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ARTICLE

A statistical meta-analysis of the wellbeing literature

Robert J. Eger · J. Haavard Maridal

Abstract: This study employs an empirical meta-analysis to examine the livability factors of wellbeing and assess each precursor's relative significance. The effect size results of individual studies of existing academic work are pooled by the use of a variety of statistical techniques to determine a meta-effect that yields statistically more significant conclusions and is a more powerful measure in that it has the ability to identify results closer to the true outcomes. The meta-analysis in this paper covers 164 studies and 560 observations published prior to September 2013. After articulating definitions of the central concepts and tenets of the scholarly research on wellbeing, the analysis continues with a literature review identifying recurring factors of wellbeing and the associated correlation. To address the variation in the type of analysis that underlies each study, all studies are converted to an effect size using Fischer's z and then analyzed under the DerSimonian-Laird random-effects model. The results largely confirm the findings in the literature but also reveal some surprises and suggest avenues for future research. The meta-analysis finds empirical support for the dimensions of living standard, health, freedom, personal and community relationships, peace, and security as significant livability factors of wellbeing.

Keywords: philosophy, public policy, eudaimonia, life satisfaction

1. Introduction

The scholarly literature identifies a number of elements as contributors to wellbeing. The purpose of this study, which uses an empirical meta-analysis approach, is to assess the relative significance of the main factors of wellbeing discussed in the literature. The paper begins with a brief introduction to the history of the concept of wellbeing and then articulates definitions of the central concepts and tenets of the scholarly research in the field. A review of the academic literature in this area helps both to explain the dimensions associated with wellbeing and to identify the main components of wellbeing. The paper then describes the meta-analytic techniques employed and identifies methodological limitations before turning its attention to the meta-analysis itself, looking at each livability factor and its associated correlations. The paper ends with a discussion and implications.

1.1 Brief history of the concept of wellbeing

In the past, *happiness* denoted a concept comparable to the term 'objective wellbeing' used today. In ancient Greece, and in both Christian and Eastern wisdom and religious literature, happiness signified a life worth living and the truly happy person pursued virtue over the course of a lifespan. Happiness was a holistic concept in the vein of the Greek poet Hesiod's and the historian Herodotus' *eudaimonia* (a virtuous and flourishing life), the Roman philosopher Cicero's *summum bonum* (the highest good), and the medieval philosopher and theologian Thomas Aquinas' *sublime beatitudo* (the Godly life). Historically, happiness had also been associated with luck, fortune, or divine favor. In this way, it was seen by some as being beyond

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a person's control to a certain extent (McMahon, 2006). Traditional perceptions of happiness began to change on two fronts during the Age of Enlightenment in the 18th century. First, the emphasis on virtue as a necessary path to flourishing and wellbeing was diminished in favor of a focus on pleasure and the absence of pain, something most strongly evident in Jeremy Bentham's (1789) philosophy of Utilitarianism. Second, the pursuit of this new form of happiness was elevated as the principal purpose of human life. As a consequence of these ideas, happiness came to be defined more narrowly—not as wellbeing in a broad and inclusive sense but rather, as in Bentham, as a good feeling.

This relatively new conception of happiness has given rise to a growing body of popular and academic literature seeking to discover how happiness, life satisfaction, and wellbeing are achieved. The academic literature focuses primarily on positive psychology, studying how individuals can feel better, and on economics, trying to understand how people and governments can make welfare-enhancing choices. Despite these focus areas, happiness research is becoming increasingly important in most of the social sciences. Academia and popular literature are not the only clusters of society concerned with wellbeing, however; attempts are increasingly being made by agencies in the governmental sphere to use research on wellbeing to inform policy, with the aim of increasing overall societal wellbeing. An example of this is the United Kingdom's recent efforts in measuring national and personal wellbeing through the Office for National Statistics (Office for National Statistics, 2014).

1.2 Theoretical background

A universal definition of *wellbeing* has somewhat eluded scholars. In the academic and popular literature, the terms *quality of life*, *happiness*, *life satisfaction*, and *prosperity* are often used interchangeably with wellbeing. However, as statistical analysis of population surveys and dictionary definitions suggest, these terms differ in their nuances. *Happiness* is increasingly used to describe momentary pleasant emotions, while *life satisfaction* is used to refer to long-term cognitive evaluation of life as a whole, a sort of deeper happiness. *Prosperity*, on the other hand, tends to be used in discussions of tangible economic conditions. Sociologist Ruut Veenhoven, considered by some to be the father of happiness studies, has argued that *wellbeing* should be used to denote quality of life overall (Frisch, 2013).

This study defines wellbeing as a composite of the two underlying concepts of happiness and life satisfaction. Although this definition has roots in ancient literature, as exemplified by Thomas Aquinas' delineation of *sublime beatitudo* (McMahon, 2006), Bradburn and Noll (1969) may have been the first modern scholarly work to emphasize the idea that wellbeing is composed of both evaluative and joy- or pleasure-based effects. Campbell, Converse, and Rodgers (1976) drew a contrast between life satisfaction and happiness, describing the former as "a judgmental or cognitive experience" and the latter as "an experience or feeling of affect" (p. 8). In this vein, Lane (2000) argued that happiness represented a marginal emotional change. Further support for this distinction can be found in Diener, Kahneman, Tov, and Arora (2010); Helliwell, Barrington-Leigh, Harris, and Huang (2009); Kahneman (1999); and Lucas, Diener, and Suh (1996). A quick analysis of self-report surveys supports the distinction between happiness and life satisfaction: the correlation between the two concepts in the World Values Survey (1981–2005) is only .47, for example, signifying that the two are different, albeit related, concepts. Along these lines, as the terms are used in this study life satisfaction describes a cognitive judgment and happiness refers to an emotional state.

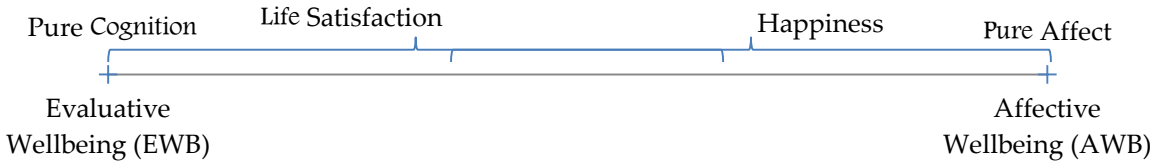
1.3 Evaluative wellbeing and affective wellbeing

Scholarly research increasingly uses the terms *evaluative wellbeing* (EWB) and *hedonic wellbeing* (HWB). In Kahneman and Deaton (2010) and Graham (2010), EWB is defined as a global, contemplative, long-term assessment, a state of wellbeing that is reflective of one's sense of quality of life—not at a given point in time but rather over the course of one's life. HWB refers to a person's present, and potentially more transient, state of wellbeing as measured by the positive or negative affects experienced immediately or daily.

In this study, however, preference is given to the term *affective wellbeing* (AWB) in place of HWB to describe a person's present or experienced state of wellbeing. The concern is that *hedonic* is not an accurate descriptor for experienced wellbeing because one's momentary, experienced feelings and emotions are not necessarily concerned solely with pleasure. Rather, it is possible for them to stem instead from a deep inner joy as explained by the Greek concept of eudaimonia, Cicero's expression of the *summum bonum*, or Thomas Aquinas' *sublime beatitudo*. According to this understanding, one's present wellbeing derives not only from bodily pleasures but also from personality traits and temperaments, including prudence (according to Aristotle's *Ethics*, book 9 and 10) (Rackham, 1934), personal choice (Seligman, 2002a, 2002b), and states of mood that may be hereditary or genetically determined (Lykken, 1999).

As depicted in Figure 1 below, EWB and AWB can be imagined as a continuum, with EWB on the pure cognitive, evaluative end and AWB on the pure immediacy, affective end. Life satisfaction is more closely aligned with the former and immediate or experienced happiness with the latter.

Figure 1: Wellbeing—Life Satisfaction and Happiness on the EWB—AWB



EWB and AWB both emanate from two primary categories of sources: *livability* and *lifeability*. Livability denotes environmental, societal factors, in which a person finds himself or herself, and lifeability describes the internal, personal dynamics that enable this person to benefit from his or her environment.

Scholarly literature distinguishes between *subjective* and *objective wellbeing* (Arneson, 1999; Parfit, 1984; Scanlon, 1993; Sumner, 2003). Subjective wellbeing (SWB) refers to a person's particular experience of his or her own life and can be measured through self-report methods such as population surveys. Objective wellbeing (OWB) consists of a list of quantifiable social or economic indicators that a scholar theorizes are determinants of quality of life (Sen, 1999).

In SWB surveys, questions can range from the very long-term and evaluative (EWB) to the very immediate and emotional (AWB). Responses to questions like those in Cantril's self-anchoring ladder (1965) fall on the extreme EWB side of the EWB-AWB continuum and are more strongly correlated with life satisfaction.[1] AWB questionnaires measure respondents' present affects. These questions may use a positive and negative affect schedule (Watson, Clark, &

[1] A typical question measuring life satisfaction might ask: "All things considered, how satisfied are you with your life as a whole these days? Use a scale from 1–10 where 1 means you are 'completely dissatisfied' and 10 means you are 'completely satisfied.'"

Tellegen, 1988), which falls on the extreme AWB side of the continuum and responses correlate more strongly with happiness.[2] Table 1 below presents a classification of the concepts introduced thus far.

Table 1: Classification of Wellbeing Concepts

Subjective Variables Of Wellbeing (SWB)		
Underlying Concept	**Life Satisfaction (EWB)**	**Happiness (AWB)**
Level Of Perception	Cognitive, evaluative, reflective, long term	Emotional, mood or affect-based, sensory, short term
Potential Measurements	Cantril's self-anchoring ladder, questionnaire (scale from 1–10)	Day reconstruction method, positive and negative affect schedule (PANAS)
Objective Variables Of Wellbeing (OWB)		
Concept	Livability dimensions (environmental, external factors)	Lifeability dimensions (individual, internal factors)
Elements	Friends, family, peace, freedom, health, income, wealth, opportunity, etc.	Degree of purpose and meaning to life, attitudes, life choices, heredity[3]
Potential Measurements	Numerical indicators of income, health, family, crime, etc.	Brain-scanning, revealed preferences, questionnaires

2. Literature review

Using the theoretical classification, this study's focus is on factors of wellbeing that stem from livability. To explore the extant literature on the factors of livability, six groupings are identified through a review of the academic literature on wellbeing. These groupings are living standard; health and environment; freedom; community and relationships; peace and security; and opportunity.

2.1 Living standard

The factor 'Living standard' is concerned with the material resources available to people in a society and is often measured through economic and financial indicators. The *living standard effect* is at the center of Jeremy Bentham's (1789) economic utility theory and a substantive component of Maslow's (1943) hierarchy of needs. Economic utility theory suggests that as individuals gain income and wealth, they gain purchasing power, which expands the bundle of goods they can afford, leading to increased consumption and, ultimately, improved wellbeing. Considerable disagreements exist in the literature regarding the degree to which income and wealth contribute to wellbeing. Currently, the science seems to have settled on an understanding that the cognitive evaluation of one's life (i.e., one's life satisfaction) is considerably and positively impacted by increases in living standard, while happiness is impacted only up to medium income levels (approximately $75,000 according to Kahneman and Deaton (2010)). Increased financial

[2] It is important to emphasize that the difference between happiness and life-satisfaction is also determined by the way questions are framed in the surveys. A question measuring happiness that would fall closer to the AWB side of the continuum is: "Presently, would you describe yourself as: (1) Very happy, (2) Rather happy, (3) Not very happy, or (4) Not at all happy?"

[3] Determined by genetic factors and therefore able to be passed on from parents to their offspring or descendants.

resources can, however, impact people's wellbeing through means other than direct consumption. Dunn, Aknin, and Norton (2008) found that spending money on other people created more happiness than did spending money on oneself, a finding supported by Zak (2011). Income is also highly correlated with health and, to a certain degree, with opportunity.

2.2 Health and environment

The factor 'health and environment', as related to wellbeing, deals with the prevailing physical, mental, and environmental conditions for individuals in a society. Although Graham (2008) and others have pointed out that people adjust surprisingly well to both negative and positive changes in their health, research has found wellbeing is greater for people who enjoy good physical and mental health. Research supporting this hypothesis includes Bee and Bjorklund (2000); Dolan and White (2007); Heylighen (1999); Katsaiti (2012) and Kushner and Foster (2000). Research, however, has found health and wellbeing is a non-recursive system. Blakeslee and Grossarth-Maticek (1996) showed that wellbeing is highly predictive of future good health. Some of the objective indicators of health identified in the literature include life expectancy, undernourishment, suicide rates, positive experiences, mental and physical suffering, and air, water, and sanitation quality.

2.3 Freedom

Freedom concerns the extent to which people are in control of their own lives. Sen (1999) was among the first to propose that freedom is a "bundled commodity" consisting of political, economic, civil, and religious categories. The magnitude of freedom can be measured by the degree to which there is respect for political, civil, religious, and economic freedoms in a society as well as by people's perceptions of these freedoms. Triandis and Gelfand (1998) say that although absolute freedom in all areas may be counterproductive, dynamic social systems and cultures have a tendency to combine a sense of social responsibility and solidarity with a high degree of freedom for people to follow their personal moral compasses to make key choices for themselves. Gundelach and Kreiner (2004) and Verme (2007) find freedom to be the component possessing the overall strongest correlation to wellbeing. Other research supporting the correlation between increased wellbeing and freedom in general includes Heylighen (1999), Brooks (2008a, 2008b), and (Veenhoven, 2008, 2012). More specifically, Diener, Diener, and Diener (1995) found that political freedom and civil liberties enhance wellbeing, while Gropper, Lawson, and Thorne (2011) found that economic freedom augments wellbeing.

2.4 Community and relationships

The factor 'community and relationships' relates to the quality of the community, family life, and friendships in a society. According to social causation theory (Joung, 1997; Mastekaasa, 1992), community and family relations increase wellbeing by providing emotional and financial support to the individual. This support serves as a buffer against the travails of life, thereby preserving or increasing wellbeing. The empirical literature has found that deep human interactions are directly beneficial to the individual's emotional state and feeling of wellbeing. There is also an indirect effect through higher social capital and lower transaction costs that leads to economic growth and an increased standard of living. Empirical support for the importance of close-knit community interaction for wellbeing can be found in Stolle (1998), Putnam (2000), Guiso, Sapienza, and Zingales (2006), and Zak (2011). Religious engagement as a precursor for higher wellbeing has been identified by Lim and Putnam (2010), Winkelmann and Winkelmann

(1998), Ellison and Levin (1998), Diener and Suh (1997), Veenhoven (1996), Wilson (1967), Helliwell (2008), and Inglehart (2010). Drummond (2000), Plagnol and Easterlin (2008), Helliwell and Putnam (2004), Diener, Gohm, Suh, and Oishi (2000), Kahneman and Krueger (2006), and Veenhoven (2012) provide support for marriage and family life as important aspects of people's wellbeing.

2.5 Peace and security

The factor 'peace and security' relates to sources of instability in a society such as the level of violence and crime; and also to trust, transparency, corruption, and bureaucratic quality, or efficiency. In addition to community and freedom, peace is one of those factors humans need in order to thrive. Competent governance, in the sense of the minimization of violence, crime, corruption, and cronyism, fosters a peaceful society. Research that has found some of the foregoing impact wellbeing includes Oishi (2012), Oishi and Roth (2009), Inglehart (1990), Frey and Stutzer (2000), Inglehart and Klingemann (2000), and Diener, Inglehart, and Tay (2013).

2.6 Opportunity

Opportunity is concerned with people's access to things like community basics (i.e. workable infrastructure) education, employment, and entrepreneurship that enables them to live satisfying and happy lives. The link between opportunity and wellbeing on a societal level is a highly mobile economic and social environment. A society with high levels of opportunity is an environment that does not discriminate. It is one that allows equal prospects for all when it comes to pursuing the good life. As such, the factor 'opportunity' is closely related to the factors 'freedom' and 'living standard'. The opportunity to work, satisfaction with one's job, and the prospect of pursuing entrepreneurial undertakings have been found to be strong explanatory factors of wellbeing according to Frankl (1963), Brooks (2008a, 2008b), and Murray (1988), among others. Opportunity is especially important to the underprivileged, and poverty sometimes results from a lack of opportunity. Research supporting the link between poverty and wellbeing includes Biswas-Diener and Patterson (2011), Marshall et al. (2001) and Oishi, Kesebir, and Diener (2011). According to Meulemann (2001), education might also be an important driver of opportunity.

3. Methodology

The theoretical background and scholarly literature support the operationalization of these six categories. The review of the scholarly literature introduced the reader to the most recurring findings based on these groupings. It provides an opportunity to explore and test, through a meta-analysis, the linkage of these livability aspects with wellbeing.

By offering the opportunity to combine evidence from retrospectively accumulated or prospectively generated data, meta-analysis is an important research tool that increases statistical power by combining results from studies that have similar or related research hypotheses. The effect size results of individual studies are pooled by use of a variety of statistical techniques to determine a meta-effect, which is a more powerful measure of the outcome. In addition to increased statistical power, other advantages include greater generalizability and increased ability to do multifactor analyses. Using meta-analysis shifts the focus from an individual study's statistical significance towards the true effect size.

The meta-analysis in this paper was performed by first asking whether the factors identified in the literature impact wellbeing. A systematic literature search was performed based on the

specified factors. Several search techniques were used to retrieve studies for inclusion. Articles written in a language other than English were considered if they had been translated into English. Identification was achieved through electronic library databases including JSTOR, ProQuest, Web of knowledge, and Dissertation Abstracts International, the Web-based search engine Google Scholar, and the Web-based World Database of Happiness (Veenhoven, 2013). Computerized searches involved multiple combinations of terms reflecting wellbeing (life satisfaction, satisfaction with life, happiness, quality of life, emotional wellbeing, subjective wellbeing, and wellbeing).

The studies identified as relevant were then reviewed and, when inclusion/exclusion criteria were deemed similar, graded for quality. Judgments about the quality of studies was based on design, follow-up, and outcome assessments. The inclusion/exclusion criteria for the selection process were as follows:

1. The study must involve participants of working age who reside within the geographic location investigated;
2. The study must include a nationally representative sample;
3. A measure of wellbeing must be clearly defined;
4. An objective measure of at least one of the proposed factors within the literature on livability must be present; and
5. The study must be publically available with results presented in a correlation or a convertible metric that is conducive to computational conversion into an effect size.

Meta-analysis is particularly influenced by the external validity of each of the examined studies. Here, external validity refers to the generalization of research findings either from a sample to a larger population or to settings and populations other than those studied. To address external validity, assessment is based on (1) the extent to which empirical measures accurately reflect the stated theoretical constructs, (2) whether the research setting conforms to the scope of the theory under test, (3) a subjective assessment regarding confidence that the findings presented may be repeated under identical conditions, and (4) the confirmatory status of the theory under test. In these ways, external validity is principally seen as a theoretical issue and can be addressed only by an examination of the interplay between theory and methods.

All potentially relevant studies published or posted through September of 2013 were considered for inclusion. Every attempt was made to be inclusive; however, the criteria for inclusion and exclusion does not guarantee that every relevant study is identified using these criteria. Selected articles were then abstracted.

3.1 Fixed effects (FE) vs. random effects (RE)

Given that meta-analysis is the focus of this study, the distinction between fixed effects (FE) and random effects (RE) models is a critically important topic because there is a strange anomaly in the behavioral and social sciences today. The anomaly is the fact that although the FE models are almost never appropriate, the majority of published meta-analyses in social science in general and some related areas have been based on FE models. This is not the case in either the industrial and organizational psychology literature and certain other literatures such as management studies, organizational behavior, and business strategy (Hunter & Schmidt, 2000).

Inference under a meta-analysis framework indicates that if there is real variation in population parameters across studies, the FE model not only cannot detect this variation, but also produces confidence intervals (CIs) that are erroneously narrow. That is, the FE model greatly underestimates the amount of uncertainty in the estimated mean value. Of course, the FE

model produces accurate results when there is zero variance across studies in the population values. The problem is that there are few if any study sets that meet this condition (Hunter & Schmidt, 2000). On the other hand, RE models produce accurate results in both cases: when there is and is not variation in study population values.

Evidence of the anomaly and of the use of FE models is explored in (Schmidt, Oh, & Hayes, 2009). Using two different RE methods to reanalyze the data from five FE-based meta-analysis publications in *Psychological Bulletin* that included a total of 54 separate meta-analyses, they found that the average level of underestimation of the width of the CIs by the FE models was 55%. That is, the FE CIs are, on average, less than half as wide as the actual CIs. This amounts to a very serious overestimation of the degree of certainty of the mean effect sizes. Hence, the use of FE models instead of RE models does not lead to merely technical anomalies. It leads to major errors.

Hedges and Vevea (1998) and Overton (1998) point to a possible reason for the use of FE methods. They suggest that the choice of a FE or RE model depends on the type of inference that is the goal of the meta-analysis. If the goal is to draw conclusions that are limited to the set of studies at hand, and there is no desire to generalize beyond the particular set of studies included in the analysis, the FE model can be used when population parameters vary and when they do not. Hedges and Vevea (1998) refer to this as conditional inference. The usual goal of research, however, is generalizable knowledge (Toulmin, 1961), which requires generalization beyond the current set of studies to other similar studies that have been or might be conducted. Hedges and Vevea (1998) refer to this as unconditional inference.

The objective of this meta-analysis is to make unconditional inferences about a wide population of studies; that is, to draw conclusions that can be generalized beyond the specific set of studies included in the presented meta-analysis. The methodological purpose, therefore, is to reach conclusions that are not limited to the specific set of studies in the meta-analysis, because the set of studies at hand is viewed as a sample of a larger number of studies that might exist or could be conducted (Hedges & Vevea, 1998; Hunter & Schmidt, 2000; Overton, 1998; Murray et al., 1994). In this case, generalization of conclusions is an important aspect of the study and the RE model is offered in the analysis, i.e., the inference of cumulative knowledge (Field, 2005; Hedges & Vevea, 1998; Murray et al., 1994).

To address variation in the type of analysis that underlies each study, all studies are converted to an effect size using Fischer's z and then analyzed under the DerSimonian-Laird random-effects model. This model assumes heterogeneity between the studies; that is, it assumes that the true effect can be different for each study. The model assumes that the true effects of individual studies are distributed with a variance τ^2 around an overall true effect, but the model makes no assumptions about the form of the distribution of either the within-study or the between-studies effects.

3.2 Addressing publication bias

Once a study included in this meta-analysis has been subjectively assessed for external validity, based on both statistical methods and theory, the results and implications of that study are assessed for publication bias. Publication bias is the term for what occurs whenever the research that appears in the published literature is systematically unrepresentative of the population of completed studies. Simply put, when the research that is readily available differs in its results from the results of all the research that has been done in an area, readers and reviewers of that research are in danger of drawing the wrong conclusion about what that body of research shows.

Although publication bias has likely been around for as long as research has been conducted and reported, it has come to prominence in recent years largely with the introduction and widespread adoption of the use of systematic review and meta-analytic methods to summarize research. In part, this is because, as methods of reviewing have become more scientific and quantitative, the process of reviewing (and synthesizing) research has been increasingly seen as paralleling the process of primary research. Parallels to the threats to the validity of primary research have been uncovered at every step of the systematic review process (Cooper, 1998; Shadish, Cook, & Campbell, 2002). Publication bias is a non-trivial issue. Evidence that publication bias has had an impact on meta-analyses has been firmly established by several lines of research (Rothstein, Sutton, & Borenstein, 2005). Thus, a problem that was viewed hazily through the looking glass of traditional reviews came into sharp focus under the lens of meta-analysis.

To address the threat of publication bias, this study uses the Egger, Smith, Schneider, and Minder (1997) regression method, which tests for a linear association between the intervention effect and its standard error. Alternative methods, such as that of Begg and Mazumdar (1994), which proposed testing the interdependence of variance and effect size using Kendall's method, may also be applicable in testing for publication bias. Although Begg and Mazumdar (1994) make fewer assumptions than do Egger et al. (1997), the method of Begg and Mazumdar (1994) is insensitive to many types of bias to which the test of Egger et al. (1997) is sensitive. As suggested by Sterne, Gavaghan, and Egger (2000), in cases where the number of studies in the meta-analysis is small, the Begg and Mazumdar (1994) method has very low power to detect bias. Given the number of studies available for several of the livability factors in this meta-analysis, the Egger et al. (1997) test for publication bias was used.

3.3 Descriptive results

Table 2 below reports the descriptive count of the studies meeting the criteria of inclusion in the meta-analysis. The total count of observation is 560 with 164 unique studies identified. This indicates that on average each study contributed about 3.4 observations. In the meta-analysis, each country or geographical area that is uniquely identified is considered an observation. This is not to say that each unique study provides information on a single geographical entity; in fact, many of the uniquely identified studies may offer generalizable information. Unique studies may also offer multiple components or factors that are independently assessed.

Table 2: Study count

Number of Observations	560
Number of Unique Studies	164

Table 3 below reports the tests for validity based on publication bias using Egger et al. (1997). Using p-values, the results indicate the presence of potential publication bias for one of the components, GDP per capita, at the conventional $p = 0.05$ level. This analysis is presented to assist in formulating overall inferences for each of the livability factors presented above.

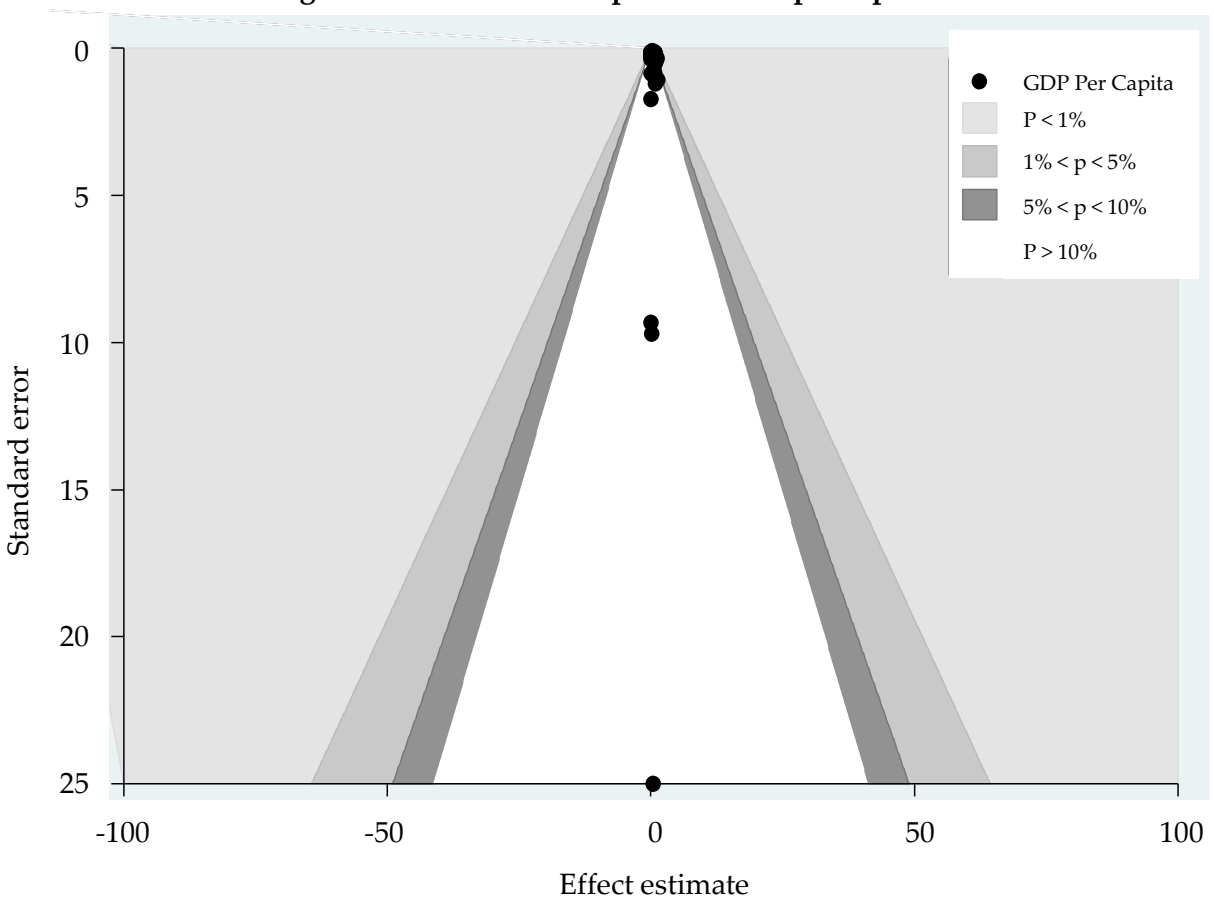
Table 3: Publication Bias Test using Egger et al. (1997)

	Publication Bias (p-value)
Living standard	
Current living standards	
GDP per capita (PPP adjusted, real, and logged)	p = 0.03
Are you satisfied or dissatisfied with your standard of living, all the things you can buy or do?	p = 0.10
Improvement in living standards	
5-year growth rate of GDP per capita	p = 0.89
Right now, do you feel your economic situation is getting better or getting worse?	p = 0.28
Freedom	
Political rights	p = 0.21
Civil liberties	p = 0.35
Economic freedom	p = 0.19
Overall perception of freedom: Are you satisfied or dissatisfied with your freedom to choose what to do with your life?	p = 0.99
Health and environment	
Physical health	
Life expectancy at birth	p = 0.33
Infant mortality rate	p = 0.07
Mental and emotional health	
Suicide rate	p = 0.21
Environmental health	
Air quality	p = 0.67
Community and relationships	
Community life	
Religious engagement	p = 0.75
Family life	
Are you married?	p = 0.10
Peace, stability and security	
Political and ethnic violence	
Violence and ethnic warfare	p = 0.09
Human rights violations	p = 0.33
Trust in national institutions	p = 0.89
Corruption in business and government	
Control of corruption	p = 0.42
World indexes: Corruption index	p = 0.58
Bureaucratic quality	p = 0.23
Opportunity	
Unemployment	p = 0.80

The concern in Table 3 above is the component GDP per capita, which is one of the underlying components of the factor of livability, 'Living standard'. GDP per capita has 50 studies associated with it, as offered in Figure 2 below. The visual assessment of these 50 studies identifies an asymmetric outcome. The asymmetry indicates strong evidence that studies with a one-sided

significance test are suppressed and those with a two-sided significance test are not. This adds further credence to the possibility that the asymmetry observed in the contour plot offered in Figure 2 below is caused by publication bias.

Figure 2: Contour funnel plot for GDP per capita



4. Meta-analysis results

Based on this study's theoretical discussion, there are three effect sizes offered in these meta-analyses. The first effect size, WB, is a measure of the correlation with wellbeing ignoring differences associated with affective wellbeing represented by happiness (AWB) and evaluative wellbeing represented by life satisfaction (EWB). The second measure of correlation uses affective wellbeing (AWB) alone. As discussed, AWB is closely related to an immediate state of wellbeing that is reflected in one's current emotional state. The data show that 132 of the 560 observations can be considered AWB studies. The third effect size offered in the meta-analysis is articulated as evaluative wellbeing (EWB). EWB is advanced as a cognitive, reflective state where individuals evaluate their wellbeing over longer periods of time. In the data, 428 observations are categorized as EWB. In addition to the three effect sizes, the 95% confidence intervals (CI) and the observation counts are reported. Appendix A provides a listing of all the studies associated with the meta-analyses.

4.1 Living standard

The analysis for the first factor of livability, 'Living standard', is presented in Table 4. From a wellbeing perspective, several components underlie 'Living standard' in the literature. Two of these are *Current living standard* and *Improvement in living standard*. Within Current living

standard, an objective measure and two subjective measures are offered in the literature. The objective measure, GDP per capita, has 50 observations in the prior literature. Measures of GDP per capita include adjusted and real; for example, Samanni and Holmberg (2010) and Fahey and Smyth (2004), respectively. The effect size for all 50 observations is a correlation of 0.53 with wellbeing and is statistically significant with a CI lower limit of 0.47 and an upper limit of 0.58. When considering AWB and EWB, the correlation is stronger with EWB and the CI is narrower, providing some evidence that the effect of income and wealth is stronger when the individual considers his or her life satisfaction (wellbeing over time) than it is for happiness (one's emotional state), a result supporting Kahneman and Deaton (2010). For *Current living standard*, the prior literature has measured only the subjective question, "Are you satisfied or dissatisfied with your standard of living, all the things you can buy or do?" as a component. Examples in the prior literature include Andrews and Withey (1976) and Headey, Veenhoven, and Wearing (1991). Sixty-four observations are found for this subjective component with a mean correlation of 0.34, a weaker correlation than found for the objective measure, GDP per capita. The results indicate that EWB has a stronger correlation than is found with AWB, with EWB having a narrower CI.

Table 4: Livability Factor—Living standard

	Average Effect Size (correlation)			95% Confidence Interval			Number of Observations		
	WB	**AWB**	**EWB**	**WB**	**AWB**	**EWB**	**WB**	**AWB**	**EWB**
Current living standards									
GDP per capita (PPP adjusted, real, and logged)	0.53	0.39	0.58	0.47, 0.58	0.28, 0.48	0.51, 0.64	50	14	36
Are you satisfied or dissatisfied with your standard of living, all the things you can buy or do?	0.34	0.24	0.37	0.31, 0.36	0.17, 0.30	0.33, 0.40	64	16	48
Improvement in living standards									
5-year growth rate of GDP per capita.	0.03	-0.14	0.09	-0.04, 0.10	-0.26, -0.0	0.02, 0.16	41	10	31
Right now, do you feel your economic situation is getting better or getting worse?	0.09	0.17	0.00	0.01, 0.17	0.09, 0.24	-0.09, 0.10	8	4	4

Within *Improvement in living standard*, an objective measure and two subjective measures are offered. The objective measure, 5-year growth rate of GDP per capita, which is the chosen proxy for Improvement in living standard, contains 41 observations in the prior literature. Statistical

significance is found for both AWB and EWB, although the correlations are in opposite directions. For AWB the 5-year growth rate is negatively associated with immediate happiness, which is quite possible given that the 5-year growth rate is measuring a reflective aspect of wellbeing. The finding, however, may support Graham's (2010) thesis of short-run "unhappy growth." The same observation holds true for the positive correlation between EWB and the 5-year growth rate, which signals that the reflective measure is positively correlated with the reflective measure of wellbeing. The effect size for wellbeing is a statistically insignificant correlation of 0.03. This is most likely due to the reflective nature of the 5-year growth rate in which AWB and EWB are pulling the wellbeing outcome in different directions. For *Improvement in living standard*, the prior literature has measured only the subjective question, "Right now, do you feel your economic situation is getting better or getting worse?" as a component. Eight observations are found for this subjective component with a mean correlation of 0.09, a stronger correlation than found with the 5-year growth rate of GDP per capita. The results indicate that AWB has a stronger correlation than is found with EWB, with EWB found to be statistically insignificant. The result is to be expected as the variable addresses people's personal changes in income.

4.2 Freedom

The analysis for the livability factor, 'Freedom', is presented in Table 5. Four components are identified and used in the prior literature. Within 'Freedom', *Political rights* is offered in the prior literature. The effect size for all 28 observations for *Political rights* is a correlation of 0.16 with wellbeing. This correlation is statistically significant with a CI lower limit of 0.08 and an upper limit of 0.24. When considering AWB and EWB, the correlation is weaker with EWB, providing some evidence that *Political rights* is stronger when individual wellbeing is considered as happiness.

Table 5: Livability Factor—Freedom

	Average Effect Size (correlation)			95% Confidence Interval			Number of Observations		
	WB	**AWB**	**EWB**	**WB**	**AWB**	**EWB**	**WB**	**AWB**	**EWB**
Political rights	0.16	0.22	0.14	0.08, 0.24	0.08, 0.34	0.05, 0.24	28	6	22
Civil liberties	0.23	0.28	0.22	0.14, 0.32	0.11, 0.43	0.11,0.31	23	6	17
Economic freedom	0.35	0.35	0.35	0.26, 0.42	0.16, 0.52	0.24, 0.43	28	4	24
Overall perception of freedom: Are you satisfied or dissatisfied with your freedom to choose what to do with your life?	0.24	0.19	0.28	0.18, 0.28	0.14, 0.24	0.20, 0.35	21	10	11

The next component of 'Freedom' is *Civil liberties*. Twenty-three observations are found for *Civil liberties* with a mean correlation of 0.23. The results indicate that EWB has a weaker correlation than is found with AWB based on magnitude, although EWB has a narrower CI. The component *Economic freedom* has an average correlation with wellbeing of 0.35. The correlation is consistent across both AWB and EWB, with EWB and wellbeing reflecting similar CIs. The final component

of 'Freedom' that is observed in the prior literature is *Overall perception of freedom*. The average correlation for *Overall perception of freedom* is 0.24 with EWB showing the strongest correlation. In the literature, limitations exist on the correlation between wellbeing and religious freedom due to a lack of longitudinal data on religious freedom.

4.3 Health and environment

Three components are identified as underlying the third livability factor, 'Health and environment'. Beginning with *Physical health*, two sub-components are present in the extant literature. *Life expectancy at birth*, in Table 6, shows a statistically significant average correlation of 0.11 with wellbeing. The strongest correlation for Life expectancy at birth is found with AWB, with an average correlation of 0.27. The reported correlation for *Infant mortality rate* is -0.14, indicating that as infant mortality increases wellbeing decreases. All studies found in the extant literature using the criteria offer only EWB when estimating the effect of wellbeing and infant mortality. Studies measuring the relationship between overall *Mental and emotional health* in a society and its overall wellbeing are sparse in the existing literature. The empirical findings focus on *Suicide rate*. This component has the fewest studies meeting the inclusion criteria of all the components found in the literature reviewed for this meta-analysis. The negative correlation of 0.14 is bolstered by a single study associated with EWB that shows a correlation of -0.25. If that study is ignored, as shown in the AWB column, the resulting correlation of Suicide rate with wellbeing is statistically insignificant. The final component underlying the livability factor 'Health and environment' is *Environmental health*. Of the three sub-components of health identified in academic works, only one sub-component, *Air quality*, is measured in the extant literature. Although the correlation for this sub-component is -0.03, the outcome is a statistically insignificant correlation.

Table 6: Livability Factor—Health and environment

	Average Effect Size (correlation)			95% Confidence Interval			Number of Observations		
	WB	**AWB**	**EWB**	**WB**	**AWB**	**EWB**	**WB**	**AWB**	**EWB**
Physical health									
Life expectancy at birth	0.11	0.27	0.02	0.07, 0.16	.012, .041	0.01, 0.04	15	5	10
Infant mortality rate	-0.14		-0.14	-0.24, -0.02		-0.24, -0.02	6	0	6
Mental and emotional health									
Suicide rate	-0.14	-0.11	-0.25	-0.04, -0.23	0.00, -0.22		5	4	1
Environmental health									
Air quality	-0.03		-0.03	-0.15, 0.09		-0.15, 0.09	6	0	6

4.4 Community and relationships

The analysis for the fourth livability factor, 'Community and relationships', is presented in Table 7. In academic works two major components are identified that relate to 'Community and relationships', *Community life* and *Family life*. Table 7 presents both components, noting that *Community life* contains Religious engagement only. Unfortunately, longitudinal data does not exist for secular community engagement in the literature used in the meta-analysis. Religious engagement is significantly positively correlated with wellbeing for EWB. The effect size of

Religious engagement is insignificant for the AWB studies. Given the relatively small number of observations from AWB studies, the statistically significant correlation for wellbeing results is dominated by the EWB studies overall. The component *Family life* has one sub-component, Are you Married?, which meets the criteria for this study. Are you Married? is positively correlated with all the wellbeing measures, with a correlation of about 0.06 (WB) and a CI lower limit of 0.03 and an upper limit of 0.08.

Table 7: Livability Factor—Community and relationships

	Average Effect Size (correlation)			95% Confidence Interval			Number of Observations		
	WB	**AWB**	**EWB**	**WB**	**AWB**	**EWB**	**WB**	**AWB**	**EWB**
Community Life									
Religious Engagement	0.07	-0.02	0.07	0.03, 0.11	-0.08, 0.04	0.03, 0.12	87	6	81
Family Life									
Are you Married?	0.06	0.07	0.05	0.03, 0.08	0.05, 0.10	0.02, 0.08	73	21	52

4.5 Peace, stability, and security

The analysis for the livability factor 'Peace, stability, and security' is presented in Table 8. The major components observed in the literature that underlie 'Peace, stability, and security' are identified as *Political and ethnic violence*, *Human rights violations*, *Law and order*, *Trust in national institutions*, *Corruption in business and government*, and *Bureaucratic quality*. The results for *Political and ethnic violence* indicate that wellbeing is negatively correlated with *Political and ethnic violence* for AWB, a correlation of -0.28, showing that in the immediacy associated with AWB increases in *Political and ethnic violence* reduce wellbeing. The correlation with wellbeing is not statistically significant with either WB or EWB. The *Human rights violations* component shows a positive correlation of -0.20 with wellbeing. When considering AWB and EWB, the correlation is stronger with AWB, providing some evidence that *Human rights violations* is stronger when the individual considers his or her immediate wellbeing. The next component is *Trust in national institutions*. No statistically significant correlation is found for Trust in national institutions and wellbeing. *Corruption in Business and Government* is composed of two sub-components, both of which have been used in prior studies that meet the inclusion criteria. The sub-component Control of corruption is positively correlated with all three measures of wellbeing. A correlation of 0.40 is associated with wellbeing, which is similar to both the AWB and EWB correlations. AWB has the strongest correlation with Control of corruption at an average of 0.47. The Corruption index shows a negative correlation with wellbeing as measured in the WB and AWB measurements. The Corruption index is statistically correlated with the EWB measure of wellbeing. The results for *Bureaucratic quality, or efficiency*, indicate a positive correlation across all measures of wellbeing.

Table 8: Livability Factor—Peace, stability, and security

	Correlation			95% Confidence Interval			Number of Observations		
	WB	**AWB**	**EWB**	**WB**	**AWB**	**EWB**	**WB**	**AWB**	**EWB**
Political and Ethnic Violence	0.14	-0.28	0.27	-0.16, 0.41	-0.43, -0.13	-0.02, 0.52	8	2	6
Human rights violations	-0.20	-0.33	-0.13	-0.11, -0.29	-0.19, -0.45	-0.03, -0.24	27	10	17
Trust in national institutions	0.10	0.02	0.12	-0.01, 0.20	-0.07, 0.12	-0.01, 0.24	9	2	7
Corruption in business and government									
Control of corruption	0.40	0.47	0.39	0.30, 0.50	0.01, 0.76	0.29, 0.48	11	2	9
Corruption index	-0.27	-0.54	-0.14	-0.47, -0.05	-0.71, -0.30	-0.37, 0.10	10	3	7
Bureaucratic quality	0.37	0.40	0.37	0.29, 0.45	0.14, 0.62	0.28, 0.44	19	4	15

4.6 Opportunity

The analysis for the final livability factor, 'Opportunity', is presented in Table 9. In the literature, there are at least four components that underlie 'Opportunity'. These are entrepreneurship, community basics, education, and employment. Although the literature has four major components for 'Opportunity', the inclusion criteria limit the analysis to *Employment*. Table 9 presents the results for *Employment*. The objective measure, Unemployment, has 21 observations assessed from the prior literature. The effect size for all 21 observations is a correlation of 0.04 with wellbeing and is statistically insignificant, with a CI lower limit of -0.04 and an upper limit of 0.11. When considering AWB and EWB, the correlation is statistically insignificant with EWB, but it is statistically significant for AWB with a correlation of 0.19; thereby leading to an assessment that individuals consider their immediate wellbeing when considering employment. This finding may seem surprising, but the outcome is intuitive if we consider that unemployment is a temporary individual effect that can change in a very short period of time.

Table 9: Livability Factor—Opportunity

	Average Effect Size (correlation)			95% Confidence Interval			Number of Observations		
	WB	**AWB**	**EWB**	**WB**	**AWB**	**EWB**	**WB**	**AWB**	**EWB**
Employment									
Unemployment	0.04	0.19	0.01	-0.04, 0.11	0.01, 0.35	-0.06, 0.09	21	3	18

5. Conclusion

This study has investigated, through a meta-analysis, the livability factors and associated components identified in the literature as contributors to wellbeing. Using the theoretical background associated with wellbeing, two constructs observed in the literature underpin wellbeing: happiness and life satisfaction. Using the meta-analysis, the findings support the underlying constructs associated with wellbeing—happiness, which is identified as AWB in the

analysis; and EWB, the identifier for life satisfaction. The meta-analysis of the prior empirical literature shows that the two constructs differ in regard to the magnitude and statistical significance of their correlations as they relate to wellbeing, supporting the hypothesized continuum derived through the synthesis of the theoretical literature.

The main findings of the analyses are that all six livability factors are present within the prior literature, although the frequency with which the components of these factors are used varies. The livability factor identified as 'Living standard' has strong representation in the empirical literature, with dozens of studies using this factor. The results for 'Living standard' show that the underlying components are all positively related to wellbeing, with variability in magnitude found with both AWB and EWB. The results for 'Living standard' are indicative of those found with the livability factors 'Freedom' and 'Community and relationships,' although 'Freedom' has correlation coefficients approximately 50% smaller than those found with 'Living standard'. Correlations of 'Community and relationships' are approximately 50% smaller than those found with 'Freedom'. The implication for these three livability factors is that all three are important when investigating the implications of wellbeing, but that the magnitudes of the impacts are different.

For the other three livability factors, 'Health and environment,' 'Peace, stability, and security,' and 'Opportunity,' the results show that these three factors are correlated with wellbeing although their representation in the literature is substantially lower than that the other three livability factors. One reason may be the difficulty in measuring these livability factors, in addition to the possibility that these factors have become of interest rather recently within the literature. The importance of these livability factors is quite apparent, with many of the correlations with wellbeing at around a modest magnitude of 0.15. This leads to the conclusion that ignoring these three livability factors might produce erroneous assumptions about wellbeing—in particular, about each underlying construct of wellbeing, happiness, and life satisfaction.

This meta-analysis is used to answer questions not posed by the individual studies. The selection of studies based on the criteria laid down for this meta-analysis is focused on providing estimates that may help improve or settle controversies arising from apparently conflicting studies regarding the factors of wellbeing. Statistical analysis of findings allows the degree of conflict to be formally assessed and reasons for different results to be explored and quantified as social science assessments of wellbeing advance in the literature. The meta-analysis has also discovered the need for further studies of wellbeing that include multiple dimensions of wellbeing simultaneously in order to capture indirect relationships, spurious effects, and other matters of interest.

The empirical value of this meta-analysis is to increase statistical power and improve precision, since significance level and the estimation of effect-size can be improved when they are based on more information. Some of the components have a small number of prior studies associated with them, which directly impacts the value of the meta-analysis for those variables. The results for some of the components and sub-components in small studies should encourage researchers to continue to explore the influence of these components and sub-components on wellbeing.

This study explores the effects of all the research found to date regarding AWB, EWB, and wellbeing. The promise of enhancing our understanding of the role of wellbeing in the world encourages future research, as wellbeing and its underlying constructs continue to provide important information to policy-makers throughout the world.

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