Reciprocal associations between parenthood and mental well-being – a prospective analysis from age 16 to 52 years

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Abstract

Objective The present study examines the bidirectional nature of the associations between parenthood and mental well-being using 36-year longitudinal data.

Background Mental well-being can affect if and when one becomes a parent (selection hypothesis), and the characteristics of parenthood can affect mental well-being (causation hypothesis). However, life course research has infrequently studied these hypotheses in parallel. Previous studies have also typically only focused on one aspect of parenthood (e.g., having children) and on the negative aspects of the mental well-being construct.

Method The participants in the Finnish 'Stress, Development and Mental Health (TAM)' cohort study were followed up at ages 16, 22, 32, 42, and 52 (N = 1160). The measures of parenthood (having children, timing of parenthood, and number of children) and mental well-being at ages 16 and 52 (depressive symptoms, self-esteem, and meaningfulness) were based on self-report.

Results For men, higher self-esteem in adolescence was associated with having children, and having children was associated with higher self-esteem in middle age. For women, depressive symptoms at age 16 were associated with becoming a parent at age 24 or younger. For both genders, having children was associated with a higher sense of meaningfulness in middle age.

Conclusion Studied within the life course perspective, our results indicate that parenthood has a positive effect on mental well-being in mid-adulthood even when accounting for selection effects.

Keywords Parenthood · Life course · Longitudinal study · Depressive symptoms · Self-esteem · Meaningfulness

Introduction

Becoming a parent is a profound transition in one's life, as it introduces many changes to a person's daily life and also affects their life course more generally. Parenthood is a potential source of both stress and resources, and it has also been associated with mental well-being in both the short and long term (Kravdal et al., 2017; Radó, 2020). However, it should be noted that an individual's mental well-being may have an effect on whether they become a parent or the timing of this transition (Laursen & Munk-Olsen, 2010). In this study, we examined these reciprocal associations using a cohort with 36-year follow-up data from the age of 16 to 52 in women and men. More specifically, we focused on whether mental well-being in adolescence is associated with if and when one becomes a parent (selection hypothesis) and whether characteristics of parenthood predict later mental well-being (causation hypothesis). In addition to becoming a parent, we also studied the timing of parenthood and the number of children. We examined mental well-being more broadly than the traditional mental illness approach by considering both the positive and negative indicators of mental well-being. Issues relating to parenthood and mental well-being are topical areas of research, as the roles of traditional institutions, such as the family, have undergone many changes in Western societies; families have fewer children, people become parents at an older age, and childlessness is more common (Elder & George, 2016; Official Statistics of

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Finland (OSF), 2021a, 2021b). At the same time, mental illnesses have been assessed as a leading cause of the global burden of disease, affecting individuals' physical, psychological, and social functioning (Vigo et al., 2016).

Parenthood and mental well-being

Only a limited number of previous studies have researched both whether mental health predicts becoming a parent and whether parenthood predicts later mental health. A Swedish cohort study by Kalucza et al. (2015) examined both of these effects from the age of 16 to 43 with 1001 participants; their research focused on whether psychological symptoms at age 16 affect who becomes a parent and whether entry into parenthood affects psychological symptoms by middle age. Kalucza et al. (2015) found that there was no selection effect for women; however, men who reported poorer mental health in adolescence were less likely to become a father. After controlling for adolescent mental health when addressing whether parenthood affected mental health in middle age, Kalucza et al. (2015) found that having children was associated with better mental health in women, but not in men.

Regarding selection effect, Laursen and Munk-Olsen (2010) found that prior psychiatric disorders were associated with a lower likelihood of becoming a parent. A study by Jonsson et al. (2011) suggested that the prospect of having children was the same for females with adolescent depression and non-depressed females; however, females with a history of depression were more likely to report an abortion or miscarriage. Several studies on the effect of parenthood on mental health have presented similar results to Kalucza et al. (2015). For example, Yu et al. (2019) indicated that parenthood is more strongly associated with a mother's mental well-being rather than a father's, and Hansen et al. (2009) found that parenthood only has a positive effect on self-esteem and life satisfaction among women. Some cross-sectional studies have suggested that being a parent is associated with better mental well-being; for example, both male and female adults who are parents have fewer depressive symptoms or experience more happiness (Aassve et al., 2012; Helbig et al., 2006). On the other hand, Nelson et al. (2013) found higher meaningfulness in all parents compared to non-parents. However, several longitudinal studies have indicated that parents and non-parents both report similar outcomes in terms of mental well-being and life satisfaction (Angeles, 2010; Nomaguchi & Milkie, 2003).

Timing of parenthood and the number of children

Because the studies have yielded mixed results, it is important to examine in more detail the various characteristics of parenthood when analyzing the bidirectionality of the association between parenthood and mental well-being. In addition to being a parent, the timing of parenthood and the number of children should also be considered in the study of parenthood and mental well-being, as these factors have been identified as relevant in earlier studies (Mirowsky & Ross, 2002; Pearson et al., 2019).

The effect of mental well-being on the timing of parenthood has received little attention to date. A study by Bohman et al. (2010) found that there was no significant difference in the age of having a first child between formerly depressed women and women in the comparison group. Bardone et al. (1998) also identified similar results in women: adolescent depression was not associated with early pregnancies, but adolescent conduct disorder did predict early pregnancies. When examining the effect of parenthood on mental health, the timing of parenthood has been considered a primary factor from a life course perspective (Mirowsky & Ross, 2002); the consequences of different life events can vary depending on the timing of the events in a person's life course (Elder, 1998). For example, transitions to parenthood at different ages can have different impacts on mental well-being in the later life course (Umberson et al., 2019). Prior studies have suggested that delaying parenthood and the birth of a first child is beneficial to mental health (Kravdal et al., 2017; Mirowsky & Ross, 2002; Myrskylä et al., 2017). In contrast, becoming a parent in early young adulthood has been associated with poorer self-esteem and mental health in mid-life and in the later life course (Casad et al., 2012; Henretta, 2007; Kravdal et al., 2017; Nomaguchi & Milkie, 2020), with some studies suggesting that particularly affects women (Kohler et al., 2005). Becoming a parent at a young age or in early adulthood may have consequences in the long term, as it can interrupt the transition to adulthood, disrupt an educational or professional path, and increase emotional and economic stress (Barban, 2013; Mirowsky & Ross, 2002; Williams et al., 2015); thus, early parenthood can cumulatively affect later life and well-being.

In addition to becoming a parent and the timing of parenthood, the number of children is also associated with mental well-being (Pearson et al., 2019). The number of children in a family may affect family's and parents' financial and psychological resources – families with more children require more resources. Mental health may be affected by a perceived stress of responsibility that increases as the number of children in the family increases (Kravdal et al., 2017). Keenan and Grundy (2019) found that parents of four or more children experienced more depression than parents with fewer children, and their health declined faster during the follow-up study. Pearson et al. (2019) reported similar results: having a higher number of children was a risk factor for mental disorders, especially among mothers. However, Kravdal et al. (2017) also found that adults who were childless and those with only one child were more likely to
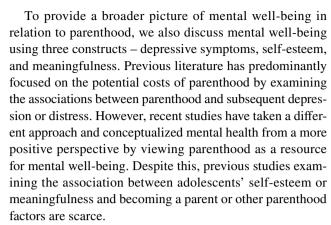
purchase antidepressants in late mid-life than parents with two or more children. The effect of adolescent mental well-being on the number of children has barely been addressed in the previous literature, which might be because this relationship is rather complex. If the experience of childbearing has been burdensome and stressful, it can affect the likelihood of having more than one child (Luppi, 2016; Mencarini et al., 2018). However, Bohman et al., (2010) found that people who had experienced adolescent depression had same number of children on average as the comparison group, suggesting that adolescent depression has no significance in terms of the number of children.

Role of gender

As shown above, gender seems to play an important role in the association between parenthood and different mental health factors. This may be in part due to traditional gender roles in relation to parenting, where women tend to take more parental responsibilities compared to men (Doucet, 2009). However, the studies examining gender differences between parenthood factors and mental well-being have found mixed results: some studies have found that parenthood factors have a stronger effect on women's mental well-being (Kalucza et al., 2015; Nomaguchi & Milkie, 2003; Pearson et al., 2019; Yu et al., 2019), while others that they have stronger associations with men's well-being (Nelson et al., 2013; Nelson-Coffey et al., 2019). Also, the selection and causation effects may be different between genders, like in the study by Kalucza et al. (2015), where selection effect was found only in men and causation effect only in women.

Present study

Life course studies that have simultaneously examined the reciprocal associations between parenthood and mental well-being, i.e., whether mental well-being in adolescence is associated with likelihood of becoming a parent (selection hypothesis) and whether parenthood predicts mental well-being in mid-adulthood (causation hypothesis), have remained limited. By using 36-year longitudinal data on the same individuals from the age of 16 to 52 years, we were able to examine if parenthood predicts mental well-being in middle age while simultaneously accounting for selection effects. The present study extends previous research by examining three different aspects of parenthood – in addition to exploring the relationship between mental health and becoming a parent, we also address the timing of parenthood and the number of children. Men and women were studied separately, as previous studies have suggested that the costs and rewards of parenthood may vary by gender (Nomaguchi & Milkie, 2003; Yu et al., 2019).

To provide a broader picture of mental well-being in relation to parenthood, we also discuss mental well-being using three constructs – depressive symptoms, self-esteem, and meaningfulness. Previous literature has predominantly focused on the potential costs of parenthood by examining the associations between parenthood and subsequent depression or distress. However, recent studies have taken a different approach and conceptualized mental health from a more positive perspective by viewing parenthood as a resource for mental well-being. Despite this, previous studies examining the association between adolescents' self-esteem or meaningfulness and becoming a parent or other parenthood factors are scarce.

The research questions were as follows:

Q1. Is mental well-being at age 16 associated with becoming a parent, the timing of parenthood, and the number of children in women and men during the life course?

Q2. Are being a parent, the timing of parenthood, and the number of children associated with mental well-being in middle-aged women and men when selection effects are accounted for?

Based on previous studies (particularly Kalucza et al, 2015; but also Casad et al., 2012; Hansen et al., 2009; Kravdal et al., 2017; Nelson et al., 2013; Pearson et al., 2019; Umberson et al., 1989) we specifically hypothesized that:

1. Depressive symptoms at age 16 are not associated with becoming a parent for women, but for men, depressive symptoms decrease the likelihood of becoming a father.
2. Being a parent is associated with less depressive symptoms, higher self-esteem and higher meaningfulness in middle age.
3. Becoming a parent at older age is associated with less depressive symptoms and becoming a parent at younger age is associated with more depressive symptoms and lower self-esteem, especially in women.
4. Higher number of children is associated with more depressive symptoms, especially in women.

Methods

Study design and data

The original target population included all Finnish-speaking ninth-grade pupils who attended secondary schools in Tampere in the spring of 1983. Tampere is an industrial and university city in southern Finland that had a population of 166,000 at that time. In the 1980s, Tampere had the second

largest population in Finland and nearly all of the residents were Caucasian and Finnish-speaking. A questionnaire was completed by 2,194 pupils (96.7% of the target population, mean age 15.9, n = 1071 (48.8%) women and n = 1123 (52.2%) men) during a school day in 1983. The participants were then followed up in 1989 (N = 1,656; 75.5%), 1999 (N = 1,471; 67.0%), 2009 (N = 1,334; 60.8%), and 2019 (N = 1,160; 52.9%) when they were aged 22, 32, 42, and 52 years, respectively. The original study population that participated at the 1983 baseline (N = 2,194) was recontacted during each study wave. However, the present study only included the participants who had participated in the 2019 follow-up survey at age 52 (N = 1,160, n = 648 (55.9%) women and n = 512 (44.1%) men).

To analyze drop-out, we compared relevant background variables and the three mental well-being variables from baseline (at age 16) between those included in current study (N = 1160) and those, who were not participating in the follow-up in 2019 (N = 1034). In these analyses, male gender (p < 0.001), lower school performance (p < 0.001), parental divorce (only in women, p = 0.021), parental SES (only in men, p = 0.001) and lower meaningfulness (only in men, p = 0.009) predicted drop-out. Depression and self-esteem at age 16 were not associated with drop out at age 52.

The study protocol has been approved by the Ethics Committee of Tampere University Hospital and the Institutional Review Board of the Finnish Institute for Health and Welfare.

Measures

Parenthood

Three different variables of parenthood were used in the study: being a parent (yes/no), the timing of becoming a parent, and the number of children.

Information about being a parent was obtained at the age of 52 from the question, "How many children do you have?". If the participant answered with one or more, he or she was coded as a parent. This information was also verified with the data from previous study waves, and in 10 cases the missing information was replaced with "yes" based on previous responses.

The timing of parenthood was calculated from the year of birth of the first child and the respondent's own year of birth. Questionnaires at 22, 32, and 42 years of age were used to obtain the date of birth of the first child. Previous studies suggest a non-linear association between age of becoming a parent and mental well-being (e.g., Kravdal et al., 2017), thus the timing of parenthood was used as a categorized variable: "At age 24 or younger", "25–32", "At age 33 or older", and "No children". There is no consensus in the literature for cut-offs for age (Aasheim et al., 2013) and our

categorizations were based lower (≤ 24) and upper (≥ 33) quartiles.

The number of children was obtained at the age of 52 from the question, "How many children do you have". The data from previous surveys was used to fill in missing information. The number of children was categorized as "No children", "1 child", "2 children", and "3 children or more" (Helbig et al., 2006).

Mental well-being

Mental well-being was studied using three variables: depressive symptoms, self-esteem, and meaningfulness. The surveys at age 16 and age 52 measured depressive symptoms and self-esteem in the same way. However, the measure used for meaningfulness at age 16 was narrower than the broader measure used at age 52.

The depressive symptoms measure was constructed using a 17-item psychosomatic symptoms checklist that included seven items (on a scale from 0 to 3) that are indicative of depressiveness: lack of energy, sleeping difficulties, nightmares, fatigue, irritability, loss of appetite, and nervousness/anxiety (Pelkonen et al., 2003). Four of these are used as symptoms of clinical depression, e.g. in the DSM-V-classification (American Psychiatric Association, 2013). In the present sample Cronbach's alpha for reliability was 0.71 at age 16 and 0.81 at age 52. When calculating the sum-score, a maximum of two missing items were allowed, and replaced by the mean of the respondent's available items.

Self-esteem was measured using seven statements that resembled those used in the Rosenberg's self-esteem measure (Rosenberg, 1965), which is internationally widely used measure of self-worth. The statements were assessed on a 5-point scale (1 = totally disagree – 5 = totally agree), and the statements were as follows: "I believe in myself and in my possibilities", "I wish I was different from how I am" (reversed), "I suffer from feelings of inferiority" (reversed), "I think I have many good qualities", "I feel I lack self-confidence" (reversed), "I can do what others can", and "I am often dissatisfied with myself" (reversed). The self-esteem score was calculated as the mean of items (scale 1–5; maximum of two missing items allowed), with a higher score indicating better self-esteem. Cronbach's alpha for reliability was 0.80 at age 16 and 0.90 at age 52.

Meaningfulness (or meaning in life) was measured using a scale that assessed the framework aspect of the construct, i.e., the extent to which individuals find purpose in their lives or establish a set of life goals or meaningful perspectives (Battista & Almond, 1973; Steger et al., 2006). Five items were included in the scale, resembling those used e.g., in the Meaning of Life Questionnaire (Steger et al., 2006): "I have clear future plans" (reversed), "I am uncertain about my future", "I feel my life lacks purpose", "I have a clear

understanding of my goals in life" (reversed) and "I am certain I will find my place in the world" (reversed). At age 16, there were only two items that measured meaningfulness, and both related to perceptions of one's future. The meaningfulness score was calculated as the mean of these items, and Cronbach's alpha for reliability was 0.72 at age 16 and 0.88 at age 52. For meaningfulness at age 52, a maximum of two missing items were allowed, and these were replaced by the mean of the respondent's available items. For the calculation of the 2-item measure of meaningfulness at age 16, no missing items were allowed.

The three mental well-being variables were correlated. At age 16, depressive symptoms correlated with self-esteem (Pearson correlation coefficient $r = -0.362$, $p < 0.001$) and with meaningfulness ($r = -0.181$, $p < 0.001$), while correlation between self-esteem and meaningfulness was $r = 0.428$ ($p < 0.001$). At age 52, the correlations between depressive symptoms and self-esteem ($r = 0.816$), depressive symptoms and meaningfulness ($r = -0.569$), and also between self-esteem and meaningfulness ($r = -0.564$) were all significant ($p < 0.001$).

Control variables

The control variables used for the study were parental divorce (yes/no) and parental socio-economic status (SES) (based on the father's occupation: "manual", "lower non-manual", "upper non-manual"); the data for the control variables was taken from the baseline study at age 16.

Statistical analysis

All analyses for the study were performed using IBM SPSS Statistics 27, and for the most they were carried out separately for men and women. Frequencies and percentages were reported for categorical variables; means and standard deviations were provided for continuous variables. Gender differences were tested using the chi-square test (categorical variables) and ANOVA (continuous variables). P-values < 0.05 were considered statistically significant.

Logistic regression analysis was used to analyze whether mental well-being at age 16 predicts being a parent in middle age. To study whether mental well-being at age 16 was associated with the timing of parenthood and the number of children, multinomial logistic regression analyses were performed. To study our second research question whether being a parent, the timing of parenthood, or the number of children, are associated with mental well-being in middle-aged women and men, we used linear regression analysis. In both of these analyses, the reference categories were "becoming a parent at age 25–32" (timing of parenthood) and "having 2 children" (number of children), as they were most common in the present sample. In the analysis, 95%

confidence intervals (CI) were calculated for the odds ratio (OR) and for the relative risk ratio (RRR).

For each analysis, an unadjusted model was first estimated with becoming a parent, the timing of parenthood, or the number of children as the only predictor/outcome in the model. The covariates parental divorce and parental SES were added to an adjusted Model 1 that was then estimated.

For the analysis of parenthood predicting mental well-being, we also used the measures of depressive symptoms, self-esteem, or meaningfulness (depending on the outcome of the analyses) from the baseline study wave to control for selection effects (adjusted Model 2).

Gender differences were tested with interaction terms in models using total sample (women and men) data. We used interaction terms between gender and mental well-being variable, i.e., depressive symptoms, self-esteem and meaningfulness, in analysis of mental well-being at age 16 predicting the parenthood variables, and interaction terms between gender and parenthood variable, i.e., having children, the timing of becoming a parent and number of children, in the analysis of parenthood factors predicting mental well-being at age 52. Interaction terms were introduced to the fully adjusted models.

Results

Table 1 presents the descriptive statistics of the study variables. At age 52, almost 81% of the respondents were parents. The respondents had become a parent for the first time at approximately age 27.7 for women and age 29.3 for men. Most of the female and male respondents had become a parent between the ages of 25 and 32. For both genders, becoming a parent for the first time at age 33 or older was the second most common category (women 23.1% and men 29.8%). Both women and men had on average two children, which was also the most common category for the number of children.

Mental well-being in adolescence predicting parenthood (Q1)

Results from the logistic regression analyses of mental well-being at age 16 predicting parenthood are shown in Table 2. Depressive symptoms at age 16 were associated with higher odds of having children for women and lower odds for men, but only in the unadjusted model. For men, higher self-esteem at age 16 was associated with higher odds of being a parent by age 52. Differences between women and men were significant regarding the effect of depressive symptoms and self-esteem on parenthood.

In the multinomial logistic regression analysis of the mental well-being at age 16 predicting the timing of

Table 1 Study variables by gender

Variable	All (n=1160) % (n)	Women (n=648) %(n)	Men (n=512) %(n)	Gender difference p[a]
Parent (yes)	80.6 (916)	81.0 (513)	80.1 (403)	0.696
Timing of parenthood (age), mean (SD)	28.4 (5.0)	27.7 (4.9)	29.3 (4.8)	<0.001
< =24	21.0 (173)	25.1 (123)	13.4 (50)	
25–32	56.9 (490)	57.0 (279)	56.7 (211)	
> =33	23.1 (199)	17.9 (88)	29.8 (111)	
Number of children, mean (SD)	2.0 (1.5)	2.0 (1.5)	2.0 (1.5)	0.899
No children	19.3 (219)	19.0 (120)	19.7 (99)	
1 child	14.3 (163)	13.6 (86)	15.3 (77)	
2 children	35.2 (400)	36.8 (233)	33.2 (167)	
3 children or more	31.1 (354)	30.6 (194)	31.8 (160)	
Depressive symptoms at age 16, mean (SD)	4.1 (2.8)	4.5 (2.7)	3.5 (2.5)	<0.001
Depressive symptoms at age 52, mean (SD)	4.6 (3.3)	5.0 (3.3)	4.1 (3.2)	<0.001
Self-esteem at age 16, mean (SD)	3.6 (0.7)	3.5 (0.7)	3.8 (0.7)	<0.001
Self-esteem at age 52, mean (SD)	4.0 (0.8)	3.9 (0.8)	4.1 (0.7)	<0.001
Meaningfulness at age 16	3.5 (1.0)	3.3 (1.0)	3.7 (0.9)	<0.001
Meaningfulness at age 52	3.9 (0.9)	3.8 (0.8)	3.9 (0.9)	0.015
Parental SES at age 16				0.119
Manual	47.5 (546)	49.6 (318)	44.8 (228)	
Lower non-manual	32.4 (373)	32.3 (207)	32.6 (166)	
Upper non-manual	20.1 (231)	18.1 (116)	22.6 (115)	
Parental divorce at age 16	22.2 (255)	23.0 (148)	21.1 (107)	0.449

[a] Test of gender difference: Chi-square for categorical/dichotomous and ANOVA for continuous variables

Table 2 Logistic regression analyses of mental well-being at age 16 predicting being a parent by age 52 for women and men

| Independent variables | Women n=620–633 | | Men n=489–502 | |
	Unadjusted	Adjusted[a]	Unadjusted	Adjusted[a]
	OR (95% CI) p	OR (95% CI) p	OR (95% CI) p	OR (95% CI) p
Depressive symptoms at age 16	**1.08 (1.00–1.17) 0.047**	1.07[b] (0.99–1.16) 0.086	**0.92 (0.84–1.00) 0.044**	0.92[b] (0.85–1.00) 0.059
Self-esteem at age 16	0.86 (0.63–1.17) 0.327	0.85[b] (0.62–1.16) 0.295	**1.90 (1.37–2.72) <0.001**	**1.85[b] (1.31–2.62) 0.001**
Meaningfulness at age 16	1.08 (0.89–1.31) 0.452	1.09 (0.90–1.33) 0.379	1.23 (0.97–1.56) 0.091	1.19 (0.94–1.52) 0.152

[a] Adjusted Model: Parental divorce and SES at age 16

[b] Statistically significant difference in effects between genders (p<0.005)

parenthood (Table 3), depressive symptoms in women at age 16 were more strongly associated with becoming a parent at age 24 or younger in comparison to becoming a parent between the ages of 25 and 32. For men, lower self-esteem was a significant predictor for childlessness in the follow-up study waves, and the association differed significantly from the effect among women as indicated by the gender x self-esteem interaction term. Adding the control variables did not change any statistically significant results.

In the multinomial logistic regression analysis of mental well-being predicting the number of children (Table 4), only two significant associations were found

Table 3 Multinomial logistic regression analysis of mental well-being at age 16 predicting the timing of parenthood at age 52 for women and men

Independent variables	Women n=597–610		Men n=461–470	
	Unadjusted	Adjusted[a]	Unadjusted	Adjusted[a]
	RRR (95% CI) p	RRR (95% CI) p	RRR (95% CI) p	RRR (95% CI) p
Depressive symptoms at age 16				
Parent at age 25–32	*ref*	*ref*	*ref*	*ref*
Parent at age 24 or younger	**1.11 (1.03–1.19) 0.008**	**1.10 (1.02–1.19) 0.016**	0.99 (0.87–1.12) 0.822	0.99 (0.87–1.12) 0.832
Parent at age 33 or older	1.01 (0.92–1.10) 0.917	0.99 (0.90–1.09) 0.798	0.96 (0.87–1.06) 0.391	0.95 (0.86–1.05) 0.326
No children	0.95 (0.87–1.03) 0.193	0.95 (0.87–1.04) 0.253	1.07 (0.98–1.18) 0.129	1.07 (0.97–1.17) 0.170
Self-esteem at age 16				
Parent at age 25–32	*ref*	*ref*	*ref*	*ref*
Parent at age 24 or younger	1.03 (0.74–1.42) 0.869	1.10 (0.79–1.52) 0.595	0.81 (0.50–1.32) 0.400	0.80 (0.49–1.31) 0.367
Parent at age 33 or older	1.19 (0.82–1.72) 0.368	1.11 (0.76–1.62) 0.587	1.18 (0.81–1.74) 0.385	1.19 (0.81–1.76) 0.380
No children	1.22 (0.87–1.70) 0.247	1.24[b] (0.88–1.74) 0.212	**0.54 (0.37–0.78) 0.001**	**0.55[b] (0.38–0.81) 0.002**
Meaningfulness at age 16				
Parent at age 25–32	*ref*	*ref*	*ref*	*ref*
Parent at age 24 or younger	1.00 (0.81–1.23) 0.979	1.05 (0.85–1.29) 0.682	0.99 (0.71–1.39) 0.969	0.99 (0.71–1.40) 0.971
Parent at age 33 or older	1.03 (0.81–1.31) 0.795	1.04 (0.81–1.33) 0.737	1.09 (0.85–1.40) 0.511	1.10 (0.85–1.42) 0.467
No children	0.93 (0.75–1.14) 0.489	0.93 (0.75–1.15) 0.498	0.85 (0.66–1.10) 0.208	0.87 (0.67–1.13) 0.306

[a] Adjusted model: Parental divorce and parents SES at age 16

[b] Statistically significant difference in effects between genders (p < 0.005)

– both related to the male respondents. Men who had depressive symptoms at age 16 were more likely to have no children in comparison to having two children, but not after controlling for parental divorce and SES at age 16. Additionally, lower self-esteem at age 16 was a significant predictor of not having children by age 52 for men; this result was the same after adding the control variables. Both associations were significantly different from the corresponding effects among women as indicated by the interaction terms.

Parenthood predicting mental well-being in middle age (Q2)

In the linear regression analyses of the being a parent predicting mental well-being (Table 5), for women, parenthood was associated with less depressive symptoms at age 52 after controlling for parental divorce, parents SES, and depressive symptoms at age 16. For men, having children was associated with better self-esteem in middle age in each model and the difference comparing to the corresponding association in

Table 4 Multinomial logistic regression analysis of mental well-being at age 16 predicting the number of children at age 52 for women and men

Independent variables	Women n = 620–633		Men n = 489–502	
	Unadjusted	Adjusted[a]	Unadjusted	Adjusted[a]
	RRR (95% CI) p	RRR (95% CI) p	RRR (95% CI) p	RRR (95% CI) p
Depressive symptoms at age 16				
2 children	ref	ref	ref	ref
1 child	1.03 (0.93–1.13) 0.121	1.02 (0.93–1.12) 0.699	0.98 (0.87–1.10) 0.681	0.97 (0.86–1.09) 0.569
3 children or more	1.06 (0.99–1.14) 0.113	1.06 (0.98–1.14) 0.132	1.05 (0.96–1.15) 0.288	1.05 (0.96–1.15) 0.273
No children	0.96 (0.88–1.05) 0.305	0.96[b] (0.88–1.04) 0.314	**1.11 (1.00–1.22) 0.041**	1.10[b] (1.00–1.22) 0.057
Self-esteem at age 16				
2 children	ref	ref	ref	ref
1 child	0.96 (0.66–1.40) 0.825	0.97 (0.66–1.42) 0.857	0.76 (0.49–1.18) 0.223	0.78 (0.50–1.22) 0.269
3 children or more	0.95 (0.71–1.27) 0.711	0.94 (0.70–1.27) 0.689	0.83 (0.58–1.19) 0.307	0.83 (0.58–1.19) 0.323
No children	1.14 (0.81–1.60) 0.467	1.15[b] (0.81–1.63) 0.433	**0.46 (0.31–0.68) < 0.001**	**0.48[b] (0.32–0.72) < 0.001**
Meaningfulness at age 16				
2 children	ref	ref	ref	ref
1 child	0.85 (0.67–1.08) 0.175	0.88 (0.69–1.13) 0.316	1.07 (0.79–1.44) 0.667	1.10 (0.81–1.48) 0.544
3 children or more	1.10 (0.91–1.33) 0.309	1.13 (0.93–1.37) 0.209	0.99 (0.78–1.25) 0.915	1.00 (0.78–1.27) 0.978
No children	0.94 (0.76–1.16) 0.544	0.94 (0.75–1.17) 0.562	0.82 (0.63–1.08) 0.151	0.85 (0.65–1.12) 0.252

[a] Adjusted model: Parental divorce and parents SES at age 16

[b] Statistically significant difference in effects between genders (p < 0.005)

the final model among women was statistically significant. Regarding meaningfulness, associations were found for both genders; having children was associated with greater meaning in life.

In the linear regression analyses of the timing of becoming a parent predicting mental health at age 52 (Table 6), having children at age 24 or younger (compared to becoming a parent between the ages of 25 to 32) was associated with depressive symptoms in women. However, this significant association was not observed after adjusting for depressive symptoms at age 16. For women, having no children was a significant predictor of depressive symptoms in middle age in all models. For men, having no children was more

strongly associated with depressive symptoms and lower self-esteem in comparison to having children between the ages of 25 and 32; however, the association with depressive symptoms was not observed after adding the control variables. For both genders, having no children was associated with lower meaningfulness at age 52, but for women, having children at age 33 or older was also associated with lower meaningfulness. In the analyses of the timing of becoming a parent predicting mental well-being at age 52, there were no significant gender differences.

In the analysis of the number of children predicting depressive symptoms, no associations were found at age 52 (Table 7). Regarding self-esteem, having no children

Table 5 Linear regression analyses of being a parent predicting mental well-being at age 52 for women and men

	Women n=618–631			Men n=483–501		
	Unadjusted	Adjusted 1[a]	Adjusted 2[b]	Unadjusted	Adjusted 1[a]	Adjusted 2[b]
Dependent variables	B (SE) p	B (SE) p	B (SE) p	B (SE) P	B (SE) p	B (SE) p
Depressive symptoms at age 52	-0.62 (0.33) 0.062	-0.64 (0.33) 0.055	**-0.76 (0.33)** **0.021**	-0.57 (0.36) 0.113	-0.52 (0.36) 0.145	-0.37 (0.35) 0.298
R Square	0.006	0.022	0.064	0.005	0.016	0.063
Self-esteem at age 52	-0.12 (0.08) 0.134	-0.12 (0.08) 0.138	-0.10 (0.08)[c] 0.220	**0.24 (0.08)** **0.003**	**0.25 (0.08)** **0.002**	**0.16 (0.08)[c]** **0.043**
R Square	0.004	0.025	0.111	0.018	0.024	0.090
Meaningfulness at age 52	**0.18 (0.08)** **0.031**	**0.18 (0.08)** **0.028**	**0.17 (0.08)** **0.039**	**0.32 (0.10)** **0.001**	**0.33 (0.10)** **<0.001**	**0.30 (0.10)** **0.002**
R Square	0.007	0.023	0.053	0.023	0.025	0.034

[a] Adjusted Model 1: Parental divorce and parents SES at age 16

[b] Adjusted Model 2: Model 1+depressive symptoms/self-esteem/meaningfulness at age 16

[c] Statistically significant difference in effects between genders (p<0.005)

(compared to having two children) was a risk factor for lower self-esteem in men in middle age, but not after adjusting for baseline self-esteem. For women, having three or more children was associated with greater meaningfulness. For men, having no children was a risk factor for a lower sense of meaningfulness. The gender difference in the association of not having children and self-esteem was found significant.

Discussion

The present study examined the bidirectional association between parenthood and mental well-being by investigating whether mental well-being in adolescence is associated with parenthood factors and whether parenthood predicts mental well-being in mid-adulthood. The data for the study was gathered from the time when participants were aged between 16 and 52 years and thus covered the peak ages for fertility. The key results are summarized in Fig. 1. Our results showed that various factors of parenthood and aspects of mental well-being were emphasized differently in men and women. For men, lower self-esteem in adolescence was associated with not having children; in addition, not having children was also associated with lower self-esteem in mid-adulthood. For women, the results showed that having depressive symptoms at age 16 was associated with becoming a parent at age 24 or younger. On the other hand, for both genders, having children was associated with greater meaningfulness.

In this study we examined whether mental well-being at the age of 16 is associated with parenthood factors. Contrary to our hypotheses, depressive symptoms at age 16 were not

associated with likelihood of becoming a parent in men. However, in men, lower self-esteem at age 16 was associated with not having children in mid-life. This finding is in line with the study by Kalucza et al. (2015), who found selection effect among men; men with poorer mental health in adolescence were less likely to become parents. This association may have been observed because self-esteem affects many important aspects of life, such as romantic relationships; individuals with low self-esteem can find it more difficult to start a long-term relationship (Luciano & Orth, 2017), and therefore their opportunities for starting a family and having children might be affected. In contrast, and as we hypothesized, these results were not observed in the data for the female respondents. The found gender difference in the role of self-esteem in becoming a parent, may be due to the traditional gender roles that still applied to the study cohort who were born in the 1960s: men were expected to take a more proactive role in dating than women (Cameron & Curry, 2020; Rose & Frieze, 1993). For women, on the other hand, there were results relating to depressive symptoms, as depressive symptoms in adolescence were associated with becoming a parent at age 24 or younger. Clayborne et al. (2019) suggested that becoming a parent at a younger age may be linked to feelings of isolation and a desire to foster deeper connections and intimacy, and early parenthood can fulfil these needs. Depression can also affect the non-use or misuse of contraception (Hall et al., 2013), which can potentially lead to an unplanned pregnancy. Depressive symptoms at age 16 were also associated with higher odds of becoming a parent for women and lower odds for men, but both of these results became insignificant after controlling for parental divorce and SES at age 16. This suggests that

Table 6 Linear regression analyses of timing of becoming a parent predicting mental well-being at age 52 for women and men

Dependent variables	Women n = 565–608			Men n = 457–469		
	Unadjusted	Adjusted 1[a]	Adjusted 2[b]	Unadjusted	Adjusted 1[a]	Adjusted 2[b]
	B (SE) p	B (SE) p	B (SE) p	B (SE) p	B (SE) p	B (SE) p
Depressive symptoms at age 52						
Parent at age 25–32	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*
Parent at age 24 or younger	**0.82 (0.35)** **0.021**	**0.72 (0.36)** **0.043**	0.55 (0.35) 0.119	0.42 (0.51) 0.415	0.46 (0.52) 0.373	0.49 (0.51) 0.335
Parent at age 33 or older	0.50 (0.40) 0.206	0.54 (0.40) 0.180	0.56 (0.40) 0.158	0.33 (0.38) 0.379	0.37 (0.38) 0.340	0.42 (0.37) 0.257
No children	**0.92 (0.35)** **0.010**	**0.91 (0.36)** **0.011**	**0.99 (0.35)** **0.005**	**0.77 (0.39)** **0.047**	0.68 (0.39) 0.087	0.53 (0.39) 0.167
R Square	0.015	0.031	0.069	0.009	0.016	0.066
Self-esteem at age 52						
Parent at age 25–32	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*
Parent at age 24 or younger	-0.03 (0.09) 0.704	-0.01 (0.09) 0.905	-0.02 (0.08) 0.791	-0.00 (0.11) 0.977	-0.05 (0.12) 0.700	-0.02 (0.11) 0.866
Parent at age 33 or older	-0.06 (0.10) 0.524	-0.10 (0.10) 0.320	-0.11 (0.09) 0.230	-0.07 (0.09) 0.413	-0.08 (0.09) 0.375	-0.11 (0.08) 0.190
No children	0.10 (0.09) 0.250	0.10 (0.09) 0.253	0.07 (0.08) 0.412	**-0.27 (0.09)** **0.002**	**-0.28 (0.09)** **0.002**	**-0.20 (0.09)** **0.026**
R Square	0.004	0.029	0.107	0.021	0.025	0.093
Meaningfulness at age 52						
Parent at age 25–32	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*
Parent at age 24 or younger	-0.08 (0.09) 0.379	-0.06 (0.09) 0.500	-0.06 (0.09) 0.488	0.12 (0.13) 0.386	0.08 (0.14) 0.557	0.08 (0.13) 0.544
Parent at age 33 or older	**-0.22 (0.10)** **0.032**	**-0.24 (0.10)** **0.016**	**-0.24 (0.10)** **0.016**	-0.12 (0.10) 0.240	-0.11 (0.10) 0.273	-0.14 (0.10) 0.176
No children	**-0.24 (0.09)** **0.009**	**-0.24 (0.09)** **0.008**	**-0.22 (0.09)** **0.012**	**-0.34 (0.10)** **0.001**	**-0.34 (0.10)** **0.001**	**-0.31 (0.10)** **0.003**
R Square	0.015	0.032	0.059	0.029	0.027	0.036

[a] Adjusted Model 1: Parental divorce and parents SES at age 16

[b] Adjusted Model 2: Model 1 + depressive symptoms/self-esteem/meaningfulness at age 16

rather than depression in adolescence alone, the likelihood of becoming a parent might be related more to the family factors in childhood and adolescence, e.g., parental divorce or parental SES.

Regarding the association of parenthood and mental well-being in mid-adulthood, we hypothesized that having children is associated with lower depressive symptoms, higher self-esteem and higher meaningfulness (Casad et al., 2012; Helbig et al., 2006; Nelson et al., 2013). Our findings suggested, that having no children (compared to those being a parent, having two children, or becoming a parent between the ages of 25 and 32) was associated with poorer mental well-being in middle age, although the results varied by outcome and gender. This association was particularly relevant regarding self-esteem in men in middle age, as having no children was consistently associated with lower self-esteem in the analyses. This result may be related to relationship

status, as a steady relationship is in the most of the cases a prerequisite for having children, while steady relationship in turn has been found to be important for self-esteem, especially for men (Grundström et al., 2021). For women, as we hypothesized, having children at age 24 or younger was associated with depressive symptoms, but this association was not observed after accounting for depressive symptoms in adolescence. This finding suggests that rather than parenthood itself, it may be that mental health status prior having a child may also affect the mental health after having a child. This is an important finding and shows the relevance of addressing potential selection mechanisms when assessing the effect of timing of parenthood on mental well-being in middle age.

Corresponding with the results of Nelson et al. (2013) and in line with our hypothesis, the present study found that having children was associated with a greater sense of

Table 7 Linear regression analyses of number of children predicting mental well-being at age 52 for women and men

Dependent variables	Women n = 618–632			Men n = 483–501		
	Unadjusted	Adjusted 1[a]	Adjusted 2[b]	Unadjusted	Adjusted 1[a]	Adjusted 2[b]
	B (SE) p	B (SE) p	B (SE) p	B (SE) p	B (SE) p	B (SE) p
Depressive symptoms at age 52						
2 children	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*
1 child	0.40 (0.41) 0.339	0.31 (0.42) 0.461	0.27 (0.41) 0.510	0.42 (0.45) 0.352	0.50 (0.44) 0.256	0.57 (0.43) 0.185
3 children or more	-0.27 (0.32) 0.387	-0.26 (0.32) 0.412	-0.37 (0.31) 0.245	0.10 (0.36) 0.792	0.07 (0.36) 0.846	0.02 (0.35) 0.957
No children	0.58 (0.37) 0.113	0.59 (0.37) 0.109	0.67 (0.36) 0.066	0.69 (0.41) 0.092	0.65 (0.41) 0.110	0.48 (0.40) 0.223
R Square	0.010	0.025	0.068	0.007	0.019	0.067
Self-esteem at age 52						
2 children	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*
1 child	-0.02 (0.10) 0.814	-0.01 (0.10) 0.933	-0.00 (0.10) 0.989	-0.06 (0.10) 0.543	-0.06 (0.10) 0.522	-0.04 (0.10) 0.709
3 children or more	0.14 (0.08) 0.069	0.13 (0.08) 0.089	0.14 (0.07) 0.058	-0.05 (0.08) 0.529	-0.03 (0.08) 0.669	-0.01 (0.08) 0.907
No children	0.17 (0.09) 0.056	0.17 (0.09) 0.060	0.15 (0.09)[c] 0.084	**-0.28 (0.09)** **0.003**	**-0.28 (0.09)** **0.002**	-0.17 (0.09)[c] 0.057
R Square	0.010	0.031	0.116	0.019	0.025	0.090
Meaningfulness at age 52						
2 children	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*
1 child	-0.11 (0.10) 0.309	-0.09 (0.10) 0.365	-0.08 (0.10) 0.451	-0.06 (0.12) 0.631	-0.04 (0.12) 0.716	-0.05 (0.12) 0.679
3 children or more	**0.19 (0.08)** **0.014**	**0.19 (0.08)** **0.018**	**0.16 (0.08)** **0.038**	0.02 (0.09) 0.853	0.03 (0.09) 0.727	0.04 (0.09) 0.654
No children	-0.12 (0.09) 0.179	-0.13 (0.09) 0.164	-0.12 (0.09) 0.181	**-0.33 (0.11)** **0.002**	**-0.32 (0.11)** **0.002**	**-0.29 (0.11)** **0.007**
R Square	0.023	0.037	0.064	0.024	0.026	0.036

[a] Adjusted Model 1: Parental divorce and parents SES at age 16

[b] Adjusted Model 2: Model 1 + depressive symptoms/self-esteem/meaningfulness at age 16

[c] Statistically significant difference in effects between genders (p < 0.005)

meaningfulness for both genders in comparison to having no children. Parenthood and having children can be related to a sense of purpose, a perception of reward, and a pursuit of important life goals, and these characteristics are often associated with achieving meaningfulness (Nelson et al., 2014). In regard to meaningfulness, women who had three or more children experienced a greater sense of meaningfulness in comparison to women who had two children. The desired number of children also plays a role in the association between parenthood and mental well-being (Kravdal, 2014), suggesting that women with three or more children may have always wanted a large family and achieving this goal provided positive meaning in their life. However, this result may also be influenced by a relationship status: three or more children may indicate a

long and secure relationship. On the other hand, the result could also reflect a new relationship in which one mutual child is desired. Women who became a parent at age 33 or older reported a lower sense of meaning in life, and this may be associated with the age of the children in a family. The participants who became a parent after age 33 might have child or children that were still relatively young at the follow-up stage at age 52, and this could have affected the meaning in life. A recent study found that women and men with older children (30 years or older) reported better mental health than parents with younger children (Simon & Caputo, 2019). However, contrary to our hypotheses and to previous studies (e.g., Mirowsky & Ross, 2002), we did not find evidence that older age of becoming a parent is associated with less depressive symptoms.
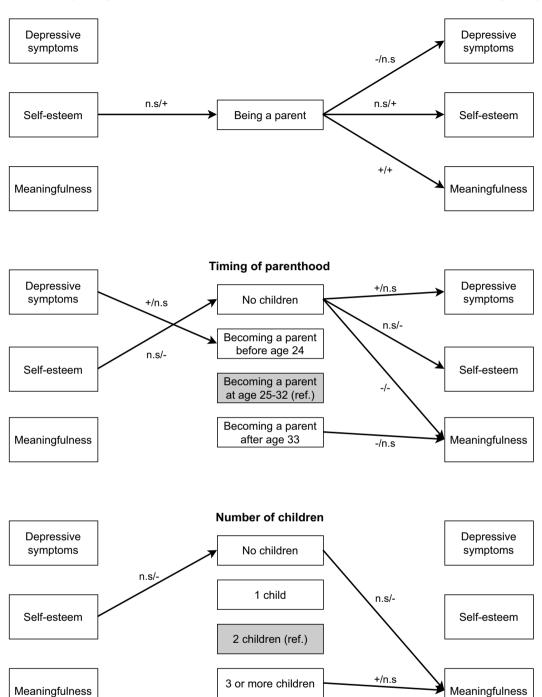
Fig. 1 Summary of the results from the final adjusted models in Tables 2, 3, 4, 5, 6, 7: mental well-being at age 16 predicting the parenthood factors and parenthood factors predicting the mental well-being at age 52 in women and men. Statistically significant results are marked with an arrow, and the direction of the association (±) is marked next to the arrow separately for women and men (women/men), n.s = not significant

Mental well-being in adolescence did not predict the number of children in any of the models. This may be because the number of children is more affected by a parent's mental health status following the arrival of the first child and between each subsequent child. Contrary to our hypotheses and the results of Pearson et al. (2019), we did not find that a higher number of children was a risk factor for poorer mental well-being. However, the different results may be due to the fact that our follow-up data extended beyond the active childbearing period; in contrast, Pearson et al. (2019) focused on the peak childbearing years.

Strenghts and limitations

Utilizing data from a prospective 36-year longitudinal follow-up study, we researched the long-term relationships between parenthood and mental well-being from the age of 16 to 52 years; we were able to account for possible selection effects by following the same cohort. At baseline the sample comprised practically the whole target population (96.7%). Also, the city of Tampere represents the whole Finland well in terms of population structure, birth rate, family forms and educational level in the 1980's and 1990's (Statistic Finland, 2022). To our knowledge, this was the first study to examine in parallel whether mental well-being in adolescence is associated with parenthood and whether parenthood is associated with mental well-being in middle age, while also addressing various characteristics of parenthood and aspects of mental well-being.

However, the present study also had limitations. For some of the results the effect sizes were relatively small. This is likely due to the long study period and can be regarded rather typical for associations covering such a long follow-up time. While the participation rate of 52.9% in a 36-year follow-up can be considered reasonable, the question of drop-out needs to be considered. Male gender and poorer school performance at age 16 were the most prominent predictors of drop-out. However, with the exception of meaningfulness among men, the mental health variables did not predict non-response. Nevertheless, the drop-out analyses indicate some selection to the follow-up at age 52, warranting cautiousness when generalizing the results to the original target population.

We were not able to determine whether the participants' childlessness was voluntary or involuntary, as the data did not include the underlying reasons for not having a child or children. Additionally, our results may have been affected by the lack of information on whether having a child/children was planned or unplanned. The data gathered during each study wave did not specify if the participants' child/children were biological offspring or, for example, fostered children or stepchildren. In addition to the age of the oldest child, the age of subsequent children can also have an effect on the results, as poorer mental well-being has previously been reported among parents with minor children (Pudrovska, 2008) and parents with children under the age of 30 (Simon & Caputo, 2019).

While tightly tied to parenthood, we did not consider relationship status in our analyses. This is because the exact timing and order of all relevant events (especially changes in relationship status) could not have been ascertained from our data and thus the causal ordering between events would have been difficult to control for in the analyses. The main focus of this study was on the bidirectional association between parenthood and mental well-being.

Conclusion

The relationship between parenthood and mental well-being is bidirectional, and this was clearly evident in the present study. Studying only whether being a parent or not is not enough, but a broader perspective on the characteristics of parenthood must be considered. The analyses uncovered differences between the genders: self-esteem was highlighted in men, and depressive symptoms were highlighted in women. These results revealed the importance of examining the topic from a perspective that addressed both the positive and negative aspects of mental health. Overall, our results showed – in contrast to some cross-sectional and short-term follow-up studies – that parenthood is positively associated with mental well-being in middle age, even when accounting for selection effects.

Data availability The data is available upon reasonable request. The data cannot be placed on a public repository or given as supporting files due to legal restrictions and the nature of the data (individual level data). Data requests are reviewed in the Finnish Institute for Health and Welfare for compliance with the original research purposes of the study project. Suggestions for collaboration can be sent to: Noora Berg or Olli Kiviruusu, Finnish Institute for Health and Welfare, PO Box 30, 00,271 Helsinki, Finland (contact: noora.berg@thl.fi/ olli.kiviruusu@thl.fi).

Declarations

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

Financial interests The authors have no relevant financial or non-financial interests to disclose.

Ethics approval The study protocol has been approved by the Ethics Committee of Tampere University Hospital and the Institutional Review Board of the Finnish Institute for Health and Welfare.

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