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The Development of Generativity in Middle Adulthood and the Beginning of Late Adulthood: A Longitudinal Study from Age 42 to 61

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Abstract

Previous studies have yielded mixed results regarding the development of generativity during adulthood. Longitudinal data were utilized to investigate the average development of generativity between the ages of 42 and 61 as well as individual differences in terms of its development. The study used data from the Jyväskylä Longitudinal Study of Personality and Social Development (JYLS) (initial $N=369$). The data consisted of 291 individuals whose generativity scores, measured using the Generativity Scale, were available at age 42, 50, or 61. Rasch analysis was utilized to form a generativity measure. The development of generativity between the measurements was investigated in women and men using Bland–Altman plots and the latent change score model. The results showed that, on average, generativity decreased from age 42 to 61 in women and men; however, there were individual differences in the extent and direction of the change with age. The level of generativity at age 42 predicted the change occurring between ages 42 and 50 and ages 50 and 61. Furthermore, the change between ages 42 and 50 predicted the change occurring between ages 50 and 61. The more positive the baseline value or the earlier occurring change, the more negative the subsequent change. To conclude, despite the mean-level generativity decreases during middle and late adulthood, there was variance across individuals of the same age, who were followed for nearly two decades. The study emphasizes the importance of investigating individual differences in the development of generativity in adulthood.

Keywords Adulthood · Generativity · Individual differences · Latent change score model · Longitudinal · Psychosocial development

Introduction

Generativity involves guiding and ensuring the well-being of the next generation and represents the seventh of Erikson's (1963) stages of psychosocial development. According to Erikson, generativity is a central developmental stage in adulthood, which is expected to increase during middle adulthood. Erikson argued that the accomplishment

of previous stages, such as identity and intimacy, is necessary for resolving the next stages. Thus, to be psychosocially ready to express generativity, individuals should have explored and discovered who they are both as individuals and members of society as well as be capable of committing to close relationships (Erikson, 1963; McAdams, 2001). Furthermore, fulfilling the task of generativity is essential to advancing to the last stage, that is, ego integrity, which normatively emerges in late adulthood. However, all stages of psychosocial development are interrelated, and each item, such as generativity, exists in some form before the stage becomes relevant (Erikson, 1963).

Erikson (1963) argued that while generativity also includes the concepts of productivity and creativity, care for others in the world is the basis of this developmental stage. Social roles, such as a parent, teacher, leader, and volunteer, serve as arenas for individuals to express generativity and care for the next generation (McAdams et al., 1993). However, simply being a parent, for example, does not guarantee

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that an individual will be generative (Erikson, 1963). The antithesis of generativity is stagnation, which can be seen as focusing care mainly on the self rather than on others and being incapable of creating and producing a legacy (McAdams, 2001). Nevertheless, stagnation should not be viewed simply as the absence of generativity (Newton et al., 2019; Van Hiel et al., 2006).

Furthermore, generativity is considered a resource for society to commit its members toward making contributions for the common good, maintaining sustainable continuity between generations, and promoting societal change (McAdams, 2001). In addition to the societal benefits of generativity, it may contribute to individuals' psychological and physical functioning. For example, higher generativity has been associated with better psychological (Rothrauff & Cooney, 2008) and affective (Grossman & Gruenewald, 2020; Weiss & Kunzmann, 2020) well-being, better adjustment to aging (Landes et al., 2014) and retirement (Serrat et al., 2018), as well as a lower probability of functional disability and mortality (Gruenewald et al., 2012). In the present study, we investigated the development of generativity in middle adulthood and the beginning of late adulthood. Middle adulthood is traditionally regarded as the period between the ages of 40 and 60 (\pm ten years), after which late adulthood is supposed to emerge (Infurna et al., 2020; Lachman et al., 2015) – although there is now greater variation in the specific definitions and timings of different life stages.

The construct of generativity has been further developed since Erikson's (1963) initial psychosocial theory. Instead of working at a single level, researchers have distinguished different forms of generativity. According to McAdams and colleagues (e.g., McAdams & de St. Aubin, 1992; McAdams et al., 1998), generativity consists of seven psychosocial features, including desire, demand, concern, belief, commitment, action, and narration. Some generativity measures assess specific features of the phenomenon, such as the Loyola Generativity Scale (LGS) (McAdams & de St. Aubin, 1992), which measures generative concern, while others, such as the Generativity Scale developed by Ryff and Heincke (1983), seek to assess generativity more generally. The Generativity Scale contains items regarding perceptions about cultural demands (e.g., "Adults should be more concerned about what kind of a world they are leaving for their children"), generative concern (e.g., "I am concerned about providing guidance and direction to younger people"), and generative action (e.g., "I spend a good deal of time sharing my experience and know-how with younger people"). The development of generativity has also been investigated through measures assessing the other stages of Erikson's psychosocial development (e.g., Inventory of Psychosocial Development [IPD], Whitbourne et al., 1992; California Adult Q-sort items [CAQ], Peterson & Klohnen, 1995). In addition to measuring stagnation, ego integrity, and despair,

the observer-rated CAQ measures generative realization, which has been argued to reflect the extent to which individuals actually express generativity in their lives (Peterson & Klohnen, 1995). IPD measures the eight stages of Erikson's psychosocial development theory and was developed in 1977, even before the models of the separate aspects of generativity were established (Whitbourne et al., 1992).

Despite research findings alluding to the benefits of generativity to individual functioning, the developmental aspects of generativity during adulthood are not fully understood. There have been a few longitudinal investigations of the development of generativity in adulthood, but results regarding the average development of generativity in middle and late adulthood have been mixed (Table 1). Two studies have found an increase in generativity throughout adulthood. A linear average increase was reported from age 17 to 57 in college-educated individuals (Whitbourne et al., 2009) and a curvilinear from age 43 to 72 in college-educated women (Newton et al., 2019), although the quadratic term of the growth curve model in the latter was not statistically significant. However, a later study using the same sample as Whitbourne et al. (2009) showed no mean-level changes over a ten-year period in participants aged 31–71 (Lodi-Smith et al., 2021), although a different generativity measure was used in the latter study.

Nonetheless, most studies have suggested that, on average, the development of generativity may take a non-linear shape, potentially including increases, decreases, and periods of stability, depending on the age range of the participants (Einolf, 2014; Nelson & Bergeman, 2021; Shane et al., 2021). One study modeled generativity development as a quadratic (i.e., inverted u-shaped) average growth trajectory in 24–92-year-old individuals (Shane et al., 2021). Specifically, this study showed a positive change in generativity across assessment waves (three waves, 9 years apart) in 24–51-year-old participants, no change in participants aged between 52 and 61 years, and a negative change in those over 62 years. Increases, decreases, and stability in generativity were also observed in a study where six age cohorts were followed for 10 years (Einolf, 2014). The results showed an increase in generativity in men aged 24–29, no significant mean-level changes in participants aged 30–59, a decline in men and women aged 60–69, and stability in women and men aged 70–74. Although modest overall rank-order stability was observed during adulthood, there was considerable variability across decade-spanning age groups (Einolf, 2014).

Furthermore, there is some evidence of cubic growth in generativity during adulthood. A 10-year study comprising individuals aged 40–84 showed that generativity peaked at the age of 40, followed by a relatively stable period between ages 50 and 70, and a decline after age 70 (Nelson & Bergeman, 2021). However, the reported effects seemed to be

Table 1 Longitudinal studies investigating the development of generativity in middle and late adulthood

Study	Measure	Target group and number of measurement waves	Analysis method	Functional form of trajectory	Age for observed generativity development		
					Increase	Stability	Decrease
Einolf (2014)	Loyola Generativity Scale (LGS)	Age-heterogeneous sample (MIDUS), age range 24–84, 2 waves	Paired <i>t</i> -tests ^a	Change scores	24–39 (men)	24–39 (women); 30–69; 70–84	60–79
Lodi-Smith et al. (2021)	Loyola Generativity Scale (LGS)	College-educated women and men (RALS), age range 31–71, 2 waves	Latent change model	Change scores		31–71	
Nelson and Bergeman (2021)	Loyola Generativity Scale (LGS)	Age-heterogeneous sample (NDHWB), age range 40–84, 10 waves	Two-level growth curve model	Cubic		50–70	40–49; 71–84
Newton et al. (2019)	The California Adult Q-sort items (CAQ)	College-educated women, age range 43–72, 4 waves	CFA + two-level growth curve model	Quadratic	43–72		
Shane et al. (2021)	Loyola Generativity Scale (LGS)	Age-heterogeneous sample (MIDUS), age range 24–92, 3 waves	Two-level growth curve model	Linear / age-measurement wave-interaction	24–51	52–61	62–92
Whitbourne et al. (2009)	Inventory of Psychosocial Development (IPD)	College-educated women and men (RALS), age range 17–57, 3–4 waves	Two-level growth curve model	Linear	17–57		

^aThe development of generativity during ten-year follow-up was analyzed separately in six age cohorts

MIDUS = Midlife in the United States; RALS = Rochester Adult Longitudinal Study; NDHWB = Notre Dame Study of Health & Well-being

confounded with cohort effects, potentially masking a quadratic average trajectory shape. Altogether, previous studies suggest diverse patterns of growth in generativity during adulthood. Although there is variation in the results of studies concerning the peak of generativity, it was observed between the ages of 50 and 60 in most studies (Einolf, 2014; Shane et al., 2021; Whitbourne et al., 2009).

Regarding the differences in the results obtained from these studies, a range of factors, such as selected variables, samples, and occasions of measurement, may be relevant when studying change and stability (Nesselrode, 1991). For example, a range of generativity measures and participant characteristics (e.g., gender, education) may have contributed to the varying results. Fine-grained measures, such as LGS, and more general generativity measures (e.g., IPD, CAQ) may lead to different results. Previous theories (McAdams & de St. Aubin, 1992; Stewart & Vandewater, 1998) have distinguished several features of generativity, which may have unique developmental paths. For example, it

may be that the desire for generativity is formulated already in early adulthood, while the capacity for generativity is highest in middle adulthood followed by generativity accomplishment (Stewart & Vandewater, 1998). In the existing literature, generativity has often been investigated through undifferentiated self-report questionnaires administered to groups of people of different ages. Schoklitsch and Baumann (2012) have, however, pointed out that these questionnaires may consist of irrelevant items for older adults, such as those regarding caring for children. The decline of generativity often detected in late adulthood may, thus, reflect the changing life contexts and difficulty involved in constructing non-age-specific generativity scales than the inner characteristics of respondents. In addition, demographic characteristics could explain some differences in the results. Newton et al. (2019) investigated a sample of college-educated women, while Whitbourne et al. (2009) investigated college-educated women and men. While women may feel more obligated than men to provide care beyond the closest relationships

to the larger society, higher education may increase social interest and offer more personal resources, consequently increasing generative action (Keyes & Ryff, 1998).

Also, statistical analysis models (e.g., mixed vs. growth curve models) and their parameterizations (e.g., different parameterizations of growth curves) and data characteristics (e.g., the number of time points, measurement frequency, trajectory shapes) may lead to varied results. For example, the number of time points determines the shape of the change that a growth curve model can accommodate, and the shape of the polynomial used in the growth model further determines the stage at which generativity peaks. Also, it is important to recall that beyond the mean-level development, generativity may develop at dissimilar rates in people. High variability in individual change trajectories increases the variance in the growth curve parameters as well as the amount of residual variance. As the models in previous studies included significant residual variance, alternative modeling strategies may be better at modeling individual trajectories. Moreover, it is difficult to assess the variability in the trajectories of individual participants and the accuracy of the average trajectory based on the findings of previous studies because not all of these studies reported descriptive statistics of longitudinal generativity measurements, and only one (Lodi-Smith et al., 2021, see their Fig. 2) showed individual developmental trajectories. In the study presenting the individual generativity trajectories between two time points, high individual variability in change was evident. In addition, moderate test–retest correlations (Einolf, 2014), low intraclass correlation (Newton et al., 2019), and significant residual variation in the growth curve models for generativity suggest that, beyond the mean-level assessment of change, there may have been variation within individuals' generativity trajectories. Most previously deployed methods, such as latent growth models, may not be well-suited to representing possible differences, considering that the changes in individual generativity trajectories can be dynamic rather than static (Serang et al., 2019). As an alternative, we conducted latent change score models as they can address these kinds of differences in development in a more descriptive way, especially since the focus is on individual change (McArdle, 2009). With the latent change score model, change can be analyzed as a latent variable that represents individual change over time.

The Present Study

In the present study, we focused on the development of generativity at the level of the individual in middle adulthood and the beginning of late adulthood as well as the mean-level development. Instead of studying only mean-level linear or quadratic change from 42 to 61 years of age, the aim was

to use Bland–Altman plots to describe change across pairs of measurement waves (42–50, 50–61, 42–61) and latent change score models to quantify the size, direction, and significance of the change and the capability of predicting the change occurring among the three measurements when adjusted for the baseline measurement. In particular, the aim was to investigate whether the earlier measurement waves of generativity (at age 42) predicted subsequent changes in the development of generativity (at ages 50 and 61) and whether the magnitude of the previous change (from age 42 to 50) contributed to the degree of change occurring in the subsequent phase of life (from ages 50 to 61).

Due to evidence from previous studies on the development of generativity in adulthood and the attendant individual variability (e.g., Lodi-Smith et al., 2021), we hypothesized that individual trajectories would show different shapes deviating from the average development. Regarding the overall trend in the development of generativity during adulthood, we hypothesized that generativity would reach its highest value between the ages of 50 and 61 since most previous studies suggested that the peak occurred near the turn of middle and late adulthood (Einolf, 2014; Shane et al., 2021; Whitbourne et al., 2009). There are no findings of significant gender-based differences in the development of generativity in middle and late adulthood (Lodi-Smith et al., 2021; Shane et al., 2021; Whitbourne et al., 2009), but such differences during early adulthood have garnered some evidential support (Einolf, 2014). However, in the presence of high variability among individual changes, growth curve models may not be sufficiently sensitive in assessing gender differences. Thus, we analyzed women and men separately due to the relatively small number of previous studies examining gender differences in the development of generativity.

Methods

Participants

The study utilized data drawn from the Jyväskylä Longitudinal Study of Personality and Social Development (JYLS), which has followed the same participants since 1968, who were eight years old at the time ($N = 369$, born mostly in 1959) (Pulkkinen, 2017). The initial sample consisted of 12 randomly selected second-grade school classes from the town of Jyväskylä, Finland (the initial participation rate was 100%). The participants were all native Finns. The present study used data from the three most recent follow-up phases, conducted in 2001, 2009, and 2020–2021, when the participants were 42, 50, and 61 years old, respectively. The sample, which participated in the previous data collection phases at ages 42 and 50, was found to be representative of the general population of Finland of the same age, for

example, in terms of marital rate, number of children, and employment (Pulkkinen & Kokko, 2010; Pulkkinen et al., 2003). The participants are described in more detail below in the Descriptive Results section.

The data were collected through mailed Life Situation Questionnaires (LSQ), in-person psychological interviews with self-report inventories, and health examinations. In the present study, both interview and LSQ data were utilized due to the position of the Generativity Scale questionnaire in the study procedure (at age 42, as a part of the interview, and at ages 50 and 61, included in the LSQ). The data analyzed in the present study involved 291 participants (79% of the initial sample; 134 women and 157 men) who had completed the Generativity Scale in at least one of the three data collection phases since the age of 42 when generativity was first assessed. The number of individuals providing generativity data was 241 at age 42 (70% of the available sample at age 42), 255 at age 50 (79% of the available sample at age 50), and 205 at age 61 (67% of the available sample at age 61). Among the 291 participants, the Generativity Scale was completed at all three data collection phases by 177 individuals (61% of the study sample). In addition, 58 individuals (20% of the study sample) participated in one data collection phase and 56 individuals (19% of the study sample) in two data collection phases.

Measures

Generativity

Generativity was measured with a 10-item version of the Generativity Scale (Ryff & Heincke, 1983). High scores on this scale indicate an individual's generative concern for guiding the next generation, awareness of their responsibility and role as a leader, perceptions of self as a norm bearer and decision maker, and sense of influence capacity. Low scores indicate a sense of little impact on others, emphasis on self-concern or self-preoccupation, and no felt obligation or interest in guiding and sharing information with the younger generation.

The Generativity Scale is a self-report questionnaire. The participants rated each item (e.g., "I spend a good deal of time sharing my experience and know-how with younger people") on a scale from 1 = *strongly disagree* to 4 = *strongly agree*. The average score for the 10 items was computed (1–4), with a higher score indicating higher generativity. Cronbach's alpha for the average generativity score was 0.72 for all three measurements. The JYLS study has measured generativity with the Generativity Scale since the first measurement of generativity in 2001. Thus, to investigate the development of generativity during adulthood, we utilized the same measure in the subsequent data collections.

Rasch analysis was used to form a *generativity measure* based on the rating-scale model. The Likert-type items of the generativity scale were ordinal, and the simple average computed from these items was also ordinal. This computation assumes equidistant response scale steps as well as an equal unit-increasing contribution from each item. Since these assumptions cannot be easily guaranteed in the ordinal items, we used Rasch analysis, which is used to convert ordinal item responses (similar to the generativity measure) into a near-interval scale measure through a probabilistic model (Wright & Masters, 1982). The subsequent latent growth curve model assumes at least an interval scale measurement, and thus, the generativity measures based on the Rasch model were used in the main analyses. This approach can be used to provide additional statistics to help determine the reliability and validity of an assessment on the item and individual levels as well as the generativity instrument. Additional analyses of the quality of the generativity measure were conducted since the generativity measure used in the study has not been widely deployed. A Rasch model fit (person and item fit) can be examined from two perspectives (infit and outfit), designed to indicate unexpected response patterns from the point of view of the participants and items; outfit concerns an outlier-sensitive fit (e.g., careless responses), whereas infit involves an inlier-sensitive or information-weighted fit (e.g., idiosyncratic groups) (Linacre, 2002). The expected mean-square fit value is 1.0, indicating perfect correspondence with the model prediction, whereas lower values indicate overly predictable values (where the data overfit the model), and higher values point to unpredictability (where the data underfit the model) (Wright & Linacre, 1994). The Rasch model has been utilized in recent psychological research (e.g., Barber et al., 2022; Vaganian et al., 2022).

Demographic Information

To describe the sample at age 61, we utilized the following demographic information: vocational educational status (coded as 1 = *vocational courses or less*; 2 = *vocational school*; 3 = *vocational college or polytechnic*; and 4 = *university*); employment status (coded as 1 = *employed (regular daytime or shift work, part-time employment or a reduced work week, or entrepreneur)*; 2 = *unemployed (unemployed, laid off)*; and 3 = *retired or other (pension or part-time pension, job alternation leave, family caregiver, and other)*); self-rated current financial situation of one's household (with answer options coded as 1 = *fairly or extremely tight*; 2 = *fairly good*; and 3 = *extremely good*); self-rated health during the past year (with five answer options further categorized as 1 = *excellent*; 2 = *fairly good*; 3 = *average*; and 4 = *fairly or extremely poor*); and the number of biological

children and grandchildren (further coded as 1 = *no children or no grandchildren*; and 2 = *yes, at least one*).

Statistical Analysis

As a descriptive analysis, we used independent samples *t*-tests to investigate possible gender differences in the generativity measure (drawn from the Rasch analysis) and the average score (average of the 10 items on the Generativity Scale) at ages 42, 50, and 61. The relationship between the average score and the generativity measure is presented in Supplement 1 online (see Figure S1). We used Pearson's correlation coefficients to analyze the rank-order stability of the generativity measure from ages 42 to 50, 50 to 61, and 42 to 61. The individual and average generativity measure trajectories are shown in Supplement 1, together with the intraclass correlation estimates (Figure S2).

We used Bland–Altman plots and one-sample *t*-tests to investigate the changes occurring between the ages of 42, 50, and 61. Bland–Altman plots made it possible to study model-free individual differences in the change between two measurement points according to the level of generativity represented by the assessment average. This enabled the assessment of stability across measurements of generativity. Bland–Altman plots were conducted with the generativity measures. We used the one-sample *t*-test to analyze the significance of the average change between the two measurements and the independent samples *t*-test for possible gender differences in the average changes between the two measurements. In addition to the generativity measure, we calculated the significance of the change for the average score. The descriptive analyses and Bland–Altman plots were conducted using IBM SPSS Statistics (version 26).

We investigated individual changes in the generativity measure using latent change score (LCS) models. These models can be seen as an extension of the paired *t*-test, which permits multiple measurement waves and baseline adjustments that can provide means, variances for, and regression coefficients between changes as descriptive parameters. The likelihood ratio test suggested that there were statistically significant parameter differences between men and women, $\chi^2(9) = 19, p = 0.025$. Thus, we reported separate model parameter estimates for men and women from a two-group model for the mean-covariance structure parameterization of the models. No parameters were omitted from the model, neither were additional constraints placed on it, during the analysis. Parameters with constraints specific to the LCS approach are indicated with the at sign (@), followed by the value constraint. All other parameters were set free for estimation, and their estimates are shown in the figures in the results. Parameters for the gender-group model were estimated using the lavaan package (version 0.6–7, Rosseel, 2012) in the R programming environment.

In addition, Rasch analysis was used to investigate the person and item fit (see online Supplements 1 and 2). We used a scatter plot of generativity logit measures against the infit index estimates to assess systematicity in the fit estimates with respect to the generativity level and identify persons with unexpected item response patterns (Supplement 1, Figures S3 and S4). Concerning the generativity measure, the item functioning results revealed some differences in the item measures between age groups and genders (Supplement 1, Figures S5–S6; see Supplement 2 for a more detailed discussion). However, the item fit mean-square estimates indicated a reasonable fit for all ten items (Supplement 1, Figure S4), and the examination of the eigenvalues supported the use of one factor (Supplement 1, Figure S7). While different ranges have been suggested for interpretations of goodness of fit concerning the mean-square fit (Wright & Linacre, 1994), we considered estimates within the 0.4–1.9 range (significance level 0.01) acceptable and conducted sensitivity analyses that excluded participants who exceeded these limits. We estimated the means, standard deviations, and correlations of the generativity measure between the group measurements based on the person fit values (Supplement 1, Table S1). The sensitivity analyses showed that 186 and 193 participants recorded infit mean-square and outfit mean-square values, respectively, within the range (0.4–1.9) in all measurements (Supplement 1, Table S1) and that the proportion of those exceeding the limit 1.9 was lowest at age 61 (Supplement 1, Figure S8; see Supplement 2 for a more detailed discussion). Furthermore, the results of the latent change score analysis did not materially change following the sensitivity analyses (Supplement 1, Table S2). Thus, we conducted the main analysis for the whole sample.

Results

Descriptive Results

The participants' demographic information at age 61 is illustrated in Table 2. The means of the average generativity scores and the generativity measures drawn from the Rasch model are presented in Table 3. The average score of around 3.0 indicated that individuals were, on average, more likely to agree with the items than to disagree with them. Average decreases were found in the means of the average generativity scores and generativity measures between the ages of 42 and 61. No statistically significant gender differences were observed across the ages. The rank-order stability of the generativity measure between the ages was moderate. Pearson's correlation coefficients varied between 0.49 and 0.63 ($p < 0.01$) in women and 0.43 and 0.63 ($p < 0.01$) in men.

Table 2 Participants' demographic characteristics at age 61 (Women $n = 107$, Men $n = 98$ –99)

	Women		Men	
	<i>n</i>	%	<i>n</i>	%
Level of vocational education				
Vocational courses or less	11	10.3	24	24.5
Vocational school	26	24.3	43	43.9
Vocational college or polytechnic	51	47.7	17	17.3
University	19	17.8	14	14.3
Employment situation				
Employed	75	70.1	68	69.4
Unemployed	11	10.3	11	11.2
Retired or other	21	19.6	19	19.4
Financial situation				
Extremely good	20	18.7	15	15.2
Fairly good	62	57.9	64	64.6
Fairly or extremely tight	25	23.4	20	20.2
Self-rated health				
Excellent	18	16.8	26	26.3
Fairly good	59	55.1	39	39.4
Average	24	22.4	29	29.3
Fairly or extremely poor	6	5.6	5	5.1
Having (biological) children				
No	14	13.1	13	13.3
Yes, at least one	93	86.9	85	86.7
Having (biological) grandchildren				
No	53	49.5	53	54.1
Yes, at least one	54	50.5	45	45.9

Employed regular daytime or shift work, part-time employment or a reduced work week, entrepreneur; *Unemployed* unemployed, laid off; *Retired or other* pension or part-time pension, job alternation leaves, family care giver and other

Individual Differences in Generativity

Based on the Bland–Altman plots, a negative trend was observed in the generativity measure between ages 42 and 50, 50 and 61, and 42 and 61 (Fig. 1). The thick solid line in the Bland–Altman plots represents the average difference between the measurements. The position of the line was below zero in all the plots, indicating that the average change between the measurements was negative in all the investigated measurement periods (42–50, 50–61, 42–61) in men and women. On average, the measure for 50-year-old women was 0.32 units ($p < 0.001$) lower than when they were 42 years old, and the measure for 61-year-old women was 0.39 units ($p < 0.001$) and 0.69 units ($p < 0.001$) lower than when they were 50 and 42 years old, respectively (Table 3). Generativity in men also decreased with age (Fig. 1), but the only statistically significant change between the measurements was observed between ages 42 and 61, which indicated that the measure for 61-year-old men was,

on average, 0.42 units lower than when they were 42 years old ($p = 0.001$) (Table 3). Men and women did not differ significantly in terms of average change (Table 3).

Nevertheless, the decreasing trend in generativity was not observed in all individuals. The plots and summary statistics also indicated positive difference estimates in individual generativity levels, indicating that generativity increased in some individuals between the two measurement points. Overall, the Bland–Altman figures suggest that it was slightly more common for the generativity measure to decrease rather than increase in the follow-up phase. The full details of the longitudinal trends are presented in the individual trajectory figures in Supplement 1 (see Figure S2).

Change as a Latent Variable

The latent change score model was conducted separately for men and women. The mean level of the generativity measure at the baseline (age 42) was 1.58 ($p < 0.001$) in women and 1.42 ($p < 0.001$) in men. For individuals with a baseline generativity value of zero, the average baseline-adjusted change in generativity in women and men between ages 42 and 50 was 0.31 ($p < 0.001$) and 0.29 ($p < 0.001$), respectively. The baseline value of generativity was negatively associated with the change occurring in generativity between ages 42 and 50 and 50 and 61 in both genders. In women, a one-unit increase in the baseline value was associated with a 0.39-unit decrease ($p < 0.001$) in the change between ages 42 and 50 and a 0.34-unit decrease ($p < 0.001$) between ages 50 and 61. In men, the results were parallel. A one-unit increase in the baseline value was associated with a 0.35- ($p < 0.001$) and 0.50- ($p < 0.001$) unit decrease in the changes between ages 42 and 50 and 50 and 62, respectively. Thus, the higher the baseline value, the more negative the change between ages 42 and 50 and 50 and 61. The latent score models are shown graphically in Fig. 2 for men and women.

The change in generativity between ages 42 and 50 predicted further change in generativity between ages 50 and 61. A one-unit increase in the change between ages 42 and 50 was associated with a 0.65-unit decrease in the change between ages 50 and 61 ($p < 0.001$) in women. In men, a one-unit increase in the change between ages 42 and 50 was associated with a 0.83-unit decrease in the change in generativity between ages 50 and 61 ($p < 0.001$). Thus, the more positive the change between ages 42 and 50, the more negative the change between ages 50 and 61 (Fig. 2).

Discussion

The longitudinal data of Finnish women and men showed an average decreasing trend in generativity from ages 42 to 61. Although the results showed non-significant changes in

Table 3 Means (M) and Standard Deviations (SD) for generativity average scores, generativity measures, and difference values in women and men

Generativity variable	Women						Men						T-test ^a		
	N	M	SD	T ^b	df	p	N	M	SD	T ^b	df	p	t	df	p
Age 42															
Average score	120	3.16	.36				121	3.12	.39				0.70	239	.486
Measure		1.56	1.03					1.43	1.16				0.90	239	.368
Age 50															
Average score	121	3.06	.36				134	3.04	.44				0.36	250.96	.718
Measure		1.29	.99					1.22	1.18				0.46	253	.643
Age 61															
Average score	107	2.92	.41				98	3.01	.40				-1.55	203	.123
Measure		0.94	1.09					1.11	1.03				-1.09	203	.276
Difference 50–42															
Average score	109	-0.11	0.30	-3.90	108	<.001	100	-0.07	0.36	-2.08	99	.040	-0.81	207	.420
Measure		-0.32	0.85	-3.90	108	<.001		-0.17	1.01	-1.66	99	.101	-1.16	207	.249
Difference 61–50															
Average score	104	-0.16	0.38	-4.17	103	<.001	92	-0.08	0.42	-1.90	91	.061	-1.30	194	.196
Measure		-0.39	1.04	-3.81	103	<.001		-0.25	1.21	-1.95	91	.054	-0.88	194	.380
Difference 61–42															
Average score	97	-0.27	0.39	-6.83	96	<.001	85	-0.16	0.38	-3.73	84	<.001	-1.96	180	.051
Measure		-0.69	1.08	-6.28	96	<.001		-0.42	1.10	-3.52	84	.001	-1.65	180	.100

^aT- test for independent samples (grouping variable = gender)

^bT- test for one sample (test value = 0)

Average score = Average of the 10 items of the Generativity Scale; Measure = Generativity measure drawn from the Rasch Analysis

generativity in men between ages 42 and 50 and 50 and 61, the overall change with age in men between ages 42 and 61 was significant. Also, men and women did not differ significantly in average generativity scores or measures at any age. However, we found individual differences in the size and direction of change with age based on the baseline level of generativity as well as previous change. Specifically, generativity in the participants at age 42 predicted the change occurring in generativity between ages 42 and 50 and 50 and 61. Also, the change between ages 42 and 50 predicted further change between ages 50 and 61.

Generativity has traditionally been considered a midlife stage emerging after the resolution of intimacy and preceding ego integrity, but previous studies have offered mixed results regarding the average development of generativity in adulthood. A few studies have suggested a small increasing trend in generativity from early to middle (Einolf, 2014; Shane et al., 2021; Whitbourne et al., 2009) and late adulthood (Newton et al., 2019), in line with the initial theory by Erikson (1963). Nevertheless, the results of the highest level of generativity at age 42 in the present study suggest an opposite trend in generativity and are contrary to the hypothesis that generativity would peak between the ages of 50 and 61. These observations lend support to the study by Nelson and Bergeman (2021), in which the highest

scores were observed in 40 year olds, followed by mean-level declines. However, the decrease in the average level of generativity does not necessarily indicate that the meaning of generativity weakens from age 42 and that the last stage, ego integrity, begins, as one would expect according to the initial theory. Instead, it has been argued that the resolutions of psychosocial issues evolve continuously and cumulatively throughout life (Slater, 2003; Whitbourne et al., 2009). The development of generativity may, thus, be a more complex phenomenon, which may not have been fully captured by a mean-level or trajectory-type investigation.

The findings of the present study indicated that individuals with higher generativity at the baseline had more negative between-measurement changes. Regarding the possibility of a ceiling effect, few participants reached the maximum generativity scores at any age. Consequently, the differences between the results gained in the present and previous studies may be partly explained by the underlying association between the baseline level and subsequent changes in generativity. Thus, as individual variation in the development of generativity was found in the present study, the individual variation across the study populations may have accounted for the results of previous studies. Altogether, rather than being a midlife stage with clearly defined starting and end points, the development of generativity may have more to do

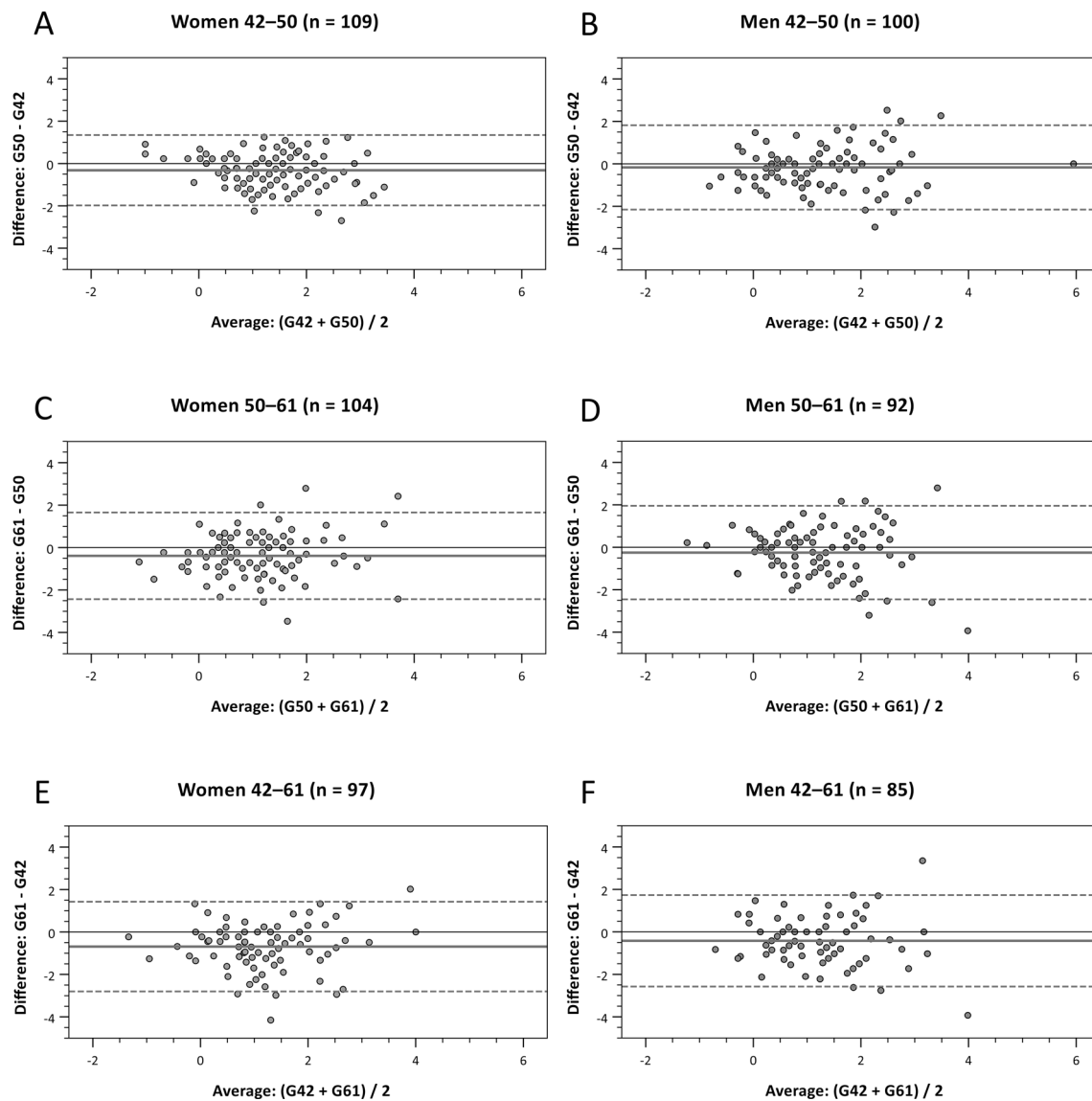


Fig. 1 Bland–Altman Plots for Women (A, C, E) and Men (B, D, F). Plots show individuals' differences and averages of the generativity measures between two measurements (ages 42–50, 50–61, and 42–61). Thick solid line represents the mean of differences and dotted

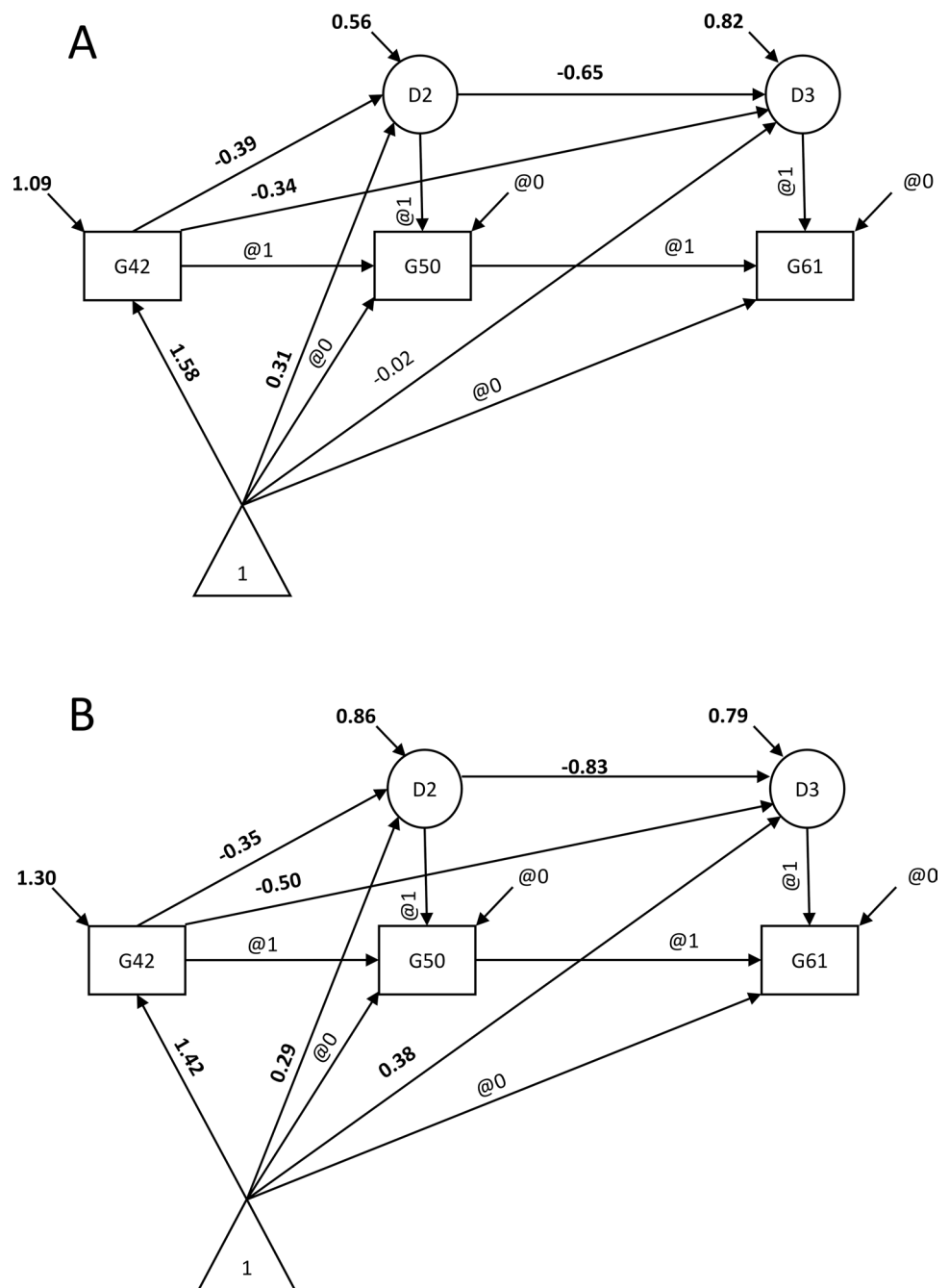
lines represent the limits of agreement (from $-1.96 SD$ to $+1.96 SD$). G₄₂=Generativity at age 42; G₅₀=Generativity at age 50; G₆₁=Generativity at age 61

with the surrounding contexts (e.g., social timing) as well as the individual characteristics (e.g., gender, education) and social roles leading to variability in generativity development (McAdams, 2001).

The present study corroborates the individual development of generativity in adulthood found in Lodi-Smith et al. (2021), particularly in terms of showing that the change in generativity depended on the baseline level of generativity and previous change in this level. Due to the uniqueness of individuals' characteristics and life situations, the results are understandable. Recently, Shane et al. (2021) found differences in generativity trajectories based on the level of individuals' sense of control and income. Also, control strivings,

agreeableness, education, and the number of children were associated with generativity throughout adulthood; however, the changes with age were parallel at all levels in terms of these explanatory factors. Also, in Whitbourne et al. (2009), four cohorts of parents and non-parents born 11 years apart showed relatively similar trajectories in generativity during adulthood. It may be that these kinds of relatively static individual characteristics, such as personality traits or educational background, could be associated with the baseline level of generativity rather than explaining the diverse results of the extent and direction of the change. Also, in the sample of the present study, most of the participants were parents and had obtained a vocational education. This also

Fig. 2 Latent Change Score Models for Women (A) and Men (B). G42=Generativity at age 42; G50=Generativity at age 50; G61=Generativity at age 61; D2=Difference score in generativity between age 42 and 50; D3=Difference score in generativity between age 50 and 61. Bold typeface indicates $p < 0.05$



supports the consideration that these characteristics, which remained relatively stable throughout middle adulthood, may not be able to explain the differences in the individuals' generativity development.

During middle adulthood, individuals commonly encounter life transitions in the areas of family and work, such as launching their children into adulthood and retirement planning (Infurna et al., 2020). These transitions are normative changes that could be associated with a decreasing trend in generativity measures toward late adulthood as work and family serve as essential arenas for individuals

to express generativity (McAdams et al., 1993). However, non-normative changes could also occur. Possible opportunities and challenges in middle adulthood, such as career development, job insecurity, or changes in the qualitative features of social relationships (e.g., frequency of communication, proximity) (Infurna et al., 2020) could also contribute to one's chances of caring for others as well as being creative and productive. For example, more positive parental experiences with adult children were found to be associated with parents' greater generativity (An & Cooney, 2006). Furthermore, in a recent meta-analysis,

challenging job demands, work hours, job autonomy, and the number of employees supervised were found to be positive antecedents of generativity (Doerwald et al., 2021). These kinds of changes in the diverse domains of life (e.g., family, work) could be more dynamic, potentially explaining the individual differences in the changes occurring in generativity. However, changes in another area of life could also shift the emphasis to other area, perhaps leading to no direct change in the level of generativity. Supporting this view, Peterson and Stewart (1996) found that working women with high levels of generativity found gratification through work and that those who did not work found gratification through parenthood.

Also, new channels to express generativity may be possible with age and increasing leisure time, such as grandparenthood and volunteering (Infurna et al., 2020; McAdams et al., 1993). Grandparenthood and community involvement may develop new targets to be concerned about, thereby arousing generative behaviors. Also, with increasing age, the deaths of loved ones may weaken the personal resources to act generatively. During middle and late adulthood, physical health concerns become more common (Infurna et al., 2020). Good health and physical functioning may serve as resources to express generativity; however, health concerns may diminish possibilities to contribute to the well-being of others and possibly force one to take more time to focus on oneself. Nevertheless, it is notable that in our study sample, 69% of the participants perceived their health as excellent or fairly good at age 61. To conclude, in future research on the changes occurring in generativity, changes in the determining factors should also be considered. Consequently, as the explanatory factors may be dynamic within individuals, the follow-up of the same sample of individuals through adulthood is essential to be able to study the development of generativity at the level of the individual. Nevertheless, although the investigation of explanatory factors is central to future research, this understanding of the dynamics of generativity development was a necessary first step.

Previous theories of the development of generativity have suggested that different features of generativity may be relevant among different ages (McAdams et al., 1998; Stewart & Vandewater, 1998). In middle adulthood, in particular, generative capacity (Stewart & Vandewater, 1998) and generative concern and action (McAdams et al., 1998) have been found to be more important than in late adulthood. We utilized the Generativity Scale (Ryff & Heincke, 1983), which measures generativity on a general level, including items assessing generative concern, action, and perceptions about cultural demands. However, the items concerning influence on others (e.g., “I often make decisions that influence the lives of many others”) and generative behavior and strivings (e.g., “I spend a good deal of time sharing my experience and know-how with younger people”) may

reflect more about the generativity, especially felt capacity, expressed by working parents with children living at home. Consequently, the decreasing trend in generativity found in the present study could be partly explained by the reduced capability of the generativity measure in assessing generativity in late adulthood when generativity may be expressed primarily through generative achievement (Stewart & Vandewater, 1998) or generative narration (McAdams et al., 1998). The suitability of the scale in measuring generativity particularly in middle adulthood is also supported by the initial study by Ryff and Heincke (1983), which tested the Generativity Scale in three age groups: young adulthood, middle age, and old age. The results showed that participants in all age groups saw middle age as the most generativity-oriented period, in line with Erikson’s (1963) initial theory. Altogether, the diversity of the methods used in the measurement of the development of generativity may contribute to challenges in comparing study results as the different measures may result in diverse trajectories.

The present study aimed to investigate possible gender differences in the development of generativity due to the lack of a previous research focus on this dimension. The preliminary likelihood ratio test suggested differences in the change score model parameters between women and men. Also, the supplementary analyses indicated gender differences in the model fit in the Rasch model, suggesting differences in the response patterns, and some of the items functioned differently across gender. Except for the significance level of the changes across ages varying between men and women, no significant gender differences emerged, and the average development was highly similar for both groups, confirming the fittingness of the Generativity Scale for both genders. However, gender differences could be more prominent when studying the factors explaining individual differences in the development of generativity. For example, parenthood has been found to be associated with the level of generativity in men but not in women (McAdams & de St Aubin, 1992). In any event, the role of gender in the development of generativity should not be excluded from future studies.

Some limitations need to be considered. When studying change, it should be acknowledged that the selection of persons, variables, and occasions of measurement may contribute to the generalization of the results (Nesselrode, 1991). The sample size was relatively small compared to that of previous studies investigating the development of generativity during adulthood. However, we investigated the development of generativity in the same sample of middle-aged women and men for 19 years, which enabled us to examine individual differences in the changes during middle adulthood and the beginning of late adulthood. In future studies, larger samples could be preferred as the observed effects and changes in generativity were relatively small. Also, more frequent measurement intervals might have revealed additional

information about the development of generativity and shown even more dynamic patterns of generativity development in the individual trajectories (see Supplement 1, Figure S2). We used the Generativity Scale (Ryff & Heinicke, 1983), whose validity received little attention following the initial study (Bradley, 1997). Also, the Generativity Scale does not distinguish different features of generativity; it is a general measure of generativity.

Although the representativeness of the JYLS sample to the general population of Finland of the same age has been indicated in the previous phases of data collection (Pulkkinen & Kokko, 2010; Pulkkinen et al., 2003), the generalizability of the results to other cultures may be limited. One of the features of generativity in McAdams et al. (1993) was cultural demand, which refers to how and why individuals are responsible for the next generation. Cultures may have differing views about demands for taking care of subsequent generations, consequently influencing the development of generativity. In non-Western cultures, the self is viewed as interdependent and defined through social roles, whereas in Western cultures, individual distinctness and autonomy are inculcated from childhood (Hofer et al., 2008; Markus & Kitayama, 1991). In addition, culture may contribute to the timing of generativity. For example, in many non-Western countries, early marriage and parenthood are more acceptable, which may enable generativity to evolve earlier (Karacan, 2014). Additionally, in Western cultures, the maturation of a child may contribute more toward diminishing possibilities of expressing generativity (e.g., reduced contact) than in collectivist cultures where extended families and taking part in caring for other people's children are more common (Hofer et al., 2008; Østbye et al., 2018). Thus, more research is needed on cross-cultural differences and similarities in generativity development.

The strengths of the study were related to the sample and methodological features. To form the generativity measure, Rasch analysis was applied. Rasch analysis has advantages in constructing a latent variable of rating-scale items and offers useful tools to identify, for example, differentially functioning items and measurement bias. It also makes it easier to accommodate missing responses as approximate person measures can be obtained based on the item parameters of available responses. Other advantages are discussed in Wright and Masters (1982) and Boone et al. (2014). Also, the use of the Bland–Altman plot and latent change score model with multiple time points in the investigation of the development of generativity in adulthood was novel, at least to our knowledge. These methods provided a model-free analysis of changes and enabled a more specific investigation into the individual differences in the development of generativity in Finnish women and men of the same age,

who were followed from middle adulthood to the beginning of late adulthood.

The study offers important information about the development of generativity in adulthood. It indicated the role of previous levels of generativity as well as of previously occurring change in the prediction of further change. The results suggest diversity in the development of generativity, with individual differences in the size and direction of change relating to age. To conclude, investigating only mean-level developments in the population may oversimplify the phenomenon of generativity, thereby ignoring the factors associated with individual differences.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s10804-022-09436-1>.

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Declarations

Conflict of interest The authors have no conflict of interest to declare.

Ethical Approval Ethical Committee of the Central Finland Health District ethically approved the data collections of the JYLS study conducted in 2001 and 2009. The Ethical Committee of the University of Jyväskylä ethically approved the most recent data collection, conducted in 2020–2021.

Informed Consent Informed consent was obtained from all participants included in the study in each data collection.

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