Validation of the 'Life Essentials Assessment Framework' questionnaire

Findings

Gianfranco Giuntoli
Gary Raine
Anne-Marie Bagnall

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Centre for Health Promotion Research
Institute for Health and Wellbeing
Queen Square House (Room 230)
80 Woodhouse Lane
Leeds Metropolitan University
Leeds LS2 8NU

Email: g.giuntoli@leedsmet.ac.uk

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Executive summary

Introduction

The 'Life Essentials Assessment Framework' ('Leaf') questionnaire is a six questions, interviewer-administered questionnaire devised by Age UK Wakefield District to enable effective evaluation of vulnerable adults' needs and to help establish the effectiveness of service provision. It aims to meet the increasing demand by funders to measure service users' improvement against expected delivery outcomes.

'Leaf' covers 6 areas of life, called 'paths', which are deemed essential to positive living for vulnerable adults:

Path 1 - Daily Living Skills – day to day living, self-care and personal hygiene shopping

Path 2 - Managing Finances: planning and managing finances, future plans

Path 3 - Social Networks: relationships and social connections

Path 4 - Emotional Wellbeing: depression, anger, dignity

Path 5 - Physical Health: management of long term conditions, mobility etc.

Path 6 - Pleasure in Life: satisfaction, interest in a variety of settings and circumstances.

Each path is assessed through a single question which is exemplified by some statements and is evaluated on a ten steps ladder.

'Leaf' is administered at three points in time: at the point of assessment of the clients' needs, at the completion of the service delivered or at six weeks, depending on the nature of delivery, and then at 90 days.

The Centre for Health Promotion Research, Institute for Health and Wellbeing at Leeds Metropolitan University was commissioned by AGE UK Wakefield District to assess the measurement characteristics of 'Leaf'. The assessment aimed to investigate its validity, reliability, and capacity to measure change in two phases:

- A first phase in which existing data is used to undertake all possible relevant validation analyses.

- A second phase in which further, specific data are collected to undertake all the validation analyses that are not possible based on the existing data.

This documents reports on the results of the first phase of the assessment, which was undertaken using an existing data set of the answers to the 'Leaf' questionnaire of 99 older people who were interviewed at two points in time: before and after the delivery of some specific social care interventions.

Methods

The available data enabled us to undertake the following tests of the validity, reliability, and capacity to measure change of the 'Leaf' questionnaire:

- For validity (which indicates whether the 'Leaf' questionnaire effectively measures what it is intended to measure):
    - Face validity, which indicates whether, on the face of it, the instrument appears to be assessing the desired qualities (assessed through a methodological and theoretical analysis).
    - Content validity, which consists of a judgment on whether the instrument samples all the relevant or important content/domains given its main aims (assessed through a methodological and theoretical analysis).
    - Factorial validity, which assesses whether the factor structure of the questionnaire conforms to the theoretical definition of the construct (assessed using Principal Component Analysis).
- For reliability (which indicates whether the 'Leaf' questionnaire is able to measure consistently):
    - Internal consistency, which describes the extent to which all the items in a given test measure the same construct (assessed using Cronbach's alpha).
- For measures of change (which indicates the capacity of the 'Leaf' questionnaire to detect change before and after the interventions):
    - Paired t-test for normally distributed variables and Wilcoxon Signed-Rank Test for non normally distributed variables.

Findings

Overall, the analyses showed that:

- The six questions that make up the 'Leaf' questionnaire present significant elements of ambiguity, both in their wording and in their answering options, and need to be amended.
- The six items of the 'Leaf' questionnaire do not represent a scale that measures a single construct. However, three items ('Pleasure in life', 'Emotional wellbeing', and 'Social networks') show the potential to represent a short scale aimed at measuring the construct 'mental well-being'.
- The 'Leaf' questionnaire recorded an improvement of the clients' satisfaction after the delivery of the interventions. However, no inference can be made in relation to whether such change was caused by the services delivered by AGE UK because the questionnaire was not administered to a control group.

In particular, the face validity analyses suggested that:

- All of the six items presented some important sources of ambiguity that represent a threat to the validity of the answers recorded using the questionnaire. In particular:
    - The questions underneath each item (see Appendix 1), which aim to exemplify the six main questions, are a source of major ambiguity because they make unclear what question the respondents are actually answering, whether the main item or one of the exemplifying ones.
    - The question aimed at assessing physical health: 'How does your physical health affect your life and how well do you look after your own health?' is 'double barrelled', that is it asks two questions in one. As such it is a source of major ambiguity for the respondents.
    - The exemplifying statements in the scales of 1 to 10 do not always offer an intuitive, clear and consistent interpretation of the specific level of the scale to which they have been assigned. For example, the descriptors for the scores 3, 5, and 7 of the scale for the social networks item (item number 3) are respectively: 'Needing help, sometime lonely', 'Wanting more contact', and 'Have people around me, would sometimes like more contact', which have very similar meanings. On the other hand, the labels for the 10 points ladder of the item on emotional wellbeing (item number 4), make an inconsistent use of adverbs: the label of score 5 is 'content at times', which uses a temporal adverb, whereas the label for score 7 is 'quite content', which uses a quantity adverb.
    - The label 'content', which is the top end of the 10 steps ladders used to record the clients' state in relation to each of the six main questions, may not allow the most effective use of the scales.

The content validity analyses suggested that:

- The six items of the 'Leaf' questionnaire seem to be designed to tap on three main underpinning constructs: 'Mental Well-Being', 'Functional abilities, and 'Living standards'. However, of these three constructs, only Mental well-being can be linked to three items, e.g. 'Pleasure in life', 'Emotional wellbeing', and 'Social networks', which are enough to potentially be a small scale that tap on both the hedonic component of mental well-being – that is how people *feel* about life (e.g. their emotions and satisfaction with life) – and its eudaimonic component, that is how people *function* in life, respectively from a psychological and a social point of view.

- The two other domains, i.e. 'Functional abilities' and 'Living standards', are assessed respectively through two items, i.e. 'Physical health' and 'Daily living skills', and one item, i.e. 'Managing finances', which are not enough to constitute measurement scales.

The factorial validity analyses showed that:

- One item ('Managing finances'), does not correlate with the others and so would need to be dropped in order for the 'Leaf' to become a valid scale.
- Two items, i.e. 'Daily Living Skills' and 'Managing Finances', were significantly skewed in both the before and after administrations and made limited use of the 10 points scale range, suggesting that there are issues with their wording, with the labels given to their 10 points scales, or both.
- The 'Leaf' questionnaire assesses three main sub domains. This result was consistent with the hypotheses advanced through the content analysis of the questionnaire. The three sub domains identified through the Principal Component Analysis can be called respectively:
    - 'Mental well-being', which consisted of the items 'Pleasure in life', 'Emotional wellbeing', and 'Social networks'. In particular, the item 'Pleasure in life' measured the hedonic component of mental well-being, whereas the items 'Emotional well-being' and 'Social networks' measured its eudaimonic component.
    - 'Functional abilities', which consisted of the item 'Daily living skills' and 'Physical health'.
    - 'Living standard', which consisted of the item 'Managing finances'.

Although the first sub domain could represent a sub scale of the 'Leaf' questionnaire, the other two, i.e. 'everyday functionality' and 'physical health', consisted only of one item. Overall, single items tend to be less reliable than measurement scales to assess specific life domains.

The Cronbach's alpha of the subscale 'mental well-being' was .725 for the before administration and .860 for the after administration, suggesting that the internal consistency of this sub scale is not consistently above the recommended threshold of .80.

Conclusions and recommendations

The first phase of the validation of the 'Leaf' questionnaire aimed to undertake all possible relevant validation analyses of this measurement tool using the answers collected from 99 older people interviewed at two points in time: before and after the delivery of specific AGE UK services.

The analyses returned three main findings:

- The current version of the 'Leaf' questionnaire presents significant ambiguities in the way the questions are worded and the 10 points ladders are labelled.
- The six items of the 'Leaf' questionnaire do not represent a scale that measure one single underpinning construct. However, they tap on three main constructs, which can be called 'Mental well-being', 'Functional abilities', and 'Living standard'. Only the three items that measure the construct 'Mental well-being' showed the potential to represent a short scale. On the other hand, the constructs 'Functional abilities' and 'Physical health' were measured respectively by two items and one item and so did not represent scales. Overall, single items tend to be less reliable than measurement scales to assess specific life domains.
- The 'Leaf' questionnaire recorded an improvement of the clients' satisfaction after the delivery of the interventions. However, no inference could be made in relation to whether such change was caused by the services delivered by AGE UK because the questionnaire was not administered to a control group.

Overall, this first phase of the evaluation of the 'Leaf' questionnaire has shown the potential of this questionnaire and it is recommended to proceed with the second phase of the validation.

Key recommendations for the second phase of the validation of the 'Leaf' questionnaire are:

- The six items need to be reworded in such a way to remove all sources of ambiguity, which represent a threat to the validity of the questionnaire. With regard to this, it is suggested that the exemplifying questions listed underneath each of the six items are not used to explain the main items to the clients. Their current use as explanations for the main items during the administration of the questionnaire represents a major source of ambiguity with regard to what questions the clients are actually answering. Each of the six main questions of the 'Leaf' questionnaire should be self-explaining, if further examples are needed to clarify them, then this means that the questions are still significantly vague/ambiguous.

- It is important to decide what is the overall goal of the 'Leaf' questionnaire. If its main aim is to measure change in relation to a number of aspects of the life of AGE UK clients which are all deemed essential, despite the fact that they may be unrelated to each other, e.g. 'Managing finances', then the findings that the six items of 'Leaf' do not represent a scale should not be of concern.

  However, this does not exclude that each of the three life domains identified through the Principal Component Analysis, i.e. 'Mental well-being', 'Functional abilities', and 'Living standard', can be measured through short, valid and reliable scales, especially considering that single items tend to be less reliable than measurement scales to assess specific life domains. With regard to this, as mentioned, three items of the 'Leaf' questionnaire already present the potential to be a short scale for the measurement of the construct 'Mental well-being'. It is suggested that two short scales could be created for the two other constructs, i.e. 'Functional abilities' and 'Living standard', using the explanatory questions (currently listed underneath each item) as complementary items. Because each of these explanatory questions are strictly related to the items that they intend to exemplify, they may be used as questions tapping on those same constructs.
- There is the need to undertake further tests of the reliability (e.g. measures of stability) and validity of the 'Leaf' questionnaire. For example:
    - Test-retest reliability, which entails the comparison of the 'Leaf' questionnaires to other, already validated questionnaires and scales that aim to measure similar constructs.
    - Construct validity, which entails the formulation of specific hypothesis to test whether 'Leaf' allows researchers to make accurate inferences about Age UK clients.
- The 'Leaf' questionnaire should be administered to a control group to help establishing causal links between AGE UK interventions and the change that the 'Leaf' questionnaire records between different points in time.
- Finally, it is recommended to adopt a simpler way to record the data collected through the questionnaire. Currently the data is recorded in an Excel spreadsheet using letters instead of numbers. It is suggested to record the scores of the clients on each question using numbers, not letters, which cannot be used to undertake any statistical calculation.

1. Introduction

This document presents findings from the first phase of the assessment of the 'Life Essentials Assessment Framework' ('Leaf') questionnaire, a six questions, interviewer-administered questionnaire devised by Age UK Wakefield District to enable effective evaluation of vulnerable adults' needs and to help establish the effectiveness of service provision. The assessment aimed to investigate the validity, reliability, and capacity to measure change of the 'Leaf' questionnaire in two phases:

- A first phase in which existing data is used to undertake all possible relevant validation analyses.

- A second phase in which further, specific data are collected to undertake all the validation analyses that are not possible based on the existing data.

This documents reports on the results of the first phase of the assessment, which was undertaken using an existing data set of the answers to the 'Leaf' questionnaire of 99 older people who were interviewed at two points in time: before and after some specific social care interventions.

The remaining of this report is divided into four parts. The first section offers some background on the 'Leaf' questionnaire. The second and third sections report respectively on the methods and results of the first phase of the assessment, and the fourth discusses the results and offers some recommendations for possible revisions of the 'Leaf' questionnaire.

2. Background

The 'Leaf' questionnaire's aims to meet the increasing demand by funders to measure service users' improvement against expected delivery outcomes. It covers 6 areas of life, called 'paths', which are deemed essential to positive living for vulnerable adults:

Path 1 - Daily Living Skills: day to day living, self-care and personal hygiene shopping

Path 2 - Managing Finances: planning and managing finances, future plans

Path 3 - Social Networks: relationships and social connections

Path 4 - Emotional Wellbeing: depression, anger, dignity

Path 5 - Physical Health: management of long term conditions, mobility etc.

Path 6 - Pleasure in Life: satisfaction, interest in a variety of settings and circumstances.

Each life domain (i.e. path) is assessed through a single question which is exemplified by some statements and is evaluated on a ten steps ladder. The ladder consists of numbers

from 1 to 10, some of which are associated to example statements that change for each life domain (see Appendix 1).

'Leaf' is administered at 3 points in time: at the point of assessment of the clients' needs, at the completion of the service delivered or at six weeks, depending on the nature of delivery, and then at 90 days. In each case, the service provider and the client meet and discuss to find where the client fits on the scale.

'Leaf' collects also data on referral sources, reasons for referral and agencies that individuals are signposted on to.

3. Methods

The data used for the validation consisted of the answers of 99 older people who completed the 'Leaf' questionnaire on 2 occasions: before they were delivered specific social care services and after their delivery. The available data enabled us to undertake the following tests of the validity, reliability, and capacity to measure change of the 'Leaf' questionnaire:

- For validity (which indicates whether the 'Leaf' questionnaire effectively measures what it is intended to measure):
    - Face validity, which indicates whether, on the face of it, the instrument appears to be assessing the desired qualities (assessed through a methodological and theoretical analysis).
    - Content validity, which consists of a judgment on whether the instrument samples all the relevant or important content/domains given its main aims (assessed through a methodological and theoretical analysis).
    - Factorial validity, which assesses whether the factor structure of the questionnaire conforms to the theoretical definition of the construct (assessed using statistical techniques, please see below).
- For reliability (which indicates whether the 'Leaf' questionnaire is able to measure consistently):
    - Internal consistency, which describes the extent to which all the items in a given test measure the same construct (assessed using statistical techniques, please see below).
- For measures of change (which indicates the capacity of the 'Leaf' questionnaire to detect change before and after relevant events):
    - Paired t-test for normally distributed variables and Wilcoxon Signed-Rank Test for non normally distributed variables.

In particular, following the methodology suggested in the literature (see Field, 2005), the factor validity of the 'Leaf' questionnaire was assessed by first checking the range, skewness, and standard deviation of the six items. Skewness scores were standardized and z-scores with an absolute values greater than 2.58 were considered to be significantly skewed at p <.001.

Principal component analysis was then used. Given the general rule of having 10 participants per each variable (see Field, 2005), the sample of 99 participants can be considered adequate to run Principal Component Analysis (the data set includes six variables, requiring a minimum sample of 60 participants). However, overall, a sample of 100 participants is considered below optimal levels (Field, 2005), so there is a possibility that the analyses run into computational difficulties.

A Varimax Rotation was chosen on the basis of the fact that the three constructs identified through the content analysis are theoretically independent of each other. However, an oblique rotation was also used to check the hypothesis that the factors were related to each other.

Given the sample's size and the fact that the analyses use less than 30 variables, Kaiser's recommendation of retaining factors with eigenvalues over 1 was adopted if communalities after extraction were greater than 0.7 (Field, 2005). If not, the scree plot was investigated and the number of factors to retain decided based on the shape of the curve. Considering the size of the sample (99 individuals), a loading greater than .512 was used to decide whether variables significantly loaded on the factors (Field, 2005).

Cronbach's alpha was used as a measure of internal consistency. As commonly agreed in the literature, it was assumed that Cronbach's alpha should exceed 0.8.

The available data did not allow us to undertake further tests to offer a more in depth investigation of the reliability (e.g. measures of stability such as test-retest reliability), validity (e.g. construct validity), and capacity to measure change of the 'Leaf' questionnaire (because there was no control group).

4. Analysis

This section reports on the analyses undertaken to explore the face validity, content validity, factor validity, reliability and capacity to measure change of the 'Leaf' questionnaire.

Face validity

A review of the questions and response scales of the 'Leaf' questionnaire indicates the following issues:

- The questions in the boxes underneath each item (see Appendix 1), which aim to exemplify the six main questions, are a source of major ambiguity because they make unclear what question the respondents are actually answering, whether the main item or one of the exemplifying questions.
- The question aimed at assessing physical health: 'How does your physical health affect your life and how well do you look after your own health?' is 'double

barrelled', that is it asks two questions in one. As such it is a source of major ambiguity for the respondents.

- The exemplifying statements in the scales of 1 to 10 do not always offer an intuitive, clear and consistent interpretation of the specific level of the scale to which they have been assigned. For example, the descriptors for the scores 3, 5, and 7 of the scale for the social networks item (item number 3) are respectively: 'Needing help, sometime lonely', 'Wanting more contact', and 'Have people around me, would sometimes like more contact', which have very similar meanings. On the other hand, the labels for the 10 points ladder of the item on emotional wellbeing (item number 4), make an inconsistent use of adverbs: the label of score 5 is 'content at times', which uses a temporal adverb, whereas the label for score 7 is 'quite content', which uses a quantity adverb.
- The label chosen as the top end of the 10 steps ladder, i.e. 'content', may not allow the most effective use of the 10 steps scale.

Content validity

The six items that compose the 'Leaf' questionnaire tap on important 'essential' life domains. However, some items, for example 'Emotional wellbeing', 'Pleasure in life', and 'Social networks', can be intuitively related to the construct of well-being and its two main components, i.e. hedonic well-being (which refers to how people *feel* about life, e.g. their emotions and satisfaction with life) and eudaimonic well-being (which refers to how people *function* in life psychologically and socially). Other items, such as 'Managing finances', 'Daily living skills', and 'Physical health', aim to evaluate how people function in different, more practical aspects of their everyday life, so they can be considered as wider indicators of quality of life.

Overall, the items of the questionnaire seem to tap on the following three main domains:

- Mental well-being, which is broken down in its two main components:
    - Hedonic well-being: item 'Emotional wellbeing'.
    - Eudaimonic well-being: items 'Pleasure in life' and 'Social networks'.
- Functional abilities: items 'Physical health' and 'Daily living skills'.
- Living standard: 'Managing finances'.

In the 'Leaf' questionnaire, only the mental well-being domain is assessed with three questions, whereas the other two are measured with one or two items at them most, which are not enough to constitute measurement scales. Overall, single items tend to be less reliable than measurement scales to assess specific life domains.

Descriptive statistics and factorial validity

The descriptive statistics of the six items of the 'Leaf' questionnaire (see 0, Figure 2, and Table 1) show that three items were significantly negatively skewed ('Daily Living Skills' and 'Managing Finances' both in the before and after administrations, whereas 'Physical Health' only in the after administration) and one, 'Emotional Wellbeing', was significantly

positively skewed in the before administration. Figure 1 shows that the use of the lower ends of the 10 points scales was limited for the items 'Daily Living Skills' and 'Managing Finances'.

Overall, items that are significantly skewed, that make a limited use of the scale range, and that show particularly high or low values for the standard deviation indicate the presence of problems and present an obstacle to undertake statistical analyses such as, for example, factor analysis.

Table 1. Skewness z-scores and standard deviations

Leaf items	Before z-score	After z-score	Before Standard Deviation	After Standard Deviation
Daily Living Skills	-2.75	-4.30	2.78	1.92
Managing Finances	-3.90	-6.45	2.82	1.51
Social Networks	1.13	-1.27	3.16	2.43
Emotional Wellbeing	3.77	-1.21	2.17	2.02
Physical Health	-0.98	-2.54	2.85	2.41
Pleasure in Life	1.41	-1.77	3.03	2.55

Inspection of the correlation matrix (see Appendix 3) indicates that the item 'Managing Finances' does not correlate with the majority of the other items. This fact suggests that this item is measuring something different compared to the others. However, the determinant in the correlation matrix shows that there is not a problem with multicollinearity in the data (i.e. the items do not correlate very highly with each other).

The KMO statistic for the Principal Component Analysis with all the variables in was .632 and the Barlett's test was highly significant, which indicates that factor analysis can be used for this data, although the score of the KMO statistic is considered to be mediocre (Field, 2005). Inspection of the diagonal elements of the anti-image correlation matrix indicates that the item 'Managing finances' has a value below the requested 0.5, indicating issues with this item.

These preliminary findings suggest that the item 'Managing finances' should be removed from the 'Leaf' questionnaire if the aim is to build a valid scale.

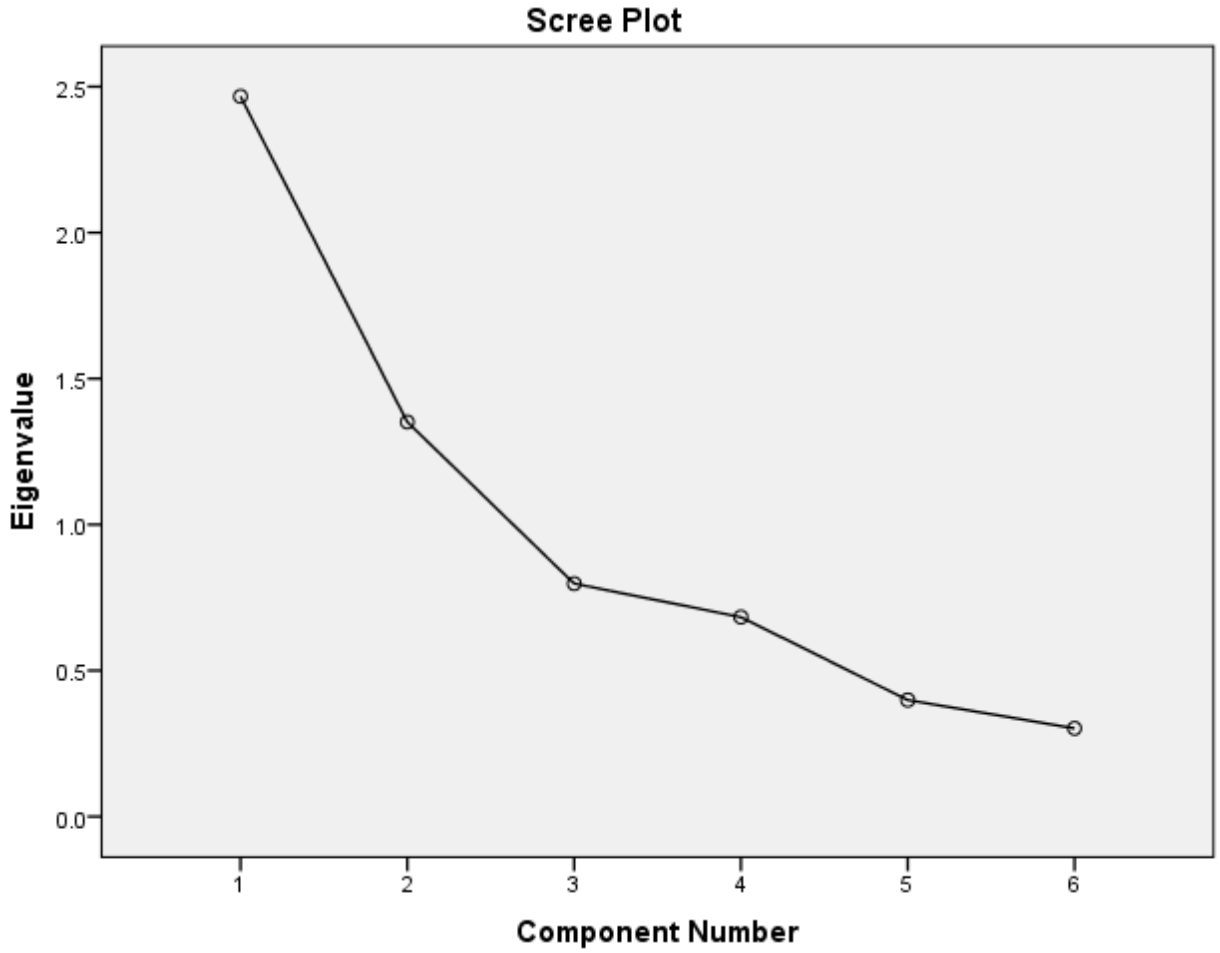
With regard to the number of factors to retain, Kaiser's recommendation of retaining factors with eigenvalues over 1 would lead to retain two factors (see Table 2).

Table 2

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	2.466	41.108	41.108
2	1.351	22.524	63.632
3	.798	13.299	76.931
4	.683	11.383	88.314
5	.399	6.650	94.965
6	.302	5.035	100.000

However, despite the fact that the dataset included less than 30 variables, the communalities after extraction were not greater than 0.7 (see Appendix 3), so Kaiser's recommendation may not be accurate for this dataset. Inspection of the scree plot (see Figure 1) suggests that a three factors solution might be more appropriate. So, both a two factors model and a three factors models were extracted.

Figure 1.



The two factors models explained a total of 64% of the variance, about two thirds of which was explained by the first factor (see Table 2). Factor 1, which can be called 'Mental well-being', consisted of the items 'Pleasure in life', 'Social networks', and 'Emotional well-being' (see Table 3). Factor 2, which can be called 'Everyday functionality', consisted of the items 'Daily Living Skills', 'Physical health', and 'Managing Finances'. However, the two factors solution presented a high proportion (80%) of nonredundant residuals with absolute values higher than 0.5, which is a source of concern for how well the model fits the data.

Table 3. Rotated Component Matrix[a]

Items	Component	
	1	2
PinL_Before	.870	.169
EW_Before	.752	-.068
SN_Before	.740	.132
DLS_Before	.227	.841
MF_Before	-.147	.799
PH_Before	.453	.523

Notes. Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 3 iterations.

The three factors solution had also a KMO statistic of .632 and the Barlett's test was highly significant. The model explained 76% of the variance. The proportion of nonredundant residuals decreesed to 60%, which, however, is still high and so a source of concern for how well the model fits the data.

Table 4 shows that the three factors were:

- Factor 1, 'Mental well-being', which consisted of the items 'Pleasure in life', 'Social networks', and 'Emotional well-being'.
- Factor 2, 'Functional abilities', which consisted of the items 'Physical health' and 'Daily Living Skills'.
- Factor 3, 'Living standard', which consisted of the item 'Managing Finance'.

The orthogonal rotation and the oblique rotation offered very similar results, so the Varimax method was preferred and is reported down here (see Table 4).

Table 4. Rotated Component Matrix[a]

	Component		
	1	2	3
PinL_Before	.867	.233	.066
SN_Before	.827	-.005	.190
EW_Before	.684	.232	-.229
PH_Before	.199	.905	.005
DLS_Before	.141	.668	.561
MF_Before	.002	.071	.930

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 4 iterations.

Reliability

Cronbach's alpha was calculated for both the 'Mental well-being' (.725) and the 'Everyday functionality' (.597) subscales identified by the first factor analysis (the Cronbach's alpha for the questionnaires administered after the intervention was higher for the component 'Mental well-being', .860, but not for the component 'every day functionality,.578). In both cases it was suggested that removing some of the items would have increased the overall alpha, indicating that not all items positively contributed to the overall reliability. However, even deleting the items did not cause alpha to become greater than 0.8, which is the prescribed optimal value for a scale to be reliable.

Detecting change

Because the six items violated the assumption of normality (see Figure 2), nonparametric Wilcoxon signed-rank tests were used instead of paired t-tests to check whether AGE UK clients reported higher satisfaction in the six life domains after they were delivered relevant interventions. Table 5 shows that the clients reported significantly higher satisfaction in the six life domains after their received the relevant interventions. However, Table 6 shows a high number of ties, that is of clients that did not report any changes in their scores for the six life domains.

Table 5. Wilcoxon Signed Ranks Test

	DLS_After - DLS_Before	MF_After - MF_Before	SN_After - SN_Before	EM_After - EW_Before	PH_After - PH_Before	PinL_After - PinL_Before
Z	-4.835[b]	-5.367[b]	-6.617[b]	-8.008[b]	-5.157[b]	-6.852[b]
Asymp. Sig. (2-tailed)	.000	.000	.000	.000	.000	.000

b. Based on negative ranks.

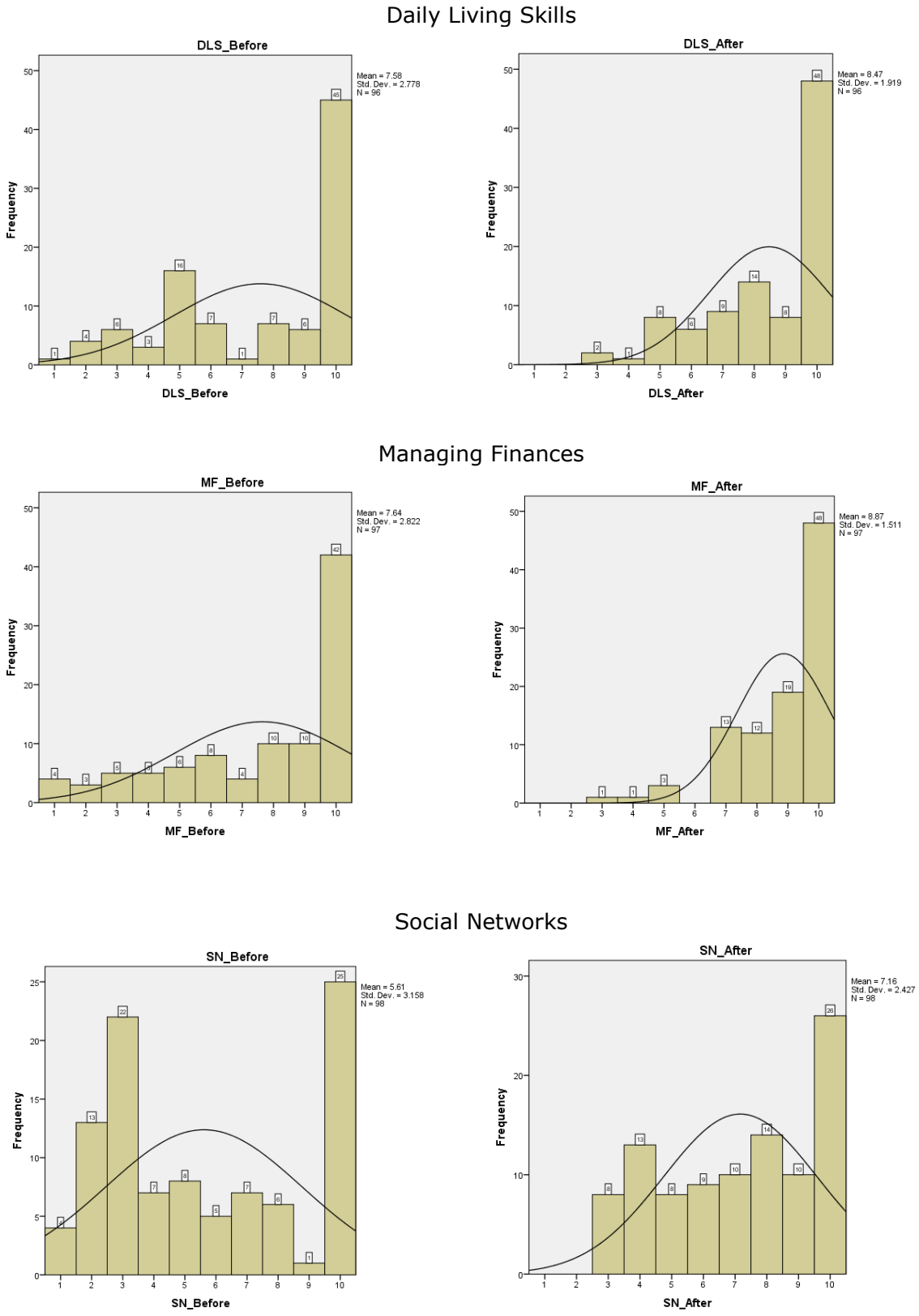
Table 6. Ranks

		N	Mean Rank	Sum of Ranks
DLS_After - DLS_Before	Negative Ranks	0[a]	.00	.00
	Positive Ranks	30[b]	15.50	465.00
	Ties	66[c]		
	Total	96		
MF_After - MF_Before	Negative Ranks	1[d]	19.00	19.00
	Positive Ranks	40[e]	21.05	842.00
	Ties	56[f]		
	Total	97		
SN_After - SN_Before	Negative Ranks	0[g]	.00	.00
	Positive Ranks	57[h]	29.00	1653.00
	Ties	41[i]		

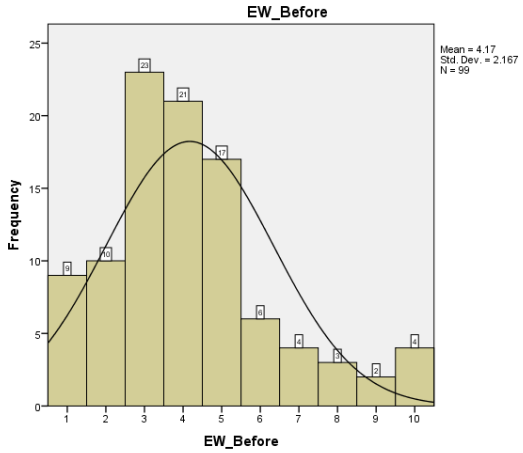
		N	Mean Rank	Sum of Ranks
	Total	98		
EM_After - EW_Before	Negative Ranks	0[j]	.00	.00
	Positive Ranks	84[k]	42.50	3570.00
	Ties	15[l]		
	Total	99		
PH_After - PH_Before	Negative Ranks	0[m]	.00	.00
	Positive Ranks	34[n]	17.50	595.00
	Ties	59[o]		
	Total	93		
PinL_After - PinL_Before	Negative Ranks	0[p]	.00	.00
	Positive Ranks	61[q]	31.00	1891.00
	Ties	32[r]		
	Total	93		

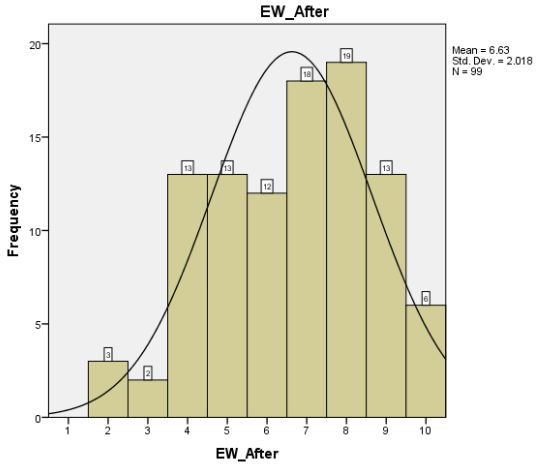
Notes. a. DLS_After < DLS_Before b. DLS_After > DLS_Before c. DLS_After = DLS_Before d. MF_After < MF_Before e. MF_After > MF_Before f. MF_After = MF_Before g. SN_After < SN_Before h. SN_After > SN_Before i. SN_After = SN_Before j. EM_After < EW_Before k. EM_After > EW_Before l. EM_After = EW_Before m. PH_After < PH_Before n. PH_After > PH_Before o. PH_After = PH_Before p. PinL_After < PinL_Before q. PinL_After > PinL_Before r. PinL_After = PinL_Before

Figure 2. Histograms of the six items of the 'Leaf' questionnaire

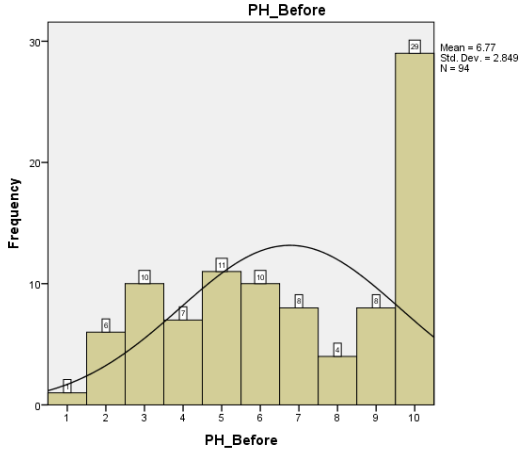


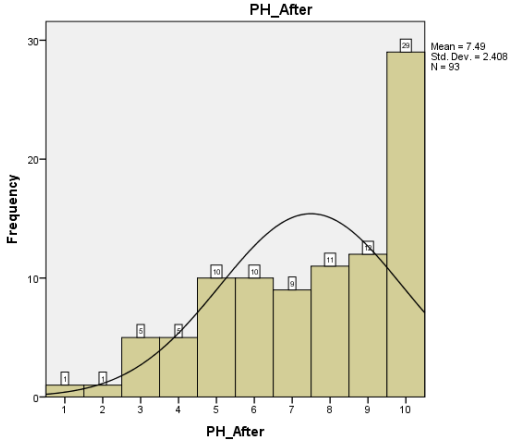
Emotional Wellbeing



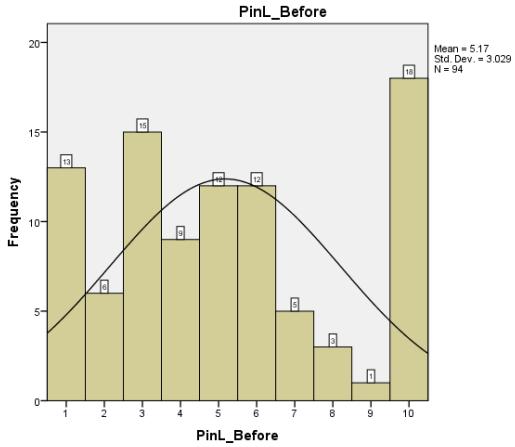


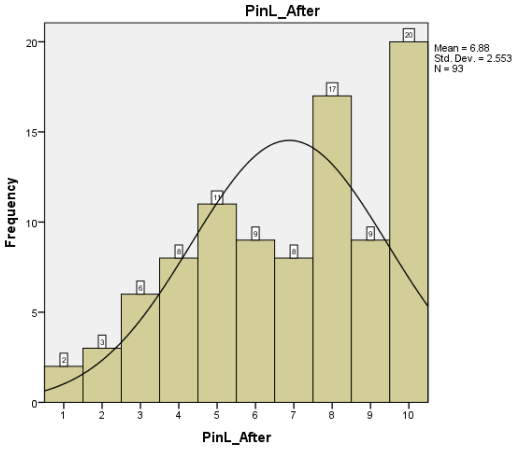
Physical Health





Pleasure in Life





5. Discussion and recommendations

The first phase of the validation of the 'Leaf' questionnaire aimed to undertake all possible relevant validation analyses of this measurement tool using the answers collected from 99 older people interviewed at two points in time: before and after the delivery of specific AGE UK services.

The analyses returned three main findings:

- The current version of the 'Leaf' questionnaire presents significant ambiguities in the way the questions are worded and the 10 points ladders are labelled.
- The six items of the 'Leaf' questionnaire do not represent a scale that measure one single underpinning construct. However, they tap on three main constructs, which can be called 'Mental well-being', 'Functional abilities', and 'Living standard'. Only the three items that measure the construct 'Mental well-being' showed the potential to represent a short scale. On the other hand, the constructs 'Functional abilities' and 'Physical health' were measured respectively by two items and one item and so did not represent scales. Overall, single items tend to be less reliable than measurement scales to assess specific life domains.
- The 'Leaf' questionnaire recorded an improvement of the clients' satisfaction after the delivery of the interventions. However, no inference could be made in relation to whether such change was caused by the services delivered by AGE UK because the questionnaire was not administered to a control group.

Overall, this first phase of the evaluation of the 'Leaf' questionnaire has shown the potential of this questionnaire and it is recommended to proceed with the second phase of the validation.

Key recommendations for the second phase of the validation of the 'Leaf' questionnaire are:

- The six items need to be reworded in such a way to remove all sources of ambiguity, which represent a threat to the validity of the questionnaire. With regard to this, it is suggested that the exemplifying questions listed underneath each of the six items are not used to explain the main items to the clients. Their current use as explanations for the main items during the administration of the questionnaire represents a major source of ambiguity with regard to what questions the clients are actually answering. Each of the six main questions of the 'Leaf' questionnaire should be self-explaining, if further examples are needed to clarify them, then this means that the questions are still significantly vague/ambiguous.

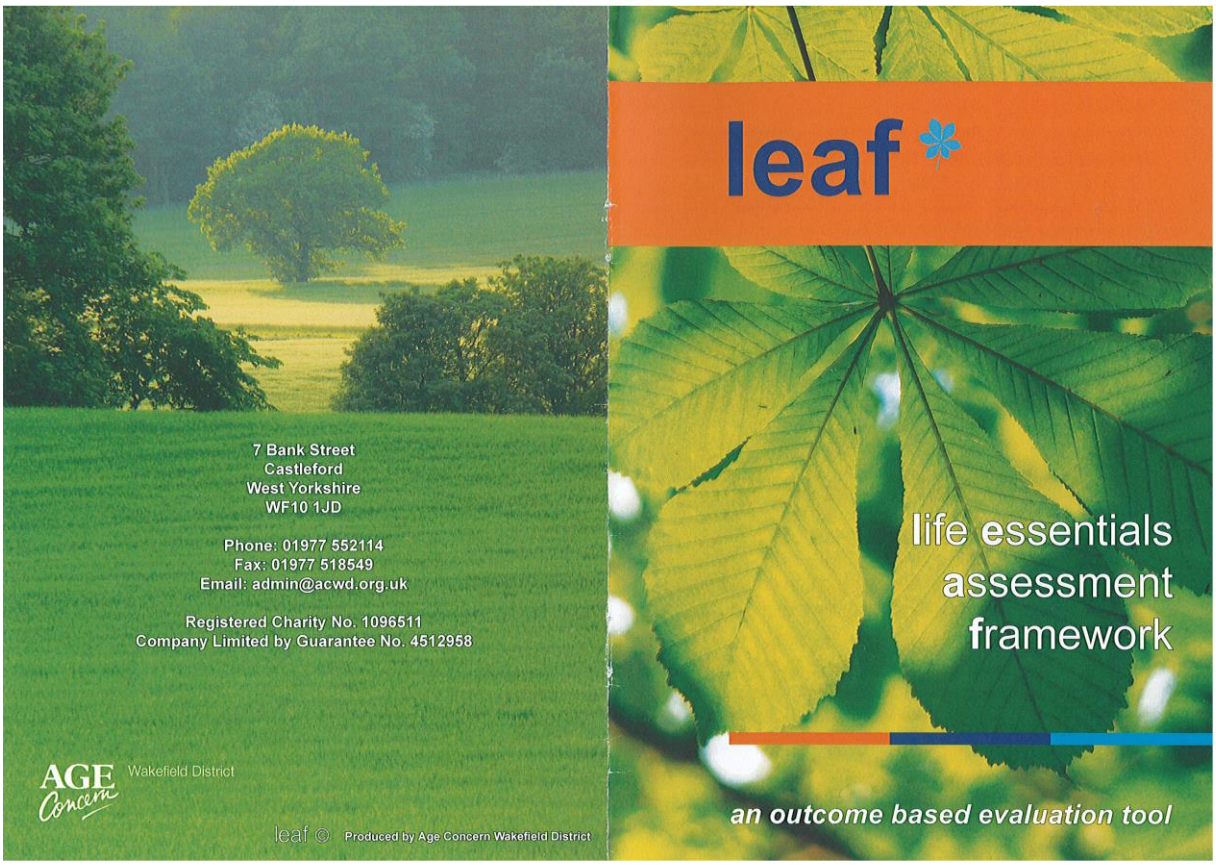
- It is important to decide what is the overall goal of the 'Leaf' questionnaire. If its main aim is to measure change in relation to a number of aspects of the life of AGE UK clients which are all deemed essential, despite the fact that they may be unrelated to each other, e.g. 'Managing finances', then the findings that the six items of 'Leaf' do not represent a scale should not be of concern.

  However, this does not exclude that each of the three life domains identified through the Principal Component Analysis, i.e. 'Mental well-being', 'Functional abilities', and 'Living standard', can be measured through short, valid and reliable scales, especially considering that single items tend to be less reliable than measurement scales to assess specific life domains. With regard to this, as mentioned, three items of the 'Leaf' questionnaire already present the potential to be a short scale for the measurement of the construct 'Mental well-being'. It is suggested that two short scales could be created for the two other constructs, i.e. 'Functional abilities' and 'Living standard', using the explanatory questions (currently listed underneath each item) as complementary items. Because each of these explanatory questions are strictly related to the items that they intend to exemplify, they may be used as questions tapping on those same constructs.
- There is the need to undertake further tests of the reliability (e.g. measures of stability) and validity of the 'Leaf' questionnaire. For example:
    - Test-retest reliability, which entails the comparison of the 'Leaf' questionnaires to other, already validated questionnaires and scales that aim to measure similar constructs.
    - Construct validity, which entails the formulation of specific hypothesis to test whether 'Leaf' allows researchers to make accurate inferences about Age UK clients.
- The 'Leaf' questionnaire should be administered to a control group to help establishing causal links between AGE UK interventions and the change that the 'Leaf' questionnaire records between different points in time.
- Finally, it is recommended to adopt a simpler way to record the data collected through the questionnaire. Currently the data is recorded in an Excel spreadsheet using letters instead of numbers. It is suggested to record the scores of the clients on each question using numbers, not letters, which cannot be used to undertake any statistical calculation.

References

Field, A. (2005) *Discovering statistics using SPSS*, London: Sage.

Appendix 1 - The 'Leaf' questionnaire



Welcome

Welcome to **leaf,** the **l**ife **e**ssentials **a**ssessment **f**ramework, that has been devised by Age Concern Wakefield District to enable you to help evaluate the client's needs, establish the effectiveness of your services and develop an individual action plan for the client to bring about positive change.

leaf covers the areas of life essential to positive living for vulnerable adults in a variety settings and circumstances. The assessment tool and action plan are designed to be used in one-to-one and group settings, the areas of greatest need can be established and goals set for change.

The assessment process is designed to be revisited in order to review progress and reset goals. It is a mechanism for encouraging the confidence of the client and ensuring that where unexpected change has taken place that altered needs are captured and reassurances given.

The tool is designed to take both service providers and the client on a positive partnership journey. It is essential that those delivering the assessment tool are trained in its use and the understanding of the client's needs.

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Path 6 - Pleasure in Life	9

Overview of the Paths

The Paths for each of the six areas to be reviewed are shown below, some relate to areas where the client has difficulties, others may not be a problem at all.

Each Path has ten steps, the client will be asked, on a scale of 1-10, where they believe that they fit on the path at the time of the review. The service provider and the client will then work together to find where they fit on the path, according to the statements which are located at different points on the Path.

Path 1 - Daily Living Skills

This Path is about whether you manage independently on a day-to-day basis, or whether you are at a stage where you need some assistance.

Path 2 - Managing Finances

This Path is about how you manage your day-to-day finances and personal administration. It asks if you are confident in all of these tasks or whether there are particular areas, eg filling in forms, that you need some assistance with.

Path 3 - Social Networks

This Path is about how content you are with your social networks and relationships. It asks if you are content in the relationships that you have or if you would like to expand your social network.

Path 4 - Emotional Wellbeing

This Path is about your general wellbeing. Are you content on a day-to-day basis? Are there things that you would like to change that will affect your emotional wellbeing?

Path 5 - Physical Health

This Path asks how your physical health impacts on your life and how well you look after your own health. Do you lead a healthy lifestyle? How well do you manage any illness that you may have?

Path 6 - Pleasure in Life

This Path asks if you find the things you do are both interesting and satisfying.

Path 1 - Daily Living Skills

On a scale of 1 to 10 - how able are you to manage day-to-day in your home?

For example:

- In an average day can you manage to get out of bed and get washed?
- Can you get the shopping in that you need?
- Are you able to cook yourself a full meal?
- Are you able to move around your home easily? Can you clean and tidy your house?

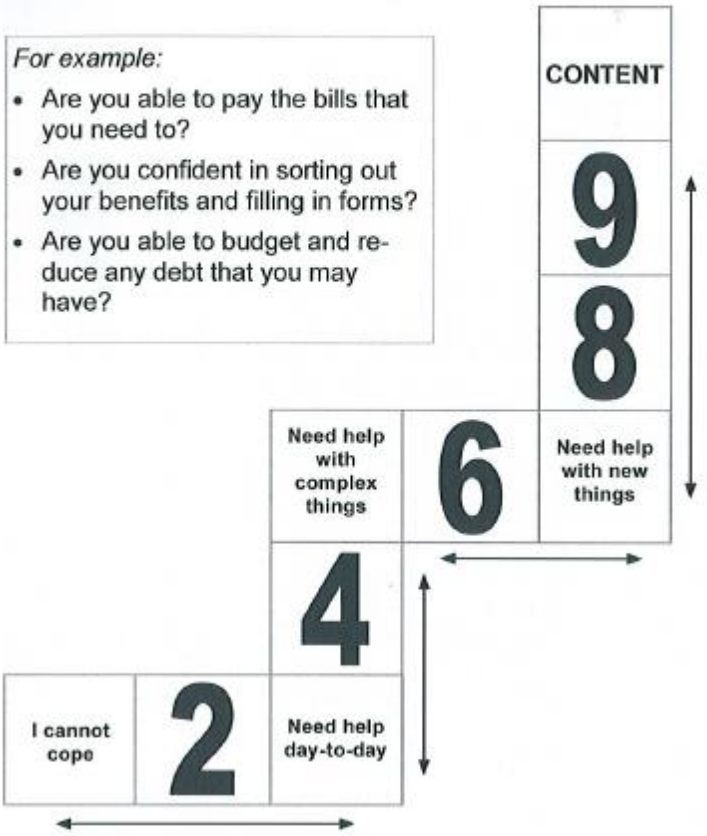
- 4 -

Path 2 - Managing Finances

On a scale of 1 to 10 - how well do you deal with your day to day finances?

For example:

- Are you able to pay the bills that you need to?
- Are you confident in sorting out your benefits and filling in forms?
- Are you able to budget and re-duce any debt that you may have?

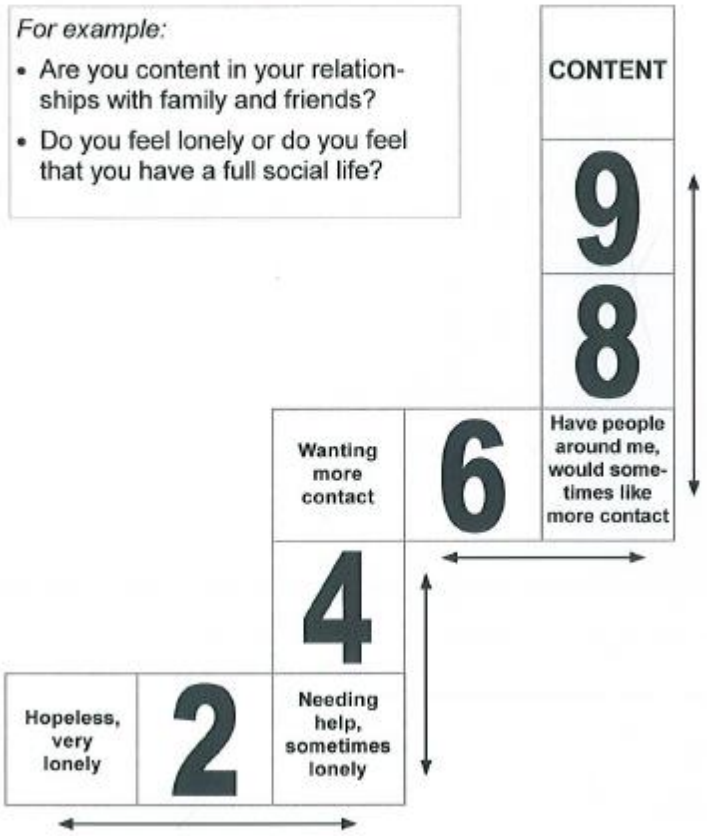


Path 3 - Social Networks

On a scale of 1 to 10 - how content are you with your social networks and relationships?

For example:

- Are you content in your relationships with family and friends?
- Do you feel lonely or do you feel that you have a full social life?



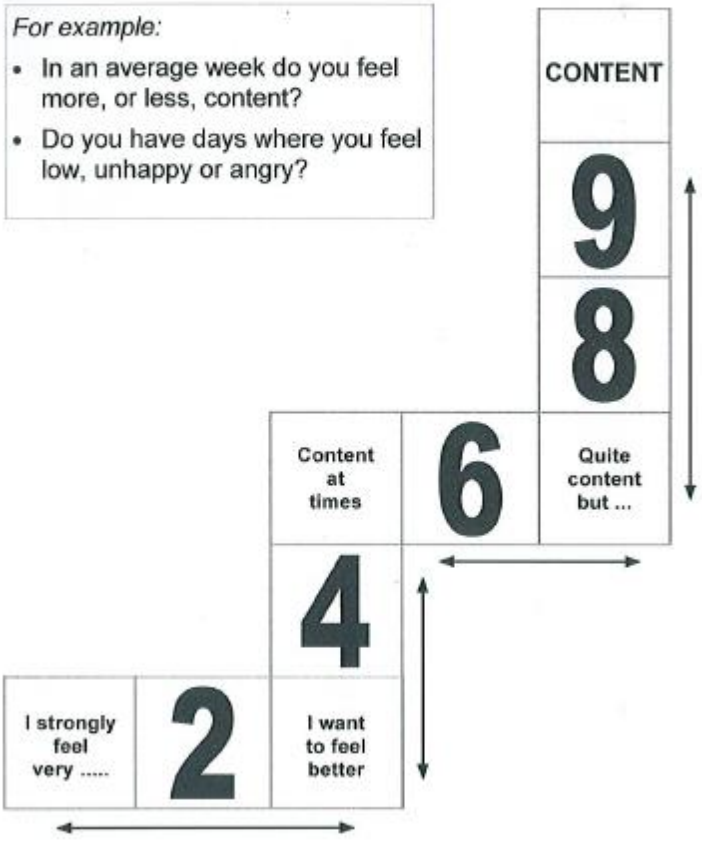
- 6 -

Path 4 - Emotional Wellbeing

On a scale of 1 to 10 - how do you feel in an average week?

For example:

- In an average week do you feel more, or less, content?
- Do you have days where you feel low, unhappy or angry?



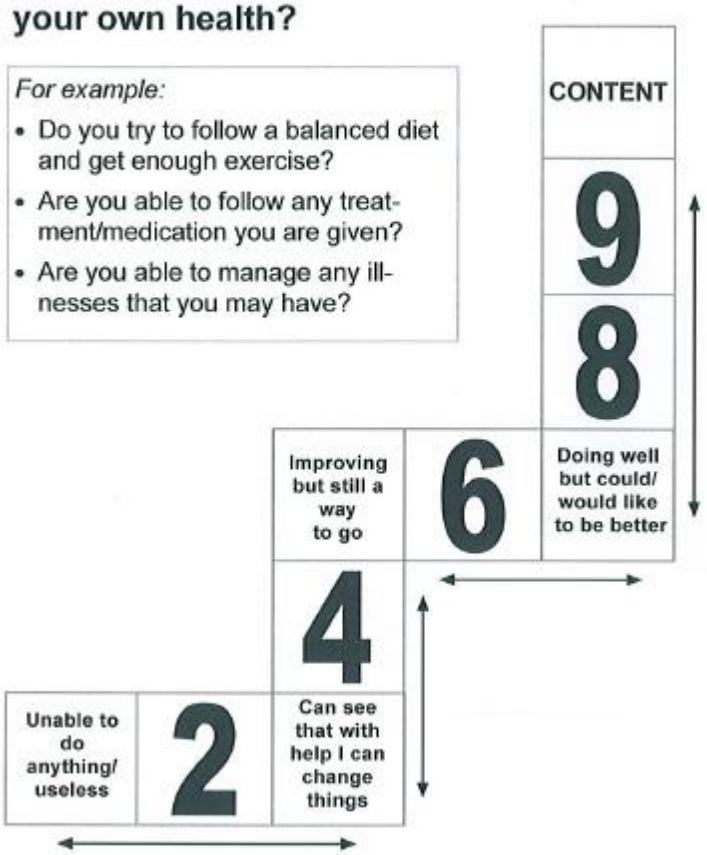
- 7 -

Path 5 - Physical Health

On a scale of 1 to 10 - how does your physical health affect your life and how well do you look after your own health?

For example:

- Do you try to follow a balanced diet and get enough exercise?
- Are you able to follow any treatment/medication you are given?
- Are you able to manage any illnesses that you may have?



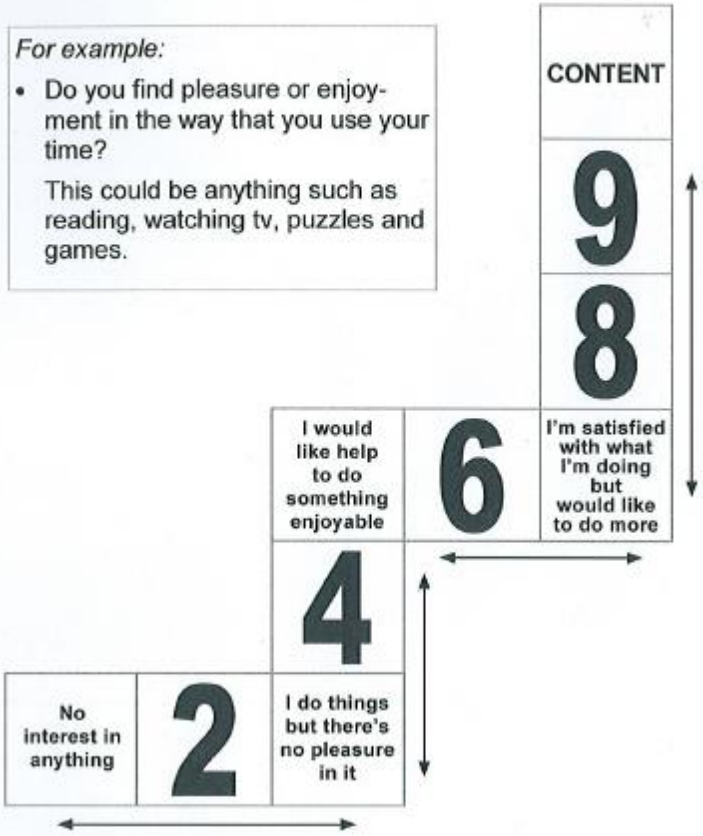
Path 6 - Pleasure in Life

On a scale of 1 to 10 - do you find the things you do are interesting and satisfying?

For example:

- Do you find pleasure or enjoyment in the way that you use your time?

  This could be anything such as reading, watching tv, puzzles and games.



Appendix 2 – Descriptive statistics

		DLS_Before	MF_Before	SN_Before	EW_Before	PH_Before	PinL_Before
N	Valid	96	97	98	99	94	94
	Missing	3	2	1	0	5	5
Mean		7.58	7.64	5.61	4.17	6.77	5.17
Std. Error of Mean		.284	.287	.319	.218	.294	.312
Median		9.00	9.00	5.00	4.00	7.00	5.00
Mode		10	10	10	3	10	10
Std. Deviation		2.778	2.822	3.158	2.167	2.849	3.029
Variance		7.719	7.962	9.972	4.695	8.117	9.175
Skewness		-.676	-.955	.275	.917	-.243	.351
Std. Error of Skewness		.246	.245	.244	.243	.249	.249
Kurtosis		-.985	-.352	-1.472	.772	-1.339	-1.035
Std. Error of Kurtosis		.488	.485	.483	.481	.493	.493
Range		9	9	9	9	9	9
Minimum		1	1	1	1	1	1
Maximum		10	10	10	10	10	10

		DLS_After	MF_After	SN_After	EW_After	PH_After	PinL_After
N	Valid	96	97	98	99	93	93
	Missing	3	2	1	0	6	6
Mean		8.47	8.87	7.16	6.63	7.49	6.88
Std. Error of Mean		.196	.153	.245	.203	.250	.265
Median		9.50	9.00	8.00	7.00	8.00	7.00
Mode		10	10	10	8	10	10
Std. Deviation		1.919	1.511	2.427	2.018	2.408	2.553
Variance		3.683	2.284	5.891	4.073	5.796	6.518
Skewness		-1.060	-1.580	-.309	-.294	-.636	-.442
Std. Error of Skewness		.246	.245	.244	.243	.250	.250
Kurtosis		.106	2.555	-1.293	-.682	-.642	-.847
Std. Error of Kurtosis		.488	.485	.483	.481	.495	.495
Range		7	7	7	8	9	9
Minimum		3	3	3	2	1	1
Maximum		10	10	10	10	10	10

Appendix 3 - Principal component analysis

Correlation Matrix[a]

		DLS_Before	MF_Before	SN_Before	EW_Before	PH_Before	PinL_Before
Correlation	DLS_Before	1.000	.447	.223	.151	.483	.290
	MF_Before	.447	1.000	.070	-.054	.112	.080
	SN_Before	.223	.070	1.000	.296	.255	.618
	EW_Before	.151	-.054	.296	1.000	.228	.534
	PH_Before	.483	.112	.255	.228	1.000	.379
	PinL_Before	.290	.080	.618	.534	.379	1.000
Sig. (1-tailed)	DLS_Before		.000	.018	.077	.000	.003
	MF_Before	.000		.255	.307	.146	.227
	SN_Before	.018	.255		.002	.008	.000
	EW_Before	.077	.307	.002		.015	.000
	PH_Before	.000	.146	.008	.015		.000
	PinL_Before	.003	.227	.000	.000	.000	

a. Determinant = .219

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.632
Bartlett's Test of Sphericity	Approx. Chi-Square	130.863
	df	15
	Sig.	.000

Anti-image Matrices

		DLS_Before	MF_Before	SN_Before	EW_Before	PH_Before	PinL_Before
Anti-image Covariance	DLS_Before	.599	-.307	-.028	-.026	-.275	-.027
	MF_Before	-.307	.774	.003	.090	.086	-.023
	SN_Before	-.028	.003	.614	.034	-.004	-.283
	EW_Before	-.026	.090	.034	.702	-.017	-.250
	PH_Before	-.275	.086	-.004	-.017	.693	-.107
	PinL_Before	-.027	-.023	-.283	-.250	-.107	.450
Anti-image Correlation	DLS_Before	.601[a]	-.451	-.046	-.040	-.426	-.052
	MF_Before	-.451	.492[a]	.005	.122	.117	-.038
	SN_Before	-.046	.005	.666[a]	.052	-.006	-.539
	EW_Before	-.040	.122	.052	.674[a]	-.024	-.445
	PH_Before	-.426	.117	-.006	-.024	.685[a]	-.192
	PinL_Before	-.052	-.038	-.539	-.445	-.192	.630[a]

a. Measures of Sampling Adequacy(MSA)

Communalities

	Initial	Extraction
DLS_Before	1.000	.759
MF_Before	1.000	.660
SN_Before	1.000	.565
EW_Before	1.000	.570
PH_Before	1.000	.479
PinL_Before	1.000	.786

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.466	41.108	41.108	2.466	41.108	41.108	2.148	35.800	35.800
2	1.351	22.524	63.632	1.351	22.524	63.632	1.670	27.833	63.632
3	.798	13.299	76.931						
4	.683	11.383	88.314						
5	.399	6.650	94.965						
6	.302	5.035	100.000						

Extraction Method: Principal Component Analysis.

Reproduced Correlations

		DLS_Before	MF_Before	SN_Before	EW_Before	PH_Before	PinL_Before
Reproduced Correlation	DLS_Before	.759[a]	.639	.279	.113	.543	.339
	MF_Before	.639	.660[a]	-.003	-.165	.351	.007
	SN_Before	.279	-.003	.565[a]	.547	.404	.666
	EW_Before	.113	-.165	.547	.570[a]	.305	.643
	PH_Before	.543	.351	.404	.305	.479[a]	.483
	PinL_Before	.339	.007	.666	.643	.483	.786[a]
Residual[b]	DLS_Before		-.192	-.056	.038	-.059	-.050
	MF_Before	-.192		.074	.111	-.239	.073
	SN_Before	-.056	.074		-.252	-.149	-.048
	EW_Before	.038	.111	-.252		-.077	-.109
	PH_Before	-.059	-.239	-.149	-.077		-.103
	PinL_Before	-.050	.073	-.048	-.109	-.103	

Extraction Method: Principal Component Analysis.

a. Reproduced communalities

b. Residuals are computed between observed and reproduced correlations. There are 12 (80.0%) nonredundant residuals with absolute values greater than 0.05.