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RESEARCH PAPER

How Locus of Control Predicts Subjective Well-Being and its Inequality: The Moderating Role of Social Values

Roger Fernandez-Urbano[1,2] · **Vicente Royuela**[3]

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Abstract

Previous research has established the central role of an individuals' locus of control (LoC) in influencing subjective well-being. However, earlier studies have predominantly omitted an exploration of potential moderating factors at the country-level and have rarely delved into the influence of LoC on an important yet often-overlooked dimension of well-being—namely, subjective well-being inequality. Addressing these gaps, this study examines the association between individuals' LoC and subjective well-being, considering both the mean and inequality aspects. Additionally, it explores the moderating influence of country's social values, particularly the individualism-collectivism dimension. Utilizing data from the Integrated Values Survey, comprising 170,000 observations across 37 countries from 1996 to 2022, our study confirms a strong positive relationship between LoC and subjective well-being while also unveiling a strong negative relationship with subjective well-being inequality. Moreover, it demonstrates that country's social values exert significant moderation effects on the relationship between LoC and subjective well-being, affecting both the mean level and inequality aspects, albeit in opposing directions. By employing the Oaxaca-Blinder decomposition, our findings support the importance of structural effects. Understanding how increasing LoC shapes people's wellbeing in a society holds implications for policymaking and contributes to ongoing discussions on collective choice and inequality.

Keywords Locus of control · Subjective well-being · Inequality · Individualism · Collectivism

✉ Roger Fernandez-Urbano
roger.fernandez@barcelonagse.eu

Vicente Royuela
vroyuela@ub.edu

[1] Department of Political and Social Sciences, European University Institute, Via dei Roccettini, 9, San Domenico di Fiesole, Florence 50014, Italy

[2] Present address: Department of Social Sciences, University of Luxembourg, Campus Belval, Porte des Sciences, 11, Esch-sur-Alzette 4366, Luxembourg

[3] AQR-IREA Research Group, University of Barcelona, Av Diagonal, 690, Barcelona 08034, Spain

1 Introduction

The study of the determinants and quantification of happiness has been a topic of enduring interest in the social sciences, with its origins dating back to the classics of the late 18th and early 19th centuries (Fernandez-Urbano, 2024). Over the past three decades, research has brought to light an important potential predictor of subjective wellbeing: individuals' locus of control (LoC) (Argyle, 2013; Pu et al., 2017; Quevedo & Abella, 2014; Verme, 2009). LoC can be defined as the degree to which individuals perceive control over their lives and environment (Lefcourt, 1976). Those with high LoC attribute the life outcomes to their own effort and ability, while individuals with low LoC often believe that external forces, such as fate, predominantly dictate their life outcomes (Rotter, 1990; Verme, 2009).

The literature on the relationship between LoC and subjective well-being lacks, however, empirical evidence in at least two critical areas that can reveal how this relationship unfolds considering societal dynamics that can have theoretical and practical implications relevant to contemporary societal challenges. Firstly, existing research has been limited in its exploration of potential moderating variables at the country level. As elucidated by sociological and social psychology research, individuals' LoC can be influenced by social values that transcend the objective reality or material conditions (Boltanski & Thevenot, 2006; Bandura, 2001). These social values can lead individuals to overestimate or underestimate their LoC, significantly influencing their subjective well-being. Our study aims to bridge this gap by investigating the moderating role of individualist-collectivist social values at the country level in the relationship between LoC and subjective well-being.

Secondly, most of the social science literature on subjective well-being primarily concentrates on the mean levels, often neglecting the inequality of subjective well-being. While the former provides a measure of the overall level of subjective well-being within a population, the latter delves into the degree of variance and disparities in subjective well-being (Veenhoven, 2005). As proposed by Zhang (2022: 2), "high (subjective) well-being inequality means that well-being is more unequally distributed among the population, while low well-being inequality means that the distribution of well-being is more equal". Although increasing individuals' LoC can enhance the mean level of subjective well-being within a population, its association with subjective well-being inequality remains unclear. On one hand, increasing LoC may empower individuals to seize control of their lives, yielding greater personal achievements and a higher level of subjective well-being in the population. However, this may also lead to increase within and between individual comparisons and frustrations, potentially contributing to greater inequality in subjective well-being. Conversely, raising LoC may reduce extreme cases of low subjective well-being among individuals that would feel now with more agency to improve their situation, ultimately reducing the overall subjective well-being inequality in a society. Our study aims to explore these potential dynamics, thereby addressing an important gap in the literature by investigating the relationship between LoC and subjective well-being inequality, considering the moderating role of individualist-collectivist social values across countries.

This study contributes to the economics of happiness literature. This literature kicked-off after the discovery of the 'Easterlin Paradox' in 1974 (Easterlin, 1974) which showed that even though people (or countries) with higher incomes report higher levels of subjective well-being than low-income individuals (or countries), average subjective well-being eventually levels off with constant income growth over time. In the last two decades, the

availability of large and representative data surveys has facilitated the examination of the paradox hypothesis (Rojas, 2019) and the exploration of potential explanations, such as the influence of long working hours (Layard, 2010), individual-level comparisons (Clark and D'Angelo, 2013), or the asymmetry in the subjective experience of positive and negative growth (De Neve et al., 2018). Furthermore, it has allowed for a more central positioning of subjective well-being in the analysis by investigating its relationship with various socio-economic variables, both at the individual and country levels (Rojas, 2019; Layard, 2005).

Additionally, our study makes a valuable contribution to the literature on inequality and collective choice (Roemer & Trannoy, 2015). The examination of aggregated preferences to inform optimal decisions for society is a fundamental aspect of economic theory and public policy. Utilitarian and Rawlsian perspectives have traditionally guided discussions on collective choice. Utilitarianism posits that the best society is one that maximizes the overall happiness, while Rawlsian theory emphasizes that a society performs well if it pursues the minimal inequality in happiness among citizens (Veenhoven, 2005). Therefore, our study aligns with this literature by focusing on both subjective well-being outcomes (i.e. mean and inequality) and their connection to LoC, along with the moderating role of social values.

This study aims to contribute to contemporary debates on citizens' rights and freedoms and their relationship with societal organization and political regimes. By examining how individuals' perceived freedom of choice and control over their lives relates to subjective well-being and considering the moderating role of individualist-collectivist social values in wealthy nations, this research can offer valuable insights into understanding contemporary problems, such as the increasing support for populist ideologies or polarization. Social science research indicates that these phenomena often emerge from the perceived loss of control over opportunities and status among certain population groups, exacerbated by the precarization of working conditions and rising economic insecurity (see Case & Deaton, 2020).

The empirical section covers 170,000 observations from 37 developed countries over 26 years (1996–2022) using the Integrated Values Survey. We utilize multilevel methods that account for the hierarchical structure of the data. To address unobserved effects, we complement these methods with OLS regressions featuring dyadic country and time fixed effects. Furthermore, we employ Recentered Influence Function (RIF) regressions for the part of the analysis devoted to subjective well-being inequality. Finally, to gain a deep understanding of the moderating role of country's social values, we apply the Oaxaca-Blinder decomposition method. This technique allows to test whether observed differences stem from compositional effects or coefficient–structural effects.

The structure of the study proceeds as follows: we review existing research on the relationship between LoC and mean levels of subjective well-being. Subsequently, we present theoretical and empirical evidence demonstrating the potential moderating role of country's social values. Following this, we introduce the concept of subjective well-being inequality, review relevant literature pertaining to this concept, and discuss its potential relationship with LoC and the contextual moderating variable. The "Methodology" Section then unfolds, detailing the data and the empirical strategy. Results are then presented and interpreted, followed by a final discussion and conclusion.

2 Theoretical Discussion and Hypotheses

2.1 LoC and Subjective Well-Being

A substantial body of research has explored the relationship between individuals' LoC and subjective well-being, consistently revealing a positive relationship (see: Argyle, 2013; Judge et al., 1998; Quevedo & Abella, 2014; Kesavayuth et al., 2022). The bulk of these studies has concentrated on adult populations in Western countries. Julien B. Rotter, the social psychologist who introduced the concept of LoC, proposed that this positive relationship arises because high LoC individuals tend to emphasize successes and view failures as opportunities for learning rather than personal shortcomings, reinforcing their sense of personal control. In contrast, low LoC individuals, who believe that external forces such as fate or luck predominantly dictate their outcomes, tend to experience more failures as they attribute these to external forces, which can perpetuate a sense of lack of control (Rotter, 1966).

One of the most relevant empirical studies to date is the work of Verme (2009), which involved a sample of 260,000 observations from 84 countries across a 25-year period. Utilizing the World Values Survey, the study not only revealed a robust positive correlation between LoC and life satisfaction (i.e. a cognitive measure of subjective well-being) but also demonstrated that LoC was a stronger predictor of life satisfaction than other essential individual factors, such as health, employment, income, marital status, or religion, both across and within countries. Importantly, the study established that LoC is not a proxy for subjective well-being. Verme's findings are consistent with earlier empirical research conducted by Veenhoven (2000) and Inglehart et al. (2008). These studies also argue societies that experience economic growth, greater levels of democracy, and increased social tolerance, witness elevated levels of both LoC and mean levels of subjective well-being.

2.2 The Moderating Role of Social Values

In accordance with Social Convention Theory in sociology, a nation's social values, encompassing the inherent values of the society in which individuals are immersed (Thevenot, 2011), can significantly influence both an individuals' LoC and subjective well-being (Boltanski & Thevenot, 2006; Durkheim et al., 1971). This theory posits that individuals must develop three forms of engagement to gain social acceptance: publicly justified engagement for the common good, engagement in an individual plan, and familial engagement. These engagements bestow individuals with powers that contribute to their subjective well-being: the power of public recognition achieved through contributions to the common good, the power of individual autonomy in pursuing personal goals, and the power of intimate personal relationships. Simultaneously, these engagements underscore the interdependence of individuals and society (Whiteside & Mah, 2012). The subjective well-being of individuals is intricately tied to their cooperation with established social institutions and their interactions with those around them. Consequently, individuals tend to adapt and align their perceptions of socio-economic realities and their perceptions of what is appropriate and possible to achieve in their life (i.e. their perceived LoC) with the social values of their

society. This alignment enhances their capacity to fulfil the engagements mentioned earlier (Boltanski & Thevenot, 2006).[1]

This article incorporates countries' social values by considering the individualist-collectivist dimension. Individualist societies emphasize individuality and personal needs, encouraging individuals to make their own free choices and take responsibility for their actions (Triandis, 2001). In these societies, success and failure are measured by personal achievements resulting from individual effort. Consequently, individuals in individualist societies are more likely to believe that they have control over their own lives and their actions significantly influence their life outcomes (Markus & Kitayama, 2014). In contrast, collectivist societies prioritise in-group cohesion, interdependence, and unwavering loyalty throughout individuals' lives, where one's position in life is socially determined (Hofstede, 1991). The social values of collectivist societies, therefore, emphasize group harmony over personal autonomy. Individual success is often measured by the ability to contribute to the group and maintain harmony, with a greater acceptance of the influence of external and societal factors on individuals' outcomes (Fiske et al., 1998; Markus & Kitayama, 2014).

Empirical studies indicate that societies exhibiting values typical of individualist and collectivist societies can result in differing perceptions of LoC and related socioeconomic perceptions, such as perceived income inequality or social mobility. These perceptions, in turn, can be related to individuals' subjective well-being beyond objective conditions. For instance, Alesina et al. (2004) found a large and negative effect of perceptions of income inequality on subjective well-being in Europe but not in the United States. The authors argue that in highly individualist countries like the United States, people tend to perceive high levels of social mobility and believe that income inequality is primarily the result of individual effort. In more collectivist societies, such as those in Southern Europe, people perceive lower levels of social mobility and attribute a more significant role to external circumstances beyond individuals' control in determining their outcomes (Alesina & Angeletos, 2005; Ramos & Van de Gaer, 2016).

It could be argued that individuals in individualist societies may tend to feel a greater sense of LoC than individuals in collectivist societies. This, in turn, may lead individuals embedded in more individualist societies to perceive they have more personal agency and control to attain subjective well-being. In light of these considerations, if social values distinguishing individualist and collectivist societies play a moderating role between individual's LoC and subjective well-being, we hypothesise that the relationship between LoC and subjective well-being will be more positively and strongly correlated in individualist countries than in collectivist ones (Hypothesis 1).

2.3 LoC and Subjective Well-Being Inequality

This article explores the relationship between LoC and subjective well-being inequality, an unexplored area in empirical research. While most social science research on subjective well-being mainly focus on average subjective well-being levels, an emerging body of research has begun to examine the extent of divergence of subjective well-being levels (Mathentamo & Lunga, 2021; Veenhoven, 2005).

[1] Related research on social exclusion states that individuals tend to comply with the shared social values in their societies to avoid exclusion (Bandura, 1986).

Existing empirical research on subjective well-being inequality has primarily concentrated on three key areas. Initially, scholars have strived to establish a robust measurement for this concept due to the ordinal nature of the standard subjective well-being measures. Some researchers have adopted the cardinalization of subjective well-being measures, following the framework of Van Praag and Ferrer-i-Carbonell (2011), although this approach has faced criticism (Schröeder and Yitzhaki, 2017; Bond & Lang, 2019). Recent research by Bérenger and Silber (2022) explores disparities between ordinal and cardinal measures of subjective well-being inequality, finding distinctions between these measures. Notably, the standard deviation exhibited a stronger association with ordinal indices than other cardinal indices, supporting its use as a measure of subjective well-being inequality.

The second line of research has focused on examining trends in subjective well-being inequality across countries and over time. For example, Stevenson and Wolfers (2008) scrutinized subjective well-being inequality in the United States from 1972 to 2006. Their study revealed a clear decline in subjective well-being inequality during the 1970s and 1980s, with diminishing disparities among different educational attainment groups by the 2000s. Dutta and Foster (2013), using a similar timeframe in the same country, found higher subjective well-being inequality in the 2000s compared to the 1990s but not as high as in the 1980s–1970s. Another notable study, conducted by Becchetti et al. (2014), analyzed trends in subjective well-being inequality in Germany during two time periods (1992–4 and 2005–7). Their findings indicated an increase attributed to deteriorating labour market conditions and demographic changes.[2]

The final strand of research, building on the aforementioned areas, has examined determinants of subjective well-being inequality, such as income inequality (Becchetti et al., 2014; Gandelman & Porzecanski, 2013; Kollamparambil, 2020), GDP growth (Niimi, 2018; Zhang, 2022), labour market conditions (Becchetti et al., 2014), and institutional quality (Ovaska & Takashima, 2010). This research has revealed an inverted U-shape relationship with subjective well-being inequality, emphasizing the importance of a country's macroeconomic development stages (e.g., see: Ott, 2011). Recently, Yang et al. (2019) explored subjective well-being inequality using the Chinese General Social Survey (2003–2015), finding that urbanization significantly decreased it. Using Oaxaca–Blinder decomposition regressions, they identified structural–coefficient effects as the primary contributors to increased inequality, contrasting with previous findings in Becchetti et al. (2014) for Germany.

To our knowledge, no empirical research has explored the relationship between LoC and subjective well-being inequality. Given the novelty of this analysis, we present two contrasting theoretical arguments to elucidate potential manifestations of the relationship.

On one hand, increasing levels of LoC in a society may contribute to an increase in subjective well-being inequality. It could be argued that as individuals perceive themselves as more dependent and responsible for their actions, subjective well-being outcomes may exhibit significant variations. While a higher LoC can foster a sense of personal accomplishment and enhanced well-being when outcomes are positive, it can also lead to greater individual comparisons and heightened frustrations when individuals fail to achieve desired

[2] In their study, the authors also explored whether the change in subjective well-being inequality was caused by the change of the composition of micro factors of the population (i.e. composition effect), which include age, sex, education, income, marital and work status, or by the change of the strength of the relationships between subjective well-being inequality and these factors (i.e. structural–coefficient effect). They find that composition effects play a key role, being education and unemployment key drivers of subjective well-being inequality.

outcomes. This dual effect can result in larger variations in subjective well-being, thereby increasing inequality. Therefore, it is reasonable to hypothesise a positive relationship between LoC and subjective well-being inequality (Hypothesis 2.a). Furthermore, in more individualist societies, an increase in the average LoC could lead to larger levels of subjective well-being inequality compared to more collectivist societies (Hypothesis 3.a) given the heightened emphasis on personal responsibility and achievement.

On the other hand, increasing levels of LoC may exhibit a negative relationship with subjective well-being inequality. This perspective posits that as individuals perceive themselves to have greater control over their lives, the extremities of unhappiness are likely to diminish, leading to a general convergence towards higher levels of subjective well-being. Consistent with this reasoning, we hypothesise a negative relationship between LoC and subjective well-being inequality (Hypothesis 2.b). Furthermore, within the context of more individualist societies, it is hypothesised that an increase in the average LoC would result in lower levels of subjective well-being inequality compared to those residing in more collectivist societies (Hypothesis 3.b).

3 Methodology

3.1 Integrated Values Survey Dataset

Our data derive from the Integrated Values Survey (IVS), compiled from the European Values Survey (EVS) and World Values Survey (WVS) longitudinal data files spanning seven waves (1981 to 2022) across 118 countries and aiming to represent the adult population.

To ensure a reasonable comparative basis in terms of socioeconomic development at the country level, our empirical analyses focused on developed countries with high Human Development Index (HDI) from 1996 to 2022. The selected 37 countries include Australia, Austria, Belgium, Canada, Chile, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Iceland, Ireland, Italy, Japan, South Korea, Latvia, Lithuania, Malta, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, Great Britain, and the United States.

3.2 Empirical Models

Our basic model links subjective well-being to LoC and a list of control variables:

$$SWB_{itc} = \propto + LoC_{itc}\psi + X_{itc}\delta + GDP_{tc}\mu + C_c + T_t + \vartheta_{tc} + \epsilon_{itc} \quad (1)$$

where SWB_{itc} represents the subjective well-being of individual i in year t and in country c; LoC_{itc} signifies the LoC of the individual i in year t and in country c. We also include time (T_t) and country (C_c) fixed effects. As justified in Empirical analysis Sect. 4.3 below, ϑ_{tc} refers to a level-2 (contextual) variable that separately captures unobserved country-time dyadic effects in the model (i.e., random effects). X_{itc} denotes a vector of individual control variables, while GDP_{tc} controls for countries' annual GDP growth rates. Finally, ϵ_{itc} is the idiosyncratic error term.

To investigate the moderating role of country's social values, we extend the baseline model by incorporating an interaction term between LoC and the individualist-collectivist social values at the country level:

$$SWB_{itc} = \propto + LoC_{itc}\psi + [LoC_{itc}x\ individualism_c]\,\beta + X_{itc}\delta + GDP_{tc}\mu + C_c + T_t + \vartheta_{tc} + \epsilon_{itc} \quad (2)$$

where $individualism_c$ represents the individualist-collectivist social values in country c and β signifies the coefficient for the interaction term between country-level social values and LoC, which will be used to test Hypothesis 1.

To test the hypotheses related to subjective well-being inequality (Hypotheses 2a–b, 3a–b), we employ Recentered Influence Function (RIF) regressions. Instead of using the mean levels of subjective well-being as the dependent variable, we focus on the Recentered Influence Function, $RIF(SWB; v)$, of the distributional parameter v, which is the selected measure of inequality:

$$E\left[RIF(SWB; v)|\, X\right] = X\gamma^{v} \quad (3)$$

Where γ captures the marginal effect of the covariates (X) on the distributional statistic of inequality (v).

Furthermore, to reinforce the test of Hypotheses 1, 3a and 3b, the Oaxaca-Blinder decomposition method is used similar to the approach used by Becchetti et al. (2014) and Yang et al. (2019), which allows to distinguish whether the observed variations can be attributed to compositional effects, stemming from differences in individuals across countries, or structural effects, resulting from differing effects of LoC on subjective well-being outcomes within societies with varying levels of individualism-collectivism values.

3.3 Dependent and Interest Variables

3.3.1 Subjective Well-Being

Our dependent variable is self-reported well-being. Diener et al. (1985) developed the 'Satisfaction with Life Scale,' which became the standard measure of subjective well-being in the economics of happiness literature (Kahneman & Krueger, 2006). This scale is usually included in representative population surveys to ask questions like: 'Taking all things into consideration, what is your level of satisfaction with life in general? Note that 1 is very dissatisfied and 10 is very satisfied.' This is considered a cognitive measure of subjective well-being (Diener et al., 2017). In addition, an affective measure of subjective well-being (i.e. happiness) is used in Sect. 4.5. as a robustness check.

3.3.2 Subjective Well-Being Inequality

The standard deviation of subjective well-being is used as a measure of subjective well-being inequality.

3.3.3 LOC

Our interest variable is operationalized using a single-item measure: "Some people feel they have completely free choice and control over their lives, while other people feel that what they do has no real effect on what happens to them. Please use this scale where 1 means 'no choice at all' and 10 means 'a great deal of choice' to indicate how much freedom of choice and control you feel you have over the way your life turns out (code one number)." This question is available in all waves of the IVS and is introduced linearly with 10 values, each category given equal importance. This single-item measure offers several advantages for large-scale surveys such as the IVS. It captures a general sense of LoC with a broad range of options, facilitating higher response rates and ease of analysis. Additionally, it aligns conceptually with the Rotter's early definition and measurement of LoC, ensuring its relevance and robustness in the context of our study.

3.3.4 Individualism

This is a variable ranging from 0 to 1, reflecting the level of individualism or collectivism social values in a country. A higher value indicates more individualist social values, while a lower value suggests more collectivist social values. To make this distinction, we use one of the few indexes within sociological research that examines the individualist-collectivist dimension of countries. Based on Hofstede's innovative work and his definitions of collectivist and individualist societies provided above, researchers from *Hofstede Insights* classify countries on an index according to their degree of individualist versus collectivist values. According to Hofstede et al. (2010: 102) "in societies in which people on average hold more collectivist values, they also on average hold less individualist values (…) therefore, at the country level, individualism and collectivism appear as opposite poles of one dimension." The index, covering 72 countries, was originally created (together with other dimensions) based on Hofstede's research on the values of employees of multinational corporations and later expanded beyond the corporate world to the societies of each country. The index has been widely used in social psychology, cross-cultural psychology, international management, and cross-cultural communication. Figure 1 of the Supplementary Material (SM) plots the index for the considered countries and provides further information on the index.

3.4 Control Variables

We control for the individual covariates that the economics of happiness research generally consider relevant for subjective well-being in developed economies (see Dolan et al., 2008; Layard, 2010): age, age squared, gender, educational attainment, income, marital status, labour market status, and subjective health. Gender is a dummy variable where 0 represents male and 1 represents female. The educational variable refers to the highest educational level attained by individuals. Categorized into three levels – 1 for primary and lower secondary education, 2 for upper secondary and post-secondary non tertiary education, and 3 for tertiary education. Subjective health is self-rated health status, ranging from 1 (very good) to 5 (very poor). The marital status variable is categorized into married, single, and divorced/separated/widowed. The income variable refers to the scale of income in every country and survey-wave. Individuals can choose from very low (1) to very high (10) income levels.

Labour market status is categorized into five categories - full-time employed, part-time employed, unemployed, student, and inactive. Finally, we controlled for country's annual GDP growth rate using the World Bank dataset.

3.5 Sample

The analysis includes 170,000 observations from 37 developed countries after dropping missing values. Table 1 and Figure 2 of the SM details the list-wise deletion of observations due to missing values and plots the overall and restricted samples of LoC and subjective well-being, showing similarity for each variable.

4 Results

4.1 Descriptive Analysis of Main Variables

Table 1 presents the mean values of LoC and subjective well-being across the 37 countries. Additionally, it provides the main measure of subjective well-being inequality (standard deviation) and other measures of inequality.

Table 1 illustrates a general increase in the average values of LoC and subjective well-being over time, with slight decline for subjective well-being from the 5th to the 6th wave, possibly linked to the 2008 Global Crisis. Subjective well-being inequality, as measured by the standard deviation and related indicators, shows a consistent decline across waves (see Fig. 1 below).[3]

Table 1 Descriptive statistics of main variables

	LoC	SWB							
	Mean	Mean	Standard deviation	Coeff. of variation	Gini	Atkinson (0.5)	80/20 ratio	80/50 ratio	50/20 ratio
Wave III (1996–1998)	6.510	6.408	2.482	0.387	0.218	0.049	2.250	1.286	1.750
Wave IV (1999–2004)	6.675	6.742	2.460	0.365	0.203	0.045	1.800	1.286	1.400
Wave V (2005–2009)	7.004	7.190	2.116	0.294	0.16	0.029	1.800	1.125	1.600
Wave VI (2010–2013)	7.103	7.097	2.079	0.293	0.16	0.028	1.800	1.125	1.600
Wave VII (2017–2022)	7.309	7.397	1.927	0.26	0.142	0.022	1.500	1.125	1.333
Total	6.976	7.047	2.209	0.314	0.172	0.033	1.800	1.125	1.600

[3] Figs. 4 and 5 of the SM display the distribution of subjective well-being and LoC for the considered countries in the analysis. SM subsequently displays: Fig. 6, combining countries' mean of subjective well-being and LoC; Fig. 7, showing the weighted and binned scatterplots between both variables at the country level; Figs. 8 and 9 displaying histograms of the within country distribution of both variables; Table 2.a showing the average subjective well-being over control variables; and Table 2.b showing descriptive statistics of all variables used in our empirical analysis.

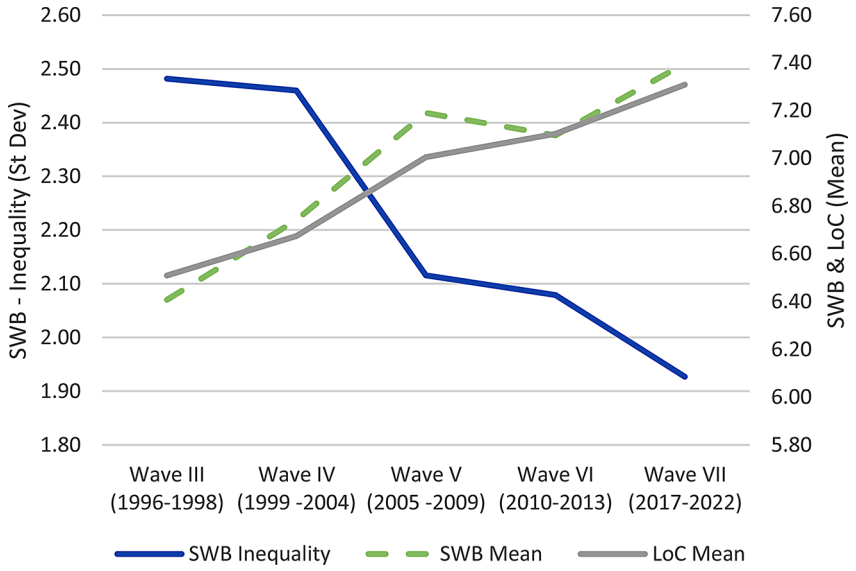

Fig. 1 Evolution of LoC and subjective well-being (mean and inequality)

4.2 Empirical Analysis

Our empirical analysis employs a variety of alternative and complementary techniques, primarily relying on cross-classified multilevel models to account for individual interactions within their social context (Hox et al., 2010). This approach utilizes *country-year* (i.e.,ϑ_{tc}) at level-2 effectively capturing respondents' experiences within each country and year as random effects (Bryan & Jenkins, 2016). To address the potential bias in our parameter estimates resulting from the correlation of random effects 'country-year' (ϑ_{tc})with the variables of interest, we also employ an OLS regression with dyadic fixed effects of country and time as a particular case of the multilevel model.

4.2.1 LoC and Subjective Well-Being

We initiate our analysis with an 'empty' multilevel model, considering both country and country-time level-2 dimensions (available at Table 3 of the SM). This initial model confirms the necessity of a multilevel approach due to significant level-2 variance.[4] Table 2 presents the estimates exploring the relationship between individuals' LoC and subjective well-being, accounting for covariates. We estimate first the multilevel model (ML) and then the OLS regression with dyadic country-time fixed effects. The sequential inclusion of various control variables is detailed in Tables 5, 6, and 7 of the SM.

[4] After conducting a likelihood ratio test between the random intercept model and the random slope model, the later model confirms that the relationship between LoC and subjective well-being changes across countries. Whereas the random intercept model artificially assumes the same slope between the two variables across countries, the random slope model allows for cross-country variation (see SM-Table 4). An alternative way to identify how much of the total variation in subjective well-being can be attributed to country-level level variance is the intra-class correlation coefficient (see SM Box 1).

Table 2 LoC and subjective well-being

	Model 1	Model 2	Model 3	Model 4
	ML	OLS-FE	ML	OLS-FE
			H1 - Individualism	
LoC	0.293***	0.293***	0.222***	0.222***
	(0.00206)	(0.00268)	(0.00539)	(0.00711)
Interaction LoC # individualism			0.137***	0.138***
			(0.00962)	(0.0119)
Age	-0.0352***	-0.0352***	-0.0352***	-0.0351***
	(0.00163)	(0.00172)	(0.00163)	(0.00172)
Age sq.	0.000423***	0.000423***	0.000422***	0.000422***
	(1.64e-05)	(1.74e-05)	(1.64e-05)	(1.74e-05)
Gender (Ref: woman)	0.132***	0.131***	0.129***	0.129***
	(0.00888)	(0.00881)	(0.00887)	(0.00881)
Health (Ref: Very good health)				
Good health	-0.507***	-0.506***	-0.498***	-0.498***
	(0.0114)	(0.0105)	(0.0114)	(0.0105)
Fair health	-1.131***	-1.130***	-1.120***	-1.119***
	(0.0134)	(0.0135)	(0.0134)	(0.0135)
Poor health	-2.009***	-2.007***	-1.999***	-1.997***
	(0.0203)	(0.0242)	(0.0203)	(0.0242)
Very poor health	-2.702***	-2.701***	-2.690***	-2.688***
	(0.0463)	(0.0674)	(0.0463)	(0.0673)
Marital sts. (Ref: Married)				
Single	-0.335***	-0.335***	-0.334***	-0.334***
	(0.0129)	(0.0128)	(0.0129)	(0.0127)
Divorced	-0.436***	-0.436***	-0.436***	-0.436***
	(0.0125)	(0.0132)	(0.0125)	(0.0132)
Education (Ref: Low)	-0.0628***	-0.0625***	-0.0618***	-0.0615***
Middle	(0.0125)	(0.0135)	(0.0125)	(0.0135)
High	-0.0530***	-0.0528***	-0.0519***	-0.0516***
	(0.0139)	(0.0144)	(0.0139)	(0.0143)
Labour market sts. (Ref: Employed)	-0.00557	-0.00550	-0.00513	-0.00506
Part-time	(0.0164)	(0.0156)	(0.0164)	(0.0156)
Unemployed	-0.443***	-0.442***	-0.438***	-0.437***
	(0.0192)	(0.0221)	(0.0192)	(0.0221)
Students	0.118***	0.118***	0.121***	0.121***
	(0.0228)	(0.0221)	(0.0228)	(0.0221)
Inactive	0.136***	0.136***	0.135***	0.135***
	(0.0130)	(0.0135)	(0.0130)	(0.0135)
Income (Ref: Very Low Income)	0.172***	0.171***	0.174***	0.173***
2. income	(0.0198)	(0.0237)	(0.0198)	(0.0237)
3. income	0.272***	0.273***	0.275***	0.276***
	(0.0193)	(0.0228)	(0.0193)	(0.0228)
4. income	0.386***	0.388***	0.388***	0.390***
	(0.0194)	(0.0224)	(0.0194)	(0.0224)
5. income	0.490***	0.492***	0.493***	0.495***
	(0.0195)	(0.0224)	(0.0195)	(0.0224)
6. income	0.553***	0.555***	0.555***	0.557***
	(0.0204)	(0.0228)	(0.0204)	(0.0228)

Table 2 (continued)

	Model 1	Model 2	Model 3	Model 4
	ML	OLS-FE	ML	OLS-FE
			H1 - Individualism	
7. income	0.648***	0.650***	0.648***	0.650***
	(0.0212)	(0.0232)	(0.0212)	(0.0232)
8.income	0.674***	0.676***	0.674***	0.676***
	(0.0228)	(0.0244)	(0.0228)	(0.0244)
9. income	0.732***	0.734***	0.730***	0.732***
	(0.0260)	(0.0261)	(0.0260)	(0.0261)
10. income	0.762***	0.763***	0.755***	0.756***
	(0.0269)	(0.0265)	(0.0269)	(0.0265)
GDP	0.0438***		0.0452***	
	(0.00941)		(0.00947)	
Country – Time FE	NO	YES	NO	YES
Country FE	YES	NO	YES	NO
Time FE	YES	NO	YES	NO
R-squared		0.359		0.360
Number of groups	83	83	83	83
ICC	0.0159		0.01619	

Note: Observations 171,091. Robust standard errors in parentheses.

Significance: * $p<0.05$, ** $p<0.01$, *** $p<0.001$

The results show a significant positive association between LoC and subjective well-being, even after accounting for individual characteristics and country and time fixed effects. Specifically, the change in subjective well-being predicted by LoC (on a 1–10 scale) is 0.293. The standardization of the variables also indicates that LoC significantly relates to subjective well-being, accounting for approximately one-tenth of the standard deviation. These findings align with existing literature in the field. The direction of control variables also yields the expected results, in line with previous literature. There is an inverted U-shaped relationship with age (with a minimum at 42 years), income positively influences subjective well-being, unemployment negatively correlates with subjective well-being, and education, health and marital status also exhibit significant relationships (see: Dolan et al., 2008; Layard, 2010).

Models 3 and 4 show a significant and positive interaction between LoC and country's social values (proxied by the individualist-collectivist indicator). Figure 2 illustrates that the association between LoC and subjective well-being positively strengthens as countries have more individualist values. These results confirm Hypothesis 1, revealing a strong moderating role of country's social values and that the relationship between LoC and subjective well-being is more positively correlated in individualist countries compared to collectivist ones. To ensure the robustness of these findings, we split countries by the median value of the individualism variable, designating countries with an index above 0.60 as individualist and those below as collectivist. Our results remain consistent, even when considering individualism as a 0–1 dummy variable. More details and alternative robustness checks are provided in the Tables 8 and 9 of the SM.

The contribution of countries' social values to explain the LoC–subjective well-being relationship is further analysed in Table 3, differentiating between the composition and

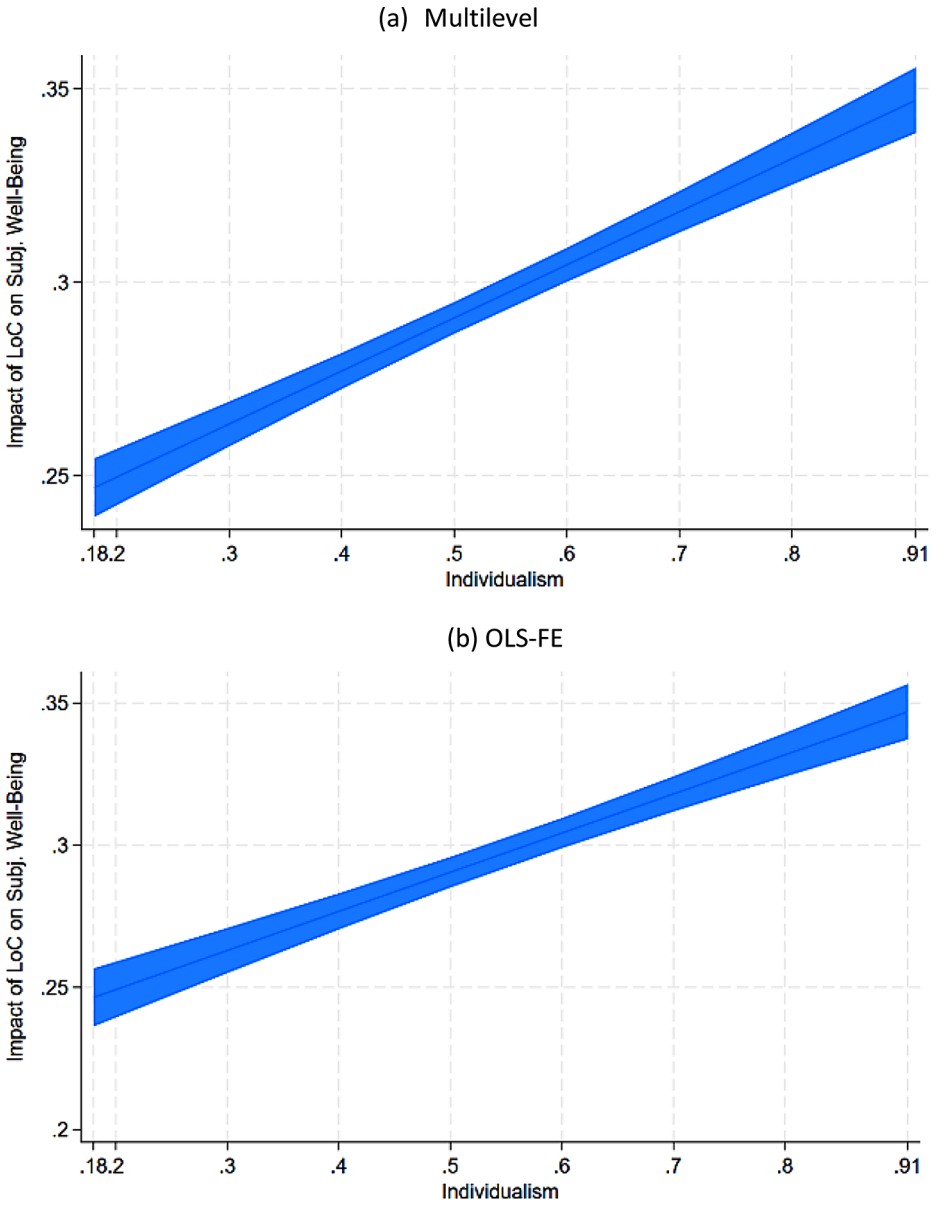

Fig. 2 Marginal effects of the interaction of LoC on subjective well-being mean by level of individualism country values (0 very collectivist social values – 1 very individualist social values)

structural effects using the Oaxaca-Blinder regression, both with and without reweighting (i.e. accounting the inverse probability weights for the identification of the counterfactual distributions).

The analysis reveals that the general differences between countries are largely attributable to individual characteristics of people in these countries (composition effect) and to

Table 3 Oaxaca-Blinder decomposition over individualism/collectivism countries

	No Reweight		Reweight	
	Composition effect	Structural effect	Composition effect	Structural effect
LoC	0.142	0.254	0.137	0.333
	(0.00394)***	(0.0353)***	(0.00488)***	(0.0509)***
	[0.00391]***	[0.0344]***	[0.00567]***	[0.0512]***
Total difference	0.683		0.683	
	(0.0104)***		(0.0104)***	
	[0.0103]***		[0.0104]***	
Explained – Unexplained	0.393	0.289	0.407	0.275
	(0.00680)***	(0.0102)***	(0.0110)***	(0.0159)***
	[0.00637]***	[0.0102]***	[0.0120]***	[0.0141]***
Specification / Reweighting Error			0.0117	-0.00238
			(0.00721)	(0.00994)
			[0.00770]	[0.00601]

Note: $N = 171{,}360$. All regressions include all controls as in former models. Standard errors between parenthesis corresponds to robust estimates; between brackets corresponds to bootstrapped estimates (200 replications). Significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4 Results of RIF regressions. Standard deviation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
LoC	-0.152***	-0.127***	-0.0934***	-0.149***	-0.107***	-0.0503***	-0.145***
	(0.00233)	(0.00234)	(0.00252)	(0.00695)	(0.00357)	(0.00300)	(0.00412)
Interaction LoC				0.108***			
# individualism				(0.0117)			
Interaction LoC					0.0311***		
# indiv. dummy					(0.00489)		
Controls	NO	NO	YES	YES	YES	YES	YES
Country FE	NO	YES	YES	YES	YES	YES	YES
Time FE	NO	YES	YES	YES	YES	YES	YES
Observations	204,023	204,023	171,091	171,091	171,091	80,083	91,008
R-squared	0.043	0.104	0.165	0.166	0.166	0.144	0.172

Note: Columns 1 to 3 include sequentially control variables; column 4 include the interaction of the LoC with the degree of individualism; column 5 include the interaction with a dummy for individualist countries (above the median); column 6 corresponds to collectivist countries; and column 7 corresponds to the estimate of individualist countries. Standard errors between parenthesis corresponds to robust estimates

Significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

lesser extent by structural effects (i.e. composition effect of 0.393 and structural effect of 0.289). However, the structural effect for LoC is notably larger than the composition effect, a distinction that is particularly significant. Therefore, it is the impact of LoC on subjective well-being that primarily differs across countries. These results affirm the substantial moderating role of country's social values in the relationship between LoC and subjective well-being and further validate Hypothesis 1.

To test the hypotheses related to subjective well-being inequality, we employ RIF regressions. Results are displayed in Table 4 below.

Results highlight a robust negative relationship between LoC and subjective well-being inequality. As the average LoC score increases by one unit, the standard deviation of subjective well-being decreases by 0.152 to 0.107, with the estimate becoming lower as additional covariates are considered. This outcome aligns with Hypothesis 2.b, which predicted a negative relationship between LoC and subjective well-being inequality.

Moreover, the parameter between the interaction term and subjective well-being inequality is positive and significant, indicating that the relationship between LoC and subjective well-being inequality is sensitive to countries' social values, particularly the level of individualism. Figure 3 illustrates the marginal effect, indicating that there is a general decline in subjective well-being inequality as individuals live in more individualist countries, albeit the extent of this decline exhibits a diminishing trend. These findings substantially align with Hypothesis 3.b. These results remain robust when considering individualism as a 0–1 dummy variable or in separate regressions as detailed in columns 5 to 7 in Table 4 (see also SM Table 10 to observe the sequential introduction of covariates). Results are also robust when using other measures of subjective well-being inequality (see Tables 11 and 12 of the SM).

The moderating influence of countries' social values on the relationship between LoC and subjective well-being inequality is further decomposed in Table 5, which separates the composition and structural effects using the Oaxaca-Blinder regression, both with and without reweighting.

The results confirm that the overall unexplained effect of the subjective well-being inequality is slightly larger than the explained effect, what indicates the important role of different parameters explaining subjective well-being inequality in countries differing by the level of individualist values. At the same time, this result is particularly important for our variable of interest, LoC. The structural effect is six times larger than the composition effect (-0.418 versus −0.0681, respectively). These results confirm the solid moderating role of countries' social values when studying the association between LoC and subjective

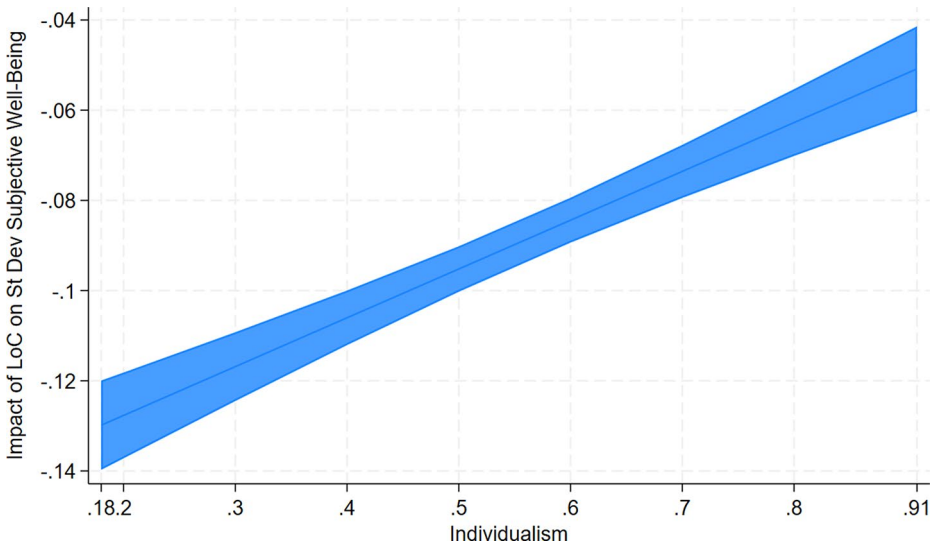

Fig. 3 Marginal effects of the interaction of LoC on subjective well-being inequality by level of individualism country values (0 very collectivist social values – 1 very individualist social values)

Table 5 Decomposition of the subjective well-being inequality over countries by level of individualism

	No reweight		Reweight	
	Composition Effect	Structural Effect	Composition Effect	Structural Effect
LoC	-0.0626	-0.804	-0.0681	-0.418
	(0.00233)***	(0.0329)***	(0.00773)***	(0.0750)***
	[0.00222]***	[0.0305]***	[0.00919]***	[0.0916]***
Total difference	-0.404		-0.397	
	(0.00736)***		(0.00766)***	
	[0.00786]***		[0.00714]***	
Explained / Unexplained Effect	-0.178	-0.226	-0.226	-0.171
	(0.00528)***	(0.00916)***	(0.0208)***	(0.0223)***
	[0.00511]***	[0.00873]***	[0.0192]***	[0.0208]***
Specification / Reweighting Error			-0.0281	0.0142
			(0.0179)	(0.0119)
			[0.0269]	[0.0104]

Note: $N = 173{,}041$. All regressions include all controls as in former models. Standard errors between parenthesis corresponds to robust estimates; between brackets corresponds to bootstrapped estimates (200 replications). Significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

well-being inequality. Reports of full results for all covariates are provided in Table 13 of the SM).

4.3 Heterogeneity

We have addressed the heterogeneity of our findings with regard to gender and age. Regarding the latter, our focus was the division at 42 years, which represents a pivotal point associated with the lowest subjective well-being and approximates the median age. Our findings demonstrate that the general pattern remains consistent regardless of the subgroup under consideration. Notably, a more accentuated influence of LoC on subjective well-being is observed among older individuals and the moderating effect of country's social values is more prominent among younger people. Gender differences were observed, but were relatively minor, with slightly larger parameters for women. Regarding subjective well-being inequality, a similar trend emerges, yielding an intriguing result: among younger individuals, there is no significant moderating effect of country's social values. Our application of the Oaxaca-Blinder analyses reaffirmed that the structural effect of LoC far outweighed the compositional effect for both subjective well-being outcomes (i.e. mean and inequality). This difference was particularly pronounced among men and younger individuals (see Tables 14 and 15 of the SM) (See Table 6).

4.4 Robustness Check: Happiness

We conducted a robustness analysis with an alternative dimension of subjective well-being – namely, the concept of happiness. In contrast to life satisfaction, which serves as an evaluative and cognitive measure of subjective well-being, happiness represents a psychological construct that encompasses an affective and hedonic dimension of subjective well-being, such as positive emotional states and pleasure (Diener et al., 2017). Our happiness measure consists of a 1–4 scale, where higher values denote greater levels of happiness, with

Table 6 Heterogeneity by gender and age

	Average Multilevel	OLS_FE	Inequality RIF	Average Multilevel	OLS_FE	Inequality RIF
	Men			Women		
LoC	0.221***	0.220***	-0.132***	0.225***	0.224***	-0.163***
	(0.00791)	(0.0106)	(0.0106)	(0.00737)	(0.00959)	(0.00917)
Interaction LoC # individualism	0.126***	0.128***	0.0801***	0.145***	0.146***	0.130***
	(0.0140)	(0.0175)	(0.0177)	(0.0133)	(0.0162)	(0.0155)
R-squared		0.361	0.163		0.362	0.172
Number of observations	79,207	79,207	79,207	91,884	91,884	91,884
	Below 42 Years			42 Years & Above		
LoC	0.171***	0.171***	-0.0852***	0.257***	0.256***	-0.194***
	(0.00810)	(0.0106)	(0.0109)	(0.00726)	(0.00965)	(0.00914)
Interaction LoC	0.185***	0.186***	-0.00550	0.105***	0.106***	0.186***
# individualism	(0.0151)	(0.0180)	(0.0190)	(0.0126)	(0.0159)	(0.0150)
R-squared		0.323	0.145		0.389	0.181
Number of observations	71,350	71,350	71,350	99,741	99,741	99,741
Controls	YES	YES	YES	YES	YES	YES
Country – Time FE	NO	YES	YES	NO	YES	YES
Country FE	YES	NO	NO	YES	NO	NO
Time FE	YES	NO	NO	YES	NO	NO

Significance: * $p<0.05$, ** $p<0.01$, *** $p<0.001$

1 signifying "Not at all happy", and 4 corresponding to "Very happy." In our analysis (see Tables 16, 17, 18 and 19 of the SM), we replicated the main tables of our study, obtaining analogous results as those observed for life satisfaction. Results exhibit consistency across countries, with the structural effect of LoC exerting a more substantial influence than the compositional effects.

5 Discussion and Concluding Remarks

This study examined the relationship between individuals' LoC and subjective well-being, considering both the mean and inequality dimensions of the latter. Moreover, it explored the moderating role of countries social values, particularly the individualist–collectivist values. Leveraging data from the Integrated Values Survey, spanning 170,000 individuals across 37 developed economies from 1996 to 2022, our study yielded four pivotal findings: (1) LoC is strongly and positively associated with subjective well-being, net of individual and macro characteristics; (2) the relationship between LoC and subjective well-being is positively and more strongly correlated in individualist countries compared to collectivist nations; (3) there is a strong negative relationship between LoC and subjective well-being inequality; (4) as individuals live in more individualistic societies, there is a decrease in subjective well-being inequality resulting from the increase in average LoC, although this decrease is gradually smaller.

These results underscore the strong positive connection between LoC and subjective well-being across its cognitive and affective dimensions, which is in line with previous literature (e.g. see: Argyle, 2013; Pu et al., 2017; Quevedo & Abella, 2014; Verme, 2009).

More importantly, our study unveils the strong negative relationship of LoC with subjective well-being inequality. This is a novel result in the literature given that empirical research on the relationship between LoC and subjective well-being inequality has no precedents. It therefore contributes to our understanding of LoC as an important determinant of subjective well-being and reveals that higher LoC contributes to diminish extreme negative levels of subjective well-being in a country, converging towards higher levels of well-being. This result resonates with debates on individual freedom and responsibility and its relationship with society. It particularly speaks to those collective choice and inequality postulates that argue to guarantee and promote freedom of choice and control as a basis for increasing individual and societal welfare such as Sen's capability approach (Sen, 2009) or the theory of equal opportunity (Roemer, 2002; Roemer & Trannoy, 2015) that jointly reconciles Utilitarian and Rawlsian perspectives.

This leads to a second point of discussion; it is important to consider the social values prevailing in the countries in which individuals are embedded. Our results underscore the strong moderating role of individualist-collectivist social values in the relationship between LoC and subjective well-being, extending to both the mean and inequality dimensions of the latter. The robustness of these results is bolstered by the relevance assigned to the structural effects in Oaxaca-Blinder regressions. Results show that the association between LoC and the subjective well-being mean positively strengthens as individuals live in more individualist countries. This result speaks to previous related research showing that individuals in more individualist societies are more inclined to believe that individual effort plays a strong role in individual outcomes, independent of external circumstances outside their control (Alesina & Angeletos, 2005; Ramos & Van de Gaer, 2016),

Importantly, our findings reveal that the overall decrease in subjective well-being inequality that occurs as LoC increases is less pronounced in individuals residing in more individualist societies. This novel result expands our knowledge of how LoC relates with subjective well-being, by showing that the largest reductions in subjective well-being inequality that come from living in a society with more individualistic values are produced in societies that still retain collectivist values. In other words, the reduction in subjective well-being inequality from transitioning from an already highly individualistic country to a slightly more individualistic one is not as large as the decline observed when transitioning between two countries that can exhibit collectivist tendencies.

Finally, it is important to highlighting the time dimension of this study. The extensive dataset, comprising 170.000 observations representative of the adult population from 37 countries with high HDI, spans from the mid-1990s to 2022. This temporal breadth allows us to take into account the dynamic behaviour of our variables of interest across a significant portion of the globe.

These findings hold implications for public policy, particularly in light of the global trend towards increasing individualist values over the past century, marked by economic development, democratic transitions, and the emergence of consumer societies with educated middle classes (Hofstede et al., 2010), as well as with the recent rise of political polarization and populist movements in wealthy nations arising from the perceived loss of status and opportunities among certain population segments (Case & Deaton, 2020). The findings highlight the importance of fostering high levels of LoC in the population, which can help mitigate political disaffection that may lead to populism. Targeted public policies could be instrumental in cultivating a sustainable sense of freedom of choice and control. For

instance, educational systems that encourage independence and creativity, labour market policies that support the establishment of start-ups, permanent and secure job contracts, as well as active labour market policies that help the unemployed in finding meaningful jobs. Collectively, these policies may play a pivotal role in both reducing subjective well-being inequality and increasing overall subjective well-being within societies, thereby fostering social integration and trust.

It is important to acknowledge certain caveats inherent in this study, particularly in the utilization of large longitudinal datasets such as the Integrated Values Survey. While the survey provides many solid advantages described above, the cross-sectional nature of the data limits our ability to control for heterogeneous unobservable fixed effects at the individual level, and the absence of a panel structure in the data poses challenges in establishing causal relationships, warranting caution in interpreting correlations. Additionally, the lack of regional information across different waves may overlook variations within countries, arising from diverse economic and social factors. These limitations lay the groundwork for future research avenues. Therefore, suggest several avenues for future research.

Replicating our analysis with panel data surveys that track the same individuals across samples representative of different countries and/or regions would be highly beneficial. The incorporation of countries with diverse levels of socioeconomic development beyond those with high HDI examined in this study would also provide relevant insights. Additionally, distinguishing between urban and rural areas could yield valuable insights, given the potential role of urbanization in our variables of interest as well as focusing on individuals' socioeconomic origin. Future research could also explore alternative subjective well-being measures, such as eudaimonic well-being. Employing multi-item scales for locus of control, such as the Rotter or Levinson measures, would provide a more nuanced understanding. Finally, employing experimental methods to examine causal pathways in our variables of interest, alongside qualitative approaches like semi-structured interviews or focus groups, would enhance our understanding of the mechanisms underlying our findings.

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Declarations

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