



THE WORLD HEALTH ORGANIZATION QUALITY OF LIFE ASSESSMENT (WHOQOL): DEVELOPMENT AND GENERAL PSYCHOMETRIC PROPERTIES*

THE WHOQOL GROUP†

Abstract—This paper reports on the field testing, empirical derivation and psychometric properties of the World Health Organisation Quality of Life assessment (the WHOQOL). The steps are presented from the development of the initial pilot version of the instrument to the field trial version, the so-called WHOQOL-100. The instrument has been developed collaboratively in a number of centres in diverse cultural settings over several years; data are presented on the performance of the instrument in 15 different settings worldwide. © 1998 Elsevier Science Ltd. All rights reserved

INTRODUCTION

The general concept of quality of life was initially considered a useful adjunct to traditional concepts of health and functional status. An ideal health assessment, therefore, would include a measure of the person's physical health, a measure of physical, social and psychological functioning, and a measure of quality of life. Such an assessment would cover key physical, psychological, social and spiritual domains of life. Early attempts at assessments that went beyond physical health status merely examined functional status, sometimes as a rating on a single scale, rather than the broader concept of quality of life. Although such single dimensional scales have poor reliability (e.g. Clark and Fallowfield, 1986), they continue to be used in related forms such as the Axis V Global Assessment of Functioning scale in DSM-IV (American Psychiatric Association, 1994). Such scales, unfortunately, attempt to condense a complex multidimensional concept into a single Procrustean dimension. To devise a measure of quality of life that is both reliable and valid, a broad range of potentially independent domains covering all important aspects of quality of life is necessary. Furthermore, to devise a measure that is reliable and valid cross-culturally requires a different approach to instrument development (see Kuyken *et al.*, 1994; Patrick *et al.*, 1994; Bullinger *et al.*, 1995). Therefore, an international collaboration has taken place over several years in order to develop a reliable, valid, and responsive assessment of quality of life that is applicable across cultures (The WHOQOL Group, 1994a,b, 1995).

THE WHOQOL: DEVELOPMENT OF THE PILOT FORM

The rationale for the development of the WHOQOL, its conceptual background, the proposed uses and the steps taken to develop the pilot version of the WHOQOL have been described in

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detail in several recent publications (i.e. The WHOQOL Group, 1994a,b, 1995; Orley and Kuyken, 1994). In brief, the aim was to develop a quality of life assessment that would be applicable cross-culturally. Rather than simply developing an assessment in one language and translating it into other target languages, the aim was to simultaneously develop the assessment in several different cultures and languages. Given that the main focus of the current paper will be on the field testing, empirical derivation and psychometric properties of the WHOQOL, the initial steps in the development of the WHOQOL will only be described briefly.

Concept clarification

The first phase of work involved international collaborative review to establish a definition of quality of life and an approach to international quality of life assessment. Quality of life was defined as "individuals' perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept affected in a complex way by the persons' physical health, psychological state, level of independence, social relationships and their relationship to salient features of their environment" (The WHOQOL Group, 1995). A study protocol was drafted that described in detail all the steps to be followed in the development of the WHOQOL (World Health Organization, 1993).

Qualitative pilot

The aim of the second phase of work was (1) to break the definition of quality of life down into those aspects of life (facets) considered necessary for a comprehensive assessment, (2) to operationalise these facets, (3) to generate a global question pool from which the WHOQOL questions would be psychometrically derived while also maintaining the conceptual structure and (4) develop equivalent response scales for different language versions of the WHOQOL. The work involved expert review, focus groups and expert and lay-question writing panels. This work was carried out simultaneously in each different cultural setting worldwide, with coordination and technical support from the WHO coordination group in Geneva.

The WHOQOL facets

Focus groups in each centre generated suggestions for aspects of life that they considered contributed to its quality. Participants from these groups were mostly individuals from the general population who were in contact with health care (World Health Organization, 1992). Following free discussion, each group was also presented with a list of aspects derived from a review of existing scales. In this way they could indicate whether or not they considered any of these to be important,

had they not done so already. These suggestions were arranged as a set of facets and for each facet a definition was written. The range and definition of facets were developed iteratively, such that each centre involved in the project considered and reconsidered the proposals from their own centres, from other centres, and from the coordinating team. Separate focus groups comprising individuals with a disease or impairment currently using health services, healthy participants and health personnel were assembled in each centre to deliberate on the facets. The inclusion of facets was based, therefore, on a consensus within and between cultures among health professionals, persons from the general population who were "healthy" and persons who were in contact with health services because of disease or impairment. Some facets were modified, and a facet on "spirituality" had to be added because of these procedures.

Generation of a preliminary global question pool

Following the focus group work, question writing panels were established in each of the 11 field centres who participated in this phase of work. Questions were written in the local language of the field centre. A maximum of twelve questions was written in each centre for each facet. A conceptual distinction was made between two types of question: "perceived objective questions", that is, global evaluations of functioning (e.g. "How well do you sleep?") and "self-report subjective questions", that is, highly personalised evaluations of functioning (e.g. "How satisfied are you with your sleep?") (The WHOQOL Group, 1994a, 1995). Question writing panels were asked to include both types of questions. These questions were then translated into English.

The WHOQOL coordinating group then pooled all questions from all centres to make up a "global question pool" of some 1800 questions. A content analysis of the questions identified many semantically equivalent questions (e.g. "How much of the time are you tired?" and "How often are you tired?"), thus reducing the number of questions in the global question pool. Judgements of semantic equivalence were carried out by consensual agreement in a small working group, and were subsequently reviewed by all principal investigators. Questions were then carefully examined to see to what extent they met the criteria for WHOQOL questions. This led to a considerable reduction in the number of questions in the global pool to around 1000 questions. The principal investigator in each of the field centres then rank-ordered the questions for each facet according to "how much it tells you about a respondent's quality of life in your culture" as judged by the discussions in the focus groups. From the combined rankings for all centres, 236 questions were selected for the WHOQOL pilot

instrument (World Health Organization, 1993; The WHOQOL Group, 1995).

Generation of the response scales

It was decided to use five-point Likert scales for all items in the instrument. It is well-recognised that scalar equivalence between different language versions of the same measure cannot be assumed (Hui and Triandis, 1985; Bullinger, 1994). Therefore, response scales were derived for each of the WHOQOLs language versions. To ensure equivalence across WHOQOL field centres, a methodology was used which specified the anchor points for the different types of response scales to be used in the instrument (that is, using English anchor points scales identified by "Very satisfied–Very dissatisfied", "Not at all–Extremely", "Not at all–Completely", and "Never–Always"), and then obtained the best descriptors for the 25%, 50% and 75% points between the two anchors for each response scale (see The WHOQOL Group, 1994a,b for further details).

This series of steps enabled a pilot WHOQOL comprising 236 questions addressing 29 facets of quality of life to be constructed in readiness for translation (where not already in the local language) and field testing. The 29 facets were grouped into six major domains which will be described in more detail below.

RESEARCH AIMS

The piloting and subsequent psychometric evaluation are described in the present paper. It had several aims:

- (1) to examine the construct validity of the WHOQOL domain and facet structure, and refine and reduce it accordingly
- (2) to select the best questions for each facet with the aim of producing a version of the WHOQOL for use in the field trials
- (3) to establish the WHOQOLs psychometric properties.

METHOD

Design

A cross-sectional design was used. An agreed-upon standardised study protocol was followed in the 15 centres who participated in this phase of the study (World Health Organization, 1993).

*The age at which the rites of passage into adulthood (e.g. legal responsibility, marriage, finishing education, employment) is markedly different between India and the U.S.A., for example.

The field centres

To ensure that the collaboration was genuinely international, field centres were selected to provide differences in level of industrialisation, available health services, and other markers relevant to the measurement of quality of life (e.g. role of the family, perception of time, perception of self, dominant religion). The fifteen participating field centres were as follows: University of Melbourne, Australia; Institute of Diabetes, Endocrinology and Metabolic Disease/University of Zagreb, Croatia; INSERM, Paris, France; Madras Medical College, India; All India Institute of Medical Sciences, New Delhi, India; Ben-Gurion University of the Negev, Beer-Sheva, Israel; Science University of Tokyo, Japan/St Luke's College of Nursing, Japan; Tilburg University, The Netherlands; University of Panama, Panama; Bekhterev Psychoneurological Research Institute, St. Petersburg, Russia; University of Barcelona, Spain; Institute of Mental Health, Bangkok, Thailand; University of Bath, U.K.; University of Washington, Seattle, U.S.A. and University of Zimbabwe, Harare, Zimbabwe.

The sample

The sampling frame was dictated by (1) the required sample size and sample diversity required for the development of a generic health-related quality of life measure and (2) the practical constraints of following a standardised protocol in fifteen culturally diverse centres. The pilot WHOQOL was administered to a minimum of 300 respondents in each of the 15 field centres participating in this phase of the project. Field centres were instructed to administer the pilot WHOQOL to adults, with "adult" being culturally defined*. A sampling quota was specified with regard to age (50% > 45, 50% ≤ 45), gender (50% male, 50% female), and health status (250 persons with a disease or impairment; 50 "healthy" respondents). Field centres were instructed to recruit a sample of respondents that represented the health care users in their country or region with a variety of diagnoses and varying degrees of severity of disease or disability.

The pilot WHOQOL

The pilot instrument contained 236 questions, covering six domains and 29 facets of quality of life (Table 1). This was based on approximately eight questions per facet: four "perceived objective" questions and four "self-report subjective" questions.

The format of the pilot WHOQOL was standardised with respect to instructions, headers and question order. All questions asked about the two weeks prior to administration of the questionnaire. Questions in the pilot instrument were mainly grouped by response format, for example, with all of the "Satisfaction" items grouped together. However, because some facets needed to be elabo-

Table 1. WHOQOL domains and facets

Domain I Physical	
1	Pain and discomfort
2	Energy and fatigue
3	Sexual activity
4	Sleep and rest
5	Sensory functions
Domain II Psychological	
6	Positive feelings
7	Thinking, learning, memory and concentration
8	Self-esteem
9	Bodily image and appearance
10	Negative feelings
Domain III Level of independence	
11	Mobility
12	Activities of daily living
13	Dependence on medicinal substances and medical aids
14	Dependence on nonmedicinal substances (alcohol, tobacco, drugs)
15	Communication capacity
16	Work capacity
Domain IV Social relationships	
17	Personal relationships
18	Practical social support
19	Activities as provider/supporter
Domain V Environment	
20	Freedom, physical safety and security
21	Home environment
22	Work satisfaction
23	Financial resources
24	Health and social care: accessibility and quality
25	Opportunities for acquiring new information and skills
26	Participation in and opportunities for recreation/leisure activities
27	Physical environment: (pollution/noise/traffic/climate)
28	Transport
Domain VI Spirituality/religion/personal beliefs	
Overall quality of life and general health perceptions	

rated by a short description (viz., mobility, spirituality/religion/personal beliefs, work capacity and work satisfaction), questions addressing these facets were grouped on a facet by facet basis.

A separate set of questions were administered, containing 41 questions, asking respondents to indicate how important each facet was to their quality of life. There was at least one importance question for each facet. However, some facets contained more constituent concepts than others (e.g. the facet "Pain and discomfort" included distinct aspects related to frequency/intensity of pain, control of pain, distress caused by pain, and disability caused by pain). These facets therefore required more questions than those facets comprising a single uni-dimensional concept (e.g. Work capacity). The analyses of the importance questions will be reported in a future publication.

Field centres were free to include up to two additional national/regional questions per facet, in a separate questionnaire, if the coverage of the facet by core questions was felt to be inadequate in the culture of the field centre. These were normally some of the questions that had been suggested by the focus groups in that country, but not included in the 236 core questions. For example, in Thailand, where the vast majority of the population are Buddhists, the additional national questions included the following question for the facet Negative feelings, "How well are you able to rid

yourself of negative feelings through meditation?" This question would clearly be inappropriate to most respondents in other settings, but addresses an important aspect of psychological well-being in Thailand. Any additional "national" questions were reviewed by the coordinating group as meeting the criteria for WHOQOL questions (see The WHOQOL Group, 1995). However, these questions were additional to the agreed upon core questions.

Procedure

For those questions in the core not already generated in the national languages, the pilot instrument (instructions, headers and questions) was translated into each of the national/regional languages, according to the WHOQOL translation methodology (Sartorius and Kuyken, 1994). The pilot WHOQOL, with the response scales added, was pre-tested with a small sample of health care users to provide preliminary feedback on: any problems with wording; any problems with the response scales; any problems with the instructions; the relevance of questions; and respondents' overall impression of the measure.

In several field centres, different cultural groups coexist, often speaking languages other than the national/regional language. In these centres the pilot WHOQOL was administered only to those individuals fluent in the national/regional language.

Most of the respondents completed self-report versions of their language appropriate WHOQOL. A small minority of the respondents were administered the WHOQOL as a structured interview if literacy problems or a physical disability prevented self-completion, though, unfortunately, centres did not record the numbers of structured interviews carried out. The data were sent to WHO, Geneva for analysis.

RESULTS AND DISCUSSION

General descriptions of the sample

The data presented in Table 2 provide summary descriptions of the samples from the 15 centres in terms of age, gender, health status, and sample size. As would be expected, the statistics show that there were some differences between the centres for these descriptive statistics. Where appropriate therefore, later tables will include both raw facet and domain scores, and, in addition, scores that have been adjusted for age, sex, and health status.

Missing values

There were very few missing values in the data set. Missing responses tended to be from facets that, for one reason or another, were not applicable to a particular respondent. These non-applicable facets were the sex, work and drugs facets, which showed a range of missing values up to a maximum

Table 2. General descriptions of the sample from each of the 15 centres

	<i>n</i>	Age \pm s.d.	% Female	% Sick
Total	4802	43.4 \pm 16.0	53.8	81.0
Bangkok	300	37.7 \pm 15.3	61.0	83.3
Beer Sheva	344	47.3 \pm 18.5	43.7	81.1
Madras	412	38.0 \pm 14.3	47.1	76.0
Melbourne	300	41.3 \pm 16.6	61.4	69.5
New Delhi	304	40.7 \pm 14.3	49.3	83.2
Panama	300	39.7 \pm 14.5	58.0	83.3
Seattle	300	47.3 \pm 15.9	55.3	83.3
Tilburg	411	48.1 \pm 13.9	62.5	83.5
Zagreb	300	44.6 \pm 15.6	50.0	83.3
Tokyo	286	46.0 \pm 20.0	53.8	80.4
St. Petersburg	300	45.2 \pm 12.7	49.3	82.7
Harare	300	42.9 \pm 13.4	53.8	83.3
Barcelona	305	44.6 \pm 16.7	49.2	83.6
Paris	323	42.3 \pm 15.6	52.4	77.7
Bath	319	45.0 \pm 17.4	50.9	81.2
		$F = 15.4, P < 0.001$	$\chi^2 = 68.2, P < 0.001$	$\chi^2 = 1844.4, P < 0.001$

of 7.2% for one of the work-related items. Overall, approximately 85% of individual items had less than 2.0% missing values. Following the guidelines set out for the scoring of the WHOQOL (World Health Organization, 1995), missing values were replaced with the appropriate mean variable scores in subsequent analyses. This procedure provides a conservative approach to missing values (Winer, 1971) and is recommended when the percentage of missing values is low.

Summary of preliminary frequency, reliability, and correlation analyses

A series of frequency, reliability, and correlation analyses were run on the pilot data from the WHOQOL at three different levels of analysis (see Bullinger *et al.*, 1995, for a detailed discussion of this approach):

- (i) at the level of individual centres,
- (ii) summarised across the individual centres,
- (iii) on the pooled global data.

That is, preliminary analyses were carried out for each centre individually, as summaries across the 15 centres, and as a single pooled dataset, in order to examine both general trends in the data, and potential differences between centres.

The frequency analyses were carried out to examine the distribution of responses across the five-point rating scales for the items. In relation to dichotomous response scales (e.g. Yes–No statements), guidelines vary, though a 90–10 percentage distribution or better (e.g. 80–20) is normally recommended (Kline, 1983). This recommendation was slightly amended for the 5-point WHOQOL scales such that any items with two or more adjacent scale points showing <10% of the responses on aggregate were highlighted as having frequency problems. Of course, it is possible for an item to meet the criterion in the pooled global data, yet show frequency problems in one or more of the centres. Therefore, items that met the criterion for the global data, but failed to meet it for more than 50% of the centres were also highlighted as having frequency problems.

Scale reliability analyses were also carried out (using the SPSS-Windows package) at the three levels of (i) centres, (ii) summarised centres, and (iii) global data; that is, any items with problematic corrected item-total correlations either in the pooled data or in more than 50% of the centres were highlighted as having reliability problems. These initial reliability analyses were carried out in order to identify items that were inappropriate because they correlated with their own facets at values of Pearson $r < 0.4$.

One further set of analyses was based on the multi-trait analysis program (MAP) analysis developed for the medical outcomes study (MOS) carried out by Ware and his colleagues (Hays *et al.*, 1988), although for the WHOQOL the analyses were run on SPSS (Windows). Nevertheless, these analyses will be referred to as “MAP” analyses as a shorthand. The purpose of the MAP program is to identify any item that loads higher on another subscale than on its own predicted sub-scale. Any items showing this pattern could then either be eliminated altogether or could be considered for inclusion with the alternative sub-scale. In the event, our MAP analyses showed that *none* of the WHOQOL items presented with this problem. However, a less troublesome variant of the MAP problem was observed for a number of items, in the majority of which an item was found to load highly on its own sub-scale (e.g. at $r > 0.7$), but was also found to load significantly on one or more additional sub-scales (at $r > 0.4$). In some cases of course this pattern would be predicted; for example, items in the Psychological domain that assessed negative feelings would be predicted to correlate with the Self-Esteem and Positive Feelings facets. Nevertheless, items were identified that showed high correlations with one or more facets which were not the major facet on which they were meant to load.

The analyses of frequency, reliability, and MAP problems led to a number of items being dropped at this stage in the analysis, so that they were not considered for inclusion in the field trial

Table 3. Summary of items dropped because of a range of problems

Items with frequency problems	
F314	Do you have problems with your sex life?
F511	How well do you hear?
F711	Do you have the ability to remember things?
F712	How is your memory?
F714	How would you rate your ability to think through everyday problems?
F715	Is your thinking clear?
F724	How satisfied are you with your ability to think?
F812	How do you feel about yourself?
F823	How satisfied are you with the respect you get from others?
F911	How would you rate your physical appearance?
F921	How do you feel about how you look?
F1212	How well are you able to take care of yourself in your everyday life?
F1411	Do you need to take something such as alcohol, tobacco or drugs to feel better?
F1412	Is there anything, other than prescribed medication, that you must take to make your life tolerable?
F1413	To what extent do you need a non-medical substance to feel good (e.g. alcohol, tobacco, drugs)?
F1414	To what extent are you dependent on addictive substances?
F1421	How much does your use of alcohol, tobacco or drugs improve your ability to handle day to day life?
F1423	To what extent are you worried about any dependence on non-medical substances?
F1511	How well are you able to communicate with others?
F1512	How easy is it for you to communicate with others?
F1515	How well are you able to understand other people?
F1521	How satisfied are you with your ability to understand and respond to others appropriately?
F1522	How satisfied are you with your ability to communicate with others?
F1523	How satisfied are you with how you communicate?
F1525	How satisfied are you with your ability to understand others?
F1711	To what extent do you have good relationships with other people?
F1712	How are the personal relationships in your life?
F1821	How happy are you with the support your family provide?
F1911	How much do you feel you have to carry all the families problems on your shoulders?
F1912	How would you rate your ability to provide support for others?
F1922	How satisfied are you with the help you provide others?
F1924	How much does any taking care of another person interfere with your everyday life?
F1925	How much of a burden to you is taking care of others?
F2011	To what degree do you feel safe where you live?
F2015	How would you rate your level of freedom?
F2123	How satisfied are you with the comfort of your living conditions?
F2212	How much do you value working?
F2213	How good are the conditions in which you work?
F2214	How would you rate the relations with people in your work environment?
F2413	How would you rate the health care you get?
F2423	How satisfied are you with the health care you obtain?
F2924	How satisfied are you with the purpose and meaning in your life?
Items with internal reliability problems	
F113	How easily are you able to get relief from pain?
F623	How worried are you about what the future holds for you?
F1514	Do you have trouble making yourself understood?
F1923	How much do you get satisfaction from caring for others?
F2412	How difficult is it for you to access health services when you need them?
F2513	How well informed are you about what is happening around you?
F2725	How satisfied are you with the water facilities where you live (availability and quality of water for drinking, cooking and bathing)? (also items F1412, F1911, F1924, F1925 — listed above under frequency problems)
Items from individual centres with non-significant or negative item-facet correlations	
F313	Is your sexual life a concern to you?
F412	How refreshed do you feel after sleeping?
F924	How much do you worry about how you look?
F1112	Are you able to move freely without difficulty?
F1614	How limited is your ability to work?
F1813	How much of the time can you get the support of those around you at difficult times?
F2121	How satisfied are you with your home?
F2414	How difficult is it for you to access social services when you need them? (also F113 — listed above under reliability problems)
Items with MAP problems	
F611	How happy are you?
F621	How satisfied are you with your level of happiness?
F622	How satisfied are you with your level of contentment?
F1016	Do you feel hopeless?
F1222	How satisfied are you with your ability to manage in your everyday life? (also F812 listed above under frequency problems)
Items with non-significant sick-well comparisons	
F814	Do you regard yourself as worthy of respect from others?
F1814	How much support do you get from your family?
F2211	How much do you like your work?
F2215	How well does your work suit you?
F2221	How satisfying is your work?
F2222	How much satisfaction do you get from your work?
F2224	How satisfied are you with your working conditions?
F2914	To what extent does spirituality give meaning to your life?
F2422	How satisfied are you with the quality of health services available to you?
F2424	How satisfied are you with the availability of social services?
F2711	How would you rate your physical environment (e.g. pollution, climate, noise, attractiveness)?
F2713	How polluted is the environment where you live?
F2714	How noisy is the area in which you live?
F2723	How satisfied are you with the climate of the place where you live?
F2724	How concerned are you with the noise in the area you live in?
F2921	How satisfied are you with your spiritual life? (also F313 F1813 F1923 F2121 F2212 F2213 F2214 F2414 — listed above under previous sections)

WHOQOL. These dropped items are summarised in Table 3. Items dropped because they failed to discriminate between sick and well populations, shown in this table, are discussed in the following section.

As noted above, in the development of the WHOQOL a conceptual distinction between items that were “perceived objective” versus “self-report subjective” was proposed. However, the analyses showed that almost all of the correlations between “perceived objective” and “self-report subjective” items within facets were at $r > 0.8$. The distinction therefore was dropped for the field trial version of the WHOQOL.

The second wave of reliability analyses

Following the exclusion of the items listed in Table 3, the scale reliability analyses were repeated for each facet at the levels of the centres, the summarised centres, and the pooled global data. These repeated analyses were again designed to highlight any items that now possessed reliability problems because of the altered composition of the facets following elimination of some of the items. These repeat analyses were also used to provide information about the size of the item-to-corrected-facet correlations, a factor that was taken into account in the item selection procedure for the field trial WHOQOL (see later).

Validity analyses

The pilot study of the WHOQOL provided an opportunity for testing known groups discriminant validity in the form of a comparison between healthy and unhealthy individuals (see Table 3 above). Any items therefore that did not significantly distinguish healthy from unhealthy individuals were highlighted for possible elimination during the selection of the final set of field trial items. A further validity check that was used for facets and domains was the extent of the correlation with the five general quality of life questions that were included in the WHOQOL to provide an Overall QOL score. In the event, all of the facets and domains correlated significantly with the Overall QOL score ranging from $r = 0.244$ (Spirituality/Personal Beliefs) to 0.676 (Energy), so that no facets or domains were considered for exclusion on the basis of this criterion.

Analyses of domain and facet inter-correlations

The results presented so far have focused on the item-facet correlations. However, another significant level within the hierarchical structure of the WHOQOL includes the predicted relationships between the original 29 facets and the 6 different domains to which these facets were assigned according to the conceptual analyses of the coordinating group. As a preliminary test of these predicted loadings, a table of facet and domain inter-correlations was produced in order to carry out the equivalent

of the MAP item analyses presented earlier. The most notable finding was that whereas the experts had relegated Sexual Activity to the Physical domain (facet-to-corrected-domain $r = 0.159$), the data showed that respondents considered sex to be part of the Social Relationships domain ($r = 0.405$), to which it was therefore moved.

Problem facets

Following the analyses described above, several facets were excluded from the assessment, due to frequency, reliability, and MAP problems of the items included within the facets. Facet 19, Activities as Provider/Supporter, for example, had been designed to assess the burden of care imposed on an individual through having to care for others. Five items had frequency problems, whilst another two items correlated more highly with the Personal Relationships facet than with facet 19 and were therefore moved to the Personal Relationships facet, resulting in the facet Activities as Provider/Supporter being dropped from the general WHOQOL. A further four facets were eliminated as a result of similar problems (Sensory Functions, Dependence on Non-Medicinal Substances, Communication Capacity and Work Satisfaction).

Item selection for the field trial WHOQOL

The elimination of five facets meant that there were now 24 specific facets in addition to several items measuring overall quality of life. In deciding on the number of items to choose for each retained facet, it was considered necessary to achieve a balance between on the one hand keeping enough items so that the psychometrics of the scale could be further assessed with the data from the field trial tests, but on the other hand making the instrument substantially shorter. The decision was taken to select four items per facet, because four is the minimum number required for scale reliability analyses (Kline, 1983) which will be carried out in future psychometric testing of the instrument. These decisions therefore led to the selection of $25 \times 4 = 100$ items (including the four general items); thus, the revised field trial WHOQOL has come to be known as the WHOQOL-100. Each facet was calculated by summing the item scores within each facet. Scores for facets therefore ranged from 4–20.

The final selection of items took into account a number of features of the items including the extent and the rank order of an items loading on a particular facet, the degree of conceptual overlap between potential items (which was minimised where possible), and the extent and range of problems highlighted in the earlier analyses. The final selection for the WHOQOL-100 is presented in Table 4, together with facet Cronbach alpha values and corrected item-facet loadings for the pooled

Table 4. Facet reliability analyses for the WHOQOL-100

Column name	Question	Direction of scoring	Facet-item correlation	Cronbach alpha
	Overall quality of life and general health +			
g11	How would you rate your quality of life?	+	0.68	0.84
g21	How satisfied are you with your quality of life?	+	0.78	
g22	In general, how satisfied are you with your life?	+	0.76	
g23	How satisfied are you with your health?	+	0.54	
Facet 1	Pain and discomfort	-		
f111	How often do you suffer (physical) pain?	-	0.48	0.76
f121	Do you worry about your pain or discomfort?	-	0.61	
f123	How difficult is it for you to handle any pain or discomfort?	-	0.51	
f125	To what extent do you feel that (physical) pain prevents you from doing what you need to do?	-	0.63	
Facet 2	Energy and Fatigue	+		
f211	Do you have enough energy for everyday life?	+	0.59	0.82
f213	How easily do you get tired?	-(rev.)*	0.68	
f221	How satisfied are you with the energy that you have?	+	0.65	
f224	How bothered are you by fatigue?	-(rev.)*	0.65	
Facet 3	Sleep and Rest	+		
f411	How well do you sleep?	+	0.77	0.87
f413	Do you have any difficulties with sleeping?	-(rev.)*	0.75	
f422	How satisfied are you with your sleep?	+	0.74	
f423	How much do any sleep problems worry you?	-(rev.)*	0.62	
Facet 4	Positive feelings	+		
f612	How much do you enjoy life?	+	0.64	0.78
f613	Do you generally feel content?	+	0.50	
f614	How positive do you feel about the future?	+	0.59	
f616	How much do you experience positive feelings in your life?	+	0.64	
Facet 5	Thinking, learning, memory and concentration	+		
f713	How would you rate your memory?	+	0.56	0.75
f721	How satisfied are you with your ability to learn new information?	+	0.57	
f716	How well are you able to concentrate?	+	0.48	
f723	How satisfied are you with your ability to make decisions?	+	0.55	
Facet 6	Self-esteem	+		
f811	How much do you value yourself?	+	0.58	0.80
f813	How much confidence do you have in yourself?	+	0.65	
f821	How satisfied are you with yourself?	+	0.64	
f822	How satisfied are you with your abilities?	+	0.61	
Facet 7	Bodily image and appearance	+		
f912	Are you able to accept your bodily appearance?	+	0.60	0.79
f913	Do you feel inhibited by your looks?	-(rev.)*	0.61	
f914	Is there any part of your appearance that makes you feel uncomfortable?	-(rev.)*	0.63	
f923	How satisfied are you with the way your body looks?	+	0.59	
Facet 8	Negative feelings	-		
f1012	How often do you have negative feelings, such as blue mood, despair, anxiety, depression?	-	0.63	0.86
f1013	How worried do you feel?	-	0.66	
f1022	How much do feelings of sadness or depression interfere with your everyday functioning?	-	0.77	
f1023	How much do any feelings of depression bother you?	-	0.78	

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Facet 9	Mobility	+		
f1111	How well are you able to get around?	+	0.71	
f1121	How satisfied are you with your ability to move around?	+	0.73	0.89
f1122	How much do any difficulties in mobility bother you?	-(rev.)*	0.79	
f1123	To what extent do any difficulties in movement affect your way of life?	-(rev.)*	0.79	
Facet 10	Activities of daily living	+		
f1211	To what extent are you able to carry out your daily activities?	+	0.65	
f1213	To what extent do you have difficulty performing your routine activities?	-(rev.)*	0.70	0.83
f1223	How satisfied are you with your ability to perform your daily living activities?	+	0.63	
f1224	How much are you bothered by any limitations in performing your everyday living activities?	-(rev.)*	0.64	
Facet 11	Dependence on medication or treatments	-		
f1311	How dependent are you on medications?	-	0.79	
f1313	How much do you need any medication to function in your daily life?	-	0.84	0.91
f1314	How much do you need any medical treatment to function in your daily life?	-	0.79	
f1322	To what extent does your quality of life depend on use of medical substances or medical aids?	-	0.79	
Facet 12	Working capacity	+		
f1611	Are you able to work?	+	0.83	
f1612	Do you feel able to carry out your duties?	+	0.84	0.93
f1613	How would you rate your ability to work?	+	0.80	
f1621	How satisfied are you with your capacity for work?	+	0.84	
Facet 13	Personal relationships	+		
f1713	How alone do you feel in your life?	-(rev.)*	0.44	
f1721	Do you feel happy about your relationship with your family members?	+	0.52	0.68
f1723	How satisfied are you with your personal relationships?	+	0.57	
f1921	How satisfied are you with your ability to provide for or support...?	+	0.36	
Facet 14	Social support	+		
f1812	Do you get the kind of support from others that you need?	+	0.67	
f1815	To what extent can you count on your friends when you need them?	+	0.70	0.81
f1822	How satisfied are you with the support you get from your family?	+	0.48	
f1825	How satisfied are you with the support you get from your friends?	+	0.70	
Facet 15	Sexual activity	+		
f311	How would you rate your sex life?	+	0.76	
f312	How well are your sexual needs fulfilled?	+	0.61	0.80
f321	How satisfied are you with your sex life?	+	0.77	
f323	Are you bothered by any difficulties in your sex life?	-(rev.)*	0.35	
Facet 16	Physical safety and security	+		
f2012	How safe do you feel in your daily life?	+	0.63	
f2013	Do you feel you are living in a safe and secure environment?	+	0.61	0.73
f2022	How much do you worry about your safety and security?	-(rev.)*	0.38	
f2023	How satisfied are you with physical safety and security?	+	0.51	

continued overleaf

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Facet 17	Home environment	+		
f2111	How comfortable is the place where you live?	+	0.74	
f2112	To what extent does the quality of your home meet your needs?	+	0.73	0.86
f2122	How satisfied are you with the conditions of your living place?	+	0.71	
f2124	How much do you like it where you live?	+	0.67	
Facet 18	Financial resources	+		
f2311	Have you enough money to meet your needs?	+	0.75	
f2315	Do you have financial difficulties?	-(rev.)*	0.80	0.88
f2323	How satisfied are you with your financial situation?	+	0.74	
f2324	How much do you worry about money?	-(rev.)*	0.70	
Facet 19	Health and social care: availability and quality	+		
f2411	How easily are you able to get good medical care?	+	0.52	
f2415	How would you rate the quality of social services available to you?	+	0.67	0.80
f2421	How satisfied are you with your access to health services?	+	0.66	
f2425	How satisfied are you with the social care services?	+	0.65	
Facet 20	Opportunities for acquiring new information and skills	+		
f2511	How available to you is the information you need in your day-to-day life?	+	0.62	
f2512	To what extent do you have opportunities for acquiring information that you feel you need?	+	0.65	0.80
f2521	How satisfied are you with your opportunities for acquiring skills?	+	0.56	
f2522	How satisfied are you with your opportunities to learn new information?	+	0.63	
Facet 21	Participation in and new opportunities for recreation/leisure	+		
f2612	To what extent do you have the opportunity for leisure activities?	+	0.59	
f2613	How much are you able to relax and enjoy yourself?	+	0.66	0.79
f2622	How much do you enjoy your free time?	+	0.55	
f2623	How satisfied are you with the way you spend your spare time?	+	0.59	
Facet 22	Physical environment: (pollution/noise/traffic/climate)	+		
f2712	How healthy is your physical environment?	+	0.36	
f2724	How concerned are you with noise in the area you live in?	-(rev.)*	0.36	0.65
f2721	How satisfied are you with your physical environment (e.g. pollution, climate, noise, attractiveness)?	+	0.60	
f2723	How satisfied are you with the climate of the place where you?	+	0.45	
Facet 23	Transport	+		
f2812	To what extent do you have adequate means of transport?	+	0.62	
f2814	To what extent do you have problems with transport?	-(rev.)*	0.71	0.83
f2822	How satisfied are you with your transport?	+	0.65	
f2823	How much do difficulties with transport restrict your life?	-(rev.)*	0.70	
Facet 24	Spirituality/Religion/personal beliefs	+		
f2911	Do your personal beliefs give meaning to your life?	+	0.71	
f2913	To what extent do you feel your life to be meaningful?	+	0.52	0.85
f2922	To what extent do your personal beliefs give you the strength to face difficulties?	+	0.79	
f2923	To what extent do your personal beliefs help you to understand difficulties in life?	+	0.76	

global data. The Cronbach alphas demonstrate good internal consistency for the facets with a range of 0.65 to 0.93. All facet scores range from 4 to 20, with higher scores denoting higher quality of life, except for the reverse scored facets Pain and discomfort, Negative feelings, and Dependence on medication.

Preliminary data from the WHOQOL-100

The mean item scores for each facet and domain are presented in Table 5. Because earlier analyses (see Table 2 above) had shown that there were some differences in age, sex, and health status between the centres, Table 6 presents the item means adjusted for

Table 5. WHOQOL-100 mean facet and domain scores across centres

	All	BK 1	BS 2	MD 3	ME 4	ND 5	PN 6	SE 7	TL 8	ZG 9	TK 10	SP 11	HR 12	BR 13	PR 14	BT 15
N	4802	300	344	412	300	304	300	300	411	300	286	300	300	305	323	319
Pain	11.1 ± 3.5	11.1 ± 3.7	10.8 ± 3.4	11.8 ± 3.8	9.4 ± 3.2	11.1 ± 3.7	11.5 ± 3.2	10.8 ± 3.4	11.2 ± 3.0	10.8 ± 3.0	9.5 ± 2.8	12.3 ± 3.0	14.7 ± 3.9	11.3 ± 3.1	9.6 ± 3.2	10.4 ± 3.3
Energy	12.8 ± 3.6	13.7 ± 3.2	14.1 ± 3.2	11.7 ± 3.2	13.5 ± 3.2	12.6 ± 3.9	13.1 ± 3.3	12.5 ± 3.8	11.5 ± 4.3	13.0 ± 3.3	13.2 ± 3.5	12.4 ± 3.1	11.6 ± 4.5	12.9 ± 3.2	14.1 ± 3.3	12.6 ± 3.6
Sleep	14.1 ± 3.9	14.2 ± 3.5	15.0 ± 3.7	13.9 ± 3.8	14.2 ± 3.7	14.5 ± 3.6	14.4 ± 3.5	13.7 ± 4.3	14.2 ± 3.9	15.2 ± 3.8	14.3 ± 3.4	13.9 ± 3.8	11.5 ± 4.9	13.7 ± 4.2	14.9 ± 4.0	14.1 ± 3.6
Feel	13.0 ± 3.1	12.9 ± 2.6	14.6 ± 2.7	12.2 ± 3.0	14.1 ± 2.7	11.8 ± 3.3	14.3 ± 2.9	13.9 ± 3.0	13.4 ± 2.6	12.5 ± 3.1	12.9 ± 3.0	11.4 ± 3.1	10.9 ± 3.4	13.7 ± 2.8	12.9 ± 3.2	13.9 ± 2.9
Think	14.0 ± 2.9	13.9 ± 2.3	15.1 ± 2.6	14.0 ± 2.7	14.9 ± 2.6	14.0 ± 3.1	14.8 ± 2.5	14.3 ± 2.8	13.3 ± 2.6	14.5 ± 2.6	13.3 ± 2.6	13.9 ± 2.7	12.5 ± 4.0	13.7 ± 2.5	14.2 ± 2.7	14.2 ± 2.9
Esteem	14.0 ± 3.1	14.2 ± 2.8	15.1 ± 2.9	14.3 ± 2.9	14.7 ± 2.8	14.2 ± 3.3	15.8 ± 2.6	14.4 ± 3.2	13.4 ± 2.7	14.3 ± 2.5	12.5 ± 3.1	13.2 ± 2.6	13.1 ± 4.1	13.8 ± 2.6	12.8 ± 3.0	13.8 ± 3.2
Body	14.9 ± 3.4	14.2 ± 2.7	15.9 ± 3.3	14.0 ± 3.3	15.2 ± 3.2	15.2 ± 3.4	15.3 ± 3.5	13.7 ± 3.8	15.6 ± 3.2	16.3 ± 2.9	13.4 ± 3.2	13.9 ± 2.7	14.8 ± 4.6	15.6 ± 2.8	15.2 ± 3.5	14.4 ± 3.3
Neg	10.6 ± 3.8	10.0 ± 3.6	9.3 ± 3.4	11.8 ± 3.5	9.3 ± 3.6	10.7 ± 3.8	10.7 ± 3.5	10.4 ± 3.7	10.2 ± 3.2	10.5 ± 3.3	9.0 ± 3.3	11.9 ± 3.3	14.6 ± 4.1	11.3 ± 3.4	9.6 ± 3.9	9.7 ± 3.5
Mobil	15.0 ± 4.2	14.7 ± 3.8	15.8 ± 4.1	13.5 ± 4.2	16.5 ± 3.5	14.1 ± 4.5	15.0 ± 3.6	14.9 ± 4.2	14.3 ± 4.2	15.7 ± 3.7	17.0 ± 3.2	16.1 ± 3.9	12.6 ± 4.8	14.1 ± 3.9	17.3 ± 3.0	14.9 ± 4.8
Activ	14.6 ± 3.7	15.0 ± 3.0	16.1 ± 3.3	13.0 ± 3.2	16.4 ± 3.0	13.4 ± 3.6	14.5 ± 3.3	15.1 ± 3.8	13.6 ± 4.1	14.8 ± 3.0	16.2 ± 2.5	14.3 ± 3.0	11.3 ± 4.3	14.3 ± 3.2	15.9 ± 3.3	15.0 ± 3.9
Medic	10.3 ± 4.8	11.6 ± 4.5	8.3 ± 4.4	10.8 ± 4.4	7.9 ± 4.4	11.1 ± 4.0	9.7 ± 4.6	10.7 ± 5.1	11.5 ± 4.5	10.3 ± 4.9	10.1 ± 4.4	10.6 ± 4.3	14.5 ± 5.0	8.7 ± 4.5	8.5 ± 4.8	9.1 ± 4.9
Work	14.1 ± 4.0	13.7 ± 3.4	15.3 ± 4.0	13.1 ± 3.4	15.9 ± 4.0	13.1 ± 4.4	15.1 ± 3.7	14.0 ± 4.4	12.4 ± 4.4	14.3 ± 4.1	14.5 ± 3.2	15.1 ± 3.5	12.7 ± 4.7	14.7 ± 3.6	15.4 ± 3.0	13.6 ± 4.4
Relat	15.0 ± 2.9	16.0 ± 2.2	16.1 ± 2.6	13.8 ± 2.7	15.4 ± 2.8	15.1 ± 3.0	15.1 ± 2.9	13.8 ± 3.6	14.7 ± 3.0	15.5 ± 2.6	14.6 ± 2.4	14.5 ± 2.6	14.5 ± 3.4	15.5 ± 2.4	15.1 ± 2.7	15.3 ± 3.0
Supp	14.1 ± 3.4	13.5 ± 2.9	15.0 ± 3.4	12.5 ± 3.1	15.2 ± 3.1	13.4 ± 3.5	13.6 ± 3.4	13.9 ± 3.6	13.8 ± 3.3	15.0 ± 3.2	13.4 ± 2.7	14.3 ± 3.0	14.3 ± 3.9	14.5 ± 3.3	14.2 ± 3.4	15.3 ± 2.7
Sex	13.6 ± 3.7	13.7 ± 2.4	14.9 ± 3.8	13.8 ± 2.9	13.8 ± 4.1	13.1 ± 3.5	13.6 ± 3.6	12.2 ± 4.3	13.0 ± 3.6	14.4 ± 3.8	13.6 ± 2.2	12.9 ± 3.3	14.8 ± 4.9	12.8 ± 3.5	14.3 ± 3.7	13.5 ± 3.9
Safety	14.0 ± 3.1	14.3 ± 2.6	15.8 ± 2.7	13.3 ± 3.0	15.1 ± 2.7	13.7 ± 3.5	13.0 ± 2.5	14.3 ± 3.5	15.0 ± 2.5	14.4 ± 2.9	15.5 ± 2.8	11.7 ± 2.9	13.1 ± 3.8	13.2 ± 2.3	13.5 ± 3.1	14.2 ± 2.8
Home	14.6 ± 3.5	14.7 ± 2.9	16.2 ± 3.0	12.5 ± 3.0	15.9 ± 2.7	14.4 ± 3.2	13.9 ± 3.7	14.7 ± 3.9	15.5 ± 3.0	15.0 ± 3.6	15.0 ± 3.5	12.2 ± 3.7	14.0 ± 3.5	14.9 ± 3.0	14.6 ± 3.8	16.1 ± 3.0
Finan	12.3 ± 4.2	12.6 ± 3.8	14.2 ± 3.7	10.6 ± 3.6	13.6 ± 3.8	12.8 ± 3.9	11.1 ± 3.1	11.7 ± 4.6	13.3 ± 3.7	12.0 ± 3.7	13.6 ± 3.6	9.2 ± 3.4	7.7 ± 3.3	12.2 ± 3.1	13.1 ± 4.1	13.5 ± 3.8
Servic	13.4 ± 3.1	13.9 ± 2.3	14.7 ± 2.9	12.7 ± 2.5	15.4 ± 2.4	13.6 ± 2.7	13.4 ± 2.6	14.7 ± 3.4	13.8 ± 2.7	13.3 ± 2.9	13.7 ± 2.3	10.4 ± 2.9	9.3 ± 2.8	12.9 ± 2.7	14.6 ± 2.5	14.4 ± 2.4
Inform	13.6 ± 3.2	13.4 ± 2.9	14.7 ± 2.9	12.1 ± 2.7	15.1 ± 2.7	13.2 ± 3.3	13.2 ± 3.0	15.0 ± 3.0	14.5 ± 2.8	13.6 ± 2.6	13.6 ± 2.5	13.5 ± 2.8	10.1 ± 3.9	13.0 ± 2.8	14.5 ± 2.9	14.2 ± 2.7
Leisur	12.9 ± 3.3	12.8 ± 2.8	13.9 ± 2.9	11.3 ± 2.6	14.2 ± 2.8	12.3 ± 3.3	12.8 ± 3.1	13.4 ± 2.9	14.2 ± 3.2	12.6 ± 3.1	13.5 ± 3.5	11.8 ± 3.1	11.6 ± 4.8	12.4 ± 3.1	13.5 ± 3.6	13.8 ± 3.0
Envir	13.3 ± 3.0	13.4 ± 2.9	14.3 ± 3.0	11.9 ± 2.7	14.3 ± 2.7	13.3 ± 2.9	12.5 ± 2.7	13.9 ± 3.2	14.3 ± 2.6	12.9 ± 2.9	14.8 ± 2.7	11.3 ± 2.7	13.5 ± 2.8	12.0 ± 2.6	13.4 ± 3.2	13.7 ± 2.7
Transp	14.5 ± 3.8	14.4 ± 2.7	16.1 ± 3.4	12.9 ± 2.9	16.7 ± 3.0	12.8 ± 3.3	13.1 ± 3.5	16.1 ± 3.5	16.2 ± 3.4	15.3 ± 3.4	15.1 ± 3.2	11.9 ± 3.6	10.4 ± 3.5	14.5 ± 3.2	16.3 ± 3.4	15.9 ± 3.5
Spirit	13.7 ± 3.7	14.2 ± 2.9	13.5 ± 4.0	13.6 ± 2.8	14.2 ± 3.4	13.5 ± 3.5	15.7 ± 2.2	14.9 ± 3.8	12.6 ± 3.5	14.5 ± 3.3	13.5 ± 3.9	13.7 ± 3.1	13.1 ± 4.8	14.1 ± 3.3	12.1 ± 4.6	13.1 ± 3.8
Overall	13.3 ± 3.4	13.3 ± 2.9	14.8 ± 2.8	12.6 ± 3.2	14.7 ± 3.1	13.3 ± 3.1	13.6 ± 3.4	13.1 ± 4.0	13.1 ± 3.5	13.4 ± 2.8	14.0 ± 2.8	11.5 ± 3.1	11.3 ± 3.9	13.3 ± 2.7	13.6 ± 3.2	14.0 ± 3.5
Dom 1	13.3 ± 3.0	13.6 ± 2.7	14.1 ± 2.8	12.6 ± 3.0	14.1 ± 2.7	13.4 ± 3.1	13.3 ± 2.7	13.2 ± 3.2	12.8 ± 3.1	13.8 ± 2.8	14.0 ± 2.5	12.7 ± 2.7	10.8 ± 4.0	13.1 ± 2.8	14.5 ± 2.6	13.4 ± 2.8
Dom 2	13.9 ± 2.5	13.9 ± 2.0	15.1 ± 2.2	13.3 ± 2.2	14.7 ± 2.3	13.7 ± 2.4	14.7 ± 2.3	14.0 ± 2.6	13.9 ± 2.2	14.2 ± 2.2	13.4 ± 2.2	12.9 ± 2.2	12.1 ± 3.3	13.9 ± 2.0	13.9 ± 2.5	14.1 ± 2.4
Dom 3	14.4 ± 3.4	13.9 ± 2.6	15.7 ± 3.3	13.2 ± 2.9	16.2 ± 3.0	13.4 ± 3.4	14.7 ± 3.0	14.3 ± 3.7	13.2 ± 3.5	14.6 ± 3.2	15.4 ± 2.2	14.7 ± 3.0	11.5 ± 4.1	14.6 ± 2.9	16.0 ± 2.6	14.5 ± 3.9
Dom 4	14.2 ± 2.7	14.4 ± 1.9	15.3 ± 2.6	13.3 ± 2.3	14.8 ± 2.7	13.9 ± 2.6	14.1 ± 2.7	13.3 ± 3.2	13.9 ± 2.7	14.9 ± 2.6	13.9 ± 1.9	13.9 ± 2.4	14.5 ± 3.5	14.3 ± 2.4	14.5 ± 2.6	14.7 ± 2.6
Dom 5	13.6 ± 2.4	13.7 ± 1.9	15.0 ± 1.9	12.2 ± 1.8	15.0 ± 1.9	13.3 ± 2.2	12.9 ± 2.2	14.2 ± 2.6	14.9 ± 2.0	13.6 ± 2.0	14.3 ± 2.1	11.5 ± 2.1	11.2 ± 2.1	13.1 ± 1.8	14.2 ± 2.2	14.5 ± 2.0
Dom 6	13.7 ± 3.7	14.2 ± 2.9	13.5 ± 4.0	13.6 ± 2.8	14.2 ± 3.4	13.5 ± 3.5	15.7 ± 2.2	14.9 ± 3.8	12.6 ± 3.5	14.5 ± 3.3	13.5 ± 3.9	13.7 ± 3.1	13.1 ± 4.8	14.1 ± 3.3	12.1 ± 4.6	13.1 ± 3.8

BK = Bangkok, BS = Beer Sheva, MD = Madras, ME = Melbourne, ND = New Delhi, PN = Panama, SE = Seattle, TL = Tilburg, ZG = Zagreb, TK = Tokyo, SP = St. Petersburg, HR = Harare, BR = Barcelona, PR = Paris, BT = Bath.

Table 6. Facet and domain scores across centres: Adjusted for age, sex and patient status (item means)

	All	BK	1	2	3	4	ME	5	ND	6	PN	7	SE	8	TL	9	ZG	10	TK	11	12	HR	13	BR	14	PR	15
n	4802	300	344	412	300	300	411	300	286	300	300	300	300	300	300	300	300	300	300	300	300	300	305	323	319		
Pain	11.1 ± 0.9	11.2 ± 0.9	11.1 ± 0.9	11.0 ± 1.0	10.9 ± 1.1	10.9 ± 1.1	11.2 ± 0.9	11.2 ± 0.9	11.2 ± 0.9	11.2 ± 0.9	11.2 ± 0.9	11.2 ± 0.9	11.2 ± 0.9	11.2 ± 0.9	11.2 ± 0.9	11.2 ± 0.9	11.2 ± 0.9	11.1 ± 0.9	11.1 ± 0.9	11.1 ± 0.9	11.2 ± 0.9	11.2 ± 0.9	11.2 ± 0.8	11.2 ± 1.0	11.1 ± 0.9		
Energy	12.8 ± 1.0	12.7 ± 0.9	12.8 ± 1.0	13.0 ± 1.1	13.0 ± 1.1	13.0 ± 1.1	12.6 ± 0.9	12.7 ± 1.0	12.8 ± 1.0	12.8 ± 1.0	12.7 ± 1.0	12.7 ± 1.0	12.7 ± 1.0	12.7 ± 1.0	12.6 ± 0.9	12.7 ± 1.0	12.7 ± 1.0	12.8 ± 1.0	12.8 ± 1.0	12.8 ± 1.0	12.7 ± 1.0	12.7 ± 1.0	12.7 ± 0.9	12.9 ± 1.0	12.8 ± 1.0		
Sleep	14.1 ± 0.9	14.1 ± 0.9	14.1 ± 1.0	14.3 ± 1.0	14.4 ± 1.1	14.1 ± 0.8	14.0 ± 0.8	14.1 ± 0.9	14.1 ± 0.8	14.1 ± 0.8	14.1 ± 0.9	14.1 ± 0.9	14.0 ± 0.9	14.0 ± 0.9	14.0 ± 0.8	14.1 ± 0.9	14.1 ± 0.9	14.1 ± 0.9	14.1 ± 0.9	14.1 ± 0.9	14.1 ± 0.9	14.1 ± 0.9	14.0 ± 0.8	14.2 ± 1.0	14.1 ± 0.9		
Feel	13.0 ± 0.5	13.0 ± 0.5	13.0 ± 0.5	13.1 ± 0.6	13.2 ± 0.6	13.0 ± 0.5	12.9 ± 0.5	13.0 ± 0.5	13.0 ± 0.5	13.0 ± 0.5	13.0 ± 0.5	13.0 ± 0.5	13.0 ± 0.5	13.0 ± 0.5	12.9 ± 0.5	13.0 ± 0.5	13.0 ± 0.5	13.0 ± 0.5	13.0 ± 0.5	13.0 ± 0.5	13.0 ± 0.5	13.0 ± 0.5	13.0 ± 0.5	13.1 ± 0.5	13.0 ± 0.5		
Think	14.0 ± 0.5	14.1 ± 0.5	14.0 ± 0.5	14.2 ± 0.5	14.2 ± 0.6	14.1 ± 0.4	13.9 ± 0.5	14.0 ± 0.5	14.1 ± 0.4	14.1 ± 0.4	14.1 ± 0.5	13.9 ± 0.5	13.9 ± 0.5	13.9 ± 0.5	13.9 ± 0.4	14.0 ± 0.5	14.0 ± 0.5	14.0 ± 0.5	14.0 ± 0.5	14.0 ± 0.5	14.0 ± 0.5	14.0 ± 0.5	14.0 ± 0.5	14.1 ± 0.5	14.0 ± 0.5		
Esteem	14.0 ± 0.4	14.0 ± 0.4	13.9 ± 0.5	14.1 ± 0.4	14.1 ± 0.5	14.0 ± 0.4	14.0 ± 0.4	14.0 ± 0.4	14.0 ± 0.4	14.0 ± 0.4	14.0 ± 0.4	14.0 ± 0.4	13.9 ± 0.4	13.9 ± 0.4	13.9 ± 0.4	13.9 ± 0.4	13.9 ± 0.4	13.9 ± 0.4	13.9 ± 0.4	13.9 ± 0.4	13.9 ± 0.4	13.9 ± 0.4	13.9 ± 0.4	14.0 ± 0.4	13.9 ± 0.4		
Body	14.9 ± 0.6	14.7 ± 0.5	15.0 ± 0.5	14.8 ± 0.5	14.8 ± 0.5	14.8 ± 0.6	14.9 ± 0.5	14.8 ± 0.6	14.8 ± 0.6	14.7 ± 0.5	14.7 ± 0.5	14.9 ± 0.5	14.9 ± 0.5	14.9 ± 0.5	14.9 ± 0.6	14.9 ± 0.6	14.9 ± 0.6	14.9 ± 0.6	14.9 ± 0.6	14.9 ± 0.6	14.9 ± 0.5	14.8 ± 0.5	14.9 ± 0.5	14.9 ± 0.5	14.9 ± 0.5		
Neg	10.6 ± 0.7	10.8 ± 0.7	10.5 ± 0.7	10.6 ± 0.7	10.5 ± 0.8	10.7 ± 0.8	10.6 ± 0.7	10.6 ± 0.7	10.7 ± 0.8	10.8 ± 0.7	10.8 ± 0.7	10.6 ± 0.7	10.6 ± 0.7	10.6 ± 0.7	10.6 ± 0.7	10.6 ± 0.7	10.6 ± 0.7	10.6 ± 0.7	10.5 ± 0.8	10.6 ± 0.7	10.6 ± 0.7	10.7 ± 0.7	10.6 ± 0.7	10.6 ± 0.7	10.6 ± 0.7	10.6 ± 0.8	
Mobil	15.0 ± 1.1	15.1 ± 1.1	15.0 ± 1.2	15.3 ± 1.3	15.4 ± 1.3	15.0 ± 1.0	14.9 ± 1.1	14.9 ± 1.1	15.0 ± 1.0	15.0 ± 1.1	15.0 ± 1.1	14.9 ± 1.1	14.9 ± 1.1	14.9 ± 1.1	15.0 ± 1.1	15.0 ± 1.1	15.0 ± 1.1	15.0 ± 1.1	15.0 ± 1.1	15.0 ± 1.1	15.0 ± 1.1	15.0 ± 1.1	14.9 ± 1.1	14.9 ± 1.1	15.2 ± 1.2	15.0 ± 1.1	
Activ	14.5 ± 0.9	14.5 ± 0.9	14.6 ± 0.9	14.7 ± 1.0	14.8 ± 1.1	14.5 ± 0.9	14.5 ± 0.9	14.5 ± 0.9	14.5 ± 0.9	14.5 ± 0.9	14.5 ± 0.9	14.5 ± 0.9	14.5 ± 0.9	14.5 ± 0.9	14.5 ± 0.9	14.5 ± 0.9	14.5 ± 0.9	14.5 ± 0.9	14.6 ± 1.0	14.5 ± 0.9	14.5 ± 0.9	14.5 ± 0.9	14.5 ± 0.9	14.6 ± 1.0	14.6 ± 1.0	14.5 ± 0.9	
Medic	10.3 ± 2.2	10.0 ± 2.0	10.5 ± 2.4	9.7 ± 2.3	9.6 ± 2.5	10.2 ± 1.8	10.1 ± 2.0	10.6 ± 2.1	10.7 ± 1.9	10.4 ± 2.0	10.4 ± 2.0	10.4 ± 2.0	10.4 ± 2.0	10.4 ± 2.0	10.4 ± 2.0	10.4 ± 2.0	10.4 ± 2.0	10.4 ± 2.0	10.4 ± 2.0	10.4 ± 2.0	10.4 ± 2.0	10.3 ± 2.1	10.5 ± 2.0	10.0 ± 2.3	10.0 ± 2.3	10.4 ± 2.1	
Work	14.1 ± 1.1	14.2 ± 1.0	14.1 ± 1.2	14.4 ± 1.2	14.4 ± 1.2	14.1 ± 0.9	14.2 ± 1.0	14.0 ± 1.0	14.0 ± 1.0	14.1 ± 1.1	14.1 ± 1.1	14.0 ± 1.0	14.0 ± 1.0	14.0 ± 1.0	14.0 ± 1.0	14.0 ± 1.0	14.0 ± 1.0	14.0 ± 1.0	14.1 ± 1.1	14.0 ± 1.0	14.0 ± 1.0	14.1 ± 1.0	14.0 ± 1.0	14.3 ± 1.1	14.1 ± 1.1	14.1 ± 1.1	
Relat	15.0 ± 0.3	14.9 ± 0.3	15.0 ± 0.3	14.9 ± 0.3	15.0 ± 0.4	14.9 ± 0.4	15.0 ± 0.3	15.0 ± 0.3	15.0 ± 0.3	15.0 ± 0.3	14.9 ± 0.3	14.9 ± 0.3	15.0 ± 0.3	15.0 ± 0.3	15.0 ± 0.3	15.0 ± 0.3	15.0 ± 0.3	15.0 ± 0.3	15.0 ± 0.3	15.0 ± 0.3	15.0 ± 0.3	14.9 ± 0.3	14.9 ± 0.3	15.0 ± 0.4	15.0 ± 0.4	15.0 ± 0.4	
Supp	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.2 ± 0.4	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	
Sex	13.6 ± 0.6	13.7 ± 0.6	13.6 ± 0.7	13.7 ± 0.7	13.8 ± 0.7	13.6 ± 0.5	13.6 ± 0.6	13.5 ± 0.6	13.6 ± 0.5	13.6 ± 0.6	13.6 ± 0.6	13.6 ± 0.6	13.6 ± 0.6	13.6 ± 0.6	13.6 ± 0.6	13.6 ± 0.6	13.6 ± 0.6	13.6 ± 0.6	13.6 ± 0.6	13.5 ± 0.6	13.5 ± 0.6	13.7 ± 0.6	13.5 ± 0.6	13.7 ± 0.6	13.7 ± 0.6	13.6 ± 0.6	
Safety	14.0 ± 0.3	13.9 ± 0.3	14.1 ± 0.3	14.0 ± 0.3	14.1 ± 0.4	14.0 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.0 ± 0.3	14.0 ± 0.3	14.0 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.1 ± 0.3	14.0 ± 0.3	14.0 ± 0.3	14.0 ± 0.3	14.0 ± 0.3	14.0 ± 0.3	14.0 ± 0.3	14.0 ± 0.3	
Home	14.6 ± 0.6	14.4 ± 0.5	14.7 ± 0.6	14.4 ± 0.5	14.6 ± 0.6	14.5 ± 0.6	14.6 ± 0.6	14.7 ± 0.6	14.6 ± 0.6	14.6 ± 0.6	14.5 ± 0.5	14.7 ± 0.6	14.7 ± 0.6	14.7 ± 0.6	14.8 ± 0.5	14.6 ± 0.6	14.6 ± 0.6	14.6 ± 0.6	14.7 ± 0.6	14.7 ± 0.6	14.7 ± 0.6	14.6 ± 0.6	14.6 ± 0.6	14.6 ± 0.6	14.6 ± 0.6	14.7 ± 0.6	
Finan	12.3 ± 0.8	12.0 ± 0.8	12.4 ± 0.9	12.0 ± 0.8	12.3 ± 0.9	12.1 ± 0.9	12.1 ± 0.8	12.4 ± 0.8	12.5 ± 0.8	12.3 ± 0.8	12.3 ± 0.8	12.3 ± 0.8	12.3 ± 0.8	12.3 ± 0.8	12.3 ± 0.8	12.3 ± 0.8	12.3 ± 0.8	12.3 ± 0.8	12.4 ± 1.0	12.3 ± 0.8	12.3 ± 0.8	12.2 ± 0.7	12.3 ± 0.8	12.3 ± 0.9	12.3 ± 0.8	12.3 ± 0.9	
Servic	13.4 ± 0.3	13.3 ± 0.3	13.4 ± 0.3	13.3 ± 0.3	13.4 ± 0.3	13.3 ± 0.3	13.4 ± 0.3	13.4 ± 0.3	13.4 ± 0.3	13.3 ± 0.3	13.3 ± 0.3	13.4 ± 0.3	13.4 ± 0.3	13.4 ± 0.3	13.4 ± 0.3	13.4 ± 0.3	13.4 ± 0.3	13.4 ± 0.3	13.4 ± 0.3	13.4 ± 0.3	13.4 ± 0.3	13.4 ± 0.3	13.4 ± 0.3	13.4 ± 0.3	13.4 ± 0.3	13.4 ± 0.3	
Inform	13.6 ± 0.4	13.5 ± 0.4	13.6 ± 0.4	13.6 ± 0.4	13.7 ± 0.5	13.5 ± 0.4	13.6 ± 0.4	13.6 ± 0.4	13.6 ± 0.4	13.6 ± 0.4	13.6 ± 0.4	13.6 ± 0.4	13.6 ± 0.4	13.6 ± 0.4	13.6 ± 0.4	13.6 ± 0.4	13.6 ± 0.4	13.6 ± 0.4	13.6 ± 0.4	13.5 ± 0.4	13.5 ± 0.4	13.6 ± 0.4	13.5 ± 0.4	13.6 ± 0.4	13.6 ± 0.4	13.6 ± 0.4	
Leisur	12.9 ± 0.4	12.8 ± 0.4	13.0 ± 0.4	12.9 ± 0.4	13.0 ± 0.4	12.9 ± 0.4	13.0 ± 0.4	13.0 ± 0.4	13.0 ± 0.4	12.8 ± 0.4	12.8 ± 0.4	13.0 ± 0.4	13.0 ± 0.4	13.0 ± 0.4	13.0 ± 0.4	13.0 ± 0.4	12.9 ± 0.4	12.9 ± 0.4	13.0 ± 0.4	12.9 ± 0.4	12.9 ± 0.4	12.9 ± 0.3	12.9 ± 0.4	12.9 ± 0.4	13.0 ± 0.4	13.0 ± 0.4	
Envir	13.3 ± 0.3	13.2 ± 0.3	13.4 ± 0.4	13.2 ± 0.3	13.3 ± 0.3	13.2 ± 0.3	13.3 ± 0.3	13.4 ± 0.3	13.3 ± 0.3	13.2 ± 0.3	13.2 ± 0.3	13.3 ± 0.3	13.4 ± 0.3	13.4 ± 0.3	13.4 ± 0.3	13.3 ± 0.3	13.3 ± 0.3	13.3 ± 0.3	13.4 ± 0.4	13.3 ± 0.3	13.3 ± 0.3	13.3 ± 0.3	13.3 ± 0.3	13.3 ± 0.3	13.3 ± 0.3	13.3 ± 0.3	
Transp	14.5 ± 0.5	14.3 ± 0.5	14.6 ± 0.5	14.4 ± 0.5	14.6 ± 0.5	14.4 ± 0.5	14.6 ± 0.5	14.6 ± 0.5	14.6 ± 0.5	14.4 ± 0.5	14.4 ± 0.5	14.6 ± 0.5	14.6 ± 0.5	14.6 ± 0.5	14.6 ± 0.5	14.6 ± 0.5	14.6 ± 0.5	14.6 ± 0.5	14.6 ± 0.6	14.6 ± 0.5	14.6 ± 0.5	14.5 ± 0.4	14.5 ± 0.5	14.5 ± 0.5	14.6 ± 0.6	14.6 ± 0.6	
Spirit	13.7 ± 0.3	13.8 ± 0.3	13.7 ± 0.3	13.7 ± 0.4	13.8 ± 0.4	13.7 ± 0.3	13.7 ± 0.3	13.8 ± 0.3	13.8 ± 0.3	13.7 ± 0.3	13.7 ± 0.3	13.7 ± 0.3	13.7 ± 0.3	13.7 ± 0.3	13.8 ± 0.3	13.8 ± 0.3	13.8 ± 0.3	13.8 ± 0.3	13.7 ± 0.3	13.7 ± 0.3	13.7 ± 0.3	13.7 ± 0.3	13.7 ± 0.3	13.7 ± 0.3	13.7 ± 0.3	13.7 ± 0.3	
Overll	13.3 ± 0.8	13.2 ± 0.8	13.3 ± 0.8	13.3 ± 0.9	13.5 ± 0.9	13.2 ± 0.8	13.3 ± 0.7	13.3 ± 0.8	13.3 ± 0.8	13.2 ± 0.8	13.2 ± 0.8	13.3 ± 0.8	13.3 ± 0.8	13.3 ± 0.8	13.3 ± 0.8	13.3 ± 0.8	13.3 ± 0.8	13.3 ± 0.8	13.3 ± 0.8	13.3 ± 0.8	13.3 ± 0.8	13.2 ± 0.7	13.2 ± 0.7	13.4 ± 0.9	13.4 ± 0.9	13.3 ± 0.8	
Dom 1	13.3 ± 0.9	13.2 ± 0.9	13.3 ± 1.0	13.4 ± 1.0	13.5 ± 1.1	13.3 ± 0.9	13.3 ± 1.0	13.3 ± 0.9	13.3 ± 0.9	13.2 ± 0.9	13.2 ± 0.9	13.2 ± 0.9	13.2 ± 0.9	13.2 ± 0.9	13.1 ± 0.9	13.2 ± 0.9	13.2 ± 0.9	13.3 ± 1.0	13.3 ± 1.0	13.2 ± 0.9	13.2 ± 0.9	13.2 ± 0.9	13.2 ± 0.9	13.4 ± 1.0	13.3 ± 0.9		
Dom 2	13.9 ± 0.5	13.8 ± 0.4	13.9 ± 0.5	13.9 ± 0.5	14.0 ± 0.5	13.8 ± 0.4	13.8 ± 0.4	13.8 ± 0.4	13.8 ± 0.4	13.8 ± 0.4	13.8 ± 0.4	13.8 ± 0.4	13.8 ± 0.4	13.8 ± 0.4	13.8 ± 0.4	13.8 ± 0.4	13.8 ± 0.4	13.8 ± 0.4	13.9 ± 0.5	13.8 ± 0.4	13.8 ± 0.4	13.8 ± 0.4	13.8 ± 0.4	13.9 ± 0.5	13.9 ± 0.5	13.9 ± 0.5	
Dom 3	14.4 ± 1.3	14.4 ± 1.2	14.3 ± 1.4	14.6 ± 1.4	14.8 ± 1.5	14.4 ± 1.2	14.4 ± 1.2	14.2 ± 1.3	14.2 ± 1.2	14.4 ± 1.2	14.4 ± 1.2	14.4 ± 1.2	14.2 ± 1.3	14.2 ± 1.3	14.2 ± 1.2	14.3 ± 1.2	14.3 ± 1.2	14.3 ± 1.2	14.3 ± 1.4	14.3 ± 1.2	14.3 ± 1.2	14.3 ± 1.3	14.2 ± 1.2	14.5 ± 1.4	14.5 ± 1.4	14.3 ± 1.3	
Dom 4	14.2 ± 0.4	14.2 ± 0.3	14.2 ± 0.4	14.3 ± 0.4	14.4 ± 0.4	14.2 ± 0.4	14.2 ± 0.3	14.2 ± 0.3	14.2 ± 0.3	14.2 ± 0.3	14.2 ± 0.3	14.2 ± 0.3	14.2 ± 0.3	14.2 ± 0.3	14.2 ± 0.3	14.2 ± 0.3	14.2 ± 0.3	14.2 ± 0.3	14.3 ± 0.4	14.2 ± 0.3	14.2 ± 0.3	14.2 ± 0.3	14.2 ± 0.3	14.3 ± 0.4	14.2 ± 0.3	14.2 ± 0.4	
Dom 5	13.6 ± 0.4	13.4 ± 0.4	13.7 ± 0.4	13.5 ± 0.4	13.6 ± 0.4	13.5 ± 0.4	13.7 ± 0.4	13.7 ± 0.4																			

Table 7. Mean facet and domain scores across gender, age and health status

n	Analysis 1 — Gender				Analysis 2 — Age				Analysis 3 — Health status					
	Male	Female	F	p	18-44	45-64	Age 65+	F	p	Post hoc	Sick	Well	F	P
2241	11.0 ± 3.5	11.2 ± 3.5	3.4	ns	2590	1585	586	4.8	0.008	b > a = c	3889	913	350.6	0.0001
*Pain	13.1 ± 3.6	12.5 ± 3.7	28.7	0.0001	13.0 ± 3.4	11.3 ± 3.7	10.9 ± 3.6	10.9 ± 3.6	0.0001	a > b = c	11.5 ± 3.5	9.2 ± 2.9	343.3	0.0001
Energy	14.2 ± 3.9	14.0 ± 4.0	2.1	ns	14.4 ± 3.8	13.7 ± 4.1	13.9 ± 4.1	13.9 ± 4.1	0.0001	a > b = c	12.3 ± 3.6	14.7 ± 3.0	246.3	0.0001
Sleep	13.0 ± 3.2	13.1 ± 3.1	1.4	ns	13.2 ± 3.1	12.8 ± 3.2	13.0 ± 3.1	13.0 ± 3.1	0.0001	a > b = c	13.7 ± 4.0	15.9 ± 3.2	117.9	0.0001
Feel	14.1 ± 2.9	14.0 ± 2.9	3.7	ns	14.3 ± 2.9	13.8 ± 2.9	13.7 ± 2.8	13.7 ± 2.8	0.0001	a > b = c	12.8 ± 3.2	14.0 ± 2.7	100.8	0.0001
Think	14.1 ± 3.1	13.9 ± 3.0	4.00	0.005	14.2 ± 3.2	13.7 ± 2.9	13.6 ± 2.9	13.6 ± 2.9	0.0001	a > b = c	13.8 ± 2.9	14.9 ± 2.6	73.9	0.0001
Esteem	15.2 ± 3.4	14.6 ± 3.4	40.1	0.0001	14.6 ± 3.5	15.1 ± 3.3	15.2 ± 3.2	15.2 ± 3.2	0.0001	a > b = c	14.7 ± 3.5	15.6 ± 3.1	51.1	0.0001
Body	10.4 ± 3.8	10.8 ± 3.8	16.0	0.0001	10.8 ± 3.7	10.7 ± 3.9	9.4 ± 3.7	9.4 ± 3.7	0.0001	a > b > c	10.9 ± 3.8	9.4 ± 3.2	110.4	0.0001
*Neg. feeling	15.0 ± 4.2	15.1 ± 4.2	1.9	ns	15.4 ± 4.1	14.7 ± 4.3	14.3 ± 4.3	14.3 ± 4.3	0.0001	a > b = c	14.5 ± 4.3	17.3 ± 3.0	357.7	0.0001
Mobility	14.6 ± 3.6	14.5 ± 3.7	0.1	ns	14.7 ± 3.5	14.3 ± 3.8	14.6 ± 3.8	14.6 ± 3.8	0.0001	a > b = c	14.1 ± 3.7	16.5 ± 2.7	329.1	0.0001
Activities	10.4 ± 4.8	10.2 ± 4.9	2.3	ns	9.3 ± 4.7	11.1 ± 4.8	12.2 ± 4.4	12.2 ± 4.4	0.0001	a < b < c	11.2 ± 4.7	6.2 ± 3.0	926.0	0.0001
*Medic/ dep	14.1 ± 4.1	14.2 ± 4.0	0.7	ns	14.5 ± 4.0	13.9 ± 4.2	13.2 ± 4.0	13.2 ± 4.0	0.0001	a > b > c	13.6 ± 4.1	16.2 ± 3.0	306.0	0.0001
Work	14.9 ± 2.9	15.0 ± 2.9	2.2	ns	14.8 ± 3.0	15.0 ± 2.8	15.5 ± 2.7	15.5 ± 2.7	0.0001	a = b > c	14.8 ± 2.9	15.5 ± 2.5	43.4	0.0001
Pers. Rels.	13.9 ± 3.3	14.3 ± 3.4	16.0	0.0001	14.1 ± 3.4	14.1 ± 3.4	14.4 ± 3.2	14.4 ± 3.2	0.0001	ns	14.0 ± 3.4	14.6 ± 3.2	28.2	0.0001
Soc. support	13.6 ± 3.7	13.7 ± 3.7	0.7	ns	13.9 ± 3.8	13.5 ± 3.6	12.7 ± 3.2	12.7 ± 3.2	0.0001	a > b > c	13.3 ± 3.7	14.8 ± 3.4	108.7	0.0001
Sex	14.0 ± 3.2	14.1 ± 3.0	1.5	ns	14.0 ± 3.1	13.9 ± 3.2	14.6 ± 3.1	14.6 ± 3.1	0.0001	a = b > c	13.9 ± 3.2	14.5 ± 2.8	31.2	0.0001
Safety	14.4 ± 3.5	14.8 ± 3.5	11.6	0.0007	14.2 ± 3.5	14.9 ± 3.4	15.8 ± 3.1	15.8 ± 3.1	0.0001	a < b < c	14.6 ± 3.5	14.8 ± 3.4	4.8	0.03
Home	12.1 ± 4.1	12.4 ± 4.2	6.3	0.01	11.7 ± 4.0	12.3 ± 4.3	14.4 ± 4.0	14.4 ± 4.0	0.0001	a < b < c	12.1 ± 4.2	12.9 ± 3.8	21.8	0.0001
Finances	13.3 ± 3.1	13.4 ± 3.1	2.6	ns	13.2 ± 3.0	13.3 ± 3.3	14.3 ± 2.9	14.3 ± 2.9	0.0001	a = b > c	13.3 ± 3.1	13.8 ± 2.9	18.0	0.0001
Services	13.5 ± 3.2	13.6 ± 3.1	2.7	ns	13.6 ± 3.1	13.4 ± 3.3	13.7 ± 3.2	13.7 ± 3.2	0.0001	ns	13.4 ± 3.2	14.4 ± 2.9	72.6	0.0001
Information	13.0 ± 3.3	12.9 ± 3.4	0.3	ns	12.8 ± 3.3	12.8 ± 3.4	13.9 ± 3.3	13.9 ± 3.3	0.0001	a = b > c	12.8 ± 3.4	13.5 ± 3.2	30.7	0.0001
Leisure	13.3 ± 3.0	13.3 ± 3.0	0.1	ns	13.1 ± 2.9	13.4 ± 3.1	14.2 ± 3.1	14.2 ± 3.1	0.0001	a < b < c	13.3 ± 3.0	13.4 ± 2.9	1.2	ns
Envir.	14.5 ± 3.8	14.5 ± 3.8	0.1	ns	14.3 ± 3.7	14.6 ± 3.9	15.4 ± 3.6	15.4 ± 3.6	0.0001	a < b < c	14.4 ± 3.8	15.1 ± 3.6	30.2	0.0001
Transport	13.4 ± 3.7	14.0 ± 3.6	26.9	0.0001	13.8 ± 3.6	13.7 ± 3.7	13.5 ± 3.9	13.5 ± 3.9	0.0001	ns	13.6 ± 3.7	14.1 ± 3.5	15.5	0.0001
Overall	13.2 ± 3.4	13.4 ± 3.3	4.3	0.04	13.3 ± 3.4	13.1 ± 3.5	13.8 ± 3.2	13.8 ± 3.2	0.0001	b < a < c	12.9 ± 3.4	14.9 ± 2.9	266.7	0.0001
Domain 1	13.4 ± 3.0	13.1 ± 3.0	12.1	0.0005	13.5 ± 2.9	13.0 ± 3.2	13.2 ± 3.2	13.2 ± 3.2	0.0001	a > b	12.8 ± 3.0	15.2 ± 2.3	475.3	0.0001
Domain 2	14.0 ± 2.5	13.7 ± 2.4	13.5	0.0002	13.9 ± 2.5	13.7 ± 2.4	14.0 ± 2.3	14.0 ± 2.3	0.04	b < c	13.6 ± 2.5	14.8 ± 2.2	158.2	0.0001
Domain 3	14.3 ± 3.4	14.4 ± 3.4	1.3	ns	14.8 ± 3.3	13.9 ± 3.5	13.5 ± 3.4	13.5 ± 3.4	0.0001	a > b > c	13.8 ± 3.4	16.9 ± 2.2	737.4	0.0001
Domain 4	14.1 ± 2.7	14.3 ± 2.7	7.9	0.005	14.2 ± 2.7	14.2 ± 2.6	14.3 ± 2.4	14.3 ± 2.4	0.16	ns	14.1 ± 2.7	15.0 ± 2.4	84.6	0.0001
Domain 5	13.5 ± 2.4	13.6 ± 2.3	3.6	ns	13.4 ± 2.3	13.6 ± 2.5	14.6 ± 2.4	14.6 ± 2.4	0.0001	a < b < c	13.5 ± 2.4	14.1 ± 2.2	44.3	0.0001
Domain 6	13.4 ± 3.7	14.0 ± 3.6	26.9	0.0001	13.8 ± 3.6	13.7 ± 3.7	13.5 ± 3.9	13.5 ± 3.9	1.3	ns	13.6 ± 3.7	14.1 ± 3.5	15.5	0.0001

Three separate analyses of the global data for WHOQOL-100 looking at individual facets and overall domains (values are means, range 4-20). Analysis (1) Male vs female comparisons; (2) "Younger" vs "middle-aged" vs "older" adults; (3) "Sick" vs "Well" comparison groups. Post hoc comparison Dunnett C test was used due to unequal variances amongst groups (a = 18-44 years, b = 45-64 years, c = 65+ years). * = Facets scored in a negative direction (i.e. higher score = lower quality of life).

these differences. Finally, Table 7 presents some preliminary comparisons for the global data between male and female respondents, between younger (18–44 years), middle-aged (45–64 years), and older (65 years plus) adults, and between the healthy and unhealthy respondents. The data in Table 7 show a considerable number of significant differences; for example, all but one of the comparisons (for the Physical Environment facet) showed significant differences between the healthy and the unhealthy respondents, although almost two-thirds of the male–female comparisons were not statistically significantly different.

Comments on the cross-cultural performance of the WHOQOL

As noted in previous publications on the development of the WHOQOL (e.g. The WHOQOL Group, 1995), it was a possibility that no field trial version of the WHOQOL could have been developed in which the same item, facet, and domain structure could be used for all centres. Hence, in theory each centre could have required the development of its own unique version of the WHOQOL. The data presented so far suggest the opposite conclusion; namely, that it has been possible to identify a common item, facet, and domain structure to be used for the field trial WHOQOL-100. The data analyses showed that it was possible to develop a multi-cultural WHOQOL-100 that has acceptable psychometric properties for all the 15 centres studied.

There are a number of additional ways in which the possibility of a universal core concept of quality of life can be tested within the present dataset. The first test is based on the fact that many of the centres included a number of so-called “national items” in addition to the general WHOQOL questions. These national questions were included primarily when a centre considered that an important aspect of a facet was not addressed by the general questions. The preliminary analyses of these national questions suggest that, in fact, they performed no better than the general questions, therefore, they do not appear to question the universality of the core WHOQOL; a detailed set of analyses of the data on these “national” questions is in preparation.

A second way to test the universal versus culture-specific aspects of the WHOQOL is to use more sophisticated multivariate analyses and compare the potential structures and loadings across the different centres. Although these analyses will be presented in a separate publication in considerably more detail, some preliminary findings regarding the

structure of the WHOQOL-100 will be presented here.

Exploratory factor analysis of the facets. Principal components analysis with varimax rotation was carried out on a random split half of the sample ($n = 2056$) to establish alternative models to the six domain structure. Orthogonal rotation was employed because there was no reason to assume that facets such as physical environment and pain and discomfort would be related to one another.

Principal components analysis yielded four factors with eigenvalues greater than one, explaining 58% of the variance. The scree plot of factors suggested this solution to be appropriate. The principal component extracted explained 37.9% of the observed variance, reflecting the strong relationships amongst many of the facets. Table 8 gives the results of the rotated four factor solution. The first factor included facets relating to the physical and level of independence domains, and may reflect a physical capacity domain. The second factor comprises all facets relating to the environment domain. The third factor comprised three of the facets relating to the psychological domain and the facet relating to spirituality. The fourth factor encompassed all facets relating to the social relationships domain and the facet relating to bodily image and appearance. As shown, the facet relating to overall quality of life is shown to load on all factors.

Confirmatory factor analysis. The conceptual model of quality of life suggested a six domain structure, as shown in Table 1 above. This structure was compared to a single domain structure, and to the four domain structure suggested by exploratory factor analysis of the split-half sample, using the EQS Version 5.0 package (Bentler and Wu, 1995). (Both negative feelings and bodily image facets were retained within the psychological domain, despite their loadings on the physical capacity and social relationships domains shown in the exploratory factor analysis.) As shown in Table 9, the six domain structure fell below 0.9 on the comparative fit indice (which ranges in value from 0 to 1, and for which a value of 0.9 or greater is considered as a good degree of “fit” for the model in question*) for the total sample population, and for both ill and well subjects when considered separately. Whilst the fit was substantially better than null models which assumed either that there was only a single domain or in which all facets were assumed to be independent of each other (for which $\chi^2 = 51,085.4$ and is therefore clearly unacceptable), the four factor solution represented an improved model, as shown by the improved fit indices and the significant decrease in χ^2 (e.g. to 7,716.3 for the total sample). Moreover, this structure was shown to be the best fit for both ill and well sample populations (see Table 9). This four domain model can be improved further, for example, by allowing certain facet errors to covary; details of these further

*The comparative fit index is the indice of preference reported here as this indice takes into account both the degrees of freedom within the model and the sample size.

Table 8. Principal components analysis of facets included within the WHOQOL-100

Facet	First principal component	Factor 1	Factor 2	Factor 3	Factor 4
Pain and discomfort	0.59	0.75			
Energy and fatigue	0.70	0.73			
Sleep and rest	0.61	0.56			
Positive feelings	0.71			0.57	
Thinking, memory, concentration	0.64			0.71	
Self-esteem	0.66			0.71	0.37
Bodily image and appearance	0.54				0.61
Negative feelings	0.70	0.56			
Mobility	0.59	0.72			
Activities of daily living	0.76	0.75			
Dependence on medication	0.46	0.72			
Work capacity	0.67	0.68		0.40	
Personal relationships	0.69			0.40	0.63
Practical social support	0.55		0.39		0.50
Sexual activity	0.49				0.68
Safety and physical security	0.58		0.58		0.35
Home environment	0.57		0.69		
Financial resources	0.57		0.67		
Health and social care	0.57		0.69		
Opportunities for acquiring new information and skills	0.67		0.52	0.52	
Participation and opportunities for leisure	0.70		0.47	0.43	
Physical environment	0.41		0.68		
Transport	0.53		0.68		
Spirituality/ personal beliefs	0.36			0.66	
Overall quality of life	0.82	0.46	0.38	0.40	0.41

Significant loadings of >0.35 are shown.

analyses are beyond the scope of the present paper and will be presented elsewhere. Nevertheless, although the goodness of fit indices still fall below 0.9 and the χ^2 values are still significant, the model presents a good fit when the heterogeneity of the sample and the sample size is taken into account (Fig. 1).

GENERAL DISCUSSION

The analyses presented in this paper are remarkable in that they demonstrate that it has been possible to develop a measure of quality of life that is reliable and valid for use in a diverse range of cultures. The initial development of the pilot WHOQOL included input at a conceptual level from culturally diverse centres; thus, no centre provided the base instrument which was then merely translated into other languages. Instead, a general instrument was developed through an iterative process that included an agreed definition of Quality of Life, agreed definitions of the facets, the generation

of a large item pool reflecting those definitions, and, finally, an agreed set of items for the pilot WHOQOL.

The preliminary analyses of the item response distributions, item-facet reliability analyses, and examination of item correlations with other facets showed that some items had to be eliminated. In addition, the item analyses suggested that some facets should not be retained in the field trial instrument either because responses were, for example, too skewed, or because the facet demonstrated poor reliability and validity across cultures. It must be emphasised however that although facets related to sensory functioning, communication, and burden of care for others have been dropped from the core WHOQOL-100, we would envisage add-on modules designed for either specific populations (e.g. those with sensory or communication dysfunctions) or for specific cultures in which these items could be included, so long as they met the reliability and validity criteria. The development of the core WHOQOL-100 provides a first step in defining the

Table 9. Structural equation modelling fit indices

	1 domain	6 domain	4 domain
	Total sample		
χ^2	14854.2, <i>df</i> = 275	8790.5, <i>df</i> = 270	7716.3, <i>df</i> = 271
CFI	0.713	0.832	0.853
Ave off diag.	0.0667	0.0552	0.0517
	Ill sample		
χ^2	11851.4	7080.9	6234.6
CFI	0.708	0.828	0.850
Ave off diag.	0.0660	0.0550	0.0522
	Well sample		
χ^2	2736.3	1819.5	1765.3
CFI	0.713	0.819	0.825
Ave off diag.	0.0677	0.0574	0.0570

The WHOQOL Group

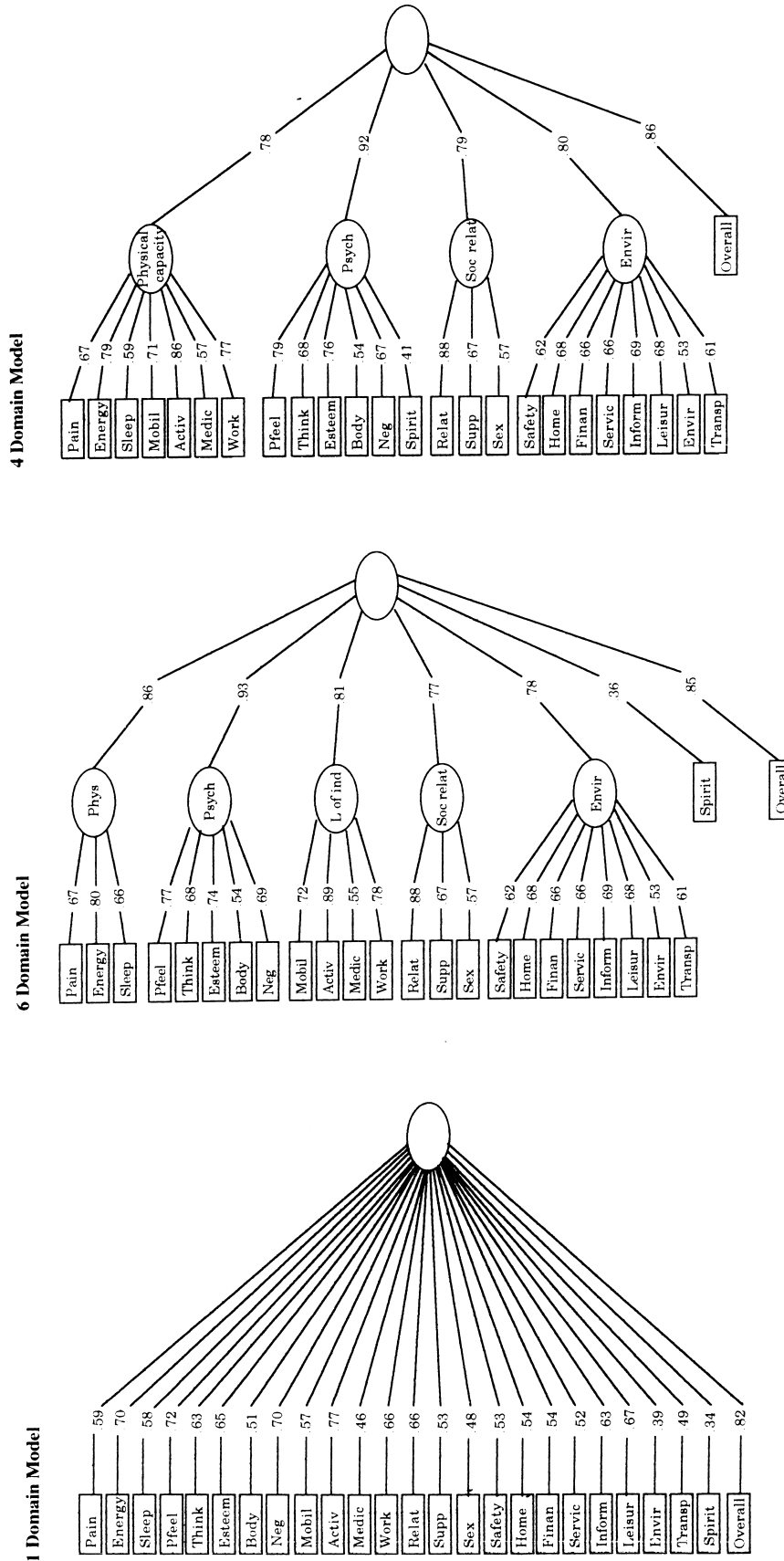


Fig. 1. Structural equation models for single domain, six domain and four domain structures.

core set of items needed to assess quality of life, but it is not intended to suggest that other aspects of quality of life should be excluded, since in certain clinical studies it may be necessary to consider the addition of a disease- or treatment-specific WHOQOL and/or national questions if these are culturally relevant. Similarly, although preliminary confirmatory factor analysis of the data would suggest a four domain solution to be optimal (including physical, psychological, social relationships and environment domains), further analysis using data from a WHOQOL-100 field trial version assessment is envisaged, to explore this structural model further.

The steps presented in this paper do of course represent an intermediate stage in the development of the WHOQOL. The WHOQOL-100 is, to the extent that the data have permitted analysis, a reliable and valid instrument that can be used in a diverse range of cultures. There are however a significant number of questions that have yet to be addressed, but which did not form part of the pilot testing of the instrument. One of the main limitations of the data presented here is that they are cross-sectional. Longitudinal data are of course necessary to investigate the test-retest reliability of the instrument in populations who have not experienced significant life change. However, it is also necessary to collect longitudinal data from populations who *have* experienced significant life change in order to assess the sensitivity or responsiveness of the instrument to change. In particular, given the anticipated widespread clinical use of the WHOQOL, it is necessary to examine how a range of physical, psychological and social interventions impact on both general and specific aspects of quality of life and whether or not the WHOQOL can detect such changes. Similarly, discriminant validity of the WHOQOL-100 will be further examined using specific disease/illness populations. In addition, it is now necessary to put the WHOQOL-100 to the test as an instrument in its own right, as opposed to an "extracted" one, as well as in a range of new cultures which were not represented in the first set of 15 centres. Furthermore, it is necessary to validate the WHOQOL-100 by comparing it to established quality of life instruments such as the SF-36 and to compare it to existing domain specific instruments such as the Beck Depression Inventory. All of these studies and extensions are currently underway and will be reported on in due course. In the meantime, the WHOQOL-100 presents a major advance both in the background methodology used for the development of a reliable and valid cross-cultural instrument, and in the provision of an instrument that measures a broad range of domains of quality of life.

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