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ORIGINAL RESEARCH

Cheerful Discontent: Understanding the African Well-being Paradox

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Abstract
While positive affect and life evaluation are positively correlated in Sub-Saharan Africa (SSA), their relationship is much weaker than in Western countries, suggesting a misalignment between how people feel and how they judge their lives, a pattern we refer to as the African well-being paradox. Using Gallup World Poll microdata (2013–2024) covering 39 SSA and 27 Western countries, we construct an individual-level measure of this misalignment: the difference between positive affect and life evaluation scores (the PA-LE balance) and analyse its determinants using eXtreme Gradient Boosting (XGBoost) with SHapley Additive exPlanations (SHAP). Our results show that the PA-LE balance in SSA is both higher and more widely dispersed than in Western countries. More than two-thirds of individuals in SSA exhibit a positive balance and can be classified as "cheerfully discontented". In contrast, Western countries exhibit a narrower, more symmetric distribution. Across regions, optimism and negative affect account for the largest share of predictive attribution. The distinct SSA pattern arises not from different drivers, but from their configuration: comparatively low economic optimism coexists with relatively low negative affect. This suggests that structural constraints shape life evaluations, while relational and social resources sustain positive daily experiences, creating a situation of "cheerful discontent".

Keywords Life evaluation · positive affect · Africa · XGBoost · SHAP

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1 Introduction

How individuals feel about and evaluate their lives and experiences is often highly correlated (Diener et al., 1985). However, in Sub-Saharan Africa (SSA), the relationship is much weaker than in Western countries, suggesting a misalignment between these complementary components of subjective well-being (SWB) in this region. We refer to this pattern as the African well-being paradox.

According to the World Happiness Report (WHR), SSA countries consistently perform poorly in life evaluative rankings, with most scoring between 3 and 5 on the Cantril ladder (the evaluative component of SWB), placing over 80% in the bottom quartile. In particular, the 2025 World Happiness Report ranks Mauritius (5.83), the highest-ranking country in SSA, at number 78 out of 147 countries (Helliwell et al., 2025).[1]

In contrast, when we consider positive affect (the emotional component of SWB), we observe that, at the country level, many SSA countries have people reporting being happy in daily life while dissatisfied with life in general (Helliwell et al., 2025). For example, Senegal ranked first in positive affect (0.86) in 2025, despite a life ladder score of 4.85 and a ranking of 107th (Helliwell et al., 2025).

This paradox, where individuals feel happy yet evaluate their lives poorly, has been described as "cheerful discontent" in the context of South Africa (Rothman & Veenhoven, 2013), and its converse, "contentedly despairing."[2]

Gallup World Poll 2024 country-level data confirm this: positive affect and life evaluation correlate strongly in Western countries ($r=0.76$; left-hand side of Fig. 1). However, in SSA (right-hand side), the Pearson correlation coefficient ($r=0.19$) shows a positive, but weak linear relationship. At the aggregate level, this implies that the two components vary largely independently of each other in SSA. Therefore, on initial inspection, the evidence suggests that in most SSA countries, a situation of "cheerful discontent" (higher positive affect than ladder score) prevails. This phenomenon has also been documented in previous research (Rothman & Veenhoven, 2013; Blanchflower & Bryson, 2024); however, no empirical studies have provided plausible reasons for its existence.

Although previous research on SWB in SSA (see Sects. 2.2 and 2.3) has documented a misalignment between the affective and evaluative dimensions, most studies rely on macro-level indicators, standard regression techniques, or small-scale qualitative approaches. Some of these studies have examined the correlation between the two dimensions. While such analyses are informative about average co-movement, they cannot directly capture the magnitude of the disconnect at either the individual or aggregate level. Moreover, correla-

[1] Low life evaluation scores of SSA countries can also be found in cross-national research based on the World Values Survey (WVS) and are typically associated with lower levels of economic development and institutional quality (Veenhoven & Berg, 2013). The WVS asks respondents the following evaluative wellbeing question: "All things considered, how satisfied are you with your life as a whole these days?" respondents need to rate their satisfaction on a scale from 1 to 10, where 1 means "completely dissatisfied" and 10 means "completely satisfied". However, an exploration of the difference between affect scores and life evaluation scores is beyond the scope of this paper.

[2] In the literature on unemployment and SWB in the Western world, this phenomenon is also known as 'Dissatisfied with life but having a good day' (Knabe et al., 2010).

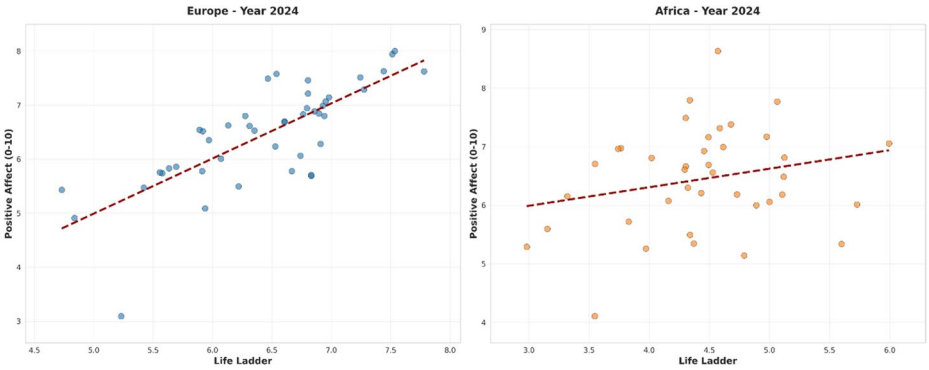

Fig. 1 Positive affect vs. life evaluation (2024); Europe and SSA

tion and regression analyses may obscure underlying heterogeneity, as regions can exhibit positive yet distinct relationships.

To address these shortcomings and better understand the source of the disconnect in SSA, we construct an individual-level positive affect–life evaluation (PA–LE) balance using large-scale microdata. This single difference measure (the balance) enables us to quantify the misalignment and examine its distribution across regions. By subtracting the two components, we can identify the prevalence of individuals who are cheerfully discontented. Furthermore, modelling and comparing regional balances allows us to directly contribute to explaining the African well-being paradox. Our PA–LE balance does not conflate the two complementary dimensions of SWB; rather, it represents a third construct that captures the degree of alignment between affect and evaluation. This new variable reflects the coherence between how individuals *feel about* and *evaluate* their lives, offering a theoretically meaningful indicator of well-being and a valuable concept for empirical analysis.

Given the above, this study investigates the following research questions: (i) How does the proposed PA–LE balance compare with previous correlational analyses, and what additional insights does it offer? (ii) What factors predict the PA–LE balance in SSA, and are these predictors similar to those observed in Europe? and (iii) If the key predictors are the same, why does SSA differ and what underlies these relationships across regions?

To address these research questions, our analysis draws on Gallup World Poll microdata (2013–2024) for 39 SSA countries and 27 Western countries. Unless otherwise noted, all empirical analyses in this study are conducted at the individual level using pooled microdata, while country-level statistics are presented only for descriptive context. We apply an eXtreme Gradient Boosting (XGBoost) model to train our data to examine the most important features (factors) influencing the PA–LE balance. Subsequently, we evaluate the model's performance by testing its ability to predict the balance on an unseen dataset. Furthermore, we rely on SHapley Additive exPlanations (SHAP) to explain the output of our XGBoost model. SHAP uses concepts from cooperative game theory to assign a marginal contribution per observation for each feature (variable) for its contribution to a specific prediction. Using SHAP mean absolute values will inform us about the ranking (absolute importance) of our features, while SHAP mean signed values will show the direction (positive or negative) and magnitude of each feature's predictive relationship with the PA-LE balance. Using SHAP's

dependency plots, we identify the relationships between feature values and their marginal contributions to predicting the PA–LE balance.

Our study makes several contributions to the existing literature on subjective well-being in several distinct ways. We develop a new individual-level measure of the Positive Affect–Life Evaluation (PA–LE) balance, which indicates the difference between how people feel and how they judge their lives. This measure contributes to the existing literature that has adopted correlation and regression analyses by quantifying both the magnitude and direction, enabling comparisons across regions. Additionally, we apply eXtreme Gradient Boosting (XGBoost) with Shapley value explanations (SHAP) to identify the most important features for predicting PA-LE balance and to examine how these features differ across individuals within regions. Unlike traditional econometric models such as OLS, which focus on estimating the average (conditional mean), this method captures individual-level heterogeneity and non-linear dynamics that are masked in mean-based specifications. Furthermore, we integrate insights from both cognitive and affective dimensions of SWB to generate policy-relevant implications for reducing the PA–LE imbalance by addressing economic expectations while leveraging emotional resilience and community strengths.

The remainder of the paper is structured as follows. The next section presents our theoretical framework and provides a literature review that focuses on studies examining variables associated with the affective and cognitive components of SWB in SSA. The data, selected variables and methodology are discussed in Sect. 3. The results are presented in Sect. 4, while the paper concludes with policy recommendations in Sect. 5.

2 Background

2.1 Subjective Well-Being

Subjective well-being (SWB) is "*the degree to which an individual judges the overall quality of his or her life-as-a-whole favourably*" (Veenhoven, 1984, Chap. 2). According to Veenhoven (2000), SWB draws on two primary sources: emotional states and cognitive judgments; so, it depends on how people feel and how they evaluate their lives.

Affective measures of SWB capture positive and negative emotions (e.g., joy, calm, anger, sadness), whereas evaluative measures assess life satisfaction or contentment with one's circumstances. In this research, we focus on positive affect and a specific measure of evaluative well-being, the Cantril ladder, which measures the degree of contentment or how people's current circumstances compare to their best and worst conceivable life situations (Cantril, 1965; Helliwell et al., 2025).

Affective and evaluative well-being often diverge (Rojas & Veenhoven, 2013), as different factors may influence them (Kahneman & Deaton, 2010; Diener et al., 2010). Veenhoven (1984, 2009) argues that affective well-being (moods and discomfort) reflects whether basic needs are met, signals that are largely unconscious and evolutionarily older than cognitive evaluations. By contrast, evaluative well-being is shaped by culture and personal aspirations. While cognitive standards for life evaluation vary widely across individuals and cultures, affective responses are thought to be more biologically grounded and thus more stable across populations. Veenhoven emphasises that the "affective compass" is evolutionarily older, and that the human cognitive orientation system evolved as an addition rather than a

replacement, which is consistent with research on the "primacy of affect" (Zajonc, 1980). Consequently, feelings often dominate when people evaluate their overall SWB: rather than consciously comparing aspirations to achievements, individuals frequently infer their overall SWB from how they generally feel.

Kahneman and Deaton (2010), using large-scale survey data, show that life evaluation measures rise steadily with income. In contrast, emotional well-being improves with income only up to a threshold, beyond which additional income is no longer associated with greater happiness, lower stress, or reduced negative affect. In contrast to life evaluation, affective well-being is more strongly related to factors such as health, social contact, and daily constraints on action. While this work clearly establishes that evaluative and affective measures respond to systematically different correlates, it remains largely descriptive and does not fully explain why these differences arise at the cognitive level.

De Boer (2025) addresses the persistent finding that evaluative SWB (life satisfaction) correlate more strongly with income and material goods, while affective measures are more closely linked to perceived freedom. Drawing on dual process theory, he argues that this reflects a functional division of cognitive labour: slow, deliberative processes (Type 2) evaluate and compare material goods, whereas fast, automatic emotional processes (Type 1) safeguard autonomy and the ability to choose among actions. Using a decision-theoretic example, De Boer (2025) illustrates how emotions are oriented toward protecting freedom while deliberation is directed toward weighing material outcomes. He concludes that the difference between evaluative and affective SWB measures arises from their reliance on distinct cognitive systems, though local contexts may alter the strength of these associations.

Indeed, while De Boer's argument highlights a universal cognitive distinction between affective and evaluative SWB, its expression may differ across cultural contexts. In SSA, for instance, autonomy is often understood in relational rather than individualistic terms (Ikuenobe, 2015), and, compared with the Western world, SWB evaluations in SSA might depend more on obligations and harmony with others than on personal goals (Lambert et al., 2020). Hence, affective SWB can remain high despite dissatisfaction with life: communal ties buffer emotional states, where life evaluations reflect structural realities, such as poverty. Life evaluations can be more negative in SSA because communal constraints, such as youth unemployment or collective poverty (i.e., local conditions), weigh more heavily in judgments. Likewise, *Ubuntu* and related philosophies that stress communitarian values are more prevalent in SSA than in the West (Metz, 2011). Along these lines, social rituals and kinship networks sustain affective SWB, while communal prospects drive evaluative well-being. Hence, life evaluations can be low even if one's daily affect is positive. This will be further explored in the next section.

2.2 Affective and Evaluative Well-Being in SSA

Understanding SWB in SSA requires multidimensional, culturally grounded approaches that reflect the region's diverse sociocultural, economic, and political contexts. Research combines quantitative analysis of large international surveys, such as the World Values Survey (WVS) and Gallup World Poll (GWP), with qualitative work using interviews, ethnographies, and participatory methods that capture indigenous views of well-being. These qualitative studies highlight the relational, spiritual, and moral dimensions that are often absent from standardised metrics.

Evaluative well-being, typically measured through life satisfaction or the Cantril ladder, is highly sensitive to structural and institutional conditions. Regression and multilevel analyses link low income, unemployment, poor health (HIV/AIDS prevalence, lower life expectancy), and food insecurity to poorer evaluations (Deaton et al., 2009; Ngamaba, 2016; Calvo et al., 2012). Freedom of choice and perceived autonomy consistently predict higher life evaluation, while national indicators such as GDP per capita, corruption, and governance quality explain a significant portion of the variation (Minkov, 2009; Joshanloo, 2019; Joshanloo & Bond, 2023).

In contrast, affective well-being in SSA has been more closely associated with relational and psychosocial factors than with material and institutional conditions. GWP survey data indicate that, despite widespread poverty, many African populations report high levels of daily happiness and emotional positivity. Rojas and Veenhoven (2013) found that countries such as Kenya and Malawi displayed high affect but low contentment, indicating a disconnect between emotional state and cognitive evaluation.

Optimism and negative affect play distinct roles in separating daily positive emotions from overall life evaluations in SSA. Studies using adaptation and social comparison frameworks show that individuals employ optimism as a survival strategy and view their futures more favourably despite acute material hardships (Graham & Hoover, 2007; Clark & D'Ambrosio, 2018). In these studies, high optimism and low negative affect buffer the impact of poverty such that life evaluations remain low even when positive affect is sustained. Other studies stress that life evaluation is more closely tied to material conditions, income, health, food, and shelter, while positive affect is driven by psychosocial factors and resilient social ties (Diener et al., 2010; Kaufman et al., 2022). Dispositional optimism, as measured in comparative and longitudinal designs, moderates these relationships, with some evidence suggesting that optimism is more strongly linked to life evaluation when material prospects are improving (Baranski et al., 2021). Social capital studies further underscore that robust support networks reinforce positive affect even in challenging economic contexts (Cramm et al., 2010; Addae & Kühner, 2022).

Qualitative studies deepen this understanding by emphasising the importance of social relationships, spiritual life, and cultural identity in sustaining affective well-being. Evidence from Uganda, South Africa, and Tanzania shows that peace of mind, respect, and communal harmony outweigh material wealth in shaping emotion (Ferrari, 2022; White & Jha, 2018; Rishworth et al., 2019). Other studies link well-being to moral conduct, inclusion, and spirituality, with community participation buffering emotional distress, especially among women and older adults (Ferrari, 2022; White & Jha, 2018; Kaufman et al., 2022).

A consistent finding in research is the disconnect between evaluative and affective well-being at the country level in Africa, and a pattern emerges: evaluative well-being mirrors structural disadvantage, while affective well-being remains resilient, often matching or exceeding levels in richer regions (Diener et al., 2018). Brulé and Veenhoven (2015) mapped global patterns of affect and contentment, showing African countries frequently cluster in the high-affect/low-evaluation quadrant, a unique configuration that standard global metrics may misinterpret if they rely only on life evaluation scores.

The conceptual framework by Brulé and Veenhoven (2015) is also particularly relevant for understanding patterns in SSA, where surveys often reveal high levels of positive affect despite low life evaluation scores. In deprived contexts, positive affect, fueled by fulfilled needs such as strong community ties, spirituality, and social inclusion, can persist even

under economic hardship or weak institutions. These findings caution against relying solely on evaluative measures, which risk overlooking important emotional realities. The concept also helps explain a phenomenon such as "cheerful discontent" (Rothman & Veenhoven, 2013) in which individuals experience frequent positive emotions while rating their lives poorly. Recognising this disconnect also underscores the importance of culturally sensitive approaches to measuring SWB in diverse settings.

The resilience of affective well-being in the face of poverty may be linked to cultural coping mechanisms, strong kinship networks, and spiritual frameworks (Kaufman et al., 2022; Ferrari, 2022; White & Jha, 2018). Studies from Ethiopia, South Africa, and Uganda describe well-being in relational and moral terms, such as being "settled," maintaining family harmony, and earning respect (White & Jha, 2018; Ferrari, 2022; Rishworth et al., 2019). These insights underscore the limitations of applying Western-centric SWB measures without cultural adaptation (Adedeji et al., 2023; White & Jha, 2018).

Spiritual well-being, connection to God, ancestors, or nature, is integral for affective and evaluative well-being (Kaufman et al., 2022; Ferrari, 2022; Adedeji et al., 2023; White & Jha, 2018). These studies highlight how emotional and moral well-being could be high despite material deprivation. Although spirituality can enhance well-being, Joshanloo (2019) suggests religiosity may dampen the effect of emotions on life satisfaction. Overall, these findings stress the need for culturally sensitive frameworks that integrate insider perspectives. Quantitative surveys confirm high affect despite low evaluation, while qualitative accounts explain this paradox through communal and spiritual coping systems that large-scale datasets overlook.

Despite these insights, prior studies analysed affective and evaluative well-being *separately* (and compared *correlations*) rather than constructing and modelling a single variable that represents the difference between them. We note that studies like Brulé and Veenhoven (2015) mapped the *high-affect/low-evaluation quadrant*, and Rojas and Veenhoven (2013) discussed "*contentment vs. affect*". However, neither constructed a standardised, individual-level balance measure to compare its dispersion across regions, ultimately explaining this dispersion with predictors and characteristics underlying these predictors.

3 Data and Methodology

3.1 Data and Samples of Countries

In this study, we use data from the Gallup World Poll (GWP), which draws on representative samples of the public in various countries. The annual sample size in each nation is approximately 1,000 persons, and Gallup aims to conduct repeated surveys over time. Specifically, we utilise micro-level data spanning the years 2013–2024 for 39 SSA countries, 27 European Union countries, the USA, Canada, New Zealand, and Australia (see Supplementary Information A for a list of countries). With a large sample, we employed listwise deletion, removing observations with missing values. We were left with 356,315 observations. Additionally, we included weights in our analyses.

3.2 Target/Outcome Variable

In this section, we explain the construction of our outcome variable, the balance between positive affect and life evaluation.

3.2.1 Life Evaluation

Here, we use Cantril's ladder question, which asks respondents:

> "Please imagine a ladder, with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you, and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time? 0 is the worst possible life, and 10 is the best possible life for you."

3.2.2 Positive Affect

For positive affect, we rely on the Positive Experience Index[3], which measures respondents' experienced well-being on the day before the survey. Therefore, questions provide a measure of respondents' positive experiences. We chose to use the Positive Experience Index as the measure, as it accommodates broad cultural conceptualisations of positive emotions. This broad framing is particularly important when comparing different regions, such as SSA and Europe.[4]

The questions include: *Did you experience the following feelings during a lot of the day yesterday? How about enjoyment? Did you smile or laugh a lot yesterday? Did you feel well-rested yesterday? Were you treated with respect all day yesterday? Did you learn or do something interesting yesterday?* The positive experience index scores are calculated at the individual record level. Therefore, for each individual, the following procedure applies: the five items are recoded so that positive responses are scored as "1", and all other responses (including don't know and refused) are scored as "0." If a record has no answer for an item, then that item is not eligible for inclusion in the calculations. An individual record has a score calculated if it has at least 4 of 5 valid scores (0 or 1). The record's final score is the mean of valid items multiplied by 100. It should be noted that in terms of reliability, the index has a Cronbach's alpha of 0.91 (Gallup, 2025, p. 32).

Given that we are using the Positive Experience Index as a measure of positive affect, we perform robustness tests to support our decision. We conducted sensitivity analyses using reduced affective subsets, e.g., using enjoyment and laughter. We find that these measures are highly correlated with the Positive Experience Index ($r=0.84$, $p=0.000$), and all substantive results remained unchanged. Additionally, we replicate our base XGBoost model (see Sect. 3.4.1) using an index consisting of joy and laughter as an alternative outcome. We find that the closeness of the gains and the feature importance rankings and magnitudes

[3] To test the sensitivity of the Positive Experience Index, we also derive positive affect scores using the aggregated value of joy, and laugh, and a third measure adding well-rested. These measures are highly correlated, and the results using the different measures as outcomes are substantially the same.

[4] The Gallup measure has demonstrated measurement equivalence across 160 countries and is widely used in research (Helliwell et al., 2021; Diener et al., 2010).

across both specifications validates our decision to use the Positive Experience Index as a measure of positive affect (Please refer to Tables B2–B3 in the Supplementary Information for the Pearson correlation and the base XGBoost comparative results).

In our analyses, we rescale the Positive Experience Index to a 0–10 index (by dividing by ten) to facilitate comparison with the Cantril ladder.

3.2.3 The Positive Affect-Life Evaluation (PA-LE) Balance

We determine the balance (i.e., difference) between positive affect and life evaluation as follows:

$$\text{PA} - \text{LE Balance} = \text{Positive Affect} - \text{Cantril Ladder} \tag{1}$$

To test the robustness of the results based on the derived PA-LE balance variable, we also construct a standardised PA-LE balance using standardised variables and Eq. (1)[5]. If positive affect is higher than expected based on life evaluation, the result is a positive balance; if negative, the opposite.

Please refer to Tables B4–B6 in the Supplementary Information for robustness tests to ensure that the PA–LE balance is not mechanically driven by differences in scale, variance, or measurement error.

Drawing on dual-process accounts of subjective well-being (e.g., De Boer, 2025), the balance reflects the relative positioning of affective (Type 1) and deliberative (Type 2) processes within individuals. Differences in the balance, therefore, signal differences in how experiential and evaluative systems jointly configure well-being. In this sense, the balance can be interpreted as an index of coherence (or divergence) between fast, experience-based processes and slower, evaluative judgments. The construct, therefore, operationalises the empirical manifestation of the "cheerful discontent" phenomenon, rather than introducing a third independent well-being dimension.

3.3 Predictor Variables/Features

The selection of our features is well grounded in theory (Sect. 2.1) and the existing literature (Sect.2.2). We used 20 features from four categories: subjective, objective, demographic and structural. Please see Table B1 Supplementary Information B for the list of features.

In Table 1, we observe that SSA consistently shows greater dispersion in key features than data from Western countries. For the main outcomes, the standard deviation of life evaluation is markedly higher in SSA (2.66 vs. 1.93), whereas for positive affect, it is slightly higher in SSA than in Western countries (28.41 vs. 27.24), indicating a misalignment in SSA relative to Western countries. At the same time, both negative affect (measured as an index − 31.41 vs. 27.04) and optimism (31.84 vs. 30.50 (index)) also display greater variability.

This broader dispersion (measured by SD) extends to demographics, such as income quintile (1.44 vs. 1.40) and marital status (0.50 vs. 0.49), as well as to several indices and

[5] All models are executed alternating the ordered and standardised balance variables, to test the robustness of the results to scale variance.

Table 1 Descriptive statistics

Category	Variable	Western SD	SSA SD
Main outcomes	Positive affect index	27.24	28.41
	Life evaluation	1.93	2.66
	Negative affect index	27.04	31.41
	Optimism	30.50	31.84
Demographics	Income quintiles	1.40	1.44
	Health problem	0.42	0.45
	Marital status	0.49	0.50
Indices & subjective variables	Satisfaction with the place where you live	26.64	33.66
	Civic engagement	31.26	31.57
	Trust in institutions	33.93	37.01
	Social life	26.75	33.74
	Freedom	0.39	0.45

Source: Authors' own calculations

subjective variables, including satisfaction with the place where you live (33.66 vs. 26.64), trust in institutions (37.01 vs. 33.93), and social life (33.74 vs. 26.75).

Since our dataset covers 39 SSA countries, compared to 27 Western countries in the European Union, this broader cross-country coverage alone introduces greater structural, cultural, and socioeconomic diversity, which likely contributes to the higher variance in PA-LE balance observed in Africa. When combined with within-country variation, this helps explain the pronounced heterogeneity and polarisation in the SSA distribution. Overall, SSA exhibits greater heterogeneity in well-being-related features, as well as in demographic and subjective indicators, reflected in higher variances and standard deviations across variables.

3.4 Methodology

3.4.1 eXtreme Gradient Boosting (XGBoost)

XGBoost is a highly efficient and scalable machine learning algorithm implementing gradient boosting for decision trees. XGBoost is based on the gradient boosting framework, where models are built sequentially, and each new model corrects the errors of the previous one. This process continues until a strong predictive model is formed. It is designed for speed and performance, utilising optimisation techniques that support parallel and distributed computing, making it highly scalable for large datasets. Furthermore, it includes regularisation (L1 and L2) to prevent overfitting. The predictive model is used to construct SHAP values (Sect. 4).

XGBoost has demonstrated greater accuracy than other machine learning methods[6]. For example, Abdurrahim et al. (2020) compared the accuracy of different predictive modelling algorithms and found that XGBoost achieved the highest accuracy, surpassing other methods such as logistic regression, naive Bayes classifier, Decision Trees, and Random Forest.

Our XGBoost model is defined in Eq. (2) as:

[6] Why choose machine learning models rather than traditional econometric models: The affect–life evaluation gap is a nonlinear measure, measured at the individual level, thus we would rather employ machine learning methods that predict the full individual distribution, than traditional econometric models that focus on average conditional effects and impose restrictive linear functional forms.

$$F_M(x) = F_0 + v\beta_1 T_1(x) + v\beta_2 T_2(x) + \cdots + v\beta_M T_M(x) \quad (2)$$

Where M is the number of iterations. The gradient boosting model is a weighted $(B_1 \ldots \beta_M)$ linear combination of simple models $(T_1 \ldots T_M)$. $F_M(x)$ is the PA-LE balance as described in Sect. 3.2.3.

We initially trained the model with default parameters. We refined them using a grid search to achieve the best fit: testing every possible combination of specified parameter values ("grid") with cross-validation to identify optimal hyperparameters.

The different options and the final selected parameter values were as follows. A tree depth of 4 (the smallest Root Mean Squared Error (RMSE)), although we also tested depths of 3, 5, 6, 7, 8, 9 and 10. The regularisation parameters selected for L1 (alpha) and L2 (lambda) were 0.5. We also tested 0, 0.1, 1.0, and 2.0. The number of iterations was set to a maximum of 100 with early stopping if the validation RMSE did not improve for 5 consecutive iterations. The learning rate (eta) was set to 0.3 (at which the model converged well), and the training and testing dataset ratio was 0.8:0.2 (we also tested 0.7:0.3).

For each model, performance is evaluated on unseen (test) data using regression-based fit metrics: Mean Absolute Error (MAE), Mean Squared Error (MSE), and RMSE. These metrics validate the model's predictive power and generalisation to unseen data. The RMSE measures the distance between the predicted and observed (actual/true) values, averaged across observations, using the same units as the dependent variable. See Supplementary Information D for a full discussion on fit metrics.

A good model should show similar performance across both training and test sets, with lower test metrics (smaller errors) indicating better performance[7].

3.4.2 Feature Importance and Interpretation: SHAP Values

To interpret model outputs and provide transparency, we apply SHAP (SHapley Additive exPlanations), which decomposes each prediction into additive contributions from each feature using cooperative game theory principles (Lundberg & Lee, 2017).

SHAP values are computed at the observation level (per individual), and the marginal contribution of each feature is quantified to the predicted PA-LE gap.

In this study, we specifically use:

1. SHAP summary plots, which use mean absolute SHAP values to rank features by their overall importance to the PA-LE balance, independent of directionality.
2. SHAP boxplots, which use the average (mean) SHAP values to show the direction (positive or negative) and magnitude of each feature's effect on the PA-LE balance.
3. SHAP dependence plots, which reveal non-linear relationships and potential threshold points in the effect of each feature.

[7] The Software and libraries used in the analyses are as follows: All analyses were conducted in R version 4.3.3. XGBoost models were estimated using the library [xgboost]. SHAP values were computed using the shap library [SHAPforxgboost}. Data preprocessing and visualisation employed tidyr. Random seed was set to 2025 for reproducibility.

4 Results

In this section, we aim to address the research questions. First, we determine how the PA–LE balance compares to results from previous correlational analyses across regions. Second, we determine the predictors of the PA–LE balance in SSA and compare them with those for Europe. Lastly, we determine what underlies these predictors across regions to explain why SSA is ultimately different.

4.1 PA-LE Balance

To test the previously observed correlation between positive affect and life evaluation in SSA and Western countries (low vs. high), we use the newly constructed PA-LE balance (see Sect. 3.2.3). This single measure will also allow us to capture the magnitude (distribution) and the direction of the misalignment, i.e., whether people are cheerfully discontented or contentedly despairing.

We remind the reader that the balance is derived by subtracting life evaluation scores (0–10) from positive affect scores (scaled from 0 to 10), with a minimum value of -10 and a maximum value of 10. Our robustness tests, examining whether the PA–LE balance is mechanically driven by differences in scale, variance or measurement error (Tables B4–B6 in Supplementary Information B), confirm that it is not. Additionally, we see that the PA-LE balance measure exhibited a nearly normal distribution (skewness = -0.11) with a mean of 1.42 (SD = 3.25), indicating that, on average, positive experiences exceeded life evaluations.

From Table 2, we observe that the mean PA-LE balance is substantially higher in SSA (2.54) compared to other regions (0.63 in Europe and Australia–New Zealand, and 1.79 in North America). Although the balance is positive on average across all regions, the degree of this cheerful discontent is much stronger in SSA. The standard deviation (3.52) indicates markedly greater heterogeneity in SSA compared with the more moderate variability observed elsewhere (SD ≈ 2.5–3.2).

From Fig. 2, we also see that SSA exhibits a consistently higher and more dispersed PA–LE balance compared to Western regions. With a prevalence of 71% in SSA, we confirm that the majority of Africans are indeed cheerfully discontented, meaning that most people feel happier than they evaluate their lives. In contrast, Western countries, with their narrower distributions, show a prevalence of cheerful discontent of approximately 54%, compared to 52.9% in Australia–New Zealand and 55.8% in North America. This pattern holds not only in the pooled dataset but also across time (analysis per year). See Fig. B1 in Supplementary Information B for the density plot illustrating the regional PA–LE balance prevalence.

Table 2 Descriptive statistics of the PA-LE balance in different regions

Region	Observations	Mean	Std. Dev.	Min	Max
Europe	178 721	0.626	2.785	−10	10
Northern America	121 010	1.788	3.187	−10	10
Australia & New Zealand	14 199	0.633	2.500	−10	10
SSA	221 591	2.535	3.523	−10	10

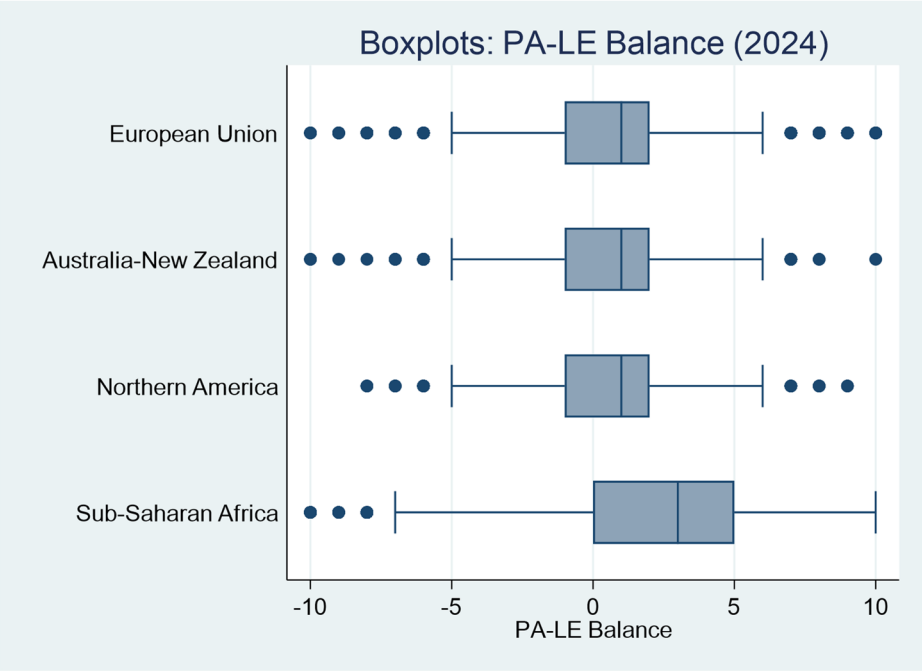

Fig. 2 PA-LE balance by region (2024)

This combination of prevalence (frequency), intensity (mean), and dispersion (SD) underscores the distinctiveness of the African experience, raising questions about why the PA-LE balance in SSA differs from that in Western countries.

In subsequent sections, we chose Europe as our proxy for Western countries given their similar characteristics, i.e., high income levels, high life evaluations, and comparative positive affect. Therefore, Europe is the opposite of what is observed in SSA. However, we ran robustness checks that included North America, New Zealand, and Australia, and the results are very similar. These are available from the authors on request.

4.2 Features Explaining the PA-LE Balance

Next, we determine the predictors of the PA–LE balance in SSA and compare them with those for Europe. However, we will first report on the performance of our predictive model.

4.2.1 Model Performance

For our main XGBoost models predicting the PA-LE balance, we performed grid testing as explained in Sect. 3.4.1. After selecting the optimal hyperparameters, we found that the models demonstrate strong aggregate performance. The predicted and observed (true) means are very close in both SSA and Europe, indicating minimal systematic bias and high macro-level predictive accuracy. For SSA, the mean PA–LE balance gap is 2.54 (true), compared with a mean predicted value of 2.57; for Europe, the corresponding figures are 0.73

(true) and 0.68, respectively. These close predictions suggest that, despite the complexity of SWB data, the models capture the central tendencies of each region with notable precision.

Nevertheless, when evaluated at the individual level, the test metrics do not represent exceptionally low prediction errors. However, they are well below the standard deviation of the dependent variable, implying satisfactory explanatory power. The RMSE values are 3.25 in SSA and 2.67 in Europe, indicating the extent of outliers characteristic of SWB data, particularly the PA-LE balance. Given the outliers, the MAE provides a more reliable measure of fit, with values of 2.57 (SD = 3.52) for SSA and 2.21 (SD = 2.85) for Europe.

Therefore, considering the wide variation in PA-LE balances, the model performance should be evaluated by the closeness of the predicted and observed (true) means rather than by the RMSE and MAE alone. Refer to Fig. B2 in the Supplementary Information for the visual of our true vs. predicted PA-LE balance. Taken together, these results suggest that the models are robust in predicting the feature importance analyses using SHAP values.

4.2.2 Feature Importance

To determine the predictors of the PA–LE balance in SSA and Europe, we consider the absolute mean SHAP values for each feature, which show the absolute importance of each feature. Figure 3 shows the top six features, and we observe that optimism and negative affect (NX) are the most important predictors of PA-LE balance across both regions. In Europe, optimism accounts for 33% (0.72) of the model's average absolute attribution, while negative affect accounts for 30% (0.66), combined explaining more than two-thirds of the PA-LE balance. Similarly, in SSA, optimism explains 31% (0.62) of the model's predictions, while negative affect explains 28% (0.55); combined, these account for nearly two-thirds of the positive balance. Given that the most important features are the same in SSA and Europe, we require further analysis to explain the disconnect in SSA.

To explore this further, we examined the predictive models of positive affect and life evaluation separately for the different regions[8]. In the predictive models of positive affect, we found negative affect to be the most important feature, whereas in the model of life evaluation, optimism was the most important. This establishes a robust cross-regional pattern: negative affect is the most important predictor of positive affective states, whereas optimism is the most important predictor of evaluations of life.

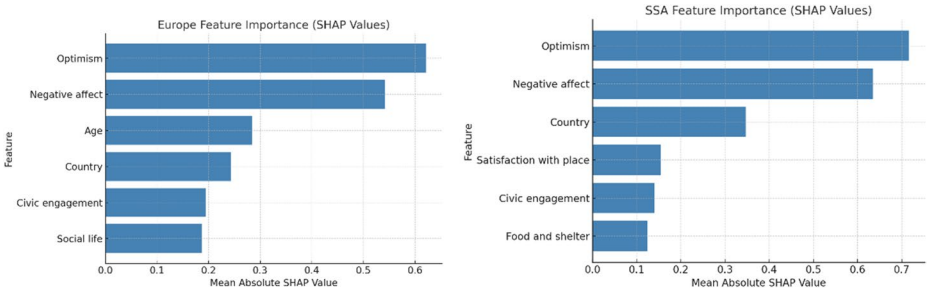

Fig. 3 Magnitude (absolute) of feature importance (mean absolute SHAP values) – Europe (left) and SSA (right)

[8] Results available from authors on request.

This finding resonates with De Boer's (2025) dual-process account (Sect. 2.1), which proposes that deliberative cognition (Type 2) underlies evaluative judgments tied to material expectations, while fast emotional processes (Type 1) safeguard autonomy and shape affective states. In our data, optimism is the most important feature in contributing to our predictive model linked to evaluation, while negative affect reflects the affective pathway, together confirming that the mechanisms highlighted by De Boer can be observed empirically across regions.

4.3 The Case for Explaining SSA

We have established that the core predictors of the PA-LE balance (negative affect and optimism) appear to be universal, yet from Sect. 4.1, we know that SSA shows a more pronounced cheerful discontentment. Therefore, the difference between Europe and SSA does not lie in which features are most important for explaining the PA-LE balance, but rather in what underlies these features. Consequently, we now investigate what predicts negative affect and optimism across regions in order to answer why SSA is ultimately different.

We turn to the SHAP estimations in the mean absolute plots (summary plots) and the mean signed plots (boxplots). We start by comparing the most important factors related to negative affect for SSA and Europe in Fig. 4. Next, we consider and compare the most important features for optimism across the two regions in Fig. 5.

Considering the absolute means, we find that in both regions, health problems followed by a lack of food are the most important features contributing to negative affect (Fig. 4). Considering the mean signed plots (i.e., box plots), we notice greater dispersion in SSA than in Europe, re-emphasising the heterogeneity in SSA. All the features show non-linear contributions, with the distribution of SHAP values crossing the 0-line, implying that in some

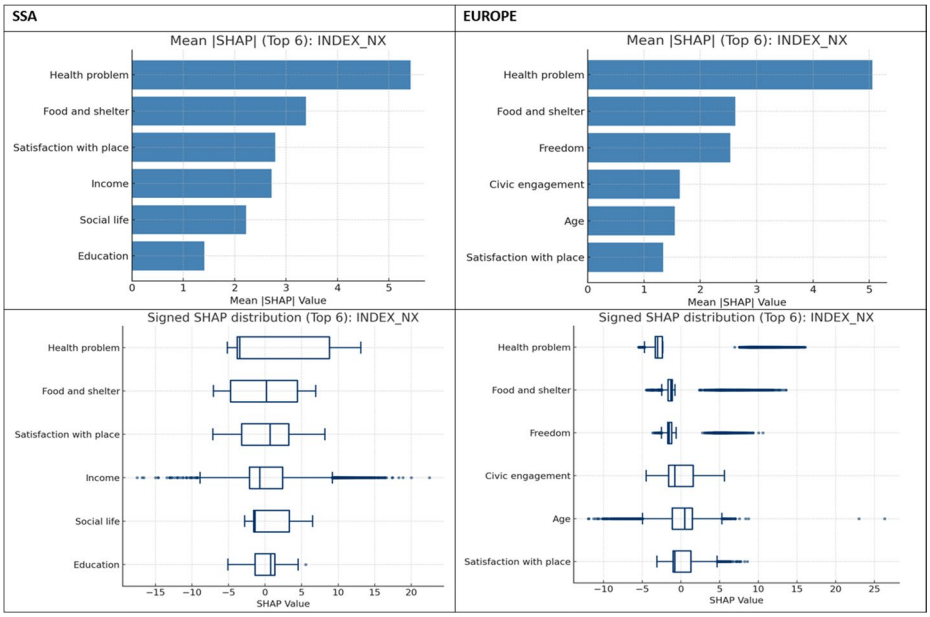

Fig. 4 Negative affect for SSA and Europe

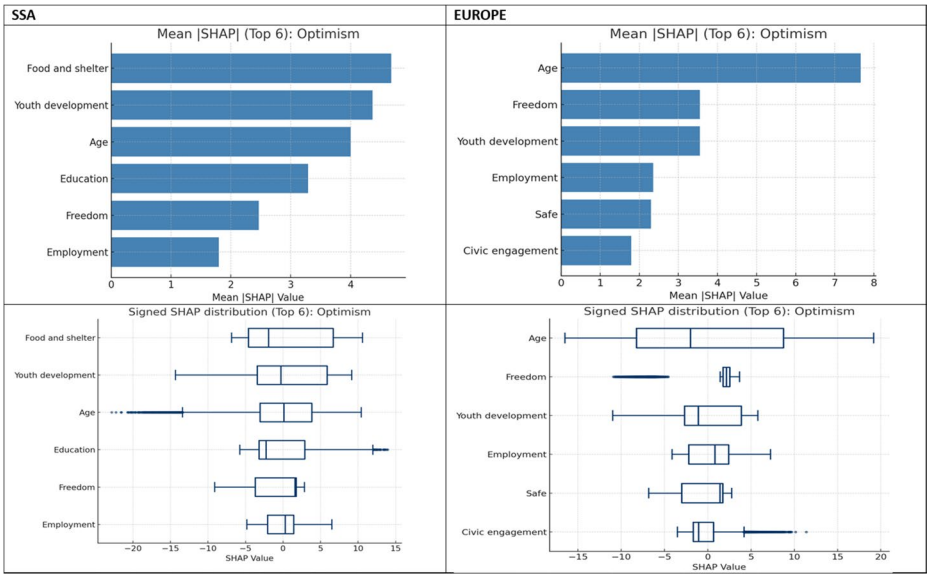

Fig. 5 Optimism for SSA and Europe

instances the feature's contribution increases negative affect, while in others it decreases negative affect. The precise relationship can be determined only by considering the dependency plots. The dependency plots in Supplementary Information C illustrate the marginal contribution of each feature to the model's prediction of negative affect. We note that in both instances, health problems and a lack of food and shelter contribute positively, thereby increasing the predicted negative affect.

In SSA, we see that after the two dominant features, satisfaction with the place where one lives, income, social support and education level matter, the effects are smaller but still important. From our dependency plots (Supplementary Information C), we see that the marginal contributions of dissatisfaction with place, as well as a lack of social support, income, and education, are associated with higher levels of predicted negative affect.

For Europe, other features that matter include freedom, civic engagement, age, and satisfaction with where one lives. The dependency plots illustrate the expected relationship, in which the marginal contributions of freedom, satisfaction with place, and age (with a limited effect for those aged 75 and older) decrease negative affect.

Interestingly, there is one surprising relationship; in Europe, we find that "too much" civic engagement can increase negative affect as the marginal contribution of civic engagement becomes progressively weaker as the index increases and eventually turns negative beyond the mid-point of the scale, showing diminishing returns, possibly reflecting overexposure to collective concerns or social fatigue.

Therefore, the difference between SSA and Europe is the buffering effects of social support and belonging.

In terms of optimism (Fig. 5), we observe that in SSA, the top mean absolute feature, according to the SHAP plots, is the food and shelter index, which is the dominant positive predictor. This means that if basic needs are met, it translates to positive optimism.

Apart from food and shelter, youth development, age, and educational level are also strong predictors in SSA. Freedom and employment are less important predictors of optimism, though still relevant. Considering the mean signed plot, we see what is expected. All the features show non-linear contributions, with the distribution of SHAP values crossing the 0-line, implying that, in some instances, the feature's contribution increases optimism, while in others it decreases it. A lack of food and shelter, as well as youth development opportunities and education, is negatively associated with optimism. In contrast, freedom and employment are positively associated with optimism. Once again, we note greater dispersion of feature values in SSA than in Europe (except for age in Europe, which shows greater dispersion than in SSA).

In Europe, we find that age is the most important feature, according to the mean absolute shape values. It has the largest predictive importance, with a marginal contribution that is, on average, negative below 35 years and positive thereafter. Freedom to make life choices and youth development both show generally positive marginal contributions to optimism. We also note that employment, safety and civic engagement matter but play smaller roles.

We note that SSA has lower levels for the features that are important for increasing optimism. Although we find the expected relationships between the marginal contributions of food and shelter, youth development, education, and freedom in predicting optimism, their average levels are lower than those in Europe. Fewer people have enough food and shelter, are optimistic about youth development, and have the freedom to make choices. This means that the predicted optimism remains low, particularly for individuals with a positive balance.

The above leads us to conclude that individuals in SSA can simultaneously exhibit low negative affect and low optimism due to strong social ties and satisfaction with the place where they live (belonging), which buffers day-to-day negative experiences such as sadness, worry, and stress. This, in turn, enables higher levels of positive experiences. In contrast, resource constraints and low expectations, especially about youth prospects, lower optimism about the future (optimism being the most important predictor of life evaluation).

In summary, Sect. 4 showed that (i) in SSA the PA–LE balance is distributed widely reflecting wide heterogeneity, with roughly two-thirds of the sample being cheerfully discontented, whereas Western countries has a narrower variance with approximately the same number of individuals classified as cheerfully discontented and contentedly despairing, (ii) that optimism and negative affect predict the PA-LE balance in both SSA and Western countries, (iii) SSA is ultimately different because negative affect is systematically lower among individuals reporting stronger social ties and higher satisfaction with place. However, lower levels of food security, youth development opportunities, and perceived freedom are associated with lower predicted optimism.

These results suggest that similar psychological dimensions are central to the PA–LE balance across regions, although their distribution and contextual embedding differ substantially.

Importantly, the distinct SSA pattern does not arise from different predictors of the PA–LE balance. Rather, it emerges from different joint distributions of shared predictors. Optimism and negative affect are central in both regions, but their average levels and dispersion differ markedly. In SSA, relatively low negative affect coexists with comparatively low optimism, whereas in Europe, higher optimism and more tightly coupled affect–evaluation relationships prevail. The paradox of cheerful discontent therefore reflects a distributional configuration within a shared psychological architecture, rather than a fundamentally different well-being mechanism.

5 Discussion and Conclusions

This study contributes to the growing literature on the multidimensionality of subjective well-being by introducing an individual-level measure that captures the alignment or misalignment between affective and evaluative components. While positive affect and life evaluation are positively correlated in SSA, their relationship is much weaker than in Western countries, suggesting a misalignment between how people feel and how they judge their lives, a pattern we refer to as the African well-being paradox. Moving beyond cross-national correlations, we operationalised this apparent disconnect as an individual-level positive affect–life evaluation (PA–LE) balance and examined its distribution and predictors across SSA and Western countries using Gallup World Poll microdata (2013–2024). By modelling the difference between affective and evaluative well-being at the individual level, this study shifts the focus from whether the two components correlate to how they jointly configure SWB across contexts.

Our results show that the misalignment between PA and LE is not merely a weaker correlation in SSA but also a distinct distributional configuration. The PA-LE balance in SSA is both higher on average and substantially more dispersed, with a majority of individuals reporting markedly higher positive affect than life evaluation ("cheerful discontent"). Conversely, in Western countries, the balance is narrowly distributed and more symmetric. This indicates that the African well-being paradox is not simply a matter of lower life evaluation levels, but of how affective and evaluative components jointly configure well-being.

The SHAP analysis shows that optimism and negative affect account for approximately two-thirds of the predicted PA-LE balance across both Western countries and SSA. These results align closely with De Boer's (2025) dual-process framework, in which slow, deliberative cognition shapes evaluative judgments of material conditions, while fast, emotional processes maintain affective stability through perceptions of autonomy and control. In the SSA context, where structural realities constrain optimism, but daily affect remains buffered through social capital and belonging, these dual mechanisms help explain the paradox of "cheerful discontent." Life evaluations follow the deliberative pathway of low economic expectations, while affective well-being reflects the emotional resilience that maintains positive balance despite hardship. In Western countries, by contrast, affect and evaluation are more tightly coupled, and optimism plays a stronger role in shaping life assessments.

For SSA, several policy implications follow from this analysis. First, structural interventions aimed at expanding economic opportunities, particularly for young people, may increase optimism and improve life evaluations. Initiatives such as youth entrepreneurship programs and targeted employment incentives (e.g., the African Union's 1 Million Next Level Initiative) can help lift expectations and improve life evaluations. Second, social interventions should protect and enhance community-based sources of affective well-being, including social cohesion, neighbourhood safety, and local health or faith-based support networks. Strengthening these everyday buffers is essential for sustaining emotional resilience; policies that inadvertently undermine social cohesion could weaken affective resilience without improving evaluative well-being. Only by addressing both economic and social pathways can societies foster environments where people are not only cheerful but genuinely content.

In contrast to SSA, where affective well-being rests on strong social bonds and community life, Western countries can draw lessons from the buffering role of these ties (see also Courchesne et al., 2026). Western societies, where affective well-being often depends on individual achievement and self-expression, may benefit from fostering greater community

belonging and social support, thereby increasing satisfaction with one's place of living. Governments can pursue this through a strategic mix of social, physical, and civic policies. For example, investing in community spaces and infrastructure, or supporting neighbourhood associations, volunteering platforms, and local clubs such as sports, arts, and hobby groups that strengthen communal ties. Greater freedom to make life choices, coupled with lower barriers to participation in local decision-making, can reinforce feelings of belonging and control that are central to affective well-being. Policies that cultivate cohesive, liveable communities and encourage genuine connection can help reduce negative affect and promote more sustainable emotional well-being.

Several limitations warrant consideration. First, the analysis relies on self-reported survey data, which may be subject to cultural response styles. Second, while the XGBoost–SHAP framework enhances interpretability, it remains correlational and cannot establish causal relationships between subjective and structural factors. Third, while the PA–LE balance captures alignment between two components of subjective well-being, it does not encompass eudaimonic or flourishing dimensions.

Future research could extend this agenda in several directions. Comparative studies might test whether similar affect-evaluation disconnects appear when using eudaimonic or flourishing measures, such as those in the Global Flourishing Database (VanderWeele et al., 2025). Longitudinal and multilevel designs could explore how macro-level dynamics, such as economic shocks, governance reforms, or shifts in social cohesion, shape the PA–LE balance over time. Methodologically, hybrid models that combine machine learning with multilevel approaches could better capture both hierarchical data structures and non-linear effects. Longitudinal analyses could further investigate whether cheerful discontent represents a stable configuration or responds dynamically to macroeconomic or institutional change. In addition, future studies could examine whether the PA–LE balance predicts downstream outcomes such as migration intentions, voting behaviour, or civic participation, thereby testing whether affect–evaluation misalignment has behavioural consequences. Finally, advancing the non-WEIRD research agenda (Henrich et al., 2010; Burger & Pang, 2025) requires integrating culturally grounded concepts of well-being and autonomy in African contexts, thereby enriching global theories of happiness and expanding the diversity of well-being metrics beyond Western-centric norms.

In sum, this study reframes the African well-being paradox as a matter of distribution rather than mechanism. The same core psychological dimensions matter across regions, but their configuration differs. Cheerful discontent is best understood not as inconsistency, but as a structurally patterned alignment between resilient affect and constrained expectations.

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Author Contributions TG and SR contributed equally to the manuscript. Therefore, they are joint first authors, and the displayed order of these authors alternates with each subsequent study.

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Data and Code Availability All analyses were conducted in R, and the syntax is available from the corresponding author upon request. The data supporting the findings of this study are available from Gallup; however, restrictions apply to their availability. The data used in this study were obtained under license and are not publicly available.

Declarations

Ethical Considerations This study complies with all relevant ethical regulations. Gallup collected data, and no institutional review board was needed for approval.

Conflicts of Interest The authors have no conflicts of interest to report.

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