The Personal Wellbeing Index

Construct Validity for the Netherlands

Jacqueline van Beuningen and Tineke de Jonge

Discussion paper (201124)

Centraal Bureau voor de Statistiek

Den Haag/Heerlen, 2011

Verklaring van tekens

.	=	gegevens ontbreken
*	=	voorlopig cijfer
**	=	nader voorlopig cijfer
x	=	geheim
–	=	nihil
–	=	(indien voorkomend tussen twee getallen) tot en met
0 (0,0)	=	het getal is kleiner dan de helft van de gekozen eenheid
niets (blank)	=	een cijfer kan op logische gronden niet voorkomen
2010–2011	=	2010 tot en met 2011
2010/2011	=	het gemiddelde over de jaren 2010 tot en met 2011
2010/'11	=	oogstjaar, boekjaar, schooljaar enz., beginnend in 2010 en eindigend in 2011
2008/'09–2010/'11	=	oogstjaar, boekjaar enz., 2008/'09 tot en met 2010/'11

In geval van afronding kan het voorkomen dat het weergegeven totaal niet overeenstemt met de som van de getallen.

Colofon

Uitgever
Centraal Bureau voor de Statistiek
Henri Faasdreef 312
2492 JP Den Haag

Prepress
Centraal Bureau voor de Statistiek
Grafimedia

Omslag
Teldesign, Rotterdam

Inlichtingen
Tel. (088) 570 70 70
Fax (070) 337 59 94
Via contactformulier:
www.cbs.nl/infoservice

Bestellingen
E-mail: verkoop@cbs.nl
Fax (045) 570 62 68

Internet
www.cbs.nl

ISSN: 1572-0314

60083201124 X-10

Personal Wellbeing Index
Construct Validity for The Netherlands

Summary

This report describes the results of the analyses of the Personal Wellbeing Index (PWI) for the Netherlands. We show that the original scale has sufficient construct validity. Six of the eight distinguished life domains contribute significantly to the explained variance of the overall quality of life. Further, PWI indicators are related to other items and alternative dependent variables as expected from theory. Lastly, the eight life domains can be aggregated into one PWI scale with high construct validity. We conclude that the PWI can be used as a quality of life measure instead of a single life satisfaction indicator in order to reveal the multi-dimensionality of quality of life.

Contents

1 Introduction **5**

1.1 Background 5
1.2 The Personal Wellbeing Index 6
1.3 Objective and structure of the report 8

2 Method **9**

2.1 Data Collection 9
2.2 The PWI measurement construct 9
2.3 Analyses 10

3 Results **12**

3.1 Testing data assumptions 12
3.2 Regression analyses 13
3.3 Nomological validity 15
3.4 Factor analysis 16
3.5 PWI scores 17

4 Reflection and conclusions **19**

References **20**

Appendix A A new framework for Dutch key social indicators **22**

Appendix B Translating the PWI into Dutch **24**

1 Introduction

Given the multidimensionality of satisfaction with life, the question arose whether it would be possible to measure satisfaction with respect to various life domains using a composite index that could compete with our existing general question on satisfaction with life. Therefore, the construct validity of the multidimensional Personal Wellbeing Index (PWI) for the Netherlands has been analysed.

1.1 Background

Statistics Netherlands developed its first Life Situation Survey in 1974. The survey covered several life domains. Besides an objective indication for each domain, respondents were asked for their perceptions with respect to each domain. In addition, the survey contained the more general subjective question "How satisfied are you with your life?". The Life Situation Survey evolved into the Continuous Life Situation Survey that started in 1997. Although in the course of time several modules disappeared from this survey and several questions have been incorporated in other social surveys addressing a specific aspect of the life situation, the general question on life satisfaction is still included and remains unchanged over time.

In the past few years the measurement of subjective wellbeing has spurred research interests at Statistics Netherlands, not in the least due to the "Beyond GDP" discussion and the recommendations in the report of the Stiglitz-commisssion (Stiglitz, Sen, and Fitoussi 2009). Based on the recommendations in this report on the dimensions of quality of life (QoL), Statistics Netherlands restructured the framework on the key indicators of the life situation in the Netherlands to reflect the following dimensions:

- Material living standards;
- Economic risks;
- Education and profession;
- Health;
- Institutional participation and trust;
- Social cohesion and relations;
- Physical safety;
- Natural environment and living environment.

An explanation for why these dimensions do not fully coincide with those in the Stiglitz-report can be found in appendix A.

1.2 The Personal Wellbeing Index

Given the eight dimensions for quality of life in our new framework, the question arose whether it would be possible to measure satisfaction with each of these dimensions by a composite index that could compete with our existing general question on satisfaction with life.

As far as we know, the Personal Wellbeing Index (PWI) developed by the International Wellbeing Group (IWbG) is currently the only multi-dimensional scale measuring satisfaction with life (IWbG 2006). The PWI covers a basic set of eight quality of life domains:

- standard of living;
- personal health;
- achieving in life;
- personal relationships;
- personal safety;
- community connectedness;
- future security;
- spirituality/religion.

These eight domains represent the first-level deconstruction of satisfaction with "life as a whole". The International Wellbeing Group (IWbG 2006) indicates that there is no current theory to motivate the choice of life domains, but suggests that two further criteria be employed to narrow the focus of the search to domains most likely to result in a scale with the simplest conceptual construction:

(a) Each domain name must describe a broad aspect of life which is amenable to both objective and subjective measurement. This is based on the fundamental principle that QoL exists as separate objective and subjective dimensions. While the PWI is concerned only with the subjective dimension, this criterion allows for the possibility that a parallel objective scale could be constructed. This criterion also excludes affective adjectives (e.g., Happiness).

(b) Each domain must describe an unequivocal indicator variable, as opposed to a causal variable of QoL. An indicator variable may be defined as one that can never act alone as a mediator. An example of an indicator variable is

‘Satisfaction with your health’ and an example of a causal variable is ‘Satisfaction with your control over your life’. Since the perception of control can mediate the influence of physical disability on health satisfaction, control is not an unequivocal indicator variable.

The PWI scale contains eight items of satisfaction, each one corresponding to one of the quality of life domains mentioned above. Each item represents a domain of life satisfaction that explains some unique variance in the ‘life as a whole’ question, while also sharing most of its variance with the other domains. This shared variance is called Homeostatically Protected Mood (Cummins 2009) Essentially, therefore, each item represents its own domain (e.g., health) through a small amount of unique variance with sufficient power for the domains to respond differentially when subjective wellbeing homeostasis (attached) is challenged. Thus, the PWI can be used as a scale comprising closely-related items that form a single factor measuring subjective wellbeing, or the individual domains can be examined to provide a diagnostic profile of wellbeing across the domains.

The items in the PWI are all intentionally semi-abstract. For example, people are not asked how satisfied they are with the relationship they have with their partner. While this is an interesting question in its own right, it is very specific, such that the satisfaction response will be driven by specific cognitions and emotions determined by the target. However, the PWI domains are designed to measure broad life aspects, as described above.

It has been shown that countries can be compared on the PWI (Lau, Cummins, and McPherson 2005). This implies that people from different cultures interpret the translated scale in a similar way. The predecessor of the PWI, the Comprehensive Quality of Life Scale (ComQol), was developed by selecting relevant domains from the literature followed by empirical validation (Cummins 1997; Gullone and Cummins 1999). This is used as a benchmark to validate the PWI. The ComQol is a more extensive scale than the PWI and includes objective measures as well as importance ratings in addition to seven subjective domains that resemble the PWI. Internal consistency, test-retest reliability, and correlations with other relevant variables have been examined.

1.3 Objective and structure of the report

The dimensions distinguished by the PWI differ slightly from the dimensions in our own framework. Only three dimensions fully correspond between the frameworks. These are the PWI domains standard of living, personal health and physical safety. The PWI domains personal relationships and community connectedness relate to the dimension social cohesion and relations in our framework. One could argue that the PWI domain achieving in life is comparable to the dimension education and profession in our framework. The PWI domain future security is interpreted more broadly than the dimension economic risks that we identify. The PWI domain spirituality/religion does not correspond to any of the dimensions in our framework. Despite this mismatch we decided to measure the original PWI to examine the construct validity for the Netherlands. This is mainly to test whether the conceptual basis of the PWI is valid, i.e., whether it is possible to have a set of semi-abstract items that each represent a domain of life satisfaction and explain unique variance in the 'life as a whole' question, while sharing most of its variance with the other domains. If this holds, it follows that the concept could possibly be applicable to another set of life domains as well. The challenge would be to come up with appropriate semi-abstract items for the domains that represent our framework.

Objective

The objective of the study described in this report was to analyse the construct validity of the PWI in the Netherlands. It is important to show empirically whether the eight indicators can be combined into one index, because this is empirical proof of an overall underlying quality of life concept. In addition to this we investigated whether PWI indicators affect variables which have been identified in theory as outcomes of wellbeing.

Structure

First, a description of how the data were collected, the PWI measures, and the analytical steps taken to study the PWI are given in chapter 2. Next, the results of the analyses are described in chapter 3. Lastly, chapter 4 is dedicated to a reflection on the applicability of the PWI concept for Statistics Netherlands and ends with the conclusions.

2 Method

The PWI was translated into Dutch using a back-translation procedure and included in the 2010 Survey on Perceptions. The results were analysed in several analytical steps to test the construct validity of the PWI for The Netherlands.

2.1 Data collection

The PWI was included in the 2010 Survey on Perceptions ('Onderzoek Belevingen') by Statistics Netherlands. The Dutch version of the PWI used in this survey was translated by Statistics Netherlands using a back-translation procedure (Wild et al. 2005). First, the PWI was translated into Dutch by a Dutch native speaker. Second, the Dutch translation was translated back into English by an English native speaker. Prof. Dr. R. Cummins of the Deakin University in Australia, who initiated the development of the PWI, was consulted during the process. Appendix B contains a description of the outcomes of this translation process.

The Survey on Perceptions employs a mixed-mode design, where respondents are approached for a CAWI response, followed by a re-approach in CATI and a second re-approach in CAPI ("HPE") (Janssen 2010; Cuppen, van der Laan, and van Nunspeet 2011). The sample consists of 3,402 citizens of 18 years and older. The majority responded using CAWI (61.4 percent). This is an advantage for the PWI because self-reports are recommended (IWbG 2006).

2.2 The PWI measurement construct

The PWI is measured by asking respondents the following questions (in brackets are the domains these correspond with):
How satisfied are you with…?
1. your standard of living? [Standard of Living]
2. your health? [Personal Health]
3. what you are achieving in life? [Achieving in Life]
4. your personal relationships? [Personal Relationships]
5. how safe you feel? [Personal Safety]
6. feeling part of your community? [Community-Connectedness]
7. your future security? [Future Security]

8. your spirituality or religion? [Spirituality – Religion]

One additional indicator is included about the satisfaction with the overall quality of life, formulated as "How satisfied are you with your life as a whole?". This indicator is not part of the PWI, but is used to test construct validity (IWbG 2006). This indicator is used as dependent variable in OLS regression analyses to test the effect of the eight PWI indicators.

Thus, respondents are asked about their perceptions of their own life and its subdomains. The response scale for each question is an eleven-point scale ranging from "0" to "10", whereby "0" stands for "Completely dissatisfied" and "10" for "Completely satisfied". The midpoint of the scale coded "5" means "Neutral" or "Not dissatisfied, not satisfied". Following previous research, the scale was rescaled to scores from "0" to "100" for this paper to ease interpretation of the results. The psychometric qualities of the scale have been tested empirically in several countries (Cummins 1995).

Not all indicators necessarily contribute significantly to the index, however, in previous research all indicators are typically included because they are relevant in other countries. The eight domain indicators are summed and averaged. Missing values are excluded. Therefore, a respondent with one missing value has an average score based on seven indicators. If someone has four or more missing values, no PWI score is calculated in this study.

2.3 Analyses

The following analytical steps were taken to study the PWI:

Step 1.
The percentage of missing values, multivariate outliers, and response sets are analysed to check whether any respondents need to be excluded from further analysis.

Step 2.
Various OLS regression analyses are conducted with PWI indicators as predictors. Stepwise regression is used to test whether each indicator contributes to the explained variance of the indicator on satisfaction with life as a whole. In addition,

effects on alternative dependent variables are examined. These analyses show whether the eight PWI domains correspond to the overall quality of life and other related constructs.

Step 3.

Nomological validity is established by examining various alternative wellbeing measures and correlations of PWI domain indicators and items from other scales that relate to the same life domain.

Step 4.

Principal Component analysis (PCA) is conducted to determine construct validity of the PWI. PCA determines the factors which can account for the total variance in a set of variables. Furthermore, relevant PWI indicators are summed and averaged into a PWI construct score for each respondent. Construct validity is also tested using reliability analysis and the Cronbach's alpha is reported. These analyses determine whether the eight domains of the PWI can be condensed into one overall PWI construct.

3 Results

OLS regression was used to test whether each indicator significantly affects the satisfaction with one's overall quality of life. Furthermore, we tested how the PWI behaves with respect to related constructs. Lastly, the factor structure has been explored. Based on these analyses the conclusion is drawn that the PWI scale shows sufficient construct reliability. The PWI scores of various groups are reported.

3.1 Testing data assumptions

Some respondents return response sets with extreme scores on each of the eight PWI indicators, i.e., respondents who score only "0" or "100" on the PWI scale. There are 21 respondents with either of these patterns (0.6 percent of the sample). This is comparable to the Austrian PWI analyses (Renn et al. 2009). Factor loadings do not change substantially after exclusion of these cases. Furthermore, there is no indication that this group has not given real answers. Four of the five respondents who scored only "0" on the PWI disagree with the statement that in most cases their life is almost ideal. Because there are no clear conceptual or empirical reasons to eliminate these cases, they are not excluded from the sample in line with previous research (Renn et al. 2009).

Most PWI indicators are negatively skewed as the range is -1.49 to -0.75, which is slightly outside the usual range of -1 to 1. This is typical for PWI data (Renn et al. 2009). Kurtosis is higher than the cut-off value 2 for all indicators except two, namely satisfaction with future security and with religion. The Shapiro-Wilk test shows deviations from normality for each of the eight indicators (minimum $SW(2488) = 0.86$, $p < 0.01$). Therefore, results of the regression analyses should be interpreted with caution. In order to be able to compare our results with previous studies we use the original indicators (Lau et al. 2005; Renn et al. 2009).

There are also multivariate outliers in the sample, which implies that some respondents have relatively different answer patterns on the PWI. This might imply individual cases who are very different from the remainder of the sample and thus bias the results. Alternatively, they could be meaningful subgroups in the sample; for example, a small group that is extremely unhappy. In any case it is important to examine the biasing effect on the results (Mardia 1975). The Mahalanobis distance check for multivariate outliers is only available for respondents who do not have

missing values (N=2488). It uses correlations in the dataset to check how different each observation is from the others. There are 129 outliers ($D^2(8) > 26.13$, $p < 0.001$), which is 2.2 percent of the total sample. The average PWI score for the remaining respondents is 73.97 (SD = 10.44, N = 2359), which is slightly higher than the score with outliers. In the OLS regression analyses without these outliers satisfaction with safety feelings does not contribute to satisfaction with quality of life, the other indicators including religion have a positive effect. However, the effect of religion is very small ($\beta = 0.04$, $p < 0.01$). The analysis of the full sample described in section 3.2 does not show effects of religion, which is in line with previous research. Therefore, we assume that the outliers represent a meaningful subgroup in the sample and should not be excluded.

3.2 Regression analyses

OLS regression is used to test whether each of the eight indicators significantly affects the satisfaction with one's overall quality of life (PWI1). Two indicators are not significantly related to overall quality of life. Satisfaction with religion and safety are not related to overall quality of life. Satisfaction with standard of life is related most to overall quality of life ($\beta = 0.36$, $p < 0.01$) followed by satisfaction with personal relationships ($\beta = 0.20$, $p < 0.01$), achievements in life ($\beta = 0.19$, $p < 0.01$) and health ($\beta = 0.14$, $p < 0.01$). These four domains seem to be the most important for explaining the wellbeing of Dutch citizens. Details are presented in Table 1. The Variance Inflation Factor ranges from 1.16 to 2.25, which is well below the threshold of 10 and shows there is no multicollinearity between the eight domain indicators. This indicates there is no large overlap between indicators and all can be included in the regression analysis. The explained variance on overall quality of life is 66 percent. Correlations between the domain indicators including overall quality of life range from 0.28 to 0.73, which is a larger range than the 0.39 to 0.67 from Lau et al. (2005) and 0.31 to 0.62 from Renn et al. (2009). Pairwise deletion is used, because of the high percentage of missing values on satisfaction with religion due to respondents who are not religious. The model is also estimated using listwise deletion (i.e., all cases with at least one missing value on the PWI are excluded) (Table 2). However, results are similar and therefore not discussed in detail.

Furthermore, the contribution of each indicator is examined separately by a series of hierarchical regressions. In step 1 seven indicators are included while the remaining indicator is included in step 2. This is done eight times. Two indicators do not

contribute significantly to the explained variance of overall quality of life ($p < 0.05$). This is "satisfaction with safety" and "satisfaction with religion". This is in line with results from Australia, where religion and safety do not contribute uniquely either (IWbG 2006). Religion is the newest indicator of the PWI. When it was added it caused much discussion on the wordings of the question and it is the only indicator with an additional answer option stating "Not applicable". This indicator turned out to be problematic in the pretest of the Dutch version of the PWI as well (appendix B). Thus, when the other PWI indicators are controlled for, this indicator does not contribute unique variance to explaining overall quality of life. In addition, two indicators contribute less than 0.00 to the explained variance. Although significant, it can be argued that this is not a relevant contribution. These are: future security and community connectedness.

3.2.1 Correlations and results of OLS regressions (pairwise deletion)

	1	2	3	4	5	6	7	8	9	B	β	Part r^2
PWI1 overall quality	1									-	-	-
PWI2 living standard	.73	1								.33	.36**	.15
PWI3 health	.56	.51	1							.11	.14**	.03
PWI4 achievements	.68	.66	.52	1						.16	.19**	.04
PWI5 relationships	.61	.52	.42	.57	1					.17	.20**	.07
PWI6 safety	.39	.38	.37	.37	.34	1				.02	.00	.00
PWI7 community	.54	.52	.41	.51	.47	.49	1			.06	.07**	.00
PWI8 security	.56	.56	.48	.55	.43	.47	.59	1		.05	.06**	.00
PWI9 religion	.28	.27	.23	.26	.25	.27	.30	.30	1	.01	.02	.00
Adj. R^2											0.66	
R^2 change	-	.06**	.01**	.02**	.02**	.00	.00*	.00*	.00			

Note. All correlations are significant, * $p < 0.05$, ** $p < 0.01$.

3.2.2 Correlations and results of OLS regressions (N=2486)(listwise deletion)

	1	2	3	4	5	6	7	8	9	B	β	Part r^2
PWI1 overall quality	1									-	-	-
PWI2 living standard	.75	1								.36	.38 **	.17
PWI3 health	.58	.53	1							.11	.14 **	.03
PWI4 achievements	.69	.67	.55	1						.16	.17 **	.04
PWI5 relationships	.63	.55	.45	.61	1					.16	.19 **	.06
PWI6 safety	.40	.39	.41	.38	.36	1				-.00	-.00	-.00
PWI7 community	.56	.55	.43	.54	.50	.51	1			.07	.07 **	.01
PWI8 security	.56	.58	.50	.56	.44	.48	.61	1		.04	.05 **	.00
PWI9 religion	.29	.28	.24	.26	.25	.27	.31	.31	1	.02	.03 *	.00
Adj. R^2											0.67	
R^2 change	-	.07**	.01**	.01**	.02**	.00	.00**	.00**	.00*			

Note. All correlations are significant, * $p < 0.05$, ** $p < 0.01$.

3.3 Nomological validity

Nomological validity refers to how the PWI behaves with respect to related constructs. That is, the extent to which it behaves as it should. As wellbeing is part of a nomological net or system of constructs and relationships, the PWI should correlate with alternative wellbeing measures. In addition, the domain indicators should correlate highly with other measures tapping into the same domain. If this is the case, we can be confident that the PWI does in fact measure what it is supposed to measure.

Another well-known subjective multi-item wellbeing scale is the Satisfaction With Life Scale (SWLS) developed by Diener et al. (1985), which consists of five items measuring global life satisfaction. Whereas the PWI uses a numerical 11-point response scale ranging from 0 to 10, the SWLS has a verbal 7-point response scale range from "Strongly disagree" to "Strongly agree". This discrepancy in response scales may attribute to a lower correlation than if the same response scales had been applied, due to differences in interpretations by the respondents. However, this scale was used as it was before by Renn et al. (2009) to validate the PWI. Several indicators of the scale correspond to PWI indicators. For example, "So far, I have achieved the most important things in my life" is significantly correlated with satisfaction with achievement in life ($r = 0.50$, $p < 0.01$). Further, the item "My living conditions are excellent" is significantly correlated with satisfaction with standard of life ($r = 0.50$, $p < 0.01$). The PWI scale as a whole correlates significantly with the SWLS ($r = 0.56$). However, this correlation is lower than the 0.79 that Renn et al. (2009) report for Austria. In addition, the PWI scale (i.e., PWI2-PWI9) correlates more strongly with the quality of life as a whole (i.e., PWI1) ($r = 0.75$, $p < 0.01$) than the SWLS scale ($r = 0.55$, $p < 0.01$).

Several other items from the Survey on Perceptions were also related to the PWI indicators based on the domain on which they focus. Perceived health, a five-point scale ranging from "Very bad" to "Very good", and suffering from long-term diseases, a Yes/ No question, are significantly related to satisfaction with health ($r = 0.67$, $p < 0.01$; $r = 0.46$, $p < 0.01$). Lastly, frequency of church attendance, a five-point scale ranging from "Rarely or never" to "Once a week or more", is significantly related to satisfaction with religion ($r = 0.41$, $p < 0.01$). Each correlation is in the expected direction. As expected, all correlations mentioned are higher than correlations of the respective item with any of the other PWI indicators.

Several alternative dependent variables are tested in the regression analyses using the eight PWI indicators as predictors. Each dependent variable is related to personal wellbeing according to previous research (Renn et al. 2009; Diener et al. 1999). The first is "How often did you feel happy [in the last four weeks]?" with response options ranging from "Never" to "All the time" on a six-point scale. As with the SWLS, the number of response options differs, which could deflate correlations. Three PWI indicators do not have a significant relation with this dependent variable, namely: feelings of safety, connectedness to the community, and religion. This could be because these domains do not affect situational fluctuations of happiness, but do affect the individual's wellbeing baseline.

3.4 Factor analysis

The PWI indicators meet the criteria for exploratory factor analysis (Kaiser-Meyer-Olkin = 0.90; Bartlett's Test of Sphericity $\chi^2(28) = 8086.17$; $p < 0.01$). The Kaiser-Meyer-Olkin test checks whether partial correlations among indicators are small, high values indicate that factor analysis is appropriate. The Bartlett's Test checks the hypothesis that the variables in the population correlation matrix are uncorrelated. A significant result rejects this hypothesis. These tests suggest that the eight domain indicators can be combined into one construct instead of eight independent measures.

Principal Components Analysis (PCA) was conducted using Varimax rotation to explore the factor structure of the PWI. The eight domain indicators form one factor. Factor loadings range from 0.45 for satisfaction with religion to 0.81 for satisfaction with standard of living and achievement in life. Factor loadings above 0.40 are relevant and can be included in the scale (Hair et al. 1998). The explained variance of the indicators on the factor is 53 percent. Table 3 shows the results of the factor analysis.

Cronbach's alpha is 0.86, which is above the 0.70 threshold. Therefore, the PWI scale shows sufficient construct reliability (Hair et al. 1998). If satisfaction with religion were to be excluded alpha would increase. Since alpha is sufficient, all indicators are included. Table 4 shows the mean and standard deviation of each indicator.

3.4.1 Factor analysis

Indicator	Factor loading	Communality
PWI2 living standard	0.81	0.65
PWI3 health	0.72	0.52
PWI4 achievements	0.81	0.66
PWI5 relationships	0.73	0.53
PWI6 safety	0.65	0.42
PWI7 community	0.78	0.61
PWI8 security	0.79	0.62
PWI9 religion	0.45	0.20
% explained variance component 1	53	

Note. PCA with Varimax rotation.

3.4.2 Descriptives

Indicator	Unweighted Mean (SD)	Weighted Mean (SD)	N (%)
PWI1 overall quality	76.19 (14.16)	75.94 (14.44)	3400 (99.94)
PWI2 living standard	75.53 (15.31)	75.11 (15.69)	3395 (99.79)
PWI3 health	74.09 (17.81)	73.96 (18.02)	3397 (99.85)
PWI4 achievements	74.09 (16.11)	73.77 (16.41)	3388 (99.59)
PWI5 relationships	78.53 (16.57)	78.14 (16.92)	3395 (99.79)
PWI6 safety	72.13 (17.14)	72.20 (17.21)	3400 (99.94)
PWI7 community	71.58 (15.49)	71.22 (15.71)	3389 (99.62)
PWI8 security	67.80 (17.76)	67.62 (17.96)	3373 (99.15)
PWI9 religion	69.75 (21.48)	70.20 (21.52)	2521 (74.10)

3.5 PWI scores

The overall PWI score is weighted to correct for sample selectivity with regard to background characteristics. This ensures representative findings for the Dutch population. The average PWI score is 72.98 (SD = 11.98), which is within the normative range of 70 to 80 for Western countries.

When various groups are compared based on gender, age, ethnicity, education level, marital status and perceived health the PWI scores are ranked as expected based on previous happiness research (Gringhuis and Israëls 1999; Veenhoven 2008; Vaughan et al. 1985; Witter et al. 1984) (Table 5). That is, young people score higher on wellbeing than old people, native Dutch people score higher than

immigrants, higher educated score higher than lower educated people, and healthy people score higher than people in poor health.

3.5.1 Ranking of groups on average weighted PWI scores

	PWI (SD)
Gender	
Male	72.61 (12.02)
Female	73.35 (11.93)
Age	
18-24	74.20 (9.48)
25-44	74.17 (11.66)
45-64	72.25 (12.58)
65 and older	71.53 (12.27)
Ethnicity	
Dutch	73.34 (11.45)
Western immigrant	72.76 (11.78)
Non-western immigrant	70.42 (15.45)
Education level	
Tertiary II (university master, doctor)	77.49 (10.83)
Tertiary I (hbo,university bachelor)	75.37 (10.22)
Secondary (havo, vwo,mbo 2-4)	73.81 (10.49)
Lower secondary (vmbo,mbo1,mavo onderb)	71.30 (11.91)
Primary (primary education)	69.39 (14.11)
Marital status	
Married	74.06 (11.36)
Divorced	69.19 (14.09)
Widowed	70.10 (13.72)
Unmarried	72.70 (11.60)
Health	
Very good	78.88 (9.64)
Good	73.59 (10.55)
Mediocre	66.23 (11.70)
Bad	58.19 (14.53)
Very bad (N=13)	46.86 (23.23)

Note. Minimum sample size is 100 unless indicated otherwise.

4 Reflection and conclusions

The purpose of this report is to show whether the PWI is a valid construct. Six of the eight indicators are significantly related to the overall quality of life. Satisfaction with religion is not related and is slightly different because of the "Not applicable" answer option and the fact that many Dutch people are not religious, rendering the item irrelevant. In addition, satisfaction with feelings of safety is not related either. However, the internal consistency and factor structure show that these indicators do not need to be excluded from the scale. That is, all indicators load onto one overall factor and the construct validity is sufficient. Further, because of the high explained variance of the overall quality of life (66 percent) we are confident that the eight domains represent quality of life perceptions adequately. This explained variance is also comparable to the explained variance that is reported in previous literature, namely 65 percent compared to 68 percent (Fugl-Meyer, Braenholm, and Fugl-Meyer 1991). This implies that the original PWI can be applied to the Netherlands. We find that the first four indicators, namely satisfaction with living standard, achievements in life, health, and personal relationships are the most important indicators of the PWI in the Netherlands. The four indicators represent the items that coincide with our own framework of dimensions of the quality of life. The finding that the remaining four PWI indicators contribute less may be due to the difficulty respondents seem to have with answering these questions instead of the limited importance of the domains (see appendix B). For example, respondents were unsure as to what community and the future refer to and the "Not applicable" option had to be included for religion to enable respondents without religious denomination to answer the question. The PWI can be used if the goal of a study is to explain differences between people in wellbeing. That is, the information about domain satisfaction can be used to target unhappy people in a specific way in order to improve their wellbeing.

We believe that the conceptual basis of the PWI can be used to design a multi-dimensional index for wellbeing that meets our own framework. The four PWI items that coincide with the dimensions of our framework could be part of this. For the other items that are not included in the PWI, appropriate semi-abstract items will have to be conceptualised. We would prefer a multi-dimensional index that meets the dimensions in our own framework to the PWI, since this corresponds with the recommendations of the Stiglitz-report.

References

Cummins, R. A. (1995), "On the Trail of the Gold Standard for Subjective Well-Being", *Social Indicators Research*, 35 (2), 179-200.

Cummins, R. A. (2009), "Subjective Wellbeing, Homeostatically Protected Mood and Depression: A Synthesis", *Journal of Happiness Studies*, 11, 1–17.

Cummins, R.A., M. P. McCabe, Y. Romeo, S. Reid, and L. Waters (1997), "An Initial Evaluation of the Comprehensive Quality of Life Scale—Intellectual Disability", *International Journal of Disability, Development and Education*, 44 (1), 7-19.

Cuppen, M., Laan, P. van der, Nunspeet, W. van (2011), "Re-engineering Dutch social surveys: From single-purpose surveys to an integrated design", paper for the 58th ISI Congress (http://isi2011.congressplanner.eu/pdfs/450015.pdf)

Diener, E., R. E. Emmons, R. J. Larsen, and S. Griffin (1985), "The Satisfaction With Life Scale", *Journal of Personality Assessment*, 49 (1), 71-75.

Diener, E., E. M. Suh, R. E. Lucas, H. L. Smith (1999), "Subjective Well-Being: Three Decades of Progress", *Psychological Bulletin*, 125 (2), 276-302.

Fugl-Meyer, A. R., I. B. Braenholm, and K. S. Fugl-Meyer (1991). "Happiness and domain-specific life satisfaction in adult northern Swedes", *Clinical Rehabilitation* 5, 25-33.

Gringhuis, G. and A. Israëls (1999), "Analyzing well-being in relation to characteristics in the population", The Hague: Statistics Netherlands.

Gullone, E. and R. A. Cummins (1999), "The Comprehensive Quality of Life Scale: A Psychometric Evaluation with an Adolescent Sample", *Behaviour Change*, 16 (2), 127-139.

Hair, J. F., Jr., Anderson, R. E., Tatham, R. L., and Black, W. C. (1998), "Multivariate data analysis with readings", (5th ed.). Englewood Cliffs, NJ: Prentice-Hall.

International Wellbeing Group (IWbG)(2006), "Personal Wellbeing Index – Adult, Manual 4th Edition", Melbourne: Australian Centre on Quality of Life, Deakin University (http://www.deakin.edu.au/research/acqol/instruments/wellbeing_index.htm)

Janssen, B. (2010), "Web data collection for Household Survey at Statistics Netherlands", The Hague/Heerlen: Statistics Netherlands, Internal document.

Lau, A. L. D., R. A. Cummins, and W. McPherson (2005), "An Investigation into the Cross-Cultural Equivalence of the Personal Wellbeing Index", *Social Indicator Research*, 72, 403-430.

Mardia, K. V. (1975), "Assessment of Multinormality and the Robustness of Hotelling's T^2 Test", *Journal of the Royal Statistical Society, Series C (Applied Statistics)*, 24 (2), 163-171.

Renn, D. et al. (2009), "International Well-being Index: The Austrian Version", *Social Indicators Research*, 90, 243-256.

Stiglitz, J.E., A. Sen, and J.P. Fitoussi (2009), "Report by the Commission on the Measurement of Economic Performance and Social Progress", CMEPSP. Available at: www.stiglitz-sen-fitoussi.fr.

Vaughan, D. A., J. B. Kashner, W. A. Stock, and M. Richards (1985), "A Structural Model of Well-Being: A Comparison of Ethnicity", *Social Indicators Research*, 16 (3), 315-332.

Veenhoven, R. (2008), "Sociological Theories of Subjective Well-being", in M. Eid and R. Larsen (Eds.), *The Science of Subjective Well-being: A tribute to Ed Diener*. New York: Guilford Publications, 44-61.

Wild, D., Grove, A., Martin, M., Eremenco, E.,McElroy, S., Verjee-Lorenz, A., Erikson, P. (2005), "Principles of Good Practice for the Translation and Cultural Adaptation Process for Patient-Reported Outcomes (PRO) Measures: Report of the ISPOR Task Force for Translation and Cultural Adaptation", *Value in Health,* 8 (2), 94-104

Witter, R. A., M. A. Okun, W. A. Stock, and M. J. Haring (1984), "Education and Subjective Well-Being: A Meta-Analysis", *Educational Evaluation and Policy Analysis*, 6 (2), 165-173.

Appendix A

A new framework for Dutch key social indicators

The set of key indicators for the life situation in the Netherlands summarises the objective and subjective indicators for both welfare and wellbeing Statistics Netherlands derives from its social surveys and registers. A first set was developed in 1999 and published on the internet for the first time in 2000 as the so-called Social Monitor. The key indicators for this first monitor were divided into fifteen life situation dimensions that have not changed since then. However, in order to meet international developments, after publication of the report of the Stiglitz-commission Statistics Netherlands decided to restructure the dimensions into a new framework based on the key QOL dimensions identified in that report:

- Material living standards (income, consumption and wealth);
- Health;
- Education;
- Personal activities including work;
- Political voice and governance;
- Social connections and relationships;
- Environment (present and future conditions);
- Insecurity, of an economic as well as a physical nature.

We adapted these dimensions slightly, including a re-ordering, as shown in table A1, to make them applicable at the micro-level and within Statistics Netherlands.

A.1 Adaptation of the dimensions in the Stiglitz-report

Dimension Stiglitz report	Dimension Dutch framework
	Context
Material living standards	Material living standards
Insecurity of an economic nature	Economic risks
Education	Education and profession
Health	Health
Political voice and governance	Institutional participation and trust
Social connections and relationships	Social cohesion and relations
Insecurity of a physical nature	Physical safety
Environment	Natural and living environment
Personal activities including work	

Although QOL is multi-dimensional, it is useful to have some indicators at an overall level. Therefore, we added a context dimension. For example, the indicators for the overall evaluation of life expressed in terms of happiness and satisfaction with life will be assigned to this dimension.

The most important adaptation is the reassignment of the indicators relating to the dimension “Personal activities including work” to the other dimensions. After all, the personal activities dimension is the only one related to what people do, whereas all other dimensions relate to what they have and the risks involved. By assigning indicators for personal activities to other dimensions, we bring together having and doing. In line with this we expanded the dimension “education” to “education and occupation”, since in the Stiglitz-report indicators for paid work are assigned to the personal activities dimension.

In the Stiglitz-report the dimensions “Political voice and governance” and “Environment” are described mainly from a macro and international comparative perspective. For application to the micro-level we changed these dimensions into “Institutional participation and trust” and “Natural environment and living environment”.

Lastly, we split the insecurity dimension into two, one for economic risks and one for risks of a physical nature. This framework is the basis for the further exploration and analysis of SWB at Statistics Netherlands.

Appendix B

Translating the PWI into Dutch

Introduction

The Dutch version of the PWI used in the Survey on Perceptions was translated by Statistics Netherlands using a back-translation procedure (Wild et al. 2005). First, the PWI was translated into Dutch by a Dutch native speaker. Second, the Dutch translation was translated back into English by an English native speaker. Translating the PWI was rather difficult since it did not just involve translating the words and sentences, but also translating the concepts captured by the index. Some items are not a literal translation of the English text, but after discussions among the translators and researchers a different translation was chosen deliberately.

In order to get an idea of how well the PWI was translated and how the Dutch items would be interpreted , the Questionnaire Laboratory (Q-lab) of Statistics Netherlands executed a small pretest among fourteen respondents who work at Statistics Netherlands, but are not normally involved in household surveys or PWI-like questions. To test how the concept of the PWI was interpreted the respondents were initially asked to complete the PWI. They were encouraged not to think too long about their answers and to record their initial reaction. After completing the PWI, including the question on satisfaction with life as a whole, respondents were asked to indicate for each item whether they thought it was difficult to answer and if so to explain why. In addition, they could indicate for each of the items what they thought of when they answered. Lastly, the respondents could write down any general remarks they might have about the test, the PWI, or the questions.

Difficult to answer?

None of the respondents thought the items satisfaction with life as a whole, standard of living or personal health were difficult to answer. No remarks were made for these items. For the other items several respondents made remarks. In general they remarked upon the vagueness of the concepts. "*What do you mean by 'community'*", "*I'm not sure how to interpret this, the future is always uncertain.*" The item about religiousness elicited the most remarks, twelve in total. Five respondents gave the neutral rating 5 for this item and two respondents left it blank. The remarks show that the respondents do not know how to answer the question, because they do not have a religion: "*I'm afraid that if I tick satisfied, it may be interpreted as me having a religion. Which I don't, but I do have an ideology. So the question is*

correct, but I had an awkward feeling and ticked neutral."; "*Is it possible to have a* not applicable *here?*"; "*I don't have a religion or ideology.*"

What did you think of?

Even though the respondents found several questions difficult to answer, they did have a clear idea what the PWI is about. The questions seem vague, but all respondents seem to record a similar vagueness.

Conclusions from the pretest

From the pretest it was concluded that the translation was reliable. The items that were deliberately different from the English version were interpreted as they were intended to be in Dutch. Also, the concept was understood correctly. Apart from the item on religiousness, the PWI could be answered by the test respondents. They perceived a certain vagueness, but this did not prevent them interpreting the concept and grading their satisfaction. This is in accordance with the conceptual basis of the PWI for which a deliberately non-specific format was chosen (Cummins 2009). The item on religiousness is very problematic. In theory a person can have no religion and be very satisfied with that. Yet, as is clear from the remarks, the statement is not always interpreted in that way. In the Australian version of the PWI an "opt out" is added for persons with no spiritual or religious beliefs. It seems logical to do the same in the Dutch version.

Final translation

Based on the remarks made by the test respondents, the conclusions drawn from the results and consultation of Prof. Dr. R. Cummins, some minor changes in the translation were made. Furthermore, an "opt out" was added to the response scale for the question on religion, because of the remarks of the respondents on this item.

B.1 Translation of the PWI in Dutch

How satisfied are you with …..	**Hoe tevreden bent u met …..**
1. your life as a whole?	1. uw leven in het algemeen?
2. your standard of living?	2. uw levensstandaard?
3. your health?	3. uw gezondheid?
4. what you are achieving in life?	4. wat u op dit moment bereikt in uw leven?
5. your personal relationships?	5. uw persoonlijke relaties?
6. how safe you feel?	6. uw veiligheidsgevoel?
7. feeling part of your community?	7. de mate waarin u zich onderdeel van uw gemeenschap voelt?
8. your future security?	8. uw zekerheid voor de toekomst?
9. your spirituality or religion?	9. uw godsdienst of levensovertuiging?