Chapter Twenty

Rasch Model Isolates Quality of Life Construct in Six WHOQOL-100 Data Sets (Argentina, France, Hong-Kong, Spain, USA, and UK)

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Abstract

A 25 item quality of life survey was developed from WHOQOL-100 that is statistically invariant across six cultures. Sample was 2,664 WHO survey respondents. Test development involved first reducing items through an analysis of person and item fit. Then multiple bivariate item calibration plots were examined to select culturally equivalent items. Rasch model results were surprisingly coherent and equivalent items appear to replicate original QOL construct.

The Constitution of the World Health Organization (WHO) defines health as "a state of complete physical, mental, and social well-being, not merely the absence of disease . . ." (The WHOQOL Group, 1993). It fol-

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lows that measurement of health and health care effects must include not only an indication of frequency and severity of diseases but also changes in well-being that are assessed by measuring Quality of Life (QOL).

WHO defines QOL as individuals' perception of their position in life relative to their cultural context including personal goals, expectations, standards, and concerns. It is a broad concept, affected in a complex way, first, by physical health, psychological state, level of independence, social relationships, and personal beliefs, and, secondly, by the relationship of these factors to salient environmental features.

With the aid of 15 collaborating centers around the world, WHO has developed two profiles for measuring QOL: WHOQOL-100 and WHOQOL-BREF (see The WHOQOL Group, 1994a, 1994b, and 1998), which can be used in a variety of cultural settings to compare populations and countries. These instruments are currently used widely in medical practice, research, auditing, and policy-making. Further WHOQOL development in other languages is progressing with WHOQOL-100 now available in over 20 different language versions. The WHOQOL-BREF is an abbreviated 26-item version of WHOQOL-100 based on data from the field trial version of WHOQOL-100.

The objective of the current project is to explore development of a short list of items that indexes QOL with a single score. This survey would reflect a construct that is:

- comparable to original content structure of WHOQOL-100 and WHOQOL-BREF
- psychometrically reliable
- reasonably comparable cross-culturally.

There is great need for a short standardized questionnaire for international comparative population surveys and economic studies. Indeed, there is substantial demand from several international organizations such as WHO for a reliable, short instrument measuring QOL in health service research and health economics. If it were possible to develop such a tool, it could complement data currently collected by generic international profiles such as WHOQOL-100 and -BREF.

After thoroughly evaluating alternative measurement approaches such as classical test theory and item response theory, we selected the Rasch model (Wright and Stone, 1979; Wright and Masters, 1982; Andrich, 1978, 1982) to identify a 10 to 15 item questionnaire capable of measuring the

underlying or latent unidimensional QOL construct that previously had been established by WHOQOL-100 and WHOQOL-BREF. This paper presents the source instrument, empirical data base, as well as experimental methodology implemented to address this problem. It is based on a previously published paper (Leplège, 2000) which was a first step in that direction. Given the magnitude of this project and its many difficulties, this second paper should still be considered more a position paper than definitive conclusion to this topic.

WHOQOL Background

The WHOQOL-100 was developed simultaneously in 15 field centers around the world. A list of the important aspects of QOL and ways of asking them was drafted on the basis of statements made by patients with a range of diseases, as well as by healthy persons and health professionals from a variety of cultures. The instrument was rigorously tested in each field center to assess validity and reliability and is currently being examined to assess its responsiveness to changing QOL status. The content structure of WHOQOL-100 reflects issues established by scientific experts, as well as lay persons in each field center to evaluate QOL defined by the following domains:.

- physical health
- psychological well being
- level of independence
- social relationships
- environment
- spirituality

Table 1 elaborates broad WHOQOL domains with facets. In addition to four overall items, domains are represented by 24 facets each containing four items producing a total of 100 WHOQOL items. All items were rated on a five-point scale where five indicates highest QOL.

Materials and Methods

Data

The data set comes from the international field testing of WHOQOL–100 that includes WHOQOL-100 responses, as well as socioeconomic and health-related variables. Although data were available from most WHOQOL centers, we decided for this feasibility project we would only take into consideration data that had been collected in Argentina, France, Great Britain, Hong Kong, Spain, and USA (Cheng, 1995). Overall num-

Table 1

Domain and Facet Structure of Questionnaire

Domains	Structure	Facet labels		
Overall quality of life	4 items			
1/ Physical health	3 facets 12 items	Energy and fatigue	Pain and discomfort	Sleep and rest
2/ Psychological	5 facets 20 items	Body image and appearance	Negative feelings	Positive feelings
		Thinking, learning, memory and concentration	Self-esteem	
3/ Level of independence	4 facets 16 items	Dependence on medicinal substances and medical aids	Activities of daily living	Mobility
		Work capacity		
4/ Social relationships	3 facets 12 items	Personal relationships	Social support	Sexual activity
5/ Environment	8 facets 32 items	Financial resources	Freedom, physical safety and security	Health and social care: accessibility and quality
		Home environment	Opportunities for acquiring new information and skills	Participation in and opportunities for recreation/leisure
		Physical environment	Transport	
6/ Spirituality	1 facet 4 items	Religion/Spirituality/Personal beliefs		

ber of persons was 2,664. Tables 2, 3, and 4 present demographic and health data. Age ranged from 9 to 92 years, and average age was 45.3 years (SD = 15.5). Women constituted 52.2 percent of the data. Sixty-six percent declared a health problem in the past versus 33 percent without problems. (The health history of American respondents was unknown.)

Analytic Procedures

We implemented the Rasch model to estimate item calibrations and person locations along the measurement continuum. In order to address our research question, we followed a two step strategy. First, a data base was prepared for item selection and calibration. This step included 'targeting' the data base which is a procedure that treats certain responses as missing data. For example, persons with extreme scores would not be considered valid for item calibration. In traditional psychometric terms this strategy removes "ceiling" and "floor" effects from an analysis. We also eliminated persons who did not fit the model well. The second step was item selection. We chose to eliminate misfitting items from the data base. Then we conducted differential item functioning analyses, country by country, for each item in the selection pool. This step was necessary to identify those items with statistically invariant calibrations across language versions. The software implemented for these procedures was SAS V6.12, and RUMM V2.7 (Andrich, Sheridan, and Luo, 1997).

Domain and Facet Structure of Questionnaire

Targeting strategy. Most interviewed persons were in fairly good health with respect to item severity also referred to as difficulty. Consequently, some questions were inappropriate for persons insofar as responses by healthy persons to questions measuring very serious health conditions do not yield relevant information for assessing item severity. The targeting strategy implemented in this research consisted of replacing observed responses with missing data when the expected values provided by a first Rasch model iteration were very close to an extreme response. In the case of WHOQOL where the maximum rating is 5, if the expected answers were higher than 4.5 or lower than 1.5, the observed answers were converted to missing data. Consequently, only useful information was exploited during scale development. Figure 1 shows this relationship between expected responses and the targeting strategy.

Elimination of misfitting persons. The person rejection criterion was based on fit values outside -3.5 and 3.5 computed by RUMM. It should be noted that this criterion is not unusually stringent but represents con-

ventional approaches to assessing residual variation that is expected to approximate a random error distribution. Residuals were aggregated and evaluated as standard normal deviates. Persons who clearly did not fit the model were not included during item calibration because their responses obscure item parameter estimation.

An analysis of covariance was also conducted to examine statistical relations of person fit values with gender, age, QOL measure status, culture, and state of health (healthy vs unhealthy). The intention, of course,

Table 2

Gender characteristics

	Argentina		France		GB		Hong-Kong		Spain		USA		Total	
	N	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%
Male	170	40.4	143	48.3	138	39.1	425	50.2	162	53.3	203	45.8	1,241	46.6
Female	251	59.6	151	51	197	55.8	415	49	136	44.7	240	54.2	1,390	52.2
MD	0	0	2	0.7	18	5.1	7	0.8	6	2.0	0	0.0	33	1.2
Total	421	100	296	100	353	100	847	100	304	100	443	100	2,664	100

Note: Abbreviations: (GB = Great Britain), (MD = missing data.)

Table 3

Age distribution

	Argentina	France	GB	Hong-Kong	Spain	USA	Total
Number	421	298	330	828	298	441	2,601
Mean age	47.1	44	48	45.2	42.6	44.2	45.3
SD	14.6	15.4	15.7	16.1	14	15.7	15.5
Minimum	20	17	9	12	19	20	9
Maximum	80	81	85	92	80	90	92

Note: Abbreviations: (GB = Great Britain), (SD = standard deviation).

Table 4

Health status

	Argentina		France		GB		Hong-Kong		Spain		USA*		Total	
	N	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%
Healthy	240	57	47	15.9	114	32.3	155	18.3	194	63.8	—	—	750	33.8
Ill	181	43	249	84.1	239	67.1	690	81.5	110	36.2	—	—	1469	66.1
MD	0	0	0	0	0	0	2	0.2	0	0.0	—	—	2	0.1
Total	421	100	296	100	353	100	847	100	304	100.0	—	—	2221	100

Note: The WHOQOL contains response scales concerned with intensity (Extremely -…- Not at all), capacity (Completely -…- Not at all), frequency (Always -…-Never) or evaluation (Very dissatisfied -…- Very satisfied ; Very poor -…- Very good).
Abbreviations: (GB = Great Britain), (SD = standard deviation), (MD = missing data).

* USA health status was not available.

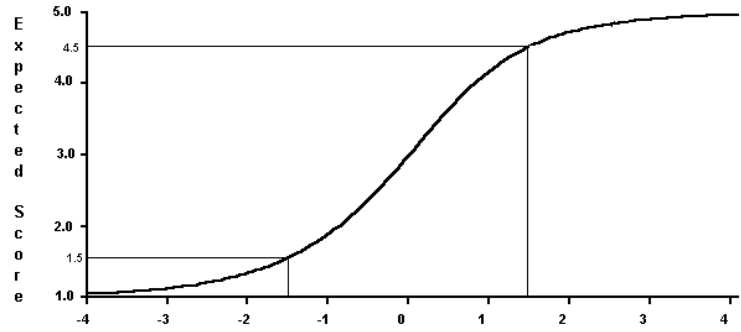

Figure 1. The expected value curve and range of acceptable responses.

was to better understand systematic variation associated with fit values. Because person fit values are related to number of items, this analysis was affected by missing data generated (targeting) and number of items.

Elimination of misfitting items. Items do not fit the Rasch model if differences between observed responses and estimated measures (calculated according to the model for the overall sample) are on average too large. To examine these differences further, RUMM software conducts a test based on homogeneous person groups defined by their score (ability). For each group, mean observed score was calculated and compared to the estimated measure mean for the group. The observed and estimated responses are compared and differences evaluated with a chi-square test statistic. We observed empirically that a chi-square value of 38, calculated on the basis of ten homogeneous person groups, corresponded approximately to an OUTFIT statistic of 3.5 calculated by BIGSTEPS (widely available Rasch measurement software). Therefore a chi-square of 38 was the threshold for rejecting or selecting an item.

Differential Item Functioning: Country by Country

The objective of this research was to identify items that have comparable item severity estimates across any given set of variables including language version, gender, and health. Consequently, the following steps were followed:

1. Items were calibrated separately for American, Argentinean, British, French, Hong Kong, and Spanish persons.

2. Calibrated item difficulties were examined in bivariate plots for all language pairs.

3. An identity line was drawn through each plot origin.

4. Statistical control lines (99% confidence interval) were drawn on either side of the identity line to guide interpretation. Items that fell outside these control lines were reviewed for elimination.

5. Items within the 99% confidence interval were judged invariant for that comparison.

6. Equivalences were counted for 96 items for each 2 by 2 comparison making a total of 15 comparisons for each item.

7. Items were classified in decreasing order based on their number of equivalent comparisons. We arbitrarily retained items that were equivalent in at least 8 out of 15 comparisons.

Notable differences between particular language comparisons are summarized in Table 9. First is shown the number of times each item is equivalent if one does not take the particular comparison into account, and second, the item's average over the whole set of retained items. The closer this number is to ten, the more equivalent the considered version is to the others.

Results

Preparation of Data Base

Targeting data base. Responses where the expectations were extreme (below 1.5 or greater than 4.5 raw score units) were converted to missing data. Originally, rate of missing data for 2,664 persons responding to 100 items was 1.6 percent. After targeting this rate was 6.4 percent. No missing data was generated for 1,831 persons (67.7%), and at least one missing response was generated for 833 persons (31.3%). Missing data was generated for ninety-four percent of persons whose QOL measure was greater than 0.7 logits and six percent whose QOL measure was less than -0.81 logits on the latent continuum. The relationship between missing data generated and person location on the continuum is presented in Figure 2. The higher the QOL measure, hence better quality of life, the greater the number of answers converted to missing data. This was expected because persons with high QOL are likely to produce very extreme responses. Table 5 shows missing data by country.

Elimination of misfitting persons. Out of 2,637 overall persons for whom the total raw scores were not extreme, 709 (27%) did not fit the

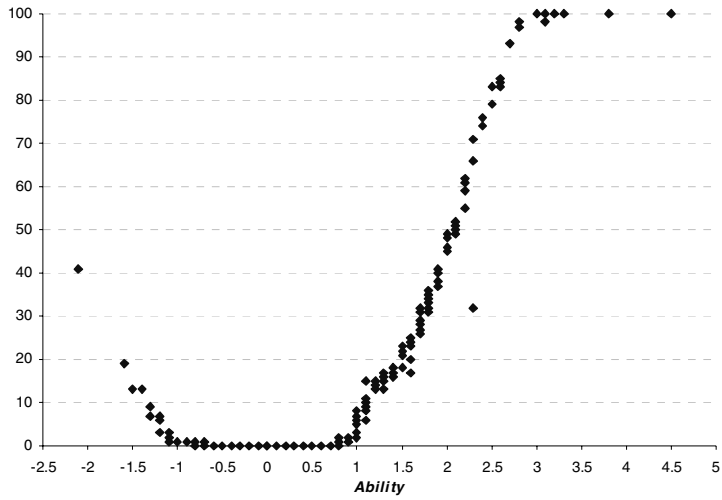

Figure 2. Relationship between subject positioning and frequency of data converted to missing.

model. (Their fit values were higher than 3.5 or lower than -3.5 calculated using RUMM). The mean fit values and percentages of misfitting persons are presented by country in Table 6. Thirty-three percent of Hong Kong persons were removed from the analysis, 27 percent of Argentinean, 20 percent of French, 21 percent of British, 35 percent of Spanish, and 18 percent of American data. Using the targeted data base, a fit index and a measure were calculated for each person. The results in Tables 7 and 8 show QOL measures for persons fitting the model are significantly higher than for misfitting persons. A significant difference in terms of culture, gender and age also appears between persons who fit and those who did

Table 5

Summary of missing data generated

	Missing data before targeting (%)	Missing data after targeting (%)
France	1.26	6.19
Spain	2.77	4.30
Argentina	0.02	1.99
Hong Kong	0.99	6.49
USA	1.29	9.91
GB	4.62	8.64
Total	1.6	6.35

not. There is no significant difference in health status. Table 5 also shows that missing data rate generated in Hong-Kong and American data were highest.

Table 6

Distribution of person fit values and percentage by country

Country	*N*	Mean*	Std Dev	Minimum	Maximum	*N* & (%) Do not fit
Argentina	421	-1.3	3.0	-12.9	6.9	113 (27)
Spain	301	-0.4	4.1	-13.9	8.7	106 (35)
France	293	0.5	2.7	-6.8	9.0	60 (20)
UK	340	-0.7	2.8	-9.9	6.1	72 (21)
Hong-Kong	841	-0.5	3.7	-23.0	10.8	280 (33)
USA	441	0.0	2.7	-13.4	6.8	78 (18)
Total	2637	-0.5	3.3	-23.0	10.8	709 (27)

*$P < .001$

Table 7

Relation of person fit to gender and health status

	Fit	Did not fit
Gender*		
Men	878 (71%)	355 (29%)
Women	1036 (75%)	349 (25%)
Health status**		
Healthy	544 (73%)	204 (27%)
Unhealthy	1019 (70%)	427 (30%)
Total	1563 (71%)	631 (29%)

Note: Health status is missing for the American data base
*$P < .05$
**NS

Table 8

Percentage of persons fit by age and QOL measure

	Fit	Did not fit
Age*		
Mean	44.7	46.6
SD	15.5	15.6
QOL status*		
Mean	0.51	0.32
SD	0.71	0.64

*$P < .001$

Item Selection

Elimination of misfitting items. Only 39 items of the initial 100 were eliminated because their chi-square values were higher than 38. They were: G1, G2, G3, G4, F1.1, F1.3, F2.1, F2.3, F4.2, F4.4, F6.3, F6.4, F7.2, F7.3, F8.1, F10.1, F10.3, F11.1, F11.2, F11.3, F11.4, F12.2, F12.3, F12.4, F13.3, F15.2, F15.4, F16.3, F16.4, F18.4, F19.1, F19.2, F19.4, F21.4, F22.2, F22.4, F24.1, F24.3, F24.4. Facet 1 (Overall QOL) and facet 11 (Medication) were completely eliminated (see Appendix for item labels.

Differential item function by language version. By plotting paired calibrations with associated confidence intervals, some variation in item calibration was found across cultures. Figure 3 shows location parameters for 61 initial item pairs between USA and Argentina. Figure 4 shows this relationship between UK and USA. Table 9 presents the 25 items with greatest equivalence across six countries. The last column shows that item F204 is the most homogenous with 14 out of 15 tests proving positive. Out of 100 initial items, none were found to be completely equivalent across six countries. (None of the items were positive 15 times out of 15.) Figure 5 and Table 10 provide additional information about retained items.

Excluding Argentina which showed the greatest homogeneity, the test on average was positive 6.9 times out of 10. The reduced set of 25 items shows a relatively restricted range between –1 and 1 logits. With the exception of items F232, F234, F91, and F131, however, the category

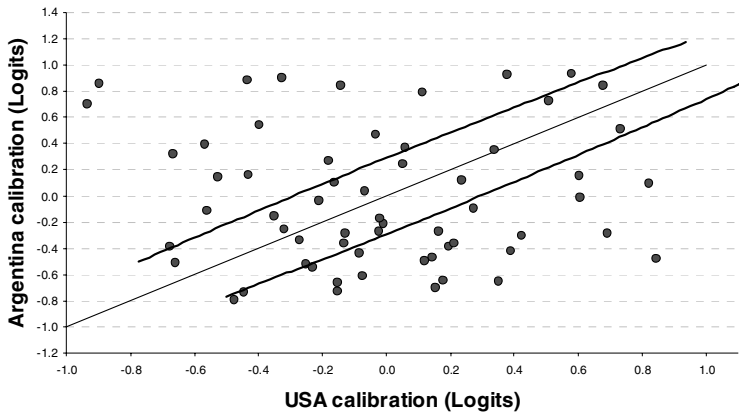

Figure 3. Plot of item difficulties between USA and Argentina with 99 percent control lines

thresholds covered the full range of QOL measures. (All domains and facets with exception of medication were preserved.) Consequently, these items provide a broad range of quality of life coverage on the continuum.

Discussion

In preliminary data analyses from four countries (Leplège, 2000), we discarded items with unordered thresholds. This time, however, we analyzed six data bases without discarding items with unordered thresholds. This has, at least, the advantage of adding 12 items to the item pool considered for cross-cultural comparison. In regards to the item selection criterion, we chose to remove items if fit values were not between –3.5 to 3.5 because a large number of misfitting items increase the probability that persons will not fit. In regards to differential item functioning, statistical control lines (99 percent confidence interval) were drawn around the identity line to guide interpretation and any items falling outside these control lines were considered as non-equivalent. A more classical criterion would have been to use a 95 percent confidence interval, but we opted for 99 percent. Given both complexity of the notion of cultural equivalence and qualitative work that has been devoted to ensuring cultural equivalence, we found it reasonable to adopt stricter criteria. It is also important to note that the ends of the confidence interval usually flare because standard errors are typically larger for easier or harder items. In these data, QOL items are concentrated in the center where standard errors are narrow which tends to diminish this appearance.

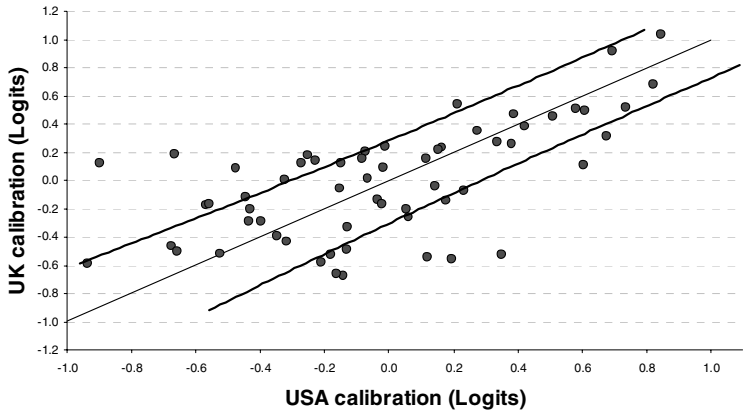

Figure 4. Plot of item difficulties between USA and UK with 99 percent control lines

Data analysis by the Rasch model to identify misfitting items was performed on the aggregated data set. This strategy supposes not only that "there is a common concept that is shared by all cultures", but also conceptual equivalence has been established across versions. Because these were defining hypotheses of the WHOQOL project, we did not challenge them. We assumed that these hypotheses were reasonable and that they had been met to varying degrees by each WHOQOL-100 language version. (But see the difference in number of equivalent items between UK and USA, on the one hand, and USA and Argentina on the other.)

Although the application of an improved version of this methodology to all WHOQOL data sets (at least 15 language versions) is conceivable, it is very unlikely that a single core of equivalent items will be identified. As a result of cultural differences between countries or translation problems, the construction of a questionnaire that is "culturally equivalent" is already difficult for only the six cultures under consideration. An extension of cultural span with additional data sets would only increase the difficulties. Nonetheless, we believe that a scale can be developed that addresses genuine cross-cultural differences by concentrating on a common core composed of two to five items that are statistically invariant. This core could then be expanded within cultures assuring cultural integrity but preserving the properties of a common scale. This approach would

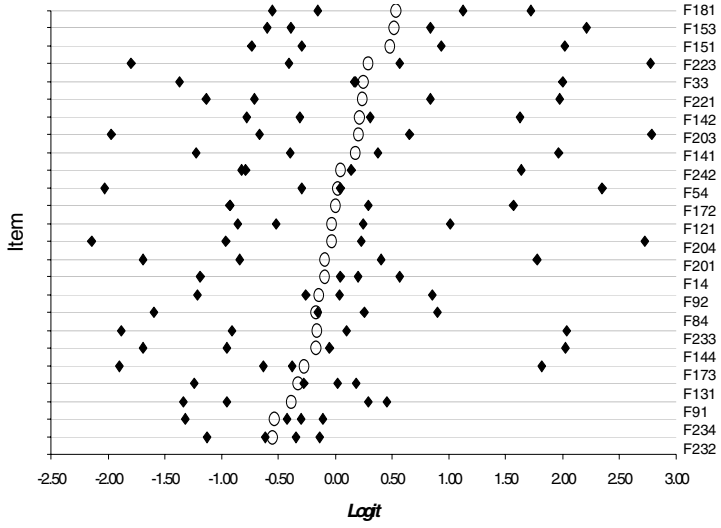

Figure 5. Graphical representation of item difficulty and average category thresholds for 25 retained items

be consistent with Rasch model measurement intentions (construction of a common rule) while allowing for differences in person distribution.

A further suggestion we would make is to abandon identification of items that are equivalent across all countries and limit oneself to taking advantage of cases where local equivalences exist between two countries.

Table 9

Equivalent items across six countries.

		With 5 countries, 10 comparisons						15 comparisons
Item	Label	USA	ARG	ESP	FR	GB	HK	All data *N*
F204	How satisfied are you with your opportunities to learn new information	9	9	9	10	9	10	14
F153	How satisfied are you with your sex life?	9	8	8	10	8	9	13
F141	Do you get the kind of support from others that you need?	8	7	7	8	10	8	12
F203	How satisfied are you with your opportunities for acquiring new skills?	8	7	9	6	7	7	11
F232	To what extent do you have problems with transport?	7	8	9	6	7	7	11
F234	How much do difficulties with transport restrict your life?	7	7	9	7	6	8	11
F121	Are you able to work?	6	8	6	8	8	8	11
F144	How satisfied are you with the support you get from your friends	7	7	7	6	10	7	11
F14	To what extent do you feel that (physical) pain prevents you from doing what you need to do?	6	10	6	6	6	6	10
F92	How satisfied are you with your ability to move around?	6	8	6	6	8	6	10
F131	How alone do you feel in your life?	10	6	6	6	6	6	10
F201	How available to you is the information that you need in your day-to-day life?	9	7	6	6	6	6	10
F223	How satisfied are you with your physical environment	6	10	6	6	6	6	10
F242	To what extent do you feel your life to be meaningful?	6	9	6	7	6	6	10
F91	How well are you able to get around?	6	7	6	6	7	4	9
F142	To what extent can you count on your friends when you need them?	5	5	5	6	8	7	9
F172	To what degree does the quality of your home meet your needs?	5	5	5	6	6	9	9
F33	How satisfied are you with your sleep?	7	5	5	4	6	5	8
F54	How satisfied are you with your ability to make decisions?	4	6	5	5	6	6	8
F84	How much do any feelings of depression bother you?	5	4	8	5	4	6	8
F151	How would you rate your sex life?	6	7	4	5	5	5	8
F173	How satisfied are you with the conditions of your living place?	5	4	6	5	6	6	8
F181	Have you enough money to meet your needs?	5	5	7	4	6	5	8
F221	How healthy is your physical environment?	5	6	4	5	5	7	8
F233	How satisfied are you with your transport?	6	8	4	5	4	5	8
	Mean	6.5	6.9	6.4	6.2	6.6	6.6	

Table 10

Difficulty and threshold estimates of 25 retained items.

		Thresholds				
Item	Difficulty	1	2	3	4	Label
F181	0.54	-0.55	-0.16	1.13	1.72	Have you enough money to meet your needs?
F153	0.52	-0.39	-0.6	0.84	2.21	How satisfied are you with your sex life?
F151	0.48	-0.29	-0.74	0.93	2.02	How would you rate your sex life?
F223	0.29	-1.79	-0.4	0.57	2.78	How satisfied are you with your physical environment
F33	0.24	-1.37	0.18	0.17	2	How satisfied are you with your sleep?
F221	0.24	-0.71	-1.14	0.84	1.98	How healthy is your physical environment?
F142	0.21	-0.78	-0.31	0.31	1.62	To what extent can you count on your friends when you need them?
F203	0.2	-1.97	-0.67	0.66	2.78	How satisfied are you with your opportunities for acquiring new skills?
F141	0.18	-1.22	-0.4	0.38	1.97	Do you get the kind of support from others that you need?
F242	0.04	-0.83	-0.79	0.15	1.64	To what extent do you feel your life to be meaningful?
F54	0.02	-2.03	-0.29	0.05	2.35	How satisfied are you with your ability to make decisions?
F172	0	-0.92	-0.93	0.29	1.57	To what degree does the quality of your home meet your needs?
F121	-0.03	-0.86	-0.52	0.25	1.01	Are you able to work?
F204	-0.04	-2.14	-0.96	0.23	2.73	How satisfied are you with your opportunities to learn new information
F201	-0.09	-1.7	-0.84	0.4	1.77	How available to you is the information that you need in your day-to-day life?
F14	-0.09	-1.19	0.05	0.2	0.57	To what extent do you feel that (physical) pain prevents you from doing what you need to do?
F92	-0.15	-1.21	-0.26	0.04	0.86	How satisfied are you with your ability to move around?
F84	-0.16	-1.6	0.25	-0.17	0.89	How much do any feelings of depression bother you?
F233	-0.16	-1.88	-0.91	0.1	2.04	How satisfied are you with your transport?
F144	-0.17	-1.69	-0.95	-0.05	2.03	How satisfied are you with the support you get from your friends
F173	-0.27	-1.9	-0.63	-0.38	1.82	How satisfied are you with the conditions of your living place?
F131	-0.33	-1.24	0.02	-0.28	0.19	How alone do you feel in your life?
F91	-0.39	-1.34	-0.95	0.29	0.45	How well are you able to get around?
F234	-0.54	-1.32	-0.43	-0.11	-0.3	How much do difficulties with transport restrict your life?
F232	-0.55	-1.12	-0.61	-0.14	-0.34	To what extent do you have problems with transport?

This approach is similar to establishing an item bank suitable for cross-cultural measurement.

In view of our study purpose, the implementation of Rasch measurement analytical methodology has opened new vistas on cross-cultural studies. However, it does not claim to have solved the problem of developing a measure that is "culturally equivalent". This research should incite readers to reflect upon our precautions interpreting questionnaire scores obtained from different cultures and stimulate further advances in developing cross-cultural questionnaires. Each step of the development process of an international questionnaire (definition of a quality of life concept that is common to several cultures, questionnaire generation including item and response categories, translation of items into other cultures, and collection of comments and feedback) has its importance in the realization of such a project.

Acknowledgement

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Appendix

WHOQOL–100 questions

OVERALL QUALITY OF LIFE AND HEALTH

G1 How would you rate your quality of life?
G2 How satisfied are you with the quality of your life?
G3 In general, how satisfied are you with your life?
G4 How satisfied are you with your health?

DOMAIN I—PHYSICAL DOMAIN

1. Pain and discomfort

F1.1 How often do you suffer (physical) pain?
F1.2 Do you worry about your pain or discomfort?
F1.3 How difficult is it for you to handle any pain or discomfort?
F1.4 To what extent do you feel that (physical) pain prevents you from doing what you need to do?

2. Energy and fatigue

F2.1 Do you have enough energy for everyday life?
F2.2 How easily do you get tired?
F2.3 How satisfied are you with the energy that you have?
F2.4 How much are you bothered by fatigue?

3. Sleep and rest

F3.1 How well do you sleep?
F3.2 Do you have any difficulties with sleeping?
F3.3 How satisfied are you with your sleep?
F3.4 How much do any sleep problems worry you?

DOMAIN II—PSYCHOLOGICAL DOMAIN

4. Positive feelings

F4.1 How much do you enjoy life?
F4.2 Do you generally feel content?
F4.3 How positive do you feel about the future?
F4.4 How much do you experience positive feelings in your life?

5. Thinking, learning, memory, and concentration

F5.1 How would you rate your memory?
F5.2 How satisfied are you with your ability to learn new information?
F5.3 How well are you able to concentrate?
F5.4 How satisfied are you with your ability to make decisions?

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6. Self-esteem

F6.1 How much do you value yourself?
F6.2 How much confidence do you have in yourself?
F6.3 How satisfied are you with yourself?
F6.4 How satisfied are you with your abilities?

7. Body image and appearance

F7.1 Are you able to accept your bodily appearance?
F7.2 Do you feel inhibited by your looks?
F7.3 Is there any part of your appearance, which makes you feel uncomfortable?
F7.4 How satisfied are you with the way your body looks?

8. Negative feelings

F8.1 How often do you have negative feelings, such as blue mood, despair, anxiety, and depression?
F8.2 How worried do you feel?
F8.3 How much do any feelings of sadness or depression interfere with your everyday functioning?
F8.4 How much do any feelings of depression bother you?

DOMAIN III—LEVEL OF INDEPENDENCE

9. Mobility

F9.1 How well are you able to get around?
F9.2 How satisfied are you with your ability to move around?
F9.3 How much do any difficulties in mobility bother you?
F9.4 To what extent do any difficulties in movement affect your way of life?

10. Activities of daily living

F10.1 To what extent are you able to carry out your daily activities?
F10.2 To what extent do you have difficulty in performing your routine activities?
F10.3 How satisfied are you with your ability to perform your daily living activities?
F10.4 How much are you bothered by any limitations in performing everyday living activities?

11. Dependence on medication or treatments

F11.1 How dependent are you on medications?
F11.2 How much do you need any medication to function in your daily life?
F11.3 How much do you need any medical treatment to function in your daily life?
F11.4 To what extent does your quality of life depend on the use of medical substances or medical aids?

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12. Working capacity

F12.1 Are you able to work?
F12.2 Do you feel able to carry out your duties?
F12.3 How would you rate your ability to work?
F12.4 How satisfied are you with your capacity for work?

DOMAIN IV—SOCIAL RELATIONSHIPS

13. Personal relationships

F13.1 How alone do you feel in your life?
F13.2 Do you feel happy about your relationship with your family members?
F13.3 How satisfied are you with your personal relationships?
F13.4 How satisfied are you with your ability to provide for or support others?

14. Practical social support

F14.1 Do you get the kind of support from others that you need?
F14.2 To what extent can you count on your friends when you need them?
F14.3 How satisfied are you with the support you get from your family?
F14.4 How satisfied are you with the support you get from your friends?

15. Sexual activity

F15.1 How would you rate your sex life?
F15.2 How well are your sexual needs fulfilled?
F15.3 How satisfied are you with your sex life?
F15.4 Are you bothered by any difficulties in your sex life?

DOMAIN V—ENVIRONMENT

16. Physical safety and security

F16.1 How safe do you feel in your daily life?
F16.2 Do you feel you are living in a safe and secure environment?
F16.3 How much do you worry about your safety and security?
F16.4 How satisfied are you with your physical safety and security?

17. Home environment

F17.1 How comfortable is the place where you live?
F17.2 To what degree does the quality of your home meet your needs?
F17.3 How satisfied are you with the conditions of your living place?
F17.4 How much do you like it where you live?

18. Financial resources

F18.1 Have you enough money to meet your needs?
F18.2 Do you have financial difficulties?
F18.3 How satisfied are you with your financial situation?
F18.4 How much do you worry about money?

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19. Health and social care: Availability and quality

F19.1 How easily are you able to get good medical care?
F19.2 How would you rate the quality of social services available to you?
F19.3 How satisfied are you with your access to health services?
F19.4 How satisfied are you with the social care services?

20. Opportunities for acquiring information and skills

F20.1 How available to you is the information that you need in your day-to-day life?
F20.2 To what extent do you have opportunities for acquiring the information that you feel you need?
F20.3 How satisfied are you with your opportunities for acquiring new skills?
F20.4 How satisfied are you with your opportunities to learn new information?

21. Participation in and opportunities for recreation and leisure

F21.1 To what extent do you have the opportunity for leisure activities?
F21.2 How much are you able to relax and enjoy yourself?
F21.3 How much do you enjoy your free time?
F21.4 How satisfied are you with the way you spend your spare time?

22. Physical environment

F22.1 How healthy is your physical environment?
F22.2 How concerned are you with the noise in the area you live in?
F22.3 How satisfied are you with your physical environment (e.g. pollution, climate, noise, and attractiveness ?
F22.4 How satisfied are you with the climate of the place where you live?

23. Transport

F23.1 To what extent do you have adequate means of transport?
F23.2 To what extent do you have problems with transport?
F23.3 How satisfied are you with your transport?
F23.4 How much do difficulties with transport restrict your life?

DOMAIN VI—SPIRITUALITY/RELIGION/PERSONAL BELIEFS

24. Spirituality/religion/personal beliefs

F24.1 Do your personal beliefs give meaning to your life?
F24.2 To what extent do you feel your life to be meaningful?
F24.3 To what extent do your personal beliefs give you the strength to face difficulties?
F24.4 To what extent do your personal beliefs help you to understand difficulties in life?