Individualized measurement of quality of life in older adults: development and pilot testing of a new tool

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Abstract We describe theoretical background, development, and piloting of a measure for quality of life in older adults that specifically takes into account the subjective perspective. Although quality of life is usually subjectively assessed, normative thresholds for “the good life” are most often set by a third party. The new tool FLQM asks for respondents to name, rate, and weight those domains in life that are most important for their life-satisfaction solely from their own point of view. Construct validity was pilot-tested in two samples of elders ($N_1 = 44$; $N_2 = 90$). Correlations were in the medium range in both studies and support the questionnaire’s validity. There were no age or gender differences on total score. However, in Study 1 as well as in Study 2 older subjects named significantly fewer domains than did younger participants. Further, in Study 1 the overall number of distinct domains generated by the participants diminished with age—the “interindividual pool of domains” shrank. Implications of this age-associated narrowing of domainscope are discussed on a background of adaptation theories. Concluding, the new questionnaire seems apt to assess older peoples’ quality of life even in a physically very ill population, but needs further testing, especially regarding its reliability. This is currently being undertaken in a larger longitudinal sample to assure psychometric properties.

Keywords Life-satisfaction · Quality of life · Validation study · Old age · Assessment

Quality of life in the aged

The quest for “the good life” is widely spread in gerontological research. Quality of life is also undoubtedly one of the most often utilized indicators in geriatric medicine, rehabilitation, and nursing. Here it serves primarily as an outcome criterion and/or regulatory index for treatment and care. There are two main concepts that need to be differentiated: “quality of life” as the umbrella term and the narrower “health-related quality of life,” which refers to those aspects directly associated with individual health or correlates of health (Bowling 1997; Guggenmoos-Holzmänn et al. 1995).

Appealing as it sounds to use the quality of a person’s life as an outcome criterion, it proves quite difficult to find a consensus on how exactly this “quality” should be operationalized. Despite all ambiguity and diversity in concepts, there is a certain agreement that quality of life (in its totality) is a multidimensional construct (Baltes and Baltes 1990; Guggenmoos-Holzmänn et al. 1995; Lawton 1991; WHOQoL Group 1995). Facets of social integration, health, economy, mobility, but also emotional well-being are included in more elaborate measures of quality of life.

The understanding of what constitutes a “good life” is to a large degree determined by two factors: socio-cultural traditions and norms on the one hand and an increasing knowledge about bio-physiological ontogenesis and its potentials and limits on the other (cf. Baltes 1997; Rowe and Kahn 1998). In many measurement tools norms and standards for a high versus a low quality of life are only accessible in that a high quality of life equals “full score”—but domains and dimensions on which to score have been set by test-developers. This approach is difficult to bring in line with the factual individual and inherently

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subjective view on quality of life that every older person holds. The subjective experience of aging goes hand in hand with processes of cognitive-emotional adaptation within the individual's goal and value system (Brandtstädter and Rothermund 2002; Carstensen et al. 2003). Especially in old age, subjective views on age and aging and normative ideas about age-adequate development are of critical importance for an evaluation of one's own situation in life (Heckhausen et al. 1989; Rothermund 2005; Wurm et al. 2008). As these individual normative ideas tend to show a great heterogeneity, the individual appraisal of a situation initiates a differential, highly individual reaction that is largely independent of the factual circumstances (Headey et al. 1991). Put into a pragmatic frame: if the aim of a given intervention is to foster an individual's quality of life, his or her very own perceptions and experiences of this very construct need to be integrated—the patient's view is an irreplaceable source of differential information.

In recent years, the patient's subjective perspective on quality of life has been more and more acknowledged in theoretical and empirical debate. So-called “patient-generated indices” are the spearhead of a whole array of measurement tools that derive judgements about quality of life from a more or less subjective basis (Fitzpatrick 1999; Garratt et al. 2002). There are several reasons for this shift: A stronger emphasis on “empowerment,” denoting increased patient participation within health-care settings (Brown and Gordon 2004); the interpretation of well-being as a directly assessable indicator of overall quality of life (Veenhoven 2000); the increasing acknowledgement of response shift (i.e., changes over time in individual definition and reference standards regarding subjective quality of life judgements) as a critical phenomenon in the interpretation of individual trajectories of quality of life (Schwartz and Sprangers 2000)—to name but the most prominent.

Subjective psychological factors that are important to overall quality of life are often divided into a “cognitive” and an “emotional” component (Diener and Lucas 2000). The emotional component refers to the affective aspects of well-being (“feeling” good or bad), while the cognitive one refers to conscious evaluations of life (“judging” life as good or bad). The focus of this study lies on the cognitive component.

Within our approach, quality of life is conceptualized in exclusively subjective terms as life-satisfaction, i.e., the degree of overlap between one's own goals/standards and subjective fulfilment of these standards. Subjective life-satisfaction shows a differential structure of content, though the mechanisms that lead to a given level of satisfaction are thought to be universal ones (Schwarz and Strack 1991; Campbell et al. 1976; Diener and Lucas

1999). Global life-satisfaction in this model is derived from an integration of domain-specific satisfactions. These domains are thought to be more or less universal ones, thus allowing generalization or the use of fixed domains for every respondent within a given operationalization or measurement-model. If this simplification is justified, is at least debateable.

Individual satisfaction and well-being are not only results of a complex interplay of circumstances and their subjective interpretation, but also have the big advantage to be amenable to direct assessment (Diener and Suh 1997; Veenhoven 2000). Also, from a very basic ethical perspective it seems adequate to first ask a person for a judgement about his or her well-being, before referring to other means to judge about a life's quality (cf. O'Boyle 1997). Nonetheless, objective circumstances, abilities, limits, and conditions have a marked influence on a person's overall quality of life. The objective (“quality of circumstances”) versus the subjective perspective (“quality of experience”) tap into very different aspects of the construct—with differential meaning and utility within a complex picture.

There are at least two established questionnaires that attempt to assess quality of life in an individualized way: the Schedule for the Evaluation of Individual Quality of Life (SEIQoL; Joyce et al. 2003) and the Patient Generated Index (PGI; Ruta et al. 1994). “Individualized” in their case refers to the approach to let respondents define by themselves those domains that are crucial to their quality of life and let them rate and weight these with respect to satisfaction and importance. “Quality of life,” thus, is operationalized in terms of life-satisfaction. There are, however, some drawbacks about these tools that might render them problematic for older people. First, the PGI is merely deficit-oriented—participants are solely asked to name domains that are negatively affected by their health. There is no room for positive aspects and resources that may add to quality of life and life-satisfaction (Ryff and Singer 1998). This implies that maximum quality is achieved when minimal health-affectations and functional limitations are experienced (cf. Rowe and Kahn 1998), by definition forbidding most elders to experience a high quality of life (Strawbridge, Wallhagen and Cohen 2002). Second, the processes of rating and especially weighting the domains are highly complex in both the SEIQoL and PGI, and seem not to be age-adequate (Macduff and Russell 1998; Smith et al. 2000; Tully and Cantrill 2000). Third, despite a focus on disability and health problems both scales have been developed primarily in and for younger age-cohorts—wording and content of instructions probably do not fit the capacities and situation of old and very old people. At least for the SEIQoL, there is some evidence for validity in healthy older people (Browne et al.

1994), but only very weak for those with mild dementia (Coen et al. 1993). It seems apt to further simplify and shorten the procedures and supply a specifically age-adequate interpretation of the general individualized approach. This could serve as an important source of information for personnel within the health- and nursing-care system to facilitate patient-oriented treatment and care (Macduff 2000; Mountain et al. 2004; Patel et al. 2003).

Based on Campbell's model of domain-specific and global life-satisfaction (Campbell et al. 1976) and with reference to Ruta's and Joyce's methodological approaches (Joyce et al. 2003; Ruta et al. 1994), a new questionnaire for quality of life in older adults was designed and pilot tested: the FLQM (original German title: *Fragebogen zur Lebensqualität multimorbider älterer Menschen*; English: Quality of life in elders with multiple morbidities; see Appendix).

Method

A new measure—the FLQM

Within the approach pilot-tested in our studies, quality of life is conceptualized in exclusively subjective terms as life-satisfaction, i.e., the degree of overlap between one's own goals/standards and subjective fulfilment of these standards in individually generated life-domains (see Appendix).

In a first step, respondents freely generate around five life-domains that are most important to their overall life-satisfaction in a positive or negative way. To ease this relatively complex cognitive task, a list of examples of varying abstractness is included in the instructions. These examples are not meant to represent an exclusive list of domains, but to give an idea of possible scope and abstractness, “open up the field,” and incite respondents to generate personally relevant domains. In a second step, domain-specific satisfactions are rated on a six-point Likert-scale (ranging from 1 “There is hardly anything to improve” to 6 “It could hardly be worse”). Last, the relative importance of each domain is rated on a six-point scale (ranging from 1 “Among the most important things in my life” to 6 “Not important compared to the other domains”). For final overall scoring, these two ratings are inversely recoded (1 = 6, etc.) to indicate a more favorable outcome by higher values. A global score for life-satisfaction is calculated as a sum-of-products (Σ domain-specific satisfaction * domain-specific weight), corrected by the individual sum of weights (Σ domain-specific weights). This score has a theoretical range of 1–6 with lower scores indicating lower satisfaction.

Study 1

Pilot study design and sample

In a pilot study (Study 1), first evidence for construct validity of the FLQM was gathered. The sample consisted of $N = 44$ older persons (age-range: 65–96 years; women: $n = 33$; men: $n = 11$) recruited from home-care service clients in the city of Berlin. Those were handed out an information leaflet by their respective home-care assistant that gave a brief overview over the planned study and asked for voluntary phone-contact with the investigator for more detailed information and appointments for data-collection. Altogether, 134 clients were approached, there were 47 call-backs, out of which 44 agreed to participate (equaling a response rate of 32.8%). Respondents were cognitively not impaired (inclusion criterion by MMSE-screening: ≥ 21 points; Folstein et al. 1975) and suffered from at least four self-reported diseases. To assess these, participants were asked to freely list all their current diseases that were treated or, according to participants, would need professional treatment (cf. Table 1). All the participants gave their informed consent prior to inclusion.

The FLQM was administered along with a range of questionnaires relating to convergent constructs to be able to attain an estimation of construct validity: Philadelphia Geriatric Centre Morale Scale (PGCMS; Lawton 1975) was used to assess overall subjective well-being, positive and negative affect were assessed by the PANAS scales (Watson et al. 1988), subjective physical and psychological functioning by the SF-36 (Ware and Sherbourne 1992), and global life-satisfaction by a single item (“Taken all things together, how satisfied are you with your life?,” rated on a six-point Likert-scale). All questionnaires were read to respondents aloud; they were handed a copy of the FLQM and could read themselves while the FLQM was simultaneously read to them. Interviewer bias was being controlled

Table 1 Characteristics of samples in Studies 1 and 2

	Min.	Max.	Median	M	SD
Study 1 ^a ($n = 44$)					
Age	65	96	77.00	77.80	8.09
Self-reported diseases	4	9	4.00	4.66	1.01
Study 2 ^b ($n = 90$)					
Age	65	94	76.00	76.46	7.20
Self-reported diseases	0	11	3	3.79	2.29

^a $n(\text{female}) = 33$; $n(80+ \text{ years}) = 14$; free account of diseases; inclusion criterion: minimum of 4 diseases

^b $n(\text{female}) = 37$; $n(80+ \text{ years}) = 32$; list of 28 specific diseases (following CIRS-G; Miller and Towers 1991); no minimum number of diseases as inclusion criterion

by rigid standard operating procedures (SOPs) for all administered tests and questionnaires. Interviewer training and supervision assured interview quality. All interviewing was done by one trained interviewer.

Additionally, 21 out of the 44 respondents completed a brief cognitive questionnaire (“meta-questionnaire”) about their evaluation of the procedure and possible problems they encountered with the FLQM. Questions related to length of the questionnaire (“How did you experience the length of this questionnaire?”), semantic understanding (“Did you find the instructions regarding the steps of questionnaire administration easily understandable?”), task-complexity (“How did you experience the difficulty of this task?”), and the FLQM rating scales (“How did you get along with the school-grade rating scales?”). Answers were given on three-point scales. This questionnaire was included to assure appropriateness of the new measure FLQM and track possible sources of misunderstanding or barriers for completion. Every other respondent, starting with the second one, was asked to fill in the extra questionnaire. The last participant refused to do so, resulting in 21 instead of 22 completed questionnaires.

Analyses

Life-domains generated by the participants were recorded on paper by the interviewer in Study 1. The notes were read

Table 2 Coding scheme for life-domains freely generated within FLQM

Category
1. Family
2. Own health
3. Friendship
4. Cognitive abilities
5. Mobility and physical functioning
6. Hobbies
7. Social contacts
8. Cultural and aesthetic matters
9. Developing new abilities
10. Own abode
11. (Social) participation
12. Finances
13. Spouse
14. (Social) commitment
15. Well-being and sensual experience
16. Autonomy and self-determination
17. Weltanschauung/philosophy
18. Travel
19. Incontinence/continence

to the respondent, and altered if she/he deemed that necessary to capture what she/he meant. These records were then manually entered into the statistics software. Following this first step, a categorization of the original text was undertaken to facilitate comparisons/to be able to describe and compare frequencies across patients and patient subgroups. Individual domain-content on the FLQM was coded within a scheme of 19 categories to allow better interindividual comparison (see Table 2). These categories were inductively derived from focused interviews in a study conducted prior to this one, in which one interviewer conducted nine in-depth semi-structured qualitative interviews (cf. Flick 2007), which comprised four open-ended questions regarding (1) things that add to and (2) diminish overall quality of life, (3) how participants would define in their own terms “quality of life,” and (4) what was the most important thing in their life. Two coders were trained and achieved very good inter-coder reliability in sample texts prior to Study 1 (determined as coefficient $M = .95$; cf. Gower 1998).

Pearson correlation-coefficients were calculated to explore convergent validity between the FLQM and the other scales related to well-being and health-perceptions. Age-group (65–79 vs. 80+ years) differences in relation to overall FLQM-score were calculated using *t* test, age-group differences in relation to number of life-domains generated using Mann–Whitney U-Test. Correlation between age and FLQM-score was calculated as Pearson-coefficient; correlation between age and number of life-domains, and correlation between number of diseases and FLQM-score were calculated as Spearman-coefficients.

Possible priming effects of the examples given in the instructions were investigated in an exploratory analysis by determining the proportion of overlap between the examples on the list and the individual domains per participant.

We also explored the number of different domains generated, i.e., complexity of the overall domain-system or the “interindividual pool” of domains, across different age-groups. A domain was considered part of the interindividual pool when at least 20% of the participants mentioned the respective domain (recall the relatively small sample size when interpreting numbers). Domains mentioned by less than 20% of the sample (i.e., by only one or two participants in Study 1) were interpreted as being of individual importance only and not included in the interindividual pool. We then descriptively compared the number of different domains in the respective interindividual pools among younger (65–79 years) and older (80+ years) participants.

The “meta-questionnaire” was only analyzed in descriptive terms.

Study 2

Study design and sample

In Study 2, a representative sample of 520 men and women aged 65 years and above was drawn by the local authorities for the district Mitte in Berlin, Germany. Participants were contacted by mail in a two-step procedure (initial invitation letter and reminder). Out of the 520, 4.2% did not respond at all, 5.4% were neutral drop-outs (deceased or invalid address), 69.0% refused to participate, 4.0% ($n = 21$) gave consent only to a brief telephone-administered questionnaire, and 17.3% ($n = 90$) agreed to face-to-face interviewing. Age and gender distribution of the sample are given above in Table 1. All the participants gave informed consent prior to inclusion in the study.

Besides FLQM, brief measures of positive and negative affect (IPANAS; Thompson 2007), a single item concerning global life-satisfaction (*Considering your present overall situation, how satisfied are you with your life?*), the Satisfaction with Life Scale (SWLS; Diener et al. 1985), and the EQ-5D (Greiner et al. 2003) as a measure of health-related quality of life including a self-rating of health on a scale from 0 (“worst imaginable”) to 100 (“best imaginable”), were administered. As in Study 1, these scales aimed at providing an estimation of construct validity.

Number of self-reported diseases was determined by supplying a list of 28 specific diseases relating to major somatic systems (e.g., cardiovascular, gastrointestinal, musculoskeletal, metabolic, and stroke), following the procedure of the Cumulative Illness Rating Scale for Geriatrics (CIRS-G; Miller and Towers 1991). A disease was counted, if it had occurred within the past 4 weeks prior to assessment or if functional capacity was limited due to that disease. Occurrences and functional limitation were collected as self-report. Interviewer bias was being controlled by rigid standard operating procedures (SOPs) for all administered tests and questionnaires. Interviewer training at two occasions and regular supervision assured interview quality. All interviewing was done by one trained interviewer.

This study being part of a larger research undertaking, a number of measures concerning health, physical, and social functioning, as well as socio-economic background, not directly connected with the topic of this research article, were also assessed (cf. Holzhausen et al. submitted).

Analyses

Domains were immediately entered in a computer via a questionnaire interface. Domains were read to the respondent and altered if she/he deemed that necessary to capture what she/he meant. These records were then manually

Table 3 Descriptive statistics: FLQM and scales used for validation in Study 1

	Min.	Max.	Median	M	SD
FLQM-score	2.20	6.00	4.04	4.04	0.75
Global life-satisfaction	3.00	6.00	4.00	4.16	0.75
PANAS					
Positive affect	1.80	4.30	3.20	3.16	0.56
Negative affect	1.00	2.71	1.20	1.46	0.52
PGCMS					
PGCMS total score	1.53	5.00	3.58	3.56	0.74
Non-agitation	1.83	5.00	3.75	3.74	0.87
Attitude toward own aging	1.20	5.00	3.23	3.20	1.01
Life-satisfaction	1.25	5.00	3.75	3.73	0.86
SF-36					
Sum-score physical	11.66	55.82	33.68	32.67	11.32
Sum-score psychological	21.75	68.96	55.18	53.14	10.37

Note: All the scores are raw scores

entered into the statistics software. Following this first step, as in Study 1, a categorization of the original text was undertaken within a scheme of 19 categories to allow better interindividual comparison (see Table 2).

Pearson correlation-coefficients were calculated to underpin convergent validity between the FLQM and the other scales related to well-being and health-perceptions (positive affect, global life-satisfaction, SWLS, and EQ-5D) as well as association with self-rated health (EQ-5D VAS scale). Age-group (65–79 vs. 80+ years) and gender differences in relation to overall FLQM-score were calculated using *t* test, age-group, and gender differences in relation to number of life-domains generated using Mann–Whitney U-Test. Correlation between age and FLQM-score was calculated as Pearson-coefficient; correlation between age and number of life-domains was calculated as Spearman-coefficient. To determine discriminant validity we conducted a median split on the number of self-reported diseases and compared the two groups in terms of differences on FLQM-score by *t* test.

Results

Study 1

Participants named between 3 and 8 important life-domains ($M = 5.5$, median = 5), and on the mean scored $M = 4.0$ ($SD = 0.8$) on the FLQM. This score lies clearly above the theoretical scale mean of 3.5. Administration of the FLQM on average took $M = 18$ min ($SD = 9$ min, Median = 15 min). Descriptive statistics for the FLQM and scales used for validation can be found in Table 3. The FLQM-score approximates normal distribution (cf. Fig. 1).

Fig. 1 Distribution of FLQM raw-scores in Study 1 ($N = 44$)

Correlations between the FLQM and convergent variables expectedly ranged from medium to large coefficients ($r = .30$ to $r = .63$; $P < .05$ –.01; cf. Cohen 1992), thus supporting construct validity (see Table 4). The highest correlation on total scale level (as opposed to subscales) was found between the FLQM-score and global life-satisfaction ($r = .63$, $P < .01$), the lowest between the FLQM-score and negative affect ($r = -.15$, n. s.). There was no correlation between number of self-reported diseases and FLQM-score ($r = .02$, $P = .91$).

Age-group differences in overall FLQM-score were not observed ($t = 0.27$, $df = 42$, $P = .79$). Also, there was no significant correlation between age and overall FLQM-score ($r = .03$, $P = .83$). There was, however, a significant difference between younger and older participants with

respect to number of life-domains: on average, respondents aged between 65 and 79 years on average generated a larger number of individually relevant domains (Median = 6) than did those aged 80 years and older (Median = 5; $Z = -2.33$, $P < .05$). Consequently, age and number of life-domains were significantly negatively correlated ($r = -.46$, $P < .001$).

The mean quotient from number of domains overlapping with the examples provided as part of the instructions and total number of domains per person was $M = 0.5$ ($SD = 0.3$). In other words, on the mean there was an overlap of 54.0% between individual domains and these examples on category-level (not on verbatim level).

Participants did not mention major problems with the FLQM-procedure on the meta-questionnaire and generally deemed FLQM's content and form as easily understandable by their age-group and sufficient for the task: out of the 21 participants who completed the "meta-questionnaire," 20 answered "no" to the question, if they deemed the task a difficult one; 18 stated, the length of the questionnaire was adequate (3 saw it as "too brief"); all the 21 found instructions to be easily understandable; 18 got along well with the school-grades for judgments (3 reported "some difficulties").

In the exploratory analysis regarding number of domains in the interindividual pool of frequently mentioned domains, we found age-group differences on a descriptive level: whereas younger participants (65–79 years) named domains from a variety of 13 with a frequency of $\geq 20\%$, the older ones (80+ years) only named 7 different domains with a frequency of $\geq 20\%$.

Table 4 Correlation-matrix of FLQM and scales used for validation in Study 1

	1	2	3	4	5	6	7	8	9	10
1 FLQM	–									
2 Global LS	.63***	–								
3 PANAS <i>positive</i>	.50***	.36**	–							
4 PANAS <i>negative</i>	–.15	–.22	.15	–						
5 PGCMS <i>total score</i>	.30*	.55***	.08	–.42**	–					
6 PGCMS <i>Non-agitation</i>	–.02	.28*	–.08	–.44**	.82***	–				
7 PGCMS <i>Aging</i>	.43**	.56***	.22	–.09	.72***	.30*	–			
8 PGCMS <i>Life-satisfaction</i>	.48***	.53***	.24	–.31*	.83***	.59***	.51***	–		
9 SF-36 <i>physical</i>	.48***	.43**	.30*	–.03	.03	–.21	.26*	.11	–	
10 SF-36 <i>psychological</i>	.33*	.33*	.30*	–.17	.60***	.51***	.33*	.62***	–.17	–
11 # Self reported diseases	.02	–.13	.18	.33*	–.08	–.06	–.05	–.06	–.22	.20

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$

Note: $N = 44$

1 FLQM = FLQM total score; 2 Global LS = global life-satisfaction; 3 PANAS *positive* = positive affect; 4 PANAS *negative* = negative affect; 5 PGCMS *total score*; 6 *Non-agitation* = PGCMS subscale Non-agitation; 7 *Aging* = PGCMS subscale Attitude toward own aging; 8 *Life-satisfaction* = PGCMS subscale Life-satisfaction; 9 SF-36 *physical* = SF-36 Sum-score physical; 10 SF-36 *psychological* = SF-36 Sum-score psychological; and 11 # self-reported diseases = number of self-reported diseases

Table 5 Descriptive statistics: FLQM and scales used for validation in Study 2

	Min.	Max.	Median	M	SD
FLQM-score	2.29	5.61	4.27	4.23	0.56
Global life-satisfaction	3.00	6.00	5.00	4.90	0.95
SWLS	2.40	6.00	4.90	4.72	0.85
IPANAS					
Positive affect	1.10	4.20	2.80	2.77	0.66
Negative affect	1.00	2.22	1.10	1.24	0.31
EQ-5D	15.61	97.66	72.52	68.44	19.83
Self-rated health VAS	30	100	70	68.62	19.44

Note: All the scores are raw scores

Fig. 2 Distribution of FLQM raw-scores in Study 2 ($N = 90$)

Study 2

Participants named between 2 and 7 important life-domains ($M = 5.5$, median = 5), and on the mean scored $M = 4.2$ ($SD = 0.6$) on the FLQM. As in Study 1, the mean lies

above the theoretical scale mean of 3.5. Descriptive statistics for the FLQM and the respective scales used for validation are depicted in Table 5. The distribution of FLQM-scores is normal (cf. Fig. 2).

Correlations between the FLQM and global life-satisfaction, SWLS, and EQ-5D ranged from medium to large ($r = .35$, $r = .53$, and $r = .40$, respectively, $P < .01$), thus supporting construct validity (see Table 6). Correlation with positive affect was low ($r = .24$, $P < .05$), there was literally no correlation with negative affect ($r = .05$, $P = .64$).

There was a significant difference on FLQM-score between those with more than three ($M = 4.1$) and with up to three self-reported diseases ($M = 4.4$; $t = 2.57$, $P < .05$). Also, a medium correlation between FLQM-score and self-rated overall health ($r = .41$, $P < .01$) could be observed (cf. Table 6). In contrast to Study 1, FLQM score was correlated with age ($r = -.28$, $P < .01$; see Fig. 3). Age-group differences on FLQM-score were also significant ($t = 2.10$, $df = 88$, $P < .05$). There were no gender differences in overall FLQM-score ($t = 0.59$, $df = 88$, $P = .55$). As in Study 1, there was an age-group difference with respect to number of life-domains in that younger participants generated more domains (Median = 6) than did older ones (Median = 5; $Z = -2.36$, $P < .05$). Also, there was a small but significant negative correlation between age and number of domains ($r = -.21$, $P < .05$). There were no gender differences with respect to number of life-domains ($Z = -0.78$, $P = .44$).

Overall discussion

All in all, results from the two pilot studies support on different levels the construct validity of the FLQM as a

Table 6 Correlation-matrix of FLQM, scales used for validation, age, and subjective health in Study 2

	1	2	3	4	5	6	7
1 FLQM	—						
2 Global LS	.35**	—					
3 SWLS	.53***	.40***	—				
4 PANAS <i>positive</i>	.24*	.27*	.32**	—			
5 PANAS <i>negative</i>	-.05	-.17	-.06	-.06	—		
6 EQ-5D	.40***	.37***	.28**	.37**	-.12	—	
7 Self-rated health VAS	.41***	.47***	.26*	.36**	.04	.64***	—
8 Age	-.28**	-.12	-.11	-.33**	.03	-.29**	-.27*

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$

Note: $N = 90$

1 FLQM = FLQM total score; 2 Global LS = global life-satisfaction; 3 SWLS = Satisfaction with Life Scale; 4 PANAS *positive* = positive affect; 5 PANAS *negative* = negative affect; 6 EQ-5D; 7 Self-rated health VAS = Health state according to additional EQ-5D VAS scale; and 8 Age

Fig. 3 FLQM-score by age in Study 2 ($N = 90$)

measure of life-satisfaction, being an important facet of quality of life. Correlations between the FLQM and the convergent scales in both studies are in the medium range. Especially, in Study 1 large correlations between FLQM and global life-satisfaction (single item) and the PGCMS subscale “life satisfaction” support validity. Respective correlations in Study 2 between FLQM and SWLS and global life-satisfaction are a little weaker, but still substantial. While in both studies the correlations with the other scales used for validation are only medium, the very distinct nature of assessment using the FLQM did not lead us to expect a stronger interrelation of these measures with the FLQM score.

Despite decreasing functional abilities and increasing health complaints, there is empirical evidence for only very little changes in global life-satisfaction with age (Diener and Suh 1997; Kunzmann et al. 2000; Schilling 2006; Smith et al. 2002). In line with this so-called “paradox of subjective well-being in old age,” there is no connection between FLQM-score and *health in terms of number of diseases* with the overall score, whereas moderate correlations can be observed between FLQM-score and *physical functioning* (as measured by the physical subscale of the SF-36 in Study 1) and *self-rated health* (as measured by the EQ-5D VAS scale in Study 2), respectively. These results highlight the role that subjective appraisals (in this case of health and functioning) play in determining subjective well-being (cf. Heady et al. 1991; Diener and Lucas 1999).

In Study 2, there was only a small association between positive affect and FLQM; in comparison, correlations between positive affect and the more global measures of satisfaction (single item and SWLS) were much higher. This supports Schwarz and Strack’s (1991) assumption that affect has less influence on ratings of life-satisfaction, if the latter is assessed with reference to specific life-domains and not as an overall judgement. In contrast, in

Study 1, there was a medium correlation between positive affect and the FLQM overall-score. Unfortunately, the sample is too small to test for the influence of special features on the relationship. On the other hand, in the order of questionnaires the IPANAS was positioned after the FLQM with only a short span between them. Thus, the cognitive evaluation of life-satisfaction could have had a framing effect on the emotional assessment. It seems advisable to separate the affective and cognitive evaluations to assure independent answers, as it has been done in Study 2.

On a different level, results from the meta-questionnaire in Study 1 back up the age-adequacy of the FLQM-procedure. The FLQM seems to be easily understood by older adults, the rating procedure was generally appreciated, and the duration of the tasks was not seen as too long by the majority of participants.

A highly interesting finding from Study 1 is that complexity (in terms of numerical count) of individually important domains decreases with age. Exploratory analyses revealed that not only did older participants (80+ years) name fewer domains, but that also the inter-individual pool of important domains markedly decreased with age. Thus the scope of different life-domains important to individual well-being is diminished by almost 50% in the older group. In Study 2, only the quantitative part of the analyses in Study 1 was undertaken. As in Study 1, older participants named markedly fewer domains than did younger ones. This shrinking complexity on an intra- as well as interindividual level can be interpreted in terms of Baltes and Baltes’ (1990) model of Selective Optimization with Compensation or Brandtstädter’s two-process framework of adaptation (Brandtstädter and Rothermund 2002). Put simply, both models predict an adaptive shift in subjective importance to those domains in life in which a person is still able to exert a certain degree of control or participation (in whichever way). Physical, social, or psychological changes can lead to downgrading of importance or even substitution of domains, as well as to a recalibration of reference standards to maintain overall well-being. The diminished complexity of the pool of domains in this study might reflect such common underlying changes in the older age-group that lead to a smaller number of different life-domains to be considered of substantial importance to satisfaction with life. Still, these selected (or adapted) domains obviously serve as a source of subjective satisfaction with life as reflected by the almost constant FLQM-score over age. Level of (self-reported) functional impairment is probably a key predictor of this effect. In a larger sample, multiple regression analysis should be utilized to specify the influence of self-perceived functional ability above variables such as age and social integration on domain-complexity. Future studies using the FLQM-procedure

should direct at least some attention on these presumed processes and pursue to explore deeper the effects of increasing limitations on individual content of domains relevant for life-satisfaction. In this context, the evaluation of domain-specific concurrent validity should also take a central position (i.e., testing of congruence between domain-specific satisfaction- and importance-ratings, and measures related to the specific domain).

There are several limitations and drawbacks to both studies presented here. First, because of the different nature of the two samples used in Studies 1 and 2, a direct comparison of results must be undertaken with caution. Sample 1 is a convenience sample of older people receiving home-care. It might be positively selected within this specific sub-population insofar as they had to actively contact the principal investigator for inclusion in the study. In contrast, the population-based sample in Study 2 seems to be the more reliable one due to sample size and recruitment procedure. While results from both studies support the use of the FLQM, sound proof for its validity needs to be gathered in larger-scale projects (to which Study 1 was a pre-test).

Second, a possible priming-effect of those domains listed as examples in the course of instructions needs to be seriously considered. On the mean in Study 1, about half of the dimensions named by the participants were also listed among the examples. These examples were included, because there is evidence that measures such as the SEI-QoL (Joyce et al. 2003) are problematic in older populations with respect to the active generation of life-domains. While exploratory analyses in Study 1 hint to an at least moderate priming effect of the examples on the life-domains actually generated by respondents, the choice of these examples needs to be critically reflected. Furthermore, the FLQM so far seems to be only apt for elders without cognitive impairment. Taken the large number of older persons suffering from a mild to moderate dementia, it is advisable to further elaborate the method to also capture this part of the population.

Third, reliability of the FLQM has not been tested yet. Classical indices such as internal consistency (Cronbach's Alpha) obviously make no sense, given the heterogeneous and individual content of the FLQM. But stability under stable or at least controlled circumstances could very well serve as a means to determine reliability. Thus, it is highly desirable to test the FLQM for long-term stability and reproducibility.

Last, it seems that a majority of participants in Study 1 named primarily those domains that are adaptive for well-being, i.e., that add to their overall life-satisfaction. Despite the instructions mention "satisfaction and dissatisfaction" the latter seems to be underrepresented. This side-effect of

human adaptation in the sense of Baltes and Baltes (1990) or Brandtstädter (Brandtstädter and Rothermund 2002) is almost unavoidable, but nonetheless problematic in that there is a danger of overestimating quality of life when relying solely on subjective accounts. Thus we remind to see the FLQM as a *supplementary* means to determine overall quality of life that should be combined with more objective and/or performance-focused assessments for the broader picture.

The FLQM is a questionnaire that generates both quantitative and qualitative information about a person's quality of life from a strictly subjective perspective. Quantitative information relates to the degree to which a person is satisfied with the things that are important to his/her life. The qualitative aspect of the FLQM, however, allows one to trace back the individual sources of a person's well- or ill-being. In combination with the domain-specific ratings of satisfaction and weight, an interesting longitudinal perspective emerges, as it is possible to not only observe changes in satisfaction over time, but at the same time relate these changes to either changes in the composition of relevant domains, changes in domain-specific satisfaction, or changes in domain-importance. As the question of which factors contribute to older peoples' well-being is still an open one, it could serve as a valuable tool in research focussing on subjective determinants of life-satisfaction, as well as group-comparisons regarding possible systematic differences in these determinants. Possibly, the FLQM could also aid in geriatric case-management in providing individually fit anchors for psycho-social prevention and intervention. Currently, a larger study is being carried out to gather sounder proof for the FLQM's validity and reliability in community-dwelling elders (cf. Holzhausen et al. submitted). Also, a pilot study testing a questionnaire adapted to the situation of nursing-home residents is in preparation. With increasing evidence of both utility and validity, individualized assessment of quality of life could become an integral part of decision-making and quality assurance in geriatric rehabilitation, nursing, and care.

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Appendix

English translation of the FLQM

Step 1: What is important in your life?

Different people vary widely in what they find important in life. I would now like you to let me know what you consider essential to a good life. This question may take you into somewhat unfamiliar territory, but you are the only one who can answer it, since people differ considerably in their needs and desires.

When asked this question, many people give answers such as the following:

Contact with their family,
their own state of health, or
their mobility.

However, very different things can also play an important role:

One's mental faculties (e.g., memory),
how one's apartment is arranged,
the cultivation of friendships.

Other people value the following:

Being able to take an active part in life,
learning something new and developing one's
knowledge, or
pursuing one's hobbies (e.g., making music or
attending sport events).

Obviously there are many things that can be important for your life. So please take some time and think about it.

They do not necessarily have to be positive things—perhaps you also lack something important in your life or you cannot meet your needs in certain domains.

Please name around five life domains (you may also name four or six domains) that most strongly influence your overall level of satisfaction or dissatisfaction with life.

Step 2: How satisfied or dissatisfied are you with these domains?

Please have a closer look at every single one of these areas. How satisfied or dissatisfied are you with each life area in your present situation?

Please rate each domain on the 6-point scale you see below: A rating of 1 means you are so satisfied with this life domain that virtually nothing can be improved; a rating of 6 means you are so dissatisfied with this life domain that you can hardly imagine it being any worse.

Please indicate your satisfaction or dissatisfaction with each life domain by giving it a rating between 1 and 6. If

you are equally satisfied with several or all domains, simply give them the same rating.

1	2	3	4	5	6
There is hardly anything to improve	Very satisfied	Satisfied	Rather dissatisfied	Very dissatisfied	It could hardly be worse

Step 3: How important are these domains to you?

Please take your time and have another close look at the individual life domains. They are probably not all equally important to you. Please indicate how important you consider each domain.

Here you see again a 6-point scale: A rating of 1 means this domain ranks among the most important things in your life; a rating of 6 means you find this domain unimportant compared to the other areas.

Please indicate the importance you attach to each life domain by giving it a rating between 1 and 6. If you find several or all domains equally important, simply give them the same rating.

1	2	3	4	5	6
Among the most important things in my life	Very important	Important	Somewhat important	Rather unimportant	Not important compared to the other domains

References

- Baltes PB (1997) On the incomplete architecture of human ontogeny. *Am Psychol* 52:366–380
- Baltes PB, Baltes MM (1990) Psychological perspectives on successful aging: the model of selective optimization with compensation. In: Baltes PB, Baltes MM (eds) *Successful aging. Perspectives from the behavioral sciences*. University Press, Cambridge, pp 1–34
- Bowling A (1997) *Measuring health. A review of quality of life measurement scales*, 2nd edn. Open University Press, Buckingham
- Brandtstädter J, Rothermund K (2002) The life-course dynamics of goal pursuit and goal adjustment: a two-process framework. *Dev Rev* 22:117–150
- Brown M, Gordon WA (2004) Empowerment in measurement: 'muscle', 'voice', and subjective quality of life as a gold standard. *Arch Phys Med Rehabil* 85:S13–S20
- Browne JP, O'Boyle CA, McGee HM, Joyce CR, McDonald NJ, O'Malley K, Hiltbrunner B (1994) Individual quality of life in the healthy elderly. *Qual Life Res* 3:235–244

- Campbell A, Converse P, Rodgers WL (1976) The quality of American life: perceptions, evaluations and satisfactions. Russell Sage Foundation, New York, NY
- Carstensen LL, Fung HH, Charles ST (2003) Socioemotional selectivity theory and the regulation of emotion in the second half of life. *Motiv Emot* 27:103–123
- Coen RF, O'Mahony D, O'Boyle CA, Joyce CRB, Hiltbrunner B, Walsh JB, Coakley D (1993) Measuring the quality of life of dementia patients using the schedule for the evaluation of individual quality of life. *Ir J Psychol* 14:154–163
- Cohen J (1992) A power primer. *Psych Bull* 112:155–159
- Diener E, Lucas RE (1999) Personality and subjective well-being. In: Kahnemann D, Diener E (eds) *Well-being: the foundations of hedonic psychology*. Russell Sage Foundation, New York, NY, pp 213–229
- Diener E, Lucas RE (2000) Subjective emotional well-being. In: Lewis M, Haviland JM (eds) *Handbook of emotions*. Guilford, New York, NY, pp 325–337
- Diener E, Suh E (1997) Measuring quality of life: economic, social, and subjective indicators. *Soc Indic Res* 40:189–216
- Diener E, Emmons RA, Larsen RJ, Griffin S (1985) The Satisfaction With Life Scale. *J Pers Assess* 49:71–75
- Fitzpatrick R (1999) Assessment of quality of life as an outcome: finding measurements that reflect individuals' priorities. *Qual Health Care* 8:1–2
- Flick U (2007) *Designing qualitative research*. Sage, Thousand Oaks, CA
- Folstein MF, Folstein SE, McHugh PR (1975) Mini-mental state A practical method for grading the cognitive state of patients for the clinician. *J Psychiatr Res* 12:189–198
- Garratt A, Schmidt L, Mackintosh A, Fitzpatrick R (2002) Quality of life measurement: bibliographic study of patient assessed health outcome measures. *Brit Med J* 324:1417–1428
- Gower JC (1998) Similarity, dissimilarity, and distance measure. In: Armitage P, Colton T (eds) *Encyclopedia of biostatistics*. Wiley, Chichester, pp 4097–4100
- Greiner W, Weijnen T, Nieuwenhuizen M, Oppe S, Badia X et al (2003) A single European currency for EQ-5D health states. Results from a six-country study. *Eur J Health Econ* 4: 222–231
- Guggenmoos-Holzmans I, Bloomfield K, Brenner H, Flick U (eds) (1995) *Quality of life and health: concepts, methods and applications*. Blackwell, Berlin
- Headey B, Veenhoven R, Wearing A (1991) Top-down versus bottom-up theories of subjective well-being. *Soc Indic Res* 24: 81–100
- Heckhausen J, Dixon RA, Baltes PB (1989) Gains and losses in development throughout adulthood as perceived by different adult age groups. *Dev Psychol* 25:109–121
- Holzhausen M, Fuchs J, Martus P, Busch M, Scheidt-Nave C (submitted) Operationalizing multimorbidity and autonomy for health services research in aging populations—the OMAHA study. Study protocol, objectives, and sample description. *BMC Pub Health*
- Joyce CR, Hickey A, McGee HM, O'Boyle CA (2003) A theory-based method for the evaluation of individual quality of life: the SEIQoL. *Qual Life Res* 12:275–280
- Kunzmann U, Little TD, Smith J (2000) Is age-related stability of subjective well-being a paradox? Cross-sectional and longitudinal evidence from the Berlin Aging Study. *Psychol Aging* 15: 511–526
- Lawton MP (1975) The Philadelphia Geriatric Center Morale Scale: a revision. *J Gerontol* 30:85–89
- Lawton MP (1991) A multidimensional view of quality of life in frail elders. In: Birren JE, Lubben JE, Rowe JC, Deutchman DE (eds) *The concept and measurement of quality of life in the frail elderly*. Academic Press, San Diego, pp 3–27
- Macduff C (2000) Respondent-generated quality of life measures: useful tools for nursing or more fool's gold? *J Adv Nurs* 32: 375–382
- Macduff C, Russell E (1998) The problem of measuring change in individual health-related quality of life by postal questionnaire: use of the patient-generated index in a disabled population. *Qual Life Res* 7:761–769
- Miller MD, Towers A (1991) A manual of guidelines for scoring the Cumulative Illness Rating Scale for geriatrics (CIRS-G). University of Pittsburgh, Pittsburgh, PA
- Mountain LA, Campbell SE, Seymour DG, Primrose WR, Whyte MI (2004) Assessment of individual quality of life using the SEIQoL-DW in older medical patients. *Q J Med* 97:519–524
- O'Boyle CA (1997) Measuring the quality of later life. *Philos Trans R Soc Lond B* 352:1871–1879
- Patel KK, Veenstra DL, Patrick DL (2003) A review of selected patient-generated outcome measures and their application in clinical trials. *Value Health* 6:595–603
- Rothermund K (2005) Effects of age stereotypes on self-views and adaptation. In: Greve W, Rothermund K, Wentura D (eds) *The adaptive self: personal continuity and intentional self-development*. Hogrefe, Göttingen, pp 223–242
- Rowe JW, Kahn RL (1998) *Successful aging: the MacArthur Foundation Study*. Pantheon Books, New York
- Ruta DA, Garratt AM, Leng M, Russell IT, MacDonald LM (1994) A new approach to the measurement of quality of life. The Patient-Generated Index. *Med Care* 32:1109–1126
- Ryff CD, Singer B (1998) The contours of positive human health. *Psychol Inq* 9:1–28
- Schilling O (2006) Development of life satisfaction in old age: another view on the “paradox”. *Soc Indic Res* 75:241–271
- Schwartz CE, Sprangers MAG (2000) *Adaptation to changing health. Response shift in quality-of-life research*. American Psychological Association, Washington, DC
- Schwarz N, Strack F (1991) Evaluating one's life: a judgment model of subjective well-being. In: Strack F, Argyle M, Schwarz N (eds) *Subjective well-being. An interdisciplinary perspective*. Pergamon Press, Oxford, pp 27–47
- Smith HJ, Taylor R, Mitchell A (2000) A comparison of four quality of life instruments in cardiac patients: SF-36, QLI, QLMI, and SEIQoL. *Heart* 84:390–394
- Smith J, Borchelt M, Maier H, Jopp D (2002) Health and well-being in the young old and oldest old. *J Soc Issues* 58:715–732
- Strawbridge WJ, Wallhagen M, Cohen RD (2002) Successful aging and well-being: self-rated compared with Rowe and Kahn. *Gerontologist* 42:727–733
- Tully MP, Cantrill JA (2000) The validity of the modified patient generated index—a quantitative and qualitative approach. *Qual Life Res* 9:509–520
- Veenhoven R (2000) The four qualities of life ordering concepts and measures of the good life. *J Happiness Stud* 1:1–39
- Ware JE, Sherbourne CD (1992) The MOS 36-item short-form health survey (SF-36) I. Conceptual framework and item selection. *Med Care* 30:473–483
- Watson D, Clark LA, Tellegen A (1988) Development and validation of brief measures of positive and negative affect: the PANAS scales. *J Pers Soc Psychol* 54:1063–1070
- WHOQoL Group (1995) *The World Health Organization Quality of Life assessment (WHOQOL): position paper from the World Health Organization*. *Soc Sci Med* 41:1403–1409
- Wurm S, Tomasik MJ, Tesch-Romer C (2008) Serious health events and their impact on changes in subjective health and life satisfaction: the role of age and a positive view on ageing. *Eur J Ageing* 5:117–127