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4-Year Stability, Change, and Multidirectionality of Well-Being in Very-Old Age

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Abstract

We examined stability, change, and dedifferentiation of well-being in 124 participants with a baseline age between 87 and 97 years (M = 90.56) across 7 measurement occasions over 4 years. Measures of hedonic (life satisfaction, positive affect and negative affect) and eudaimonic well-being (autonomy, purpose in life, self-acceptance, environmental mastery), as well as indicators of mental distress (depressive symptoms, attitudes toward death and dying, disease phobia) were included. Average levels indicated high well-being at all measurement occasions in the majority of indicators analyzed. However, mean numbers of depressive symptoms were close to the cutoff point of clinical depression. Moreover, positive affect, environmental mastery, and purpose in life showed a worsening trend over time. Analyses of intraindividual correlations revealed high loadings of these indicators on a common factor. However, several well-being indicators were not substantially interrelated on the intraindividual level, suggesting their trajectories are rather independent of each other. Acceptance of death and dying was surprisingly high and even increased, whereas mean levels in fear of death were very low and declined over time. Overall, our findings do not suggest late-life dedifferentiation of well-being trajectories in very-old age. Our results rather support the need to consider indicators of hedonic and eudaimonic well-being, as well as mental distress, to understand the multifaceted and multidirectional dynamics of well-being in very-old age.

Key words: Very old age, hedonic well-being, eudaimonic well-being, depressive symptoms, attitudes toward death and dying

Longitudinal evidence concerning stability versus change in different facets of subjective well-being in very-old age has remained scarce. The well-being of those at the far end of the human lifespan seems to a large degree uncharted territory of aging research, with conclusions on the development of well-being in very-old age often drawn based on projections of findings from less-old samples. The aging of the very old, however, may be considered "special" in that such individuals are survivors of their cohorts' average life expectancy. In a sense, in very-old age, a positively selected subpopulation is experiencing the most challenging and vulnerable phase of the human lifespan. Advanced old age may be characterized as the life phase with the highest ambivalence. On the one hand, individuals in this life phase may enjoy survivorship, the endurance of intimate relations, and possibly the evolution of wisdom-related insights (Erikson, Erikson & Kivnick, 1986). On the other hand, life in very old age is frequently accompanied by multi-morbidity and chronic functional impairment and seems to be strongly driven by nearness to death (Baltes, 2006).

Given this specific dynamic, it is not sufficient to assume that developmental trends in well-being observed across younger-old ages apply similarly to very-old age; rather, more empirical data targeting a broad range of well-being facets from very-old individuals is needed to understand "how life feels" at the far end of the lifespan. To contribute to that need, we provide in this study an advanced description of longitudinal data on well-being in a sample of very-old individuals. With advanced description, we refer to a mostly explorative analysis of change and stability, as well as coupling dynamics over time, in multiple facets of well-being that have been assessed at 7 measurement occasions across 4 years. We consider subjective well-being as a multifaceted domain of psychological functioning and investigate the heterogeneity and potential multidirectionality of changes in different facets of well-being in very-old age.[1]

[1] Throughout this article, we use the term "facet" to represent specific components of well-being, following common usage in personality research (with "facet" representing lower-level components of broad personality domains, e.g., Smith, Fischer, & Fister, 2003). In particular, "facet" may be preferred over the term "dimension" to avoid the

Facets of Well-Being in Very-Old Age

As a major step to grasp the range of components of well-being, our selection of well-being facets takes into account the second-order differentiation between *hedonic* and *eudaimonic* components of well-being, which have been distinguished conceptually (Ryan & Deci, 2001) and empirically (Gallagher, Lopez, & Preacher, 2009; Keyes, Shmotkin, & Ryff, 2002; Waterman, 1993; Waterman, Schwartz, & Conti, 2008). In addition, we also consider aspects of *mental distress* that might be experienced with a particularly high risk in very-old age and may be understood in terms of "negative well-being" (or "ill-being"; Headey, Holmström & Wearing, 1984, 1985; Ryff et al., 2006), denoting unpleasant and averse psychological experiences.

In the hedonic view, well-being is equated with experiences of pleasant emotions or happiness (e.g., Kahneman, Diener, & Schwarz, 1999; Ryan & Deci, 2001). Thus, hedonic well-being basically refers to the common notion of well-being as implied in measures of life satisfaction and affective well-being, with the latter typically narrowed down to the experience of high positive affect (PA) and low negative affect (NA).

In several longitudinal studies (Mroczek & Spiro, 2005; Schilling, 2006), mean level declines in very-old adults' life satisfaction have been reported. Cross-sectional and longitudinal research on affective well-being overall suggests high stability of PA across the life span, with some age-related decrease in old age (Charles, Reynolds, & Gatz, 2001). With respect to NA, from both longitudinal (Charles et al., 2001) and cross-sectional (Carstensen, Pasupathi, Mayr, & Nesselroade, 2000; Mroczek & Kolarz, 1998; Windsor, Burns, & Byles, 2012) perspectives, there is evidence for decline with advancing age, but declines cease or are at least attenuated in old age. Notably, mean-level declines in hedonic well-being indicators are not in contradiction with high empirically

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connotation of a presumed dimensional structure of a higher-order factor model. In the present paper, we ask for potential higher-order within-person factors *exploratively*, not presuming a specific (between-person) dimensional structure underlying the included facets of well-being.

observed rank-order stabilities of life satisfaction (Schilling, 2006) and affective well-being (Kunzmann, 2008; Kunzmann et al., 2000.

In contrast to the hedonic definition of well-being as the "pleasant life", the term "eudaimonia" refers to concepts defining well-being not just in terms of pleasure and happiness, but rather in terms of the "meaningful life" and individual self-realization. A prominent example has been the work on psychological well-being (PWB) by Ryff and colleagues (e.g., Ryff, 1989; Ryff & Keyes, 1995). PWB comprises six facets of human positive functioning and self-realization: autonomy, personal growth, self-acceptance, purpose in life, environmental mastery, and positive relationships with others.

Among the PWB scales, purpose in life was found to be lower in old age as compared to middle adulthood (Ryff, 1989) and to decline further across old age (Pinquart, 2002; Wilson et al., 2013). In a sample of Canadian older adults, all PWB dimensions—except autonomy and self-acceptance—were negatively (yet rather weakly) correlated with age (Clarke, Marshall, Ryff, & Rosenthal, 2000). Ryff, Keyes, and Hughes (2004) found that purpose in life and personal growth were lower in older adults as compared to middle-aged adults. However, positive age-group differences in favor of the older group were found for self-acceptance (see also Ryff, 1991), environmental mastery, and positive relationships with others.

Besides heudonic and eudaimonic well-being, we consider a range of additional components representing negative facets of individual well-being. Previous research has stressed the need to consider these negative facets of "ill-being" as unique components—contrasting with and complementing the positive facets of (hedonic and eudaimonic) well-being—to gain a comprehensive understanding of an individual's overall well-being. In particular, Ryff et al. (2006) strongly argued for the need to consider indicators of psychological well-being vs. ill-being and reported evidence for differential correlates of both domains, adding to earlier findings on the well-being vs. ill-being distinction by Headey, Holmström & Wearing (1984, 1985). Following a clinical understanding of well-being in terms of mental health, Keyes (2005, 2007) revealed evidence of a

two-factor model comprising unique (but correlated) dimensions of positive mental health and mental illness. Though his concept of mental illness was clinically focused (in that diagnoses of mental disorders were considered as indicators of that factor), we argue that his crucial argument that mental health must be understood in regard of the presence of positive *and* absence of negative mental states also applies to a broader, nonclinical understanding of subjective well-being. Therefore, we included in our analyses indicators of mental distress that may cause stress experiences—specifically, in very-old adults who are rather close to death.

First, *depressive symptoms* must be considered as a crucial source of mental distress in very-old age. Although there is no consistent pattern across studies indicating systematic age differences in the occurrence of depression across the adult lifespan (Jorm, 2000), depression has been found to be rather common also in (very) old age (Katona & Shankar, 2004). One out of three older adults reports depressive symptoms, and one-third of this group with depressive complaints reaches the diagnostic ICD-10 depression threshold (Helmchen, Linden, Kurtz, & Birkhofer, 2002). Clinical depression has been reported to be more frequent among the oldest-old age as compared to the young-old (Fiske, Wetherell, & Gatz, 2009), although other studies found the reverse pattern of lower rates of depressive symptoms in old-old compared to young-old age (e.g., Burton, Strauss, Bunce, Hunter, & Hultsch, 2009).

Second, *fears and attitudes toward death and dying* deserve consideration as a potential source of mental distress, particularly in very-old age (Cicirelli, 2003; Kastenbaum, 2000). In research on mental distress or ill-being, components of anxiety have usually been included (Keyes, 2005; Ryff et al., 2006). We argue that in very-old age, the most salient components of anxiety may be fears related to death and dying, which hence deserve consideration as a potential negative facet that is detrimental to the well-being of the very old. Moreover, people's subjective perceptions of their own mortality have not only been considered in terms of death-related fears, but also acceptance of the end of life (Cicirelli, 2003; Neimeyer, Wittkowski, & Moser, 2004; Wong, Reker, & Gesser, 1994). That is, the very old may not only be mentally distressed by fears of death and

dying, but also by failures to accept the near end of life and the respective limitation of their future time perspective. However, we are not aware of any study that has addressed late-life changes and stability of fears and acceptance of death and dying in very-old age.

Third, we included *disease phobia* as another component of anxiety that may generate mental distress in very-old age. Although individuals with pronounced health-related concerns usually report lower general well-being and exhibit more depressive symptoms (Bravo & Silverman, 2001; Hinz, Rief, & Brähler, 2003), such concerns may have their own quality in advanced old age and thus need separate consideration. However, to our knowledge, no study has empirically researched disease phobia in advanced old age so far.

Multidirectionality of Well-Being Changes in Very-Old Age?

Considering change in multiple facets of subjective well-being, it is obvious to ask whether changes in these facets are interrelated. In other words, the multidirectionality of these changes within individuals may be questioned, considering higher-order well-being factors able to describe ups and downs in different indicators of well-being. Beyond the description of changes in each indicator, addressing multidirectionality implies an analysis of correlated changes in different well-being indicators.

This issue resembles the classic idea of differentiation versus dedifferentiation in cognitive abilities in old age (de Frias, Lövdén, Lindenberger, & Nilsson, 2007; Ghisletta & Lindenberger, 2003). Terminal decline processes in cognitive performance and in other functional domains (Gerstorf, Ram, Lindenberger, & Smith, 2013) may limit the adaptation capacity and resources of very-old adults, which may result in rather uniform well-being declines occurring in a "dedifferentiated", unidirectional way across key well-being facets. Gerstorf et al. (2010) found a pronounced well-being decline in the last 3 to 5 years of life that was generalizable across 3 different nations and different well-being operationalizations (including depressive symptoms), which may (cautiously) be considered as evidence for late-life well-being dedifferentiation. However, correlations between terminal decline trajectories of different well-being measures, which

would be a stronger test of well-being unidirectionality in very-old age, were not computed in this study. Also, Burns et al. (2014a) have found that terminal decline occurs across different indicators of mental health and well-being. However, their identified terminal decline effects were primarily driven by a minority of the sample. Moreover, Vogel, Schilling, Wahl, Beekman, and Penninx (2013), who compared late-life changes in positive and negative affect, found negative affect to be more strongly related to time to death than positive affect. Similarly, Schilling, Wahl, and Wiegering (2013) evidenced time-to-death-related dynamics in negative, but not in positive affect. These latter findings suggest that other scenarios than late-life well-being dedifferentiation are also plausible. For example, very-old individuals can be considered long-term survivors of age-related losses and may have learned to cope with aggravation by focusing self-regulation efforts selectively towards those facets of well-being that can be protected most easily and/or most efficiently (Brandtstädter, Rothermund, Kranz, & Kühn, 2010; Erikson, Erikson, & Kivnik, 1986). If such adaptational preferences and/or capabilities exist, they may promote differentiation—rather than dedifferentiation—of well-being in very-old age. In conclusion, regarding the issue of late-life differentiation versus dedifferentiation in the area of well-being, several issues have remained unresolved in this area. By examining multidirectionality of intraindividual changes of well-being facets, we provide further evidence of how differentiated these facets unfold within very-old persons over time.

Methods

We used data from the longitudinal project LateLine, including 7 measurement occasions from 2009 to 2013 (T1-T7; means in months [SD] of subsequent measurement intervals: 11.3 [1.5], 11.2 [1.3], 5.9 [0.7], 5.8 [0.5], 4.0 [0.7], 9.9 [0.5]). LateLine followed up a random sample of older individuals born between 1912 and 1922 living alone in the Heidelberg-Mannheim area, selected in 2002 (ENABLE-AGE project; for detailed information on the parent sample, see Iwarsson et al., 2007). The inclusion criterion of living alone was chosen as the group of very-old adults living alone is, on the one hand, supposed to be a particularly vulnerable one. On the other hand, living

alone in very-old age is quite common, due to factors such as widowhood, and amounted to more than 50% of all those 80 years of age and older in Germany in 2002 (Wahl & Heyl, 2015). Data from $N = 124$ survivors (79% female) of the parent sample were obtained ($N = 113$, 92, 71, 61, 55, 51 and 44, at the respective measurement occasions; i.e., there were 11 "drop-ins" that entered the database after T1). Each study participant provided on average 3.93 observations (SD = 2.49, Mode = 7; participants with 1 observation: $N = 33$ [26.6%], 2 observations: $N = 19$ [15.3%], 3 observations: $N = 11$ [8.95%], 4 observations: $N = 6$ [4.8%], 5 observations: $N = 7$ [5.6%], 6 observations: $N = 12$ [9.7%], 7 observations: $N = 36$ [29.0%]).

Data collection was carried out at home visits by trained interviewers. Participants with severe cognitive impairment, based on a Mini-Mental State examination (MMSE; Folstein, Folstein, & McHugh, 1975) score below 17 and based on face validity, were excluded from participation. As in very-old age, individuals with vision impairment or literacy deficits are systematically disadvantaged regarding their MMSE scores (Holtsberg et al., 1995), so we decided for this "conservative" cutoff score in order to make sure that we excluded severely cognitively impaired study participants only.

It was not possible to obtain reasons for non-participation among all study participants who dropped out of the study between T1 and T7. Among those who were willing to provide reasons for study attrition, the most frequently reported reasons were: interview considered as too effortful (T2: 40%; T3: 60%; T4: 50%; T5: 47.1%; T6: 31.3%; T7: 62.5%) and health constraints (T2: 30%; T3: 10%; T4: 38.9%; T5: 47.1%; T6: 56.3%; T7: 37.5%). Fifty individuals (40.3%) died in the time interval between T1 and T7.

Measures

We included multiple indicators of the 3 broad well-being domains (hedonic well-being, eudaimonic well-being, and mental distress). To minimize confusion among our very-old study participants due to changes of response formats and answer categories within the interview, the Satisfaction With Life Scale (SWLS) and the Ryff scales of psychological well-being were adapted

using a 5-point scale, so that the response format of these scales was identical with other instruments included (PANAS, FIMEST-E).

Hedonic well-being. *Life satisfaction* was assessed by the SWLS (Diener, Emmons, Larsen, & Griffin, 1985). The SWLS measures global life satisfaction in 5 items, with a response format from 1 ("strongly disagree") to 5 ("strongly agree"). The internal consistency of the SWLS was .82, .79, .79, .75, .75, .83, and .79 at the respective measurement occasions.

Affective well-being was assessed based on the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The PANAS consists of 10 positive and 10 negative emotion adjectives. Respondents have to report how often (1 ["never"] to 5 ["very often"]) they have experienced each of the 20 emotions within a specified time period. We used the time since last measurement occasion as a time frame in order to assess individual levels of affective well-being across broader time periods, which are less affected by situational and contextual "noise" components (e.g., the season of the respective assessment). *Positive affect* (PA) and *negative affect* (NA) were computed by averaging all reported positive- and negative-emotion frequencies, respectively. For PA, internal consistencies (T1-T7) were .83, .87, .85, .85, .80, .86, and .76; for NA: .83, .85, .84, .86, .86, .79, and .85.

Eudaimonic well-being. Four subscales of the Ryff scales of psychological well-being (Ryff, 1989) were included as measures of eudaimonic well-being. Each scale consists of nine items which had to be answered on a scale from 1 ["strongly disagree"] to 5 ["strongly agree"]. The specific subscales are: *autonomy* (e.g., "I have confidence in my opinions, even if they are contrary to the general consensus"; Cronbach's α T1-T7: .72, .75, .81, .73, .79, .61, .70), *environmental mastery* (e.g., "In general, I feel I am in charge of the situation in which I live"; α T1-T7: .74, .80, .69, .87, .81, .69, .65), *purpose in life* (e.g., "Some people wander aimlessly through life, but I am not one of them"; α T1-T7: .69, .74, .61, .61, .48, .72, .48), and *self-acceptance* (e.g., "I like most aspects of my personality"; α T1-T7: .80, .84, .84, .67, .85, .83, .76). Two of the PWB subscales—personal growth and positive relationships with others—were not assessed in order to

minimize the interview length and burden for our very-old respondents. Moreover, we considered these subscales as less "topical" in the life of very-old individuals (mostly) living alone and with rather limited time perspective, because they may be less reachable or modifiable than the other dimensions at the end of life.

Measures of mental distress. *Depressive symptoms* were assessed with the 15-item short version of the Geriatric Depression Scale (Sheik & Yesavage, 1986; Cronbach's α T1-T7: .82, .80, .85, .83, .84, .81, .79). Items had to be answered with "yes" or "no." *Attitudes toward death and dying* were assessed by a short-form of the German FIMEST-E ("Fragebogeninventar zur mehrdimensionalen Erfassung des Erlebens gegenüber Sterben und Tod", Multidimensional Orientation Toward Dying and Death Inventory; Wittkowski, 1996, 2001). Answers were given on a scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). For reasons of economic assessment, we shortened the instrument by excluding items with lowest factor loadings reported by Wittkowski (1996), resulting in 6 items for the subscale *fear of dying* (α T1-T7: .85, .77, .79, .79, .72, .84, .83), 4 items for the subscale *fear of death* (α T1-T7: .82, .72, .64, .85, .87, .79, .81), and 6 items for the subscale *acceptance of death and dying* (α T1-T7: .73, .67, .76, .53, .86, .94, .64). *Disease phobia* was assessed using a shortened version of the German adaptation of the Whiteley Index (Hiller & Rief, 2004). We kept only items with loadings higher than .50 on the disease phobia factor, resulting in a 6-item scale with a yes/no response format (α T1-T7: .64, .61, .55, .62, .64, .71, .67).

Statistical Analyses

Due to the descriptive aims of this study, a large part of the results presented will concern basic sample statistics, including autocorrelations between adjacent measurement occasions indicating the rank-order stability of the well-being measures. Moreover, we computed intra-class correlation (ICC) coefficients as an indicator of overall within-person stability. To do so, we used longitudinal mixed modeling (Hox & Kreft, 1994; Verbeke & Molenberghs, 2000), running

random-intercept–only models, which provide the ICC in terms of the relative proportion of the total variance that is due to interindividual (as against intraindividual) differences.

Additionally, we checked the well-being measures for systematic linear and curvilinear trends of decline or increase, again by means of longitudinal mixed modeling, using "years" as time unit. Mixed-model analyses were conducted by use of PROC MIXED, implemented in the SAS 9.2 software package (SAS Institute Inc., 2009).

To examine the coupling of changes in different facets of well-being, we computed within-person (intraindividual)—versus between-person (interindividual)—correlations among the well-being measures, as follows. Running the random-intercept models (also used for ICC computation) implies a partition of each well-being score into an individual-level component and a residual component representing the deviation of the score from that individual level observed at the respective measurement occasion. Thus, for each pair of well-being indicators, the correlation between the residuals estimated from both random intercept models is an estimate of the within-person correlation, whereas the correlation between the individual-level components represents the between-person correlation.[2]

Finally, we aimed to analyze whether the bivariate intraindividual correlations reveal some distinctive groups of well-being indicators that are highly linked within individuals across time. Thus, we ran an exploratory factor analysis on the intraindividual correlation matrix. In doing so, we considered that these intraindividual correlations may be lowered due to substantial portions of indicator-specific variance, representing measurement error and/or specific factors (e.g., Fabrigar & Wegener, 2012). In particular, according to the "conventional" statistical theory, the maximum

[2] Note also Bland & Altman's (1995a, 1995b) proposal to compute within- and between-person correlations, which is however somewhat limited in dealing with the drop-outs/ins; it does not apply a maximum likelihood estimation of $\hat{Y}_i$. Also, Hamlett, Ryan, & Wolfinger's (2004) straightforward technique for a "direct" maximum likelihood estimation of the intraindividual correlation seemed unsuitable for use with our longitudinal design, as it is derived from a mathematical rationale implicitly based on the assumption of equal-measurement intervals.

likelihood estimates of the individual mean levels do not contain the measurement error, which hence is fully contained in the measurement-occasion–specific deviations from the individual mean level. Therefore, we preferred common-factor analysis, which accounts for the indicators' unique variances, over the widely used principal-component analysis (see Fabrigar & Wegener, 2012, for a discussion of the pros and cons of both techniques) and ran the iterative principal factor and the maximum likelihood model-fitting procedures by use of SAS 9.2 PROC FACTOR (SAS Institute Inc., 2009).

Results

We begin with graphical displays of intraindividual trajectories of all well-being indicators (Figure 1, Panels A-L). At first glance, high intraindividual changeability seems apparent in the individual trajectories of all measures, in that there are not only changes of the absolute scores, but also of the relative position within the sample. However, in most measures, participants tended to score on a restricted range of the measurement scales. That is, most participants reported high life satisfaction, self-acceptance, autonomy, and environmental mastery, and a ceiling effect can be seen in acceptance of death and dying; most scores of NA, fear of death, and disease phobia are located below the respective scale midpoints. Bottom effects occur in that most participants reported very low fear of death and disease phobia at most measurement occasions. Also, depressive symptoms appear somewhat skewed toward lower values; note, however, that many individual scores are ≥ 5, indicating clinically relevant depression (Sheik & Yesavage, 1986; Stek et al., 2004). Scores of PA and purpose in life appear concentrated around their scale midpoints, whereas fear of dying appears as the only variable with scores distributed rather equally across the whole range of the scale.

Stability and Change of Well-Being Measures

Descriptive statistics of the stability versus changes in hedonic well-being—including means, autocorrelations, and intra-class coefficients—are listed in Table 1. Overall, no pronounced mean level changes are visible (analyses of mean level trends will be reported below). Furthermore,

the autocorrelations indicate high rank-order stabilities of the cognitive and affective well-being measures ($r > .60$ for all, with a maximum of $r = .82$).

As an indicator of overall within-person stability, we computed the intra-class correlation (ICC) coefficients, which indicate the relative proportion of the total variance that is due to interindividual (versus intraindividual) differences. These proportions were .72, .71, and .73, for SWLS, PA, and NA, respectively. Thus, major parts of the variances of the hedonic well-being indicators are due to interindividual differences in the persons' average level across the repeated measures; however, about a quarter to a third of the total variability was due to within-person changes, confirming the substantial changeability that can be seen in the individual trajectories depicted in Figure 1, Panels A-C.

Descriptive statistics for eudaimonic well-being measures are shown in Table 2. Again, mean level changes appear rather small. The autocorrelations of the Ryff scales were again high (mostly ranging .60 □ .79). Thus, similar to hedonic well-being, individuals hardly changed their relative position of eudaimonic well-being indicators within the sample.

The ICCs were .67, .64, .59, and .68, for autonomy, environmental mastery, purpose in life, self-acceptance, respectively. Thus, the eudaimonic well-being scores overall appeared more changeable within persons than hedonic well-being. In particular, purpose in life shows high changeability, with 41% of the total variation due to within-person changes. Notably, this high proportion of intraindividual variation corresponds with lowest rank-order stability and at least some tentative mean level changes revealed for purpose in life, altogether pointing to this facet of well-being as one of those undergoing the most pronounced intraindividual changes in our sample.

Descriptive statistics of the changes in depressive symptoms, fear of dying, fear of death, acceptance of dying and death, and disease phobia are shown in Table 3. Again, no pronounced mean level changes are apparent, except some more clear-cut tendency of decline in fear of death. Rank-order stability of depressive symptoms, fear of dying, and disease phobia were high, with

most autocorrelations above $r = .60$. However, fear of death and particularly acceptance of death and dying revealed low rank-order stabilities.

ICCs for depressive symptoms and fear of dying revealed again some substantial changeability in terms of about a quarter of the total variability due to within-person changes. Much lower ICCs were revealed for fear of death, acceptance of death and dying, and disease phobia. The graphical displays of the individual trajectories in Figure 1, Panels J-L, are illustrative in showing that these relatively low shares of interindividual variance reflect the ceiling or bottom effects in these indicators. I.e., because the old individuals did not so much differ in their individual levels of fear of death, acceptance of dying and death, and disease phobia, the intraindividual deviations from these individual levels provided larger shares of the overall variation, particularly for acceptance of death and dying.

Growth-Curve Models of Developmental Trends of Well-Being

We computed multilevel linear and curvilinear (quadratic) curve models to check for the systematic trajectories of all well-being variables. Results are reported in Table 4 (the curvilinear model is provided only if it fitted substantially better than the respective linear model in terms of the difference in the Bayes Information Criterion; Kass & Raftery, 1995).

Among the set of hedonic well-being indicators, only PA had a significant linear fixed-slope effect, indicating a trend of small mean level decrease over time (-.04 units per year). In addition, a marginally significant linear mean level increase of SWLS can be observed. More notably, the random variance of the linear slopes in PA was marginally significant only. In contrast, the random slope effects of all other hedonic well-being indicators were significant.

Regarding eudaimonic well-being, we found significant fixed effects that indicate a linear decline in environmental mastery (-.05 units per year) and purpose in life (-.08 units per year), but not in autonomy and self-acceptance. Significant random slope variances were revealed for purpose in life and self-acceptance, but not for autonomy and environmental mastery.

Analyzing the indicators of mental distress, significant fixed-slope components were revealed for attitudes toward death—namely, there was a linear increase in acceptance of death and dying (.04 units per year) and a linear decrease in fear of death (-.08 units per year). Regarding fear of dying, the average trend was curvilinear in terms of a mean trajectory starting at baseline with a decrease, slowing down across the measurement period due to a significant positive quadratic time effect (the curve reveals an overall mean decrease by -.33 units across 4 years). An only marginally significant mean linear increase was found in depressive symptoms. The random slope variances were significant for all mental distress facets, except that acceptance of death and dying revealed only a marginally significant random slope variation.

Mixed modeling maximum likelihood estimation provides missing-at-random (MAR) treatment, but some of the missingness in our sample (including monotone drop-out, drop-in at T2 or T3, and intermittent non-response) may have occurred not at random (MNAR; for definitions, e.g. Schafer & Graham, 2002). To check the growth curve estimates—in particular the fixed slope effects—for MNAR bias, we applied the pattern mixture approach to divide the sample into subgroups with different patterns of missingness and include this division as between-person predictor in the mixed models (for details, Hedeker & Gibbons, 1997). However, there were 23 different patterns, only 3 of them with more than 10 observations. Following the rationale that intermittent non-response may be reasonably considered as MAR, whereas in particular monotone drop-out from the study deserves consideration in terms of MNAR (e.g., Enders, 2011), we defined three patterns based on the last available measurement at T7 (n = 44) versus T4-T6 (n = 21; including 5, 5, 11 with last observation at T4, T5, T6, respectively) versus T1-T3 (n = 59; including the 33 individuals measured only once, whose slope hence was constrained equal to that of the others that dropped out before T4). Only for PA, these patterns interacted significantly with slope ($p \leq .05$). The fixed PA-slope estimate averaging over the missing data patterns yielded -.066 ($p \leq .001$), hence the significant trend of PA decline holds after controlling for patterns of missingness. No other significant pattern-slope interactions were found (notably, with respect to type II error, all

interactions revealed $p > .20$). In addition, the patterns had an impact on the intercept estimates of PA, mastery, and depressive symptoms (i.e., later drop-out related to higher levels of PA and mastery and with less depression).

It may be asked to which degree the mean level trends reported above reflect specific sample characteristics in terms of basic socio-demographic conditions and physical and cognitive health of the respondents. Therefore, we estimated the fixed-slope effects adjusted for gender, education (4-graded level of educational achievement), functional health (measure of activities of daily living [ADL], Sonn & Hulter-Åsberg, 1991), and cognitive status (MMSE score). First, we ran additional growth curve models to control for the effects of the time-invariant, between-person level predictors (gender, education, and the person means of ADL and MMSE). Doing so virtually did not change the previously reported fixed-slope effects. The pattern of significant fixed-slope effects was the same for all well-being outcomes and the values of the significant slope effects changed only slightly.[3] Next, we also added the time-varying within-person effects of ADL and MMSE (i.e., the person mean deviation scores, e.g., Hoffman & Stawski, 2009). Doing so revealed some notable (and expectable) changes with regard to the fixed-slope effects. For PA, environmental mastery, and depressive symptoms, the fixed-slope effects were no longer significant (or marginally significant) and lowered (i.e., -.019, .028, -.011, respectively for PA, mastery, and depression), whereas the ADL deviation score revealed significant within-person effects, in that higher functional health was associated with higher PA and mastery and less depressive symptoms. A reversed effect was

[3] To analyze whether the time-invariant characteristics are moderators of intraindividual change, we tested additionally the interactions of gender, education, and between-person scores of ADL and MMSE with time. Significant interactions ($p \leq .05$) were found as follows: Education interacted with the slope for PA and self-acceptance (and showed marginally significant interactions with regard to purpose in life). Notably, these interactions indicate that those with the highest education level showed strongest *declines* in these indicators. Also, gender interacted with time in predicting NA, indicating that men tended towards less NA, whereas female mean level of NA was stable over time. With regard to self-acceptance, the person mean score of ADL interacted with the slope, indicating that lower overall levels of functional health predict less reduction (but also lower overall levels) of self-acceptance.

revealed for SWLS and NA, in that the fixed linear slope effect was now significant and slightly increased for SWLS (i.e., .052, $p \leq .05$), but substantially increased for NA (i.e., -.005, $p \leq .01$). However, there was only a marginally significant within-person effect of MMSE on NA (higher MMSE score correlated with less NA), but no other significant within-person effects of ADL and MMSE on these outcomes. No other fixed-slope effects were changed by the inclusion of time-varying deviation scores of ADL and MMSE.

Analysis of Correlated Changes in Well-Being

We first computed 2 sets of correlations, namely the between-subject (interindividual) and within-subject (intraindividual) correlations among all well-being measures. The intraindividual correlations, shown in the lower triangular part of Table 5, are generally much lower compared with the interindividual correlations between the individuals' average levels, shown in the upper triangular part. Focusing on the *intra*individual associations, at least medium-sized correlations (i.e., $r > .30$, considering the effect-size evaluations, as proposed by Cohen, 1989) were revealed among SWLS, PA, environmental mastery, self-acceptance, and depressive symptoms, with only 3 correlations within this group of indicators slightly below .30. Also, NA appears substantially intraindividually correlated with depressive symptoms, but revealed only small or minor correlations with all other well-being indicators. Moreover, fear of death appeared substantially correlated with acceptance of death and dying on the intraindividual level.

Going further, to gain a more comprehensive view of the association between intraindividual ups and downs in the well-being indicators analyzed, we ran exploratory common factor analyses on the intraindividual correlation matrix. Table 6 shows the results obtained from fitting a common-factor model with the iterative principal-factor method (for comparison, we also ran the maximum likelihood technique, which revealed fairly equal results). A 2-factor solution was sufficient to account for 100% of the common variance (i.e., the prior communalities estimated by the squared multiple correlations). We used oblique promax rotation to obtain a simple structure of the factor pattern, which revealed a factor correlation of -.34.

Noticing the highest loadings as well as shares of intraindividual variance accounted for, the first factor seems particularly intrinsic in PA, environmental mastery, and depressive symptoms (with highest and negative loading on that factor, which accounts for nearly 50% of its intraindividual variance and all of its communality). In addition, SWLS, self-acceptance, and purpose in life also showed some substantial loading (>.30) on the first factor. The strongest indicators of the second factor were fear of death and acceptance of death and dying, whereas disease phobia, self-acceptance, and environmental mastery also loaded substantially on that factor.

Discussion

In this study, stability, change, and trends of dedifferentiation among well-being indicators were investigated across 4 years in a sample of very-old adults. To take the multidimensionality of well-being (Diener et al., 1999; Gallagher et al., 2009; Ryan & Deci, 2001) and possible trends of multidirectionality into account, multiple indicators were used—namely, measures of hedonic (cognitive and affective) well-being, eudaimonic well-being, and indicators of mental distress. Following our descriptive aims, the findings may be summarized as follows.

Overall Levels of Well-Being

Our sample of the very old appeared rather "well off" in most of the facets of well-being across the study observations. Largely in accordance with the available—although rather rare previous research with individuals in advanced old age (e.g., Isaacowitz & Smith, 2003; Kunzmann, 2008) —a majority expressed remarkably high scores in hedonic and eudaimonic well-being, such that the means in most measures were above the theoretical scale midpoints. Also, among the indicators of mental distress, most individuals reported a high acceptance of death and dying and only little fear of death; disease phobia was very low in the sample.

However, some indicators did not show very favorable distributions—namely PA, purpose in life, and fear of dying—as indicated by means close to the respective scale midpoints. Most notably, depressive symptoms showed rather high average scores close to the clinically relevant depression level. This confirms findings that depression is common in old and very-old age

(Helmchen et al., 2002; Katona & Shankar, 2004; Stek et al., 2004; van't Veer-Tazelaar et al., 2008). Heightened depression levels may thus be a particular characteristic of very-old age, when general functional capacity decreases and vulnerability as well as health constraints increase, thus limiting the individual's adaptational and self-regulatory capacity (Baltes & Smith, 2003; Smith, 2001; Smith et al., 2002). However, we acknowledge that the GDS short-form used is a screening tool only and is not apt for diagnoses of clinical depression. Positive answers of very old adults to some items (e.g., "Have you dropped many of your activities and interests?"; "Do you prefer to stay at home, rather than going out and doing new things?") may actually not be caused by depressive symptoms, but by factors such as health-related restrictions. Some support for this assumption was found when we analyzed change in depressive symptoms by controlling for functional health (ADL). A significant relationship between ADL and depressive symptoms emerged, indicating that lower ADL scores in very-old age accompany more depressive symptoms.

Still, the high depression levels we identified in this study seem to conflict particularly with high hedonic well-being in terms of high life satisfaction and low NA. Further findings, as will be discussed below, may resolve that seeming inconsistency.

Stability Versus Changeability of Well-Being

As in other studies (Kunzmann, 2008; Schilling, 2006), we generally found high rank-order stability across most well-being indicators. This is remarkable, as we did not apply corrections for attenuation which estimate true-score correlations by taking into account that indicators are not perfectly reliable. Therefore, "true-score stabilities" are higher than the stabilities we reported.

Only the autocorrelations of acceptance of death and dying and of fear of death were low. However, distributions of both acceptance of death and dying and fear of death were considerably skewed, with most individuals reporting high acceptance and low fear, resulting in ceiling/bottom effects and restricted interindividual variances. Moreover, it seems that many individuals had temporary "breaks" of increased fear of death and/or lost acceptance of death and dying at a single measurement occasion, but "recovered" again toward the more positive attitudes at the subsequent

measurement (see again Fig. 1, Panels J and K). These shifts toward "excess" values may have additionally contributed to low autocorrelations.

High rank-order stabilities do not preclude intraindividual change, as has become evident from substantial shares of intraindividual variation found in all facets. Given that these proportions of the indicators' variances do not fully represent fluctuation due to measurement error, but also changes due to systematic developmental trends or situation-specific true-score changes, it can be concluded that even in oldest-old age well-being shows changeability.

Trajectories of Well-Being

Our investigation of systematic well-being trajectories based on growth-curve models pointed at multidirectional change trends: On the one hand, favorable trends were found for the attitudes toward death and dying. Acceptance of death and dying was already high at T1, but showed a mean level trend of further linear increase over time. Also, although mean fear of death was already low at baseline, a linear mean level trend of further decrease was revealed. For fear of dying, which was on a medium mean level at baseline, evidence of a small mean level decline was found. These mean level trends point at adaptive capabilities of very-old adults in dealing with proximity to death and dying, in that on average, they were able to reduce respective fears and raise acceptance the longer they survived. Moreover, we observed an increase in life satisfaction (SWLS) over time, though this effect was low in size and only marginally significant.

On the other hand, a worsening trend in mean-level trajectories was found in PA, environmental mastery, purpose in life—and, though only marginally significant—in depressive symptoms. Our findings confirm previous research that evidenced increases in depressive symptoms (Helmchen et al., 2002) and declines in PA (Charles et al., 2001; Diener & Suh, 1998; Isaacowitz & Smith, 2003; Schilling et al., 2013; Vogel, Schilling, Wahl, Beekman, & Penninx, 2013) and in purpose in life (Clarke et al., 2000; Ryff, 1989; Ryff et al., 2004; Springer, Pudrovska, & Hauser, 2011; Wilson et al., 2013) in old and very-old age. The mean decline in PA may have been partly caused by the fact that the PANAS items primarily measure high-arousal affect. The

inclusion of more low-arousal positive affect items might have resulted in a less steep mean PA decline, or even in an increase—as has been found by Windsor, Burns and Byles (2012) based on cross-sectional age comparisons.

Finally, apart from increasing and decreasing mean-level trajectories, a trend of mean-level stability was found for NA , autonomy, self-acceptance, and disease phobia. This is in line with studies based on younger age groups, which reported overall small longitudinal age variation in psychological well-being (Springer, Pudrovska, & Hauser, 2011). Thus, regarding systematic mean level changes, well-being in very-old age revealed "rich" multidirectionality, suggesting trends of gains, losses, and stability.

It must be noted, however, that all reported slope trends implied rather slight changes. Moreover, as reflected by significant variability in most multilevel slope components and as illustrated by Figure 1, we found substantial heterogeneity in change trends. For each single measure, different trends could be observed within the study sample, with stability for some individuals and changes in either direction for others. Therefore, rather than focusing on mean level trends, future research might profit from addressing predictors of interindividual differences in intraindividual well-being change trajectories. For instance, potential developmental heterogeneity in terms of subgroups with different prototypical change trends may be investigated (e.g., Schilling, Wahl, & Reidick, 2013). Moreover, developmental conditions as well as contextual and other (time-varying) factors triggering particular trends need to be analyzed by future research. Burns et al., (2014b), for example, demonstrated that late-life well-being changes were attenuated once time-varying health was taken into account. We ran additional analyses by including interaction effects of gender, education, ADL, and cognitive ability with time. Only a few interactions reached significance; higher education was associated with stronger declines in PA and self-acceptance. Men exhibited decline in NA, whereas women did not. Lower ADL was associated with less decline in self-acceptance. It thus seems that only a modest amount of interindividual differences in

late-life well-being slopes can be accounted for by sociodemographic predictors, functional health, and cognition.

Coupled Changes in Well-Being

We found substantial within-subject correlations among SWLS, PA, environmental mastery, self-acceptance, and depressive symptoms. NA was also intraindividually correlated with depressive symptoms, but not with any other well-being indicator. Fear of death and acceptance of death and dying were also substantially interrelated within individuals. Overall, it seems that environmental mastery and depressive symptoms are in a sense the “core” indicators, whose intraindividual ups and downs are linked with most of the other well-being indicators, altogether showing the largest intraindividual correlations. Alternatively, the substantial intercorrelations we found (both on an interindividual level as well as intraindividually) between depression and SWLS—as well as between depression and PA—may partially be explained by the fact that the content of some GDS items overlaps with items used to assess life satisfaction (e.g., "Are you basically satisfied with your life?") and affective well-being (e.g., "Do you feel happy most of the time?").

In notable contrast, there are 3 indicators that appeared to vary within the individuals relatively independent of all others: autonomy, fear of dying, and disease phobia. It should be noted that these variables showed several substantial *inter*individual correlations with other well-being indicators. Attitudes toward death and dying as components of mental distress seem to be ambiguous in that they are substantially related to other mental distress indicators if considered interindividually (e.g., fear of dying with depression, fear of dying and fear of death with disease phobia), but not based on intraindividual correlations.

For an in-depth examination of the structural relationships underlying these within-subject correlations, we used exploratory common-factor analysis. A 2-factor solution was revealed. Notably, there were 3 well-being indicators whose loadings on both factors were rather weak

(negative affect, autonomy, and fear of dying). The trajectories of these measures may thus be, to a large extent, independent of the changes in all other well-being indicators.

Considering that depressive symptoms, but also PA and environmental mastery, revealed a particularly high negative loading on the first of these factors, this factor points at a component of current positive activation, varying within the person across situations. Intraindividual changes of environmental mastery may reflect the ups and downs in functional competences (Heyl & Wahl, 2012). These competences are crucial for engagements in prohedonic activities, which in turn affect the formation of PA, considered reactive to experiences of pleasure and reward (Fowles, 1987; Quilty & Oakman, 2004; Watson et al., 1999). Following the influential tripartite model of depression and anxiety (Clark & Watson, 1991), depressive symptomatology is viewed as composite of a general factor of negative affectivity and anhedonia in terms of low PA, implying that the formation of depressive symptoms is basically driven by interferences of prohedonic activities. Thus, an intraindividual change factor may underlie these indicators in terms of current positive activation, signaling ups and downs of behavioral engagements that are successful in providing positive hedonic value to the very-old individuals. For instance, episodes of acute illnesses—or quite simply the weather conditions—may temporarily interfere with a very-old person's usual means to "have some fun." At times when such positive activation is compromised, other facets of well-being also might be hindered. In particular, this factor accounted for moderate shares of intraindividual variance in life satisfaction, self-acceptance and purpose in life. We found support for this explanation when we investigated changes in depression, positive affect, and environmental mastery, adjusted for functional health (ADL); controlling for ADL, the linear trends of all 3 well-being indicators were no longer significant. Moreover, ADL was found to be significantly associated with these well-being measures. One possible conclusion from these findings is that declining functional health complicates the exertion of prohedonic activities, likely resulting in lower feelings of environmental mastery, reduced PA, and more depressive symptoms.

Notably, this view of current positive activation implies an explanation of our initially inconsistent findings of favorable mean levels of life satisfaction and NA versus rather high average rates of depressive symptoms. We argue that there is no contradiction. First, in very-old age, intraindividual increases in depressive symptoms may largely arise from anhedonia due to frequent interferences of positive activation. Thus, at a given measurement occasion, a substantial share of currently "anhedonic" individuals experiencing reduced PA elevates the average rate of depressive symptoms. In contrast, NA has been viewed as less activity-based, focused more towards aversive and threatening stimuli serving behavioral inhibition rather than activation ("inward focus", Kunzmann, 2008; Watson et al., 1999). Second, life satisfaction, considered as "cognitive" component of hedonic well-being, could be expected to be only moderately impacted by constrictions of positive activation: Constrictions of prohedonic activities in very-old age may be perceived as normal and expected; hence, the very old might adjust evaluative judgments of their current life to reduced internal set-points (e.g., Diener, Lucas, & Scollon, 2006).

The second factor shows particularly strong expression in the fear-of-death measures, explaining more than one-third of its intraindividual variance (and nearly all of the communality), and also, though weaker, in acceptance of dying and death, accounting for all its communality. Notably, fear of dying did not load on this factor, which hence seems focused towards the end of life itself, rather than on the agonizing process leading to that end. It may reflect a component of current end-of-life despair. Most individuals reported low fear of death and high acceptance of death and dying at most measurement occasions, and most intraindividual changes occurred as temporarily increased fear of death and/or lost acceptance of dying and death. This temporary changes then may also bolster attention towards health symptoms that may signal the end of life, promoting hypochondriac concerns and increasing feelings of loss of control, corrupting the perceptions of environmental mastery and self-acceptance as well.

Study Limitations

Obviously, our sample was limited in terms of size and representativeness and caution is needed with respect to the generalizability of our findings. Low sample size also prevented advanced latent-variable modeling that may be desirable in order to disentangle true change from fluctuation due to measurement error and to specify measurement invariance. Also, selective dropout might have occurred, so our longitudinal findings need to be interpreted carefully. Patterns of (montone) dropout affected the individual levels of only three facets, and—more important with regard to our focus on intraindividual change—only the linear trend in PA (suggesting that the average decline unbiased by dropout may even be steeper). Thus, potential effects of selective dropout on systematic changes in the well-being facets seem to be only minor. However, the intraindividual correlations (as well as the factor analysis based on these) should be regarded as purely descriptive results, computed for exploratory reasons without any adjustment for dropout patterns.

Regarding psychometric properties of the well-being measures, not all scales revealed high internal consistency across all measurement occasions. Specifically, for purpose in life, we found Cronbach's α to be <.50 at 2 measurement occasions. However, this could also be due to restricted variability in purpose in life scores at these measurement waves. When considering autocorrelations as alternative reliability estimates, the resulting reliability of purpose in life was mostly acceptable. Concerning acceptance of death and dying, we found both low retest reliability estimates, as well as low Cronbach's α scores, at some measurement occasions. However, this may be due to a pronounced ceiling effect in acceptance of death and dying rather than to disadvantageous psychometric properties of the assessment instrument used. This ceiling effect even increased over time and led to a very restricted score range and variability, which consequently may have produced underestimation of reliability.

We also acknowledge that alternative classifications of well-being domains might be plausible. Specifically, the assumption of distinct eudaimonic well-being factors, as assessed by the Ryff scales of psychological well-being, has been empirically questioned by studies in which other

factor solutions, including higher-order and method factors, have been found (Abbott et al., 2006, 2010; Burns & Machin, 2009). Moreover, it seems that some Ryff indicators have "double loadings," both on an eudaimonic and on a hedonic well-being factor (Keyes, Shmotkin, & Ryff, 2002). However, the aim of this study was not to investigate the factor structure of well-being, but rather to analyze late-life stability and change of a broad range of well-being indicators.

To further qualify our results and data-analytic approach, stronger declining trends in well-being might have resulted if we had analyzed terminal well-being changes related with distance to death (Gerstorf et al., 2010; Palgi et al., 2010; Schilling et al., 2013; Vogel et al., 2013). Terminal decline in well-being has been reported to be even more pronounced if people reach a very old age (Gerstorf, Ram, Röcke, Lindenberger, & Smith, 2008). Moreover, strong trends of dedifferentiation in terminal cognitive trajectories have recently been found (Wilson, Segawa, Hizel, Boyle, & Bennett, 2012). Specifically, in the Wilson et al. (2012) study, close-to-death slopes of different cognitive domains were highly interrelated, whereas preterminal cognitive slopes, representing changes more distant from death, were not. Future research should investigate if similar findings emerge when comparing dedifferentiation of preterminal vs terminal well-being changes. However, the number of participants in our study who had died between T1 and T7 was rather small and not sufficient for advanced statistical analyses of terminal decline. Therefore, the question if there is a terminal dedifferentiation not only in cognitive trajectories, but also in changes of different well-being indicators, needs further investigation.

Summary and Conclusions

This study's descriptive overview of multiple facets of well-being in very-old age may be summarized by the following most crucial aspects. First, in some contrast to the mostly positive well-being patterns, we found rather high average depression levels. Also, PA and environmental mastery showed a negative change trend. Moreover, these three indicators shared substantial portions of intraindividual variability from a common source, suggesting a factor of positive activation reactive to situational or contextual conditions. High levels of depressive symptoms may

hence result from interferences of that positive activation in very-old age, pointing at a key component of well-being at the end of the lifespan. In late life, limited opportunities for prohedonic experiences should be regarded as a crucial domain regarding risks of "ill-being" (and particularly depression) in very-old age.

Second, very-old adults seem less distressed by threats that could be regarded particularly salient in late life. Seemingly, they hardly feared death and showed high acceptance of death and dying; they did not worry much about their health. Also, no maladaptive trends of change over time in these indicators appeared, but rather some minor trend to declining distress related with death and dying. An exception was fear of dying, which revealed larger interindividual differences, averaging at a level that may be rated as a "medium" burden of fear. Thus, fear of a potentially agonizing process of dying—not of death itself—may provide distress for some, but not all, of the very old. This component might be worth more attention in oldest-old research and intervention. Aside of these fears of dying, however, we revealed findings that point at temporary distress which might be understood as occasional outbreaks of despair due to being near the end of life. Of course, this ad hoc interpretation is speculative and needs further empirical confirmation, but it seems worth such consideration for future research based on shorter assessment intervals (e.g., daily-diary studies).

Third, the findings underscore the heterogeneous and multidirectional nature of well-being in very-old age. Within-subject associations evidenced substantial independence of intraindividual changes in different indicators, which would not fit with a notion of well-being dedifferentiation in very old age. Even taking again into account that intraindividual correlations have been attenuated by measurement error, at least some indicators appeared to vary within persons largely independent from the others. Multidirectionality of changes was evident from mean-level growth curves, which revealed a diversity of trends, indicating both favorable and maladaptive directions, as well as stability for different indicators. Overall, it may be concluded that well-being does not dedifferentiate at the end of the human lifespan.

Text: 8602 Words

Conflict of Interest

None.

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Table 1

Means and First-Order Autocorrelations of Hedonic (Cognitive and Affective) Well-Being Measures Across the Seven Measurement Occasions

	SWLS		Positive Affect		Negative Affect	
	M (SD)	R	M (SD)	R	M (SD)	R
T1	3.66 (0.85)		3.25 (0.63)		2.11 (0.62)	
T2	3.77 (0.82)	.73***	3.20 (0.68)	.75***	2.08 (0.63)	.81***
T3	3.82 (0.76)	.78***	3.24 (0.64)	.73***	2.08 (0.62)	.77***
T4	3.92 (0.69)	.76***	3.28 (0.60)	.79***	1.99 (0.62)*	.79***
T5	3.88 (0.70)	.66***	3.22 (0.60)*	.75***	2.03 (0.59)	.72***
T6	3.68 (0.80)	.71***	3.16 (0.70)	.82***	1.97 (0.56)	.79***
T7	3.91 (0.76)*	.77***	3.22 (0.60)	.62***	2.02 (0.71)	.70***
ICC	.72		.71		.73	

Note. SWLS = Satisfaction With Life Scale (Diener et al., 1985)

T2-T7 means tested for significant difference to previous wave mean (repeated-measures t-test).

† $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 2

Means and First-Order Autocorrelations of Eudaimonic Well-Being Measures (Ryff Scales of Psychological Well-Being) Across the Seven Measurement Occasions

	Autonomy		Environmental Mastery		Purpose in Life		Self-Acceptance	
	M (SD)	R	M (SD)	R	M (SD)	R	M (SD)	R
T1	3.98 (0.55)		4.07 (0.58)		3.22 (0.68)		4.08 (0.58)	
T2	3.91 (0.57)	.67***	4.04 (0.62)	.73***	3.08 (0.65)*	.75***	4.04 (0.64)	.67***
T3	3.97 (0.63)	.67***	4.11 (0.64)	.66***	3.07 (0.64)	.64***	4.08 (0.70)	.69***
T4	3.89 (0.57)	.72***	4.08 (0.72)	.66***	3.08 (0.59)	.63***	4.09 (0.52)	.79***
T5	3.95 (0.58)	.71***	4.00 (0.60)	.74***	2.93 (0.58)*	.54***	4.03 (0.64)	.79***
T6	3.99 (0.47)	.79***	3.94 (0.54)	.72***	2.97 (0.59)	.61***	4.00 (0.55)	.74***
T7	3.91 (0.59)	.60***	3.98 (0.62)	.57***	2.90 (0.60)	.71***	4.04 (0.55)	.69***
ICC	.67		.64		.59		.68	

Note. T2-T7 means tested for significant difference to previous wave mean (repeated-measures t-test).

† $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 3

Means and First-Order Autocorrelations of Mental Distress Measures (Depression, Attitudes Toward Death and Dying and Disease Phobia) Across the Seven Measurement Occasions

	Depression		Fear of Dying		Fear of Death		Acceptance of Death and Dying		Disease Phobia	
	M (SD)	R	M (SD)	R	M (SD)	R	M (SD)	R	M (SD)	R
T1	4.24 (3.33)		3.19 (0.98)		1.84 (0.82)		4.67 (0.40)		1.28 (1.41)	
T2	4.27 (3.36)	.78***	2.95 (0.96)**	.71***	1.72 (0.72)	.53***	4.67 (0.38)	.09	1.16 (1.32)	.57***
T3	4.04 (3.49)	.87***	2.85 (1.00)	.59***	1.58 (0.77)	.42***	4.78 (0.41)*	.51***	1.07 (1.20)	.62***
T4	3.96 (3.40)	.78***	2.94 (0.93)	.68***	1.66 (0.85)	.66***	4.80 (0.29)	.27*	1.27 (1.38)	.62***
T5	4.52 (3.28)	.67***	3.03 (0.82)	.71***	1.74 (1.04)	.42**	4.79 (0.34)	.28†	1.39 (1.48)	.79***
T6	4.20 (3.10)	.71***	3.02 (0.99)	.79***	1.52 (0.63)	.47**	4.71 (0.38)	.45**	0.92 (1.34)**	.77***
T7	4.10 (3.08)	.56***	3.00 (1.03)	.60***	1.43 (0.66)	.50**	4.85 (0.27)	-.10	1.31 (1.39)	.46**
ICC	.74		.74		.61		.34		.58	

Note. T2-T7 means tested for significant difference to previous wave mean (repeated-measures t-test).

† $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 4

Fixed and Random Effects For Well-Being Measures From Multilevel Models

	Hedonic Well-Being			Eudaimonic Well-Being				Mental Distress				
	SWLS	Positive Affect	Negative Affect	Autono-my	Environ-mental Mastery	Purpose in Life	Self-Ac-ceptance	De-pression	Acceptance of Death and Dying	Fear of Dying	Fear of Death	Disease Phobia
Fixed Regression Coefficients:												
Intercept	3.664***	3.204***	2.122***	3.975***	4.050***	3.160***	4.030***	4.379***	4.678***	3.185***	1.818***	1.231***
(SE)	(0.080)	(0.060)	(0.057)	(0.049)	(0.055)	(0.060)	(0.057)	(0.316)	(0.033)	(0.089)	(0.073)	(0.116)
Linear slope	0.045†	-0.044**	-0.029	-0.006	-0.052**	-0.075***	-0.009	0.145†	0.036**	-0.260***	-0.076*	-0.039
(SE)	(0.023)	(0.017)	(0.018)	(0.014)	(0.018)	(0.019)	(0.019)	(0.084)	(0.013)	(0.072)	(0.032)	(0.041)
Quadratic slope	na	na	na	na	na	na	na	na	na	0.059**	na	na
(SE)										(.019)		
Random Variances and Covariances:												

Variance Intercept	0.613***	0.339***	0.316***	0.216***	0.276***	0.334***	0.326***	9.753***	0.061**	0.667***	0.380***	1.153***
(SE)	(0.097)	(0.056)	(0.050)	(0.038)	(0.047)	(0.057)	(0.052)	(1.536)	(0.020)	(0.119)	(0.89)	(0.215)
Variance Linear	0.023***	0.006†	0.013***	0.002	0.010*	0.011*	0.016**	0.209*	0.004	0.026*	0.038**	0.047*
Slope (SE)	(0.007)	(0.004)	(0.004)	(0.003)	(0.005)	(0.005)	(0.006)	(0.090)	(0.003)	(0.013)	(0.015)	(0.023)
Covariance	-0.067**	-0.003	-0.015	0.002	-0.008	-0.038**	-0.037**	-0.421	-0.011	-0.045	-0.076*	-0.067
Intercept-Slope (SE)	(0.023)	(0.013)	(0.012)	(0.008)	(0.012)	(0.015)	(0.014)	(0.325)	(0.007)	(0.032)	(0.033)	(0.057)
Residual Variance	0.150***	0.112***	0.085***	0.104***	0.116***	0.139***	0.097***	2.585***	0.101***	0.316***	0.365***	0.673***
(SE)	(0.013)	(0.010)	(0.007)	(0.009)	(0.010)	(0.012)	(0.008)	(0.214)	(0.009)	(0.028)	(0.032)	(0.056)
R^2	.19	.11	.21	.03	.16	.18	.20	.14	.08	.14	.17	.10

Note. Intercept components refer to first individual measurement (i.e., time coded 0 at each respondent's first study participation); slope components denote effects of measurement time in years (i.e., months/12).

SE = standard error. $R^2 = 1 - \sigma^2/\sigma_0^2$; i.e.,proportion of within-person variance "explained" (σ^2 and σ_0^2 denote the estimates of the model's and the unconditional model's residual variance, respectively; Xu, 2003).

† $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 5

Within-Subject and Between-Subject Correlations of the Well-Being Measures

	SWLS	PA	NA	Aut	EM	PL	SA	Dep	FDy	FDe	AcDD	DP
Live Satisfaction (SWLS)		**.58*****	**-.39*****	.12	**.68*****	**.40*****	**.80*****	**-.74*****	**-.40*****	-.10	.04	**-.35*****
Positive Affect (PA)	.26**		-.11	.12	**.56*****	**.56*****	**.53*****	**-.70*****	-.23**	.06	.06	-.19*
Negative Affect (NA)	-.11*	-.09*		**-.34*****	**-.49*****	.05	**-.40*****	**.41*****	**.41*****	.15†	-.20*	**.50*****
Autonomy (Aut)	.01	.02	.05		**.33*****	-.01	.23*	-.11	**-.31*****	**-.42*****	**.33*****	**-.43*****
Environmental Mastery (EM)	**.33*****	**.32*****	-.17***	.11*		**.39*****	**.73*****	**-.73*****	**-.40*****	-.26**	.17†	**-.45*****
Purpose in Life (PL)	.09*	.23***	-.00	.07	.24***		**.34*****	**-.48*****	-.16†	.03	-.09	-.05
Self-Acceptance (SA)	**.40*****	.28***	-.19***	.22***	**.52*****	.15***		**-.70*****	**-.44*****	-.24**	.07	**-.45*****
Depression (Dep)	**-.32*****	**-.40*****	**.31*****	-.05	**-.44*****	-.24***	-.26***		**.34*****	.06	-.12	**.46*****
Fear of Dying (FDy)	-.11*	-.03	.02	.04	-.12**	-.04	-.12*	.16***		**.32*****	-.02	**.56*****
Fear of Death (FDe)	-.05	.06	.06	-.11*	-.16***	-.01	-.16***	-.02	.18***		**-.51*****	**.36*****
Acceptance of Death and Dying (AcDD)	.12*	.09†	-.07	.09†	.26***	-.03	.20***	-.00	.02	**-.30*****		-.24**

Disease Phobia (DP)	-.08†	-.04	.10*	-.10*	-.17***	.02	-.22***	.15**	.16***	.22***	-.06

Note. Values above the diagonal correspond to the between-subject (interindividual) correlations, values below the diagonal correspond to within-subject (intraindividual) correlations. Bold print indicates medium and large effects (r>.30; Cohen, 1989).

† $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 6

Factor Pattern Matrix and Communalities of the Well-Being Indicators from Exploratory Factor Analysis

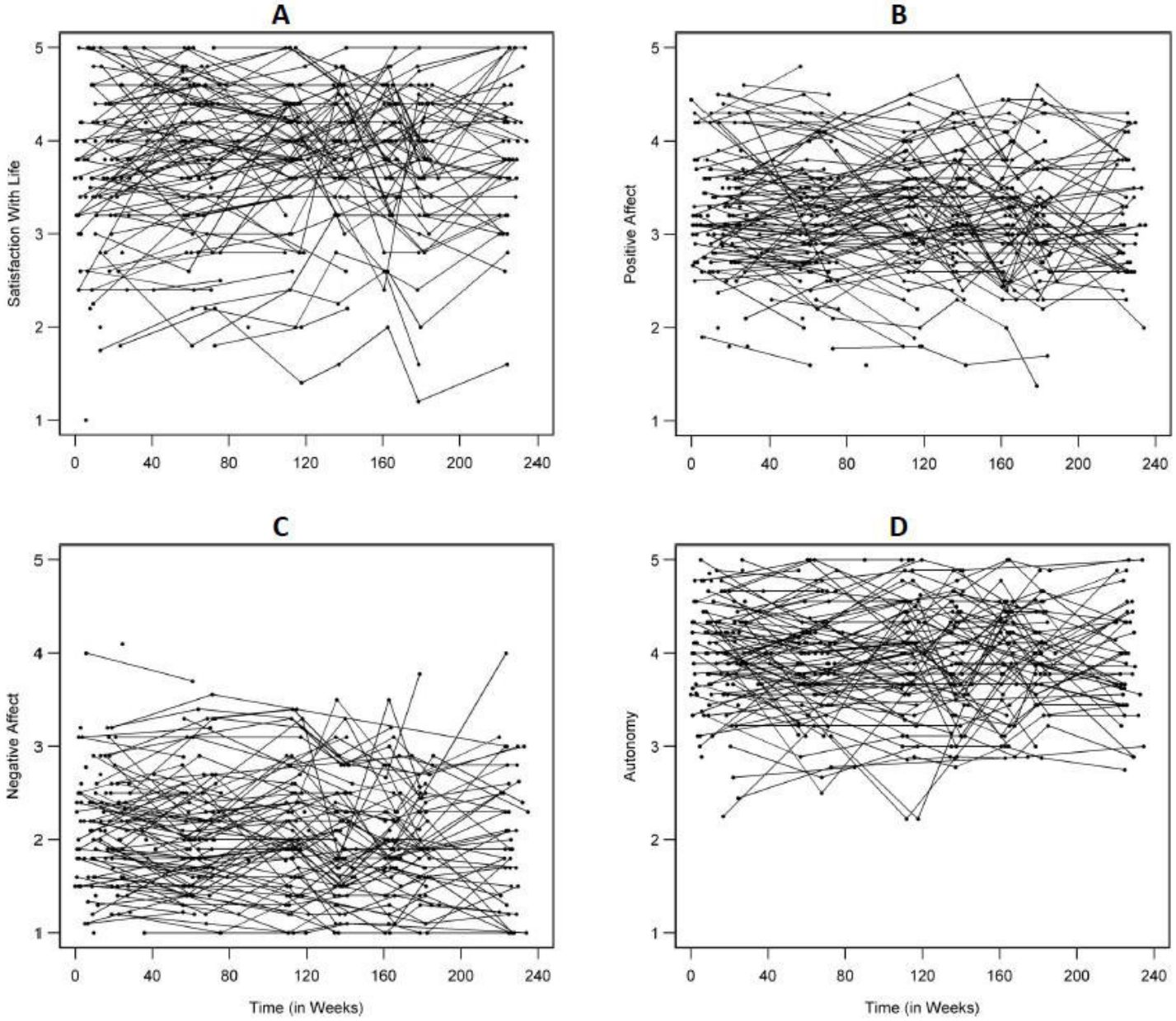
	Factor 1		Factor 2		
	Loadings	SSPC	Loadings	SSPC	Communalities
Live Satisfaction	.42	.15	.11	.01	.22
Positive Affect	.59	.31	-.12	.01	.32
Negative Affect	-.20	.04	-.06	.00	.05
Autonomy	.03	.00	.21	.04	.05
Environmental Mastery	.58	.30	.30	.08	.55
Purpose in Life	.35	.11	-.08	.01	.11
Self-Acceptance	.45	.18	.38	.13	.46
Depression	-.73	.47	.11	.01	.49
Fear of Dying	-.09	.01	-.17	.02	.05
Fear of Death	.21	.04	-.65	.37	.38
Acceptance of Death and Dying	-.02	.00	.43	.17	.18
Disease Phobia	-.06	.00	-.32	.09	.12

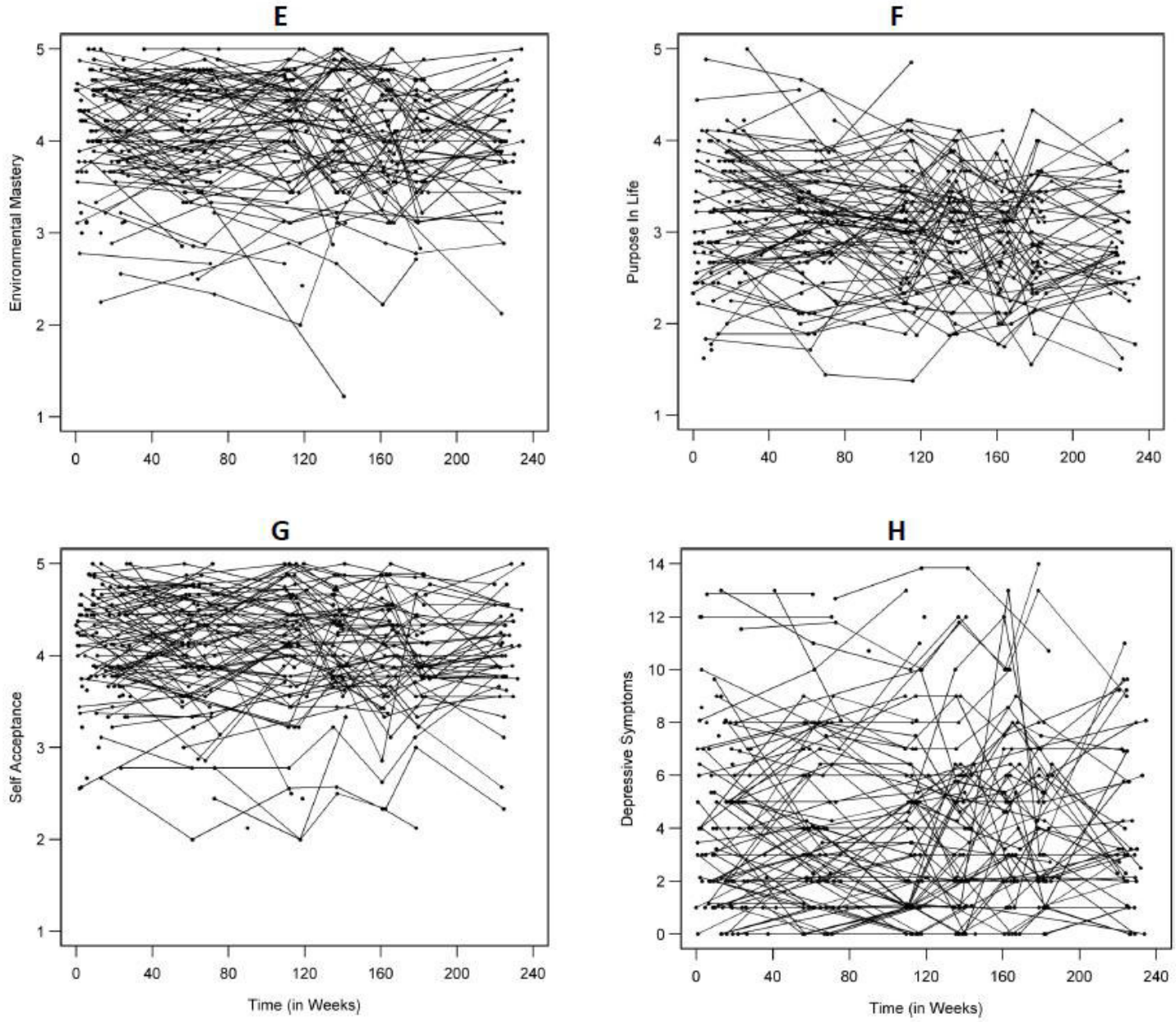
Note. Promax-rotated factor pattern matrix and final communality estimates obtained by iterative principal factor analysis (e.g. Fabrigar & Wegener, 2012).

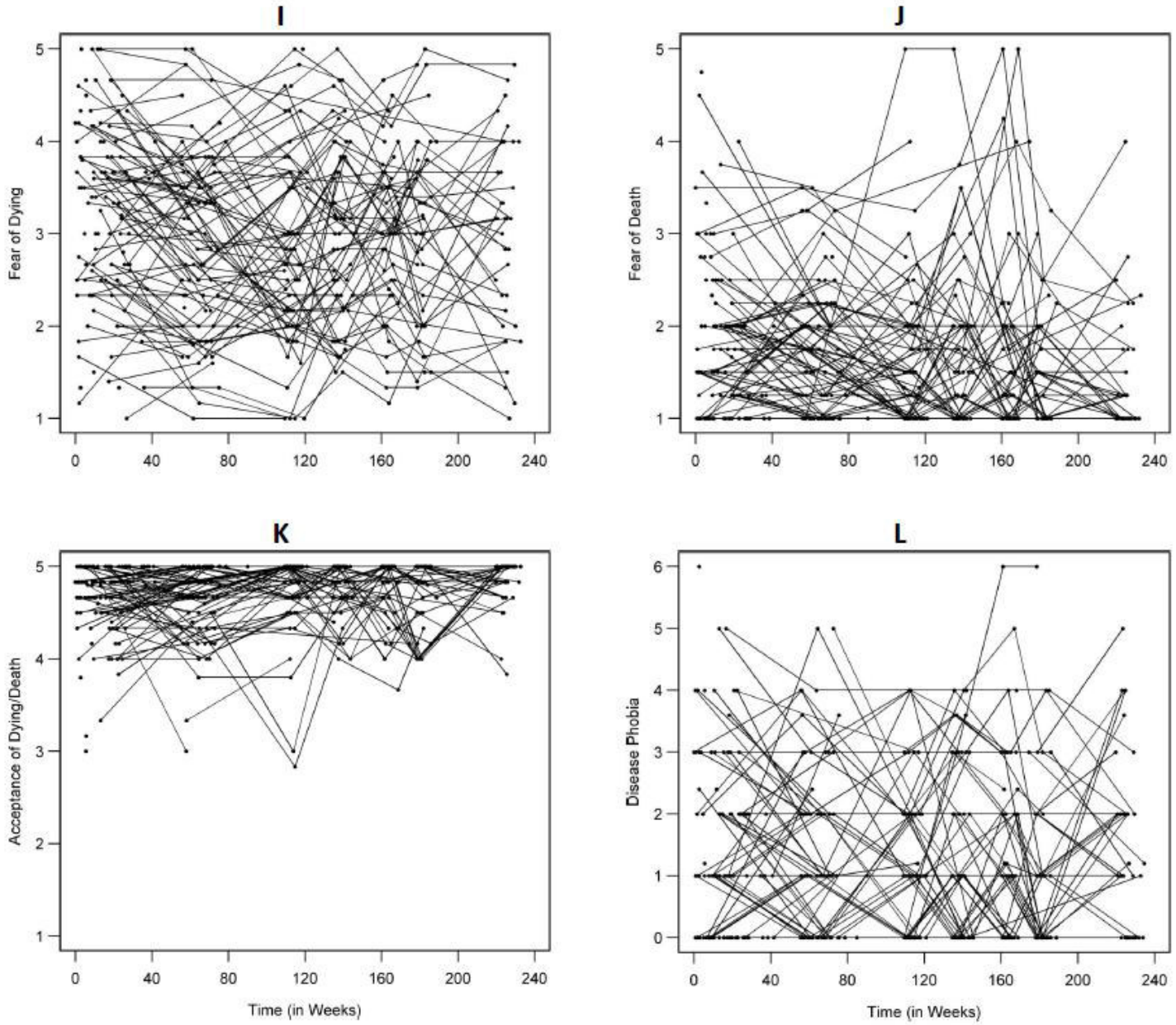
SSPC = squared semi-partial correlations; indicating share of indicator variance uniquely accounted for by the respective factor.

Figure 1

Individual Trajectories of Measures of Hedonic Well-being, Eudaimonic Well-being, and Mental Distress


A
Satisfaction With Life
B
Positive Affect
C
Negative Affect
Time (in Weeks)
D
Autonomy
Time (in Weeks)


E
Environmental Mastery
F
Purpose In Life
G
Self Acceptance
H
Depressive Symptoms
Time (in Weeks)
Time (in Weeks)


I
Fear of Dying
J
Fear of Death
K
Acceptance of Dying/Death
L
Disease Phobia
Time (in Weeks)
Time (in Weeks)