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MEANING IN LIFE IN THREE SAMPLES OF ELDERLY PERSONS WITH HIGH COGNITIVE FUNCTIONING

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ABSTRACT

The study examined the relationships between meaning in life and cognitive functioning in three elderly samples. The participants in Sample I were 78 persons aged 82–87, in Sample II 182 persons aged 83–92, and in Sample III 299 persons aged 65–-69. The samples took part in interviews and cognitive tests in 1996–1997. Several interview questions together with the Sense of Coherence questionnaire were used to study the degree and content of meaning in life. Cognitive functioning was measured by Digit Span, Digit Symbol, and Word Fluency in Sample I and Mini-D in Samples II and III. Each sample was divided into the group of persons with high cognitive functioning (including those whose results in cognitive tests fell in the top third of their age cohort) and the comparison group (including the rest of the sample). The analysis showed no difference between the groups in the degree of meaning in life in any of the three samples. The content of meaning in life differed in the two groups: human relationships were reported as a reason for meaning in life and a source of strength in life more often by the persons with high cognitive functioning than by the comparison group. Moreover, those with high cognitive functioning reported that they had taken up a new activity (especially one involving social interests) that gave a sense of meaning in life after retirement more often than the comparison group. Death had positive meaning for the majority of the participants and the groups did not differ in meaning of death. The interactions between the various measures of meaning in life showed that having a sense of coherence and zest for life were factors related to the sense of meaningfulness in life. Meaning of death was not related to other measures.

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INTRODUCTION

According to Frankl (1959, 1967), each person has a "will to meaning." Searching for a meaning in life is a master motive in human life. This motive is independent and universal in nature; meaning in life can be acquired regardless of sex, age, intellectual capacity, setting, personality characteristics, or religious views. The relationship between a sense of meaning in life and zest for life is emphasized in Frankl's theory: a strong sense of meaning in life maintains a zest for life and lays the foundation for well-being. Losing a sense of meaning in life may decrease zest for life, which in turn may lead to feelings of emptiness and depression, and in the worst case, to suicide. Meaning in life seems to be especially important in the second half of life (Battista & Almond, 1973; Wong, 1989). Functional deterioration and awareness of approaching death in advanced age produce a need to explore the fundamental questions in life. In his psychosocial theory of human development, Erikson (1994) describes the eighth and the last stage of human life as a time when a person has to evaluate his or her life, accept it as an integrated whole and also accept death as the natural end of life. In Tornstam's (1989) concept of "gerotranscendence," an old person builds up a metaperspective of his or her life, thereby gaining a new perspective on self and others, time and space, and life and death. Material aspects of life become less important whereas spiritual and fundamental questions of life assume greater significance.

Empirical studies have supported the theoretical perspectives mentioned above. The studies have usually focused on the degree or content of meaning in life, and in so doing have attempted to measure the quantity or quality of meaning. The degree of meaning in life is usually studied by questionnaires in which sum scores are calculated: these are taken to indicate the strength of a person's sense of meaning in life. In these studies the degree of meaning in life has been shown to have a significant association with psychological well-being and integration of the self (Depats, Drost, & Hansen, 1995; Orbach, Iluz, & Rosenheim, 1987; Reker, Peacock, & Wong, 1987; Zika & Chamberlain, 1992). It is interesting to note that fear of death was not found to be associated with the sense of meaning in life (Orbach et al., 1987), as might have been supposed according to developmental theories emphasizing acceptance of death (Erikson, 1994; Tornstam, 1989). Meaning in life seems to be at least in some degree universal in nature: Orbach et al. (1987) found that cultural origin or education does not affect the degree of meaning in life. Although finding a meaning in life is often claimed to be unrelated to gender, some differences between men and women have been found. Orbach et al. (1987) reported that men had a stronger degree of commitment, i.e., a stronger sense of meaning in life, than women. Reker et al. (1987) found that men and women had an equal degree of meaning in life according to most subscales (existential vacuum, death acceptance, goal seeking, and future meaning) in Life Attitude Profile test. However, women had a stronger will to meaning and viewed life as more under their control than men in early middle-age and young-old age.

Meaning in life seems to be stronger among older people than young adults in cross-sectional settings (Orbach et al., 1987; Reker et al., 1987). In our follow-up study of Finnish elderly people, we found the sense of meaning in life to be quite stable over an 8-year follow-up of Finnish persons aged 65–84 (Takkinen & Suutama, 1999a). The sense of meaning in life did not change and zest for life decreased only slightly among the oldest participants during the follow-up.

The degree of meaning in life is close to the "sense of coherence" construct formulated by Aaron Antonovsky (1979, 1987). A sense of coherence means a global orientation to life composed of three interrelated subcategories: comprehensibility (cognitive component), manageability (instrumental component), and meaningfulness (motivational component). Antonovsky also developed a measure to assess the degree of sense of coherence. His Sense of Coherence questionnaire has been used in studying coping resources and everyday manageability (see e.g., Langius & Björvell, 1993; Sagy & Antonovsky, 1990) but has not been so extensively applied in researching the degree of meaning in life. Nevertheless, the comparisons with various other scales have shown that the Sense of Coherence is related to other scales studying the degree of meaning in life (Chamberlain & Zika, 1988; Coward, 1996; van Selm & Dittmann-Kohli, 1998). Indeed, Antonovsky (1987) himself has stated that the sense of meaningfulness holds a central position in the sense of coherence. By virtue of being the motivational element, meaningfulness upholds the whole system: without meaning there will be no comprehensibility or manageability. The sense of coherence is formed in childhood and adolescence, and remains fairly stable in adulthood. According to the theory of Antonovsky (1979, 1987), a sense of coherence is strongly associated with health and well-being. This positive relationship has been found in populations of various ages, including elderly persons (Langius & Björvell, 1993; Sagy & Antonovsky, 1990; Steiner et al., 1996).

The content of meaning in life is usually studied by asking people to write essays on or rate in a questionnaire what they consider the most important contents of meaning in life. The results have shown that the content of meaning in life most often concerns human relationships regardless of the age of the respondents (DePaola & Ebersole, 1995; Viterbo & McCarthy, 1983). Ebersole and DePaola (1986) and DePaola and Ebersole (1995) studied the content of meaning in life in normal older samples of golden anniversary couples and elderly nursing home residents. The most important factor contributing to meaning in life in both samples was human relationships. Other factors frequently mentioned included health and functioning and pleasure. Viterbo and McCarthy (1983) found a similar result among the elderly residents of a convalescent center: the most frequently-mentioned reason for a sense of meaning in life was human relations, closely followed by health. The third reason was religious belief. In our Finnish follow-up and cohort studies of 65–92-year-olds, human relations most often expressed the content of meaning in life (Takkinen & Suutama, 1999a, 1999b). Health and functioning and reasons relating to life—such as respect for life,

interest in life, and belief in the future—were also reasons for finding life meaningful in these samples.

Religion is often regarded as an important factor in old people's lives (McFadden, 1995). The growing importance of spiritual aspects and values in later life has been shown in the cross-sectional studies of Orbach et al. (1987) and Reker et al. (1987), where the contents of meaning in life were compared for various age groups. Nevertheless, compared to other factors promoting meaning in life, which have been mentioned in studies of elderly people, religion was mentioned rather rarely (DePaola & Ebersole, 1995; Ebersole & DePaola, 1986). Religion seems to be more a source of strength in life than a reason for meaning in life among old people (Takkinen & Suutama, 1999a).

In addition to meaning in life, another important psychological factor in old age is cognitive functioning. In earlier studies, Jalavisto, Lindqvist, and Makkonen (1964) found that good cognitive functioning predicted longevity. Ruoppila and Suutama (1997) arrived at a similar result in a follow-up study of elderly cohorts: good results in cognitive tests among 75- and 80-year-olds indicated a smaller likelihood of dropping out because of mortality or poor health before the follow-up examination five years later. Cognitive functioning was also found to predict longevity in the longitudinal studies of Lehr (1982) and Palmore (1982). The relationship between meaning in life and cognitive functioning has not received much attention. Referring to some earlier studies, Frankl (1959) took the view that meaning in life is independent of cognitive functioning. However, this issue has not been empirically studied among elderly populations, nor has the relationship between the content of meaning in life and cognitive functioning received attention.

In this study we were interested in the relationships between cognitive functioning and meaning in life. In addition, the interrelations between different measures of meaning in life in old age were investigated. The study aimed to deal with three aspects. First, previous empirical findings and theories have suggested that a strong sense of meaning in life can be attained regardless of cognitive functioning. In accordance with this, our hypothesis was that the sense of meaning in life—and also zest for life and a sense of coherence—is independent of cognitive functioning in old age. However, the content of meaning in life may vary according to the level of cognitive functioning, since cognitive functioning may contribute to (or impede) certain types of interests. Thus, as a second aspect of our study, we described the content and source of meaning in life (including also the meaning of death) in elderly persons with high cognitive functioning and in the comparison group. As no previous studies are known to us concerning the contents of meaning in life of people with high cognitive functioning, no hypothesis about the contents of meaning was posited in advance. Third, various measures of meaning in life were applied, including interview questions generated according to the theoretical views of Frankl and Erikson, and Antonovsky's Sense of Coherence questionnaire. Although these measures represent various views of the

phenomenon, they are thought to examine the construct of meaning in life. Hence, our hypothesis was that the measures would prove to be related to each other. Three different samples of elderly persons were used in this study in order to cross-validate the results.

METHOD

Participants

The study was part of the Evergreen project, which is a multidisciplinary research program on health and functioning among elderly residents of Jyväskylä, Finland. A more detailed description of the samples, designs, and methods of the Evergreen project is presented elsewhere (Heikkinen, 1997, 1998). In the present study, three different samples were used.

Sample I was drawn from the cohorts of citizens born in 1910 ($N = 382$ in 1989) and 1914 ($N = 285$ in 1990). These cohorts were studied in 1989–1990 and followed up in 1994–1995 with in-depth interviews concerning physical, psychological, and social functioning, plus laboratory tests and a medical examination. The participation rate was about 90 percent for the interviews and about 75 percent for the laboratory examinations. From these two cohorts, a smaller sample was drawn for an interview in 1997. The sample selected for the interview consisted of 111 elderly persons, but because of missing data, mainly due to mortality, the final sample was restricted to 78. Sample characteristics are shown in Table 1.

Table 1. Sample Characteristics

	Sample I $n = 78$	Sample II $n = 182$	Sample III $n = 299$
Mean age (range)	85.1 (83-87)	85.2 (83-92)	66.3 (65-69)
Years of formal education	7.4	6.0	9.2
Gender (%)			
Female	62	72	41
Male	38	28	59
Marital status (%)			
Single	18	13	10
Married	30	23	58
Cohabiting	0	1	1
Widowed	49	60	16
Divorced	4	3	14

Sample II was drawn from a random sample of non-institutionalized citizens of Jyväskylä (n = 759 in 1988) born in 1904–1913. This sample participated in a baseline interview in 1988 and in the follow-up eight years later in 1996. The proportion participating was about 85 percent of those eligible. The sample for the present study (n = 182) consisted of persons who took part in an interview in 1996. The characteristics of the sample are presented in Table 1.

Sample III was drawn from a random sample of non-institutionalized citizens of Jyväskylä (n = 393 in 1996) born in 1927–1931. Of this population, 82 percent attended the interviews in 1996. The present sample (n = 320) consisted of the participants in this interview. The sample characteristics are shown in Table 1.

Procedure

Selection of Groups According to Cognitive Tests

Several cognitive tests were used for selecting the group with high cognitive functioning and the comparison group. The descriptive data on the test results of the two groups are presented in Table 2.

In Sample I, the selection was carried out according to Digit Span from the Wechsler Memory Scale (WMS) (Wechsler, 1945; Wechslerin muistiasteikko, 1978), Digit Symbol from the Wechsler Adult Intelligence Scale (WAIS) (WAIS käsikirja, 1971; Wechsler, 1955) and Word Fluency from the Schaie-Thurstone Adult Mental Abilities Test (Schaie, 1985). The Finnish versions of the tests were used. These three tests were chosen because their results were available for both cohorts of the sample and together can be considered to represent versatile intellectual functioning. The cognitive tests were carried out as described in earlier

Table 2. Cognitive Test Results in Elderly Persons with High Cognitive Functioning (COG) and Comparison Group (COM)

Cognitive Test	COG	COM	*t* Value
Sample I (*n*)	(38)	(40)	
Digit Span, Mean (*SD*)	10.2 (1.57)	8.0 (0.86)	4.00***
Digit Symbol, Mean (*SD*)	31.4 (6.89)	18.3 (7.37)	7.58***
Word Fluency, Mean (*SD*)	43.6 (9.78)	27.2 (12.89)	7.24***
Sample II (*n*)	(51)	(137)	
Mini-D, Mean (*SD*)	39.7 (1.42)	30.2 (6.44)	16.29***
Sample III (*n*)	(76)	(225)	
Mini-D, Mean (*SD*)	42.4 (0.49)	37.3 (4.52)	16.57***

***$p < .001$

studies (Ruoppila & Suutama, 1997). Contrary to the usual practice, the Word Fluency test was administered orally with a time limit of three minutes. The participants were divided into two groups: persons with high cognitive functioning, i.e., those in the top third according to the results of the three cognitive tests, and the comparison group, which consisted of the remaining participants in the sample.

In Sample II and Sample III, the selection of the groups was based on the Mini-D test (Erkinjuntti, Laaksonen, Sulkava, Syrjäläinen, & Palo, 1986), which in turn is based on the theory of Luria (1980). This test has been developed in order to screen for dementia, but it can also be used to assess general cognitive functioning in five areas: orientation, memory and learning, visualization, problem-solving, and reasoning. The test has shown good internal consistency and is strongly related to other cognitive measures. For instance, Ruoppila and Suutama (1997) found strong correlations (> 0.60) with Digit Span, Digit Symbol, and Word Fluency in elderly persons. The group with high cognitive functioning consisted of persons in the top third of their sample according to the Mini-D results. The comparison group consisted of the rest of the participants.

The characteristics of the group of persons with high cognitive functioning and the comparison group were compared using the *t*-test for independent samples and contingency tables. As could have been expected, cognitive functioning was significantly higher in the groups of persons defined as having high cognitive functioning than in the comparison group (Table 2). A significant difference was also found in education: the persons with high cognitive functioning had a longer formal education than the comparison group in Sample I ($t(76) = 4.82$, $p < .001$), in Sample II ($t(176) = 4.95$, $p < .001$), and in Sample III ($t(297) = 4.47$, $p < .001$). The groups did not differ in gender or in marital status.

Interview on Meaning in Life

The interviews were carried out in 1996–1997 by trained female interviewers from the University of Jyväskylä. The interviews took place mainly at the participants' homes. About 10 percent of the participants were interviewed in sheltered accommodation, in an old people's home or in a hospital. In Sample I, the interview focused on the experience of aging. In addition to the theme of meaning in life, the interview dealt with the individual life course (life-line), self-rated health, psychological functioning, and wisdom. The interview lasted approximately two hours. For Sample II and Sample III, the interview dealt with psychological, physiological, and social functioning (see Heikkinen, 1997), and it lasted about four hours, divided into two interview sessions.

In all three samples, the questions of meaning in life were situated in the middle of the interview following the discussion of the life-line drawing in Sample I, and after filling in the depression inventory in Sample II and Sample III. Six questions on meaning in life were asked in the following order: 1) What is the meaning of

death to you? 2) How meaningful is life to you? 3) Can you explain why it is meaningful/meaningless? 4) What gives you strength in your life? 5) After retiring, have you found a new field of activity that gives meaning or purpose to your life? 6) Has your zest for life changed recently and in what direction?

Questions 2 and 6 were Likert-type scales with five categories (see Tables 3 and 4). The answers to questions 1, 3, 4, and 5 were classified later into nominal categories, as presented in Tables 5–7. The classification was made in the same way as in the larger eight-year follow-up and cohort studies of Finnish elderly people (Takkinen & Suutama, 1999a, 1999b). Following the classification, it was found that 86 percent of the items were categorized in the same way by the two raters, indicating good inter-rater reliability. In Sample I, when the interviewee gave several answers to one question, all answers were included in the analysis and were arranged in the order of their importance for the interviewee. There were 1–4 answers per question. Each answer was included in the analysis with a weighting according to its importance for the interviewee (e.g., the weight of most important reason for meaning in life = 1.00, the weight of the second most important = 0.75, the weight of the third most important = 0.50, and the weight of the fourth most important = 0.25). In Sample II and Sample III, only the most important answer was coded.

The Sense of Coherence (SOC) questionnaire was filled in after the interview in Sample I and Sample III. Mainly this was done by the interviewee, but in the case of persons with poor sight or motor problems, the interviewer read the questions to the interviewee and filled in the questionnaire according to the answers. The SOC

Table 3. Sense of Meaning in Life in Elderly Persons with High Cognitive Functioning (COG) and Comparison Group (COM)

	Sample I		Sample II		Sample III	
Sense of Meaning in Life	COG $n = 38$ (%)	COM $n = 39$ (%)	COG $n = 51$ (%)	COM $n = 130$ (%)	COG $n = 76$ (%)	COM $n = 224$ (%)
Very meaningful	16	8	6	5	12	7
Meaningful	50	49	43	53	76	69
Difficult to say	5	21	26	28	8	19
Meaningless	26	15	22	12	4	5
Very meaningless	3	8	4	3	0	0
Total	100	100	100	100	100	100

Difference between the COG and the COM:
Sample I: $G^2(4) = 6.92$, $p > .05$
Sample II: $G^2(4) = 3.37$, $p > .05$
Sample III: $G^2(4) = 7.13$, $p > .05$

Table 4. Change in Zest for Life in Elderly Persons with High Cognitive Functioning (COG) and Comparison Group (COM)

	Sample I		Sample II		Sample III	
Change in Zest for Life	COG $n = 38$ (%)	COM $n = 40$ (%)	COG $n = 51$ (%)	COM $n = 129$ (%)	COG $n = 75$ (%)	COM $n = 224$ (%)
Clearly increased	3	3	0	0	1	2
Increased	3	0	4	4	8	6
Remained the same	63	75	69	74	85	88
Decreased	24	15	22	19	5	5
Clearly decreased	8	8	6	2	0	0
Total	100	100	100	100	100	100

Difference between the COG and the COM:
Sample I: $G^2(2) = 1.39$, $p > .05$
Sample II: $G^2(2) = 1.51$, $p > .05$
Sample III: $G^2(2) = 1.17$, $p > .05$

Note: Since the minimum expected cell frequency was lower than 1, Change in Zest for Life was reclassified into three categories for the log-linear analysis.

Table 5. Reasons for Meaning in Life in Elderly Persons with High Cognitive Functioning (COG) and Comparison Group (COM)

	Sample I		Sample II		Sample III	
Reason for Meaning in Life	COG $n^a = 43$ (%)	COM $n^a = 41$ (%)	COG $n = 35$ (%)	COM $n = 103$ (%)	COG $n = 70$ (%)	COM $n = 203$ (%)
Human relations	40	15	37	19	44	33
Religion	5	10	0	9	4	2
Reasons relating to life[b]	21	24	29	26	26	23
Hobby, work	14	15	3	5	4	3
Health, functioning	14	22	0	6	4	7
Psychological well-being	7	5	0	1	1	3
Cannot say	0	5	31	34	16	26
Other	0	5	0	0	0	2
Total	100	100	100	100	100	100

[a]Number of weighted answers.
[b]Respect for life, interest in life, belief in the future.

Table 6. Sources of Strength in Life in Elderly Persons with High Cognitive Functioning (COG) and Comparison Group (COM)

	Sample I		Sample II		Sample III	
Source of Strength in Life	COG $n^a = 50$ (%)	COM $n^a = 54$ (%)	COG $n = 51$ (%)	COM $n = 131$ (%)	COG $n = 76$ (%)	COM $n = 222$ (%)
Human relations	18	5	28	15	32	38
Religion	26	28	47	45	25	18
Reasons relating to life[b]	10	13	4	2	9	6
Hobby, work	20	17	2	3	4	8
Health, functioning	10	15	6	10	8	8
Psychological well-being	10	6	8	6	12	9
Material well-being	2	6	0	2	0	1
Cannot say	0	2	0	6	4	5
Other	4	6	6	11	7	8
Total	100	100	100	100	100	100

[a]Number of weighted answers.
[b]Respect for life, interest in life, belief in the future.

Table 7. Meaning of Death in Elderly Persons with High Cognitive Functioning (COG) and Comparison Group (COM)

	Sample I		Sample II		Sample III	
Meaning of Death	COG $n^a = 43$ (%)	COM $n^a = 41$ (%)	COG $n = 51$ (%)	COM $n = 130$ (%)	COG $n = 76$ (%)	COM $n = 223$ (%)
Unavoidable, natural thing (+)	47	44	37	47	46	53
Hope for new life (+)	22	17	24	15	20	13
End of everything (0)	12	7	8	11	11	14
Liberation from suffering (+)	2	7	10	7	4	5
Fear (–)	5	5	6	3	7	2
Hard, unpleasant thing (–)	0	2	0	2	0	2
Rest, peace (+)	2	0	6	4	4	2
Riddle (0)	0	2	0	1	0	0
Cannot say	0	2	0	2	0	1
Other (+, 0, –)	9	12	10	9	9	7
Total	100	100	100	100	100	100

[a]Number of weighted answers.
(+) rated as positive, (0) rated as neutral, and (–) rated as negative meaning of death.

questionnaire, in its full length version, contains 29 items each having a 7-point semantic differential scale with two anchoring phrases (e.g, 1 = very often, 7 = very seldom or never). The Finnish translation of Antonovsky's (1987) shortened version of the 13-item SOC questionnaire was used. The maximum sum score was 91. The questionnaire consists of three subcategories based on the underlying theory of Antonovsky. Meaningfulness was solicited by four questions (e.g., Do you have the feeling that you don't really care about what goes on around you?), comprehensibility by five questions (e.g., Do you have the feeling that you are in an unfamiliar situation and don't know what to do?), and manageability by four questions (e.g., How often do you have feelings that you're not sure you can keep under control?). Several studies have shown that these subcategories are highly interrelated and the internal consistency of the questionnaire is good (e.g., Feldt & Rasku, 1998; Flannary & Flannary, 1998). In the present study, Cronbach's was 0.70 in Sample I and 0.79 in Sample III indicating adequate internal consistency.

Analyses

Analyses were carried out in each of the three samples for the two cognitive groups, persons with high cognitive functioning and comparison group. Men and women were analyzed together. Since most of the variables were nominal or ordinal in nature, contingency tables were used in describing the data. To identify relationships in the frequency data, log-linear models were applied (Agresti, 1984; Everitt, 1977). Log-linear models produce a G^2 value, which is similar to χ^2. The use of log-linear models had some advantages in this study: the models are robust for nominal or ordinal data with small categories, and appropriate in examining multidimensional contingency tables (i.e., assessing the relationships between more than two variables). Contingency tables and log-linear models also offer illustrative information for the linearity of the associations. Thus, in addition to linear associations, the non-linear, for instance quadratic, associations are observed.

A purely descriptive analysis was applied to nominal variables (questions 1, 3, 4, and 5) where there were many categories in which the frequencies remained very low (the minimum expected cell frequency < 1) and the classes could not be combined in a well-grounded way. Testing these variables (calculating χ^2 or G^2) would have been inappropriate. In addition, the fact that in Sample I several weighted answers per question were classified (i.e., the categories were not independent of each other) limited the use of the tests mentioned above. Hence, we compared the ratio (percentage difference calculated with z) of the largest categories in the two cognitive groups. The difference in the sense of coherence between the persons with high cognitive functioning and the comparison group was tested using the t-test for independent groups.

In the final log-linear analysis, the relationships between several variables related to meaning in life were examined in Sample I and Sample III. Four

variables were selected: Sense of Meaning in Life, Change in Zest for Life, Meaning of Death, and Sense of Coherence. The first two of these represent central concepts in Frankl's (1959) view of the universal will to meaning among human beings. Meaning of Death was selected according to Erikson's (1994) view, in which the acceptance of death is essential for the integration process in old age. The fourth, Sense of Coherence, represents Antonovsky's (1979, 1987) global orientation to life including meaningfulness as a basis for well-being. The classes of the original scales were reduced. The 5-point scale for the Sense of Meaning in Life was reduced to three categories: Life is meaningful, Difficult to say, and Life is meaningless. Change in Zest for Life was similarly reduced to three categories: Increased, Remained the Same, and Decreased. Meaning of Death was reclassified into three categories: Positive, Neutral, and Negative meaning of death (see Table 6). Sense of Coherence was divided into three groups of equal size according to the sum scores: Strong, Moderate, and Weak Sense of Coherence.

RESULTS

The Degree of Meaning in Life and Cognitive Functioning

There was no association between the sense of meaning in life and cognitive functioning in the three samples (Table 3). About 60 percent found their life meaningful and about 25 percent meaningless in Sample I and Sample II. In Sample III, well over 80 percent found their life meaningful and only about 5 percent meaningless.

Changes in zest for life were similar for persons with high cognitive functioning and for comparison group in all three samples (Table 4). For most of the participants, about 70 percent in Sample I and Sample II, and over 80 percent in Sample III, the zest for life had remained the same as before. A quarter of the population in Sample I and in Sample II and about 5 percent in Sample III reported decreased zest for life. Only a few stated that their zest for life had increased.

Sense of Coherence was studied in Sample I and Sample III. The *t*-test for independent groups showed no difference between the groups in Sample I ($t(73) = 0.59$, $p > .05$) and in Sample III ($t(296) = 0.13$, $p > .05$). For the persons with high cognitive functioning, the mean of the Sense of Coherence sum scores in Sample I was 69.1 ($SD = 10.42$) and for the comparison group 67.7 ($SD = 11.35$). In Sample III, the scores were 71.9 ($SD = 9.45$) for the persons with high cognitive functioning and 69.9 ($SD = 10.13$) for the comparison group.

All in all, the degree of meaning in life, when measured as the sense of meaning in life, the change in zest for life, and the sense of coherence, was independent of cognitive functioning. The results were similar in all three elderly samples.

The Content of Meaning in Life and Cognitive Functioning

In all three samples, the most often expressed reason for a sense of meaning in life among persons with high cognitive functioning consisted of human relationships (Table 5). For the comparison group, reasons relating to life (i.e., respect for life, interest in life, and belief in the future) were most important in Sample I and Sample II, with human relationships most important in Sample III. When comparing the percentages, human relationships were significantly more often reported by persons with high cognitive functioning than by the comparison group in Sample I ($z = 2.63$, $p < .01$), Sample II ($z = 1.65$, $p < .05$), and Sample III ($z = 2.15$, $p < .05$). In Sample I and Sample II the comparison group mentioned health and functioning more frequently, though the difference in ratios between the groups was not statistically significant. Other reported reasons for meaning in life were reasons related to life (e.g., respect for life and interest in life), hobby or work, psychological well-being, and religion. It is important to note that the "cannot say" category was large in Samples II and III. Further analysis of this category showed that the question concerning the reason for meaningfulness or meaninglessness of life, which was an extension to the question on the sense of meaning in life, was disregarded by some interviewers. These missing answers were subsequently coded to the "cannot say" category.

Life was reported as meaningless by only a small proportion of the interviewees in all three samples. Among those persons, the most often mentioned reasons for the sense of meaninglessness of life were a sense of being worthless in old age (28 percent), poor health and physical functioning (21 percent), and loneliness (11 percent) for both groups in all three samples.

The most important source of strength in life was religion in Samples I and II, and human relationships in Sample III, for both persons with high cognitive functioning and the comparison group (Table 6). Human relationships were reported significantly more often by persons with high cognitive functioning than by the comparison group in Sample I ($z = 2.03$, $p < .05$), and in Sample II ($z = 1.89$, $p < .05$). Other mentioned sources were hobby and work, health and functioning, and psychological well-being.

Meaning of death was reported similarly by the persons with high cognitive functioning and by the comparison group in all three samples (Table 7). For nearly half of the interviewees, death was seen as an unavoidable and natural event. A fifth saw in it a hope for new life and about 10 percent saw it as an end to everything. A few regarded death as a liberation from suffering, rest and peace, riddle, or as a fearful or unpleasant thing.

In regards to finding a new field of activity which would yield meaning in life in old age, half of the participants from both groups in Sample I stated that they had not found new fields of activity, i.e., their interests and activities had remained the same as before. In Sample II, 49 percent of the persons with high cognitive

functioning had found a new activity compared to only 29 percent of the comparison group. This difference was significant ($z = 2.52$, $p < .01$). Similarly, in Sample III, persons with high cognitive functioning had found a new activity more often (60 percent) than the comparison group (48 percent) ($z = 1.81$, $p < .05$). Among those who had found a new field of activity, social interests were mentioned most frequently in all three samples (about 30 percent), followed by outdoor activities including gardening, fishing, and hunting (about 15 percent). In Samples I and II, the persons with high cognitive functioning reported slightly more social interests than the comparison group, whereas the comparison group more often reported outdoor activities. The other new activities mentioned were handicrafts, arts, reading, and traveling, for both groups in all three samples.

To sum up, the results for the content of meaning in life showed the main difference between the groups to lie in human relationships, especially in two older samples. Persons with high cognitive functioning derived meaning and strength in life from human relationships more often and were more eager to take part in new social activities as a new activity than the comparison group. They were also, generally speaking, more likely than the comparison group to take up a new activity after retirement. Nevertheless, in most of the categories relating to the content of meaning in life, the persons with high cognitive functioning were very similar to the comparison group. In particular, the meaning of death was almost identical for the two cognitive groups and for the three different samples.

Interrelations between the Measures of Meaning in Life

To examine the relationships between the sense of meaning in life, change in zest for life, meaning of death, and the sense of coherence, the analysis started with a saturated log-linear model. This model includes all possible hierarchical interactions between the variables. The non-significant parameters were removed step by step according to the estimated z-values. After each removal, the difference in G^2 values for the nested models was calculated in order to check whether the removed parameter should have been retained in the model. This removal procedure was repeated, ending with the final model in which all the interactions were significant. The analysis was carried out separately for Sample I and Sample III. The final model obtained for both samples was similar: the Sense of Coherence and the Change in Zest for Life were conditionally independent (= partial association), being associated with the Sense of Meaning in Life. Meaning of Death was not associated with the other terms. The schematic picture of the significant associations is illustrated in Figure 1. The fit of the model was good, both in Sample I ($G^2(64) = 34.55$, $p = 0.99$) and in Sample III ($G^2(64) = 51.72$, $p = 0.87$). The residuals of the models in both samples were small ($< | 2 |$). The associated terms of the final model are shown in Table 8: zest for life was greater for those who find their life more meaningful. Similarly, greater meaningfulness in

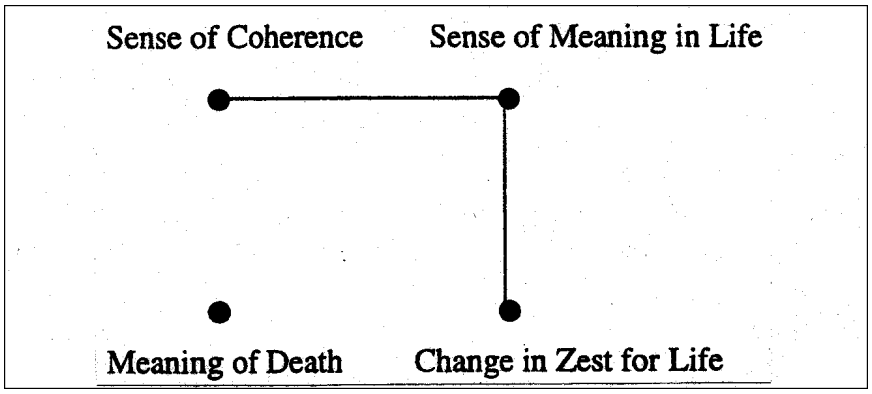

Figure 1. Schema of the relationships between Sense of Meaning in Life, Change in Zest for Life, Sense of Coherence, and Meaning of Death.

life was associated with a stronger sense of coherence. The associations between the measures were fairly linear. To sum up, the model with partial association indicates linear relationships between the Sense of Meaning in Life and Change in Zest for Life, and between Sense of Meaning in Life and Sense of Coherence, but relative independence from Meaning of Death. The equal models derived from the two samples cross-validate the interactions found between the constructs.

DISCUSSION

The focus of this study was on two important psychological aspects of aging: meaning in life and cognitive functioning. We investigated both the relationships between cognitive functioning and the degree and content of meaning in life, and the interrelations between the different measures of meaning in life. Our first hypothesis was that cognitive functioning and the degree of meaning in life would be independent of each other in old age. Second, we described the content of meaning in life among elderly persons with high cognitive functioning and a comparison group. Third, we hypothesized that different measures of meaning in life are interrelated. We tested the hypotheses in three different samples of elderly persons—two samples of persons over 80 and a sample of persons aged 65–69—in order to cross-validate the results.

The first hypothesis regarding no association between the degree of meaning in life and cognitive functioning was supported by the results of this study: finding life meaningful, having a zest for life, and a sense of coherence were all independent of cognitive functioning. These observations were in line with Frankl's (1959, 1967) view that meaning in life is a master motive independent of context

Table 8. The Relationships between Sense of Meaning in Life, Change in Zest for Life, and Sense of Coherence

		Sense of Meaning in Life					
		Sample I			Sample II		
		Meaningful $n = 40$ (%)	Difficult to Say $n = 9$ (%)	Meaningless $n = 16$ (%)	Meaningful $n = 248$ (%)	Difficult to Say $n = 54$ (%)	Meaningless $n = 16$ (%)
Change in Zest for Life	Increased	8	0	0	9	7	0
	Remained the same	78	89	56	88	85	63
	Decreased	15	11	44	4	7	38
	Total	100	100	100	100	100	100
Sense of Coherence	Strong	39	56	6	36	12	8
	Moderate	35	22	44	37	37	15
	Weak	26	22	50	27	52	77
	Total	100	100	100	100	100	100

and various personal factors, including intellectual capacity. The results, which were consistent over the three elderly samples, show that the general theoretical view of Frankl applies also to elderly people.

The second focus of the study was on the content or quality of meaning in life. Replicating earlier results (Chamberlain & Zika, 1988; DePaola & Ebersole, 1995; DeVogler & Ebersole, 1981; Viterbo & McCarthy, 1983), the descriptive results showed that human relations were the most important content of meaning in life in all three samples. However, when the groups were compared, human relationships proved to be more important to those elderly persons with high cognitive functioning, whereas for the comparison group, health and functioning were mentioned slightly more often in the two older samples. In addition to being a reason for meaning in life, social relationships also showed to be important as a source of strength in life and in terms of involving a new field of activity for the high-cognitive-functioning group in the two older samples. This was not a surprising result in view of the nature of human relationships. Cognitive functioning, which involves, for example, a better memory and verbal fluency, promotes interaction with others and vice versa: participating in social activities gives the kind of mental practice that sustains cognitive functioning. The results also showed that finding a new activity was in general more likely to occur among those with high cognitive functioning as compared to the comparison group.

Other categories pertaining to the content of meaning in life were quite similar between the groups. The answers spread into several different categories and thus the frequencies remained rather low. However, the proportion of persons answering "cannot say" for the reason for meaning in life was very high in two of the samples and—as further analysis showed—the category included items left empty by the interviewer. The interviewer bias was problematic in the analysis: it reduced the frequency of "true" reasons for meaning in life. However, it seems, according to other results derived from this study, that the bias did not distort the overall distributions.

Whereas the content or source of meaning in life seemed to differ, there was no difference in the meaning of death between high cognitive functioning and comparison groups in any of the samples. In our previous Finnish study, the meaning of death was also very stable over the ages and cohorts (Takkinen & Suutama, 1999a, 1999b). As a matter of fact, the meaning of death may be culturally bound, which could explain the stability and similarity of the responses. The results as a whole showed that the majority of the elderly people considered death a positive matter and only a small proportion of the interviewees expressed negative or fearful feelings toward it. According to the developmental view of Erikson (1994), the acceptance of death as a natural part of life indicates a positive solution to the last stage of life.

Our last hypothesis dealt with the interrelations of several measures of meaning in life. The aim was to construct a model to show the relationships between the

four variables concerning meaning in life. The model was tested in the sample of persons aged 82–87 and the sample of persons aged 65–69. In both samples, the final model showed that a stronger zest for life and a sense of coherence were related to a stronger sense of meaningfulness in life. The meaning of death showed no interactions. The association of zest for life with the sense of meaning in life reflects man's "will to meaning" so that when meaning in life is lost the zest for life is also lost, as stated by Frankl (1959, 1967). The model also indicated that the Sense of Coherence questionnaire and interview question concerning the sense of meaning in life give answers along the same lines. Even though the Sense of Coherence questionnaire has a specific subcategory of meaningfulness, the whole questionnaire can be considered as measuring meaningfulness in terms of the relationship it bears to other measures of meaning in life (Chamberlain & Zika, 1988; Coward, 1996; van Selm & Dittmann-Kohli, 1998), high interrelations between the subcategories (Feldt & Rasku, 1998; Flannary & Flannary, 1998) and the underlying theory (Antonovsky, 1979, 1987).

The model with associations between the sense of meaning in life, the change in zest for life, and the sense of coherence supported the validity and reliability of the interview questions used in this study. Measuring with only one question always involves an element of uncertainty about the reliability of the observations. The model in the present study at least partly supports the reliability of the single interview questions. The positive linear relationships suggest that calculating a sum score of, for instance, change in zest for life and a sense of meaning in life is sensible, as suggested also by the theory of Frankl (1959). The relationship with the sense of coherence, which has been shown to be strongly related to several measures of meaning in life (Chamberlain & Zika, 1988; Coward, 1996; van Selm & Dittmann-Kohli, 1998), substantiates the validity of the interview question as a measure of meaning in life. The consistent associations in the two elderly samples further cross-validate the findings.

The fact that not all of the relations between the meaning in life measures were significant (i.e., the conditional independence between change in zest for life and sense of coherence, and the independence of meaning of death) can be explained in several ways. The conditional independence of sense of coherence and change in zest for life may be due to the statistical model used: they are unrelated when linked with the sense of meaning in life in the log-linear model, but may be related in the marginal table (the association of the two variables is analyzed in their own contingency table removed from the model). Here, however, we were interested in the relationships in the generated model. In this case one obvious candidate for explaining the partial association lies in the different theoretical backgrounds of zest for life and sense of coherence. The sense of meaning in life is a factor which in the theories of Frankl (1959, 1967) and Antonovsky (1979, 1987) have in common. Zest for life is, according to Frankl, a central outcome of the sense of meaningfulness. Antonovsky, however, does not explicitly deal with zest for life in association with a sense of coherence.

The independence of the meaning of death in the log-linear model indicates that a more positive attitude to death is not related, for example, to a more meaningful life, as has been suggested in accordance with several developmental views, for instance those of Erikson (1994) and Tornstam (1989). Our finding is similar to that of Orbach et al. (1987): the fear of death was not related to losing a sense of meaning in life in their sample of adults. They considered the result to be due to the difficulty of encompassing all aspects of the fear of death with the methods generally used. In our study, we did not ask about the degree of fear, but rather about the meaning of death, which proved a positive thing for most of the respondents. The independence of the meaning of death may suggest that the meaning of death is culturally bound and that not much difference exists among old people within the same culture. Another explanation may be the instability of the meaning of death. It has been noted that attitudes toward death can vary considerably ranging from fear to hope in even the short-term among elderly people (Ruth, 1985).

The analyses in this study were carried out in three different samples of elderly persons in order to cross-validate the findings. Indeed, the results were very similar even though different measures of cognitive functioning were used for dividing the persons with high cognitive functioning from the comparison group in the different samples. The similarity of the results suggests that the significant and non-significant associations found between the constructs studied were not simply a lucky chance. The results seem to be replicable in younger and older elderly persons. However, the two older samples varied in some aspects from the younger sample. It seemed that in the older samples, cognitive functioning distinguished the content of meaning in life more than in the younger sample. This result may indicate that with age, cognitive functioning has greater significance as a factor directing motivational aspirations such as finding a source of meaning. It may also indicate that the cognitive test (Mini-D) did not discriminate cognitive functioning sufficiently in the sample of young-old persons. The variance of Mini-D was very small in this sample, whereas in the older sample it was somewhat greater. Increasing variance of cognitive functioning with age has frequently been observed in gerontological studies. As a matter of fact, differences in variances may affect the study results: a smaller variance is more likely to produce statistically non-significant results in examining relationships. In relation to sample characteristics, it is also important to note the effects of selectivity due to mortality and poor functioning, especially among the oldest age groups. Even though a representative, random sample was drawn, the participants consisted only of those who had survived and were able to attend the interviews and cognitive tests.

In conclusion, this study shows that even though the quantity or degree of meaning in life was independent of cognitive functioning, the quality or content of meaning in life was different in the two cognitive groups. To summarize, cognitive functioning is partly associated with meaning in life in later life. This brings us back full circle. As stated in the beginning, cognitive functioning and meaning in

life are both important components of well-being in old age. They may, however, represent slightly different aspects. This difference is likely to influence the results. When considered from the meaning in life point of view, well-being is not usually regarded as a capacity but is seen more as an attitude toward life (e.g., Reker & Wong, 1988; Wong, 1989). Hence, the level of functioning, for instance cognitive functioning, is not relevant. In this respect, the results of this study offer some comfort to all in that anyone, regardless of his or her cognitive level, can attain a sense of meaning in life. However, cognitive ability is important in aging. It provides the opportunity for effective functioning in the environment and participation in a wide range of activities (e.g., good memory and fluent verbalization facilitate social interaction). It sets limits to life, most dramatically in the sense of longevity (Jalavisto et al., 1964; Lehr, 1982; Palmore, 1982; Ruoppila & Suutama, 1997). But it also affects the choices of life: what to do and where to get satisfaction in life, i.e., the content of meaning in life. In this respect, cognitive functioning cannot be neglected when talking about well-being in later life.

Finally, it is worth noting that the results depend largely on how meaning in life and cognitive functioning are determined and what measures are used. Meaning in life was examined in this study by means of several measures in order to get a broader and more reliable picture of the phenomenon. One focus of the study was the interrelations between the various measures of meaning in life. The results showed that the measures were related in a reasonable way according to their theoretical backgrounds. Cognitive functioning was, however, studied only by psychometric tests. This raises the question as to the role of subjectively-experienced cognitive functioning, metacognition, everyday cognitive functioning, problem solving skills, and further, post-formal thinking and wisdom. Comparison between meaning in life and this extended view of cognitive functioning would be of benefit. Other fields of functioning, both subjectively and objectively measured, would also need to be included. It would also be important to expand the comparison of group differences to longitudinal settings in which changes over time could be followed.

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