis that income redistribution is beneficial to most against the weak hypothesis that income redistribution is beneficial to some but damaging to others. In two studies, I examined whether changes in income redistribution may have different associations with life satisfaction depending on tax and welfare, income, income mobility, political leaning, egalitarian values, economic growth, and power distance. Across different individual and societal characteristics, living in regions with increasing income redistribution was consistently linked to significantly greater life satisfaction. These results favored the strong hypothesis of income redistribution over the weak hypothesis.

Financial situations. The current studies found that increases in income redistribution predicted greater life satisfaction for the poor and the rich, for tax-payers and welfare-receivers, for people experiencing downward or upward income mobility, and for people living in countries experiencing economic growth or economic downturn. If the time-varying effect of income redistribution was purely driven by the fact that income has diminishing return on happiness, individuals with higher income should have lower life satisfaction as income redistribution increases because they needed to pay a greater proportion of tax from their income. The results from Study 2 showed some evidence that changes in income redistribution had a weaker association with life satisfaction for high-income individuals compared to low-income individuals. However, the simple slope analyses revealed that individuals on both the receiving (low income/welfare receiving) and giving (high income/tax paying) ends of income

redistribution had greater life satisfaction if they lived in regions with increasing income redistribution. Therefore, these findings suggest that the diminishing returns of income on happiness are not the only mechanism behind the positive time-varying effect of income redistribution. It is plausible that income redistribution may have benefited high-income individuals by promoting social harmony, perception of fairness, or even a sense of generosity or meaning through their monetary contribution to the broader societies.

Attitudes and values. In Study 2, I examined how individual and cultural values may interact with income redistribution to predict life satisfaction. The results suggest that income redistribution was linked to greater life satisfaction to the same degree for respondents who were on the political left as for those on the political right. The null result for political leaning as a moderator did not replicate earlier research, which found that the positive effect of income redistribution was stronger for those on the left as compared to those on the right (Hadju & Hadju, 2014). Notably, in the study by Hadju and Hadju (2014), although the association was weaker for right-winged individuals, the simple slopes for both left- and right-winged individuals were significantly positive. Therefore, these past results and the current findings were both consistent with the strong hypothesis of income redistribution.

Egalitarian values significantly moderated the association between income redistribution and life satisfaction in the analysis that analyzed each moderator separately. Based on the weak hypothesis of income redistribution, I expected that income redistribution should be more beneficial to the well-being of individuals who endorsed egalitarian values strongly. This was not the case in Study 2 – increases in income redistribution over time were more strongly linked to life satisfaction for individuals with lower egalitarian values. This finding was puzzling. One possible explanation is that the measure of egalitarian values may not be valid in this sample. In

the WVS, the two anchors of the item on egalitarian values were "Income should be made more equal" and "We need larger income differences as incentives." However, these statements may not represent two polar opposites. For example, it is possible to have high market income inequality (e.g., large differences in salary) as incentives and low net income inequality (i.e., disposable income is made more equal) at the same time. In fact, this measurement problem precisely illustrated why net and market inequality should be distinguished. Future research should carefully revise measurements of people's attitudes towards income inequality to take into account the differences in market and net income inequality.

At the cultural level, income redistribution had a stronger positive association with life satisfaction in cultures with high power distance index. This finding again ran counter to the prediction based on the weak hypothesis of income redistribution. Power distance refers to the extent to which members of lower social hierarchy accept and expect inequality in power. It is plausible that if income redistribution in such cultures is high, low-status members may see high-status members as more benevolent – that high-status members are willing to share their wealth with low-status members. To summarize the moderation analyses, the results supported the strong hypothesis of income redistribution such that income redistribution is beneficial to the well-being of most people.

Increases in Net Income Inequality over Time Predicted Lower Life Satisfaction

The time-varying effect of net income inequality was consistently negative when predicting life satisfaction. As reviewed in the introduction, past research has found mixed results for the link between income inequality and life satisfaction (e.g., Rözer & Kraaykamp, 2013; Verme, 2011; Zagorski et al., 2014). In studies that have examined income inequality and income redistribution simultaneously and specifically tested the time-varying effect of income

inequality, increases in income inequality over time consistently predicted lower life satisfaction, at least based on samples from Germany (Schwarze & Härpfer, 2007; Study 1) and 33 countries around the world (Study 2). Therefore, to the extent that the data are available, future research should 1) examine income inequality and income redistribution simultaneously and 2) separate the time-varying effect of income inequality from the between-region effect.

Differences in Within-region and Between-region Associations between Income Inequality and Life Satisfaction

Interestingly, by isolating the time-varying effects from the between-region associations of income inequality and life satisfaction, income inequality consistently showed different associations with life satisfaction when examined at the between-region level. In Studies 1 and 2, living in regions that on average had greater level of income inequality was associated with *increased* life satisfaction.

The differences in the within-region and between-region effects could be due to the fact that people have different reactions towards *change* in inequality and the average levels of inequality. For example, Chambers, Swan, and Heesacker (2014) demonstrated that Mechanical Turk workers tended to underestimate income inequality but overestimate the *increase* in income inequality from 1970-2010. Therefore, individuals may be particularly sensitive to changes in income inequality. Future research should further disentangle the relations between actual (market and net) income inequality, perceived income inequality, and the positive and negative consequences of income inequality.

With regard to the positive between-region effect of income inequality, regions with greater income inequality have greater differences in income. These differences could have stemmed from more diverse sources of income or career options, which may be beneficial for

life satisfaction. It also remains a possibility that the positive between-region effect of income inequality is confounded by a third variable.

The observed differences in the within- and between-region effects of income inequality suggest that past research may have resulted in mixed findings because past estimates of the associations of income inequality and life satisfaction were a mixture of the within- and between-regions effects (Neuhaus & Kalbfleisch, 1998). Indeed, this concern may also apply to research on inequality and other outcomes (e.g., health, social trust). Therefore, an implication from the current studies is that future research should carefully consider the level of analysis and use longitudinal designs that can separate the within-regions effects from the between-regions effects.

Future Directions, Limitations, and Conclusions

This paper discussed two different measures of income inequality – market Gini and net Gini. Past research has not consistently reported whether market or net Gini was used in analyses, and this omission may have contributed to the mixed results found in earlier research. Although the two measures of income inequality tend to be highly correlated, they were not perfectly correlated. For example, in Study 2, the correlation between net and market Gini across countries was 0.57. The two measures of income inequality could have distinct effects on people's reaction. Imagine a society where market Gini is very high (e.g., there are large differences in salary) and net Gini is very low (i.e., there are little differences in disposable income). To the extent that people are aware of others' pre-government income (e.g., people may have a rough idea of the difference in salaries of physicians, investment bankers, and cashiers), then people may perceive a high degree of income inequality even though income inequality after government-level income redistribution is relatively low. Future psychological research

should clearly specify the sources of income used to calculate Gini to improve the comparability of research across fields. This issue is particularly salient in cross-national research because countries calculate income inequality in different ways. The recent development of the SWIID provides an excellent resource for researchers because it standardizes measures of market and net income inequality across countries covering many years (Solt, 2016).

The current paper made an important methodological contribution by introducing a measure of income redistribution to the psychology literature. While the current studies focused on life satisfaction as the dependent variable, future research should further examine the consequences of income redistribution on outcomes beyond subjective well-being, such as children's outcomes, voting behavior, group processes, and physical health. In addition, the measurement of income redistribution can be easily adapted to study other phenomena. For example, it is possible to calculate the extent to which income redistribution reduces poverty by comparing individuals' pre- and post-government income to a poverty line (e.g., half of the median regional income). Therefore, this measure of income redistribution opens up many new research directions.

Some limitations in the studies should be noted. First, in Study 2, a significant amount of observations had to be excluded because certain societies do not have reliable measures of net and market Gini across time. Policymakers and researchers should consider collecting data to measure each kind of inequality in order to better monitor how income inequality changes across time. Second, the current study did not examine the potentially asymmetrical effects of increases vs. decreases in redistribution. Past research has shown that people tend to be loss aversive – that a loss in income tends to be more detrimental to well-being than the benefit brought by a gain in income (Boyce et al., 2013). It is plausible that people experience decreases in income

redistribution (e.g., a loss in welfare) more negatively than the equivalent gain from increases in income redistribution. Future research should examine the potential role of loss aversion in income redistribution. Third, the current studies used a secondary analysis approach, and not all potentially relevant variables were measured in SOEP or WVS. For example, measures of perceptions of income inequality, income redistribution, income mobility, social injustice would be very helpful in identifying the causal process underlying how income redistribution and income inequality relate to life satisfaction.

To conclude, based on 30 years of data from Germany and 24 years of data from across the world, increases in state- and national-level income redistribution over time were linked to greater life satisfaction, and this link was positive across individual, national, and cultural characteristics. The strong hypothesis of income redistribution – the idea that income redistribution benefits most people – gains empirical support from the current results. That is, income redistribution does not simply redistribute happiness. Rather, by redistributing income from the rich to the poor, citizens experience increases in life satisfaction across the board. For example, increases in income redistribution predicted greater satisfaction for tax-payers *and* welfare-receivers, for liberals *and* conservatives, and for the poor *and* the rich. The use of subjective well-being to guide social policy has gained increasing attention (Diener et al., 2015). The current studies provide a critical piece of evidence that redistribution policies play an important role on improving societal well-being.

References

Alesina, A., Di Tella, R., & MacCulloch, R. (2004). Inequality and happiness: Are Europeans and Americans different?. *Journal of Public Economics*, *88*(9), 2009-2042.

Alesina, A., & La Ferrara, E. (2005). Preferences for redistribution in the land of opportunities. *Journal of Public Economics*, *89*(5), 897-931.

Allison, P. D. (2009). *Fixed effects regression models* (Vol. 160). Thousand Oaks, CA: SAGE publications.

Baird, B. M., Lucas, R. E., & Donnellan, M. B. (2010). Life satisfaction across the lifespan: Findings from two nationally representative panel studies. *Social Indicators Research*, *99*, 183-203.

Bates, D., Maechler, M., Bolker, B., & Walker, S. (2015). *lme4: Linear mixed-effects models using Eigen and S4*. R package version 1.1-9, https://CRAN.R-project.org/package=lme4.

Berg, M., & Veenhoven, R. (2010). Income inequality and happiness in 119 nations: In search for an optimum that does not appear to exist. In B. Greve (Ed.), *Happiness and Social Policy in Europe* (p. 174-194). Cheltenham, United Kingdom: Edward Elgar.

Blanchflower, D. G., & Oswald, A. J. (2004). Well-being over time in Britain and the USA. *Journal of Public Economics, 88*, 1359-1386.

Boyce, C. J., Wood, A. M., Banks, J., Clark, A. E., & Brown, G. D. (2013). Money, well-being, and loss aversion: Does an income loss have a greater effect on well-being than an equivalent income gain? *Psychological Science*, *24*, 2557-2562.

Chambers, J. R., Swan, L. K., & Heesacker, M. (2014). Better off than we know: Distorted perceptions of incomes and income inequality in America. *Psychological science*, *25*, 613-618.

Cheung, F. (2016). Can income inequality be associated with positive outcomes? Hope mediates the positive inequality-happiness link in rural China. *Social Psychological and Personality Science*, 7, 320-330. DOI: 10.1177/1948550615619762

Cheung, F. (2017, June 19). *Figures for illustrating Gini coefficients*. Retrieved from osf.io/txrg4. DOI: 10.17605/OSF.IO/TXRG4

Cheung, F., & Lucas, R. E. (2014). Assessing the validity of single-item life satisfaction measures: Results from three large samples. *Quality of Life Research, 23*, 2809-2818.

Cheung, F. & Lucas, R. E. (2015). When does money matter most? Examining the association between income and life satisfaction over the life Course. *Psychology and Aging, 30*, 120-135.

Cheung, F. & Lucas, R.E. (2016). Income inequality is associated with stronger social comparison effects: The effect of relative Income on life satisfaction. *Journal of Personality and Social Psychology, 110*, 332-341. http://dx.doi.org/10.1037/pspp0000059

Clark, A. E., Frijters, P., & Shields, M. A. (2008). Relative income, happiness, and utility: An explanation for the Easterlin paradox and other puzzles. *Journal of Economic Literature, 46*, 95–144.

De Nardi, M., Ren, L., & Wei, C. (2000). Income inequality and redistribution in five countries. *Federal Reserve Bank of Chicago Economic Perspectives*, *24*(2), 2-20.

Di Tella, R. D., MacCulloch, R. J., & Oswald, A. J. (2003). The macroeconomics of happiness. *Review of Economics and Statistics*, *85*, 809-827.

Diener, E., Ng, W., Harter, J., & Arora, R. (2010). Wealth and happiness across the world: Material prosperity predicts life evaluation, whereas psychosocial prosperity predicts positive feeling. *Journal of Personality and Social Psychology*, *99*, 52-61.

Diener, E., Oishi, S., & Lucas, R. E. (2015). National accounts of subjective well-being. *American Psychologist*, *70*, 234-242.

Frick, J. R., Jenkins, S. P., Lillard, D. R., Lipps, O., & Wooden, M. (2007). The Cross-National Equivalent File (CNEF) and its member country household panel studies. *Schmollers Jahrbuch*, *127*, 627-654.

Hagerty, M. R. (2000). Social comparisons of income in one's community: Evidence from national surveys of income and happiness. *Journal of Personality and Social Psychology*, *78*, 764-711.

Hajdu, T., & Hajdu, G. (2014). Reduction of income inequality and subjective well-being in Europe. *Economics: The Open-Access, Open-Assessment E-Journal*, *8*(2014-35), 1-29.

Hall, P. (1992) Urban and Regional Planning, 3rd ed. London and New York: Routledge

Handcock, M. S. (2015). *Relative Distribution Methods. Version 1.6-4*. http://CRAN.R-project.org/package=reldist.

Handcock, M. S., & Morris, M. (2006). *Relative distribution methods in the social sciences*. New York, NY: Springer Science & Business Media.

Hofstede, G., Hofstede, G. J., & Minkov, M. (2010). *Cultures and Organizations: Software of the Mind, 3rd ed*. New York, NY: McGraw-Hill.

International Monetary Fund. (2017). *World Economic Outlook*. Washington, DC: International Monetary Fund, Publication Services.

Jennrich, R. I., & Schluchter, M. D. (1986). Unbalanced repeated-measures models with structured covariance matrices. *Biometrics*, *42*, 805-820.

Kahneman, D., & Deaton, A. (2010). High income improves evaluation of life but not emotional well-being. *Proceedings of the National Academy of Sciences in the United States of America, 107*, 16489–16493.

Kakwani, N. C. (1977). Measurement of tax progressivity: An international comparison. *The Economic Journal*, *87*, 71-80.

Kawachi, I., & Kennedy, B. P. (1997). The relationship of income inequality to mortality: does the choice of indicator matter?. *Social science & medicine*, *45*, 1121-1127.

Kawachi, I., & Kennedy, B. P. (1999). Income inequality and health: pathways and mechanisms. *Health Services Research*, *34*, 215–227.

Kennedy, B. P., Kawachi, I., Prothrow-Stith, D., Lochner, K., & Gupta, V. (1998). Social capital, income inequality, and firearm violent crime. *Social science & medicine*, *47*, 7-17.

Knies, G., & Spiess, C. K. (2007). *Regional data in the German Socio-economic Panel Study (soep)* (No. 17). DIW Berlin, German Institute for Economic Research.

Knight, J., Lina, S. O. N. G., & Gunatilaka, R. (2009). Subjective well-being and its determinants in rural China. *China Economic Review*, *20*, 635-649.

Kuznetsova, A., Brockhoff, P. B., Christensen, R. H. B. (2014). *lmerTest: Tests in Linear Mixed Effects Models. R package version 2.0-20.* http://CRAN.R-project.org/package=lmerTest

Lucas, R. E., & Donnellan, M.B. (2012). Estimating the reliability of single-item life satisfaction measures: Results from four national panel studies. *Social Indicators Research, 105*(3), 323-331.

Luhmann, M., Murdoch, J. C., & Hawkley, L. C. (2015). Subjective well-being in context:

    County-and state-level socioeconomic factors and individual moderators. *Social*

    Psychological and Personality Science, *6*, 148-156.

Luhmann, M., Schimmack, U., & Eid, M. (2011). Stability and variability in the relationship

    between subjective well-being and income. *Journal of Research in Personality, 45*, 186–

    197.

Luttmer, E. F. P. (2005). Neighbors as negatives: Relative earnings and well-being. *Quarterly*

    Journal of Economics, 120, 963-1002.

Ma, J. (1997). Intergovernmental fiscal transfers in nine countries: lessons for developing

    countries. *World Bank Policy Research Working*

    Paper, *1822*. https://doi.org/10.1596/1813-9450-1822

Neuhaus, J. M., & Kalbfleisch, J. D. (1998). Between-and within-cluster covariate effects in the

    analysis of clustered data. *Biometrics*, *54*, 638-645.

Oishi, S., Kesebir, S., & Diener, E. (2011). Income inequality and happiness. *Psychological*

    Science, *22*, 1095-1100.

Pinheiro J, Bates D, DebRoy S, Sarkar D and R Core Team (2015). nlme: Linear and Nonlinear

    Mixed Effects Models. R package version 3.1-122. http://CRAN.R-

    project.org/package=nlme>.

Pratto, F., Sidanius, J., Stallworth, L. M., & Malle, B. F. (1994). Social dominance orientation: A

    personality variable relevant to social roles and intergroup relations. *Journal of*

    Personality and Social Psychology, *67*, 741-763.

Rözer, J., & Kraaykamp, G. (2013). Income inequality and subjective well-being: A cross-national study on the conditional effects of individual and national characteristics. *Social Indicators Research*, *113*, 1009-1023.

Schmidt, S., & Buehler, R. (2007). The planning process in the US and Germany: A comparative analysis. *International Planning Studies*, *12*, 55-75.

Schneider S. M. (2016). Income inequality and subjective wellbeing: Trends, challenges, and research directions. *Journal of Happiness Studies*, *17*, 1719-1739.

Schwarze, J., & Härpfer, M. (2007). Are people inequality averse, and do they prefer redistribution by the state? Evidence from German longitudinal data on life satisfaction. *The Journal of Socio-Economics*, *36*, 233-249.

Sjölander, A., Lichtenstein, P., Larsson, H., & Pawitan, Y. (2013). Between–within models for survival analysis. *Statistics in medicine*, *32*, 3067-3076.

Solt, F. (2016). The Standardized World Income Inequality Database. *Social Science Quarterly*, *97*, 1267-1281.

Solt, F. (2009). Standardizing the world income inequality database. *Social Science Quarterly*, 90, 231-242.

Tomes, N. (1986). Income distribution, happiness and satisfaction: A direct test of the interdependent preferences model. *Journal of Economic Psychology*, *7*, 425–446.

Verme, P. (2011). Life satisfaction and income inequality. *Review of Income and Wealth*, *57*, 111-127.

Walasek, L. & Brown, G.D.A. (2015). Income inequality and status seeking: Searching for positional goods in unequal U.S. states. *Psychological Science*, *26*, 527-533.

Xie, Y., & Zhou, X. (2014). Income inequality in today's China. *Proceedings of the National Academy of Sciences*, *111*, 6928-6933.

Zagorski, K., Evans, M. D., Kelley, J., & Piotrowska, K. (2014). Does national income inequality affect individuals' quality of life in Europe? Inequality, happiness, finances, and health. *Social Indicators Research*, *117*, 1089-1110.

Footnotes

1. It is noted that this definition of income redistribution does not include some other governmental efforts that redistribute resources. For example, building infrastructure in low-income neighborhoods (e.g., highway, hospitals, parks) may also benefit low-income individuals, but these efforts do not necessarily translate into reduction of income inequality. Increasing minimum wage is another way to improve the income level of poorer individuals without necessarily affecting tax or welfare.

2. The intraclass correlation for life satisfaction was calculated to estimate the level of nonindependence. The intraclass correlations were .43 at the person level and .026 at the state level, indicating 43% of the variance of life satisfaction can be explained by the fact that there was a substantial amount of within-person stability in life satisfaction across the years of the study and 2.6% of the variance can be attributed to the fact that participants living in the same states had somewhat similar life satisfaction. These results supported the use of multilevel modeling.

3. Specifically, for household income, yearly household income was centered around individual-specific means; individual-specific means were then centered around state-specific means. This procedure created three variables related to household income: yearly household income, individual-specific means of income, and state-specific means of income. The yearly household income tested the time-varying effect of household income (i.e., whether changes in household income were associated with changes in life satisfaction over time), and it was used as a measure of income mobility. Individual-specific means of income tested whether richer individuals tended to report higher life satisfaction than low-income individuals. State-specific means of

income tested whether participants living in states with higher income reported greater life satisfaction compared to participants living in states with lower income.

State-level yearly net Gini and income redistribution were centered around state-specific means. The mean-centered net Gini and income redistribution tested the time-varying effects of income inequality and income redistribution (e.g., as income redistribution in State A increases, do respondents from State A reported greater life satisfaction?). Estimates of these associations were based on 424 state-years. The state-specific means of net Gini and income redistribution tested whether state differences in income inequality and income redistribution were associated with life satisfaction (e.g., do respondents from State A with high income inequality report lower life satisfaction compared to respondents from State B with low income inequality?). These associations should be interpreted cautiously because they were tested based on a small number of states (i.e., 16).

4. The survey question on income was constructed at each country for each wave by the local WVS principal investigator(s). Country statistics (e.g., census data) were used to construct 10 income brackets that corresponded to 10 income deciles. WVS participants reported their income by choosing one of the 10 income brackets. After the data were collected, the income data were recoded as income deciles to be a measure of relative income that is comparable across countries. For example, a Bulgarian participant who participated in the WVS in 1997 would see 10 income brackets that corresponded to the 10 income deciles that were specific to Bulgaria in 1997. If the participant reported that her income was at the second income bracket, it means that her income level was at the second decile (between 11%-20%) in Bulgaria in 1997.

5. The intraclass correlation for life satisfaction was .168, suggesting that 16.8% of the variance in life satisfaction can be explained by the country participants resided in. This supported the use of multilevel modeling to account for the non-independence in the data.

6. To do so, GDP, net Gini, and income redistribution were centered around country-specific means. The mean-centered GDP variable tested the time-varying effect of GDP (i.e., whether as the economy in a country grew, people became more satisfied). The mean-centered net Gini and income redistribution variables tested the time-varying effects of income inequality and income redistribution. The time-varying associations were estimated based on 90 country-years. Country-specific means of GDP, net Gini, and income redistribution were included as predictors. These variables tested whether between-country differences in GDP, income inequality, and income redistribution were associated with life satisfaction. These associations were tested with 33 countries.

Table 1

Correlations among Continuous Variables in Study 1

Variables	2	3	4	5	6	7	8	9
1. Life Satisfaction	-0.042*	0.121*	0.038*	0.028*	0.210*	0.145*	0.138*	-0.040*
2. Age	—	-0.003	-0.278*	-0.338*	-0.140*	-0.511*	0.037*	0.070*
3. Year of Education		—	-0.104*	-0.060*	0.305*	0.180*	0.183*	0.157*
4. Number of Household Adults			—	0.142*	0.471*	0.289*	-0.085*	-0.108*
5. Number of Household Children				—	0.164*	0.187*	-0.044*	-0.089*
6. Post-government Household Income					—	0.482*	0.089*	-0.087*
7. Tax and Welfare						—	0.007	-0.125*
8. Net Gini							—	0.288*
9. Income Redistribution								—

* p < .001

Table 2

Unstandardized coefficients and standard errors from multilevel models in Study 1

Variables	Main Effect Model without Covariates	Main Effect Model with Covariates	Interaction Model
Time-Varying Predictors			
Net Gini	-0.583***	-0.451**	-0.380*
	(0.167)	(0.166)	(0.167)
Income Redistribution	0.485 ***	0.674***	0.713***
	(0.119)	(0.118)	(0.119)
Household Income		0.148***	0.140***
		(0.005)	(0.005)
State-level Covariates (state-specific means)			
Net Gini	1.980***	1.410**	1.476**
	(0.454)	(0.449)	(0.449)
Income Redistribution	-3.983***	0.393	0.428
	(0.132)	(0.481)	(0.480)
Household Income		1.747***	1.722***
		(0.182)	(0.182)
Moderator			
Tax and Welfare			0.014***
			(0.001)
Interaction Terms			
Income Redistribution X Tax and Welfare			0.020
			(0.031)
Income Redistribution X Household Income			-0.157
			(0.139)

Note: *p<.05**p<.01***p<0.001

Table 3

Means, standard deviations, and correlations in Study 2

Variable	*M*	*SD*	1	2	3	4	5	6	7	8
1. Life Satisfaction	6.93	2.36								
2. Age	43.07	16.63	-.04**							
3. Income	4.63	2.43	.21**	-.08**						
4. Egalitarian Value	0.01	2.91	-.04**	.05**	-.10**					
5. Political-right	-0.00	2.28	.11**	.01*	.02**	-.15**				
6. GDP	17703	14607	.19**	.17**	.14**	.05**	-.06**			
7. Net Gini	38.35	9.91	.06**	-.22**	-.08**	-.01**	.11**	-.49**		
8. Income Redistribution	17.67	16.16	.14**	.21**	.09**	.06**	-.09**	.67**	-.73**	
9. Power Distance	58.49	18.79	-.11**	-.16**	-.18**	-.02**	.07**	-.72**	.46**	-.71**

Note. * indicates $p < .05$; ** indicates $p < .01$. *M* and *SD* are used to represent mean and standard deviation, respectively.

Table 4

Regression Coefficients and Standard Errors (in Parentheses) from Multilevel Models

	Main Effect Model without Covariates	Main Effect Model with Covariates	Egalitarian Value as Moderator	Political Leaning as Moderator	Income as Moderator	GDP as Moderator	Power Distance as Moderator
Number of Countries	33	33	33	31	33	33	23
Number of Respondents	112876	112876	108892	85774	112876	112876	85056
Intercept	6.879***	7.122***	7.101***	7.148***	7.121***	7.124***	7.250***
	(0.140)	(0.116)	(0.116)	(0.115)	(0.116)	(0.115)	(0.145)
Time-Varying Effects							
Net Gini	-0.023***	-0.064***	-0.061***	-0.052***	-0.064***	-0.059***	0.009
	(0.003)	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)	(0.006)
Income Redistribution	0.019***	0.023***	0.026***	0.023***	0.023***	0.022***	0.051***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.006)
GDP		0.760***	0.759***	0.800***	0.764***	0.737***	0.249***
		(0.033)	(0.035)	(0.043)	(0.033)	(0.035)	(0.062)
Country-Level Covariates (Country-Specific Means)							
Net Gini	0.095***	0.094***	0.093***	0.085***	0.094***	0.093***	0.072**
	(0.022)	(0.018)	(0.018)	(0.017)	(0.018)	(0.018)	(0.026)
Income Redistribution	0.068***	0.040**	0.041**	0.033*	0.040**	0.039**	0.027
	(0.012)	(0.013)	(0.013)	(0.014)	(0.013)	(0.013)	(0.021)
GDP		0.433***	0.425***	0.484***	0.434***	0.441***	0.285
		(0.124)	(0.124)	(0.139)	(0.125)	(0.124)	(0.211)
Interactions							
Income Redistribution X Egalitarian Value			-0.003**				
			(0.001)				
Income Redistribution X Political-right				0.001			
				(0.002)			
Income Redistribution X					-0.004***		

Income Decile	(0.001)	
Income Redistribution X		-0.022^{*}
Time-Varying GDP		(0.009)
Income Redistribution X		0.001^{***}
Power Distance		(0.000)

Notes. $^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

a)

Gini = A/(A+B)

Line of Equality

A

Q

Lorenz Curve

B

Cumulative % of Income

Cumulative % of People
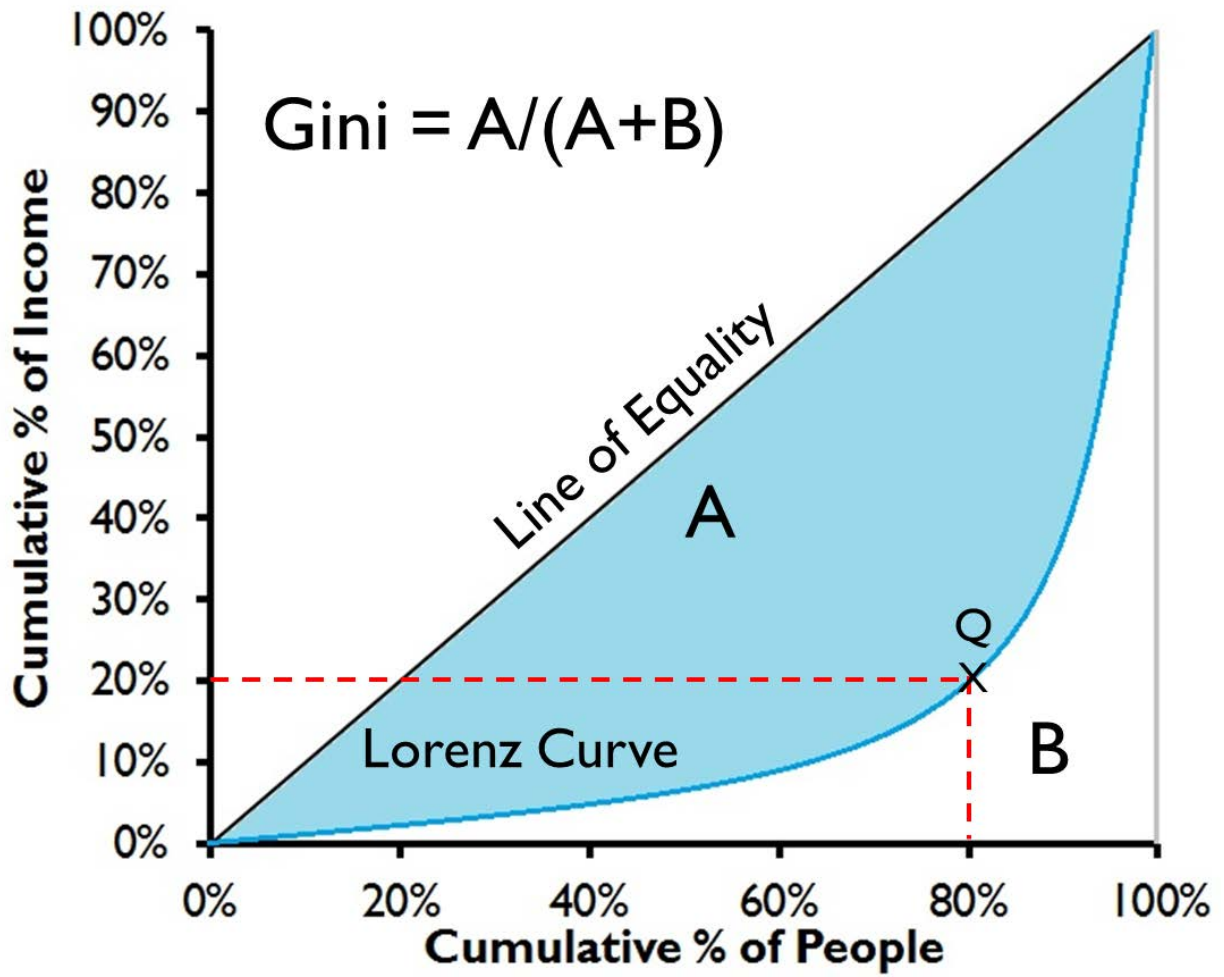
b)
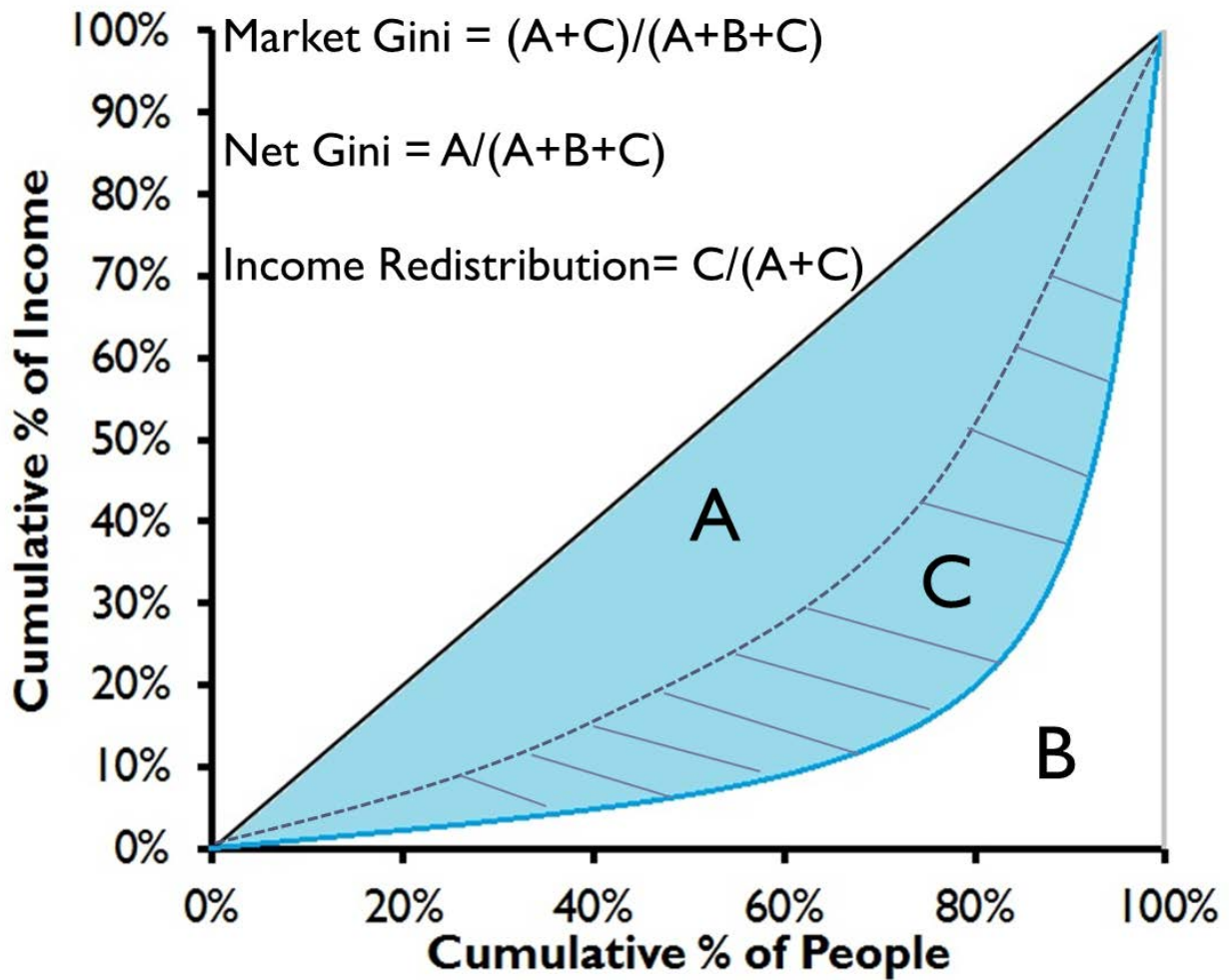
Figure 1. a) An illustration of Gini, line of equality, and the Lorenz curve and b) An illustration of how Gini changes before and after tax and welfare (Cheung, 2017). The solid Lorenz curve represents the distribution of income before tax and welfare, and the dotted Lorenz curve represents the distribution of income after tax and welfare.
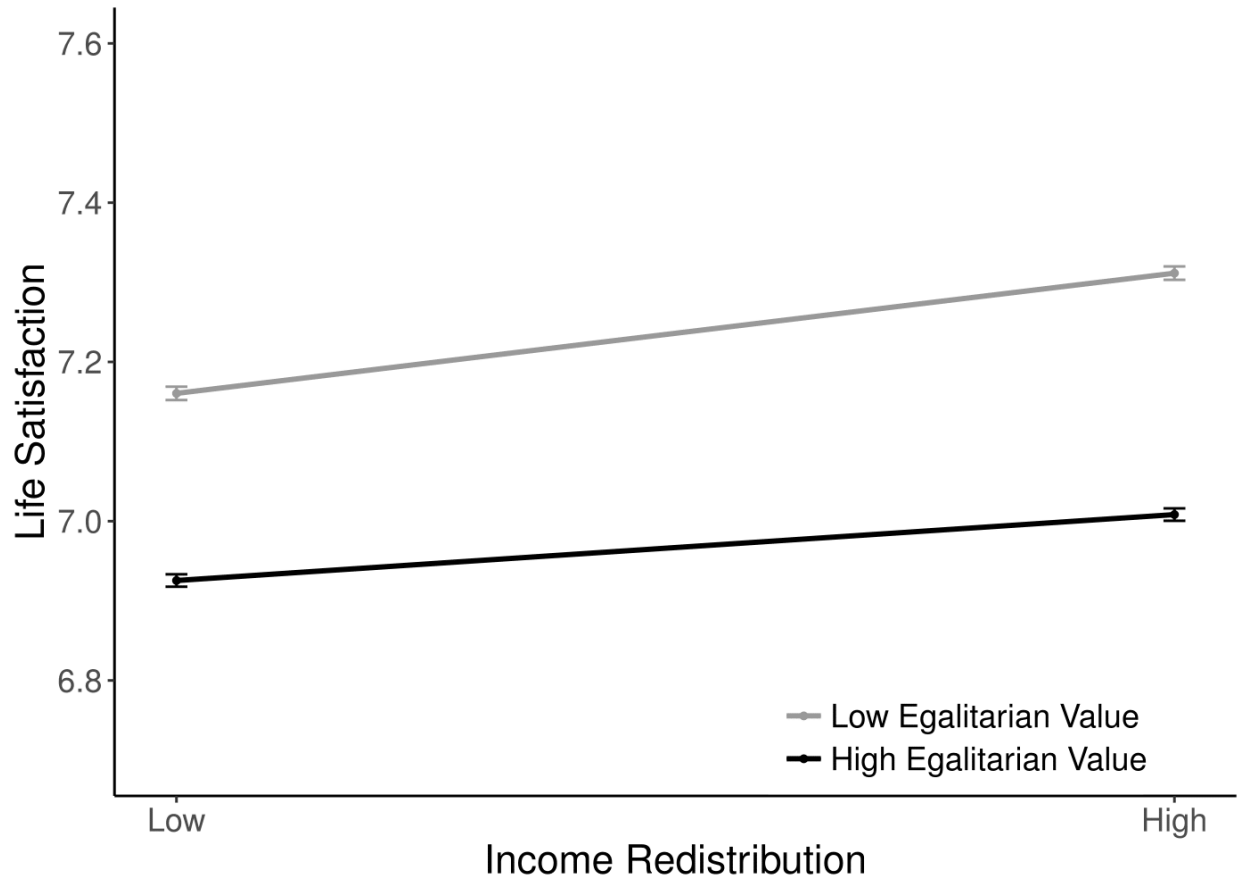
Figure 2. The interaction between income redistribution and egalitarian value. Error bars
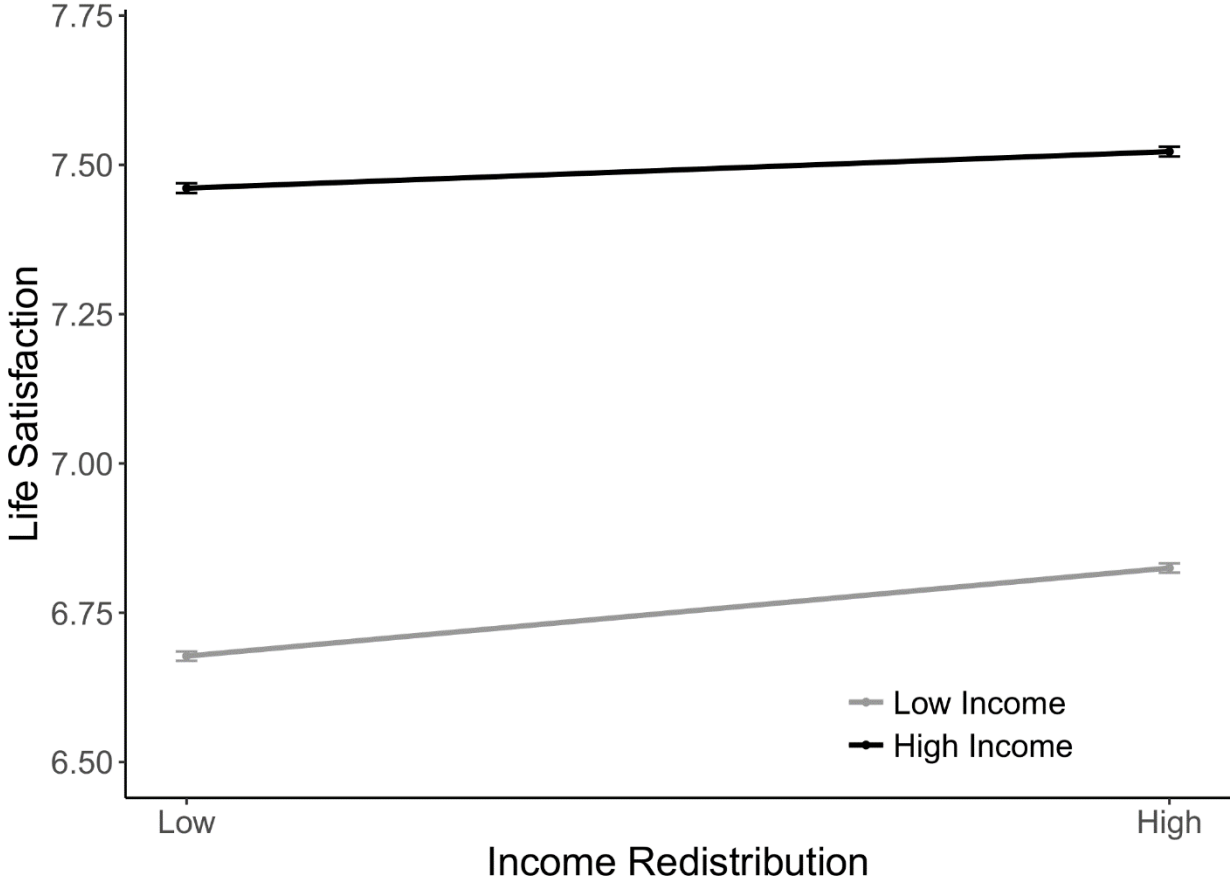
represent 95% confidence intervals.

Figure 3. The interaction between income redistribution and income. Error bars represent 95%
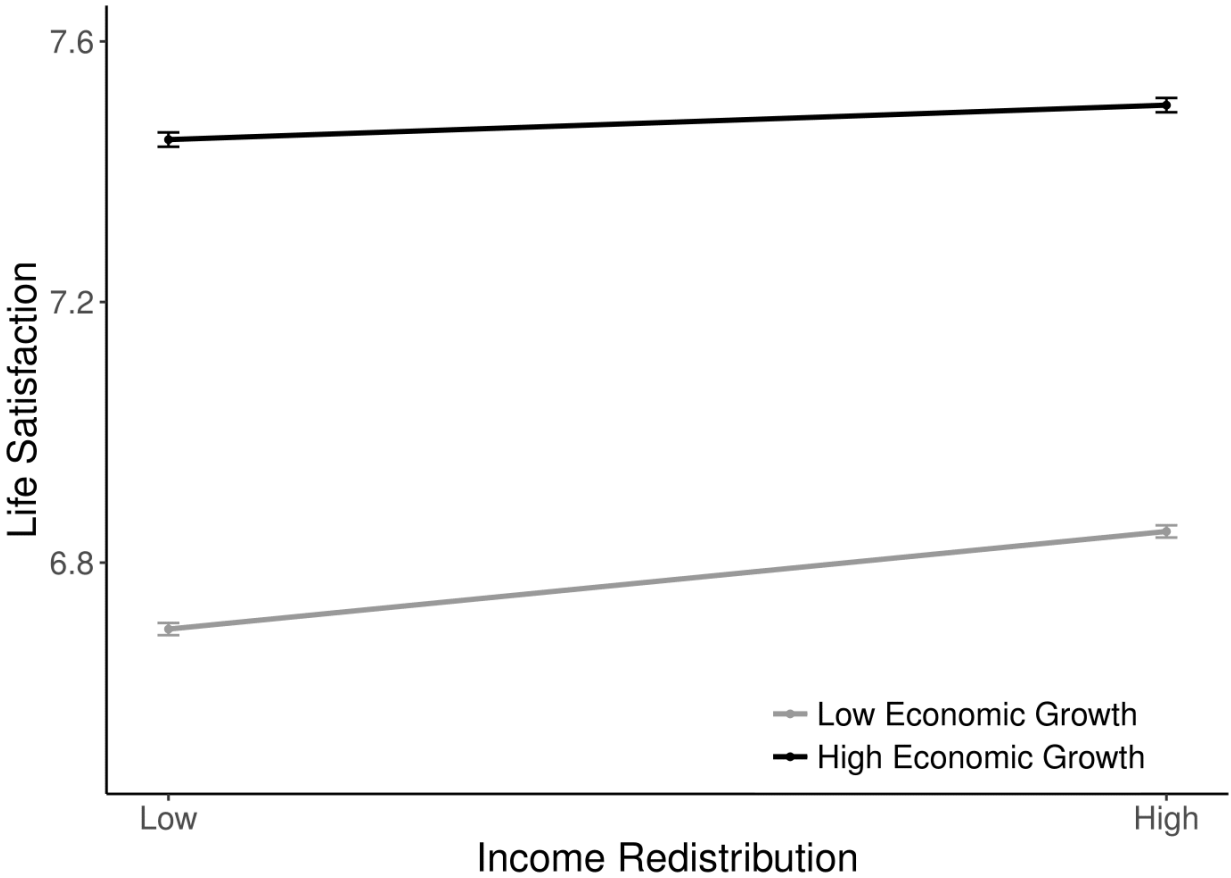
confidence intervals.

Figure 4. The interaction between income redistribution and economic growth. Error bars
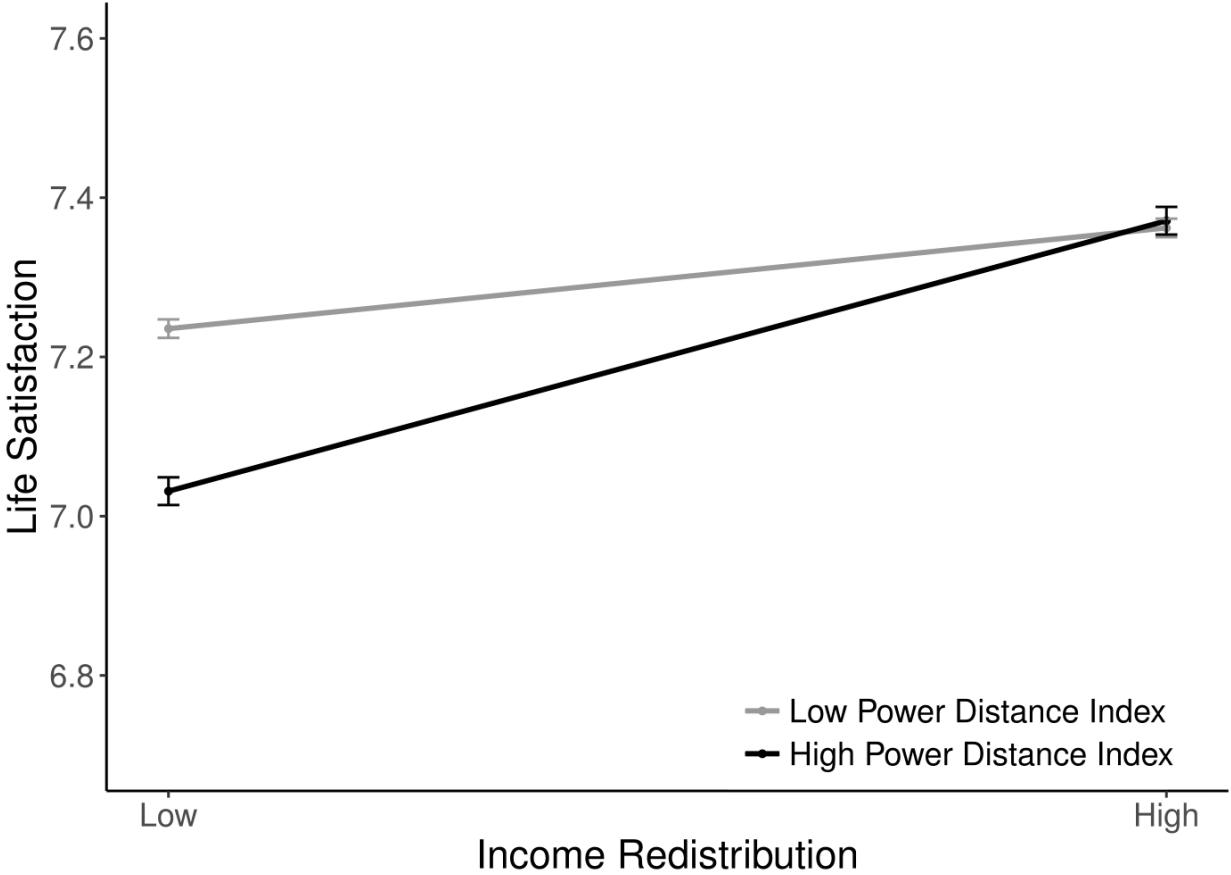
represent 95% confidence intervals.

Figure 5. The interaction between income redistribution and power distance index. Error bars represent 95% confidence intervals.