

Personal Wellbeing Index – Adult

(PWI-A)

(English)

6th Edition: Version 2

International Wellbeing Group

MANUAL

2024

Editor: Robert A. Cummins

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Citation:

International Wellbeing Group (2024) *Personal Wellbeing Index Manual: 6th Edition, Version 2, 190624, pp. 1-55*. Cummins, R. A. (Ed.). Geelong: Australian Centre on Quality of Life, School of Psychology, Deakin University – Melbourne Campus. <http://www.acqol.com.au/publications#Open-access>

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Acknowledgments: This manual was assembled on behalf of the International Wellbeing Group by the Editors and Contributing Authors. We acknowledge the support of Australian Unity (<http://www.australianunity.com.au>) as our industry partner which, in collaboration with Deakin University, has supported the development of this Index over the past 23 years. We particularly acknowledge the vital encouragement provided by the Australian Unity Board of Management.

We also acknowledge with gratitude the document production assistance of Gessica Misuraca <gessica.misuraca@deakin.edu.au>, and the editing comments provided by the following ACQOL members (alpha order): Peter Achterberg <PW_Achterberg_achterbp@gmail.com>; Georgie Frykberg <georgie.frykberg@deakin.edu.au>; Veljko Jovanović <veljko.jovanovic@ff.uns.ac.rs>; Kate Lycett <k.lycett@deakin.edu.au>; Stephen Palmer <s.palmer@uwtsd.ac.uk>; Paul Thompson <P.Thompson@connecthealth.org.au>; Adrian Tomin <adrian.tomin@gmail.com>; David Webb <dave.webb@uwa.edu.au>;

Published by *The Australian Centre on Quality of Life, Deakin University – Melbourne Campus*

ISBN No: (under application)

Date of Revision: 190624 [19th June 2024: day-month-year]

Preface:

This manual has been in development since 1995 and an historical account is available in section 1.3.2.2. The many prior versions leading to the current form, attest to the operation of an evolutionary process. As new reliable and valid information becomes available to the International Wellbeing Group, so the manual is edited to reflect contemporary understanding. It is planned to both continue this process, and to record the progression of change. The method is as follows:

As each potential change is brought to the attention of the Editor, new or replacement text will be discussed and, if worthy, new text will be generated. This proposal will then be published in an issue of the ACQol Bulletin, with a call for members' comments. Any resultant discussion will be presented in subsequent Bulletins. The final version of the change will then be added, or substituted, within the Bulletin format existing at that time. The changes will be identified by blue text.

At a time determined by the Editor, a new version of the Manual will be declared. This will be marked by removing all color from the text and incrementally increasing the number of the manual version. So, the current manual has become '6th Edition: Version 2'.

Members contributing to this text evolution are recognized in the 'Acknowledgement' section of the manual. This listing is cumulative. Earlier versions of the manual will remain available from the Editor.

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1. Defining and Measuring Quality of Life

Citation: International Wellbeing Group (2024). Defining and Measuring Quality of Life. In: Personal Wellbeing Index Manual: 6th Edition, Chapter 1, Version 1, 290224, pp 1-1 to 1-8 . Editor, Cummins R. A. Geelong: Australian Centre on Quality of Life, Deakin University - Melbourne Campus.
<http://www.acqol.com.au/publications#Open-access>

1.1 Introduction

The quality of life (QOL) construct has a complex composition, so it is not surprising that QOL has neither an agreed definition nor a standard form of measurement. This lack of agreement is reflected in the abundance of relevant ideas. The Directory of Instruments (<http://www.acqol.com.au/instruments#measures>), produced by the Australian Centre on Quality of Life, describes over 1,200 instruments which purport to measure life quality in some form, with each one containing an idiosyncratic mixture of variables.

Notably, however, many of these instruments have been developed for highly selected groups in the population. This is particularly evident for those scales devised to monitor QOL in the context of medical conditions or disability. Such scales are generally unsuitable for use with the general population because they include items specific to particular conditions. Conversely, most scales devised for use with the general population cannot be used with some major, general population sub-sets, such as people who have a cognitive impairment and children. These are important limitations since it means that the results from such QOL measures cannot be norm-referenced to the general population.

A further concern for measurement is that many QOL instruments fail to make a clear distinction between the objective and subjective dimensions of life quality. This violates the fundamental principle that objective and subjective dimensions are separate entities, that cannot be inferred from one another and so must be separately measured (Andrews & Withey, 1976; Lehman, 1983).

With these issues in mind, the Australian Centre on Quality of Life recommends the following definitions:

1.2 Quality of Life

'Quality of life is both objective and subjective. Each of these two dimensions comprises several domains which, together, define the total construct. Objective domains are measured through culturally relevant indices of objective wellbeing. Subjective domains are measured through questions of satisfaction.'

Objective life quality measurement is guided by the notion that, whatever is employed for this purpose must be regarded as having value by the cultural group in question. In contemporary society, money is the strongest contributor to objective life quality (R. A. Cummins, 2000b).

Subjective Life Quality can only be validly, empirically measured, by asking for an individual's opinion about their feelings.

1.3 Subjective Wellbeing

'Subjective wellbeing (SWB) is a broad term, referring to a person's overall sense of wellbeing, happiness, and life satisfaction. It is a subjective and personal concept, based on each person's own perceptions and feelings about their life. SWB includes emotional, cognitive, and affective components. The cognitive component is nested within emotion, while the affective component is present in consciousness as both a short-term state and long-term mood. SWB is normally influenced more strongly by subjective than objective factors. The strongest three influences on overall life satisfaction are an emotionally intimate relationship, a sense of purpose in life, and having financial adequacy. The level of SWB for each person is normally under homeostatic control.' (R. A. Cummins, 2023j).

1.3.1 Measuring Subjective Wellbeing

1.3.2 Creating standardized units of measurement for subjective variables

1.3.2.1 Overview

This section describes a formula (Percentage of Scale Maximum: %SM) by which the scores from any rating scale can be converted into standard units (percentage points: pp) on a scale from 0 to 100.

1.3.2.2 History

The first known procedure for creating standardized units of measurement for a composite social indicator/well-being index, was created for the Human Development Index (HDI) (Land, 2015). The objective of the HDI is to rank countries on a scale of human development, conceptualized in terms of functional human capabilities. This measure is formed by combining three country-level statistics: life expectancy, education, and income. The HDI and its associated Report have been published annually since 1990 by the United Nations Human Development Programme (<https://www.undp.org/>).

The HDI transforms each of the three measured statistics into a unit-free index. For example, to transform life expectancy for a country into a unit-free index, scaled between 0 and 1, the following formula is applied:

$$\text{life expectancy value (LE)} = \frac{LE - \min(LE)}{\max(LE) - \min(LE)}$$

Where LE is the measured, average, Life Expectancy for a particular country, min(LE) and max (LE) are the lowest and highest values that life expectancy can attain.

However, the HDI formula presents a problem. Because there is no absolute value for Life Expectancy, the value to be used needs to be estimated. Land (2015) describes the methodology as:

The life expectancy at birth component of the HDI is calculated using an arbitrary, minimum Value. In the original HDI formula, this minimum was 25 years. The maximum value of 83.4 years was the observed maximum value of the indicators from the countries in the HDI time series, 1980–2010. So, if country from this series had a measured Life Expectancy of 70 years, its Life Expectancy component of this country's HDI is;

$$\text{life expectancy component value is} = \frac{70 - 25}{83.4 - 25}$$

Thus, the longevity component of the HDI for a country where life expectancy birth is 70 years would be 0.77.(p.11). This value is then added to similarly calculated values for Education and Income, and the overall, linear average, becomes that country's HDI. A more detailed description of this methodology is available from (Land, 2015) pp. 10 – 14).

Pretty obviously, this formula does not produce a truly standardized measure. It is not bound by rigid measurement minima and maxima. Rather, these values can change from one application to another. For example, later versions set the maximum for life expectancy at 83.6 years, which is the maximum observed national life expectancy for Japan in 2012, while the minimum life expectancy is arbitrarily set at 20 years. This means that the HDI formula yields values that vary from time to time as the maximum and minimum values change. Thus, the scientific usefulness of the HDI is mainly restricted to those time-series data which have been created using the same HDI assumptions.

1.3.2.3 Creating standardized units for subjective measures

Some four years following the first HDI report, R.A. Cummins (1995); (R. A. Cummins, McCabe, Romeo, & Gullone, 1994a) independently devised a similar formula, called 'Percentage of Scale Maximum' (%SM), which converts empirical, subjective, survey data into a standard 0-100 point form. This is intended as a universal, standardized measure of subjective wellbeing, where the units of measurement are called 'percentage points' (pp). There are three components to the calculation of the %SM formula as follows:

a) The scale of measurement is end-defined by two values. The **Minimum response option (Rmin)** is the smallest response option available to the respondent. For scales measuring Subjective Wellbeing (SWB) the Rmin is typically 0 (e.g. no satisfaction at all). **The Maximum response option (Rmax) is typically 10** (e.g. complete satisfaction) (see the Personal Wellbeing Index). This scale construction provides 11 levels of choice and a midpoint level of 5.

b) The '**Score**' refers to the mean value of a sample of people who have all rated a common target (e.g 'How satisfied are you with your life as a whole?' all using the same prescribed response scale.

c) The spacing between Rmin and Rmax covers 11 response options each separated by 10 pp. However, respondents are requested to indicate their level of satisfaction using only the 11 response options. Thus, the raw data represent responses on a scale from 0 to 10. The formula then multiplies each mean by 100 in order to represent each Score on the %SM scale.

1.3.2.4 Demonstrating the %SM scale in terms of raw scores

The midpoint response on this scale is 5pp. That is, there are 5 response levels below this mean (0,1,2,3,4) and 5 levels above (6,7,8,9,10).

In order to demonstrate how the %SM formula works, the simplest conversion of raw scores into percentage points (pp) is when the Rmin = 0 and the number of scale choice points is

11. This is achieved through the formula: (raw score) x 100/(number of choice points in the scale-1).

This procedure can be represented as:

$$\%SM = \frac{X}{\text{number of choice points} - 1} \times 100$$

X = the raw score to be converted

A worked example

Consider the conversion of a raw score of 5. This should convert into the mid-point %SM of 50pp:

$$\%SM = \frac{5}{11 - 1} \times 100$$

$$\%SM = \frac{5}{10} \times 100$$

$$\%SM = 50pp$$

Conclusion: This transformation works as intended. Now a different demonstration uses a pp mean raw score of 7.5. Here the result is:

$$\%SM = \frac{7.5}{11 - 1} \times 100$$

$$\%SM = \frac{7.5}{10} \times 100$$

$$\%SM = 75pp$$

Conclusion, this value of 7.5pp is an approximation to the measured normative population level for both Global Life Satisfaction (77.2pp) and the Personal Wellbeing Index (75.4pp) (Khor, Hutchinson, & Cummins, 2023e). Most notable, while the scale mid-point is 50pp, the average level of SWB in the Australian population is 75pp. In fact, the world over, ‘most people are happy’ as noted by (Andrews & Withey, 1976b; Diener, 1984).

NB: The above formula and results are applicable only when the response scale has Rmin of zero and a Rmax of 10. If either of these values changes, then the formula for %SM needs to compensate and there is a **generic form** of the %SM formula as:

$$X = \frac{X - Rmin}{Rmax - Rmin} \times 100$$

X = the mean score to be converted =5

Substituting these new values:

$$X = \frac{5 - 0}{10 - 0} \times 100$$

$$X = \frac{5}{10} \times 100$$

$$X = 50\text{pp}$$

Conclusion: The generic %SM formula produces the same result as the simple formula. The next demonstration concerns whether the generic formula works when the response scale is 1 to 4, and the mean score to be converted is 2.5

$$X = \frac{X - R_{\min}}{R_{\max} - R_{\min}} \times 100$$

$$X = \frac{2.5 - 1}{4 - 1} \times 100$$

$$X = \frac{1.5}{3} \times 100$$

$$X = 50\text{pp}$$

The next demonstration concerns a scale where Rmin is -5 and Rmax is +5 and the score to be converted is 0.

$$X = \frac{X - R_{\min}}{R_{\max} - R_{\min}} \times 100$$

$$X = \frac{0 - (-5)}{5 - (-5)} \times 100$$

$$X = \frac{5}{10} \times 100$$

$$X = 50\text{pp}$$

The final demonstration concerns raw scores derived from a 4-choice scale, where the relative percentages of respondents is recorded for each category as: very satisfied (12.1%), satisfied (48.2%), not very satisfied (29.7%), and not at all satisfied (10.0%).

The conversion uses the following steps:

(a) Convert the 4-choice scale to a numerical format (4,3,2,1). The value of each choice level can then be expressed in % units as: (4 x 12.1), (3 x 48.2), (2 x 29.7), (1 x 10.0).

(b) The total value of the scale can then be calculated as:
(4 x 12.1) + (3 x 48.2) + (2 x 29.7) + (1 x 10.0) = 262.4 % units.

(c) This % value is then converted into scale units by dividing the total by 100:
262.4 / 100 = 2.62 scale units.

In other words, the mean score of the sample, on the 4 to 1 scale, is 2.62 scale units

(d) Now use the %SM formula

$$X = \frac{X - R_{\min}}{R_{\max} - R_{\min}} \times 100$$

X = the score or mean to be converted (2.62)

R_{min} = the minimum score possible on the scale (1)

R_{max} = the maximum score possible on the scale (4)

$$X = \frac{2.62 - 1}{4 - 1} \times 100$$

X = 54.13 percentage points

Conclusion: The generic %SM formula provides a reliable conversion of scale raw scores to percentage points.

1.3.3 Advantages of using the %SM data conversion

1. It yields a reliable and consistent output over time since the minima and maxima are defined solely by the measurement scale. This unit of output is in ‘percentage points (pp)’. NOTE WELL: THIS IS NOT A SIMPLE ‘PERCENTAGE’.
2. This conversion to pp confers the advantage that results from different scales, such as means and standard deviations, can be directly compared with one another.
3. This conversion does not alter the statistical properties of the data, because the process is a simple linear conversion.

The adoption of the %SM data conversion, from raw data to percentage points, produces standardized results for subjective data, which are then represented on a 0 to 100 percentage point scale (pp).

1.4 Creating measurement scales

1.4.1 Single-item scales

People can be asked to rate their global life satisfaction (GLS). This normally takes the form:

“How satisfied are you with your life as a whole?”

Although this question is an excellent measure of Subjective Wellbeing (SWB), such single-item measures are statistically less reliable than multi-item scales due to averaging effects. An example is provided by the Australian population norms for individual respondents provided in Chapter 5. The standard deviation for GLS is 16.98 percentage points (pp), while for the Personal Wellbeing Index it is 12.64pp.

1.4.2 Multi-item scales

There are two approaches to constructing a multi-item scale, each based on a different conceptualization of the SWB construct. These are ‘Reflective’ and ‘Formative’ (see

Diamantopoulos & Winklhofer, 2001).

In a Reflective Scale, the items (observed variables) are perceived as reflective indicators of the underlying construct (latent variable). ***That is, the construct (SWB) is determining the nature of the items that reflect its character.*** As such, the scale items share variance and form a relatively homogeneous factor that reflects the construct. If an individual item in a reflective scale shares variance with a non-scale item, then the other items in the scale should also share such variance with that item. An example of a reflective scale is the Satisfaction With Life Scale (SWLS: Diener, Emmons, Larsen, & Griffin, 1985), which “is narrowly focused to assess Global Life Satisfaction (GLS)” (abstract).

In a Formative Index (as it is referred to, rather than a scale) the latent variable is **caused by**, rather than reflecting, the composite items. **That is, the items determine the nature of what the index measures.** While the items must share variance with one another to form a factor representing the latent construct (SWB), each item also has a unique character. This unique variance may cause it to share variance with non-index items; a property that the other items in the index do not share.

Many SWB instruments have adopted the formative approach to scale construction. Here, individual items refer to specific life domains (life aspects) and the domain scores are averaged to produce a measure of SWB. For a review of such indexes see R. A. Cummins and Weinberg (2015). The Personal Wellbeing Index is one such formative scale, and the domains represent the first-level deconstruction of Global Life Satisfaction (GLS).

1.5 The Construction of Life Domain Measures

1.5.1 Choice of domains

A variety of techniques, such as factor analysis, may be employed to reduce the almost infinite number of putative domains to a manageable set. However, the Personal Wellbeing Index is unique in employing the theoretical principle of ‘deconstruction’ for this purpose. Using this principle, SWB is measured by the minimum set of domains which represent the first-level deconstruction of satisfaction with ‘Life as a Whole’ (GLS).

1.5.2 Domain names and characteristics

No known theory can guide the initial selection of domain names. Thus, three criteria have been employed to narrow the focus of the search to domain names most likely to result in a scale with the simplest conceptual construction.

- (a) Each domain name must describe a broad aspect of life which is amenable to both objective and subjective measurement. This is based on the fundamental principle that Quality of Life exists as separate objective and subjective dimensions. While the PWI is concerned only with the subjective dimension, this criterion allows the theoretical possibility that a parallel objective scale could be constructed. This criterion also excludes affective adjectives (e.g., Happiness).
- (b) Each domain must describe an unequivocal Indicator variable, one that indirectly reflects or indicates a *specific aspect of QOL*, as opposed to a Causal variable, which directly influences or *causes changes in QOL* (for this distinction see Fayers, Hand, Bjordal, and

Groenvold (1997). An indicator variable may be defined as one that can never act alone as a mediator (for a description of the mediator-moderator distinction, see Baron and Kenny (1986). An example of an indicator variable is ‘Satisfaction with your Health’ and an example of a causal variable is ‘Satisfaction with your control over your life’. Because the perception of control can mediate the influence of physical disability on satisfaction with life, control is not an unequivocal Indicator variable. For a more detailed description of the Causal versus Indicator Variable distinction in relation to SWB and Health Related QOL see R. A. Cummins, Lau, and Stokes (2004).

- (c) The potential addition of any new domain must meet **both of two** criteria relating to their contribution of unique variance to GLS ‘Satisfaction with life as a whole’. These are: (1) In a hierarchical regression predicting GLS, where the 7 domains are entered as step 1, when the new putative domain is entered in step 2, it must contribute significant unique variance. (2) The new putative domain must not systematically reduce the contribution of unique variance made by any of the existing domains, to the point that their contribution becomes non-significant.

This approach to scale construction has the following advantages:

- i. The end product is theoretically constrained and determined. Hence, the scale items will form a single tight factor with high construct validity.
- ii. It is a parsimonious approach, which results in the minimal domain set necessary to fulfill the ‘first-level deconstruction’ criterion.
- iii. Due to the broad, semi-abstract nature of domains, the scale content is likely to have cross-cultural validity.

The application of this approach has led to the development of the Personal Wellbeing Index.

1.6 The life and times of the Personal Wellbeing Index

The Personal Wellbeing Index was created from the Comprehensive Quality of Life Scale (ComQol). (R. A. Cummins, McCabe, Romeo, & Gullone, 1994). The ComQol comprised both an objective and subjective measure of life quality and details of this test’s development have been published (R. A. Cummins, 1991; R. A. Cummins et al., 1994; Gullone & Cummins, 1999; Marriage & Cummins, 2004). The ComQol domains were initially identified through a review of domain names used in the literature. This was subsequently followed by a three-phase process (Cummins et al., 1994) and empirical validation to generate the seven broad domains that comprised the scale (R. A. Cummins, 1997).

In 2001, the ComQol was abandoned due to two major flaws. One was that, despite repeated modification, the objective scale never factored into seven non-complex domains as intended. The other flaw was that domain importance and domain satisfaction were multiplied. A seminal article by Trauer and Mackinnon (2001) convincingly demonstrated that such multiplicative composites are psychometrically invalid. As a result, ComQol was abandoned. The detailed rationale for this action is described by R. A. Cummins (2002d).

From the ashes of ComQol emerged the Personal Wellbeing Index. This scale retained only the questions on satisfaction and six of the seven domains. The original ComQol domain, ‘How

satisfied are you with your own happiness?’, was replaced by ‘How satisfied are you with your future security?’. The ‘happiness’ domain was removed to fulfill the principle of PWI life-domain scale construction (see 1.4.2a), that any domain must be amenable to both objective and subjective measurement. The new domain title was proposed *ad hoc* by the inaugural meeting of the Australian Unity Steering Committee. Rather surprisingly, given its qualitative origin, the domain has proved to be psychometrically robust.

Another major difference between the PWI and ComQol is a change in the response scale format. This involved the replacement of the original 7-choice response scale (consisting of adjectival descriptors), with an 11-choice (0-10) End-Defined Response Scale (Jones & Thurstone, 1955). There were several reasons for this decision, the details of which have been described in R. A. Cummins and Gullone (2000b). Of these, the most important issue is avoiding the psychometric confusion caused by applying adjectival descriptors to a numerical interval scale. Such descriptors are not separated by equal psychometric intervals and therefore provide misleading and redundant information. Additionally, the 11-choice (0-10) response scale is preferred as this optimizes respondent discriminative capacity (Miller, 1956) and is simple to understand.

1.7 The International Wellbeing Group

In 2002, Cummins and Lau initiated the International Wellbeing Group (IWbG) (R. A. Cummins & Lau, 2003a). The major objective of the IWbG is to develop the PWI into a valid cross-cultural instrument. At the time of constructing this current 6th edition, over 700 people, comprising a wide range of professional affiliations, are members of the Australian Centre on Quality of Life (for the membership list see <https://www.acqol.com.au/members#acqol-members>). All members receive the weekly ACQol Bulletin. Many members are also affiliated with the International Wellbeing Group, facilitating the use of the PWI in their own countries. Through these processes of information exchange, the PWI undergoes controlled evolution as informed by empirical evidence. Recent changes to the PWI have been approved by the Group as follows:

1. In 2004 (Survey 11) a text change was made to the third domain “...what you are achieving in life” to ensure that the response pertains to the present tense. The effect of this word change (from the original “...what you achieve in life” has been to significantly reduce the mean score for this domain (see Australian Unity Wellbeing Index Report 16.0, 2006: <https://www.acqol.com.au/publications#reports>). The average value of the old wording, over Survey 1 to Survey 10, is 74.47pp (SD=0.45). The average value using the new wording in the present, over Survey 11-Survey 16 is 72.75pp (SD = 0.59). In summary, the new wording has created an item that has retained its reliability and has stabilized about 2pp below the original version. Its contribution to ‘Life as a whole’ in multiple regression has not changed.

2. In November 2006 the Group agreed to add a new domain to the PWI. The wording of this new domain generated much discussion. The version adopted is: “How satisfied are you with your spirituality or religion?” In April 2013 the Group agreed to make this Spiritual/Religious domain optional, and thus it is not part of the core set of PWI domains.

3. In 2010, Survey 24, the original bipolar response scale has been replaced with a unipolar response scale. This 11-choice (0-10) response scale optimizes respondent discriminative capacity (Miller, 1956).

4. In 2016, following discussion among members, a change was made to the rating scale, renaming the lower anchor point from “Not satisfied at all” to “No satisfaction at all”.

1.7.1 Future development and an invitation

The IWbG, as a community of scholars, is engaged in the process of understanding SWB and the role that the Personal Wellbeing Index can play in its measurement. The Personal Wellbeing Index is not a set piece. Rather, it evolves as new data and theory become available. Changes to the Index are determined by a simple majority vote of the IWbG membership.

Membership of the IWbG is an option offered to members of the Australian Centre on Quality of Life. The membership form is available at <http://www.acqol.com.au/members#acqol-members>

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2. Personal Wellbeing Index administration

Citation: International Wellbeing Group. 2024. Personal Wellbeing Index administration. In: Personal Wellbeing Index Manual: 6th Edition, Chapter 2, Version 1.0: 290224, pp 2-1 to 2-8. Editor, Cummins R. A. Australian Centre on Quality of Life, School of Psychology, Deakin University, Geelong – Melbourne Campus.

<http://www.acqol.com.au/publications#Open-access>

Abstract: This chapter explains how to collect data by administering the Personal Wellbeing Index (PWI). It also provides guidance on the additional optional items of Global Life Satisfaction and satisfaction with Spirituality or Religion. The use of the PWI Short-Form is also discussed.

Keywords: Administration, Personal Wellbeing Index, Global Life Satisfaction, Spirituality and religion, PWI Short-Form.

2.1 Guidelines for administering the PWI-A

- (a) The PWI-A index is primarily intended for use with adults (minimum 18y). The PWI-SC is intended for use with children aged at least 12y. At the administrator’s discretion, the PWI-A may be suitable for older adolescents.
- (b) The index items must be completed only, and independently, by the respondent them self. It is not valid for any other person to complete the items on behalf of the respondent.
- (c) The index items may be administered in printed form or verbally. Verbal administration may be either face to face or via a telephone interview. A printed form may be via pen-and-paper format or via online survey.
- (d) If the items are being administered verbally, the administrator must allow responses to be made in an entirely private manner and provide assurance that each respondent’s data will remain confidential.
- (e) The index items are designed to assess life domains using a semi-abstract question structure. Thus, the questions are broadly worded and intended to allow respondents to form their personal interpretation and judgment about each topic. It is thus important that administration of the index follows a structured form of instruction and interaction with the respondent as follows:
 - ei. Instruct the respondent that, if they are asked a question that they do not understand, they should just move onto the next item.
 - eii. If the respondent seeks clarification on the meaning of any question (e.g., ask for concrete explanations or examples), the administrator **MUST NOT** attempt to provide additional information. Rather, respond by saying:

“Please think of the question in a way that makes sense to you. There is no right or wrong answer. You can also skip this response if you like, and move onto the next item”

- (f) Emphasise that there is NO time limit.
- (g) If the PWI is being included in a longer questionnaire, the ordering of items within the longer questionnaire is important. This is because the semi-abstract nature of the PWI items makes them susceptible to negative and positive affective priming induced by the information in prior items. Thus, the item order in the longer questionnaire is recommended to be: First, Global Life Satisfaction. Second, the seven (or eight) PWI domains in the prescribed order. These are then followed by the other questionnaire items.
- (h) Responses are made on a 0-10, unipolar, end-defined response scale, using the anchors ‘No satisfaction at all’ and ‘Completely satisfied’. Alternative response scales are not recommended.
- (i) If intellectual disability or cognitive impairment is diagnosed or suspected, consider using the parallel instrument PWI-ID.
- (k) Information regarding scoring and interpreting the PWI responses is described in Chapter 3.

2.2 Presentation of the Index Items

2.2.1 The Personal Wellbeing Index

The PWI may comprise either 7 or 8 items. The seven core questions relating to satisfaction with life domains are as follows:

Questions	Domains
How satisfied are you with...?	
1. your standard of living?	[Standard]
2. your health?	[Health]
3. what you are achieving in life?	[Achieving]
4. your personal relationships?	[Relationships]
5. how safe you feel?	[Safety]
6. feeling part of your community?	[Community]
7. your future security?	[Future]

2.2.2 Additional Optional Items

2.2.2.1 Global Life Satisfaction (GLS)

This question is:

“How satisfied are you with your life as a whole?”

This item is NOT part of the PWI. However, it may be usefully added as preceding the PWI for two reasons. First, it sets the context for the domain questions to follow. Second, it can be used to test the construct validity of the PWI. This is achieved by regressing the domains as predictor variables against GLS ‘satisfaction with life as a whole’ (DV) to determine whether each domain contributes unique variance (known as ‘squared semi-partial correlations’ or sr^2). This procedure may also be used to inform whether a new item should be considered as an additional domain (see Chapter 1.4.2 for new domain requirements).

The GLS item is routinely included in surveys conducted in Australia (e.g., the ABS’s General Social Survey, The ANU Poll, Australian Unity Wellbeing Index, and HILDA Surveys; Australian Bureau of Statistics, 2020; Biddle & Gray, 2021; Frykberg et al., 2023; N. Watson & Wooden, 2002) and other countries. If it is to be used, then it must be administered as the FIRST item in the questionnaire, prior to the PWI items.

This positioning of GLS as the first item in a questionnaire is important for its validity. Because GLS is based on such an abstract question (‘satisfaction with your life as a whole’), the response people give is easily influenced by the provision of a more tangible target immediately before the GLS question is asked. Thus, standardizing the position of GLS as the first item that respondents encounter helps to ensure that prior items, including the Personal Wellbeing Index domains, cannot influence this global response. For further information on order effects regarding the PWI and GLS items, see Weinberg, Seton, and Cameron (2018).

While the GLS is not part of the PWI, the GLS data can be used in two ways as follows:

(a) GLS can be used as the simplest measure of Subjective Wellbeing (SWB). While this is a valid measure of SWB (Capic, Li et al. 2018b), it is less reliable than the PWI because the GLS scale is based on a single question. Thus, from the normative ranges for individuals (Chapter 5, Table 2) the SD for the GLS is 16.98pp, while for the PWI it is 12.64pp.

(b) GLS can also be used to demonstrate the construct validity of the PWI. That is, the 7 PWI domains reliably represent the first level deconstruction of GLS. This demonstration uses multiple regression, and a more complete account is provided in Chapter 4, Table 4.1. Here it is revealed that, using Australian population data, just three of the domains account for most of the shared variance: Standard, Achieving, and Relationships. This is why these three form the Short-form of the PWI (see 2.3). It is currently unclear the extent to which this grouping applies to data from other cultures and population sub-groups.

2.2.2.2 Spirituality or Religion

This question is:

“How satisfied are you with your spirituality or religion?”

This item may be included as an eighth PWI domain **if it is considered relevant** to the sample under investigation. This issue of relevance is a crucial consideration because if this item is provided to a person who has no personal sense of either spirituality or religion, then any response they provide will be invalid as an indicator of their subjective wellbeing.

If the item is to be included as an 8th domain, then a preceding ‘gating’ item is required, to guard against people with no spirituality or religion responding to the item. This gating item

is:

“Do you have a sense of spirituality or religion?”

Yes/ No

If they answer ‘Yes’, then they proceed to the spiritual/religious item.

If they answer ‘No’, they are directed to skip the spiritual/religious item, and to proceed to the following item in the questionnaire.

If this domain is included in the PWI, then it may be included in the scores that are summed to yield a measure of SWB. Note, however, that the normative ranges presented in Chapter 5 are based on the core 7-item version of the PWI.

2.2.3 The PWI-A: Written format

Where the PWI-A is administered in a pen-and-paper format, the items are presented with the corresponding response scale, with participants requested to circle the number that best corresponds to their level of satisfaction. For example:

“Please circle the number below that best represents how satisfied you feel. On this scale, 0 means you have ‘No satisfaction at all’, and 10 means you are ‘Completely Satisfied’.

1. How satisfied are you, with your standard of living?

0 1 2 3 4 5 6 7 8 9 10

2. How satisfied are you, with your health?

0 1 2 3 4 5 6 7 8 9 10

3. How satisfied are you, with what you are achieving in life?

0 1 2 3 4 5 6 7 8 9 10

4. How satisfied are you, with your personal relationships?

0 1 2 3 4 5 6 7 8 9 10

5. How satisfied are you, with how safe you feel?

0 1 2 3 4 5 6 7 8 9 10

6. How satisfied are you, with feeling part of your community?

0 1 2 3 4 5 6 7 8 9 10

7. How satisfied are you, with your future security?

0 1 2 3 4 5 6 7 8 9 10

2.2.4 The PWI-A: Online format

Where the PWI-A is administered in an online format, the items are presented with the corresponding response scale, with participants requested to select the number that best corresponds to their level of satisfaction.

The response scale may be in the format of radio buttons, a sliding scale, drop-down box, or checkboxes. Ensure that respondents are only provided with a single response, using whole numbers between 0-10.

Similar to the written format, participants are provided with the following information to introduce the questionnaire:

“Please select the number below that best represents how satisfied you feel with each item. On this scale, 0 means you have ‘No satisfaction at all’, and 10 means you are ‘Completely Satisfied’.

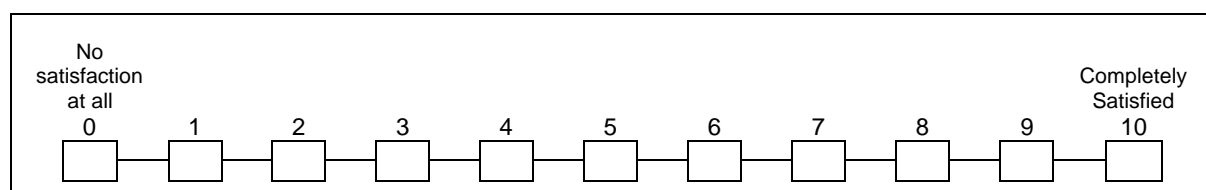
	No satisfaction at all										Completely satisfied
	0	1	2	3	4	5	6	7	8	9	10
Your standard of living?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your health?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
What you are currently achieving in life?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your personal relationships?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How safe you feel?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feeling part of your community?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your future security?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 1: Sample presentation of the PWI-A online format.

2.2.5 The PWI-A: Verbal format

Where the PWI-A is administered verbally (for example, over the phone or as part of a face-to-face interview), the interviewer must first establish that the respondent understands the nature of the task prior to administering the Index. Thus, the administrator must take respondents verbally over the 11-point satisfaction scale (as shown below), indicating the two response anchors of ‘No satisfaction at all /completely satisfied’.

The test administrator should confirm that the required response mode is understood before proceeding with the index items.

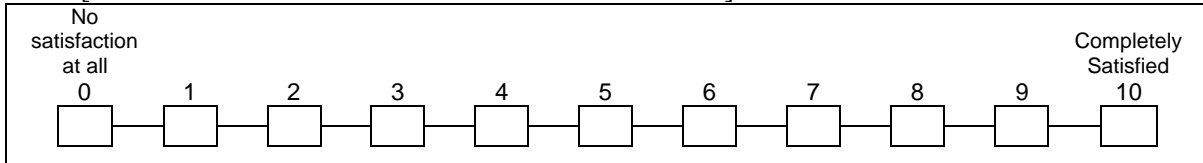


The interviewer can follow the procedure below to administer the PWI-A verbally.

“I am now going to ask how satisfied you feel, on a scale from zero to 10.”

“(On this scale,) **Zero** means you have no satisfaction at all. **10** means you feel completely satisfied. “

[FOR ADMINISTRATOR’S INFORMATION ONLY]



“Would you like me to go over this again for you?” [If “yes”, repeat the above. If “no”, proceed to next statement]

“In that case, I will start by asking how satisfied you are with life. So,----- (Refer to the test items below)”

Respondent’s Rating
(0-10)

Part I (Optional item): Satisfaction with Life as a Whole

“How satisfied are you with your life as a whole?”

Part II: Personal Wellbeing Index

“How satisfied are you with..... ?”

1. your standard of living?
2. your health?
3. what you are achieving in life?
4. your personal relationships?
5. how safe you feel?
6. feeling part of your community?
7. your future security?

Yes / No

[optional item] Do you have a sense of spirituality or religion?

[If “yes”, proceed to next question. If “no”, the Index is complete]

8. How satisfied are you with, your spirituality or religion?”

2.3 PWI short-form

Short scales offer practical benefits over longer scales in survey applications, including reduced respondent burden, quicker completion times, and easier administration and interpretation. However, there are statistical limitations to the production of short scales. For most purposes the minimum limit is three scale items. This allows the calculation of means, standard deviations, exploratory factor analyses, etc. However, a minimum of four items are required

for an evaluation of model fit using confirmatory factor analysis (Kline, 2023). This is because a three item CFA saturates the model, with no meaningful fit statistics, as there are no degrees of freedom to evaluate against a perfect fitting model. With two items, the model is under-identified and the scale cannot be meaningfully evaluated through factor analysis.

The choice of items to produce short forms of the PWI, rests on the theoretical basis of the scale. The PWI is constructed as a formative scale (Diamantopoulos & Winklhofer, 2001), being the first level deconstruction of Global Life Satisfaction (GLS). When the 7 domains are regressed together against GLS (multiple regression), only three domains consistently make a significant, unique contribution to the variance accounted for. These are Standard of living, Achieving in life, and Personal Relationships (R. A. Cummins, 2018e). Thus, these three domains comprise the short-form PWI. If a 4th domain is required (see CFA above), then any of the other domains can be chosen to complete the scale.

2.4 References

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3. Data analysis and interpretation

Citation: International Wellbeing Group. 2024. Data analysis and interpretation. In: Personal Wellbeing Index Manual: 6th Edition, Chapter 3, Version 1.0: 290224, pp 3-1 to 3-12. Editor, Cummins R. A. Australian Centre on Quality of Life, School of Psychology, Deakin University, Melbourne Campus.

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Abstract: This chapter explains how to treat PWI data prior to statistical analysis, and how to interpret the results from means and standard deviations. The major foci are:

- a) The procedures for standardizing data, measured by a subjective scale, are described. The resulting 0 to 100 percentage point (pp) metric is a universal constant.
- b) The ‘Triage’ allocation of SWB values into homeostatically functional groups, described by ‘Well’, UnderWell’, and NoWell’ provides the basis for efficient social resource allocation.
- c) The most notable aspect of Chapter 3 is that about 70% of general population samples comprise people in the ‘Well’ range (71-100pp) of subjective wellbeing. These people will not reliably increase their SWB as the result of additional services provision.

Keywords: Global Life Satisfaction, Personal Wellbeing Index, means and standard deviations, Normative Ranges, intervention effectiveness to raise SWB.

3.1 Data handling and statistical procedures

3.1.1 Data Cleaning

Prior to conducting statistical analyses, it is essential that raw data are checked for ‘response sets’. Response sets refer to a pattern in the data where a respondent consistently chooses the same response option across multiple questions, such as at the top or the bottom of the scale for all seven Personal Wellbeing Index (PWI) items, regardless of the content of the question. Such responses may occur either due to lack of understanding the question, or acquiescence, whereby a respondent tends to agree with statements, regardless of whether they truly agree with them or not. No matter the cause, the lack of variation will distort subsequent data analysis. Hence, all data from individuals showing consistent maximum or minimum scores on all 7 PWI domains should be eliminated prior to data analysis. This involves elimination of all survey data for these individuals.

In addition, the composite PWI score should only be calculated for cases that have complete data on all 7 domains. Thus, where data on any individual PWI domain are missing, the composite PWI score will also be missing.

3.1.2 Conversion of raw scores into the standard 0 – 100pp scale format

See section 1.2.

3.1.3 Creating the PWI from survey data

The PWI is formed as the average of the 7 domains: Standard, Health, Achieving, Relationships, Safety, Community, and Security. To calculate an individual's PWI score, sum their scores on each of these 7 domain items, and divide the total by 7. Notably, this does NOT include the item that normally immediately precedes these domains in the questionnaire. This preceding item of Global Life Satisfaction (GLS) is NOT part of the PWI.

3.2 Data Interpretation against normative values

3.2.1 Normative values

Subjective Wellbeing normative values for Australia are available from Chapter 5.

There are two forms of normative data. The second is the most familiar, using the data from individuals (see Table 2). The combination of these >69,000 values yields the following:

GLS:

Mean 77.24pp

SD 16.98pp

Normal range (mean \pm x2 SD) 43.28 to 100pp.

PWI

Mean 75.40pp

SD 12.64pp

Normal range (mean \pm x2 SD) 50.12 to 100pp.

While these values offer a simple comparison for other results, caution should be used when interpreting them as a valid, nationally reliable estimate of the Australian population. There are many population subgroups which are not represented in these data such as people in prison, people who are homeless, and people who, for whatever reason, choose not to participate in surveys. However, if the proportions of these people had remained constant from one survey to the next, at least the inter-survey stability of data would be reliable. Unfortunately, even that level of consistency in proportional representation cannot be claimed.

Over the past few years, the proportion of people who are willing to accept an invitation to complete surveys has plummeted. Whereas the proportion 20 years ago was around 70-80%, it is currently (2024) around 30-40%. Thus, this impacts on the generalizability of our data.

The second caveat to the interpretation of these results is that the data come from Australians. Clearly, therefore, even notwithstanding the strong multicultural composition of the Australian population, such data cannot be interpreted through a simple comparison with data from other cultures.

Despite this, these normative data have comparative value provided that the interpretive limitations are understood. For example, these Australian normative data show remarkable stability over time, and the reason for this is largely attributable to the processes of Subjective Wellbeing Homeostasis (R. A. Cummins, 2023b). These homeostatic processes are described in some detail below, and their collective action results in SWB stability even under changing conditions, provided that such changes are not overly aversive. Whether similarly gathered data

from other cultures evidence these same characteristics of stability remains to be established.

3.2.2 Normative ranges for individuals and groups

Data derived from the Personal Wellbeing Index may be used to generate normative ranges for both individuals and groups. The most common normative ranges are derived from the data of individual respondents who form an identifiable group, such as respondents to a survey. The basic statistics used to calculate such ranges are the mean (average) and the standard deviation (SD) which is a measure of the spread (variance) of the values. These two statistics can then

be used to calculate a ‘normal range’, described by two SDs on each side of the mean. This range will include about 95% of the respondents in the analysed group.

An example of this calculation, involving data representing the scores of individual people, is given in Chapter 5: Table 2. From this Table it can be seen that the Australian normative range for individuals, calculated using the combined PWI data from many surveys, has a mean of 75.40pp (percentage points, on a 0 to 100 point scale) with a standard deviation of 12.64pp. The range covered by two SDs on either side of the mean (the normative range) is between 50.12 and 100.68pp or, by approximation, between 50 and 100pp.

The importance of this calculation is that about 95% of the data provided by these combined surveys, will fall within this normal range. Logically, then, about 5% of individual scores comprising the total sample will fall outside this range. This is important information for researchers to consider when interpreting statistical analyses because these 5% are ‘outsiders’, who are statistically not part of the group. So, it is important to understand who they are.

Values above 100pp cannot be valid, by definition, since 100pp is the maximum value on the measurement scale. Such scores should be eliminated from the sample, and the Mean and SD re-calculated, before proceeding to use these data for any further purpose. Values below 50pp are likely indicative of homeostatic failure (see section 3.3). That is, the level of personal subjective challenge being experienced by the respondent, at the time they generated their response, was strong enough to defeat their normal homeostatic control. This homeostatic

defeat causes them to experience a PWI level lower than their normal score. Such magnitude of PWI score reduction is symptomatic of psychological distress, and the inclusion of these responses is likely to distort statistical analyses (see section 3.3.5).

Multiple group mean scores.

If PWI data from multiple groups are analysed separately within each group, then the data issues that arise are no different from those described above. Additionally, if the data from multiple groups are combined to produce a single average mean, then as long as the groups have about the same N (number of responses), then the means can be averaged to obtain an overall mean. This equivalence of methodology can be simply verified from the Chapter 5 results.

The grand mean of individual scores (Table 2: N=49,450) is 75.4pp. The grand mean of mean scores (Table 1: N=38) is 75.43pp. Thus, the simple addition and division procedures have yielded comparable results, whether based on the scores of individuals or the survey mean

scores. As they logically should. However, this simplicity does not apply to the calculation of overall standard deviations (SDs).

The reason that multiple SDs cannot be simply averaged is that the formula to calculate SD is sensitive to N. Roughly speaking, the higher the N, the lower is the SD. This is demonstrated in Chapter 5. Whereas the means based either on group averages or individual scores yield the same overall mean (75.4pp), the comparative SD averages are 12.64pp (individual scores: Table 2) and 0.66pp (group means: Table 1). The explanation of this difference is as follows.

The SD of individuals represents the full range of PWI values in the data set as a whole. However, when the full data set is divided into groups, the group means are much less variable because they are each generated as an average. Therefore, within the same data set, when the SD calculation is based on sub-group averages, the average SD will be much smaller than it is

when based on the scores of individuals.

In summary, these differences in SD between calculations based on the data of individuals or the data of group mean scores, cause substantial differences in the estimates of normal ranges. For individuals the normal range is 50.12pp to 100pp (Table 2), or about 50pp. For group means, on the other hand, the normal range is 74.11 to 76.75pp (Table 1), or about 2.6pp. Clearly, the SDs based on individual values, and the SDs based on sub-group mean scores, cannot be validly combined with one another.

3.3 Interpreting Subjective Wellbeing results through homeostasis

The interpretation of Subjective Wellbeing (SWB) results is entirely dependent on understanding normative data. That is, understanding the values of SWB which can be considered as ‘normal’, as well as those values representing the upper and lower levels of SWB which mark the transition into abnormality. The determination of these marker values has been a key aim of psychological science, ever since it was discovered that empirical estimates of SWB can be made reliably, that the level of SWB for each person is usually stable, and the distribution of scores comprising each SWB estimate can be statistically described.

The demonstration that empirical measures of happiness and SWB can be made reliably was demonstrated over 90 years ago, when G. B. Watson (1930) found that self-ratings on a printed rating scale correlated .81 with a composite score comprising a number of indices. From his results he proposed 37 hypotheses, the first three of which are:

- 1. Intelligence has no relation to happiness.*
- 2. Failure in love is a major cause of unhappiness.*
- 3. Enjoyment of, and success in work, is a major factor in happiness.(p.108).*

When other researchers followed his lead, all three of these hypotheses were confirmed, along with most of his other 34 findings. Watson reasonably concluded “General level of happiness among such adults can be measured with adequate reliability by a single check on one graphic scale” (Hypothesis 11: p.108). Indeed, almost a century later, the measurement of ‘Global Life Satisfaction’ by a single question ‘How satisfied are you with your life’ has become the most commonly used measure of SWB. Searching through Google Scholar, the exact phrase ‘How satisfied are you with your life’ received 9,590 citations, while ‘How satisfied are you with your life as a whole’ received 4,390. In contrast ‘How happy are you with your life’ received

569 citations (Google Scholar, 2023).

Following Watson's early research, it was soon discovered that measures of mood happiness were not only reliable but also surprisingly stable over time. For example, Hartmann (1934) obtained a test-retest reliability of .70 with two testings a month apart, while Wessman and Ricks (1966, p. 103) reported that happiness-related measures taken 2 years apart correlated .67. Similar results were reported by Bradburn (1969) in a four-wave USA study. Using a three-choice response scale, and follow-up measures at three-month intervals, he measured the consistency with which people reported being 'very happy' from one wave to the next. The correlations (gamma coefficient) ranged from .65 to .84.

By the 1970s it was clear that the level of SWB evidenced considerable stability, with significant retest correlations being reported over substantial periods (Andrews & Withey, 1976; Palmore & Kivett, 1977). But the question of what proportion of the measured variance in SWB is stable remained uncertain for several decades. Researchers such as Yap, Anusic, and Lucas (2014) estimated that about a third of the measured variance in life satisfaction is stable even over very long time periods, another third changes slowly over time, with the remaining third being occasion specific. But their questionable methodology makes these estimates unreliable. Other researchers were voicing concern that, if a homeostatic setpoint controlled SWB levels, then this implied that attempts to increase SWB must be futile (Headey, 2008a, 2010). This theme was taken up by the editors (Sheldon & Lucas, 2014) of a collection of papers from leading researchers:

“The question of whether happiness can change may be the most important question that subjective well-being researchers can tackle. If people's long-term levels of subjective well-being are truly impervious to the effects of changing life circumstances, then attempts at intervention will be doomed to failure, well-being measures will provide little information to guide policy changes, and people's perception that they are pursuing goals to maximize happiness will surely be wrong.” (p. 6)

3.3.1 Physiological Homeostasis

One possible answer to the above question comes from the transfer of homeostasis theory from biology to psychology. Within physiology, Walter Cannon (1929) demonstrated that body temperature and glucose levels remained remarkably stable even when challenged by variations in the availability of their substrate. However, he also recognized that these variables exhibited variation within a stable range, hence, the Greek word homeo (meaning similar), and stasis (stable), describing processes that involve both constancy and variation. In his 1929 review, he writes “the word [homeostasis] does not imply something set and immobile, a stagnation. It means a condition ... (Cannon 1929), which he later elaborated as “a condition which may vary, but which is relatively constant” (Cannon 1932).

Cannon's discovery was that the level of a homeostatically managed variable normally fluctuates within a limited range. And from our advantaged historical perspective it seems curious that he did not write about the mid-point of that range. Had he done so, his thoughts may have led him to question what caused the range to be so precise and unchanging. But he did not and, even within physiology, over a decade passed before Hardy (1955) first used of the term 'set-point', a term borrowed from engineering, in a lecture given in 1953. However, even Hardy does not enquire, or even speculate as to what might cause the set-point to exist. He simply comments:

“If the receptors in the skin are actually serving not only as detectors of temperature change, but as thermoregulators, they must have a ‘set’ point. That is, there must be a ‘preferred’ skin temperature” (p.255). Hardy cites two references to support “evidence of the existence of such a set- point” however his Ebaugh and Thauer (1950) citation is incorrect for this purpose, since they do not, in fact, cite a ‘set-point’ while the other reference is unavailable. Thus, Hardy must be credited with the first use of the term ‘setpoint’ in physiology.

It seems extraordinary that it took 21 years for researchers to characterize the mid-point of the homeostatic range, but there are at least three reasons. First, research at that time moved slowly in general. Second, the uptake of homeostasis theory within physiology was slow. Third, identifying the midpoint required a shifted focus of attention for a mechanism, from the edges of the range to the setpoint. However, Hardy had provided the spark, and the term ‘setpoint’ soon started to be commonly used within physiology and psychology (Google Scholar recognises 280,000 citations using the term, across all disciplines, with the top-cited 10 referring to either biology (4th) or subjective wellbeing (6th).

3.3.2 Subjective Wellbeing Homeostasis

The interest in homeostasis within physiology was very slow to be effectively transferred to psychology. This was not for lack of trying. Over the several decades following Cannon’s 1932 publication, at least a dozen authors in psychology refer to ‘homeostasis’, publishing between Allport (1937) and Maze (1953). A review of research during this period describes the failure of this transfer well. Toch and Hastorf (1955) note that the authors fail to address the key functional features of Cannon’s homeostasis. Particularly, they do not specify what is being kept ‘constant’ and, instead, regard ‘psychological homeostasis’ as referring to some form of over-all psychological constancy. This then creates a straw man, which allows them to conclude the whole concept is untenable. *“When a term cumulatively acquires a series of undesirable connotations, a point is reached at which it becomes more of a liability than an asset. This point may well have been arrived at with Cannon's homeostasis as an item in the psychological lexicon”* (Toch & Hastorf, 1955, p.91).

In the following years there were sporadic attempts to resurrect homeostasis as a psychological construct, but all failed for the same reasons as before; they did not identify a stable variable under homeostatic control. For example, Menninger (1963) proposed psychoanalytic constructs, while Antonovsky (1979) proposed stress. And so it was that the failure of this earlier research to identify a variable under valid homeostatic control caused interest within psychology to wither. Indeed, it was to be a further 38 years following the Toch and Hastorf review before homeostasis was resurrected in psychology, through the identification of Subjective Wellbeing (SWB) as a ‘setpoint’ by two publications, both in the same year.

The first of these (paper accepted for publication in April, 1992) is McGue, Bacon, and Lykken (1993) whose study of monozygotic twins not only confirmed temporal SWB stability, but also gave rise to the proposition that the return of SWB to its pre event level following change was due to a stable set-point hypothesis, predominantly influenced by genetic factors. They studied SWB measured by the Well-Being scale of the Multidimensional Personality Questionnaire (WB-MPQ: unpublished) and claimed that “typically within 1 year, sense of wellbeing has returned to its pre-event level (i.e., to a stable set point that we hypothesize is predominantly influenced by genetic factors)” (p. 105). Notably, however, McGue et al. did not make any direct measures of their own to support this statement but instead use as evidence papers by Brickman, Coates, and Janoff-Bulman (1978), Okun, Olding, and Cohn (1990), Murrell and

Himmelfarb (1989), and Wortman and Silver (1982). These citations offer very weak support for their contention. Not one of these referenced papers makes mention of ‘set-point’. No such claim of a ‘one year recovery’ is made by Brickman et al. (1978), while the reference to Wortman and Silver is an unpublished conference paper. Of the other two, Murrell and Himmelfarb (1989) studied depression following bereavement, not SWB, while Okun et al. (1990) comprises a meta-analysis of short-term intervention effectiveness among people who were institutionalized and elderly. They do not systematically describe the scales used to measure ‘SWB’. In summary, the references cited by McGue et al. (1993) weakly, if at all, justify these authors use of the term ‘setpoint’.

The second paper, also published in 1993, proposes a “set-point hypothesis of psychological functioning” (Williams & Thompson, 1993) (p.44). These authors state “The major tenet of this model is that psychological function may be normally maintained within a particular bandwidth around a specific set-point by psychological forces and by effects upon and influences extended by one's own physiology” (p.45).

Disappointingly, however, their model provides nothing more substantial than an idea transferred from physiology. The authors struggle to give their description some additional basis in psychology. Their description of ‘psychological functioning’ is circular, as “having a substantial basis in physiology with a specified level or set-point and a surrounding “bandwidth” of typical behavior for a given individual” (p.44). But they provide no empirical psychological evidence to support this contention.

Since it was thought at that time that personality was stable, they bring this into their description stating that “personality or psychological function is, at least in part, physiologically regulated” (p.44), but they cite no evidence for the physiological regulation of personality. They continue; “the set-point hypothesis of psychological function is drawn directly from the set-point theory of obesity (Keesey, 1986; Keesey & Powley, 1986)” (p.44-45). In fact, these two texts are exclusively concerned with body weight homeostasis and neither mention either personality or ‘psychological functioning’ in the sense of being related to a ‘bandwidth of typical behavior’. Thus, Williams and Thompson have composed this link in the absence of confirmatory scientific evidence. Most importantly, their speculation does not extend to the nomination of a single, measurable psychological variable that is under homeostatic control.

3.3.3 A Setpoint for Subjective Wellbeing

Shortly after the Williams and Thompson (1993) paper was published, R.A. Cummins (1995) reported a high level of consistency in the average level of subjective wellbeing (SWB) between surveys from different sources and speculated “*One explanation for this result could be the existence of a psychological, homeostatic mechanism...*” (p.193). Some three years later R. A. Cummins (1998) confirmed the population-level SWB stability and further speculated:

“It is proposed that life satisfaction is a variable under homeostatic control and with a homeostatic set-point ensuring that populations have, on average, a positive view of their lives. However, the factors that influence this set-point between 80 to 60 [percentage points] cannot yet be specified” (p.330). This was soon followed-up by an extended description of setpoints in the context of a Homeostatic Model (R. A. Cummins, 2000c).

The next major insight arrived seven years later, when Davern, Cummins, and Stokes (2007) discovered that the core of SWB was affect, in the form of Homeostatically Protected Mood

(HPMood). Then, a further seven years were to pass before the empirical demonstration of HPMood setpoints was achieved (R. A. Cummins, Li, Wooden, & Stokes, 2014a) and replicated (Capic, Li, & Cummins, 2018b). Thus, it became understood, that SWB is a composite variable. It is formed by an affective core (Homeostatically Protected Mood) which is genetically determined to have an unchanging, positive level for each person: their setpoint. The other component of SWB is emotion, which is normally volatile and reflective of cognitive-affective information processing.

As far as is known in 2024, this research remains the only empirical demonstration of homeostatic setpoints in psychology. It also explains the conundrum posed by the homeostatic process, which both causes SWB stability and yet allows SWB to change.

3.3.4 The ‘triage’ interpretation of SWB levels

By 2008, Cummins, Woerner, Gibson et.al. had established that the normal range for the SWB of individuals is between 50-100 percentage points (pp) (see their Figure 4.34. Appendix table 4.15). Moreover, the data within this range describe a normal distribution (Figure 2.26). It was also established that only 4.7% of the population had a level below 50pp. By 2014 this description had been refined (R. A. Cummins, 2014b) by the demonstration of SWB Set-Points (see above) and additional understanding that the measured SWB range of values can be divided into three portions: below 50pp represents homeostatic failure (Richardson, Fuller-Tyszkiewicz, Tomy, & Cummins, 2016); between 50-70pp represents the zone of homeostatic compromise, where all values lie below their set point but not so far below as to necessarily represent homeostatic defeat; and values above 70pp represent homeostatic integrity, where most SWB values lie within their set point range (R. A. Cummins et al., 2014a). Most recently, Melissa Weinberg has formalized this diagnostic triage (M. K. Weinberg, 2018) as follows:

3.3.4.1 The diagnostic triage for the subjective wellbeing of individuals

1. *Scores between 70 and 100pp = Well (W: normal homeostatic control)*
2. *Scores between 50 and 69pp = UnderWell (UW: challenged homeostatic control)*
3. *Scores between 0 and 49pp = NoWell (NW: defeated homeostatic control)*

3.3.5 Interpretive traps for the unwary

The interpretation of Subjective Wellbeing (SWB) data is a fraught process. Such data cannot be validly interpreted by using a ‘common sense’ view based on personal experience. The simplest example of such misinterpretation comes from SWB mean scores. When people go to a country fair and enter a competition to guess the weight of a prize-winning potato, they may reason their guess by creating a bracket of weights. They surmise the lowest possible weight as 0.7Kg, the highest possible weight 1.3Kg, then assume the midpoint as their guessed weight 1.0Kg. Using a similar logic, applied to the level of satisfaction ‘most people feel with their life’ rated on a ‘percentage point’ scale (pp) from 0pp (no satisfaction) to 100pp (complete satisfaction), the population average would be guessed as 50pp. However, this guess is completely wrong. The correct number is 75pp. The reason is that each person’s level of SWB is under active management, as explained in sections 3.3.2 to 3.3.4, and demonstrated through normative values in Chapter 5.

In fact, individual levels of SWB at or below 50pp signal homeostatic failure (see 3.3.4) and a high probability of depression (Joshano 2022). Individuals with significant depression have

lost Homeostatically Protected Mood (HPMood) from their consciousness (See 3.3.3 and 3.3.4). That is, the strong and dominating presence of negatively valenced emotion in their consciousness has displaced HPMood. Thus, HPMood is absent from their measured level of SWB.

This is crucial information for the interpretation of SWB results. As demonstrated by Richardson et al. (2016), one consequence of SWB levels <50pp is a loss of the correlations that are normally present between measures of SWB and other self-report variables. These intercorrelations are dependent on such variables sharing a strong, and unvarying, HPMood component. When that HPMood content is removed from consciousness, the level of these correlations drastically reduces (Lai & Cummins 2013). For a more detailed explanation as to how HPMood accounts for the automatic inter-correlation of self-report variables see Cummins (2023b).

One knock-on consequence of this phenomenon is that data provided by people with strong levels of depression display abnormal psychometric characteristics for all correlation-based statistics. Most obviously, their self-report variables only weakly intercorrelate with one another. A further insidious consequence is apparent in samples recruited from ‘incentivised online panels’, which typically comprised an abnormally high proportion of such people (Weinberg et al., 2018). Given the widespread use of online panels to collect data in the modern era, these authors issue a caveat emptor in terms of data interpretation.

3.4 Concluding statement concerning the interpretation of SWB data

The understanding provided by combining homeostasis theory with the diagnostic triage has profound implications for the allocation of human services. These are defined by Wikipedia as having “*the objective of meeting human needs through an applied knowledge base, focusing on prevention as well as remediation of problems, and maintaining a commitment to improving the overall quality of life of service populations.*”

One common aim of such services, to ‘improve overall quality of life’, includes an intention to increase people’s levels of subjective wellbeing or happiness. In order for this aim to be effectively operationalized requires the effective allocation of services. Most particularly, if such services are allocated to people who are ‘well’ (with a level of SWB between 70-100pp) then their level of SWB is already under homeostatic control and any effort to increase their level of SWB will be opposed by counteractive homeostatic forces. This conclusion seems not only logical but also without scientific opposition.

However, providing such services to people with a level of SWB that is between 50 and 69pp (underwell), and most especially for those whose level is below 50pp (nowell), has a high probability of raising SWB provided that the nature of the service is relevant to the cause of the homeostatic defeat. This information is highly relevant to the efficient delivery of social services because these low SWB groups are generally not the main recipients of generic social services. That is, within general Australian population samples (R. A. Cummins, Okerstrom, Woerner, & Tomy, 2005e), about 70% of each sample comprises people in the ‘Well’ range (70-100pp). As described above, these people will not further increase their SWB as the result of a services intervention. Additionally, a further 25% of the general population samples are in the ‘UnderWell’ range (50 – 69pp), who may or may not show a positive response to an intervention. While the people most in need, who are in the ‘NoWell’ range (0 to 49pp), and who are the most likely to experience a SWB benefit, are represented by just 4% of the national

samples.

In summary, it is evident that blanket increases in the provision of social services to general population groups is a very inefficient strategy by which to increase population levels of SWB. A far more efficient use of resources is to target those people likely to be experiencing homeostatic failure (see 3.3).

Such an approach is consistent with ‘Proportionate Universalism’ (Marmot 2010). This term describes whole population interventions, implemented with a scale and intensity proportionate to the needs of individuals. Through this strategy, proportionate universalism aims to reduce the steepness of the social gradient in general wellbeing.

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4. PWI psychometrics and performance

Citation: International Wellbeing Group. 2024. Personal Wellbeing Index psychometrics and performance. In: Personal Wellbeing Index Manual: 6th Edition, Chapter 4, Version 1.0: 290224, pp 4-1 to 4-13. Editor, Cummins, R. A. Australian Centre on Quality of Life, Deakin University - Melbourne Campus.

<http://www.acqol.com.au/publications#Open-access>

Acknowledgement: The International Wellbeing Group acknowledges the assistance of Nova Hartanty in the preparation of this chapter.

4.1 Psychometric Overview

The PWI scale is constructed as a Formative Index (see Chapter 1.4.2). It comprises seven items of satisfaction, each one corresponding to a quality-of-life domain as: standard of living, health, achieving in life, relationships, safety, community-connectedness, and future security. These seven domains are theoretically embedded, as representing the first level deconstruction of the global question: ‘How satisfied are you with your life as a whole?’ (Global Life Satisfaction: GLS).

The basic psychometric characteristics of the PWI in Australia have been described (R. A. Cummins, Eckersley, Pallant, Van Vugt, & Misajon, 2003a). Cumulative psychometric characteristics of the scale and Australian norms are provided in the many reports on the Australian Unity Wellbeing Index <https://www.acqol.com.au/publications#reports>. Psychometric results from other countries concerning scale composition, reliability, validity, and sensitivity are provided ad hoc in this chapter, and also by searching Google scholar.

4.2 Defining the measured construct of subjective wellbeing

The seven items of satisfaction comprising the PWI scale conform to the following three specifications:

4.2.1. Degree of abstraction (abstract & specific): ‘While the classic “Satisfaction with life as a whole” (Global Life Satisfaction: GLS) question is useful as an estimate of the homeostatic set-point for Homeostatically Protected Mood (Capic et al., 2018b), due to its high level of abstraction, GLS cannot provide information about the components of life that also contribute, positively or negatively, to the sense of wellbeing. In order to approach such information, semi-abstract questions are directed at satisfaction with life domains (Cummins, Eckersley, Pallant, Van Vugt, & Misajon, 2003, p. 164).

4.2.2. Distance from self (proximal & distal): ‘Distance from the self, ranges from highly personal (proximal) to societal/global (distal). Since the purpose of homeostasis is to maintain a sense of personal wellbeing, the influence of the generalized “positive bias” effect, generated by HPMood, decreases as satisfaction evaluations move away from self to, for example, family and friends, and is very much reduced in relation to the broader society. Thus, as evaluations of satisfaction move from proximal (personal) to distal (societal), the overall level of homeostatically-derived satisfaction diminishes, and the evaluation process becomes

increasingly influenced by factors other than simply the need to protect the self from negative appraisals (Cummins et al., 2003, p. 165). Because of this, the PWI items are all proximal.

4.2.3. Sensitivity to change (low & high): “As domains are distanced from the homeostatic influence by becoming more distal and/or more specific, they show greater variability and sensitivity to change in objectively measured life conditions” (Cummins et al., 2003, p.165). Because of the requirement for items to represent the homeostatic influence, the PWI items are all personal and semi-abstract.

4.3 Reliability

4.3.1 Internal reliability

Cronbach alpha of the PWI generally lies between .80 and .90 in Australia and internationally, as demonstrated by the following studies:

"Jovanović, Cummins et al. (2019) sampled adults in Australia, Bosnia and Herzegovina, Croatia, and Serbia. They report Cronbach alphas (p. 765) of: $\alpha = .80$ in Australia; $\alpha = .89$ in Bosnia and Herzegovina; $\alpha = .85$ in Croatia; $\alpha = .88$ in Serbia. Similar Cronbach alphas were found among undergraduates in five countries (Jovanović, 2019, p. 1374): $\alpha = .88$ in Austria, $\alpha = .86$ in Bosnia and Herzegovina, $\alpha = .84$ in Croatia, $\alpha = .88$ in Montenegro, and $\alpha = .84$ in Serbia."

Smyth, Nielsen, and Zhai (2010) sampled adults in Chinese cities and found that “The Cronbach coefficient for the PWI among this sample is 0.81” (p. 240).

Melissa K Weinberg, Bennett, and Cummins (2016) found” “Cronbach’s alpha reliability scores for both people with end-stage kidney disease and their general Australian sample were both 0.89 (p. 1231).

4.3.2 Temporal reliability

Anglim, Weinberg, and Cummins (2015) Used PWI data with at least seven waves and reported correlations between base-line and one year as $r = .76$ and between baseline and six years was $r = .67$ (p.11).

4.4 Validity

Cronbach and Meehl (1955) provide a generic history of validity testing.

4.4.1 Content Validity

Content validity is established by showing that the scale items are a sample of a larger universe of meaning, such as ‘Subjective Wellbeing’. Content validity may be established deductively (involving inferences from general principles), by defining the universe of items (e.g. a list of life domains that are regarded as a part of Subjective Wellbeing), and then sampling systematically within this universe to establish a smaller, reliable set of items. (Cronbach & Meehl, 1955, p. 282) (p.282). This was the initial procedure used to establish the Comprehensive Quality of Life Scale, which is the precursor instrument to the PWI (R. A. Cummins, 1996).

4.4.2 Factor analysis

The PWI is designed as a single index measuring a single construct as Subjective Wellbeing. Thus, the seven domains should consistently form a single stable factor. This has been confirmed, and the domains typically account for about 50% of the variance in Australia and other countries. This single factor is also consistent with the Formative construction of the PWI (see Chapter 1.4.2 Multi-item scales). In terms of individual demonstrations:

Using Australian data, Anglim et al. (2015) report a factor analysis showing clear support for a one factor solution with item loadings ranging from .60 to .79. The intra-class correlation is .72, indicating that 72% of variance in SWB is due to differences between people.” (p.6).

4.4.3 Construct validity

Construct validity concerns how well a set of indicator variables represent a concept that is not directly measurable. It is “The most necessary type of validity in scientific research” (Jacoby, 1978) (p.92). Construct validity has been established for the PWI by the processes of Formative Scale construction (see Chapter 1.4.2). The construct validity of the PWI has also been repeatedly demonstrated, using multiple regression, as a set of domains which reliably represent the first level deconstruction of Global Life Satisfaction (GLS: Satisfaction with life as a whole) (see Chapter 4, Appendix A and Chapter 6). An example of this construct validity is illustrated by Table 4.1, which has been extracted from Appendix 4A-1. This appendix contains 7 examples of such multiple regressions, each using data from a different survey within the Australian Unity Wellbeing Index series (<https://www.acqol.com.au/publications#reports>). Each survey has an N of about 2,000, and each survey sequence number is indicated in the top-left corner of each table.

Table 4.1

Survey 3	1	2	3	4	5	6	7	B	β	sr ²
1. Life as a Whole								.29**	.30	.061
2. Standard of Living	.57							.07**	.09	.006
3. Health	.35	.32						.23**	.23	.039
4. Achievements	.53	.39	.30					.17**	.21	.034
5. Relationships	.45	.31	.18	.37				.03*	.04	.001
6. Safety	.31	.30	.26	.24	.21			.03	.03	.001
7. Community	.30	.25	.18	.29	.29	.27		.13**	.14	.013
8. Future security	.48	.49	.30	.39	.24	.42	.32			
								Total unique variance	.155	
								Total shared variance	.355	

**p<.01; *p<.05
R² = .51

Table 4.1 ‘survey 1’ represents the regression of the seven PWI domains against ‘Satisfaction with life as a whole’ (Global Life Satisfaction: GLS). This form of analysis produces three different estimates of the extent to which the domain data account for variance in GLS as:

(a) The total variance accounted for in GLS by the domains in combination. This is designated by R² and indicates that 51% of the variance in GLS can be accounted for. This is a measure of construct validity. However, this contribution can be broken down into two components.

(b) The unique variance contributed by each domain. This is the overlapping variance between, for example, Standard of living and GLS, that is not common to any of the other domains. This unique variance is represented by the sr² statistic, for example .061 for Standard of living. It is calculated as the square of the ‘Part’ statistic that can be requested from SPSS in association with a multiple regression. When this sr² value is multiplied by 100 it gives the percentage of

unique variance contributed by the domain (here 6.1%). In other words, the Standard of living domain makes a unique 6.1% contribution to the variance overlap between the PWI and GLS. Such domain-level statistics help to understand the precise nature of the PWI vs GLS construct validity.

(c) The shared variance is contributed by the domains in common. This is the overlapping variance that is common to all domains, and which is also shared by GLS. The calculation of this shared variance is determined by subtraction. When the total of unique variance (15.5%) is subtracted from the total variance accounted for (51%), it yields 35.5% shared variance.

4.4.2.1 Construct validity of the PWI domains

The 7 multiple regression analyses in Appendix 4A-1 demonstrate that the combination of both unique and shared variance by the seven domains typically account for about 50 percent of the variance in ‘Satisfaction with Life as a Whole’. However, these regression analyses also reveal that the 7 domains do not equally represent the GLS variance. In particular:

(a) The three domains of Standard of living, Achieving in life, and Personal relationships account for most of the significant unique variance. For this reason, these three domains can be used as the PWI short-form (see Chapter 2.3).

(b) The domain of ‘Personal safety’ almost never makes a unique contribution in Australia but is retained because it does so in other countries (Appendix 4A-2: Argentina, Slovakia). It is also the domain with the highest level of satisfaction within the PWI in a sample of people with cancer in a Multi-instrument Comparison Study of 8022 individuals from 6 countries (Chen, 2023).

(c) The discretionary domain of ‘Spiritual or religion’ normally makes no unique contribution in Australia (Caras, 2003) but it has been shown to do so in Hong Kong within some religions but not others (L. C. H. Lai, Cummins, & Lau, 2018).

NOTE: Chapter 6 (in preparation) presents Australian normal ranges for the above multiple regression statistics.

4.4.4 Convergent validity

Convergent validity refers to the degree to which two measures, that theoretically should be related, are in fact related. Given that the Satisfaction With Life Scale (SWLS) “is narrowly focused to assess Global Life Satisfaction (GLS)” (Diener et al., 1985: abstract) and that the PWI is designed as the first-level deconstruction of GLS (Chapter 1.4.2), it might be expected that the SWLS and PWI would correlate strongly with one another. This is indeed the case (.78: Renn et al. 2009) and (.75: Anglim et al., 2015). Both scales also show much the same degree of relationship to other measures. For example, in an Indian sample, Mughal and Khanam (2013) report a .74 correlation between the Satisfaction With Life Scale (Diener et al., 1985) and the life satisfaction subscale of the ICP Subjective Well-Being Scale.

4.4.5 Discriminant validity

Campbell and Fiske (1959) introduced the concept of discriminant validity noting that “For the justification of novel trait measures... or for the establishment of construct validity,

discriminant validation as well as convergent validation is required. [the claim for a novel construct] can be invalidated by too high correlations with other [constructs] from which they were intended to differ” (p.81). This opinion is reinforced by Fiske (1982), supported by Lucas, Diener, and Suh (1996), and mirrored by Wikipedia “In psychology, discriminant validity tests whether concepts or measurements that are not supposed to be related are actually unrelated.”

These authorities also agree that discriminant validity is especially important in measures of ‘wellbeing’ due to two pervasive factors. First is the risk of construct duplication created by the broad nature of the discovered factors. Second is the lack of rules governing nomenclature, which has produced an impenetrable jungle of terms. For example, Gatt, Burton et al. (2014) use the terms Mental Health, Wellness, Wellbeing, Psychological Wellbeing, and Subjective Wellbeing as though they represent different constructs, but fail to clearly define the essential differences between them. The unfortunate result is that naïve readers fall victim to what (Kelley 1927) referred to as the “jangle fallacy”—the belief that two constructs [e.g., mental health and wellness] are different simply because they have different names [Jangle: to utter or sound in a discordant, babbling, or chattering way (Merriam-Webster, 2023)].

The effect of these two factors acting together has reduced much of the subjective wellbeing (SWB) literature to gibberish. Authors commonly make quite specific claims of interpretation in reference to some complex factorial structure they have discovered, often through a data fishing expedition, with no apparent concern for either the low discriminative validity of their factors or the multi-faceted nomenclature employed.

One reason for this unfortunate aspect of the SWB literature is the lack of theory. Very few authors test their SWB results against a theoretical framework. Rather, they simply describe their results on empirical grounds which, in the absence of theoretical rationale, have the appearance of flailing arms and legs. One alternative to this unilluminating spectacle is to use results to test propositions derived from the Theory of Subjective Wellbeing Homeostasis. For a historical account of the HPMood discovery process see (R. A. Cummins, 2021x) and for an account of Subjective Wellbeing Homeostasis as a process see Chapter 3, part 4.

How Subjective Wellbeing Homeostasis Theory explains low discriminative validity

The fundamental basis of homeostasis theory in psychology lies in the pioneering work of Russell (2003), who used a circumplex model to describe an affective classification system. In this context, he coined the term core affect, to describe a neurophysiological state experienced as a basic feeling (mood). Russell describes core affect using the homeostatic analogy of felt body temperature. It is always there, it can be accessed when attention is drawn to it, extremes are most obvious, and it exists without words to describe it.

This idea of ‘core affect’ was subsequently simplified (Davern et al., 2007) and theoretically contextualized (R. A. Cummins, 2017a) into a simple mood under homeostatic control. Now referred to as Homeostatically Protected Mood (HPMood), this central mood comprises an amalgam of three affects (content, happy, alert). HPMood has a number of special characteristics. It is:

- (a) Held at a stable, genetically determined level (setpoint) for each person.
- (b) Each person’s setpoint has an idiosyncratic level for that person. (Capic et al., 2018b; R. A. Cummins et al., 2014a).

(c) HPMood forms a part of all self-report data (R. A. Cummins, 2023a).

(d) A single level of HPMood will be present in all self-evaluative responses produced by the same individual, causing those responses to share variance (correlate) with one another.

(e) As a result of these characteristics, self-report variables such as happiness, subjective wellbeing, self-esteem, etc automatically correlate with one another when using group raw data. Thus, the requirement for such variables to display discriminative validity is unrealistic using correlational results based on raw data.

(f) This low discriminative validity due to HPMood, can be demonstrated by using HPMood as a covariate. For example, L.C. H. Lai and Cummins (2013) report the bi-variate correlations between 7 self-report variables, one of which is HPMood. All of these bi-variate correlations are highly significant. They also report that when each of these variables is used as a covariate for the other bi-variate relationships, all of these correlations are significantly reduced. However, the largest reduction in these bi-variate relationships is produced by using HPMood as the covariate (their Table 4). Thus, discriminative validity as measured by the strength of relationship between these 7 variables is greatly diminished due to the presence of HPMood. This result is consistent with Homeostasis theory.

4.5 Sensitivity

The combined survey mean scores from 34 surveys of the Australian population have produced a maximum variation of 2.6 percentage points in subjective wellbeing (see Australian Unity Wellbeing Index Report 36.0) despite major national events within this period. This low level of sensitivity is consistent with the high level of stability predicted by the theory of subjective wellbeing homeostasis. This applies both in Australia (e.g. Cummins et al., 2005) and other countries (e.g. Lau et al., 2004; Tiliouine, Cummins & Davern, 2005).

4.6 Short form of the PWI

See Chapter 2 for a description of the 3-item PWI short-form

4.7 Parallel Forms the PWI Scale

Parallel forms of the PWI have been created to allow an appropriate version of the scale to be used with the following population sub-groups:

PWI-A: designed for use with the general adult population, aged at least 18 years.

PWI- SC: designed for use with school-age children aged at least 12y and adolescents.

PWI-ID: designed for use with people who have an intellectual disability or other form of cognitive impairment.

For the psychometric equivalence of these parallel forms: see each manual.

4.8 PWI Scale and Manual Translations

These are available from: <http://www.acqol.com.au/instruments#measures>

PWI-ID: Cummins, R.A. and Lau, A.L.D. (2005). *Personal Wellbeing Index – Intellectual Disability*. 3rd Edition.

Cummins, R.A. and Lau A.L.D. (2005). *Personal Wellbeing Index – Intellectual Disability*. 3rd Edition (Chinese-Cantonese).

PWI-SC: Cummins, R.A. and Lau, A.L.D. (2023). *Personal Wellbeing Index – School Children*. 4th Edition.

Cummins, R.A. and Lau, A.L.D. (2005). *Personal Wellbeing Index – School Children*. 3rd Edition (Chinese-Cantonese).

4A APPENDIX for CHAPTER 4

4A Construct validity through multiple regression

4A-1 Australian data

Explanation: The following analyses have simultaneously regressed the 7 PWI domains against Global Life Satisfaction (GLS). The Australian data have come from the Australian Unity Wellbeing Surveys (<https://www.acqol.com.au/publications#reports>) of the general population, each with an N of around 2,000 respondents. The data for surveys 3 to 7 were collected in 2001 – 2003.

Surveys 1 and 2 are omitted as they were deemed to be unreliable.

Survey 3	1	2	3	4	5	6	7	B	β	sr ²	
1. Life as a Whole											
2. Standard of Living	.57							.29**	.30	.061	
3. Health	.35	.32						.07**	.09	.006	
4. Achievements	.53	.39	.30					.23**	.23	.039	
5. Relationships	.45	.31	.18	.37				.17**	.21	.034	
6. Safety	.31	.30	.26	.24	.21			.03*	.04	.001	
7. Community	.30	.25	.18	.29	.29	.27		.03	.03	.001	
8. Future security	.48	.49	.30	.39	.24	.42	.32	.13**	.14	.013	
									Total unique variance	.155	
									Total shared variance	.355	

**p<.01; *p<.05
Adj R² = .51

Survey 4	1	2	3	4	5	6	7	B	β	sr ²	
1. Life as a Whole											
2. Standard of Living	.61							.36**	.37	.089	
3. Health	.39	.34						.10**	.12	.011	
4. Achievements	.52	.43	.33					.20**	.20	.027	
5. Relationships	.48	.35	.24	.36				.17**	.21	.035	
6. Safety	.27	.28	.26	.23	.20			.00	.00	0.00	
7. Community	.36	.29	.22	.35	.31	.34		.06**	.07	.004	
8. Future security	.43	.47	.27	.41	.30	.43	.41	.04*	.05	.002	
									Total unique variance	.168	
									Total shared variance	.352	

**p<.01; *p<.05
Adj R² = .52

Survey 5	1	2	3	4	5	6	7	B	β	sr ²	
1. Life as a Whole											
2. Standard of Living	.56							.29**	.29	.057	
3. Health	.36	.36						.10**	.11	.010	
4. Achievements	.55	.44	.32					.25**	.25	.043	
5. Relationships	.47	.31	.18	.39				.18**	.22	.040	
6. Safety	.25	.25	.19	.24	.21			.00	.00	0.00	
7. Community	.33	.27	.17	.32	.27	.31		.06**	.07	.004	
8. Future security	.39	.44	.24	.37	.27	.46	.36	.05**	.06	.002	
									Total unique variance	.156	
									Total shared variance	.334	

**p<.01; *p<.05
Adj R² = .49

Survey 6	1	2	3	4	5	6	7	B	β	sr ²	
1. Life as a Whole											
2. Standard	.55							.29**	.31	.068	
3. Health	.36	.29						.10**	.11	.011	
4. Achieve	.52	.39	.33					.23**	.24	.042	
5. Relationships	.45	.31	.22	.35				.17**	.20	.032	
6. Safety	.24	.26	.23	.19	.19			-.02	-.02	.000	
7. Community	.34	.33	.17	.32	.29	.27		.05**	.06	.003	
8. Future Security	.39	.39	.29	.29	.26	.47	.32	.08**	.10	.007	
									Total unique variance	.163	
									Total shared variance	.317	

**p<.01; *p<.05
Adj R² = .48

Survey 7	1	2	3	4	5	6	7	B	β	sr ²	
1. Life as a Whole											
2. Standard	.56							.29**	.30	.059	
3. Health	.35	.29						.10**	.12	.012	
4. Achieve	.53	.43	.32					.23**	.23	.035	
5. Relationships	.46	.33	.22	.39				.19**	.20	.033	
6. Safety	.26	.28	.23	.23	.25			-.01	-.01	0.00	
7. Community	.31	.34	.17	.31	.26	.32		.02	.02	.000	
8. Future Security	.45	.48	.25	.42	.30	.40	.41	.10**	.11	.008	
									Total unique variance	.147	
									Total shared variance	.333	

**p<.01; *p<.05
Adj R² = .48
^aTotal Unique = .15; shared = .33

Survey 8	1	2	3	4	5	6	7	B	β	sr ²
1. Life as a Whole										
2. Standard	.56							.30**	.29	.060
3. Health	.36	.32						.10**	.12	.012
4. Achieve	.54	.39	.29					.24**	.24	.040
5. Relationships	.51	.33	.19	.41				.21**	.25	.049
6. Safety	.26	.25	.24	.18	.21			.02	.02	0.00
7. Community	.36	.31	.16	.36	.28	.34		.05**	.06	.003
8. Future Security	.42	.42	.27	.38	.29	.43	.40	.06**	.07	.003
								Total unique variance		.167
								Total shared variance		.353

**p<.01; *p<.05
Adj R² = .52

Survey 9	1	2	3	4	5	6	7	B	β	sr ²
1. Life as a Whole										
2. Standard	.54							.26**	.26	.045
3. Health	.35	.32						.08**	.09	.008
4. Achieve	.57	.44	.32					.26**	.27	.049
5. Relationships	.48	.33	.23	.42				.18**	.21	.033
6. Safety	.22	.28	.22	.21	.17			-.03	-.03	.001
7. Community	.39	.34	.19	.35	.30	.26		.08**	.10	.008
8. Future Security	.43	.48	.26	.41	.28	.43	.42	.07**	.08	.004
								Total unique variance		.148
								Total shared variance		.342

**p<.01; *p<.05
Adj R² = .49

4A-2 Other countries

The data set for each survey is available from the researcher concerned.

Each analysis involves a standard multiple regression. The PART r²(%) column is derived from squaring the PART coefficients, output from SPSS, and describes the percentage of unique variance contributed by each domain.

ALGERIA

Researcher: Habib Tiliouine <htiliouine@yahoo.fr>

Sample: General population N=1417

Variable	GLS	1.	2.	3.	4.	5.	6.	B	β	sr ²
1. Standard of living	.65							.37*	.35	.073
2. Health	.60	.54						.23*	.24	.032
3. Achieve in life	.51	.46	.48					.10*	.09	.005
4. Personal rel/ships	.47	.37	.49	.50				.08*	.09	.005
5. Safety	.43	.42	.42	.38	.42			.00	.00	.000
6. Comm. connect	.48	.39	.45	.42	.45	.50		.09*	.09	.005
7. Future security	.50	.45	.38	.47	.39	.51	.51	.14*	.13	.000
* p<.001								Total unique variance		.120
Adjusted R ² = .57								Total shared variance		.450

ARGENTINA

Researcher: Graciela Tonon <gracielatonon@hotmail.com>

Sample: 2002, General population, N=492

Variable	B	β	sr ²
1. Standard of Living	.28**	.34	.066
2. Health	.06*	.09	.005
3. Achieve	.16**	.19	.018
4. Relations	.01	.01	0.0
5. Safety	.06*	.10	.006
6. Community	.11**	.16	.019
7. Future Security	-.01	-.01	0.0
Total unique variance			.114
Total shared variance			.276
Adjusted R ² = .39			
* p < .05 ** p < .001			

Sample: 2003, General population, N=189

Variable	GLS	1.	2.	3.	4.	5.	6.	B	β	sr ²	
1. Standard of living	.69							.38**	.46	.046	
2. Health	.44	.48						.05	.06	.008	
3. Achieve in life	.62	.58	.43					.24**	.31	.032	
4. Personal rel/ships	.40	.36	.29	.48				-.01	-.01	.001	
5. Safety	.47	.52	.37	.63	.48			-.06	-.11	0.11	
6. Comm. connect	.45	.31	.28	.37	.52	.50		.15**	.23	.028	
7. Future security	.45	.55	.36	.51	.23	.62	.34	.01	.01	.001	
R ² = .59									Total unique variance		.127
Adjusted R ² = .57									Total shared variance		.443
** p<.001											

Sample: 2004, General population, N=268

Variable	GLS	1.	2.	3.	4.	5.	6.	B	β	sr ²	
1. Standard of living	.52							.34**	.38	.034	
2. Health	.27	.26						.13*	.14	.013	
3. Achieve in life	.41	.32	.11					.22**	.23	.020	
4. Personal rel/ships	.31	.26	.10	.38				.10	.11	.010	
5. Safety	.22	.27	.08	.32	.27			.01	.01	.001	
6. Comm. connect	.17	.17	.02	.28	.17	.19		.02	.02	.002	
7. Future security	.10	.16	.05	.21	.25	.22	.24	-.04	-.05	.005	
R ² = .37 ^a									Total unique variance		.085
Adjusted R ² = .35									Total shared variance		.283
** p<.001 *p<.005											

CHINA - HONG KONG

Researcher: Anna Lau <anna.lau@deakin.edu.au>

Sample: General population N=180 (as comparative group with Australian sample N=180)

Variable	GLS	1.	2.	3.	4.	5.	6.	B	β	sr ²	
1. Standard of living	.50							.25*	.42	.100	
2. Health	.30	.39						.14	.07	.000	
3. Achieve in life	.56	.53	.36					.27**	.23	.030	
4. Personal rel/ships	.41	.38	.33	.50				.14**	.19	.030	
5. Safety	.34	.45	.44	.36	.33			.08	.00	.000	
6. Comm. connect	.36	.26	.20	.17	.27	.27		.10	.08	.010	
7. Future security	.40	.54	.37	.48	.43	.18	.46	.03	.01	.000	
R ² = .76 ^a									Total unique variance		.170
Adjusted R ² = .56									Total shared variance		.390
* p<.005											
^a Unique variability = .17; shared variability = .39											

Sample: General population N=460

Variable	GLS	1.	2.	3.	4.	5.	6.	B	β	sr ²
1. Standard of living	.60							.33**	.32	.060
2. Health	.43	.39						.11**	.13	.010
3. Achieve in life	.60	.55	.41					.32**	.32	.060
4. Personal rel/ships	.40	.49	.46	.44				.01	.07	.000
5. Safety	.46	.44	.47	.43	.45			.01*	.09	.000
6. Comm. connect	.47	.37	.30	.36	.52	.43		.16**	.15	.010
7. Future security	.44	.48	.45	.46	.45	.61	.44	.01	.02	.000
								Total unique variance	.140	
								Total shared variance	.360	

* p<.005
R² = .51^a Adjusted R² = .50
^aUnique variability = .15; shared variability = .36

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5. Australian Normative Data for Subjective Wellbeing

Citation: Khor, S; Fuller-Tyszewicz, M; Capic, T.; Cummins, R. A. 2024. Australian normative data for Subjective Wellbeing. In: Personal Wellbeing Index Manual: 6th Edition, Chapter 5, Version 1.0: 290224, pp 5-1 to 5-3. Editor, Cummins, R. A. Australian Centre on Quality of Life, Deakin University – Melbourne Campus

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5.1 Executive Summary

This chapter provides normative statistics for both subjective wellbeing and subjective national wellbeing in Australia.

Normative data were drawn from 38 cross-sectional surveys of the Australian Unity Wellbeing Index, each with approximately 2000 participants who agreed to a phone interview, conducted between 2002 and 2023. Participants were over 18 years old (averaging 50 years old), understood and spoke English. There was an equal gender balance, and participants mainly living in large cities according to state population distribution. The normative data do not include participants who were under 18 years of age, those who are institutionalized, who are not fluent in English, who are not reached by the survey invitation and who do not wish to participate in the survey.

The subjective wellbeing normative range is defined as the likely scores expected from 95% of a random sample of respondents. This normal range is established from both the mean (average) and standard deviation (a standardized method of reporting the spread of values) of respondents within these 38 cross-sectional surveys. The upper and lower limits of the normative range are taken as two standard deviations above and below the mean scores, respectively. An exception is the situation when two standard deviations above the mean exceeds the maximum possible score of the scale (100 percentage points: pp). The upper normative range is capped at 100pp in these instances. Likewise, the lower limit to the normative range is capped at 0pp.

Normative data for the Australian Unity Wellbeing Index are presented in two formats:

- 1) By aggregating **individual scores** across all surveys (Table 1). The usefulness of this estimation is to allow a determination of whether a single score presented from an individual person falls within the normal Australian range.
- 2) By combining the **mean scores** from multiple surveys (Table 2). The usefulness of this estimation is to allow a determination of whether a sample mean score, calculated from a different sample of respondents, falls within the normal Australian range for grouped data.

In summary, if a value from an Australian sample lies outside these normative ranges, that result must be regarded as abnormal. Further issues of interpretation in the use of normative statistics are detailed later within this chapter.

5.1.1 Table 1. Full Sample using *data from individuals*

Variable	Normative range				
	<i>Obs</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>(-2SD)</i>	<i>(+2SD)*</i>
<i>Global Life Satisfaction</i>	71823	77.2	16.98	43.28	100
Personal Wellbeing Index	69450	75.4	12.64	50.12	100
Standard of living	71867	78.3	16.85	44.55	100
Health	71867	74.3	19.54	35.24	100
Achieving	71440	73.3	18.63	36.05	100
Relationships	71513	79.2	21.26	36.70	100
Safety	71678	80.1	17.52	45.01	100
Community connectedness	71457	71.1	19.87	31.64	100
Future security	70846	71.2	19.84	31.53	100
<i>Global National Wellbeing</i>	71636	82.9	17.3	48.38	100
National Wellbeing Index	66006	61.7	14.7	32.43	91.03
Economic Situation in Australia	70654	64.0	19.5	25.03	100
State of Natural Environment	71236	61.1	19.0	23.03	99.07
State of Social Conditions	70800	63.0	18.1	26.68	99.24
Government in Australia	71042	53.3	24.6	4.10	100
Business in Australia	69161	61.8	17.8	26.19	97.43
National Security	70112	67.1	19.5	28.20	100

*The upper limit for the normative range is capped at the maximum possible value of the scale score.

5.1.2 Table 2. Normative ranges calculated by combining survey mean scores

Variable	Normative range				
	<i>N</i>	<i>M</i>	<i>SD</i>	(-2 <i>SD</i>)	(+2 <i>SD</i>)
<i>Global Life Satisfaction</i>	38	77.25	1.11	75.02	79.48
Personal Wellbeing Index	38	75.43	0.66	74.11	76.75
Standard of Living	38	78.32	1.16	75.99	80.65
Health	38	72.29	0.99	72.31	76.27
Achieving in Life	38	73.31	0.91	71.50	75.12
Personal Relationships	38	77.86	1.12	77.01	81.48
Personal Safety	38	80.09	1.93	76.22	83.96
Community Connectedness	38	71.15	1.16	68.83	73.47
Future Security	38	71.25	1.12	68.83	73.47
<i>Global National Wellbeing</i>	38	82.90	1.35	80.20	85.59
National Wellbeing Index	38	61.70	1.38	58.94	64.47
Economic Situation in Australia	38	63.89	3.40	57.10	70.69
State of Natural Environment	38	61.16	2.51	56.14	66.17
State of Social Conditions	38	62.99	1.47	60.06	65.92
Government in Australia	38	53.17	4.30	44.56	61.78
Business in Australia	38	61.74	1.77	58.20	65.27
National Security	38	67.17	2.84	61.48	72.85

Note. N=The number of surveys, each supplying a mean score that has been used as data

THE END