

Robert A. Cummins and Melissa K. Weinberg

Introduction

This chapter begins with an overview of Subjective Wellbeing (SWB) and the processes of management called SWB homeostasis. This is relevant to the subsequent evaluation of SWB scales since homeostatic theory makes predictions as to the ability of such scales to reliably support more than one factor. The scales are then evaluated with this prediction in mind.

Defining Subjective Wellbeing

Most commonly, Subjective Wellbeing (SWB) is regarded as a composite construct. In 2006, Diener published a set of guidelines for nomenclature endorsed by some 50 prominent researchers in the area. According to this document, wellbeing and SWB are seen as synonyms, so it is not surprising to see that the description of SWB is highly inclusive. These guidelines describe SWB as referring “to all of the various types of evaluations, both positive and negative, that people make of their lives. It includes reflective cognitive evaluations, such as life satisfaction and work satisfaction, interest and engagement, and affective reactions to life

events, such as joy and sadness. – [It] is an umbrella term for the different valuations people make regarding their lives, the events happening to them, their bodies and minds, and the circumstances in which they live.” (pp. 399–400). So, within this definitional framework, subjective wellbeing is an inclusive term for the subjective experience of life.

For the purpose of constructing this chapter, the definition of SWB will be considerably tightened. This is assisted by the following empirical results and reasoning:

1. The above definition makes two assumptions, both of which are highly contestable. The first is that ‘life satisfaction’ reflects a cognitive evaluation. In this context, ‘life satisfaction’ is intended to mean some variation of the question first asked by Andrews and Withey (1976) ‘How do you feel about your life as a whole’ (p. 66), with respondents using a 7-point Delighted – Terrible response scale. More recently, the item has been commonly phrased ‘How satisfied are you with your life as a whole?’ and the response scale presents levels of satisfaction. This single-item measure is termed General Life satisfaction (GLS) and three articles report that GLS is dominated by its affective content.

In the first of these studies, Davern et al. (2007) found that the three affects of content, happy and excited, in combination, accounted for >50 % of the variance in GLS, even in the presence of items measuring the five factors of personality (NEO-PI-R; Costa and

R.A. Cummins (✉) • M.K. Weinberg
School of Psychology, Deakin University, Melbourne,
VIC 3125, Australia
e-mail: robert.cummins@deakin.edu.au;
melissa.weinberg@deakin.edu.au

McCrae 1992) and seven items derived from Multiple Discrepancies Theory (Michalos 1985). The second such report (Blore et al. 2011) studied the composition of the 4th edition of the Personal Wellbeing Index (PWI: International Wellbeing Group 2013). This scale is described in detail later. Most essentially, it is designed as the first – level deconstruction of GLS, so the two measures are closely related to one another. Blore et al. (2011) found that the three affects of content, happy and active, in combination, accounted for over 50 % of the variance in the PWI after accounting for variance contributed by 7 items derived from Multiple Discrepancies Theory (Michalos 1985), and extraversion and neuroticism measured through the Ten-Item-Personality-Inventory (TIPI; Gosling et al. 2003). The third report (Tomin and Cummins 2011) confirmed the Blore et al. (2011) results within a sample of Australian adolescents.

The results from these three studies show a high level of agreement and lead to the following conclusions: (a) Both GLS and SWB, as measured by the PWI, are dominantly affective constructs. (b) All three of the cited publications show that the variance accounted for by these regressions is heavily dominated by shared, rather than by unique variance. It has been suggested that the source of this shared variance is Homeostatically Protected Mood (HP Mood: Cummins 2010) which therefore dominates the composition of SWB.

2. The affective content of SWB is normally sourced not from emotion, as inferred by the Diener (2006) definition, but from mood. Following Russell (2003), an emotion is defined as an acute affect generated by some percept and involving cognition, while mood is defined as chronic, trait-like affect, generated automatically without a percept. When Davern et al. (2007) used 31 affects to predict GLS, the question they gave to respondents was ‘please indicate how each of the following describes your feelings when you think about your life in general.’ Clearly this is intended to tap mood rather than emotion.

3. The affective content of SWB does not normally comprise negative affect. Davern et al. (2007) used multiple regression to determine which of 31 affects, when regressed in combination to predict GLS, were able to contribute unique variance to the prediction. These affects covered all four quadrants of the circumplex (Russell 1980). The six affects that contributed unique variance were: excited, content, happy, satisfied, stressed and pleased. The only one of these that could be considered negative is ‘stressed’, and the valence of this is ambiguous. Certainly, the positive affects dominate SWB in normal population samples.

In summary of the story so far, the cited results and presented logic do not support the contention that under normal operational levels SWB is dominantly evaluative. Neither does it support the contention that the affective component has a significant emotional content nor that it comprises significant negative affect. However, all this is predicted to change under strongly negative circumstances of living.

This proposition, that the composition of SWB shifts under adverse circumstances, is informed by the theory of subjective wellbeing homeostasis (Cummins 2010, 2013). This theory is based on various empirical and logical building-blocks. Most fundamentally, each person has a set-point for the level of their GLS (Cummins et al. 2014), and a *normal range* around this set-point, within which their GLS is generally found. The mechanism by which GLS is held within its set-point-range is provided by Homeostasis theory. This proposes a management system that acts to defend SWB against emotional reactions, either positive or negative, threatening to move SWB outside its normal operating range. The combination of set-points and homeostasis is mainly responsible for the stability of SWB over time, as shown from repeated cross-sectional surveys in Australia (Cummins et al. 2012) and Macau (Rato and Davey 2012; Rato et al. 2007–2009).

It is proposed that both set-points for GLS and the SWB management system have a strong

genetic basis (Cummins et al. 2014) and that proper functioning of this homeostatic system is essential to life. At normal levels of wellbeing people feel good about them self, are well motivated to conduct their lives, and have a strong sense of optimism. When this homeostatic system fails, however, these essential qualities are severely compromised, and people are at risk of depression (Cummins 2010). This can come about through such circumstances as exposure to chronic stress, chronic pain, failed personal relationships, etc.

Fortunately, however, the homeostatic system is remarkably robust. Many people live in difficult personal circumstances that may involve low income or medical problems, and yet manage to maintain normal levels of wellbeing. This is why SWB is so stable when averaged across the population. But as with any human attribute, some homeostatic systems are more robust than others. Or, put around the other way, some people have fragile systems that are prone to failure.

Homeostatic fragility, in these terms, can be caused by two different kinds of influence. The first is likely to be genetic. Some people have a constitutional weakness in their ability to maintain wellbeing within the normal range, perhaps due to them having a low set-point. The second influence is the experience of life. Here, as has been mentioned, some experiences, such as chronic stress, challenge homeostasis. Other influences, such as intimate personal relationships, strengthen homeostasis by acting as buffers.

In summary, personal wellbeing is under active management and most people are able to maintain normal levels of wellbeing even when challenged by negative life experiences. A minority of people, however, has weaker homeostatic systems as a result of either constitutional or experiential influences. These people are vulnerable to their environment and constitute identifiable population sub-groups with predictably low SWB such as informal carers (Cummins et al. 2007), people who are unemployed (Cummins et al. 2012), people with schizophrenia (Bowins and Shugar 1998), etc.

Issues in Scale Evaluation

Psychometric Implications of HPMood

Over 22 years ago, Meehl (1990) recognized a disturbing phenomenon within self-report survey data, as the predictable inter-correlation between measures. While he did not identify the cause, it was a major reason for him to condemn research in “soft psychology” (e.g., survey research) for testing weakly substantive theories based on correlations. He named the unknown source of this automatic shared variance the “crud factor” and wrote disparagingly “In the social sciences—everything correlates to some extent with everything else” (p. 204). While Meehl’s tongue-in-cheek statement somewhat exaggerates reality, confirmatory evidence can be observed in most correlation matrices involving self-report, personally referenced data gathered from surveys.

The interactive system of SWB homeostasis and HPMood sheds light on Meehl’s ‘crud factor’. This comes from the understanding that HPMood is the dominant component of self-report scales measuring such constructs as self-esteem (Rosenberg 1979), optimism (Carver and Scheier 2003), and primary and secondary control (Chambers et al. 2003). Using Australian data, Lai and Cummins (2013) report the correlations of the above constructs with GLS as .57; .42; .42 and .36 respectively. After using HPMood as a covariate these correlations are reduced to .22; .03; .13; .01. Similar findings are reported by Cummins (2011) in respect of other self-report variables. Thus, these authors argue that HPMood is the source of shared variance which causes self-report measures to predictably inter-correlate.

The reason that HPMood supplies this shared variance is because it represents the genetic set-point for each person. Moreover, since set-points are normally distributed within a range of 70 to 90 points within any general population sample (Cummins et al. 2014), HPMood is also normally distributed. Because of this, the power of HPMood to influence the

level of self-report variables is also normally distributed within this same range. This provides a tendency for people with high set-points to report high self-esteem (for example), and for people with low set-points to report lower self-esteem.

This power of HPMood to cause shared variance within samples will depend on various factors. First is whether the data come from respondents who are experiencing homeostatic control. If their SWB level is dominated by HPMood then shared variance between self-report variables will be high. However, if SWB levels are dominated by a challenging agent, then shared variance becomes less predictable.

The second and third factors are the level of personal relevance and level of abstraction of the measured variables. The influence of HPMood will be maximal in GLS and diminish as the measured variables become either more distal (e.g. satisfaction with government) or more specific (e.g. satisfaction with haircut). Thus, HPMood will cause maximal shared variance between variables that have high levels of personal relevance and abstraction. This approximation is met for the items comprising scales of optimism, self-esteem and perceived control. Thus, since each respondent to a survey will report these variables at a level highly influenced by their level of HPMood, this constitutes a major source of shared variance, causing the scales to correlate with one another.

The propositions above have strong theoretical implications for the construction of scales to measure SWB and for the interpretation of their data. Two of these are as follows:

1. The use of raw correlations between measures of SWB, personality and positive affect cannot be validly used as indicators of ‘convergent validity’. Correlations between such variables are predictable at the level of about .20–.40 and are caused by HPMood. Similarly, the factorial cohesion of items forming a SWB scale is a weak measure of ‘construct validity’, an acceptable Cronbach alpha for such scales is almost entirely predictable, as is test-retest reliability. The crucial step in obtaining meaningful psychometric statistics in this area involves the prior removal of the

shared variance, derived from HPMood, before such statistics are calculated.

2. The correlations between scales will be greatly influenced by whether the sample comprises people who are experiencing normal homeostatic control, or whether a high proportion is experiencing homeostatic failure. Therefore, the psychometric characteristics of scales can be expected to be different between normal and pathological samples.
3. Since HPMood makes such a strong contribution to the variance within items forming SWB scales, there is little other systematic variance allowing the reliable formation of factors.

Hedonic vs. Eudaimonic Measurement

In accordance with the ethical system of eudaimonism, individuals have a responsibility to recognize and live in accordance with their daemon or ‘true self’. The daemon refers to an individual’s potentialities which, when realized, represent the highest life fulfillment of which that person is capable. Thus, the daemon is an idealized form of excellence and perfection toward which each person should strive. The process of this striving then gives meaning and direction to one’s life. The concept was introduced into psychology by Waterman (1990, 1993) who operationalizes eudaimonic living as the experiences that flow from developing the aptitudes and talents deemed worth having. It is, thus, an active process of engagement associated with ideas such as flourishing, self-actualization, and personal growth (for a review see Ryan and Deci 2001).

Another term within this philosophical taxonomy is ‘Hedonism’. This describes a more passive state of pleasure and satisfaction of desires, such as are the product of ‘pleasure-producing’ things (but see Vitterso 2013 for a more sophisticated statement).

Whether SWB is regarded as dominantly eudaimonic or hedonic depends on how SWB is defined. In the context of this chapter, SWB has been defined in hedonic terms, but not as envisaged by the Greek philosophers. HPMood

is hedonic in that it is passive and mildly pleasant. Crucially, however, it is not an emotional response to ‘pleasure-producing’ things. Thus, based on this description, the kinds of scales to be considered by this review can be most easily defined by what they are not. Excluded from consideration are scales which have a primary purpose to measure any of the following:

1. Eudaimonic constructs, such as flourishing and self-actualization.
2. Emotional responses to percepts.
3. Facets of personality, including the Big 5, but also including self-esteem, optimism and perceived control.

Surviving this list of exclusions, the scales remaining for review are those that measure SWB through satisfaction responses to items that refer to broad, semi-abstract areas of life.

Importance × Satisfaction

Several scale developers have adopted the procedure of weighting levels of satisfaction by their level of perceived importance. At an intuitive level this seems to make sense. After all, if someone responds that they are very satisfied with their wealth and yet ascribes no importance to wealth, then surely the domain of wealth satisfaction should be discounted when computing their overall SWB? Surprisingly; the answer to this question is a counterintuitive- no. In fact, all such differential item -weighting schemes are theoretically and psychometrically unsound.

The most important point of critique is certainly that the importance x satisfaction weighting scheme is theoretically flawed. This argument was first developed by Locke (1969, 1976) who noted that ratings made with respect to specific topics, such as job satisfaction, comprise both a judgment of importance to the individual as well as a satisfaction evaluation based on the discrepancy between what the individual wants and what they perceive themselves as getting. Most crucially, as determined by Locke, these two processes are not independent. That is, the level of satisfaction is influenced by the interaction of the have-want discrepancy with importance.

He states this principle as the ‘range-of-affect hypothesis’, in which the level of importance determines the range of satisfaction. That is, an item with high personal importance will produce a wide range of affective reactions, from great satisfaction to great dissatisfaction. An item with low personal importance, on the other hand, will produce a far narrower range of satisfaction. In summary, given the amount of discrepancy, the range of the satisfaction rating on an item is determined by the item’s importance. Therefore, according to Locke, item satisfaction has already incorporated the information of item importance, which renders weighting item satisfaction with item importance redundant.

Voluminous psychometric data confirm this prediction and numerous authors have argued that the differential weighting of items is psychometrically unsound (e.g. Evans 1991; Hagerty et al. 2001; Wooden 2002), or at the least unhelpful (Adams 1969; Mikes and Hulin 1968). Further insights have been provided in a series of studies by Wu and colleagues (Wu 2008; Wu and Yao 2006, 2007) and Trauer and Mackinnon (2001) who empirically demonstrate the invalidity of using such multiplicative composites (importance x satisfaction), which are actually interaction terms, as dependent variables. For advanced reading, a very insightful discussion of item weighting is provided by Hagerty et al. (2001).

There is also a logical objection to using importance as a weighting variable due to the ambiguity of its meaning. People can regard areas of their life as important for a wide variety of very different reasons. For example, they may see something as important because they do not have it and want it (e.g., an expensive car), or because they have it and do not want it (e.g., chronic pain), or because they have it and wish to retain it (e.g., political power). The logical link to another dependent variable, such as satisfaction, is clearly not going to be simple.

In summary, the evidence is overwhelming that weighting satisfaction by importance is at best redundant and at worst harmful to understanding. Despite this, several of the scales to be discussed persist with this weighting technique.

Abstract vs. Specific Variables

The archetypal example of an abstract and personal item is ‘satisfaction with life as a whole’. People respond to this question effortlessly and immediately, so they are clearly not relying on cognition to form an answer. Under such ambiguous circumstances, the use of mood as information is well established (Schwarz and Clore 1983, 1996) and in this case their source of information is HPMood.

As evaluation targets become less abstract and more specific, it becomes increasingly adaptive to rely on information derived from the environment and experience, rather than HPMood. Because of this, the domains of scales such as the Personal Wellbeing Index (see below) will evidence variability derived from two systematic sources. First, individual differences in set-points will introduce variability associated with the HPMood component. Second, individual differences in experience will contribute variability due to the cognitive evaluative component. As one consequence, there will be higher variability within individual domains than within life as a whole, and this is generally consistent with the data.

Proximal vs. Distal Variables

The influence of homeostasis, and therefore of HPMood, will decrease as items become less personal. This is because SWB homeostasis is purely concerned with maintaining a positive view of an abstract-self. Thus, as evaluation targets become increasingly non-self-related, the influence of homeostasis decreases. This will generally be manifest as decreasing satisfaction as items become less proximal and more distal.

The National Wellbeing Index is a good example of a scale based on distal variables. The six national domains do not directly concern the wellbeing of the individual (Cummins et al. 2003) but rather are evaluative of some external target (e.g., ‘How satisfied are you with

government?’). Because of this, they are not as strongly held under homeostatic control as the PWI domains. They are, thus, more free to vary and the variation that they show is weakly linked to SWB.

Summary of Issues

The evaluation of scales that follows is based on several assumptions. One is that the essence of what SWB scales are intended to measure is a positive and abstract view of self. This measurement may be made through asking questions of ‘satisfaction’ with a number of life domains which are personally-relevant, and which refer to general rather than specific targets. The central construct providing the majority of variance in such measures is HPMood, thereby casting these scales as a form of hedonic evaluation. Each scale should provide a single overview statistic which represents SWB. Because of this, scales should embrace parsimony, justifying a minimum number of domains to give a reliable estimate. Finally, if sub-scales are proposed, they must be justified through exploratory factor analysis.

Evaluation Method and Criteria

Method

This second part of the chapter presents a description and discussion of some simple scales to measure satisfaction with life. The scales have been identified by entering the search term ‘satisfaction’ into the Instruments section of the Australian Centre on Quality of Life http://www.deakin.edu.au/research/acqol/instruments/scale_search.php.

This search returned 202 instruments and revealed the diversity of approaches to measuring constructs within the area of subjective wellbeing. For the purpose of this review we have chosen to examine only the simplest forms of such scales, which can be considered to be

multi-item elaborations on the single item measure ‘satisfaction with life as a whole’. The criteria for identifying scales for inclusion are as follows:

1. The instrument must be a multi-item scale of satisfaction.
2. Each scale item must be a simple statement of a personally-relevant life domain that is proximal and not distal.
3. The response mode may be either levels of satisfaction or levels of agreement with appropriate personally-relevant statements.
4. All scale items must be relevant to adults in the general population
5. Unless accompanied by evidence of more than one factor, lists of more than 20 items will not be considered on the basis of redundancy. No single factor scale needs to comprise so many items.

The scales meeting these criteria ($N = 31$) are listed in alphabetical order with the exception of the first two. The reason for favoritism is that both have the strongest credentials as multi-item representations of ‘life as a whole’. Each of these two scales takes a different approach to the representational issue. The Satisfaction with Life Scale (Diener et al. 1985) uses five items, each of which are variations on ‘life as a whole’, which are combined to create a single index. The Personal Wellbeing Index (International Wellbeing Group 2013) uses the minimum set of life domains to represent the ‘life as a whole’ construct. Responses to these domains can be combined into a single SWB metric, or analyzed separately to provide a diagnostic profile.

Psychometric Criteria

Because of the similar construction of the scales that follow, they share most of the commonly reported psychometric properties. The reason for this is that they all use items that are heavily saturated with HPMood (Cummins 2013). They predictably have an adequate Cronbach alpha and test-re-test reliability, they inter-correlate positively with one another and with scales measuring extraversion, self-esteem, optimism,

perceived control, and eudaimonic variables such as flourishing and life meaning. They also have a predictable negative relationship with scales measuring neuroticism, depression, stress and anxiety. None of these statistics are particularly interesting and none will be reported here. The single purpose of this section is to identify the most parsimonious set of items with which to measure SWB through questions of satisfaction. In this procedure, factor analysis is the key statistic. Quoting Lawton (1982: p. 621) “Exploratory factor analysis is a first-level approach to dimensionalizing a diverse and psychometrically primitive domain.”

In following this imperative, short scales of some five or less items are exempt. They cannot contain more than one factor, each with a minimum allowable content of three items. The factorial criterion will be applied, however, to scales with six or more items. We anticipate that the factor structure of such scales is inherently unstable. As described earlier, this is due to the small amount of systematic, non-HPMood variance, caused by cognition and emotion, together with the expectation that such minor variance will change depending on both circumstance and demographic group.

Evaluation of Individual Scales

Satisfaction with Life Scale (Diener et al. 1985)

This is the most widely used scale to measure SWB. Google estimates that by December 2012 it had been cited over 6,800 times. The authors recommend this scale to assess an individual’s conscious evaluative judgment of their life using their own criteria. Most users consider it measures SWB.

The SWLS comprises five items and, despite the scale’s name, respondents use a 7-point scale anchored by ‘strongly disagree’ to ‘strongly agree’. Thus, the scale score has a range of 5–35 points. A copy of the scale is available from <http://internal.psychology.illinois.edu/~ediener/SWLS.html>.

This website also provides a list of translations. The items are as follows:

1. In most ways my life is close to my ideal.
2. The conditions of my life are excellent.
3. I am satisfied with my life.
4. So far I have gotten the important things I want in life.
5. If I could live my life over, I would change almost nothing.

The scale has a number of notable characteristics. First, each item is phrased to involve an overall judgment of life in general. Thus, the SWLS represents an expanded version of General Life Satisfaction (GLS). Items are not designed to give individual insights into the structure of SWB. This feature makes it different from the Personal Wellbeing Index (International Wellbeing Group 2013) where each item represents a domain of life that can be separately analyzed.

Given this construction, and the fact that the PWI is designed as the first-level deconstruction of GLS, 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). As a consequence, both scales also show much the same degree of relationship to other measures.

The second notable characteristic is that the wording of items tends to be extreme, such as ‘If I lived my life over I would change almost nothing’. Most likely due to this construction, people are reticent to give full endorsement as ‘strongly agree’, so they avoid this highest response category. As a consequence, the SWLS produces a lower average value than the PWI and with a larger variance. For example in a sample of college students (Renn et al. 2009) the mean SWLS and PWI is reported as 72.0 and 75.4 respectively, with standard deviations of 17.0 and 13.9.

An authoritative evaluation of the scale has been reported by Statistics Netherlands (van Beuningen 2012). Using a sample of 3,402 adults the following conclusions are drawn:

1. The scale shows high internal consistency. The five items can be combined into one underlying dimension measuring global life satisfaction.
2. There is evidence of convergent, discriminant, and nomological validity.

3. The correlation between GLS and SWLS is not very strong ($r = 0.56$), mainly because of a group of respondents who misinterpreted the SWLS; without this group the correlation increases to 0.66. As people with low and intermediate levels of education and non-native speakers are overrepresented in this group, it suggests the [wording of the] SWLS may be too complex.
4. The SWLS is sensitive to differences in data collection mode. Respondents report higher life satisfaction when asked face-to-face or via the telephone than when completing the questionnaire online. [Note: This social desirability bias may be a property of SWB scales in general]
5. Correlations of the SWLS with other related constructs are not stronger than correlations using GLS. Hence, we do not recommend that the single-item GLS should be replaced by the SWLS.

Summary: This scale is excellent as a more reliable measure than the single GLS item. Thus, it may be useful for this purpose in some instances.

Personal Wellbeing Index (International Wellbeing Group 2013)

The Personal Wellbeing Index (PWI) is developed under the auspices of the International Wellbeing Group (<http://www.deakin.edu.au/research/acqol/iwbg/>). Since November 2001, this collaborative network has been developing the PWI as a cross-culturally valid measure of SWB. In December 2012, the International Wellbeing Group involved over 140 researchers from over 50 countries and provinces. As a consequence of this diverse membership, the PWI has been translated into over 20 languages <http://www.deakin.edu.au/research/acqol/auwbi/index-translations/> and over 130 publications using the PWI are available from <http://www.deakin.edu.au/research/acqol/instruments/wellbeing-index/publications.php>

The PWI has an unusual structure that is both theoretically and empirically determined.

In theoretical terms, its items comprise the most parsimonious, first-level deconstruction of general life satisfaction (GLS). In empirical terms, each item (domain) must contribute unique, as well as shared variance, to the prediction of GLS. This is determined through multiple regressions, where GLS is simultaneously regressed against all domains.

The original version of the scale comprised seven domains as standard of living, health, achieving in life, relationships, safety, community-connectedness, and future security. In 2006 the additional item of spirituality/religion was added due to awareness of a forthcoming publication (Wills 2009) showing that this item met the criteria for a new domain. The most recent 5th edition of the PWI (2013) removes this domain from the core set of items and makes its inclusion discretionary. The major reason for this revision was the large percentage of people in some countries who do not have a religious/spiritual dimension to their life.

Respondents use an 11-point, unipolar, end-defined scale ranging from 'no satisfaction at all' (0) to 'completely satisfied' (10). This form of response format is preferable over Likert and Delighted-Terrible formats because it reduces categorical naming and allows respondents to show higher response discrimination (Cummins and Gullone 2000). The average domain score is the measure of SWB and all results are recoded onto a standard 0–100 point distribution.

Psychometric Properties

The most extensive body of results has been produced using the Australian Unity Wellbeing Index (AUWI), which is a national survey conducted since 2001. By December 2012 a total of 28 such surveys had been conducted. Copies of all reports, raw data files, and code books are available free of charge from the Australian Centre on Quality of Life website at Deakin University <http://www.deakin.edu.au/research/acqol/auwbi/survey-reports/>.

When results are adjusted to fall within a standard range of 0–100, it is now well established

(Cummins 1995, 1998, 2003) that, for Western nations, the average mean for population samples is about 75 points, with a normal range from 70 to 80 points.

This estimated range for SWB was originally calculated by grouping survey means reported in the literature. Consequently, the sample mean scores used as data to make this estimation were derived from diverse surveys conducted by different researchers, in a number of countries, and using different methodologies. When all of these factors are held constant, as they are for the mean scores from the 28 AUWI surveys to date, the normal range is from 73.7 to 76.7 points. This variation of the survey mean scores by only 3.0 percentage points has occurred despite major national and international events over the intervening 11 year period.

The scale produces a single factor (Cummins et al. 2012; Renn et al. 2009; van Beuningen and de Jonge 2011).

PWI Domain Regressions Against GLS

One of the defining features of the PWI is the requirement that each domain makes a unique contribution to the variance accounted for in GLS. Table 10.1 shows a relevant multiple regressions using accumulated data from the AUWI. The sr^2 statistic represents the proportion of unique variance contributed by each domain. It is calculated as the square of the 'Part' statistic that can be requested from SPSS in association with a multiple regression. When this value is multiplied by 100 it gives the percentage of unique variance contributed by the domain.

These results show that the seven domains together account for 51.2 % of the variance in GLS. Of this, 36.4 % is shared variance and we suggest that the source of this is Homeostatically Protected Mood (HPMood) which dominates the composition of SWB (Blore et al. 2011; Davern et al. 2007; Tomin and Cummins 2011). The remainder of the variance accounted for (14.8 %) is the combined variance unique to each of the domains. This, we propose, is the unique cognitive/affective component of each

Table 10.1 Regression of the seven PWI domains against GLS (Combined surveys)

Variable (N = 55,689)	GLS	1.	2.	3.	4.	5.	6.	B	sr ²	
1. Standard of living	.58**	.						.30**	.30	6.00
2. Health	.37**	.35**	.					.07**	.08	0.60
3. Achieve in life	.56**	.45**	.37**	.				.24**	.25	4.30
4. Personal relationships	.47**	.34**	.23**	.40**	.			.16**	.20	3.10
5. Safety	.29**	.32**	.24**	.25**	.23**	.		.00	.00	0.00
6. Comm. connect	.36**	.31**	.20**	.34**	.29**	.33**	.	.06**	.07	0.40
7. Future security	.44**	.47**	.28**	.42**	.29**	.44**	.40**	.06**	.07	0.40
R ² = .512	Total explained unique variance									14.80
Adjusted R ² = .512	Total explained shared variance									36.40

Note: GLS = General Life Satisfaction measured by the single item ‘How satisfied are you with your life as a whole?’
 p* < .01; *p* < .001

domain triggered by the domain target. The following observations pertain:

1. While six of the domains contribute unique variance, hence, meeting the criterion for their inclusion in the PWI, the domain of safety makes no unique contribution. This seems to indicate that, in Australia, personal safety does not generate a cognitive-affective complex that is powerful enough to rise above the background shared variance of HPMood. In other words, on average in Australia, personal safety is not an issue that impacts on SWB. The fact that it does so in other countries is the reason it remains as a domain (see PWI manual).
2. The opposite is true for Standard of Living, which contributes 6.0 % unique variance. Clearly, it seems, matters of personal finance are of great relevance to SWB.
3. Of the other domains, Achieving in life (4.3 %) and Personal Relationships (3.1 %) are the next strongest contributors. Thus, these three top-contributing domains appear to be the dominant predictors of SWB in this normal population sample.

Very similar results have been reported using data from Dutch adults (van Beuningen and de Jonge 2011). These authors also report some respondents were unsure what the domains of Community and Future security referred to. This is an almost inevitable problem in constructing a multi-language index using semi-abstract questions.

Normative Data

The multiple-survey data from the AUWI have been used to produce reliable norms for the Australia population. Using raw data, a normal range for individuals can be calculated from the mean (75.02 %) and standard deviation (12.33 %) across the 28 surveys. Two standard deviations on either side of the mean yields a normal range of 99.68–50.36 %. In other words, the normative range for individuals lies within the positive half of the 0–100 range.

A second kind of normative distribution can be calculated for groups instead of individuals. Here the survey mean scores are used as data (N = 28) to create normal ranges for groups. When results from specific groups are projected onto these ranges, the pattern is diagnostic, as shown in Fig. 10.1 for adult students.

Students have mid-range wellbeing, but the two domains concerning other people as Relationships (–1.9) and Community (–1.3) are below the generic normative range for sample mean scores. Domain compensation (see Best et al. 2000) comes from Health (+3.5) and Achieving (+0.3), thereby causing the overall PWI score to remain toward the higher end of the normal range.

Summary: It is evident that the PWI has good psychometric properties. This conclusion is shared by Statistics Netherlands (van Beuningen and de Jonge 2011). The disadvantage of the PWI over the Satisfaction With Life Scale is that, because the domain items are more specific in their focus, the responses that people give are

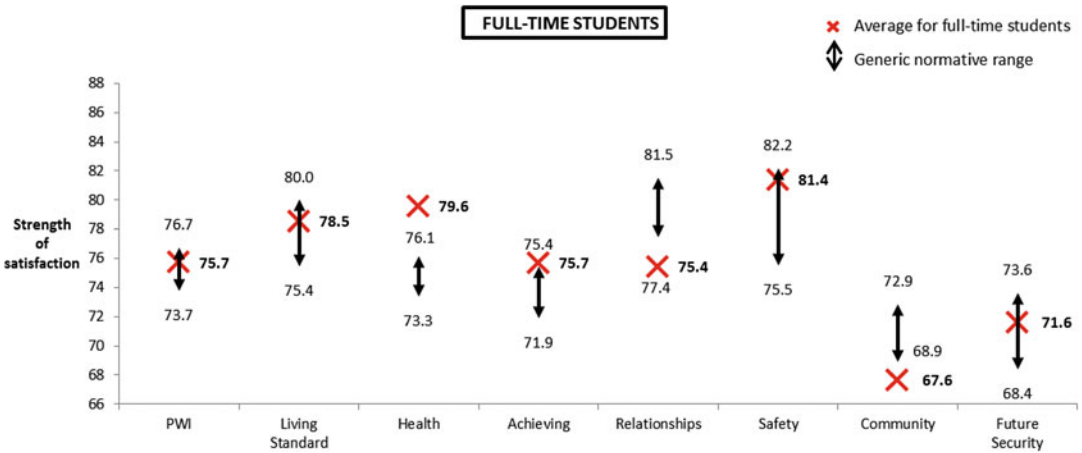


Fig. 10.1 Full-time adult students average vs. Generic normal range (PWI)

further away from HPMood. The advantage of the PWI is that each of the domains carries its own information concerning a broad area of life. Because of this, the scale can be analyzed at either the level of individual domains or by combining the domains to form a single SWB score. There are also parallel versions of the PWI for adults who have a cognitive or intellectual disability (Cummins and Lau 2005a) and school children (Cummins and Lau 2005b).

Domain Index (Andrews and Withey 1974)

These authors used cluster analysis on over 100 items, rated on the delighted-terrible response scale, to arrive at an index with 12 domains measuring ‘subjective life quality’ This index comprises 6 domains as single items, with the other 6 domains being composites of between 2 and 5 items each, adding to 26 items in all. They report that this index accounts for about 50 % of the variance in another composite index which they call ‘Life #3’. This is the combined score from GLS worded as ‘How do you feel about your life as a whole?’ asked twice, at different times during the interview and separated by 8–12 min. No factor analysis of the 12 Domain Index is reported.

Summary: Composite domains are an additional level of complexity for scale construction since they each need their own psychometric evaluation.

Community Quality of Life Scale (Sirgy and Cornwell 2001; Sirgy et al. 2000)

These authors classify QOL into subjective and objective. They then separate each of these dimensions into five proximal-distal categories as: individual, family, community, state, and world. Their major concern is global satisfaction with community, which is determined by global satisfaction with government services, business services, and non-profit services. Each of these three areas comprises a number of relevant specific items, and respondents rate these in terms of both satisfaction and importance. Global satisfaction with life is also measured using GLS, and also by a composite scale of satisfaction with the following life domains: job, family, financial, health, education, friendship, leisure, community, neighborhood, spiritual, environment, housing, cultural life, and social status. These domains were selected from a larger list of 34 domains gleaned from the literature, with the 20 domains rated as most important by faculty students and staff used for the study. How these 20 domains were reduced to the 14 listed above is not stated. No simple psychometric properties of the scale are provided and it is notable that this list contains distal variables as neighborhood, environment and cultural life. No factor analysis is available [personal communication, Sirgy, 10th February 2013.]

Summary: The scale requires further psychometric investigation. It comprises more items than are necessary for a single measure of SWB and some items are distal.

EUROHIS-QOL 8 (Schmidt et al. 2005)

This 8-item index is a QOL measure that has been derived from the WHOQOL project “as an economic screening measure” (Schmidt et al. 2005 p. 420). Thus, the index was never designed to measure subjective wellbeing. Each domain of the original WHOQOL-100 (WHOQOL Group 1998b) as well as of the WHOQOL-BREF (WHOQOL Group 1998a) (psychological, physical, social and environmental) is represented in the index by two items. All items are rated from ‘not at all’ to ‘completely’ satisfied.

1. How would you rate your quality of life
2. How satisfied are you with your health
3. Do you have enough energy for everyday life
4. How satisfied are you with your ability to perform your daily activities
5. How satisfied are you with yourself
6. How satisfied are you with your personal relationships
7. Have you enough money to meet your needs
8. How satisfied are you with the conditions of your living place

The scale has been widely used (see da Rocha et al. 2012). The original authors (Schmidt et al. 2005) conducted a large-scale survey across ten European countries. They report a universal single-factor structure with a generally good fit in structural equation modeling analyses. The following matters are notable in terms of the eight items:

1. They were selected on the basis of being previously available within the WHOQOL-100. There are, thus, three medically-related items (health, energy, performance on daily activities).
2. Two items concern global life satisfaction (Items 1 and 5).
3. The scale combines items with different levels of specificity, from personal abstract (item 5) to specific performance (item 4).
4. The scale combines items with different modalities of measurement as quantity (enough money) and satisfaction (with yourself).

5. Items do not cover satisfaction with: productivity/purpose in life, safety/security, community, or religion/spirituality.

6. Using structural modeling, Schmidt et al. (2005) found evidence for overlap between items 7 and 8. In their large study, da Rocha et al. (2012), using Rasch analysis, report unacceptable residuals for items 4, 7 and 8. They also found item 8 to show disordered thresholds.

Summary: The scale is dominated by health-related items, contains two responses to GLS, and omits some life areas generally considered relevant to SWB. It also incorporates distal variables, combines items with different levels of specificity and different response modalities. There is also evidence of item redundancy and disordered thresholds.

Faces (FACES) Quality of Life Assessment (Zhang et al. 2004)

This is intended as a QOL scale to be used with people who have psychosis, however most items are suitable for general population samples. The 15 questions measure the level of satisfaction with several aspects life, including: Housing, Conditions of daily living, Social Relationships, Supports, Vocational. The scale appears to have been developed for the cited study, no psychometric data are provided and the provenance of items is not stated.

Summary: Additional psychometric analyses are required.

Questions on Life Satisfaction (FLZM) (Henrich and Herschbach 2000)

The scale assesses ‘General Life Satisfaction’ during the past 4 weeks. In its original form it assessed both importance and satisfaction, with the item scores represented by each multiplicative composite. Subsequent authors (Daig et al. 2009) have used only the satisfaction scale. It comprises eight items as: Friends/acquaintances, Leisure time/hobbies, Health, Income/financial security, Occupation/work, Housing/living conditions, Family life/children, Partnership/sexuality.

Alternative wording has been provided for adolescents (Goldbeck et al. 2007). The method of selection of the items is not stated and no factor analysis is reported.

Summary: Additional psychometric analyses are required.

Huntington's Disease Quality of Life Battery for Carers (Aubeeluck and Buchanan 2007)

The battery incorporates a 'satisfaction' subscale with six items taken from the Comprehensive Quality of Life Scale (Cummins 1997) combined with 'life as a whole' and one health-specific item (the treatment that your HD affected relative receives). The ComQoL is a precursor of the Personal Wellbeing Index (International Wellbeing Group 2013). All items ask 'How satisfied are you with...'. Principal components analysis on the responses from 87 spousal carers revealed the presence of two subscales accounting for 46.33 and 14.94 % of the variance, respectively. Varimax rotation revealed the presence of simple structure, with each component showing strong loadings, and all variables loading highly onto only one component.

- Factor 1: your overall quality of life? 0.88; your own happiness? 0.87; the treatment that your HD affected relative receives? 0.75; and what you achieve in life? 0.55.
- Factor 2: with feeling a part of your community? 0.82; with your close relationships? 0.68; with your health? 0.65; and with how safe you feel? 0.54.

The authors use results from the single superordinate factor for their subsequent analyses.

Summary: The PWI is a more contemporary form of this scale.

Life Satisfaction Index (Clifford et al. 1991)

The scale is intended to measure general life satisfaction. The origin of the items is not stated. Respondents are asked their degree of satisfaction with the following: Safety of belongings,

Educational experiences, Friends and associates, Relationship-parents, Self, Standard of living, Leisure time-amount, Leisure time-quality, Life as a whole, National government, Fun-amount. All 11 items load onto a single factor.

Summary: The scale combines items concerning different modalities.

Life Satisfaction Index (Headey and Wearing 1989)

This scale comprises six items rated on a 9-point Delighted-Terrible scale (Andrews and Withey 1976). Each one asks 'How do you feel about – 'your life as a whole?' (asked once at the start and once at the end); 'the sense of purpose and meaning in your life?'; 'what you are accomplishing in life?'; 'how exciting your life is?'; 'the extent to which you are succeeding and getting ahead in life'; 'your life as a whole?'

Summary: GLS is asked twice and the scale comprises a mix of eudaimonic and hedonic items.

Life Satisfaction Index (Man 1991)

While the scale was devised for school children aged 13–16 years in Hong Kong, most of the items are suitable for adults. It comprises 26 items grouped into six sub-scales as: School life, family life, acceptance by others, government, media, living environment. No rationale for the selection of items or their grouping is provided. All items are rated on a seven-point scale from "very satisfied" to "very dissatisfied". The item groupings are as follows:

- School Life: (1) School life; (2) Extracurricular activities in the school; (3) The school itself; (4) Education received in the school.
- Family Life: (1) Family life; (2) Relationship with father; (3) Relationship with mother; (4) Relationship with siblings.
- Acceptance by Others: (1) Relationship with peers; (2) Friendship attained; (3) Acceptance by others; (4) Respect from others; (5) Interaction with others.

- Government: (1) The Government in handling Hong Kong affairs; (2) The Executive and Legislative Councils in handling Hong Kong affairs; (3) The Urban Council in handling local affairs; (4) The District Boards in handling local affairs.
- Media: (1) News or entertainment from TV; (2) News or entertainment from radios; (3) News or entertainment from newspapers; (4) News or entertainment from magazines.
- Living Environment: (1) Degree of air cleanliness in the neighborhood; (2) Noise pollution in the neighborhood; (3) Population density in the neighborhood; (4) Law and order in the neighborhood; (5) Living environment.

Summary: No factor analysis is provided. Many of the items are distal, some are likely to be beyond the purview of 13 year adolescents (e.g. government), and some important dimensions of life quality are missing (e.g. health).

Life Satisfaction Index (Neugarten et al. 1961)

These authors introduced two scales. The LSI-B comprises open-ended and check-list items, and will not be further considered here. Their other scale is the LSI-A, created as measure of successful aging, to be used on people aged 50 years and older. Life satisfaction is defined as a construct encompassing five underlying dimensions as: zest, resolution and fortitude, congruence between desired and achieved goals, positive self-concept, and optimistic mood tone. The authors considered various terms to describe what their scale measures, giving consideration to the terms ‘adjustment’, ‘psychological wellbeing’, ‘morale’ and ‘life satisfaction’. They decided to use ‘life satisfaction’ on the grounds that “although it is not altogether adequate, it comes close to representing the five components” (p. 137). And so began the arbitrary naming of dependent variables that continues to this day.

The original form of the scale, as the LSI-A, comprised 20 statements with an agree – disagree response format. The authors did not group the

items under the five ‘dimensions’ described above and did not perform a factor analysis. Their analyses involved combining all 20 items to yield a single score (Table 10.2).

The studies that have contributed factor analyses are as follows:

LSI-A: Liang (1984) applied structural modeling to a USA sample of 2,797 people aged 65+ years. He created 4 sub-samples of around $N = 660$ and checked the solutions for consistency. The final model comprised 3 first-order factors and a single second order factor called ‘subjective wellbeing’

Stock et al. (1994) Used items from the LSI-A to evaluate both an eight-item, three-factor model (Hoyt and Creech 1983), and an eleven-item, three-factor model (Liang 1984). Their sample of 151 elderly people from Spain failed to demonstrate clear evidence for either factor structure.

Authors who have used the LSI-A with no factor analysis, as a single super-ordinate variable, include the following: Bourland et al. (2000); Burckhardt et al. (1989) and Rook (1984).

LSI-C: Adams (1969) created the LSI-C from a study of American adults. The authors determined that item #20 failed to discriminate between high and low index values, and so was excluded. They note it is a double question. They also excluded item #19 because it showed discrimination between genders. Factor analysis of the 20 items revealed one super-ordinate factor which the authors identify as ‘presumably life satisfaction’, while factor rotation yielded four factors, with ‘positive self-concept’ missing. They recommend an 18-item version with the omission of items 19 and 20.

LSI-Z: Wood et al. (1969) created the LSI-Z from a restudy of the LSI-A on a different sample of 100 American adults. Reliability analysis led the authors to suggest the index be reduced from 20 to 13 items and that the scoring system change from one point for each affirmative response to two points, and that one point be given for “un-certain” responses. They did not use factor analysis.

Table 10.2 Versions of the life satisfaction Index

LSI-A	LSI-A	LSI-C	LSI-Z
Neugarten et al. (1961)	Liang (1984)	Adams (1969)	Wood et al. (1969)
1. I am just as happy as when I was younger	MT	MT	*
2. These are the best years of my life.	MT	MT	*
3. My life could be happier than it is now.	MT	MT	
4. This is the dreariest time of my life.		MT	*
5. Most of the things I do are boring or monotonous.	Z	MT	*
6. Compared to other people, I get down in the dumps too often.		MT	*
7. The things I do are as interesting to me as they ever were.	Z	Z	*
8. I have made plans for things I'll be doing a month or a year from now.		Z	*
9. Compared to other people my age, I make a good appearance.		Z	
10. As I grow older, things seem better than I thought they would be.		Z	*
11. I expect some interesting and pleasant things to happen to me in the future.	Z	Z	
12. I feel old and somewhat tired.	Z	Z	
13. As I look back on my life, I am fairly well satisfied.	CON	CON	*
14. I would not change my past life even if I could.	CON	CON	
15. I've gotten pretty much what I expected out of life.	CON	CON	*
16. When I think back over my life, I didn't get most of the important things I wanted.		R&F	*
17. In spite of what people say, the lot of the average man is getting worse, not better.		R&F	*

(continued)

Table 10.2 (continued)

18. I have gotten more of the breaks in life than most of the people I know.	CON	R&F	*
19. Compared to other people my age, I've made a lot of foolish decisions in my life.			
20. I feel my age, but it does not bother me.			

Note: * denotes items recommended for the LSI-Z

MT: Mood tone

Z: zest for life

CON: congruence between desired and achieved goals

R&F: resolution and fortitude

: Missing item

Authors who have used the LSI-Z with no factor analysis, as a single super-ordinate variable, include the following: Bennett (1996) and Riddick and Stewart (1994).

Summary: The few analyses that have been performed show little consistency in the factor structure of this scale. This has also been noted by other reviewers (McDowell and Newell 1987; Rook 1984). Many researchers have chosen to use some items in the list to create a single score. This seems unwise given the evident redundancy among so many items and lack of consistent psychometric data.

Life Satisfaction Index for Parents (Renwick and Reid 1992)

The index comprises 5 sub-scales. Each one contains a mixture of items, some asking about satisfaction and some asking about eudaimonic and health matters. No factor analysis is provided.

Summary: Further psychometric analyses are required.

Life Satisfaction Questionnaire (Fugl-Meyer et al. 1991)

This scale is designed to measure life satisfaction through eight questions about domain-specific life satisfaction: No factor analysis is provided.

In 2002, Fugl-Meyer et al. created the 'LiSat-11' scale, which is the above questionnaire with the addition of two items as satisfaction with somatic and psychological health. In a sample of 2,533 Swedish adults they report a factor analysis with a 4-factor solution. The strength of cross loadings is not reported and two factors have just two items each (Table 10.3).

Authors who have used the scale with no factor analysis and assume a single super-ordinate factor include: Boonstra et al. (2008) and Post et al. (1998).

Summary: The intended factor structure cannot be supported with the minimum requirement of 3-items per factor. In other respects the items are dominated by health and some others are distal variables.

Table 10.3 Factor analysis of the life satisfaction questionnaire

	Closeness	Health	Spare time	Provision
Sexual life	.82			
Partner relationship	.88			
Family life	.68			
ADL		.76		
Somatic health		.78		
Psychol. health		.62		
Leisure			.79	
Contacts			.85	
Vocation				.80
Economy				.78

Life Satisfaction Questionnaire (Kulik and Rayyan 2003)

Designed to measure life satisfaction, the scale comprises five items. e.g. ‘Things are getting steadily worse with time’ and ‘I feel a lot of happiness in my life’. The response scale measures frequency, from ‘never’ to ‘always’. No psychometric analysis is reported other than Cronbach alpha, and no explanation is offered as to why these items measure life satisfaction.

Summary: Further psychometric analyses are required.

Life Satisfaction Scale (Viitanen et al. 1988)

This scale was devised to measure the life satisfaction of stroke survivors. The origin of the items is not stated. The scale comprises GLS and six domains: Ability to manage self-care, leisure, sexuality, marriage, togetherness family, togetherness friends. No rationale for the selection of items is given and no factor analysis is provided.

Summary: Further psychometric analyses are required.

Life Satisfaction Scale (Warr et al. 1979)

Early work on measuring the mental health of unemployed workers in Britain (Warr 1978) led to Warr et al. (1979) creating this 15 item scale. Their selection of items is not based on factor analysis. In trialing this with people who were employed and using cluster analysis they discover three clusters and evidence for a super-ordinate factor.

- Satisfaction with personal life: Your present state of health; The education you have received; Your social life; Your family life.
- Satisfaction with standards and achievement: What you are accomplishing in life; What the future seems to hold for you; The present government; Freedom and democracy in Britain today; The state of law and order in Britain today; The moral standards and values in Britain today; Britain’s reputation in the world today.
- Satisfaction with life style: The house or flat that you live in; The local district that you live in; Your standard of living: the things you can buy and do; The way you spend your leisure time.

A revision by Leana and Feldman (1992) was intended to be used with people who were unemployed, and expanded the assessment of family and social life satisfaction. This version was factor analyzed by Brown et al. (2002). Using confirmatory factor analysis, they tested 1, 2 and 3 factor models. The best fitting model was the 1 factor solution.

Summary: Using 15 items to produce a single measure of SWB is very inefficient.

Life Satisfaction Scale (Leelakulthanit and Day 1993)

The items are derived from a pilot study reported in conference proceedings. The instrument comprises 13 sub-scales, each one containing 4–8 items of satisfaction. The sub-scales are: life in general, family, self, material possessions, work, social life, health, Thai government, life in Thailand, health care, recreation, consumption, spiritual life, Bangkok administration.

The scale was applied to 496 adults in Bangkok (Leelakulthanit and Day 1993), but no factor analysis is reported. The results of an exploratory and a confirmatory factor analysis (Leelakulthanit and Day 1993) using data from Bangkok and USA describe the whole scale as one-dimensional, so producing a single superordinate factor.

Summary: The scale is inefficient and involves distal variables.

Life Satisfaction Scale for Chinese (Lou 2010)

This 8-item scale measures domain-specific life satisfaction for Chinese older adults. The domains are: Family relationships; Intergenerational communication; Friendship; Partner; Food/meals; Finance; Housing; Health. The author claims two sub-scales can be created as 'life satisfaction with social needs' and 'life satisfaction with basic needs', but offers no factor analysis.

Summary: The scale requires further psychometric analysis.

Manchester Short Assessment of Quality of Life (Priebe et al. 1999)

This scale was developed from the much larger Lancashire Quality of Life Profile (Oliver et al. 1996). The Manchester scale comprises a mixture of objective and subjective items. Within the latter are 11 satisfaction questions relating to work, leisure, finance, living situation, safety, household relations, family relations, social relations, sex life, mental health and health. No factor analysis is reported.

Summary: The scale is dominated by relationships and health. It requires further psychometric validation.

Michalos Questionnaire (Michalos 1980)

Within a larger questionnaire, designed as a research tool to investigate theoretical aspects of satisfaction and happiness, 12 items comprise this

life satisfaction scale. The items are: Health; Financial security; Family life; Friendships; Housing; Job; Free time activity Education; Self-esteem; Area you live in; Ability to get around; Secure from crime. The provenance of these items is the 'Michigan group' (Andrews and Withey 1976; Campbell et al. 1976) and no factor analysis of this scale is provided.

Summary: Further psychometric analyses are required. The scale also includes eudaimonic and distal variables.

Quality of Life Scale (Woodruff and Conway 1992a, b)

The purpose of this scale is to measure perceived quality of life. It comprises 16 items adapted from Caplan et al. (1984) using a 7-point response scale anchored by delighted – terrible. The items are: how you feel about your: own personal life; wife/husband (or girlfriend/boyfriend); romantic life; job; the people you work with – your co-workers; the work you do on the job – the work itself; the way you handle problems that come up in your life; what you are accomplishing in your life; your physical appearance – the way you look to others; your own health and physical condition; how you feel about yourself; how you feel about the extent to which you can adjust to changes in your life; how you feel about the kind of person you are; how you feel about your life as a whole; how content are you with your life as a whole. No factor analysis is reported.

Summary: Further psychometric analyses are required.

Quality of Life Index (Ferrans and Powers 1985)

The purpose of this instrument is to measure quality of life Ferrans and Powers (1985). The version for the general population comprises two sections of 31 items each, one to measure satisfaction and the other importance. The provenance of the items is not provided and no factor analysis is reported. A factor analysis is reported by Ferrans and Powers

(1992) on 349 out-patients receiving hemodialysis. They comment “High cross loadings were found for almost all of the items, indicating conceptual overlap between the factors.” (p. 32). They report a super-ordinate factor. Their abstract states “A four-factor solution best fit the data”. (p. 29).

The factor structure found by Rustoen et al. (1999) is shown in Table 10.4. Using maximum likelihood factor analysis and applying a direct oblimin rotation, eight factors emerged with eigenvalues >1 . A four-factor solution was forced to make them comparable with Ferrans and Powers (1992). The four factors accounted for only 45.4 % of the variance, compared with 91 % in the Ferrans and Powers study. In addition, many items cross-loaded and loaded onto different factors than found by the scale authors. Despite this, some authors have assumed the 4 sub-scale structure of Ferrans and Powers (1985) in their data analysis (Ferrans 1990; Greene 2005). Other authors have used the scale with no factor analysis, as a single variable: Arzouman et al. (1991), Faris and Stotts (1990), and Perry and McLaren (2004).

Summary: There is clearly doubt as to whether the scale factors as intended by the scale authors. Moreover, using 31 items to produce a single measure of SWB is very inefficient. In addition, some items are distal and some eudaimonic, while the procedure of multiplying satisfaction by importance is ill-advised as explained earlier.

Quality of Life Interview (Lehman et al. 1982)

The Interview is a substantial 45 min procedure designed to assess the QOL of people with severe mental illness. Within the Interview is a scale comprising nine domains of satisfaction selected from Andrews and Withey (1976) and Campbell et al. (1976). The domains are: living situation, family relations, social relations, leisure activities, work or non-work if unemployed, finances personal safety, health, and GLS. Lehman (1988) gives examples of the contents

of each domain in the form of some 6–8 items of satisfaction for each. Lehman et al. (1982) and Lehman (1988) state that the sub-scales comprising the domains produce one or two factors each, but no figures are provided.

Variations: Huxley and Warner (1992) ‘adapt’ the QOLI domains for use in Britain and rename the scale the ‘QOL Profile’. They do not report a factor analysis. Heider et al. (2007) use the eight domains as separate measures.

Summary: Further psychometric analyses are required.

Quality of Life Inventory (Frisch 1994; Frisch et al. 1992)

The 17 items that form this scale were drawn from a literature review by Frisch et al. (1992). The items are: Health; Self-regard; Philosophy of life; Standard of living; Work; Recreation; Learning; Creativity; Social service; Civic action; Love relationship; Friendships; Relationship with children; Relationship with relatives; Home; Neighborhood; Community. This paper provides no factor analysis.

The purpose of this original scale was to measure ‘life satisfaction’ (Frisch et al. 1992). The more recent scale version comprises 66 items grouped into 16 areas: Love, work, health, goals & values, play, creativity, helping, friends, relatives, home, money, children, learning, neighborhood, community, self-esteem. Each item is rated twice, once for importance, and then for satisfaction.

In terms of factorial structure, Frisch (1993) cites an unpublished conference paper as evidence that “Factor analysis of the QOLI has yielded a two-factor solution which, according to a subsequent oblique multiple groups confirmatory factor analysis, fits four different samples.” (p. 43). However, in a later review of the scale, Frisch (1998) makes no mention of factor analysis. Table 10.5 shows the results of factor analyses reported by other authors.

Table 10.4 Factor analyses of the quality of life index

Quality of life index	Ferrans and Powers (1992)	Rustoen et al. (1999)
Area / no factors ^a	4	4
1. Usefulness to others	A	AD
2. Physical independence	A	A
3. Ability to meet family responsibilities	A	AD
4. Own health	A	A
5. Stress or worries	A	ACD
6. Leisure time activities	A	ABC
7. Potential for a happy old age/retirement	A	ACD
8. Ability to travel on vacations	A	ABC
9. Potential for long life	A	AC
10. Sex life	A	
11. Health care	A	A
12. Standard of living	B	ABCD
13. Financial independence	B	BC
14. Home (furniture, house or apartment)	B	BCD
15. Job/unemployment	B	
16. Neighborhood	B	CD
17. Overall conditions in USA	B	missing
18. Friends	B	BD
19. Emotional support from others	B	BD
20. Education	B	
21. Satisfaction with life	C	ABCD

(continued)

Table 10.4 (continued)

22. Happiness in general	C	ABCD
23. Satisfaction with self in general	C	AC
24. Achievement of personal goals	C	CD
25. Peace of mind	C	CD
26. Personal appearance	C	C
27. Personal faith in God	C	
28. Family's happiness	D	D
29. Children	D	D
30. Relationship with spouse/significant other	D	D
31. Family's health	D	

^a Factors: A; Health and functioning; B: Socioeconomic; C: Psychological/spiritual; D: Family

In Table 10.5, factors with the same name are designated with the same letter. The studies are as follows:

- (a) Claiborne et al. (1999) surveyed 253 spinal patients. Factor analysis (unspecified) produced 5 factors as: (A) Personal Growth; (F) Accomplishment; (I) Environment; (K) Health; (H) Family/Support.
- (b) Eng et al. (2005) sampled 138 USA adults being treated for performance anxiety. They used exploratory principal components analysis followed by varimax rotation. Four factors: Achievement (F), Social functioning (J), Personal growth (self-actualization) (A); Surroundings (I).
- (c) O’Cleirigh and Safren (2006) sampled 152 USA people who were HIV positive. They used exploratory principal components analysis and discovered four factors: Achievement (F), Self-expression (G), Relationships (H), Environment (I),
- (d) Lunney and Schnurr (2007) surveyed 319 USA male Vietnam veterans with PTSD. They used confirmatory factor analysis, based on O’Cleirigh and Safren (2006), to form four factors as: Achievement (F), Self-expression (G), Relationships (H), Surroundings (I). They also report a superordinate factor.
- (e) McAlinden and Oei (2006) sampled 217 - Australian outpatients being treated for depression or anxiety: (D) Self-oriented QOL; (E) QOL related to others.
- (f) Thomas et al. (2009) used an Australian sample of 470 adults who had sustained a traumatic brain injury within the preceding month. Factor names: self-functioning and activity (A); self-actualization (B); and family and environment (C)
- (g) Thomas et al. (2012): 259 Australian adults were recruited through the families or friends of college students. They tested four models

Table 10.5 Factor analysis of the quality of life inventory

Quality of life inventory	Claiborne et al. (1999)	Eng et al. (2005)	O’Cleirigh and Safren (2006)	McAlinden and Oei (2006)	Lunney and Schnurr (2007)	Thomas et al. (2009)	Thomas et al. (2012)
Area / no factors	5	4	4	2	4	3	3
1. Love	H	J	H	E	H	C	C
2. Work	F	F	F .34	D	F	A	A
3. Health	K		F	D	F	A	A
4. Goals & values	F	A	F+G	D	F	A + B	A
5. Play	F	J + A	G .32	D	G	A + B	B
6. Creativity	A	A	G	D	G	B	B
7. Helping	A	J .38	H+G	D	H	B	C
8. Friends	H	J	H	D + E	H		
9. Relatives	H	J	H	E	H	C	C
10. Home	I	F	I	E	I	C	C
11. Money	F	F	F	E	F	C	C
12. Children	H		H	E	H		
13. Learning	A	A	G	D	G	B	B
14. Neighborhood	I	I	I	E	I	C	C (+15)
15. Community	I	I	I	E	I	C	
16. Self-esteem	K	F .35	F	D	F	A	A

Loadings less than .4 are indicated in parentheses (e.g., .35). Complex item loadings on two or more factors are indicated as, e.g., F+G

C (+15) indicates a double loading of neighborhood and community

for goodness of fit and found the best to represent three factors as shown plus a superordinate factor. In relation to the missing areas they refer to a previous study (Thomas et al. 2009) and state “we removed two QOLI domains (children and friends), as their loadings were weak in relation to the relevant factors (p. 226)”. Factor names: self-

functioning and activity (A); self-actualization (B); and family and environment (C).

Other researchers using the scale as a single variable are Bourland et al. (2000).

Summary: The results of the 7 factor analyses shown in Table 10.5 confirm the expectation, based on an understanding that all items are strongly influenced by HPMood, that

factors derived from lists of satisfaction responses are likely to be unstable. Virtually no coherent pattern of factor structure is evident in these results. Moreover, a 16 item scale is an inefficient way to generate a single SWB score, some items are measuring eudaimonic constructs, and the use of importance weighting is not recommended.

Quality of Life Scale (Burckhardt et al. 1989)

The 16-item QOLS was adapted from the Flanagan (1978) Quality of Life Scale, in order to make it applicable to chronic disease patients, by adding the 16th item of ‘independence’. Burckhardt et al. (1989) state “A factor analysis by Flanagan (1978) indicated a 5-factor structure” (p. 194). However this is incorrect. In fact, Flanagan reports three factors from a ‘varimax rotated factor matrix’ based on the score from a sub-group of 50 year old females who were responding to the question of ‘how well their needs and wants were being met’ in each of the 15 areas. No details of this analysis are provided and the number of areas comprising each ‘factor’ are 3, 2 and 2. No sense can be made of this.

All of the five factor structures in Table 10.6 come from Burckhardt and Anderson (2003). The sample designations are: (1.1) Healthy; (1.2) Chronic disease USA; (1.3) Chronic disease Sweden female; (1.4) mixed chronic disease male; (1.5) mixed chronic disease female. Curiously, Burckhardt and Anderson (2003) conclude “The QOLS has a fairly stable factor structure across samples” (p. 5). This claim is repeated in Burckhardt et al. (2003). In fact, as shown in Table 10.5, not one item shows a consistent factor attachment, six items form part of all three factors and four item show cross-loadings $>.4$.

A second use of this scale is reported by Langeland et al. (2007). These authors analyze their data using the three factors identified by Burckhardt and Anderson (2003), but with no factor analysis applied to their own sample. Other authors combine the 16 items into a single super-ordinate factor (Burckhardt et al. 1992;

Table 10.6 Factor structure of the quality of life scale

Item/Sample	1.1	1.2	1.3	1.4	1.5
1. Material comforts	B	C	C	–	C
2. Health	B	B	B	A	B
3. Relationship with family	A	C	A, C	C	C
4. Having/rearing children	A	C	C	C	C
5. Relationship with partner	A	C	C	C	C
6. Close friends	A	C	A, C	C	C
7. Community engagement	A, C	A	A	B	A
8. Political engagement	C	A	A	B	A
9. Scholarly activity	C	A	A	B	A
10. Understanding yourself	C	A	A	B	A
11. Job or home work	B	B	B	A	B
12. Creativity	C	A	A	B	A
13. Social activity	A	A, B	A	A, C	A
14. Reading or music	A	A	A	–	A
15. Sport participation	B	B	B	A	B
16. Independence	Not used			A	B

Factors: A = Relationships and material wellbeing; B = Personal, social, and community commitment; C = Health and functioning

Treharne et al. 2005, 2007; Wahl et al. 1998, 2004, 2005).

Summary: Once again it is evident that the factor structure of the 16-item scale is unstable, and 16-items are an inefficient way to generate a single SWB value.

Quality of Life Scale (Olson and Barnes 1992)

Using items drawn from a variety of sources, these authors constructed a 40-item scale, using satisfaction responses, which they report as factoring into 12 subscales; marriage and family life, friends, extended family, health, home, education, time, religion, employment, mass media, financial wellbeing, neighborhood/community. However, they do not report cross-loadings and some of their factors comprise two items only.

Summary: Further psychometric analyses are required.

Quality of Life Scale (Flanagan 1978, 1979)

The author uses ratings of 'importance' on a large population sample to devise a scale with 15 dimensions. He reports satisfaction results on 500 adults aged about 30 years, but no factor analysis. The items, published also by Lang et al. (1982) are as follows: Family relationships; Religion & understanding life; Passive recreation; Having children; Health & safety needs; Friends; Active recreation; Creative expression; Socializing; Spouse relationship; Learning; Material comforts; Work; Community activities; Public affairs. An alternative wording of these items is provided by Burckhardt et al. (1989).

The following authors have used the mean of the 15 items as the scale score (Bruscia et al. 2008; Burckhardt et al. 1989; Lang et al. 1982). No factor analysis has been located.

Summary: Further psychometric analyses are required.

Scale of Life Domain Satisfaction (Campbell et al. 1976)

This 9-item scale comprises the domains of housing, transportation, education, job, health, family life, social life, sexual life, and life in general. These are used as a composite index by Rook (1984).

Hall (1976) describes results from a series of studies conducted by the Social Science Research Council Survey Unit, in the UK, between 1971 and 1975. These are described by the author as a 'sister study' to Campbell et al. (1976) but they use a different set of domains as: marriage, family life, job, town, health, district, being a housewife, leisure, house, standard of living, education, democracy, financial situation, life in Britain, life as a whole.

Summary: Both of these lists contain a mixture of proximal and distal domains, and neither has been subjected to factor analysis.

Subjective Quality of Life Profile / Questionnaire (Dazord 1997; Dazord et al. 1994, 1998)

This 36-item instrument was designed to measure subjective quality of life. The items are: Ability to go out; Overall fitness; Pain; Digestion; Relationships; Sleep; Concentration; Sexuality; People's attitudes; Meals; Material possessions; Spare time; Eyesight; Money; Friends; Professional activity; Pets; Daily activities; Self-image; Spiritual life; Health; Faith; Surrounding world; Close relationships; Food; Drink; Worries; Leisure activities; Social activities; Companionship; Physical appearance; Material conditions; Group participation; Physical abilities; Creative interest; Long-term health problem. Each item is rated on satisfaction, with other 'strongly advised' ratings of importance and expectations. It is intended to yield 4 factors as: health, relationship, material context, spiritual life. No factor analysis is provided using satisfaction scores.

Summary: Further psychometric analyses are required.

Subjective Quality of Life Questionnaire (Gerin et al. 1992)

This is a multi-faceted scale which contains a section of 15 items rated on both satisfaction and importance. The items are drawn from the literature (references unspecified) and comprise the following: What you can (or cannot) eat; What you can (or cannot) drink; Your weight; Your relationships with other people in general; Religious belief/faith; Participation (or not) in various activities (cultural, religious, unions); The time you spend (or do not spend) with friends; The relationships that you have (or do not have) with your family; A special relationship with somebody; Your activities, both at home and at work; Hobbies or activities that you might have (for example: sport, do-it-yourself, painting); Other people's attitudes towards you; Your physical appearance (e.g. when you see yourself in a mirror); Material conditions of your daily life; Your

inner life (reflections, reading, meditation, etc.). No factor analysis is provided.

Summary: Further psychometric analyses are required.

Conclusions

Very few of the 31 multi-item scales reviewed meet the basic psychometric criteria required to be regarded as useful tools for research purposes. Of particular interest for this review was the evidence from factor analysis. The reason for this focus was twofold. First that homeostatic theory, outlined in part one of this chapter, predicts that because Homeostatically Protected Mood (HPMood) supplies such strong variance to most items in these scales, this shared variance will dominate correlational analyses, leaving only weak and variable other forms of shared variance by which to create factor structures. Consequently, it was predicted that factors derived from lists of satisfaction responses are likely to be unstable. This prediction is borne out by the results. Virtually no coherent pattern of factor structure is evident in the presented results for scales with more than seven items.

The second reason for the focus on factor analysis is that, in the absence of a stable factor structure, a scale with more than seven or so items is an inefficient way to generate a single Subjective Wellbeing (SWB) score. Most of the items in such scales will not be contributing unique variance, and so are redundant. It is wasteful to consume respondents' time with a lengthy questionnaire when a 7 or 8 item measure can achieve the same result.

Other issues have also been noted which either detract from the simple structure of scales or which are damaging to the interpretation of results. These matters, discussed in the first part of this chapter, are the inclusion of items referring to eudaimonic constructs, the use of distal items, and the use of importance as a weighting for satisfaction.

In summary, two scales stand out as worthy of recommendation for research purposes. The first is the Satisfaction with Life Scale (Diener et al. 1985), which uses five items to create a single reliable index of SWB. The second is the new 5th Edition of the Personal Wellbeing Index (International Wellbeing Group 2013) which uses the minimum set of life domains to represent the 'satisfaction with life as a whole' construct. The advantage of this scale is that the items can be analyzed separately to yield a diagnostic profile, or combined to provide a single measure of SWB.

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