



What You See is What You Get: The Effect of Perceived Inequality on Subjective Well-Being

Melvin John¹ · Herbert Bless¹ · Michaela Wänke¹

Accepted: 23 April 2025
© The Author(s) 2025

Abstract

When examining the influence of income inequality on subjective well-being (SWB), prior research has relied on objective measures of inequality, such as the Gini index. Alternatively, considering the subjective component, research has also investigated how evaluations of inequality, such as perceived (un-)fairness, influence SWB. However, we argue that it is important to also consider the perceived size of inequality independently from evaluations of inequality. Whereas the effect of evaluations of inequality on SWB have been the subject of prior research the effect of perceived size of inequality has received rather little attention. Across three studies, the present research suggests that the higher the perceived size of inequality the lower SWB, independent of evaluations of inequality. Study 1, a country level-analysis across 41 countries found that this relationship is stronger than and independent of objective inequality or unfairness beliefs about inequality and provides longitudinal evidence. Study 2, a representative survey study (N=836), found that the relationship between perceived size of income inequality and SWB is independent of unfairness beliefs about inequality. Study 3, a pre-registered experiment (N=302) manipulated perceived size of income inequality and found partial support for a causal impact on aspects of SWB. Overall, these results emphasize the importance of perceived size of inequality. This perspective holds important implications for explaining how income inequality impacts SWB.

Keywords Perceived income inequality · Subjective well-being · Gini index

✉ Melvin John
melvin.john@uni-mannheim.de

Herbert Bless
bless@uni-mannheim.de

Michaela Wänke
michaela.waenke@uni-mannheim.de

¹ Faculty of Social Sciences, Department of Psychology, University of Mannheim, A5,6, 68159 Mannheim, Germany

1 Introduction

Income inequality is increasingly worrying many societies. Former US-president, Barack Obama, referred to inequality as a “defining challenge of our time” (Obama, 2013) and as a test for democracy which “will determine our future” (Obama, 2017). The highly cited book, *The Spirit Level: Why Equality is Better for Everyone* (Wilkinson & Pickett, 2009a) identifies inequality as the root of many societal disruptions and social dysfunction in general. It has even been estimated that at least 1.5 million lives could be saved in OECD countries if income inequality were reduced to a level comparable to Australia or Canada (Kondo et al., 2009).

Psychologists have been particularly interested in the relation between financial inequality and subjective well-being (SWB) (Buttrick & Oishi, 2017; Ngamaba et al., 2018; Schneider, 2016) and several theoretical accounts have addressed why financial inequality reduces SWB. First, the status anxiety account (Wilkinson & Pickett, 2009a, 2017) holds that high inequality increases the salience of individuals’ position on the social ladder (Kraus et al., 2013) which in turn increases status anxiety and creates the fear of being left behind (Marmot, 2005; see also Wolbring et al., 2013 for related evidence). Second, the interpersonal trust account (Oishi et al., 2011) posits that high inequality decreases interpersonal trust, because in societies with higher inequality people are more likely to view the system as unfair and believe that more affluent people achieve their success through unfair practices (Grosfeld & Senik, 2010; see also Buttrick & Oishi, 2017; Delhey & Dragolov, 2014). Both, increased status anxiety and reduced trust, presumably act as stressors that reduce subjective well-being.

Prior research has mainly focused on objective inequality, most often captured by the Gini index of income. The empirical evidence relying on such objective measures is, however, mixed. Whereas a negative relation between SWB and income inequality has been observed in some cross-sectional (Delhey & Dragolov, 2014; Diener et al., 1995; Hagerty, 2000) and longitudinal studies (Oishi et al., 2011; Alesina et al., 2004) higher income inequality has also been found to be positively related with SWB (Berg & Veenhoven, 2010; Kelley & Evans, 2017). Reflecting these inconsistencies, a meta-analysis across 24 studies concluded that the relationship between objective inequality and SWB is weak and the underlying mechanisms complex (Ngamaba et al., 2018).

From a social-psychological perspective, however, it is usually not the objective situation that influences individuals but how the objective situation is subjectively perceived (Greifeneder et al., 2018). Indeed, recently scholars suggested that subjective inequality may be the primary catalyst for psychosocial effects of inequality and proposed that previous findings on objective inequality may be inconsistent because subjective inequality was not taken into account (Gimpelson & Treisman, 2018; Willis et al., 2022). Yet, a closer look at the respective studies reveals that subjective inequality has been conceptualized quite differently in different studies and crucially often does not distinguish between *perceived size* of inequality and the *subjective evaluation* of the size (e.g., “too large”) or *fairness beliefs* about inequality. Although these components are likely to be related one would not expect that assuming high inequality goes hand in hand with perceiving it negatively or that everybody would welcome low inequality.

Building on these considerations, the present research investigates the question: what is the role of the perceived size of inequality, independent of evaluations of its fairness, for

subjective well-being? We addressed this question across three studies employing different methodologies (country-level data, representative survey data, and experimental data), diverse operationalizations of subjective well-being, and specifically distinguishing the perceived size of inequality from other aspects of subjective inequality, our results suggest three main conclusions: (1) The perceived size of inequality is negatively related to SWB, (2) beyond and independent of objective inequality and unfairness beliefs about inequality, and (3) is causal for some components of SWB (i.e., positive and negative affect). These findings underscore the importance of perceptions of inequality in shaping subjective well-being and offer new insights into the psychological mechanisms underlying the relationship between inequality and well-being.

1.1 Subjective Inequality and SWB

Subjective inequality has been conceptualized quite differently in different studies and may refer to the perceived size as well as the evaluation of inequality (Castillo et al., 2021). Most research on the subjective inequality-SWB link has not captured descriptive aspects of inequality (i.e., how large it is perceived) and instead focused on normative aspects (i.e., how large people prefer it to be; Castillo et al., 2021; see also Valtorta et al., 2023 for an example of a scale that combines items about the perceived size and fairness of inequality into a singular score). Only very few studies attempted to assess perceived size independently of fairness beliefs or evaluations. In a seminal study Schneider (2012) assessed numerical estimates of how much a specifically described high versus low status person earns to measure perceived size of inequality and related this to the difference of how much they should earn (preferred difference). Whereas a higher gap between these two measures predicted SWB, again this approach intertwines perceived size and an evaluative component.

A different approach was taken by Schmalor and Heine (2021) with their Subjective Inequality Scale (SIS), which allows both subjective inequality and unfairness beliefs about inequality to be assessed in separate subscales with a Likert-type answer format. Their measure showed good reliability and validity and correlated negatively with SWB. However, due to its Likert-type answer format and the content of some of its items (e.g., “real opportunities to succeed in life are only available to the wealthy.”) their subscale for subjective inequality likely not only captures perceived size but also evaluations of inequality too, as is reflected by its high correlation of $r = .58$ with the other subscale of the SIS for unfairness beliefs about inequality. In all these studies, which confounded normative and descriptive components of subjective inequality it is therefore not clear whether effects on SWB are due to the perceived size of inequality itself or merely due to people being less happy when their normative preferences are violated, or both.

One may perhaps wonder why the perceived size of inequality would affect SWB beyond evaluations or fairness beliefs about inequality. In addition to the argument for precise concepts, there is also reason to believe that perceived size does matter. For example, Chambers et al. (2014) found that political liberals estimate the size of income inequality to be higher than conservatives do. Combined with the fact that objective inequality was more strongly related to SWB in countries with a more liberal (compared to a more conservative) culture (Li et al., 2019) this may suggest that political ideology moderates the objective inequality-SWB link precisely because of its simultaneous effect on the perceived size of inequality (see also Willis et al., 2022 for a discussion). Put together there seems to be sufficient rea-

son for separating the perceived size of inequality from evaluative and fairness beliefs of inequality when studying the relationship of subjective inequality and SWB.

Moreover, disentangling perceived size and evaluative components bears on assumptions regarding causal directions. Perceiving inequality as too large or as unfair may lower SWB, but it is equally plausible that being unhappy in general makes one blame inequality. Although it is possible that SWB also affects numerical estimates of income inequality this seems less plausible. Thus, disentangling the perceived size and the evaluative aspects of inequality may bring us closer to understanding the causal direction. Yet, correlational evidence is of course limited for this purpose, although cross-lagged analyses would allow some insights. For more reliable insights experimental evidence is needed which brings us to the present research.

1.2 The Present Research

Admittedly, one may speculate, that the objective size of inequality exerts its influence independently from how the *size* is subjectively perceived (in this respect the various models are not very specific). Though we do not deny such a possibility we argue that in particular from a social-psychological perspective the subjective representation of the size of financial inequality is likely a central driver of the psychological effects of inequality. The objectively same degree of inequality can result in different representations of inequality (and, conversely, different objective situations can result in the same perception). Although previous research attested to the importance of the subjective component as outlined above the role of perceived size of financial inequality for SWB has not been sufficiently captured independent of evaluations of inequality.

In the present research we explicitly distinguish between the two components *perceived size of inequality* and *fairness beliefs about inequality*. Studies 1 and 2 included a separate measure for perceived fairness of inequality in addition to perceived size to explicitly disentangle these two often confounded aspects. Besides this overarching theme we go beyond previous research in several ways.

First, we investigated the effects of objective *and* perceived size of inequality on SWB in combination. We are aware of only one previous study that did so and which found that SWB is related to subjective but not objective inequality (Vezzoli et al., 2022). However, there subjective and objective inequality were measured on two different levels (individual vs. regional level) which makes it difficult to compare the effect sizes. Additionally, only five regions on the regional level were investigated, which suggests that the analysis of the effect of objective inequality on SWB was likely underpowered. It therefore remains unclear to what extent perceived size of inequality affects SWB beyond, or perhaps even contrary to objective inequality. This question is particularly interesting, given large systematic discrepancies between the objective and perceived size of inequality (Gimpelson & Treisman, 2018; Hauser & Norton, 2017), and given the inconsistent evidence when only looking at objective inequality (Ngamaba et al., 2018). We addressed this issue by including comparable measures for both objective and perceived size of inequality (Study 1).

Second, contrary to recommendations in the general SWB literature (Diener et al., 1999), research on the inequality-SWB link has focused primarily on the cognitive component of SWB (i.e., general life satisfaction), while the affective component of SWB (i.e., emotions)

has been largely neglected (see e.g., Ngamaba et al., 2018). We addressed this issue by including measures for both the cognitive and affective component of SWB (Study 3).

Third, the focus on perceived inequality raises the question of causality. Whereas it seems more plausible that country-level objective inequality affects SWB than vice-versa, causality for the relationship between perceived inequality and SWB is less clear. People who have a more negative outlook on life may also perceive inequality as larger. We tackled this question by two approaches. In Study 1b, we investigated the prospective effect of subjective inequality over a time span of 10 years. In a longitudinal design, the direction of an effect is reflected in the temporal order of measurements, which, compared to a cross-sectional design, enables more precise inferences about the nature of a relationship (Cole & Maxwell, 2003). In Study 3, we conducted a high-powered, pre-registered experiment in which we manipulated the perceived size of inequality.

To our knowledge, the present research is unique in its combination of cross-national data (Studies 1), representative survey data (Study 2), and experimental data (Study 3). This combination allows us to examine the importance of perceived size of inequality with both high external and high internal validity. We hypothesized that the perceived size of inequality has a negative effect on SWB, beyond objective inequality, and independent of unfairness beliefs about inequality. All materials, data and code have been made publicly available on the OSF (Link). Study 3 was preregistered (Link).

2 Study 1

Study 1 consisted of two parts, Study 1a and Study 1b. Paralleling prior research on the inequality-SWB link we assessed the relation cross-nationally but, crucially, in Study 1a we included aggregate perceived size of inequality in addition to objective inequality and unfairness beliefs about inequality. In Study 1b we relied on similar data but assessed the relation between the perceived size of inequality and SWB longitudinally. We hypothesized two main findings. First, in Study 1a we expected that the perceived size of inequality is negatively related to SWB regardless of the level of objective inequality and unfairness beliefs about inequality. Second, in Study 1b we expected that the perceived size of inequality has a stronger prospective effect on SWB than vice-versa.

2.1 Study 1a – Method

2.1.1 Data

To test the first hypothesis, we combined country-level data on subjective inequality, Gini indices, and SWB (for more details see below). The resulting dataset contained country-level information on 41 countries.

2.1.2 Measures

Perceived Size of Inequality. Perceived size of inequality was operationalized according to a procedure introduced by Niehues (2014), using question 14a of the ISSP survey on social inequality (ISSP Research Group, 2017). Respondents were shown five different pyramid

charts with seven levels. Each of the five charts depicted a different degree of stratification in society. Respondents were asked to choose the chart which best represents their society. We considered the levels in the pyramid charts as income classes and that the area of each level (in mm²) indicated the size of that income class in the population (with each mm² indicating a separate observation in the population). We then applied the following formula to calculate an unbiased Gini index for each diagram (Damgaard & Weiner, 2000; Dixon et al., 1987): $G = \frac{\sum_{i=1}^n (2i-n-1)y_i}{n^2 \bar{y}} * \frac{n}{n-1}$, where n is the total area of the pyramid chart (in mm²), y_i is the income of the i 'th observation (as indicated by the income class the observation belonged to), and \bar{y} is the average income across all observations. The Gini indices of the different diagrams were 42 (A), 34 (B), 29 (C), and 20 (D and E). Based on how often the different diagrams were chosen, we computed the average perceived size of inequality for each country. Thus, we obtained a single measure for each country which indicates the perceived size of income inequality in that country (Gimpelson & Treisman, 2018).

Unfairness Beliefs about Inequality. The ISSP 2009 survey contained two items which measured beliefs about the unfairness of inequality – irrespective of the objective or perceived level of inequality. Respondents were asked to indicate on a scale from 1 (*Very just, definitely right*) to 5 (*Very unjust, definitely wrong*) how unjust and wrong they think it is that people with higher income can afford better healthcare (item 1) and better education (item 2) than people with lower incomes. These items are conceptually similar to items on unfairness beliefs about inequality in the Subjective Inequality Scale by Schmalor and Heine (2021). We aggregated the answers to these items on the country-level and used them as input in the measurement model of a latent regression analysis to estimate a latent factor for unfairness beliefs about inequality.

Subjective Well-Being. SWB at the country level was taken from the World Happiness Report for the years 2010–2012 (WHR; Helliwell et al., 2013). The WHR assesses each country's happiness score by averaging individual responses to the Cantril Scale, which asks respondents to rate their current life from 0 (*worst possible life*) to 10 (*best possible life*). Because this scale does not account for inequality, it provides an unbiased basis for examining relationships with inequality measures. The WHR relies mainly on data from the Gallup World Poll. We have intentionally used data from 2010 to 2012 merged with ISSP data from 2009 to ensure that the temporal order of the observations matches the assumed direction of the relationship, thereby reducing a potential endogeneity bias due to simultaneity (Zaefarian et al., 2017).

Objective Size of Inequality. We relied on the World Bank for data on objective income inequality in the form of Gini indices for the different countries (World Bank, 2020b). As the WHR measure for SWB for the first hypothesis dates from 2010 to 2012 we took Gini indices for each country from the year 2009. If an index for a given country for the year 2009 was not available, we took the Gini index from the year closest to the year 2009 for which data was available as a substitute.

Covariates. We controlled for several potentially confounding variables in accordance with previous research on income inequality (e.g., Li et al., 2019; Sommet et al., 2018): GDP per capita (World Bank, 2020a), rate of unemployment, (International Labour Organization, ILOSTAT database, 2020), religiosity (collected by the Gallup World Poll 2005–2009 and published in Diener et al., 2011), and a composite measure for quality of life. The composite measure for quality of life in each country was based on six variables from the World Fact

Book (United States & Central Intelligence Agency, 2009). The six variables were infant mortality rate, degree of urbanization, average life expectancy, poverty rate, literacy rate, and education expenditure in percent of the GDP. The infant mortality rate, average life expectancy and poverty rate were log transformed due to skewness. The variables were then standardized and combined (infant mortality and poverty rate were reverse scored; $\alpha=0.82$). In accordance with the other independent variables, the covariates for each country were taken from the year 2009.

Furthermore, in line with our goal to disentangle the perceived size of inequality from unfairness beliefs about inequality, we also included a measure for the evaluation of inequality that likely confounds both aspects, to assess the discriminant and convergent validity of our measures for perceived size and unfairness beliefs about inequality. The evaluation of inequality was also assessed in the ISSP 2009 survey. Respondents indicated on a scale from 1 (*strongly agree*) to 5 (*strongly disagree*) their agreement with the statement that income inequality in their country is too large. As with the other measures, we used the country-level average of this measure. Following our reasoning from above that perceived size and unfairness beliefs about inequality are two separable constructs that are confounded in evaluations of inequality, we expected that these two variables would both correlate with the evaluation of inequality but not correlate with each other.

2.2 Study 1a – Results

In a first step we looked at the bivariate correlations of our focal variables on perceived size, unfairness beliefs about, and evaluation of inequality both on the country and individual level (Table 1). We found that the higher the size of inequality was perceived, the more inequality was evaluated as too large on both the country ($r=.67, p<.001$) and the individual level ($r=.14, p<.001$). Similarly, we found that the more inequality was generally believed to be unfair the more it was evaluated as too large on both the country ($r=.41, p=.009$) and the individual level ($r=.17, p<.001$). However, we did not find a relation between unfairness beliefs with the perceived size of inequality on the country level ($r=.02, p=.920$). Only on the individual level did we find a correlation ($r=.07, p<.001$) but this correlation was much smaller in magnitude compared to the correlations of either variable with the evaluation of inequality. Consequently, and in line with our previous reasoning, our measures for perceived size of inequality and for general fairness beliefs appear to indeed assess separable aspects of perceived inequality that are confounded in the evaluation of inequality. Moreover, we found, as expected, that the perceived size of inequality was not fully

Table 1 Descriptive statistics and correlations of focal variables

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5
1. SWB	6.26	0.97	-				
2. Inequality: objective size	34.53	7.61	-0.25	-			
3. Inequality: perceived size	32.34	3.82	-0.84***	0.32*	-	0.07***	0.14***
4. Inequality: perceived fairness	3.59	0.53	0.07	-0.61***	0.02	-	0.17***
5. Inequality: evaluation	4.21	0.35	-0.53***	-0.09	0.67***	0.41**	-

Note. SWB=subjective well-being. Inequality: objective=Gini index for distribution of income. Below the diagonal are country-level correlations ($N=41$). Above the diagonal are individual-level correlations of country-mean centered variables ($N=51,696$)

† $p<.10$. * $p<.05$. ** $p<.01$. *** $p<.001$

determined by objective inequality, reflected in a medium-sized correlation on the country level ($r=.32, p=.039$) and that higher objective inequality was only descriptively related to lower SWB ($r=-.25, p=.112$).

In a second step we used latent regression analysis to test whether perceived size of inequality predicts SWB on the country level even when controlling for objective inequality and unfairness beliefs about inequality. Latent regressions are recommended to disentangle effects from correlated predictors and to account for measurement unreliability which would otherwise inflate type I error rates (Westfall & Yarkoni, 2016). Since our measure for unfairness beliefs about inequality consisted of two items, its reliability could be estimated and controlled automatically within the measurement model of the latent regression. Our measure for perceived size of inequality however relied on a single item. We therefore had to account for its (un-)reliability explicitly in two steps. We first estimated its aggregated internal consistency reliability as a function of its between and within-country variance and the between and within-country sample size as has been proposed by O'Brien (1990). We then constrained the residual variance of this item in the measurement model of the latent regression to reflect its unreliability, as has been proposed by Westfall and Yarkoni (2016). For objective inequality we assumed that the Gini index for the distribution of income has perfect reliability.

The latent regression analysis revealed that perceived size of inequality had a strong negative effect on SWB whereas the Gini index for objective inequality or unfairness beliefs about inequality did not (Table 2). This result did not change when the control variables were included, although the negative effect of perceived size of inequality on SWB was reduced. Interestingly, after the covariates had been added, a significant positive effect of objective inequality on SWB emerged. We suspect that this is due to a high negative correlation between objective inequality and quality of life ($r=-.59, p<.001$) which led to a suppressor effect. Overall, the results support our hypothesis that perceived size of inequal-

Table 2 Results from latent regression analyses predicting subjective Well-being on the country level

	Without control variables		With control variables	
	<i>b</i>	95% CI	<i>b</i>	95% CI
Inequality: perceived size	-0.89***	[-1.07, -0.71]	-0.50**	[-0.80, -0.19]
Inequality: unfairness beliefs	0.17	[-0.05, 0.39]	-0.02	[-0.23, 0.20]
Inequality: objective size	0.14	[-0.09, 0.37]	0.21	[-0.05, 0.47]
GDP p.c.			0.20	[-0.10, 0.49]
Religiosity			0.16†	[-0.02, 0.34]
Unemployment rate			0.03	[-0.15, 0.20]
Quality of life			0.49***	[0.25, 0.72]
R^2	0.73***		0.82***	
χ^2 (<i>df</i>)	1.32 (5)		12.57 (9)	
RMSEA	0.00	[0.00, 0.06]	0.10	[0.00, 0.22]
SRMR	0.03		0.02	
CFI	1.00		0.99	

Note. $N=41$. We examined the impact of subjective perceptions of income inequality on subjective well-being on the country level. GDP p.c. = Logarithm of gross domestic product per capita. Quality of life=Composite index comprising infant mortality rate, degree of urbanization, average life expectancy, poverty rate, literacy rate, and education expenditure in percent of the GDP (higher values indicate higher quality of life). RMSEA=Root mean square error of approximation. SRMR=Standardized root mean square. CFI=Comparative fit index

† $p<.10$. * $p<.05$. ** $p<.01$. *** $p<.001$

ity is negatively related to SWB beyond objective inequality and irrespective of unfairness beliefs about inequality.

2.3 Study 1b – Method

In Study 1b we investigated the effect of perceived size of inequality on SWB longitudinally. Though a longitudinal approach does not allow definitive conclusions about causality (because omitted variable bias remains an issue), it nevertheless yields more information about the nature of a relationship than a cross-sectional approach. For instance, in a cross-lagged design the reciprocity of a relationship between two variables can be assessed (Lindwall et al., 2011) and whether one variable can be used to forecast another (Hamilton, 1994).

2.3.1 Data

We used the same data as in Study 1a but additionally merged these data with country-level data on subjective inequality and SWB from 10 years later (i.e., from 2019). Such data were available for 31 out of the 41 countries included in Study 1a.

2.3.2 Measures

Perceived Size of Inequality. For the year 2009 and for the year 2019 the data were taken from the respective waves of the ISSP survey on social inequality (ISSP Research Group, 2017, 2022).

Subjective Well-Being. SWB on the country level was taken from the WHR from the years 2010–2012 (Helliwell et al., 2013) and, reflecting the time lag of 10 years, from the WHR from the year 2020–2022 (Helliwell et al., 2022).

Covariates. We controlled for the same covariates as in Study 1a.

2.4 Study 1b – Results

We used a cross-lagged panel analysis (CLPM) to compute the effect of perceived size of inequality from 2009 on perceived size of inequality from 2019 while controlling for SWB and the covariates from 2009. To facilitate model computation, we estimated the model in a two-step approach. In the first step we regressed perceived size of inequality and SWB from both years onto the covariates. In the second step we computed the CLPM, using the residuals from the regressions from the first step as input. As hypothesized, we found that in countries with higher perceived size of inequality in 2009 SWB was lower in 2019. We did not find that SWB scores from 2009 predicted perceived size of inequality from 2019 (see Fig. 1), suggesting that the direction of the relationship between perceived size of inequality and SWB is due to perceived inequality and not SWB. Interestingly, SWB scores from 2009 also did not predict SWB scores from 2019, suggesting that country-level SWB may be rather unstable over a period of 10 years and that earlier higher levels of SWB do not forecast higher later levels of SWB.

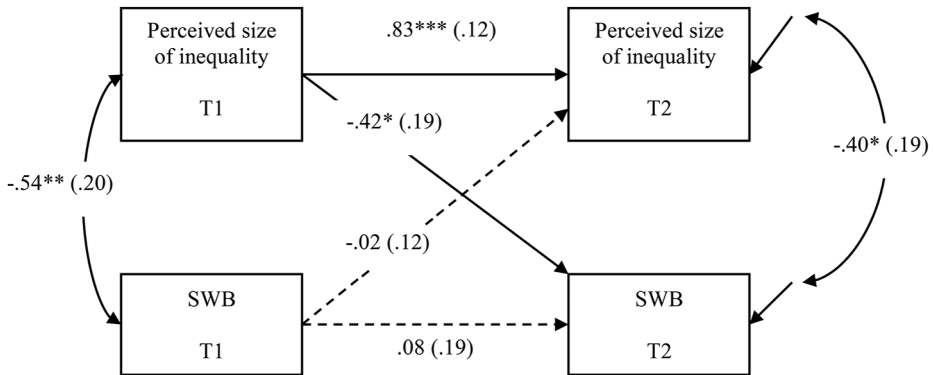


Fig. 1 Results from Country-Level Cross-Lagged Regression Predicting Perceived Size of Inequality and SWB from 2019 via Perceived Size of Inequality and SWB from 2009 Note. Cross-lagged panel regression (saturated model). $N=31$ countries. We controlled for GDP per capita, objective income inequality (Gini index), quality of life, religiosity and rate of unemployment. SWB=subjective well-being. Dashed lines show insignificant effects ($p > .05$). Coefficients are standardized. Standard errors are in brackets. Variables at T1 are from 2009 and at T2 from 2019. $^{***}p < .001$. $^{**}p < .01$. $^*p < .05$. $^{\dagger}p < .10$

2.5 Discussion

The results from Study 1 support our hypotheses that higher perceived size of inequality is related to reduced SWB, regardless of objective inequality or unfairness beliefs about inequality and that perceived size of inequality has a stronger prospective effect on SWB than vice-versa. Nevertheless, several aspects warrant attention. First, the employed Gini index is a less than perfect measure (for a discussion see De Maio, 2007). While we readily acknowledge this problem, one needs to see the present study in light of prior research applying the same (or similar) indices and in light of missing alternatives.

Second, when analyzing data at the country level and attempting to draw conclusions about individuals, there is a risk of making incorrect inferences – a phenomenon known as ecological fallacy. This occurs when relationships observed at the group level do not necessarily apply to individuals within that group. This risk applies not only to our measures of objective and perceived inequality but also to assessments of unfairness beliefs about inequality. Again, this issue seems hardly avoidable as the Gini index (and the concept of objective income inequality) is per definition an aggregate variable. For the subjective measures, data on the individual level were available, but the data set did not entail data for SWB on the individual level (and we are not aware of an international data set that entails both SWB and individuals' perceptions of the income distribution and unfairness beliefs about inequality).

Third, one may argue that individuals may have difficulties with understanding the employed measure of perceived size of income inequality (see Hauser & Norton, 2017; Norton & Ariely, 2011). Furthermore, some of the pyramid charts used to compute perceived size of inequality reflected the same Gini index but different social structures (in chart D level 4 is the largest level, whereas in chart E the largest level is level 6). Given how the pyramid charts are ordered, respondents in the ISSP survey may have interpreted chart E to reflect a more unequal society than chart D, even though they both reflect almost the same degree of inequality. While we acknowledge these potential caveats of the size measure, we

suggest that a mere misunderstanding of the question in the ISSP survey may have caused substantial error variance that should have worked against a demonstration of a systematic effect.

Fourth, we acknowledge the methodological controversies surrounding CLPMs (Hamaker et al., 2015; Lucas, 2023; Lüdtke & Robitzsch, 2022; Orth et al., 2021), namely that it does not control for unobserved, stable differences between observations and therefore may yield biased estimates of autoregressive and cross-lagged effects. However, due to a lack of suitable data, it was not possible to compute more complex cross-lagged regressions that reduce such biases (e.g., residual-level approaches in which stable between-observation differences are controlled via latent factors), because such models require at least three waves of data (Lüdtke & Robitzsch, 2022).

3 Study 2

Study 2 was designed to further examine the relationship between perceived inequality and SWB by shifting the focus from the country level to the individual level. While Study 1 provided insights into this relationship across different countries, its findings were limited by the potential for ecological fallacy and a less precise measure of perceived inequality. Study 2 does not directly resolve the limitations of Study 1 but instead complements it by providing an alternative perspective – one that avoids the ecological fallacy by analyzing perceptions of inequality and SWB at the individual level.

By conducting Study 2 within a single country, we ensured that all participants were exposed to the same objective level of income inequality. This allowed us to examine individual differences in perceived inequality without confounding effects of varying national inequality levels. While this approach does not generalize across countries, it does provide a clearer test of whether perceived inequality is associated with SWB independent of objective national inequality. In addition to this shift in analytical level, Study 2 also aimed to improve the measurement of perceived inequality. Prior research suggests that individuals may struggle to accurately assess inequality when presented with abstract or complex measures (see Hauser & Norton, 2017; Norton & Ariely, 2011). To mitigate this, we developed a new set of inequality diagrams with clearer explanations and multiple examples, but which are nevertheless consistent with our measure from Study 1. We also assessed participants' comprehension of our new measure and conducted analyses both including and excluding those who reported difficulties understanding it. We hypothesized that perceived size of inequality has a negative effect on individual SWB, independent of unfairness beliefs about inequality.

3.1 Method

3.1.1 Data

We relied on a quota sample comprising $N=1096$ (50% female, $M_{age} = 48$, $SD_{age} = 17$) people from the German population. The quotas were based on gender, age, net household income, federal state, and education such that the distributions of these variables in our

sample mirrored their real distributions in the German population. The data were collected by the online access panel respondi.¹

3.1.2 Measures

Perceived Size of Inequality. The perceived size of inequality was assessed via a graphic measure. Respondents were shown 6 bar charts depicting different levels of inequality and were asked to choose the chart they believed to represent the real distribution of income in Germany. Each chart contained 5 vertical bars, representing the income quintiles in the German population in ascending order, furthermore the income share of each quintile was shown as a percentage at the top of each bar (supplementary materials provide an English translation of the item here). We created and displayed the bar charts such that going from left to right the Gini index increased by 5 per bar chart, starting with 22 in the leftmost bar chart (thereby the actual income inequality for Germany at the time was depicted in the third chart from the left). Note that this measure is conceptually comparable to the size of inequality measure applied in Study 1 and different from more abstract, relative scales that likely also capture evaluations or focus on unfairness beliefs about inequality (see below). It thus allows to disentangle perceived size of inequality from unfairness beliefs about inequality.

We asked respondents on a scale from 1 (*not certain at all*) to 7 (*very certain*) how certain they were that they understood the question and the bar charts correctly. 80% (i.e., 883) of respondents indicated a value of at least 4 to this probing question ($M=5.00$, $SD=1.80$), suggesting that most of them were reasonably certain they understood the question and measure. We conducted the analyses twice, once excluding the remaining 20% of participants (i.e., 216) who indicated a value of 3 or lower on this scale and once including all participants.

Unfairness Beliefs about Inequality. We relied on a German translation of the subscale for unfairness beliefs from the Subjective Inequality Scale by Schmalor and Heine (SIS; 2021) to operationalize unfairness beliefs about inequality. This subscale consists of 4 items that ask for respondents' agreement with different statements about the unfairness of inequality (e.g., "It is extremely unjust if children of affluent parents get a better education.") on a scale ranging from 1 (*does not apply at all*) to 7 (*applies completely*). Importantly, and in line with our operationalization of unfairness beliefs about inequality in Study 1, the unfairness beliefs subscale of the SIS measures unfairness beliefs about inequality in general and not whether existing levels of inequality are unfair. Thus, the unfairness beliefs are not confounded with the perceived size of inequality.

We also included the subscale for subjective inequality from the SIS (Schmalor & Heine, 2021) as the rating format of this scale and the content of some of its items (e.g., "real opportunities to succeed in life are only available to the wealthy.") may also capture evaluations of inequality. Paralleling our approach in Study 1, we therefore investigated whether our measure for perceived size of inequality and the subscale of the SIS for unfairness beliefs

¹The questions were embedded in a larger questionnaire that was part of a collaboration with other researchers (participants worked on the questionnaire for about 30 min). This collaboration allowed for financing this representative study. While the questionnaire also contained questions on inequality in general (e.g., perceived changes of inequality over time) it also addressed other topics, and none of the other variables were directly relevant to the hypotheses of the present study.

about inequality both correlate with the subscale of the SIS for subjective inequality, but less with each other.

Subjective Well-Being. Respondents were asked how satisfied they are with their life as a whole on a scale from 1 (*Very dissatisfied*) to 11 (*Very satisfied*).

Covariates. We included respondents' gender (0=*male*), age, income and education (CASMIN classification (Brauns et al., 2003) in low, medium and high) as covariates as these variables have been shown to be relevant in the context of the inequality-SWB link (Schneider, 2012).

3.2 Results and Discussion

As in Study 1, in a first step we looked at the bivariate correlations of our focal variables (Table 3). We found a positive but rather low correlation between our measure for perceived size of inequality and the subjective inequality subscale of the SIS that likely also captures evaluations of inequality ($r = .17, p < .001$). Similarly, we found a strong correlation between the subjective inequality and the unfairness beliefs subscales of the SIS ($r = .46, p < .001$). However, we did not find a significant relation between the subscale for unfairness beliefs about inequality and our measure for the perceived size of inequality ($r = .06, p = .074$). In line with our previous reasoning and our results from Study 1, our measure for perceived size of inequality thus appears to assess an aspect of perceived inequality that is indeed separate from unfairness beliefs about or evaluations of inequality.

As in Study 1, in the second step we used latent regression analysis to test our hypothesis that perceived size of inequality is related to SWB even when controlling for unfairness beliefs about inequality. In the measurement model of the latent regression we explicitly constrained the reliability of our measure for perceived size of inequality to 0.4, because following the Spearman-Brown prophecy formula this reliability would be expected of a single-item in a typical psychological 6-item measurement scale with an internal consistency reliability of $\alpha = 0.80$ (Westfall & Yarkoni, 2016). The internal consistency reliability of the subscale for unfairness beliefs about inequality was estimated directly from the data ($\alpha = 0.84$).

The latent regression analysis showed, as hypothesized, that respondents who perceived income inequality to be higher reported lower SWB than individuals who perceived income inequality to be lower, $b = -0.14, p < .001, 95\% CI [-0.22, -0.06]$ (see Table 4). Furthermore, respondents who thought that inequality is generally more unfair also reported lower

Table 3 Descriptive statistics and correlations of focal variables

Variable	M	SD	1	2	3
1. SWB	6.84	2.62			
2. Inequality: perceived size	37.02	8.03	-0.09**		
3. Inequality: unfairness beliefs	5.74	1.18	-0.15***	0.06†	
4. Inequality: evaluation	4.82	1.22	-0.25***	0.17***	0.46***

Note. $N = 883$. SWB = subjective well-being

† $p < .10$. * $p < .05$. ** $p < .01$.

*** $p < .001$

Table 4 Results from latent regression analyses predicting subjective well-being on the individual level

	Without control variables		With control variables	
	β	95% CI	β	95% CI
Inequality: perceived size	-0.12**	[-0.20, -0.04]	-0.14***	[-0.22, -0.06]
Inequality: unfairness beliefs	-0.15***	[-0.22, -0.08]	-0.11**	[-0.18, -0.04]
Income			0.28***	[0.21, 0.34]
Age			0.08*	[0.01, 0.15]
Gender (1 = female)			0.02	[-0.11, 0.15]
Education: medium			0.07	[-0.08, 0.22]
Education: high			0.04	[-0.16, 0.24]
R^2	0.04***		0.11***	

Note. $N=835$. We examined the impact of perceived size of income inequality on subjective well-being with a representative sample on the individual level

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$

SWB, $b = -0.11$, $p = .002$, 95% CI [-0.18, -0.04]. Importantly, perceived size of inequality was independently related to SWB, as hypothesized.²

The results of Study 2 further emphasize the role of perceived size of income inequality and extend Study 1 in various aspects. First, by moving from the country to the individual level the potential ecological fallacy was circumvented. Importantly, we observed a significant relation on the individual level between individuals' perceived size of inequality and their reported SWB.

Second, by employing two separate measures for perceived size and perceived fairness on the individual level, Study 2 further complements our approach from Study 1 of disentangling these two components. Importantly, the results indicate that perceived size is related to SWB independent of unfairness beliefs about inequality. In contrast to prior research of Schmalor and Heine (2021) using a rating scale measure, the graph measure was only descriptively and rather weakly correlated ($r = .06$, $p = .074$) with unfairness beliefs. Thus, the present approach allows for a clear distinction of perceived size and perceived fairness. On a more general level, the obtained results extend prior research on the inequality-SWB link that has emphasized the subjective component of income inequality (e.g., Bavetta et al., 2019; Castillo et al., 2021) by adding perceived size of income inequality as a component that is in large parts independent of the evaluative component or general unfairness beliefs about inequality.

Third, by employing detailed and extensive instructions for the graph measure, the present study presumably helped individuals to understand the graph measure. An analysis of the answers to the probing question revealed that only a minority of 20% of participants were uncertain they understood the graph measure correctly (i.e., provided answers below the scale midpoint of the probing question). Including these participants in the analyses attenuated the effect of perceived size of inequality on SWB but did not eliminate it.

Fourth, a comparison of Study 1 and Study 2 reveals more pronounced effects in the country level analyses than in the individual level analyses. One may speculate whether this is due to the reduced error resulting from combining individuals' responses in Study 1. Moreover, one may argue that country differences in perceived size of income inequality

² We also conducted the analysis a second time, including respondents who indicated they were uncertain that they understood our measure for perceived size of inequality. This resulted in a slight attenuation of the effect of perceived size of inequality on SWB but did not eliminate it ($b = -0.09$, $p = .026$, 95% CI [-0.16, -0.01]).

are confounded with other variables that influence SWB. We cannot dismiss this possibility based on the present data. However, we tried to control for such variables in Study 1 with a spectrum of societal indicators that entered the “quality of life” variable. Given the independent effects of subjective and objective size of inequality in Study 1, the potential spectrum of such variables is restricted to variables that are related to SWB and perceived size and at the same time not to objective income inequality. Importantly, the present research refrains from strong claims about the effect size of perceived size of inequality. The main purpose rests on demonstrating the potential of the perceived size variable per se. For solid claims on the effect sizes, research ideally requires data on SWB and perceived size of inequality on the country and on individual level. To the best of our knowledge, such data are currently not available.

In light of these considerations, we argue that overall, the results of Study 2 support our hypothesis and extend previous research by disentangling perceived size of and unfairness beliefs about inequality and showing that they are independently related to SWB.

4 Study 3

The first two studies emphasize that the role of perceived size of inequality goes beyond that of objective inequality (Study 1) and is largely independent of fairness perceptions (Study 1 and 2). The cross-lagged correlational analysis even gives a first hint that it is indeed perceived size that has an impact on SWB and not the other way around. However, it would be desirable to go beyond correlational evidence and directly assess the causal relationship. We therefore experimentally manipulated the perceived size of income inequality. As dependent variables we assessed participants’ positive and negative emotions and their general satisfaction with life. Emotions are often considered as a component of SWB (Diener et al., 1999). As mentioned in our preregistration emotions are more likely to reflect contextual influences than general well-being (Luhmann et al., 2012) and are therefore more likely to capture situational and experimentally induced contexts.

We hypothesized that, compared to the low inequality condition, participants in the high inequality condition report more negative emotions, less positive emotions, and lower satisfaction with life.

4.1 Method

The design, procedure, all materials, and analyses for Study 3 were preregistered (Link).

4.1.1 Sample

The experiment was conducted online with 302 German participants (46% female, $M_{\text{age}} = 29$ years, $SD_{\text{age}} = 9$) recruited via the recruitment platform Prolific. Each participant was paid £1. An a priori power analysis yielded a sample size of at least 300 participants for detecting a small to medium effect ($d = 0.3$) with a 5% type I error probability and a type II error probability below 20%.

4.1.2 Materials

Manipulation of Perceived Inequality. To manipulate perceived size of inequality, participants were randomly assigned to one of two between-subjects conditions. They read an ostensible newspaper article about the income distribution in Germany that described the actual objective distribution of income inequality at the time. However, participants were given additional false information about the income inequality in 22 other European countries suggesting that the actual income inequality in Germany is either comparatively low (low inequality condition) or high (high inequality condition). A horizontal bar chart depicted the ostensible income inequality in all 23 countries in ascending order according to the ostensible relative size of inequality. In this bar plot, inequality in Germany either appeared to be fourth lowest (low inequality condition) or fourth highest (high inequality condition). As an attention check, participants answered a few questions about the content of the respective texts. To check the success of the manipulation participants indicated on a 10-point scale ranging from 1 (*the income distribution in Germany is very unequal*) to 10 (*the income distribution in Germany is very equal*) the perceived size of income inequality in Germany near the end of the study.

Positive and Negative Emotions. As the first two dependent variables, participants' positive and negative emotions were measured with 3 items each from a German version of the modified Differential Emotion Scale (mDES; Fredrickson, 2013). The items included the negative emotions anger, sadness, and disgust, and the positive emotions hope, happiness, and serenity. Participants indicated on a scale from 1 (*Does not apply at all*) to 7 (*Applies completely*), how much each emotion was applicable to describe how they felt at the time. Ratings were averaged separately for negative emotions ($M=3.05$, $SD=1.53$, $\alpha=0.85$) and positive emotions ($M=3.61$, $SD=1.34$, $\alpha=0.86$).

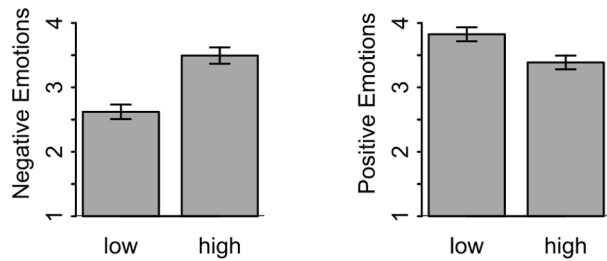
Satisfaction with Life. Participants were asked on a scale from 1 (*completely dissatisfied*) to 11 (*completely satisfied*) how satisfied they are with their life in general ($M=6.73$, $SD=2.30$).

4.2 Results and Discussion

Our manipulation of perceived income inequality was successful. Participants perceived income inequality to be larger when the inequality information was given in the context of countries with lower compared to higher income inequality, $t(300)=9.05$, $p<.001$, $d=1.05$, 95% CI [0.80, 1.29]. Furthermore, consistent with our hypothesis, we found that compared to the low inequality condition, participants reported more negative emotions $t(300)=5.17$, $p<.001$, $d=0.60$, 95% CI [0.37, 0.83], and less positive emotions $t(300)=-2.88$, $p=.002$, $d=-0.33$, 95% CI [-0.56, -0.11] in the high inequality condition (see Fig. 2). However, reported life satisfaction did not differ between the two experimental groups $t(300)=0.31$, $p=.622$, $d=0.04$, 95% CI [-0.19, 0.26].³ Interestingly, our manipulation had a stronger effect on negative than on positive emotions, suggesting that a lower perceived size of inequality mainly makes people less unhappy instead of happier.

³ Excluding participants who failed any attention checks did not change the results (negative emotions $t(268)=5.13$, $p<.001$, $d=0.63$, 95% CI [0.38, 0.87]; positive emotions $t(268)=-2.96$, $p=.002$, $d=-0.36$, 95% CI [-0.60, -0.12]; satisfaction with life $t(268)=0.70$, $p=.757$, $d=0.09$, 95% CI [-0.15, 0.32]).

Fig. 2 Effect of perceived income inequality on negative and positive emotions. Note. The left panel shows the effect on negative emotions, the right panel shows the effect on positive emotions. Error bars show standard errors. low = low inequality condition, high = high inequality condition



One may argue that the effect of our manipulation on emotions was not due to changes in perceived inequality but because ranking the countries hurt participants' national pride. To address this concern, we conducted a mediation analysis to test whether the effect of our manipulation on SWB was mediated via changes in perceived size of inequality (see Figure A1 in the online supplement). We found the effect on negative emotions was partially mediated, whereas on positive emotions it was fully mediated by perceived size of inequality, suggesting that hurt national pride alone does not account for the observed effects.

Overall, the results demonstrate that experimentally manipulating the perceived size of income inequality influenced experienced positive and negative emotions. Participants' reports of general subjective well-being were, however, unaffected by the experimental variation. As mentioned in the preregistration, one likely explanation for this finding holds that emotions experienced momentarily are more prone to capture contextual influences than judgments on satisfaction with life in general and are thus more malleable (Luhmann et al., 2012). One may speculate whether or not judgments of general life satisfaction reflect enduring positive versus negative emotions (see Diener et al., 1999).

5 General Discussion

The present research substantially extends prior research on the link between income inequality and subjective well-being. In three studies using different methodologies (country level data, representative survey data, and experimental data), different operationalizations of subjective well-being, and specifically contrasting perceived *size* of inequality from other aspects related to subjective inequality, our results suggest three main conclusions: (1) The perceived size of inequality is negatively related to SWB, (2) beyond and independent of objective inequality and unfairness beliefs about inequality, and (3) is causal for some components of SWB (i.e., positive and negative affect). These findings are important in various aspects.

First, addressing the ambiguity of perceived inequality in other studies on the (perceived) inequality-SWB link we specifically focused on the effect of perceived size of inequality on SWB and disentangled it from unfairness beliefs about and evaluations of inequality. Notably, in cross-national (Study 1) as well as individual-level data (Study 1 and 2) we found that the perceived size of inequality correlates only very little with unfairness beliefs about inequality but that perceived size and unfairness beliefs about inequality are both captured and thereby confounded in evaluations of inequality. Unlike prior research, specifically disentangling these aspects of perceived inequality therefore allowed us to assess the effect of

mere perceived size of inequality on SWB beyond general normative concerns regarding inequality.

Second, our findings may account for the mixed results on objective inequality and SWB reported in past research (Li et al., 2019; Ngamaba et al., 2018). As evidenced in Study 1, it is not objective inequality but perceived size of inequality that reduces SWB. And as evidenced in Study 2 and 3, even when objective inequality is constant, an effect between the perceived size of inequality and SWB still emerges. Furthermore, as the perceived size and objective inequality are only moderately related, as reflected by their comparatively low correlation in Study 1, and as suggested in other work (Hauser & Norton, 2017; Norton & Ariely, 2011), the effect of objective inequality on SWB may well fluctuate.

Third, unlike prior research, which has mostly relied on cross-sectional data (see Ngamaba et al., 2018), our results provide initial evidence for a longitudinal relation between perceived size of inequality and SWB (Study 1b). Furthermore, we found that experimentally increasing (vs. decreasing) perceived income inequality led to more negative and less positive affective states (Study 3).

Fourth, prior research has mostly relied on country-level data for inequality measures, our results, however, also demonstrate the inequality-SWB link on the individual level (Study 2 and 3). This eliminates several problems of interpreting country level data, such as ecological fallacies, power issues and overlapping samples across different studies looking at the same countries.

Fifth, the finding that the perceived size of inequality impacts SWB and that this perception is largely independent of the objective income distribution highlights the importance of how inequality is covered in media and public discourse as these may have substantial influence on the perceived size of inequality in the public. More generally, given the crucial role of perceived size of inequality understanding what determines these perceptions (and also unfairness beliefs about inequality) is essential. Moreover, the results emphasize the need to consider how objective income inequality is linked to the assumed mediators – for example, whether the interpersonal trust account (Oishi et al., 2011; see also Buttrick & Oishi, 2017; Grosfeld & Senik, 2010) and the status anxiety account (Wilkinson & Pickett, 2009a, b, 2017) could benefit from incorporating perceived size of income inequality.

Focusing on the perceived size of inequality, the present data complement prior research on the subjective component of income inequality. Instead of relying primarily on objective indicators of income inequality (e.g., Alesina et al., 2004; Berg & Veenhoven, 2010; Delhey & Dragolov, 2014; Diener et al., 1995; Hagerty, 2000; Kelley & Evans, 2017; Oishi et al., 2011; for an overview see Ngamaba et al., 2018) this research has emphasized the subjective aspects of income inequality by taking into account individuals' perceptions of inequality (e.g., Bavetta et al., 2019; Schmalor & Heine, 2021; Schneider, 2012; for an overview see Castillo et al., 2021).

5.1 Caveats and Future Research

Even though the results support our hypothesis, some caveats remain which may stimulate further research. First, Studies 2 and 3 were conducted exclusively with a German sample. However, prior research has shown that the effect of objective income inequality may differ between cultures (Li et al., 2019). By implication, the perceived size of inequality and the

effect it has on SWB might differ between cultures too. Future research could address this issue and replicate our approach relying on culturally more diverse samples.

Second, in Study 3 our manipulation affected emotions but not general life satisfaction, therefore not supporting a causal relationship between perceived size of inequality and life satisfaction. One potential explanation for this result holds that temporarily accessible information has a stronger effect on the more malleable affective than on the more stable cognitive component of SWB (Luhmann et al., 2012). Future research might consider different timeframes and aspects of SWB in the inequality–SWB link more explicitly and expand on our longitudinal analysis from Study 1b by considering more waves of data (if/when they become available in the future).

5.2 Conclusion

The present research underlines once more that subjective perceptions, rather than objective situations, determine cognitive and affective judgments. Across three studies using different methodologies – country-level data, representative survey data, and experimental data – we consistently found that the perceived size of income inequality is negatively related to subjective well-being (SWB). Importantly, this relationship holds (1) beyond and independent of objective income inequality and unfairness beliefs about inequality and (2) is causal for certain components of SWB, specifically positive and negative affect.

These findings may help explain previous inconsistencies in cross-country studies, as perceived and objective inequality vary largely independently across countries. They also highlight the need for future research to explicitly disentangle different components of subjective inequality. Theories on how income inequality affects SWB must account for the role of individually perceived inequality, as it appears to play a crucial role in shaping well-being.

Author Contributions Melvin John curated the data, performed the analyses and wrote the manuscript. All authors contributed to conceptualization, read and approved the final manuscript.

Funding Open Access funding enabled and organized by Projekt DEAL. This research was funded by the German Research Foundation (grant no. BL 289/18–1).

Data Availability All data collected by the authors themselves and all materials are available in an OSF repository (https://osf.io/ngz9u/?view_only=4f1517b403004240909971bbfe4b95fc). Study 3 was preregistered (https://aspredicted.org/blind.php?x=FFP_LSH).

Declarations

Ethical approval The data were collected in accordance with protocols from institutional or other relevant ethics committees.

Informed Consent Informed consent had been obtained from all participants.

Conflict of Interest The authors have no relevant financial or non-financial interests to disclose.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are

included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

References

- Alesina, A., Di Tella, R., & MacCulloch, R. (2004). Inequality and happiness: Are Europeans and Americans different? *Journal of Public Economics*, 88(9–10), 2009–2042. <https://doi.org/10.1016/j.jpubeco.2003.07.006>
- Bavetta, S., Li Donni, P., & Marino, M. (2019). An empirical analysis of the determinants of perceived inequality. *Review of Income and Wealth*, 65(2), 264–292. <https://doi.org/10.1111/roiw.12351>
- 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, *Happiness and Social Policy in Europe* (p. 13581). Edward Elgar Publishing. <https://doi.org/10.4337/9781781000731.00017>
- Brauns, H., Scherer, S., & Steinmann, S. (2003). The CASMIN educational classification in international comparative research. In J. H. P. Hoffmeyer-Zlotnik & C. Wolf (Eds.), *Advances in Cross-National Comparison* (pp. 221–244). Springer US. https://doi.org/10.1007/978-1-4419-9186-7_11
- Buttrick, N. R., & Oishi, S. (2017). The psychological consequences of income inequality. *Social and Personality Psychology Compass*, 11(3), e12304. <https://doi.org/10.1111/spc3.12304>
- Castillo, J. C., Garcia-Castro, J. D., & Venegas, M. (2021). Perception of economic inequality: Concepts, associated factors and prospects of a burgeoning research agenda. *International Journal of Social Psychology*. <https://doi.org/10.1080/02134748.2021.2009275>
- 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(2), 613–618. <https://doi.org/10.1177/0956797613504965>
- Cole, D. A., & Maxwell, S. E. (2003). Testing mediational models with longitudinal data: Questions and tips in the use of structural equation modeling. *Journal of Abnormal Psychology*, 112(4), 558–577. <https://doi.org/10.1037/0021-843X.112.4.558>
- Damgaard, C., & Weiner, J. (2000). Describing inequality in plant size or fecundity. *Ecology*, 81(4), 1139–1142. [https://doi.org/10.1890/0012-9658\(2000\)081\[1139:DIIPSO\]2.0.CO;2](https://doi.org/10.1890/0012-9658(2000)081[1139:DIIPSO]2.0.CO;2)
- De Maio, F. G. (2007). Income inequality measures. *Journal of Epidemiology & Community Health*, 61(10), 849–852. <https://doi.org/10.1136/jech.2006.052969>
- Delhey, J., & Dragolov, G. (2014). Why inequality makes Europeans less happy: The role of distrust, status anxiety, and perceived conflict. *European Sociological Review*, 30(2), 151–165. <https://doi.org/10.1093/esr/jct033>
- Diener, E., Diener, M., & Diener, C. (1995). Factors predicting the subjective well-being of nations. *Journal of Personality and Social Psychology*, 69(5), 851–864. <https://doi.org/10.1037/0022-3514.69.5.851>
- Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin*, 125(2), 276–302. <https://doi.org/10.1037/0033-2909.125.2.276>
- Diener, E., Tay, L., & Myers, D. G. (2011). The religion paradox: If religion makes people happy, why are so many dropping out? *Journal of Personality and Social Psychology*, 101(6), 1278–1290. <https://doi.org/10.1037/a0024402>
- Dixon, P. M., Weiner, J., Mitchell-Olds, T., & Woodley, R. (1987). Bootstrapping the Gini coefficient of inequality. *Ecology*, 68(5), 1548–1551. <https://doi.org/10.2307/1939238>
- Fredrickson, B. L. (2013). Positive emotions broaden and build. In *Advances in Experimental Social Psychology* (Vol. 47, pp. 1–53). Elsevier. <https://doi.org/10.1016/B978-0-12-407236-7.00001-2>
- Gimpelson, V., & Treisman, D. (2018). Misperceiving inequality. *Economics & Politics*, 30(1), 27–54. <https://doi.org/10.1111/ecpo.12103>
- Greifeneder, R., Bless, H., Fiedler, K., & Bless, H. (2018). *Social cognition: How individuals construct social reality* (Second Edition). Routledge.
- Grosfeld, I., & Senik, C. (2010). The emerging aversion to inequality. *Economics of Transition*, 18(1), 1–26. <https://doi.org/10.1111/j.1468-0351.2009.00376.x>
- 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(4), 764–771. <https://doi.org/10.1037/0022-3514.78.4.764>
- Hamaker, E. L., Kuiper, R. M., & Grasman, R. P. P. (2015). A critique of the cross-lagged panel model. *Psychological Methods*, 20(1), 102–116. <https://doi.org/10.1037/a0038889>

- Hamilton, J. D. (1994). *Time series analysis*. Princeton University Press.
- Hauser, O. P., & Norton, M. I. (2017). Mis)perceptions of inequality. *Current Opinion in Psychology*, 18, 21–25. <https://doi.org/10.1016/j.copsyc.2017.07.024>
- Helliwell, J., Layard, R., & Sachs, J. (2013). *World Happiness Report 2013*. https://s3.amazonaws.com/happiness-report/2013/WorldHappinessReport2013_online.pdf
- Helliwell, J., Layard, R., Sachs, J., De Neve, J. E., Aknin, L. B., & Wang, S. (2022). *World happiness report 2022*. Sustainable Development Solutions Network.
- International Labour Organization, ILOSTAT database (2020). *Unemployment, total (% of total labor force) (modeled ILO estimate)*. <https://data.worldbank.org/indicator/SL.UEM.TOTL.ZS>
- ISSP Research Group (2017). *International Social Survey Programme: Social Inequality IV - ISSP 2009* (Version 4.0.0) [Dataset]. GESIS Data Archive. <https://doi.org/10.4232/1.12777>
- ISSP Research Group (2022). *International Social Survey Programme: Social Inequality V - ISSP 2019*. <https://doi.org/10.4232/1.14009>
- Kelley, J., & Evans, M. D. R. (2017). Societal inequality and individual subjective well-being: Results from 68 societies and over 200,000 individuals, 1981–2008. *Social Science Research*, 62, 1–23. <https://doi.org/10.1016/j.ssresearch.2016.04.020>
- Kondo, N., Sembajwe, G., Kawachi, I., van Dam, R. M., Subramanian, S. V., & Yamagata, Z. (2009). Income inequality, mortality, and self rated health: Meta-analysis of multilevel studies. *Bmj*, 339(nov10 2), b4471–b4471. <https://doi.org/10.1136/bmj.b4471>
- Kraus, M. W., Tan, J. J. X., & Tannenbaum, M. B. (2013). The social ladder: A rank-based perspective on social class. *Psychological Inquiry*, 24(2), 81–96. <https://doi.org/10.1080/1047840X.2013.778803>
- Li, C., Zuckerman, M., & Diener, E. (2019). Culture moderates the relation between income inequality and subjective well-being. *Journal of Cross-Cultural Psychology*, 50(10), 1221–1241. <https://doi.org/10.1177/00220221198883019>
- Lindwall, M., Larsman, P., & Hagger, M. S. (2011). The reciprocal relationship between physical activity and depression in older European adults: A prospective cross-lagged panel design using SHARE data. *Health Psychology*, 30(4), 453–462. <https://doi.org/10.1037/a0023268>
- Lucas, R. E. (2023). Why the Cross-Lagged panel model is almost never the right choice. *Advances in Methods and Practices in Psychological Science*, 6(1), 251524592311583. <https://doi.org/10.1177/25152459231158378>
- Lüdtke, O., & Robitzsch, A. (2022). A comparison of different approaches for estimating Cross-Lagged effects from a causal inference perspective. *Structural Equation Modeling: A Multidisciplinary Journal*, 29(6), 888–907. <https://doi.org/10.1080/10705511.2022.2065278>
- Luhmann, M., Hawkey, L. C., Eid, M., & Cacioppo, J. T. (2012). Time frames and the distinction between affective and cognitive well-being. *Journal of Research in Personality*, 46(4), 431–441. <https://doi.org/10.1016/j.jrp.2012.04.004>
- Marmot, M. (2005). *The status syndrome: How your social standing directly affects your health* (1. paperback ed). Bloomsbury.
- Ngamaba, K. H., Panagioti, M., & Armitage, C. J. (2018). Income inequality and subjective well-being: A systematic review and meta-analysis. *Quality of Life Research*, 27(3), 577–596. <https://doi.org/10.1007/s11136-017-1719-x>
- Niehuys, J. (2014). Subjective perceptions of inequality and redistributive preferences: An international comparison. *Cologne Institute for Economic Research, IW-TRENDS Discussion Paper*(2), 1–23.
- Norton, M. I., & Ariely, D. (2011). Building a better America—One wealth quintile at a time. *Perspectives on Psychological Science*, 6(1), 9–12. <https://doi.org/10.1177/1745691610393524>
- O'Brien, R. M. (1990). Estimating the reliability of aggregate-level variables based on individual-level characteristics. *Sociological Methods & Research*, 18(4), 473–504. <https://doi.org/10.1177/0049124190018004004>
- Obama, B. (2013). *Remarks by the President on Economic Mobility*. <https://obamawhitehouse.archives.gov/the-press-office/2013/12/04/remarks-president-economic-mobility>
- Obama, B. (2017). *Farewell Address*. <https://obamawhitehouse.archives.gov/farewell>
- Oishi, S., Kesebir, S., & Diener, E. (2011). Income inequality and happiness. *Psychological Science*, 22(9), 1095–1100. <https://doi.org/10.1177/0956797611417262>
- Orth, U., Clark, D. A., Donnellan, M. B., & Robins, R. W. (2021). Testing prospective effects in longitudinal research: Comparing seven competing cross-lagged models. *Journal of Personality and Social Psychology*, 120(4), 1013–1034. <https://doi.org/10.1037/pspp0000358>
- Schmalor, A., & Heine, S. J. (2021). The construct of subjective economic inequality. *Social Psychological and Personality Science*, 194855062199686. <https://doi.org/10.1177/1948550621996867>
- Schneider, S. M. (2012). Income inequality and its consequences for life satisfaction: What role do social cognitions play? *Social Indicators Research*, 106(3), 419–438. <https://doi.org/10.1007/s11205-011-9816-7>

- Schneider, S. M. (2016). Income inequality and subjective wellbeing: Trends, challenges, and research directions. *Journal of Happiness Studies*, 17(4), 1719–1739. <https://doi.org/10.1007/s10902-015-9655-3>
- Sommet, N., Morselli, D., & Spini, D. (2018). Income inequality affects the psychological health of only the people facing scarcity. *Psychological Science*, 29(12), 1911–1921. <https://doi.org/10.1177/0956797618798620>
- United States & Central Intelligence Agency. (2009). *The CIA world factbook*. Skyhorse Publishing.
- Valtorta, R. R., Vezzoli, M., Mari, S., Durante, F., & Volpato, C. (2023). *Measuring subjective inequality: Development and validation of the Perceived Economic Inequality Scale (PEIS)*.
- Vezzoli, M., Valtorta, R. R., Mari, S., Durante, F., & Volpato, C. (2022). Effects of objective and subjective indicators of economic inequality on subjective well-being: Underlying mechanisms. *Journal of Applied Social Psychology*, *jasp.12928*. <https://doi.org/10.1111/jasp.12928>
- Westfall, J., & Yarkoni, T. (2016). Statistically controlling for confounding constructs is harder than you think. *PLOS ONE*, 11(3), e0152719. <https://doi.org/10.1371/journal.pone.0152719>
- Wilkinson, R. G., & Pickett, K. (2009a). *The spirit level: Why more equal societies almost always do better*. Allen Lane.
- Wilkinson, R. G., & Pickett, K. E. (2009b). Income inequality and social dysfunction. *Annual Review of Sociology*, 35(1), 493–511. <https://doi.org/10.1146/annurev-soc-070308-115926>
- Wilkinson, R. G., & Pickett, K. E. (2017). The enemy between Us: The psychological and social costs of inequality. *European Journal of Social Psychology*, 47(1), 11–24. <https://doi.org/10.1002/ejsp.2275>
- Willis, G. B., García-Sánchez, E., Sánchez-Rodríguez, A., García-Castro, J. D., & Rodríguez-Bailón, R. (2022). The psychosocial effects of economic inequality depend on its perception. *Nature Reviews Psychology*. <https://doi.org/10.1038/s44159-022-00044-0>
- Wolbring, T., Keuschnigg, M., & Negele, E. (2013). Needs, comparisons, and adaptation: The importance of relative income for life satisfaction. *European Sociological Review*, 29(1), 86–104. <https://doi.org/10.1093/esr/jcr042>
- World Bank (2020a). *GDP per capita (current US\$)*. <https://data.worldbank.org/indicator/NY.GDP.PCAP.CD>
- World Bank (2020b). *Gini index (World Bank estimate)*. <https://data.worldbank.org/indicator/SI.POV.GINI>
- Zaefarian, G., Kadile, V., Henneberg, S. C., & Leischnig, A. (2017). Endogeneity bias in marketing research: Problem, causes and remedies. *Industrial Marketing Management*, 65, 39–46. <https://doi.org/10.1016/j.indmarman.2017.05.006>

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.