The Transition to Grandparenthood and its Impact on the Big Five Personality Traits and Life Satisfaction

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Abstract

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Becoming a grandparent is a pivotal life event for many people in midlife or old age (Infurna et al., 2020). At the same time, there is considerable heterogeneity in how intensely grandparents are involved in their grandchildren's lives and care (Meyer & Kandic, 2017). In the context of an aging demographic, the time that grandparents are alive and in good health during grandparenthood is prolonged compared to previous generations (Leopold & Skopek, 2015; Margolis & Wright, 2017). In addition, an increased share of childcare functions are being fulfilled by grandparents (Hayslip et al., 2019; Pilkauskas et al., 2020). Thus, intergenerational relations have received heightened attention from psychological and sociological research in recent years (Bengtson, 2001; Coall & Hertwig, 2011). With regard to personality development, the transition to grandparenthood has been posited as an important developmental task in old age (Hutteman et al., 2014). However, empirical research into the psychological consequences of becoming a grandparent is sparse. Testing hypotheses derived from neo-socioanalytic theory (Roberts & Wood, 2006) in a prospective matched control-group design (see Luhmann et al., 2014), we investigate whether the transition to grandparenthood affects the Big Five personality traits and life satisfaction using data from two nationally representative panel studies.

Personality Development in Middle Adulthood and Old Age

The life span perspective characterizes aging as a lifelong process of development and adaptation (Baltes et al., 2006). In accordance with this perspective, research has found personality traits to be subject to change throughout the entire life span (Costa et al., 2019; Graham et al., 2020; Specht, 2017; Specht et al., 2014; for recent reviews, see Bleidorn et al., 2021; Roberts & Yoon, 2021). Although a major portion of personality development takes place in adolescence and emerging adulthood (Bleidorn & Schwaba,

2017; Pusch et al., 2019; Schwaba & Bleidorn, 2018), evidence has accumulated that personality traits also undergo changes in middle and old adulthood (e.g., Allemand et al., 2008; Damian et al., 2019; Kandler et al., 2015; Lucas & Donnellan, 2011; Mõttus et al., 2012; Mueller et al., 2016; Seifert et al., 2021; Wagner et al., 2016; for a review, see Specht, 2017).

Here, we examine the Big Five personality traits—agreeableness, conscientiousness, extraversion, neuroticism, and openness to experiences—which constitute a broad categorization of universal patterns of thought, affect, and behavior (John et al., 2008; John & Srivastava, 1999). While the policy relevance of the Big Five personality traits has recently been emphasized (Bleidorn et al., 2019)—especially because of their predictive power regarding many important life outcomes (Ozer & Benet-Martínez, 2005; Roberts et al., 2007; Soto, 2021, 2019; Turiano et al., 2020), we acknowledge that there are other viable taxonomies of personality (Ashton & Lee, 2007, 2020) and other levels of breadth and scope that could add valuable insights to personality development in middle adulthood and old age (Mõttus et al., 2017; Mõttus & Rozgonjuk, 2021).

Changes over time in the Big Five occur both in mean trait levels (i.e., mean-level change; Roberts et al., 2006) and in the relative ordering of people to each other on trait dimensions (i.e., rank-order stability; Anusic & Schimmack, 2016; Roberts & DelVecchio, 2000). No observed changes in mean trait levels do not necessarily mean that individual trait levels are stable over time, and perfect rank-order stability does not preclude mean-level changes. Mean-level changes in early to middle adulthood (ca. 30–60 years old; Hutteman et al., 2014) are typically characterized in terms of greater maturity as evidenced by increased agreeableness and conscientiousness, and decreased neuroticism (Damian et al., 2019; Roberts et al., 2006). In old age (ca. 60 years and older; Hutteman et al., 2014), research is generally more sparse but there is some evidence for a reversal of the maturity effect, especially following retirement (sometimes termed *la dolce vita* effect; Asselmann & Specht, 2021; Marsh et al., 2013; cf. Schwaba & Bleidorn, 2019) and at the

end of life in ill health (Wagner et al., 2016).

In terms of rank-order stability, most prior studies have shown support for an inverted U-shape trajectory (Ardelt, 2000; Lucas & Donnellan, 2011; Seifert et al., 2021; Specht et al., 2011; Wortman et al., 2012): Rank-order stability rises until reaching a plateau in midlife, and decreases, again, in old age. However, evidence is mixed whether rank-order stability actually decreases again in old age (see Costa et al., 2019; Wagner et al., 2019). Nonetheless, the historical view that personality is stable, or "set like plaster" (Specht, 2017, p. 64) after one reaches adulthood (or leaves emerging adulthood behind; Bleidorn & Schwaba, 2017) can largely be abandoned (Specht et al., 2014).

Theories explaining the mechanisms of personality development in middle adulthood and old age emphasize both genetic influences and life experiences as interdependent sources of stability and change (Specht et al., 2014; Wagner et al., 2020). In a behavior-genetic twin study, Kandler et al. (2015) found that non-shared environmental factors were the main source of personality plasticity in old age. Here, we conceptualize the transition to grandparenthood as a life experience that offers the adoption of a new social role according to the social investment principle of neo-socioanalytic theory (Lodi-Smith & Roberts, 2007; Roberts & Wood, 2006). According to the social investment principle, normative life events or transitions such as entering the work force or becoming a parent lead to personality maturation through the adoption of new social roles (Roberts et al., 2005). These new roles encourage or compel people to act in a more agreeable, conscientious, and emotionally stable (i.e., less neurotic) way, and the experiences in these roles as well as societal expectations towards them are hypothesized to drive long-term personality development (Lodi-Smith & Roberts, 2007; Wrzus & Roberts, 2017). Conversely, consistent social roles foster personality stability.

The paradoxical theory of personality coherence (Caspi & Moffitt, 1993) offers another explanation for personality development through role shifts stating that trait change is more likely whenever people transition into unknown environments where

pre-existing behavioral responses are no longer appropriate and societal norms or social expectations give clear indications how to behave instead. On the other hand, stability is favored in environments where no clear guidance how to behave is available. Thus, the finding that age-graded, normative life experiences, such as the transition to grandparenthood, drive personality development would also be in line with the paradoxical theory of personality coherence (see Specht et al., 2014). Compared to the transition to parenthood, however, societal expectations on how grandparents should behave (e.g., "Grandparents should help parents with childcare if needed") are less clearly defined and strongly dependent on the degree of (possible) grandparental investment (Lodi-Smith & Roberts, 2007). Thus, societal expectations and role demands might differ depending on how close grandparents live to their children, the quality of the relationship with their children, and other sociodemographic factors that exert conflicting role demands (Bordone et al., 2017; Lumsdaine & Vermeer, 2015; Silverstein & Marenco, 2001; cf. Muller & Litwin, 2011). In the whole population of first-time grandparents this diversity of role investment might generate pronounced interindividual differences in intraindividual personality change.

Empirically, certain life events such as the first romantic relationship (Wagner et al., 2015) or the transition from high school to university or the first job (Asselmann & Specht, 2021; Golle et al., 2019; Lüdtke et al., 2011) have (partly) been found to be accompanied by mean-level increases in line with the social investment principle (for a review, see Bleidorn et al., 2018). However, recent evidence regarding the transition to parenthood failed to empirically support the social investment principle (Asselmann & Specht, 2020b; van Scheppingen et al., 2016). An analysis of trajectories of the Big Five before and after eight major life events only found limited support for the social investment principle: small increases were found in emotional stability following the transition to employment but not for the other traits or for the other life events theoretically linked to social investment (Denissen et al., 2019). Recently, it has also been emphasized that effects of life events on the Big Five personality trends generally tend to be small and need to be properly

analyzed using robust, prospective designs, and appropriate control groups (Bleidorn et al., 2018; Luhmann et al., 2014).

Overall, much remains unknown regarding the environmental factors underlying personality development in middle adulthood and old age. One indication that age-graded, normative life experiences contribute to change following a period of relative stability in midlife is offered by recent research on retirement (Bleidorn & Schwaba, 2018; Schwaba & Bleidorn, 2019). These results were only partly in line with the social investment principle in terms of mean-level changes and displayed substantial interindividual differences in change trajectories. The authors discuss that as social role "divestment" (Schwaba & Bleidorn, 2019, p. 660) retirement functions differently compared to social investment in the classical sense which adds a role. The transition to grandparenthood could represent such an investment into a new role in middle adulthood and old age—given that grandparents have regular contact with their grandchild and actively take part in childcare to some degree (i.e., invest psychologically in the new grandparent role; Lodi-Smith & Roberts, 2007).

Grandparenthood

The transition to grandparenthood, that is, the birth of the first grandchild, can be described as a time-discrete life event marking the beginning of one's status as a grandparent (Luhmann et al., 2012). In terms of characteristics of major life events (Luhmann et al., 2020), the transition to grandparenthood stands out in that it is externally caused (by one's own children; see also Arpino, Gumà, et al., 2018; Margolis & Verdery, 2019), while at the same time being predictable as soon as one's children reveal their pregnancy or family planning. The transition to grandparenthood has been labeled a countertransition due to this lack of direct control over if and when someone has their first grandchild (Hagestad & Neugarten, 1985; as cited in Arpino, Gumà, et al., 2018). Grandparenthood is also generally positive in valence and emotionally significant—given

one maintains a good relationship with their child.

Grandparenthood can also be characterized as a developmental task (Hutteman et al., 2014) mostly associated with the period of (early) old age—although considerable variation in the age at the transition to grandparenthood exists both within and between cultures (Leopold & Skopek, 2015; Skopek & Leopold, 2017). Still, the period where parents on average experience the birth of their first grandchild coincides with the end of (relative) stability in terms of personality development in midlife (Specht, 2017), where retirement, shifting social roles, and initial cognitive and health declines can be disruptive to life circumstances putting personality development into motion (e.g., Mueller et al., 2016; Stephan et al., 2014). As a developmental task, grandparenthood is expected to be part of a normative sequence of aging that is subject to societal expectations and values differing across cultures and historical time (Baltes et al., 2006; Hutteman et al., 2014).

Mastering developmental tasks (i.e., fulfilling roles and expectations to a high degree) is hypothesized to drive personality development towards maturation similarly to propositions by the social investment principle, that is, leading to higher levels of agreeableness and conscientiousness, and lower levels of neuroticism (Roberts et al., 2005; Roberts & Wood, 2006). In comparison to the transition to parenthood which has been found to be ambivalent in terms of both personality maturation and life satisfaction (Aassve et al., 2021; Johnson & Rodgers, 2006; Krämer & Rodgers, 2020; van Scheppingen et al., 2016), Hutteman et al. (2014) hypothesize that the transition to grandparenthood is generally seen as positive because it (usually) does not impose the stressful demands of daily childcare on grandparents. Grandparental investment in their grandchildren has been discussed as beneficial in terms of the evolutionary, economic, and sociological advantages it provides for the whole intergenerational family structure (Coall et al., 2018; Coall & Hertwig, 2011).

While we could not find prior studies investigating development of the Big Five over the transition to grandparenthood, there is some evidence on changes in life satisfaction

over the transition to grandparenthood. In cross-sectional studies, the preponderance of evidence suggests that grandparents who provide grandchild care or have close relationships with their older grandchildren have higher life satisfaction (e.g., Mahne & Huxhold, 2014; Triadó et al., 2014). There are a few longitudinal studies, albeit they offer conflicting conclusions: Data from the Survey of Health, Ageing and Retirement in Europe (SHARE) showed that the birth of a grandchild was followed by improvements to quality of life and life satisfaction, but only among women (Tanskanen et al., 2019) and only in first-time grandmothers via their daughters (Di Gessa et al., 2019). Several studies emphasized that grandparents actively involved in childcare experienced larger increases in life satisfaction (Arpino, Bordone, et al., 2018; Danielsbacka et al., 2019; Danielsbacka & Tanskanen, 2016). On the other hand, fixed effects regression models[1] using SHARE data did not find any effects of first-time grandparenthood on life satisfaction regardless of grandparental investment and only minor decreases of grandmothers' depressive symptoms (Sheppard & Monden, 2019).

In a similar vein, some prospective studies reported beneficial effects of the transition to grandparenthood and of grandparental childcare investment on various health measures, especially in women (Chung & Park, 2018; Condon et al., 2018; Di Gessa et al., 2016a, 2016b). Again, beneficial effects on self-rated health did not persevere in fixed effects analyses as reported in Ates (2017) who used longitudinal data from the German Aging Survey (DEAS).

We are not aware of any study investigating the rank-order stability of traits over the transition to grandparenthood. The occurrence of other life events has been shown to be associated with the rank-order stability of personality and well-being, although only for certain events and traits (e.g., Denissen et al., 2019; Hentschel et al., 2017; Specht et al., 2011).

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[1] Fixed effects regression models exclusively rely on within-person variance (see Brüderl & Ludwig, 2015; McNeish & Kelley, 2019).

Current Study

In the current study, we revisit the development of life satisfaction across the transition to grandparenthood. We extend this research to psychological development in a more general sense by examining the Big Five personality traits. Three research questions motivate the current study which is the first to analyze Big Five personality development over the transition to grandparenthood:

1. What are the effects of the transition to grandparenthood on mean-level trajectories of the Big Five traits and life satisfaction?
2. How large are interindividual differences in intraindividual change for the Big Five traits and life satisfaction over the transition to grandparenthood?
3. How does the transition to grandparenthood affect rank-order stability of the Big Five traits and life satisfaction?

To address these questions, we compare development over the transition to grandparenthood with that of matched respondents who do not experience the transition during the study period (Luhmann et al., 2014). This is necessary because pre-existing differences between prospective grandparents and non-grandparents in variables related to the development of the Big Five or life satisfaction introduce confounding bias when estimating the effects of the transition to grandparenthood (VanderWeele et al., 2020). The impact of adjusting (or not adjusting) for pre-existing differences, or background characteristics, has recently been emphasized in the prediction of life outcomes from personality in a mega-analytic framework of ten large panel studies (Beck & Jackson, 2021). Propensity score matching is one technique to account for confounding bias by equating the groups in their estimated propensity to experience the event in question (Thoemmes & Kim, 2011). This propensity is calculated from regressing the so-called treatment variable (i.e., the group variable indicating whether someone experienced the event) on covariates related to the likelihood of experiencing the event and to the

outcomes. This approach addresses confounding bias by creating balance between the groups in the covariates used to calculate the propensity score (Stuart, 2010).

We adopt a prospective design that tests the effects of becoming first-time grandparents separately against two propensity-score-matched control groups: first, a matched group of parents (but not grandparents) with at least one child in reproductive age, and, second, a matched group of nonparents. Adopting two control groups allows us to disentangle potential effects attributable to becoming a grandparent from effects attributable to being a parent already, thus addressing selection effects into grandparenthood and confounding more comprehensively than previous research. Thereby, we cover the first two of the three causal pathways to not experiencing grandparenthood pointed out by demographic research (Margolis & Verdery, 2019): one's own childlessness, childlessness of one's children, and not living long enough to become a grandparent. Our comparative design also controls for average age-related and historical trends in the Big Five traits and life satisfaction (Luhmann et al., 2014), and enables us to report effects of the transition to grandparenthood unconfounded by instrumentation effects, which describe the tendency of reporting lower well-being scores with each repeated measurement (Baird et al., 2010).[2]

We improve upon previous longitudinal studies utilizing matched control groups (e.g., Anusic et al., 2014a, 2014b; Yap et al., 2012) in that we performed the matching at a specific time point preceding the transition to grandparenthood (at least two years beforehand) and not based on individual survey years. This design choice ensures that the covariates involved in the matching procedure are not already influenced by the event or anticipation of it (Greenland, 2003; Rosenbaum, 1984; VanderWeele, 2019; VanderWeele et al., 2020), thereby limiting the risk of introducing confounding through collider bias (Elwert & Winship, 2014). Similar approaches in the study of life events have recently

[2] Instrumentation effects caused by repeated assessments have only been described for life satisfaction but we assume similar biases exist for Big Five items due to changes in social desirability.

been adopted (Balbo & Arpino, 2016; Krämer & Rodgers, 2020; van Scheppingen & Leopold, 2020).

Informed by the social investment principle and previous research on personality development in middle adulthood and old age, we preregistered the following hypotheses (prior to data analysis; https://osf.io/a9zpc?view_only=22154f26307040ec9ba0f3a86051e549/):

- H1a: Following the birth of their first grandchild, grandparents increase in agreeableness and conscientiousness, and decrease in neuroticism compared to the matched control groups of parents (but not grandparents) and nonparents. We do not expect the groups to differ in their trajectories of extraversion and openness to experience.
- H1b: Grandparents' post-transition increases in agreeableness and conscientiousness, and decreases in neuroticism are more pronounced among those who provide substantial grandchild care.
- H1c: Grandmothers increase in life satisfaction following the transition to grandparenthood as compared to the matched control groups but grandfathers do not.
- H2: Individual differences in intraindividual change in the Big Five and life satisfaction are larger in the grandparent group than the control groups.
- H3: Compared to the matched control groups, grandparents' rank-order stability of the Big Five and life satisfaction over the transition to grandparenthood is smaller.

Exploratorily, we further probe the moderator performing paid work which could constitute a potential role conflict among grandparents.

Methods

Samples

To evaluate these hypotheses, we used data from two population-representative panel studies: the Longitudinal Internet Studies for the Social Sciences (LISS) panel from the Netherlands and the Health and Retirement Study (HRS) from the United States.

The LISS panel is a representative sample of the Dutch population initiated in 2008 with data collection still ongoing (Scherpenzeel, 2011; van der Laan, 2009). It is administered by CentERdata (Tilburg University, The Netherlands). Included households are a true probability sample of households drawn from the population register (Scherpenzeel & Das, 2010). While originally roughly half of invited households consented to participate, refreshment samples were drawn in order to oversample previously underrepresented groups using information about response rates and their association with demographic variables (household type, age, ethnicity; see https://www.lissdata.nl/about-panel/sample-and-recruitment/). Data collection was carried out online and respondents lacking the necessary technical equipment were outfitted with it. We included yearly assessments from 2008 to 2020 from several different modules (see *Measures*) as well as data on basic demographics which was assessed on a monthly rate. For later coding of covariates from these monthly demographic data we used the first available assessment in each year.

The HRS is an ongoing longitudinal population-representative study of older adults in the US (Sonnega et al., 2014) administered by the Survey Research Center (University of Michigan, United States). Initiated in 1992 with a first cohort of individuals aged 51-61 and their spouses, the study has since been extended with additional cohorts in the 1990s (see https://hrs.isr.umich.edu/documentation/survey-design/). In addition to the HRS core interview every two years (in-person or as a telephone survey), the study has since 2006 included a leave-behind questionnaire covering a broad range of psychosocial topics

including the Big Five personality traits and life satisfaction. These topics, however, were only administered every four years starting in 2006 for one half of the sample and in 2008 for the other half. We included personality data from 2006 to 2018, all available data for the coding of the transition to grandparenthood from 1996 to 2018, as well as covariate data from 2006 to 2018 including variables drawn from the Imputations File and the Family Data (only available up to 2014).

These two panel studies provided the advantage that they contained several waves of personality data as well as information on grandparent status and a broad range of covariates at each wave. While the HRS provided a large sample with a wider age range, the LISS was smaller and younger[3] but provided more frequent personality assessments spaced every one to two years. Note that [blinded] has previously used LISS data to analyze correlated changes between life satisfaction and Big Five traits across the lifespan (https://osf.io/ [blinded]). [blinded] and [blinded] have previously used HRS data to analyze Big Five traits and relationship-related constructs ([blinded]). [blinded] has additionally used the HRS to analyze mean-level and rank-order changes in Big Five traits in response to bereavement [blinded] and other relationship-related or non-Big Five-related constructs (e.g., optimism; [blinded]). These publications do not overlap with the current study in the central focus of grandparenthood.[4] The present study used de-identified archival data in the public domain, and, thus, it was not necessary to obtain ethical approval from an IRB.

Measures

[3] The reason for the included grandparents from the LISS being younger was that grandparenthood questions were part of the *Work and Schooling* module and—for reasons unknown to us—filtered to respondents performing paid work. Thus, older, retired first-time grandparents from the LISS could not be identified.

[4] Publications using LISS data can be searched at https://www.dataarchive.lissdata.nl/publications/. Publications using HRS data can be searched at https://hrs.isr.umich.edu/publications/biblio/.

Personality

In the LISS, the Big Five personality traits were assessed using the 50-item version of the IPIP Big-Five Inventory scales (Goldberg, 1992). For each Big Five trait, ten 5-point Likert-scale items were answered (1 = *very inaccurate*, 2 = *moderately inaccurate*, 3 = *neither inaccurate nor accurate*, 4 = *moderately accurate*, 5 = *very accurate*). Example items included "Like order" (conscientiousness), "Sympathize with others' feelings" (agreeableness), "Worry about things" (neuroticism), "Have a vivid imagination" (openness to experience), and "Start conversations" (extraversion). At each wave, we took a respondent's mean of each subscale as their trait score. Internal consistencies at the time of matching, as indicated by McDonald's ω (McNeish, 2018), averaged $\omega = 0.83$ over all traits ranging from $\omega = 0.77$ (conscientiousness in the parent control group) to $\omega = 0.90$ (extraversion in the nonparent control group). Other studies have shown measurement invariance for these scales across time and age groups, and convergent validity with the Big Five inventory (BFI-2) (Denissen et al., 2020; Schwaba & Bleidorn, 2018). The Big Five (and life satisfaction) were contained in the *Personality* module which was administered yearly but with planned missingness in some years for certain cohorts (see Denissen et al., 2019). Thus, there are one to two years between included assessments, given no other sources of missingness.

In the HRS, the Midlife Development Inventory (MIDI) scales were administered to measure the Big Five (Lachman & Weaver, 1997). This instrument was constructed for use in large-scale panel studies of adults and consisted of 26 adjectives (five each for conscientiousness, agreeableness, and extraversion, four for neuroticism, and seven for openness to experience). Respondents were asked to rate on a 4-point scale how well each item described them (1 = *a lot*, 2 = *some*, 3 = *a little*, 4 = *not at all*). Example adjectives included "Organized" (conscientiousness), "Sympathetic" (agreeableness), "Worrying" (neuroticism), "Imaginative" (openness to experience), and "Talkative" (extraversion). For better comparability with the LISS panel, we reverse scored all items so that higher values

corresponded to higher trait levels and, at each wave, took the mean of each subscale as the trait score. Big Five trait scores showed satisfactory internal consistencies at the time of matching which averaged $\omega = 0.75$ over all traits ranging from $\omega = 0.68$ (conscientiousness in the nonparent control group) to $\omega = 0.81$ (agreeableness in the nonparent control group).

Life Satisfaction

In both samples, life satisfaction was assessed using the 5-item Satisfaction with Life Scale (SWLS; Diener et al., 1985) which respondents answered on a 7-point Likert scale (1 = *strongly disagree*, 2 = *somewhat disagree*, 3 = *slightly disagree*, 4 = *neither agree or disagree*, 5 = *slightly agree*, 6 = *somewhat agree*, 7 = *strongly agree*)[5]. An example item was "I am satisfied with my life". Internal consistency at the time of matching was $\omega = 0.90$ in the LISS with the parent control sample ($\omega = 0.88$ with the nonparent control sample), and $\omega = 0.91$ in the HRS with the parent control sample ($\omega = 0.91$ with the nonparent control sample).

Transition to Grandparenthood

The procedure to obtain information on grandparents' transition to grandparenthood generally followed the same steps in both samples. The items this coding was based on, however, differed slightly: In the LISS, respondents were asked "Do you have children and/or grandchildren?" with "children", "grandchildren", and "no children or grandchildren" as possible answer categories. This question was part of the *Work and Schooling* module and filtered to respondents performing paid work. In the HRS, all respondents were asked for the total number of grandchildren: "Altogether, how many grandchildren do you (or your husband / wife / partner, or your late husband / wife / partner) have? Include as grandchildren any children of your (or your [late] husband's / wife's / partner's) biological, step- or adopted children".[6]

[5] In the LISS, the "somewhat" was omitted and instead of "or" "nor" was used.

[6] The listing of biological, step-, or adopted children has been added since wave 2006.

In both samples, we tracked grandparenthood status (0 = *no grandchildren*, 1 = *at least one grandchild*) over time. Due to longitudinally inconsistent data in some cases, we included in the grandparent group only respondents with exactly one transition from 0 to 1 in this status variable, and no transitions backwards (see Fig. S1). We marked respondents who continually indicated that they had no grandchildren as potential members of the control groups.

Moderators

Based on insights from previous research, we tested three variables as potential moderators of the mean-level trajectories of the Big Five and life satisfaction over the transition to grandparenthood: First, we analyzed whether gender acted as a moderator as indicated by research on life satisfaction (see Tanskanen et al., 2019; Di Gessa et al., 2019). We coded a dummy variable indicating female gender (0 = *male*, 1 = *female*).

Second, we tested whether performing paid work or not was associated with divergent trajectories of the Big Five and life satisfaction (see Schwaba & Bleidorn, 2019). Since the LISS subsample of grandparents we identified was based exclusively on respondents performing paid work, we performed these analyses only in the HRS subsample. This served two purposes: to test how respondents involved in the workforce (even if officially retired) differed from those not working, which might shed light on role conflict and have implications for the social investment mechanisms we described earlier. These moderation tests also allowed us to assess whether potential differences in the main results between the LISS and HRS samples could be accounted for by including performing paid work as a moderator in analyses of the HRS sample. In other words, perhaps the results in the HRS respondents performing paid work are similar to those seen in the LISS sample, which had already been conditioned on this variable through filtering in the questionnaire.

Third, we examined how involvement in grandchild care moderated trajectories of

the Big Five and life satisfaction in grandparents after the transition to grandparenthood (see Arpino, Bordone, et al., 2018; Danielsbacka et al., 2019; Danielsbacka & Tanskanen, 2016). We coded a dummy variable (0 = *provided less than 100 hours of grandchild care*, 1 = *provided 100 or more hours of grandchild care*) as a moderator based on the question "Did you (or your [late] husband / wife / partner) spend 100 or more hours in total since the last interview / in the last two years taking care of grand- or great grandchildren?".[7] This information was only available for grandparents in the HRS; in the LISS, too few respondents answered follow-up questions on intensity of care to be included in the analyses (<50 in the final analysis sample).

Procedure

Drawing on all available data, three main restrictions defined the final analysis samples of grandparents (see Fig. S1): First, we identified respondents who indicated having grandchildren for the first time during study participation (see *Measures*; N_{LISS} = 337; N_{HRS} = 3272, including HRS waves 1996-2004 before personality assessments were introduced). Second, we restricted the sample to respondents with at least one valid personality assessment (valid in the sense that at least one of the six outcomes was non-missing; N_{LISS} = 335; N_{HRS} = 1702).[8] Third, we included only respondents with both a valid personality assessment before and one after the transition to grandparenthood (N_{LISS} = 253; N_{HRS} = 859). Lastly, few respondents were excluded because of inconsistent or missing information regarding their children[9] resulting in the final analysis samples of first-time grandparents, N_{LISS} = 250 (53.60% female; age at transition to grandparenthood

[7] Although dichotomization of a continuous construct (hours of care) is not ideal for moderation analysis (MacCallum et al., 2002), there were too many missing values in the variable assessing hours of care continuously (variables *E063).

[8] For the HRS subsample, we also excluded N = 30 grandparents in a previous step who reported unrealistically high numbers of grandchildren (> 10) in their first assessment following the transition to grandparenthood.

[9] We opted not to use multiple imputation for these child-related variables such as number of children which defined the control groups and were also later used for computing the propensity scores.

$M = 57.94$, $SD = 4.87$) and $N_{HRS} = 846$ (54.85% female; age at transition to grandparenthood $M = 61.80$, $SD = 6.88$).

To disentangle effects of the transition to grandparenthood from effects of being a parent, we defined two pools of potential control subjects to be involved in the matching procedure: The first pool of potential control subjects comprised parents who had at least one child in reproductive age (defined as $15 \leq age_{firstborn} \leq 65$) but no grandchildren throughout the observation period ($N_{LISS} = 844$ with 3040 longitudinal observations; $N_{HRS} = 1485$ with 2703 longitudinal observations). The second pool of potential matches comprised respondents who reported being childless throughout the observation period ($N_{LISS} = 1077$ with 4337 longitudinal observations; $N_{HRS} = 1340$ with 2346 longitudinal observations). The two control groups were, thus, by definition mutually exclusive.

In order to match each grandparent with the control respondent who was most similar in terms of the included covariates we utilized propensity score matching.

Covariates

For propensity score matching, we used a broad set of covariates (VanderWeele et al., 2020) covering respondents' demographics (e.g., education), economic situation (e.g., income), and health (e.g., mobility difficulties). We also included the pre-transition outcome variables as covariates—as recommended in the literature (Cook et al., 2020; Hallberg et al., 2018; Steiner et al., 2010; VanderWeele et al., 2020), as well as the panel wave participation count and assessment year in order to control for instrumentation effects and historical trends (e.g., 2008/2009 financial crisis; Baird et al., 2010; Luhmann et al., 2014). For matching grandparents with the parent control group we additionally included as covariates variables containing information on fertility and family history (e.g., number of children, age of first three children) which were causally related to the timing of the transition to grandparenthood (i.e., entry into treatment; Arpino, Gumà, et al., 2018; Margolis & Verdery, 2019).

Covariate selection has seldom been explicitly discussed in previous longitudinal studies estimating treatment effects of life events (e.g., in matching designs). We see two (in part conflicting) traditions that address covariate selection: First, classical recommendations from psychology argue to include all available variables that are associated with both the treatment assignment process (i.e., selection into treatment) and the outcome (e.g., Steiner et al., 2010; Stuart, 2010). Second, recommendations from a structural causal modeling perspective (see Elwert & Winship, 2014; Rohrer, 2018) are more cautious aiming to avoid pitfalls such as conditioning on a pre-treatment collider (collider bias) or a mediator (overcontrol bias). Structural causal modeling, however, requires advanced knowledge of the causal structures underlying all involved variables (Pearl, 2009).

In selecting covariates, we followed guidelines laid out by VanderWeele et al. (2019; 2020) which reconcile both views and offer practical guidance[10] when complete knowledge of the underlying causal structures is unknown: These authors proposed a "modified disjunctive cause criterion" (VanderWeele, 2019, p. 218) recommending to select all available covariates which are assumed to be causes of the outcomes, treatment exposure (i.e., the transition to grandparenthood), or both, as well as any proxies for an unmeasured common cause of the outcomes and treatment exposure. To be excluded from this selection are variables assumed to be instrumental variables (i.e., assumed causes of treatment exposure that are unrelated to the outcomes except through the exposure) and collider variables (Elwert & Winship, 2014). Because all covariates we used for matching were measured at least two years before the birth of the grandchild, we judge the risk of introducing collider bias or overcontrol bias by controlling for these covariates to be relatively small. In addition, as mentioned in the *Introduction*, the event transition to grandparenthood is not planned by or under direct control of grandparents which further

[10] Practical considerations of covariate selection when using large archival datasets with no direct control over data collection are discussed in VanderWeele et al. (2020).

reduces the risk of bias introduced by controlling for pre-treatment colliders.

An overview of all covariates we used to compute the propensity scores for matching can be found in the Supplemental Material (see Tables S5 & S6). Importantly, as part of our preregistration we also provided justification for each covariate on whether we assume it to be causally related to treatment assignment, the outcomes, or both (see *gp-covariates-overview.xlsx* on https://osf.io/75a4r/?view_only=ac929a2c41fb4afd9d1a64a3909848d0). We tried to find substantively equivalent covariates in both samples but had to compromise in a few cases (e.g., children's educational level only in HRS vs. children living at home only in LISS).

Estimating propensity scores required complete covariate data. Therefore, before computing propensity scores, we performed multiple imputations in order to account for missingness in our covariates (Greenland & Finkle, 1995). Using five imputed data sets computed by classification and regression trees (CART; Burgette & Reiter, 2010) in the *mice* R package (van Buuren & Groothuis-Oudshoorn, 2011), we predicted treatment assignment (i.e., the transition to grandparenthood) five times per observation in logistic regressions with a logit link function.[11] We averaged these five scores per observation to compute the final propensity score to be used for matching (Mitra & Reiter, 2016). We used imputed data only for propensity score computation and not in later analyses because missing data in the outcome variables due to nonresponse was negligible.

Propensity Score Matching

Propensity score matching was performed in a grandparent's survey year which preceded the year when the transition was first reported by at least two years (aside from that choosing the smallest available gap between matching and transition). This served the purpose to ensure that the covariates used for matching were not affected by the event

[11] In these logistic regressions we included all covariates listed above as predictors except for *female* which was later used for exact matching and health-related covariates in LISS-wave 2014 which were not assessed in that wave.

itself or its anticipation (i.e., when one's child was already pregnant with their first child; Greenland, 2003; Rosenbaum, 1984; VanderWeele et al., 2020). Propensity score matching was performed using the *MatchIt* R package (Ho et al., 2011) with exact matching on gender combined with Mahalanobis distance matching on the propensity score. In total, four matchings were performed; two per sample (LISS; HRS) and two per control group (parents; nonparents). We matched 1:4 with replacement because of the relatively small pools of available controls. This meant that each grandparent was matched with four control observations in each matching procedure, and that control observations were allowed to be used multiple times for matching (i.e., duplicated in the analysis samples[12]). We did not specify a caliper because our goal was to find matches for all grandparents, and because we achieved good covariate balance this way.

We evaluated the matching procedure in terms of covariate balance and, graphically, in terms of overlap of the distributions of the propensity score (Stuart, 2010). Covariate balance as indicated by the standardized difference in means between the grandparent and the controls after matching was satisfactory (see Tables S5 & S6) lying below 0.25 as recommended in the literature (Stuart, 2010), and below 0.10 with few exceptions (Austin, 2011). Graphically, differences between the groups in their distributions of the propensity score were also small and indicated no substantial missing overlap (see Fig. S2).

After matching, each matched control observation received the same value as their matched grandparent in the *time* variable describing the temporal relation to treatment, and the control respondent's other longitudinal observations were centered around this matched observation. Thereby, we coded a counterfactual transition time frame for each

[12] In the LISS data, 250 grandparent observations were matched with 1000 control observations; these control observations corresponded to 523 unique person-year observations stemming from 270 unique respondents for the parent control group, and to 464 unique person-year observations stemming from 189 unique respondents for the nonparent control group. In the HRS data, 846 grandparent observations were matched with 3384 control observations (matching with replacement); these control observations corresponded to 1393 unique person-year observations stemming from 982 unique respondents for the parent control group, and to 1008 unique person-year observations stemming from 704 unique respondents for the nonparent control group.

control respondent. Due to left- and right-censored longitudinal data (i.e., panel entry or attrition), we restricted the final analysis samples to six years before and six years after the transition as shown in Table S2. We analyzed unbalanced panel data where not every respondent provided all person-year observations. The final LISS analysis samples, thus, contained 250 grandparents with 1368 longitudinal observations, matched with 1000 control respondents with either 5167 (parent control group) or 5340 longitudinal observations (nonparent control group; see Fig. S1). The final HRS analysis samples contained 846 grandparents with 2262 longitudinal observations, matched with 3384 control respondents with either 8257 (parent control group) or 8167 longitudinal observations (nonparent control group; see Table S2). In the HRS, there were a few additional missing values in the outcomes ranging from 18 to 105 longitudinal observations which will be listwise deleted in the respective analyses.

Analytical Strategy

We used R (Version 4.0.4; R Core Team, 2021) and the R-packages *lme4* (Version 1.1.26; Bates et al., 2015), and *lmerTest* (Version 3.1.3; Kuznetsova et al., 2017) for multilevel modeling, as well as *tidyverse* (Wickham et al., 2019) for data wrangling, and *papaja* (Aust & Barth, 2020) for reproducible manuscript production. A complete list of software we used is provided in the Supplemental Material. Scripts for data wrangling, analyses, and to reproduce this manuscript can be found on the OSF (https://osf.io/75a4r/?view_only=ac929a2c41fb4afd9d1a64a3909848d0/) and on GitHub (https://github.com/ [blinded]). Following Benjamin et al. (2018), we set the α-level for all confirmatory analyses to .005.

Our design can be referred to as an interrupted time-series with a "nonequivalent no-treatment control group" (Shadish et al., 2002, p. 182) where treatment, that is, the transition to grandparenthood, is not deliberately manipulated. First, to analyze mean-level changes, we used linear piecewise regression coefficients in multilevel regression

models with person-year observations nested within respondents and households (Hoffman, 2015). To model change over time in relation to the birth of the first grandchild, we coded three piecewise regression coefficients: a *before-slope* representing linear change in the years leading up to the transition to grandparenthood, an *after-slope* representing linear change in the years after the transition, and a *shift* coefficient shifting the intercept directly after the transition was first reported, thus representing sudden changes that go beyond changes already modeled by the *after-slope* (see Table S2 for the coding scheme of these coefficients; Hoffman, 2015). Other studies of personality development have recently adopted similar piecewise growth-curve models (e.g., Bleidorn & Schwaba, 2018; Krämer & Rodgers, 2020; Schwaba & Bleidorn, 2019; van Scheppingen & Leopold, 2020).

All effects of the transition to grandparenthood on the Big Five and life satisfaction were modeled as deviations from patterns in the matched control groups by interacting the three piecewise coefficients with the binary treatment variable (0 = *control*, 1 = *grandparent*). In additional models, we interacted these coefficients with the binary moderator variables resulting in two- or three-way interactions. To test differences in the growth parameters between two groups in cases where these differences were represented by multiple fixed-effects coefficients, we defined linear contrasts using the *linearHypothesis* command from the *car* R package (Fox & Weisberg, 2019). All models of mean-level changes were estimated using maximum likelihood and included random intercepts but no random slopes of the piecewise regression coefficients. We included the propensity score as a level-2 covariate for a double-robust approach (Austin, 2017). The model equations of the basic model and the moderation models can be found in the *Supplemental Material*.

Second, to assess interindividual differences in intraindividual change we added random slopes to the models assessing mean-level changes. In other words, we allowed for differences between individuals in their trajectories of change to be modeled, that is, differences in the *before-slope*, *after-slope*, and *shift* coefficients. Because multiple simultaneous random slopes are often not computationally feasible, we added random

slopes one at a time and used likelihood ratio test to determine whether the addition of the respective random slope led to a significant improvement in model fit. To statistically test differences in the random slope variance between the grandparent group and each control group, we respecified the multilevel models as heterogeneous variance models using the *nlme* R package (Pinheiro et al., 2021), which allows for separate random slope variances to be estimated in the grandparent group and the control group within the same model. Model fit of these heterogeneous variance models was compared to the corresponding models with a homogeneous (single) random slope variance via likelihood ratio tests. This was also done separately for the parent and nonparent control groups.

Third, to examine rank-order stability in the Big Five and life satisfaction over the transition to grandparenthood, we computed the test-retest correlation of measurements prior to the transition to grandparenthood (at the time of matching) with the first available measurement after the transition. To test the difference in test-retest stability between grandparents and either of the control groups, we then entered the pre-treatment measure as well as the treatment variable (0 = *control*, 1 = *grandparent*) and their interaction into multiple regression models predicting the Big Five and life satisfaction. These interactions test for significant differences in the test-retest stability between those who experienced the transition to grandparenthood and those who did not (for a similar approach, see Denissen et al., 2019; McCrae, 1993).

Results

Throughout the results section, we referred to results of statistical tests with $.005 < p < .05$ as *suggestive evidence* as stated in our preregistration.

Descriptive Results

Means and standard deviations of the Big Five and life satisfaction over the analyzed time points are presented in Tables S3 and S4. Visually represented (see Fig. S3-S8), all six outcomes display marked stability over time in both LISS and HRS.

Intra-class correlations (see Table S1) show that large portions of the total variance in the Big Five could be explained by nesting in respondents (*median* = 0.75), while nesting in households only accounted for minor portions (*median* = 0.03). For outcome–subsample combinations with an ICC_{hid} below 0.05 we omitted the household nesting factor from all models because the nesting otherwise frequently lead to computational errors—a small deviation from our preregistration. For life satisfaction the nesting in households accounted for slightly larger portions of the total variance (*median* = 0.36) than nesting in respondents (*median* = 0.32). Over all outcomes, the proportion of variance due to within-person factors was relatively low (*median* = 0.22).

Mean-Level Changes

Agreeableness

In the basic models (see Tables S7 & S8 and Figure S9), grandparents in the LISS increased slightly in agreeableness in the years after the transition to grandparenthood as compared to the parent controls, $\hat{\gamma}_{21} = 0.02$, 95% CI $[0.01, 0.03]$, $p = .003$. However, this effect was quite small and not significant when compared against the nonparent controls, or against either control sample in the HRS sample (suggestive evidence in the HRS nonparents: $\hat{\gamma}_{21} = 0.02$, 95% CI $[0.01, 0.04]$, $p = .006$). The models including the gender interaction (see Tables S9 & S10 and Figure S9) indicated that grandfathers' post-transition increases in agreeableness were more pronounced as compared to parent (LISS: $\hat{\gamma}_{21} = 0.03$, 95% CI $[0.01, 0.05]$, $p < .001$; HRS: $\hat{\gamma}_{21} = 0.04$, 95% CI $[0.01, 0.06]$, $p = .003$) and nonparent controls (HRS: $\hat{\gamma}_{21} = 0.03$, 95% CI $[0.01, 0.05]$, $p = .004$), whereas grandmothers did not differ from female controls.

There was suggestive evidence for a moderation by paid work (see Tables S11 & S12 and Figure S10): non-working grandparents increased more in agreeableness than working grandparents in anticipation of the transition to grandparenthood (difference in *before* parameter; parents: $[\hat{\gamma}_{30} + \hat{\gamma}_{31}]$ = -0.07, 95% CI [-0.12, -0.01], $p = .013$; nonparents: $[\hat{\gamma}_{30} +$

$\hat{\gamma}_{31}$] = -0.07, 95% CI [-0.12, -0.02], p = .009). Grandparents providing substantial grandchild care increased in agreeableness after the transition to grandparenthood compared to matched nonparent controls (difference in *after* parameter: [$\hat{\gamma}_{21}$ + $\hat{\gamma}_{31}$] = 0.04, 95% CI [0.01, 0.06], p = .002; suggestive evidence in the parent sample: [$\hat{\gamma}_{21}$ + $\hat{\gamma}_{31}$] = 0.04, 95% CI [0.01, 0.06], p = .006; see Tables S13 & S14 and Figure S11). However, differences between caring and non-caring grandparents—as specified in hypothesis H1b—are not significant in either sample.

Conscientiousness

We found a slight post-transition increase in grandparents' conscientiousness in comparison to the controls in the HRS (parents: $\hat{\gamma}_{21} = 0.02$, 95% CI $[0.01, 0.04]$, p = .002; nonparents: $\hat{\gamma}_{21} = 0.02$, 95% CI $[0.01, 0.04]$, p = .003; suggestive evidence in the LISS parent sample: $\hat{\gamma}_{21} = 0.02$, 95% CI $[0.00, 0.03]$, p = .006; see Tables S15 & S16 and Figure S12). Grandparents' conscientiousness trajectories were not significantly moderated by gender (see Tables S17 & S18 and Figure S12).

There were significant differences in conscientiousness depending on grandparents' work status (see Tables S19 & S20 and Figure S13): non-working grandparents saw more pronounced increases in conscientiousness in the years before the transition to grandparenthood compared to non-working parent, $\hat{\gamma}_{21} = 0.08$, 95% CI $[0.04, 0.13]$, $p <$ .001, and nonparent controls, $\hat{\gamma}_{21} = 0.07$, 95% CI $[0.03, 0.12]$, p = .002, and compared to working grandparents (difference in *before* parameter; parents: [$\hat{\gamma}_{30}$ + $\hat{\gamma}_{31}$] = -0.08, 95% CI [-0.13, -0.03], p = .002; nonparents: [$\hat{\gamma}_{30}$ + $\hat{\gamma}_{31}$] = -0.08, 95% CI [-0.12, -0.03], p = .001). There was suggestive evidence that grandparents who provided substantial grandchild care increased more strongly in conscientiousness after the transition compared to grandparents who did not (difference in *after* parameter; parents: [$\hat{\gamma}_{30}$ + $\hat{\gamma}_{31}$] = 0.03, 95% CI [0.00, 0.06], p = .034; nonparents: [$\hat{\gamma}_{30}$ + $\hat{\gamma}_{31}$] = 0.03, 95% CI [0.00, 0.06], p = .022; see Tables S21 & S22 and Figure S14).

Extraversion

The trajectories of grandparents' extraversion closely followed those of the matched controls. There were no significant effects indicating differences between grandparents and controls in the basic models (see Tables S23 & S24 and Figure S15), the models including the gender interaction (see Tables S25 & S26 and Figure S15), or the models of moderation by paid work (see Tables S27 & S28 and Figure S16). The only significant effect for extraversion was found in the analysis of moderation by grandchild care (see Tables S29 & S30 and Figure S17): compared to matched parent controls, grandparents providing substantial grandchild care increased slightly more strongly in extraversion after the transition to grandparenthood (difference in *after* parameter: $[\hat{\gamma}_{21} + \hat{\gamma}_{31}] = 0.04$, 95% CI [0.02, 0.07], $p = .001$; suggestive evidence in the nonparent sample: $[\hat{\gamma}_{21} + \hat{\gamma}_{31}] = 0.04$, 95% CI [0.01, 0.06], $p = .007$).

Neuroticism

The basic models for neuroticism (see Tables S31 & S32 and Figure S18) showed only minor differences between grandparents and matched controls: Compared to the parent controls, grandparents in the HRS shifted slightly downward in their neuroticism immediately after the transition to grandparenthood (difference in *shift* parameter: $[\hat{\gamma}_{21} + \hat{\gamma}_{31}] = -0.08$, 95% CI [-0.12, -0.03], $p < .001$), which was not the case in the three other samples (HRS nonparents, LISS parents, and LISS nonparents). Further, in the HRS there was suggestive evidence that grandparents increased in neuroticism before the transition to grandparenthood compared to the nonparent controls, $\hat{\gamma}_{11} = 0.04$, 95% CI $[0.01, 0.07]$, $p = .016$. The models including the gender interaction (see Tables S33 & S34 and Figure S18) showed one significant effect in the comparison of grandparents and controls: In the HRS, grandfathers, as compared to male parent controls, shifted downward in neuroticism directly after the transition to grandparenthood (difference in *shift* parameter: $[\hat{\gamma}_{21} + \hat{\gamma}_{31}] = -0.16$, 95% CI [-0.22, -0.09], $p < .001$; suggestive evidence in the nonparent sample: $[\hat{\gamma}_{21}$

+ $\hat{\gamma}_{31}$] = -0.07, 95% CI [-0.14, -0.01], p = .024). There was suggestive evidence that grandfathers in the HRS increased more strongly in neuroticism before the transition than male controls (parent controls: $\hat{\gamma}_{11} = 0.06$, 95% CI $[0.01, 0.10]$, p = .024; nonparent controls: $\hat{\gamma}_{11} = 0.06$, 95% CI $[0.02, 0.11]$, p = .007). Thus, effects present in the basic models seemed to be mostly due to differences in the grandfathers (vs. male controls).

Grandparents' trajectories of neuroticism as compared to the controls were significantly moderated by paid work (see Tables S35 & S36 and Figure S19): Compared to working nonparent controls, working grandparents increased more strongly in neuroticism in the years before the transition to grandparenthood (difference in *before* parameter: [$\hat{\gamma}_{21}$ + $\hat{\gamma}_{31}$] = 0.06, 95% CI [0.03, 0.10], $p < .001$; suggestive evidence in the parent sample: [$\hat{\gamma}_{21}$ + $\hat{\gamma}_{31}$] = 0.05, 95% CI [0.01, 0.08], p = .015). At the first post-transition assessment, working grandparents shifted downward in neuroticism compared to working parent controls (difference in *shift* parameter: [$\hat{\gamma}_{41}$ + $\hat{\gamma}_{61}$ + $\hat{\gamma}_{51}$ + $\hat{\gamma}_{71}$] = -0.08, 95% CI [-0.14, -0.03], p = .004; suggestive evidence in the nonparent sample: [$\hat{\gamma}_{41}$ + $\hat{\gamma}_{61}$ + $\hat{\gamma}_{51}$ + $\hat{\gamma}_{71}$] = -0.06, 95% CI [-0.11, 0.00], p = .034). There was suggestive evidence that grandparents providing substantial grandchild care decreased more strongly in neuroticism after the transition to grandparenthood than grandparents who did not (difference in *after* parameter; parents: [$\hat{\gamma}_{30}$ + $\hat{\gamma}_{31}$] = -0.04, 95% CI [-0.07, 0.00], p = .044; nonparents: [$\hat{\gamma}_{30}$ + $\hat{\gamma}_{31}$] = -0.04, 95% CI [-0.07, 0.00], p = .048; see Tables S37 & S38 and Figure S20).

Openness

For openness, we also found a high degree of similarity between the grandparents and the matched control respondents in their trajectories based on the basic models (see Tables S39 & S40 and Figure S21) and models including the gender interaction (see Tables S41 & S42 and Figure S21). Grandparents in the HRS shifted downward in openness in the first assessment after the transition to grandparenthood compared to the parent controls (difference in *shift* parameter: [$\hat{\gamma}_{21}$ + $\hat{\gamma}_{31}$] = -0.05, 95% CI [-0.09, -0.02], p = .004;

suggestive evidence in the nonparent sample: [$\hat{\gamma}_{21}$ + $\hat{\gamma}_{31}$] = -0.04, 95% CI [-0.07, 0.00], p = .039), which was due to significant differences between grandfathers and male parent controls (difference in *shift* parameter: [$\hat{\gamma}_{21}$ + $\hat{\gamma}_{31}$] = -0.11, 95% CI [-0.17, -0.06], $p < .001$). There was suggestive evidence that grandmothers in the LISS increased more strongly in openness before the transition to grandparenthood than female controls (difference in *before* parameter; parents: [$\hat{\gamma}_{11}$ + $\hat{\gamma}_{13}$] = 0.02, 95% CI [0.00, 0.03], p = .036; nonparents: [$\hat{\gamma}_{11}$ + $\hat{\gamma}_{13}$] = 0.02, 95% CI [0.00, 0.04], p = .009).

Performing paid work moderated grandparents' trajectories in subtle ways (see Tables S43 & S44 and Figure S22): Non-working grandparents increased more strongly in openness post-transition than non-working controls (parents: $\hat{\gamma}_{41} = 0.05$, 95% CI $[0.02, 0.07]$, $p < .001$; nonparents: $\hat{\gamma}_{41} = 0.04$, 95% CI $[0.02, 0.06]$, $p < .001$). Further, there was suggestive evidence that openness of non-working grandparents shifted downward directly after the transition compared to non-working controls (difference in *shift* parameter; parents: [$\hat{\gamma}_{41}$ + $\hat{\gamma}_{61}$] = -0.09, 95% CI [-0.15, -0.02], p = .007; nonparents: [$\hat{\gamma}_{41}$ + $\hat{\gamma}_{61}$] = -0.07, 95% CI [-0.13, -0.01], p = .014). However, compared to non-working grandparents, working grandparents shifted upward in openness directly after the transition (suggestive evidence for difference in *shift* parameter; parents: [$\hat{\gamma}_{50}$ + $\hat{\gamma}_{70}$ + $\hat{\gamma}_{51}$ + $\hat{\gamma}_{71}$] = 0.08, 95% CI [0.00, 0.15], p = .038; nonparents: [$\hat{\gamma}_{50}$ + $\hat{\gamma}_{70}$ + $\hat{\gamma}_{51}$ + $\hat{\gamma}_{71}$] = 0.08, 95% CI [0.01, 0.14], p = .023) and decreased afterwards (suggestive evidence for difference in *after* parameter; parents: [$\hat{\gamma}_{50}$ + $\hat{\gamma}_{51}$] = -0.04, 95% CI [-0.07, -0.01], p = .016; nonparents: [$\hat{\gamma}_{50}$ + $\hat{\gamma}_{51}$] = -0.04, 95% CI [-0.07, -0.01], p = .007). The analysis of moderation by grandchild care (see Tables S45 & S46 and Figure S23) revealed that grandparents providing substantial grandchild care increased more strongly in openness after the transition to grandparenthood than the matched nonparent controls (difference in *after* parameter: [$\hat{\gamma}_{21}$ + $\hat{\gamma}_{31}$] = 0.04, 95% CI [0.01, 0.06], p = .002; suggestive evidence in the parent sample: [$\hat{\gamma}_{21}$ + $\hat{\gamma}_{31}$] = 0.04, 95% CI [0.01, 0.07], p = .005). At the same time, the plotted trajectories demonstrated that the described moderation effects for openness were all quite small.

Life Satisfaction

The basic models for life satisfaction (see Tables S47 & S48 and Figure S24) showed that grandparents in the LISS increased more strongly in life satisfaction directly following the transition compared to nonparent controls (difference in *shift* parameter: $[\hat{\gamma}_{21} + \hat{\gamma}_{31}] = 0.18$, 95% CI [0.06, 0.30], $p = .004$). In the HRS, there was suggestive evidence that grandparents increased more strongly in life satisfaction before the transition to grandparenthood than matched parent controls, $\hat{\gamma}_{11} = 0.12$, 95% CI $[0.03, 0.21]$, $p = .010$. There was evidence in the models including the gender interaction (see Tables S49 & S50 and Figure S24) that these differences were due to grandmothers, who increased more strongly in life satisfaction directly following the transition to grandparenthood than female nonparent controls in the LISS (difference in *shift* parameter: $[\hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{23} + \hat{\gamma}_{33}] = 0.24$, 95% CI [0.08, 0.41], $p = .004$) and increased more strongly before the transition to grandparenthood compared to female parent controls in the HRS (difference in *before* parameter: $[\hat{\gamma}_{11} + \hat{\gamma}_{13}] = 0.21$, 95% CI [0.09, 0.33], $p < .001$).

The models of moderation by paid work gave suggestive evidence that working grandparents increased in life satisfaction before the transition to grandparenthood compared to working parent controls (difference in *before* parameter: $[\hat{\gamma}_{21} + \hat{\gamma}_{31}] = 0.11$, 95% CI [0.00, 0.21], $p = .047$; see Tables S51 & S52 and Figure S25). There was no evidence for a moderation by grandchild care (see Tables S53 & S54 and Figure S26).

Interindividual Differences in Change

First, we conducted comparisons of model fit between the random-intercept models reported previously and models where a random slope variance was estimated, separately for each change parameter. These comparisons showed a substantial amount of interindividual differences in change for all random slopes in all models as indicated by increases in model fit significant at $p < .001$.

Second, we estimated models with heterogeneous random slope variances between

the grandparents and each control group in order to test whether interindividual differences in change were significantly larger in the grandparents. Contrary to hypothesis H2, for agreeableness, conscientiousness, and extraversion, interindividual differences in intraindividual change were greater in the control group for all tested effects (see Tables S55, S56, & S57). In the two HRS samples, assuming group heterogeneity in the random slope variances lead to significant improvements in model fit in all model comparisons. In the two LISS samples, this was the case for around half the tests.

Interindividual differences in changes in neuroticism before the transition to grandparenthood were significantly greater in the HRS grandparents than the nonparent controls (random slope variances of the *before* parameter), *likelihood ratio* = 73.45, $p <$ .001. However, this was not the case in the comparison of grandparents with parent controls in the HRS or either control group in the LISS (see Table S58). The other parameters of change in neuroticism did not differ significantly between groups in their random slope variances or—in the HRS—displayed significantly larger random slope variances in the respective control group.

For openness, interindividual differences in changes before the transition to grandparenthood were significantly greater in the LISS grandparents than the nonparent controls (random slope variances of the *before* parameter), *likelihood ratio* = 25.90, $p <$ .001. Again, this result could not be replicated in the other three samples, and the other parameters of change did either not differ between groups in their random slope variances or had significantly larger random slope variances in the respective control group (see Table S59).

We found partial evidence for larger interindividual differences in grandparents' changes in life satisfaction (see Table S60): In the LISS, grandparents' changes before the transition to grandparenthood varied interindividually to a larger extent compared to the parent controls (random slope variances of the *before* parameter), *likelihood ratio* = 41.47, $p <$ .001, and in the HRS compared to the nonparent controls, *likelihood ratio* = 111.97, $p <$

.001. We found suggestive evidence in the HRS for larger interindividual differences in grandparents' linear post-transition changes compared to the parent controls (random slope variances of the *after* parameter), *likelihood ratio* = 11.74, $p = .008$, and in sudden shifts directly after the transition was first reported (random slope variances of the *shift* parameter), *likelihood ratio* = 10.00, $p = .019$. Still, the majority of tests for heterogeneous random slope variance in life satisfaction indicated either non-significant differences or significantly larger random slope variances in the control sample.

Rank-Order Stability

As indicators of rank-order stability, we computed test-retest correlations for the Big Five and life satisfaction for the matched sample, as well as separately for grandparents only and controls only (see Table S61). In 6 out of 24 comparisons grandparents' test-retest correlation was lower than that of the respective control group. However, differences in rank-order stability between the grandparents and control respondents did not reach significance in any of these comparisons. We found suggestive evidence that the rank-order stability of extraversion in the HRS was higher in the grandparents than in either parent, $p = .007$, or nonparent controls, $p = .029$, and that for openness it was larger in the grandparents than in the parent controls, $p = .015$. In the LISS, there was suggestive evidence that grandparents' rank-order stability in agreeableness was higher than that of the nonparent controls, $p = .009$.

Overall, we found no confirmatory evidence in support of hypothesis H3.[13]

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[13] In addition to the preregistered retest interval, we have also computed a maximally large retest interval between the first available pre-transition assessment and the last available post-transition assessment within the observation period. Here, 5 out of 24 comparisons indicated that rank-order stability was lower in the grandparents, and we found one significant difference in rank-order stability in accordance with our hypothesis: in the HRS, grandparents' rank-order stability in openness was lower than that of the nonparents, $p < .001$ (see Table S62). In another analysis, we followed the preregistered approach but then excluded any duplicate control respondents resulting from matching with replacement who might bias results towards greater stability in the controls: 14 out of 24 comparisons showed lower rank-order stability in the grandparents compared to either control group (see Table S63). However, differences between the groups were nonsignificant throughout.

Discussion

In an analysis of first-time grandparents in comparison with both parent and nonparent matched control respondents we found pronounced stability in the Big Five and life satisfaction over the transition to grandparenthood. Although there were a few isolated effects in line with our hypotheses on mean-level changes (H1), they were very small in size and also not consistent over the two analyzed panel studies—LISS and HRS. We found partial evidence for moderation of the mean-level trajectories of conscientiousness, neuroticism, and openness by performing paid work, and of extraversion and openness by providing substantial grandchild care (contrary to H1b). While interindividual differences in change were present for all parameters of change, they were only greater in the grandparents in a stark minority of conducted model comparisons (H2). Lastly, rank-order stability did not differ between grandparents and either controls group, or was larger in the control group—contrary to expectations (H3).

Social Investment Principle

We conducted a preregistered, cross-study, and multi-comparison test of the social investment principle (Lodi-Smith & Roberts, 2007; Roberts & Wood, 2006) in middle adulthood and old age where the transition to grandparenthood has been put forward as a potentially important developmental task driving personality development of the Big Five (Hutteman et al., 2014). Across all analyzed traits, we found more evidence for trait stability than change (Bleidorn et al., 2021).

Still, below we summarize the sparse evidence in line with the social investment principle because even small effects may be meaningful and involve real world consequences (Götz et al., 2021): For agreeableness and conscientiousness we found slight post-transition increases in comparison to the matched control groups which were line with the social investment principle However, the effects were not only small but also inconsistent across samples. Agreeableness only increased in the LISS (compared to parents) and

conscientiousness only in the HRS (compared to both parents and nonparents). In the HRS, neuroticism decreased in grandparents directly following the transition to grandparenthood when compared to matched parent respondents. This was not the case in the other analysis samples.

In the case of agreeableness and neuroticism, these effects were only present in the comparison of grandfathers and male controls, whereas no effects were found for grandmothers. In contrast, past research—mostly in the domains of well-being and health—found more pronounced effects of the transition to grandparenthood for grandmothers (Di Gessa et al., 2016b, 2019; Sheppard & Monden, 2019; Tanskanen et al., 2019). More beneficial effects for grandmothers have been discussed in the context of grandmothers spending more time with their grandchildren than grandfathers and providing more hours of care (Condon et al., 2013; Di Gessa et al., 2020), thus making a higher social investment.[14] In our analysis, we found partial support for this for life satisfaction (see below). Yet our results for the Big Five were not in agreement with this line of thought. Instead, one possible explanation is that (future) grandfathers have on average been previously more invested in their work lives than in child rearing, and at the end of their career or after retirement found investment in grandchild care to be a more novel and meaningful transition than grandmothers (StGeorge & Fletcher, 2014; Tanskanen et al., 2021). Currently, however, empirical research specifically into the grandfather role is sparse, and the demography of grandparenthood is undergoing swift changes toward a higher proportion of actively involved grandfathers (see Coall et al., 2016; Mann, 2007). Thus, more research into grandfathers' experience of the transition to grandparenthood is needed to substantiate our tentative findings.

To gain more insight into social investment mechanisms, we tested paid work and grandchild care as moderators. For conscientiousness, we found that grandparents who

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[14] In the HRS analysis sample, the proportion of grandparents reporting that they have provided at least 100 hours of grandchild care since the last assessment was also slightly higher in grandmothers ($M = 0.45$, $SD = 0.50$) than grandfathers ($M = 0.41$, $SD = 0.49$).

were not gainfully employed increased more strongly in anticipation of the transition to grandparenthood than working grandparents (and than the matched nonworking controls). Although this could imply that working grandparents did not find as much time for social investment because of the role conflict with the employee/worker role (see Tanskanen et al., 2021), we would have expected these moderation effects after the transition where grandparents were indeed able to spend time with their grandchild. However, such post-transition differences did not surface. Results for neuroticism were even less clearly in line with the social investment principle: Working grandparents increased in neuroticism in anticipation of the transition to grandparenthood (compared to nonparents), and decreased immediately following the transition (compared to parents). Regarding moderation by grandchild care, our results suggested that grandparents who provided substantial grandchild care increased more in conscientiousness and decreased more in neuroticism compared to grandparents who did not. However, the strength of evidence was not entirely convincing and indicates a need for temporally more fine-grained assessments with more extensive instruments of grandchild care (e.g., Vermote et al., 2021).

In total, evidence in favor of the social investment principle in our analyses was rather thin. This adds to other recent empirical tests of the social investment principle in the context of parenthood and romantic relationships (Asselmann & Specht, 2020a, 2020b; Spikic et al., 2021; van Scheppingen et al., 2016) that have challenged its core theoretical assumption of personality maturation through age-graded social role transitions. In fact, more recent formulations of the social investment principle have acknowledged that it is mostly applicable to transitions into first employment roles and romantic relationships in emerging adulthood and may also be more closely tied to subjective perceptions of adult role competency than to the transitions per se (Roberts & Davis, 2016).

Nonetheless, the possibility remains that certain preconditions we have not considered have to be met for grandparents to undergo personality maturation after the transition to grandparenthood. For example, grandparents might need to live in close

proximity to their grandchild, see them on a regular basis, and provide grandchild care above a certain quantity and quality (i.e., level of responsibility). To our knowledge, however, there are presently no datasets with such detailed information regarding the grandparent role in conjunction with multiple waves of Big Five personality data. Studies in the well-being literature have provided initial evidence that more frequent contact with grandchildren was associated with higher grandparental well-being (Arpino, Bordone, et al., 2018; Danielsbacka et al., 2019; Danielsbacka & Tanskanen, 2016). However, Danielsbacka et al. (2019) noted that this effect was due to between-person differences in grandparents, thus limiting a causal interpretation of frequency of grandchild care as a mechanism of development.

Life Satisfaction

We did not find convincing evidence that life satisfaction changed as a consequence of the transition to grandparenthood. Only in the LISS in comparison with the nonparent control group did grandparents' life satisfaction increase slightly at the first assessment following the transition to grandparenthood. This difference was present in grandmothers but not grandfathers. While this pattern of effects is in line with several studies reporting increases associated with women becoming grandmothers (e.g., Di Gessa et al., 2019; Tanskanen et al., 2019), we did not uncover it reliably in both samples or with both comparison groups and also did not see consistent effects in the linear trajectories after the transition to grandparenthood. As mentioned in the introduction, a study into the effects of the transition on first-time grandparents' life satisfaction that used fixed effects regressions also did not discover any positive within-person effects of the transition (Sheppard & Monden, 2019). Further, in line with this study, we did not find evidence that grandparents who provided substantial grandchild care increased more strongly in life satisfaction than those who did not, and, likewise, grandparents' life satisfaction trajectories were not moderated by employment status (Sheppard & Monden, 2019).

Overall, research has accumulated that there is an association between having grandchildren and higher life satisfaction on the between-person level—especially for (maternal) grandmothers who provide frequent grandchild care (Danielsbacka et al., 2011; Danielsbacka & Tanskanen, 2016)—but no within-person effect of the transition. The main reason for this is the presence of selection effects, that is, confounding that we have accounted for through the propensity score matching design (Luhmann et al., 2014; Thoemmes & Kim, 2011; VanderWeele et al., 2020).

Interindividual Differences in Change

Analyzing how grandparents differed interindividually in their trajectories of change provided additional insight beyond the analysis of mean-level change. As a prerequisite for further analyses we checked that the parameters of change exhibited considerable interindividual differences in every model. This was the case as evidenced by significant increases in model fit through the addition of random slopes. Similar to Denissen et al. (2019) who found significant model fit improvements of random slopes in most models (see also Doré & Bolger, 2018) this indicates that respondents—both grandparents and matched controls—deviated to a considerable extent from the average trajectories that we reported on previously.[15]

Next, in keeping with our analytical strategy of testing effects against the matched controls, we specified heterogeneous random slope models. We tested whether the addition of heterogeneous random slope variances for each group's change parameter lead to significantly higher model fit (indicating significant differences between grandparents and controls in the random slope variance estimates). We expected larger interindividual

[15] (internal footnote) If I only look at grandparents and test if adding random slopes to the (simplified) basic models increases model fit significantly I see that now only a minority of model comparisons indicate significant model fit increases (23 out of 72 tests at $\alpha = .005$; almost none in the HRS - 3 out of 36 tests). Not sure, if this is just a sample size issue (but why are the HRS random slopes even more often n.s.? -> maybe within-peson variance overall too low) or what is going on. Also, a couple of the random slope models now only converge with singular fit (even if I try a different optimizer). I think this is because these particular random slope variances are estimated as too close to zero.

differences in the grandparents because life events and transitions differ in the impact they have on people's daily lives and in the degree that those who experience them perceive them as meaningful or emotionally significant (Doré & Bolger, 2018; Luhmann et al., 2020). Our results, however, indicated that interindividual differences were larger in the controls than the grandparents for many models or that there were no significant group differences. Only in a minority of tests for neuroticism, openness, and life satisfaction were interindividual differences significantly larger in the grandparents. This concerned the linear slope before the transition to grandparenthood. Overall, we did not find supporting evidence for the hypothesis that interindividual differences in change would be larger in the grandparents than the controls (H2).

There are two important points to consider regarding these results: First, most previous studies investigating personality development did not compare interindividual differences in change between the event group and a comparison group (even if they did use comparison groups for the main analyses; Denissen et al., 2019; Schwaba & Bleidorn, 2019; cf. Jackson & Beck, 2021). Second, an analysis across the entire life span that also used LISS data demonstrated that interindividual differences in change in the Big Five were largest in emerging adulthood and decreased in middle and old adulthood (except for neuroticism; Schwaba & Bleidorn, 2018). Still, even in the later stages of the life span there was a substantial degree of variability in change in the whole sample, up until circa 70 years of age for most domains (Schwaba & Bleidorn, 2018). Therefore, we propose that—regarding the substantive question of how the transition affects interindividual differences in change—it is more informative to test grandparents' degree of variability in change against well-matched control groups than against zero as often done previously.

Recently, Jackson and Beck (2021) have presented evidence that the experience of sixteen commonly analyzed life events was mostly associated with decreases in interindividual variation in the Big Five. They used a comparable approach to ours but in a SEM latent growth curve framework and not accounting for covariates related to

pre-existing group differences. Their results based on the German SOEP data suggested—counter to their expectations—that most life events made people *more* similar to each other (Jackson & Beck, 2021). Thus, coupled with our results it seems that the long-held assumption that life events and transitions generally produce increased heterogeneity between people needs to be scrutinized in future studies.

Rank-Order Stability

We also investigated whether grandparents' rank-order stability in the Big Five personality traits and life satisfaction over the transition to grandparenthood differed from that of the matched controls. The hypothesis of lower rank-order stability in the grandparents (H3) was based on the idea that the transition to grandparenthood would be associated with changes in grandparents' personality or life satisfaction which might not only manifest in the mean-level but also in the relative ordering of people to each other over time. Conceptually, rank-order changes are possible in the absence of mean-level changes. Empirically, we did not find evidence supporting our hypothesis: Rank-order stability did not differ significantly between grandparents and controls and, descriptively, was larger in the grandparents in the majority of comparisons. In a recent study of the effects of eight different life events on the development of the Big Five personality traits and life satisfaction (Denissen et al., 2019), comparably high rank-order stability was reported in the event groups. Only the particularly adverse events widowhood and disability significantly lowered respondents' rank-order stability (Denissen et al., 2019).

Regarding the Big Five's general age trajectories of rank-order stability, support for inverted U-shape trajectories was recently strengthened in a study of two panel data sets (Seifert et al., 2021). This study also explored that health deterioration accounted for parts of the decline of personality stability in old age. Therefore, it is possible that in later developmental phases (see also Hutteman et al., 2014) rank-order stability of personality is largely influenced by health status and less by normative life events. In the context of

grandparenthood, this relates to research into health benefits (Chung & Park, 2018; Condon et al., 2018; Di Gessa et al., 2016a, 2016b; cf. Ates, 2017) and decreases to mortality risk associated with grandparenthood or grandchild care (Choi, 2020; Christiansen, 2014; Hilbrand et al., 2017; cf. Ellwardt et al., 2021). Thereby, grandparenthood might have a time-lagged effect on personality stability through protective effects on health. However, with the currently available data such a mediating effect cannot be reliably recovered (under realistic assumptions; Rohrer et al., 2021).

Limitations and Future Directions

The current study has a number of strengths that bolster the robustness of its inferences: It features a preregistered analysis of archival data with an internal cross-study replication, a propensity score matching design that carefully deliberated covariate choice, and a twofold comparison of all effects of the grandparents—against matched parents (with children in reproductive age) and nonparents. To obtain a more complete picture of personality development, we analyzed mean-level changes, interindividual differences in change, and changes to rank-order stability. Both of the panel studies we used had its strengths and weaknesses: The HRS had a larger sample of first-time grandparents besides information on important moderators but assessed personality and life satisfaction only every four years (within-person). The LISS assessed the outcomes every year (apart from a few waves with planned missingness) but restricted the grandparent sample through filtering of the relevant questions to employed respondents resulting in a smaller and younger sample.

Still, a number of limitations need to be addressed: First, there remains some doubt whether we were able to follow truly socially invested grandparents over time. More detailed information regarding a grandparent's relationship with their first and later grandchildren and the level of care a grandparent provides would be a valuable source of information on social investment, as would be information on possible constraining factors

such as length and cost of travel between grandparent and grandchild. Lacking such precise contextual information, the multidimensionality of the grandparent role (Buchanan & Rotkirch, 2018; Findler et al., 2013; Thiele & Whelan, 2006) might lend itself to future investigations into grandparents' personality development using growth mixture models (Grimm & Ram, 2009; Ram & Grimm, 2009). On a similar note, we did not consider grandparents' subjective perception of the transition to grandparenthood in terms of the emotional significance, meaningfulness, and impact to daily lives which might be responsible for differential individual change trajectories (Kritzler et al., 2021; Luhmann et al., 2020).

Second, we relied on self-report personality data and did not include other-reports by family members or close friends (Luan et al., 2017; McCrae, 2018; McCrae & Mõttus, 2019; Mõttus et al., 2019). Thus, our results might be influenced by common method bias (Podsakoff et al., 2003). Large-scale panel data incorporating both self- and other-reports of personality over time would be needed to address this issue (e.g., Oltmanns et al., 2020).

Third, a causal interpretation of our results depends on a number of assumptions that are not directly testable with the data (Li, 2013; Stuart, 2010): most importantly, that we picked the right sets of covariates, that our model to estimate the propensity score was correctly specified, and that there was no substantial remaining bias due to unmeasured confounding. Working with archival data meant that we had no influence on data collection, and we also aimed for roughly equivalent sets of covariates across both data sets. Therefore, we had to make some compromises to covariate choice. Still, we believe that our procedure to select covariates following recent state-of-the-art recommendations (see *Methods*; VanderWeele et al., 2020), and to substantiate each covariate's selection explicitly within our preregistration improved upon previously applied practices. Regarding the propensity score estimation, we opted to estimate the grandparents' propensity scores at a specific time point at least two years before the transition to grandparenthood which had the advantages that (*1*) the covariates were

uncontaminated by anticipation of the transition, and (*2*) the matched controls had a clear counterfactual timeline of transition (for similar recent approaches analyzing life events, see Balbo & Arpino, 2016; Krämer & Rodgers, 2020; van Scheppingen & Leopold, 2020). Inverse probability of treatment weighting (Hernán & Robins, 2020; Thoemmes & Ong, 2016), which is able to directly account for the longitudinal effects of time-varying covariates, may constitute a valuable alternative analytical strategy for future studies.

Fourth, our results only pertain to the countries for which our data are representative on a population-level, the Netherlands and the United States. Personality development, and more specifically personality maturation, have been examined cross-culturally (e.g., Bleidorn et al., 2013; Chopik & Kitayama, 2018). On the one hand, these studies showed universal average patterns of change towards greater maturity over the life span, and on the other hand they emphasized cultural differences regarding norms and values and the temporal onset of social roles. For grandparenthood, there are substantial demographic differences between countries (Leopold & Skopek, 2015), as well as differences in public child care systems which may demand different levels of grandparental involvement (Bordone et al., 2017; Hank & Buber, 2009). Compared to the US, Dutch people on average become grandparents six years later (Leopold & Skopek, 2015) and, although both countries have largely market-based systems for early child care, Dutch parents on average have access to more fully developed child care systems through (capped) governmental benefits (OECD, 2020). Despite these differences, our results from the Dutch and US samples did not indicate systematic discrepancies.

Lastly, while we assessed our dependent variables through highly reliable scales in both samples, there was a conceptual difference in the Big Five measures (see John & Srivastava, 1999): In the LISS, the IPIP Big-Five Inventory (Goldberg, 1992) presented as items statements to which respondents indicated how accurately they described them (using a bipolar response scale). However, in the HRS, the Midlife Development Inventory (Lachman & Weaver, 1997) used adjectives as items to ask respondents how well they

described them (using a unipolar response scale). This discrepancy hindered the between-sample comparison somewhat and also resulted in different distributions of the Big Five across samples (see Fig. S3-S8). The possibility should also be pointed out that our analyses on the domain-level of the Big Five were be too broad conceptually to identify patterns of personality development over the transition to grandparenthood that are discernible on the level of facets or nuances (Mõttus & Rozgonjuk, 2021).

Conclusion

Do personality traits change in grandparents over the transition to grandparenthood? Using data from two nationally representative panel studies in a preregistered propensity score matching design, the current study revealed that trajectories of the Big Five personality traits remained predominantly stable in first-time grandparents over this transition compared to matched parents and nonparents. We found slight post-transition increases to grandparents' agreeableness and conscientiousness in line with our hypothesis of personality maturation based on the social investment principle. However, these effects were minuscule and inconsistent across the four analysis samples. Together with (*1*) the lack of consistent moderation of personality development by grandparents providing substantial grandchild care, (*2*) mostly smaller interindividual differences in change in grandparents (vs. matched controls), and (*3*) comparable rank-order stability in grandparents and matched respondents, we conclude that the transition to grandparenthood did not act as an important developmental task driving personality development in middle adulthood and old age (Hutteman et al., 2014). With more detailed assessment of the grandparent role, future research could investigate if personality development occurs in a subset of grandparents who are highly socially invested.

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Supplemental Material

Model Equations

Model equation for the basic models (ignoring the additional nesting in households applied to the majority of models):

$$\begin{aligned} y_{ti} =& \beta_{0i} + \beta_{1i} before_{ti} + \beta_{2i} after_{ti} + \beta_{3i} shift_{ti} + e_{ti} \\ \beta_{0i} &= \gamma_{00} + \gamma_{01} grandparent_i + \gamma_{02} pscore_i + \upsilon_{0i} \\ \beta_{1i} &= \gamma_{10} + \gamma_{11} grandparent_i \\ \beta_{2i} &= \gamma_{20} + \gamma_{21} grandparent_i \\ \beta_{3i} &= \gamma_{30} + \gamma_{31} grandparent_i \ , \end{aligned} \tag{1}$$

where at time t for person i $e_{ti} \sim N(0, \sigma_e^2)$ and $\upsilon_{0i} \sim N(0, \tau_{00})$. y_{ti} represented one of the Big Five or life satisfaction. Separate models were computed for LISS and HRS samples, and for parent and nonparent matched controls.

Model equation for the models including the gender interaction (moderator variable $female_i$):

$$\begin{aligned} y_{ti} =& \beta_{0i} + \beta_{1i} before_{ti} + \beta_{2i} after_{ti} + \beta_{3i} shift_{ti} + e_{ti} \\ \beta_{0i} &= \gamma_{00} + \gamma_{01} grandparent_i + \gamma_{02} female_i + \gamma_{03} grandparent_i female_i \\ &\quad + \gamma_{04} pscore_i + \upsilon_{0i} \\ \beta_{1i} &= \gamma_{10} + \gamma_{11} grandparent_i + \gamma_{12} female_i + \gamma_{13} grandparent_i female_i \\ \beta_{2i} &= \gamma_{20} + \gamma_{21} grandparent_i + \gamma_{22} female_i + \gamma_{23} grandparent_i female_i \\ \beta_{3i} &= \gamma_{30} + \gamma_{31} grandparent_i + \gamma_{32} female_i + \gamma_{33} grandparent_i female_i \ , \end{aligned} \tag{2}$$

where $e_{ti} \sim N(0, \sigma_e^2)$ and $\upsilon_{0i} \sim N(0, \tau_{00})$. Again, we estimated separate models for each sample (LISS, HRS) and each comparison group (parents, nonparents).

Model equation for the models including the interaction by paid work (moderator variable $working_{ti}$):

$$
\begin{aligned}
y_{ti} =& \beta_{0i} + \beta_{1i} working_{ti} + \beta_{2i} before_{ti} + \beta_{3i} before_{ti} working_{ti} + \beta_{4i} after_{ti} \\
&+ \beta_{5i} after_{ti} working_{ti} + \beta_{6i} shift_{ti} + \beta_{7i} shift_{ti} working_{ti} + e_{ti} \\
\beta_{0i} &= \gamma_{00} + \gamma_{01} grandparent_i + \gamma_{02} pscore_i + \upsilon_{0i} \\
\beta_{1i} &= \gamma_{10} + \gamma_{11} grandparent_i \\
\beta_{2i} &= \gamma_{20} + \gamma_{21} grandparent_i \\
\beta_{3i} &= \gamma_{30} + \gamma_{31} grandparent_i \\
\beta_{4i} &= \gamma_{40} + \gamma_{41} grandparent_i \\
\beta_{5i} &= \gamma_{50} + \gamma_{51} grandparent_i \\
\beta_{6i} &= \gamma_{60} + \gamma_{61} grandparent_i \\
\beta_{7i} &= \gamma_{70} + \gamma_{71} grandparent_i \ ,
\end{aligned}
\tag{3}
$$

where $e_{ti} \sim N(0, \sigma_e^2)$ and $\upsilon_{0i} \sim N(0, \tau_{00})$. We estimated separate models for each comparison group (parents, nonparents) in the HRS.

Model equation for the models including the interaction by grandchild care (moderator variable $caring_{ti}$):

$$
\begin{aligned}
y_{ti} =& \beta_{0i} + \beta_{1i} caring_{ti} + \beta_{2i} after_{ti} + \beta_{3i} after_{ti} caring_{ti} + e_{ti} \\
\beta_{0i} &= \gamma_{00} + \gamma_{01} grandparent_i + \gamma_{02} pscore_i + \upsilon_{0i} \\
\beta_{1i} &= \gamma_{10} + \gamma_{11} grandparent_i \\
\beta_{2i} &= \gamma_{20} + \gamma_{21} grandparent_i \\
\beta_{3i} &= \gamma_{30} + \gamma_{31} grandparent_i \ ,
\end{aligned}
\tag{4}
$$

where $e_{ti} \sim N(0, \sigma_e^2)$ and $\upsilon_{0i} \sim N(0, \tau_{00})$. Restricted to the HRS post-transition period, we estimated separate models for each comparison group (parents, nonparents).

Supplemental Tables

Table S1

Intra-Class Correlations of Grandparents and Matched Controls in the Four Analysis Samples.

	A	C	E	N	O	LS
LISS: Parent controls						
ICC_{pid}	0.74	0.77	0.81	0.71	0.78	0.35
ICC_{hid}	0.05	0.01	0.02	0.07	0.00	0.37
$ICC_{pid/hid}$	0.79	0.78	0.83	0.78	0.78	0.71
LISS: Nonparent controls						
ICC_{pid}	0.76	0.76	0.64	0.67	0.79	0.32
ICC_{hid}	0.00	0.00	0.22	0.10	0.02	0.36
$ICC_{pid/hid}$	0.76	0.77	0.85	0.77	0.81	0.67
HRS: Parent controls						
ICC_{pid}	0.76	0.69	0.79	0.73	0.57	0.31
ICC_{hid}	0.00	0.07	0.00	0.01	0.21	0.35
$ICC_{pid/hid}$	0.76	0.76	0.79	0.74	0.78	0.67
HRS: Nonparent controls						
ICC_{pid}	0.71	0.73	0.77	0.76	0.59	0.33
ICC_{hid}	0.07	0.06	0.04	0.00	0.23	0.38
$ICC_{pid/hid}$	0.78	0.79	0.80	0.76	0.82	0.71

Note. A = agreeableness, C = conscientiousness, E = extraversion, N = neuroticism, O = openness, LS = life satisfaction. Intra-class correlations are the proportion of total variation that is explained by the respective nesting factor. ICC_{pid} is the proportion of total variance explained by nesting in respondents which corresponds to the correlation between two randomly selected observations from the same respondent. ICC_{hid} is the proportion of total variance explained by nesting in households which corresponds to the correlation between two randomly selected observations from the same household. $ICC_{pid/hid}$ is the proportion of total variance explained by nesting in respondents and in households which corresponds to the correlation between two randomly selected observations from the same respondent and the same household.

Table S2

Longitudinal Sample Size in the Analysis Samples and Coding Scheme for the Piecewise Regression Coefficients.

	Pre-transition years						Post-transition years						
	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
LISS: Analysis samples													
Grandparents: obs.	92	105	108	121	156	116	133	138	108	108	69	62	52
Grandparents: % women	51.09	48.57	52.78	51.24	56.41	62.93	47.37	52.90	51.85	50.00	56.52	66.13	53.85
Parent controls: obs.	335	425	381	540	740	351	450	488	333	394	365	164	201
Parent controls: % women	57.61	51.06	55.12	51.48	55.00	56.13	53.11	54.10	56.76	51.27	56.99	59.76	48.76
Nonparent controls: obs.	331	399	407	554	739	354	473	516	367	477	375	146	202
Nonparent controls: % women	52.57	54.89	57.99	52.71	55.21	54.52	49.26	54.46	52.86	52.83	54.67	48.63	51.49
LISS: Coding scheme													
Before-slope	0	1	2	3	4	5	5	5	5	5	5	5	5
After-slope	0	0	0	0	0	0	1	2	3	4	5	6	7
Shift	0	0	0	0	0	0	1	1	1	1	1	1	1
HRS: Analysis samples													
Grandparents: obs.	162		388		461		380		444		195		232
Grandparents: % women	57.41		54.12		55.53		53.95		55.41		56.41		53.45
Parent controls: obs.	619		1540		1844		1228		1504		658		864
Parent controls: % women	55.41		54.03		55.53		54.64		56.45		56.08		57.64
Nonparent controls: obs.	620		1541		1844		1205		1448		688		821
Nonparent controls: % women	56.45		54.06		55.53		56.10		58.91		57.56		60.54
HRS: Coding scheme													
Before-slope	0		1		2		2		2		2		2
After-slope	0		0		0		1		2		3		4
Shift	0		0		0		1		1		1		1

Note. obs. = observations. $time = 0$ marks the first year where the transition to grandparenthood has been reported. The number of grandparent respondents included in the final samples is $N_{LISS} = 250$ and $N_{HRS} = 846$.

Table S3

Means and Standard Deviations of the Big Five and Life Satisfaction over Time in the LISS Panel.

	Pre-transition years						Post-transition years						
	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
Agreeableness													
Grandparents	3.85	3.87	3.93	3.87	3.90	3.93	3.87	3.92	3.91	3.91	3.89	4.01	3.98
	(0.52)	(0.50)	(0.46)	(0.49)	(0.54)	(0.47)	(0.49)	(0.52)	(0.52)	(0.51)	(0.52)	(0.49)	(0.37)
Parent controls	3.93	3.89	3.90	3.87	3.91	3.95	3.91	3.89	3.90	3.92	3.86	3.86	3.81
	(0.52)	(0.51)	(0.47)	(0.50)	(0.48)	(0.48)	(0.47)	(0.51)	(0.53)	(0.48)	(0.50)	(0.43)	(0.43)
Nonparent controls	3.95	3.94	3.98	3.98	3.94	3.91	3.94	3.95	3.94	3.94	3.92	3.92	3.88
	(0.47)	(0.50)	(0.45)	(0.50)	(0.49)	(0.47)	(0.44)	(0.45)	(0.46)	(0.47)	(0.41)	(0.44)	(0.42)
Conscientiousness													
Grandparents	3.76	3.84	3.74	3.75	3.77	3.79	3.77	3.78	3.75	3.79	3.84	3.74	3.76
	(0.50)	(0.45)	(0.49)	(0.46)	(0.53)	(0.48)	(0.49)	(0.51)	(0.49)	(0.51)	(0.44)	(0.48)	(0.43)
Parent controls	3.80	3.78	3.80	3.77	3.79	3.83	3.82	3.79	3.80	3.79	3.78	3.76	3.77
	(0.52)	(0.50)	(0.52)	(0.49)	(0.49)	(0.50)	(0.49)	(0.47)	(0.47)	(0.46)	(0.43)	(0.44)	(0.45)
Nonparent controls	3.77	3.79	3.76	3.80	3.74	3.75	3.77	3.72	3.82	3.81	3.78	3.84	3.80
	(0.53)	(0.50)	(0.51)	(0.50)	(0.51)	(0.53)	(0.50)	(0.50)	(0.50)	(0.51)	(0.48)	(0.46)	(0.50)
Extraversion													
Grandparents	3.23	3.20	3.31	3.32	3.28	3.30	3.19	3.24	3.22	3.19	3.33	3.34	3.19
	(0.66)	(0.74)	(0.54)	(0.58)	(0.64)	(0.57)	(0.61)	(0.69)	(0.65)	(0.60)	(0.60)	(0.58)	(0.55)
Parent controls	3.32	3.30	3.28	3.27	3.26	3.30	3.25	3.20	3.22	3.28	3.19	3.19	3.14
	(0.58)	(0.59)	(0.58)	(0.59)	(0.59)	(0.59)	(0.64)	(0.62)	(0.59)	(0.61)	(0.58)	(0.53)	(0.56)
Nonparent controls	3.31	3.27	3.21	3.32	3.32	3.28	3.30	3.27	3.31	3.31	3.28	3.13	3.26
	(0.74)	(0.70)	(0.79)	(0.75)	(0.69)	(0.70)	(0.72)	(0.73)	(0.77)	(0.78)	(0.73)	(0.75)	(0.74)
Neuroticism													
Grandparents	2.39	2.31	2.33	2.41	2.45	2.47	2.30	2.39	2.30	2.36	2.33	2.44	2.53
	(0.71)	(0.64)	(0.60)	(0.64)	(0.65)	(0.71)	(0.67)	(0.76)	(0.68)	(0.66)	(0.67)	(0.80)	(0.67)
Parent controls	2.43	2.42	2.42	2.38	2.40	2.37	2.35	2.35	2.30	2.28	2.35	2.31	2.33
	(0.59)	(0.63)	(0.56)	(0.58)	(0.58)	(0.60)	(0.63)	(0.65)	(0.56)	(0.56)	(0.60)	(0.55)	(0.56)
Nonparent controls	2.41	2.44	2.47	2.36	2.43	2.37	2.33	2.37	2.34	2.33	2.35	2.48	2.35
	(0.64)	(0.63)	(0.69)	(0.70)	(0.69)	(0.63)	(0.69)	(0.71)	(0.74)	(0.68)	(0.70)	(0.82)	(0.83)

Table S3 continued

	Pre-transition years						Post-transition years						
	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
Openness													
Grandparents	3.43	3.50	3.54	3.49	3.49	3.50	3.48	3.48	3.50	3.45	3.50	3.43	3.36
	(0.51)	(0.50)	(0.49)	(0.45)	(0.49)	(0.50)	(0.48)	(0.54)	(0.43)	(0.46)	(0.50)	(0.53)	(0.56)
Parent controls	3.53	3.46	3.43	3.48	3.48	3.48	3.50	3.49	3.44	3.51	3.42	3.37	3.42
	(0.52)	(0.52)	(0.50)	(0.53)	(0.51)	(0.51)	(0.52)	(0.50)	(0.48)	(0.48)	(0.49)	(0.48)	(0.42)
Nonparent controls	3.53	3.57	3.53	3.58	3.52	3.51	3.52	3.55	3.54	3.59	3.53	3.51	3.51
	(0.52)	(0.51)	(0.51)	(0.52)	(0.52)	(0.51)	(0.51)	(0.51)	(0.52)	(0.51)	(0.50)	(0.47)	(0.53)
Life satisfaction													
Grandparents	5.18	5.29	5.23	5.16	5.28	5.24	5.31	5.24	5.37	5.38	5.39	5.25	5.15
	(1.06)	(0.93)	(1.13)	(0.95)	(0.93)	(1.10)	(0.93)	(1.03)	(1.09)	(0.90)	(1.10)	(1.10)	(1.00)
Parent controls	5.21	5.30	5.26	5.23	5.28	5.29	5.36	5.25	5.26	5.45	5.33	5.40	5.41
	(1.11)	(1.03)	(1.01)	(0.97)	(1.01)	(1.07)	(0.99)	(1.03)	(1.04)	(0.93)	(1.04)	(1.05)	(1.05)
Nonparent controls	5.27	5.19	5.10	5.21	5.26	5.18	5.24	5.09	5.10	5.07	5.23	4.98	5.19
	(0.92)	(0.87)	(0.90)	(0.92)	(0.95)	(0.90)	(0.96)	(1.04)	(1.12)	(1.13)	(1.08)	(1.30)	(1.18)

Note. Standard deviations shown in parentheses; $time = 0$ marks the first year where the transition to grandparenthood was reported.

Table S4

Means and Standard Deviations of the Big Five and Life Satisfaction over Time in the HRS.

	Pre-transition years						Post-transition years						
	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
Agreeableness													
Grandparents	3.46		3.51		3.51		3.52		3.52		3.50		3.56
	(0.47)		(0.48)		(0.49)		(0.49)		(0.48)		(0.53)		(0.44)
Parent controls	3.50		3.48		3.50		3.49		3.49		3.44		3.47
	(0.48)		(0.49)		(0.46)		(0.50)		(0.48)		(0.52)		(0.51)
Nonparent controls	3.50		3.50		3.50		3.52		3.52		3.44		3.48
	(0.50)		(0.50)		(0.51)		(0.50)		(0.50)		(0.53)		(0.53)
Conscientiousness													
Grandparents	3.47		3.46		3.47		3.46		3.45		3.44		3.49
	(0.46)		(0.45)		(0.44)		(0.45)		(0.44)		(0.43)		(0.44)
Parent controls	3.45		3.45		3.45		3.47		3.46		3.43		3.44
	(0.45)		(0.45)		(0.45)		(0.45)		(0.46)		(0.50)		(0.50)
Nonparent controls	3.50		3.48		3.49		3.50		3.48		3.46		3.49
	(0.44)		(0.44)		(0.44)		(0.42)		(0.45)		(0.45)		(0.43)
Extraversion													
Grandparents	3.15		3.22		3.20		3.21		3.19		3.22		3.22
	(0.56)		(0.56)		(0.54)		(0.56)		(0.58)		(0.59)		(0.58)
Parent controls	3.20		3.18		3.19		3.21		3.21		3.17		3.19
	(0.51)		(0.56)		(0.54)		(0.54)		(0.54)		(0.55)		(0.56)
Nonparent controls	3.19		3.20		3.20		3.23		3.22		3.23		3.24
	(0.55)		(0.54)		(0.56)		(0.54)		(0.54)		(0.56)		(0.57)
Neuroticism													
Grandparents	2.00		1.97		2.06		1.91		1.96		1.91		1.91
	(0.56)		(0.63)		(0.62)		(0.60)		(0.58)		(0.59)		(0.61)
Parent controls	2.01		2.05		2.01		2.03		2.00		2.01		1.95
	(0.59)		(0.60)		(0.59)		(0.61)		(0.61)		(0.61)		(0.60)
Nonparent controls	2.05		2.00		2.02		1.92		1.97		1.84		1.90
	(0.56)		(0.58)		(0.60)		(0.57)		(0.59)		(0.55)		(0.58)

Table S4 continued

	Pre-transition years						Post-transition years						
	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
Openness													
Grandparents	3.00		3.02		3.04		3.01		3.00		2.96		3.04
	(0.51)		(0.53)		(0.51)		(0.52)		(0.52)		(0.59)		(0.51)
Parent controls	3.03		3.00		2.98		3.03		3.00		2.96		2.96
	(0.51)		(0.56)		(0.54)		(0.54)		(0.52)		(0.58)		(0.56)
Nonparent controls	3.06		3.05		3.05		3.07		3.06		3.02		3.04
	(0.54)		(0.53)		(0.55)		(0.54)		(0.55)		(0.57)		(0.57)
Life satisfaction													
Grandparents	5.14		5.08		5.15		5.17		5.16		5.29		5.28
	(1.44)		(1.45)		(1.46)		(1.40)		(1.44)		(1.38)		(1.50)
Parent controls	5.14		4.98		5.01		5.11		5.10		5.06		5.12
	(1.52)		(1.57)		(1.57)		(1.52)		(1.53)		(1.47)		(1.47)
Nonparent controls	5.10		5.14		5.09		5.26		5.21		5.40		5.40
	(1.49)		(1.50)		(1.52)		(1.44)		(1.51)		(1.30)		(1.36)

Note. Standard deviations shown in parentheses; $time = 0$ marks the first year where the transition to grandparenthood was reported. To aid comparability with the LISS panel measures, we reverse scored all items so that higher values corresponded to higher trait levels.

Table S5

Standardized Difference in Means for Covariates Used in Propensity Score Matching and the Propensity Score in the LISS.

			Parent control group		Nonparent control group	
Covariate	Description	Raw variables	Before PSM	After PSM	Before PSM	After PSM
pscore	Propensity score	/	1.14	0.02	1.34	0.04
female	Gender (f.=1, m.=0)	geslacht	0.05	0.00	0.05	0.00
age	Age	gebjaar	0.85	-0.10	4.05	-0.01
degreehighersec	Higher secondary/preparatory university education	oplmet	0.07	-0.06	-0.07	0.12
degreevocational	Intermediate vocational education	oplmet	-0.20	-0.06	-0.02	0.00
degreecollege	Higher vocational education	oplmet	0.00	0.05	0.02	-0.09
degreeuniversity	University degree	oplmet	-0.08	0.14	-0.15	-0.05
religion	Member of religion/church	cr*012	0.10	0.08	0.33	0.07
speakdutch	Dutch spoken at home (primarily)	cr*089	-0.02	-0.06	0.00	-0.02
divorced	Divorced (marital status)	burgstat	0.02	-0.03	0.29	-0.02
widowed	Widowed (marital status)	burgstat	0.09	-0.12	0.13	-0.07
livetogether	Live together with partner	cf*025	-0.08	0.04	1.05	-0.02
rooms	Rooms in dwelling	cd*034	-0.03	0.05	0.63	-0.11
logincome	Personal net monthly income in Euros (logarithm)	nettoink	-0.01	0.04	0.59	-0.14
rental	Live for rent (vs. self-owned dwelling)	woning	-0.08	-0.09	-0.47	-0.03
financialsit	Financial situation of household (scale from 1-5)	ci*252	0.08	0.00	-0.03	0.00
jobhours	Average work hours per week	cw*127	0.02	0.08	0.11	-0.04
mobility	Mobility problems (walking, staircase, shopping)	ch*023/027/041	0.07	0.04	0.09	-0.02
dep	Depression items from Mental Health Inventory	ch*011 - ch*015	-0.01	0.08	-0.22	-0.08
betterhealth	Poor/moderate health status (ref.: good)	ch*004	0.00	-0.01	-0.26	0.07
worsehealth	Very good/excellent health status (ref.: good)	ch*004	0.04	-0.02	0.11	-0.04
totalchildren	Number living children	cf*455 / cf*036	0.25	0.02	NA	NA
totalresidentkids	Number of living-at-home children in household	aantalki	-0.71	0.02	NA	NA
secondkid	Has two or more children	cf*455 / cf*036	0.20	0.04	NA	NA
thirdkid	Has three or more children	cf*455 / cf*036	0.26	0.01	NA	NA
kid1female	Gender of first child (f.=1, m.=0)	cf*068	0.04	0.04	NA	NA
kid2female	Gender of second child (f.=1, m.=0)	cf*069	0.01	-0.06	NA	NA
kid3female	Gender of third child (f.=1, m.=0)	cf*070	0.17	0.02	NA	NA
kid1age	Age of first child	cf*456 / cf*037	1.70	-0.17	NA	NA
kid2age	Age of second child	cf*457 / cf*038	0.87	-0.01	NA	NA
kid3age	Age of third child	cf*458 / cf*039	0.40	0.01	NA	NA
kid1home	First child living at home	cf*083	-1.56	0.05	NA	NA

Table S5 continued

			Parent control group		Nonparent control group	
Covariate	Description	Raw variables	Before PSM	After PSM	Before PSM	After PSM
kid2home	Second child living at home	cf*084	-1.05	0.04	NA	NA
kid3home	Third child living at home	cf*085	-0.05	0.00	NA	NA
swls	Satisfaction with Life Scale	cp*014 - cp*018	0.10	-0.03	0.25	-0.06
agree	Agreeableness	cp*021 - cp*066	0.05	-0.01	0.13	-0.13
con	Conscientiousness	cp*022 - cp*067	-0.06	-0.05	0.16	0.00
extra	Extraversion	cp*020 - cp*065	0.05	0.02	0.02	-0.07
neur	Neuroticism	cp*023 - cp*068	-0.02	0.02	-0.26	0.03
open	Openness	cp*024 - cp*069	0.06	0.05	-0.16	-0.08
participation	Waves participated	/	-0.27	-0.09	0.09	-0.03
year	Year of assessment	wave	-0.23	-0.07	0.08	-0.06

Note. PSM = propensity score matching, ref. = reference category, f. = female, m. = male, NA = covariate not used in this sample. The standardized difference in means between the grandparent and the two control groups (parent and nonparent) was computed by $(\bar{x}_{gp} - \bar{x}_c)/(\hat{\sigma}_{gp})$. Rules of thumb say that this measure should ideally be below .25 (Stuart, 2010) or below .10 (Austin, 2011).

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Table S6

Standardized Difference in Means for Covariates Used in Propensity Score Matching and the Propensity Score in the HRS.

			Parent control group		Nonparent control group	
Covariate	Description	Raw variables	Before PSM	After PSM	Before PSM	After PSM
pscore	Propensity score	/	0.92	0.01	1.45	0.00
female	Gender (f.=1, m.=0)	RAGENDER	-0.07	0.00	0.01	0.00
age	Age	RABYEAR	-0.46	-0.01	-1.02	0.11
schlyrs	Years of education	RAEDYRS	0.11	0.03	0.25	-0.04
religyear	Religious attendance: yearly	*B082	0.04	0.01	0.13	0.00
religmonth	Religious attendance: monthly	*B082	0.01	-0.02	0.10	0.05
religweek	Religious attendance: weekly	*B082	0.06	0.02	0.04	0.03
religmore	Religious attendance: more	*B082	0.09	-0.04	0.06	-0.01
notusaborn	Not born in the US	*Z230	-0.05	0.03	0.13	-0.02
black	Race: black/african american (ref.: white)	RARACEM	-0.13	-0.08	-0.22	0.01
raceother	Race: other (ref.: white)	RARACEM	-0.09	-0.06	0.01	-0.05
divorced	Divorced (marital status)	R*MSTAT	-0.06	0.01	0.01	0.03
widowed	Widowed (marital status)	R*MSTAT	-0.31	0.02	-0.41	0.04
livetogether	Live together with partner	*A030 / *XF065_R	0.25	-0.02	1.05	-0.04
roomslessthree	Number of rooms (in housing unit)	*H147 / *066	-0.15	-0.05	-0.59	-0.01
roomsfourfive	Number of rooms (in housing unit)	*H147 / *066	0.00	-0.02	-0.25	-0.03
roomsmoreeight	Number of rooms (in housing unit)	*H147 / *066	0.07	-0.03	0.28	0.00
loghhincome	Household income (logarithm)	*ITOT	0.03	0.03	0.41	0.00
loghhwealth	Household wealth (logarithm)	*ATOTB	0.07	0.05	0.34	-0.02
renter	Live for rent (vs. self-owned dwelling)	*H004	-0.10	-0.08	-0.51	-0.02
jobhours	Hours worked/week main job	R*JHOURS	0.25	0.08	0.59	0.00
paidwork	Working for pay	*J020	0.28	0.07	0.62	-0.04
mobilitydiff	Difficulty in mobility rated from 0-5	R*MOBILA	-0.16	-0.04	-0.52	0.00
cesd	CESD score (depression)	R*CESD	-0.13	-0.04	-0.26	-0.04
conde	Sum of health conditions	R*CONDE	-0.22	-0.03	-0.51	0.04
healthexcellent	Self-report of health - excellent (ref: good)	R*SHLT	0.05	0.02	0.15	-0.03
healthverygood	Self-report of health - very good (ref: good)	R*SHLT	0.23	0.02	0.31	-0.02
healthfair	Self-report of health - fair (ref: good)	R*SHLT	-0.16	-0.02	-0.29	0.00
healthpoor	Self-report of health - poor (ref: good)	R*SHLT	-0.07	-0.03	-0.24	0.02
totalnonresidentkids	Number of nonresident kids	*A100	0.66	-0.05	NA	NA
totalresidentkids	Number of resident children	*A099	-0.22	0.00	NA	NA
secondkid	Has two or more children	KIDID	0.52	-0.03	NA	NA

Table S6 continued

Covariate	Description	Raw variables	Parent control group		Nonparent control group	
			Before PSM	After PSM	Before PSM	After PSM
thirdkid	Has three or more children	KIDID	0.38	-0.03	NA	NA
kid1female	Gender of first child (f.=1, m.=0)	KAGENDERBG	0.11	0.03	NA	NA
kid2female	Gender of second child (f.=1, m.=0)	KAGENDERBG	0.17	-0.01	NA	NA
kid3female	Gender of third child (f.=1, m.=0)	KAGENDERBG	0.24	0.02	NA	NA
kid1age	Age of first child	KABYEARBG	-0.35	-0.02	NA	NA
kid2age	Age of second child	KABYEARBG	0.36	-0.03	NA	NA
kid3age	Age of third child	KABYEARBG	0.35	-0.01	NA	NA
kid1educ	Education of first child (years)	KAEDUC	0.30	0.02	NA	NA
kid2educ	Education of second child (years)	KAEDUC	0.57	0.00	NA	NA
kid3educ	Education of third child (years)	KAEDUC	0.40	-0.02	NA	NA
childrenclose	Children live within 10 miles	*E012	0.14	0.01	NA	NA
siblings	Number of living siblings	R*LIVSIB	0.05	-0.04	0.21	0.03
swls	Satisfaction with Life Scale	*LB003*	0.17	0.08	0.30	0.00
agree	Agreeableness	*LB033*	0.06	0.04	0.11	0.02
con	Conscientiousness	*LB033*	0.14	0.04	0.26	-0.04
extra	Extraversion	*LB033*	0.04	0.04	0.18	0.01
neur	Neuroticism	*LB033*	-0.06	0.00	-0.04	0.01
open	Openness	*LB033*	0.04	0.07	0.05	-0.04
participation	Waves participated (2006-2018)	/	-0.36	-0.01	-0.26	-0.04
interviewyear	Date of interview - year	*A501	-0.33	-0.05	-0.18	-0.05

Note. PSM = propensity score matching, ref. = reference category, f. = female, m. = male, NA = covariate not used in this sample. The standardized difference in means between the grandparent and the two control groups (parent and nonparent) was computed by $(\bar{x}_{gp} - \bar{x}_c)/(\hat{\sigma}_{gp})$. Rules of thumb say that this measure should ideally be below .25 (Stuart, 2010) or below .10 (Austin, 2011).

Table S7

Fixed Effects of Agreeableness Over the Transition to Grandparenthood.

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
LISS								
Intercept, $\hat{\gamma}_{00}$	3.86	[3.80, 3.92]	131.70	$< .001$	3.90	[3.83, 3.97]	112.97	$< .001$
Propensity score, $\hat{\gamma}_{02}$	-0.02	[-0.10, 0.05]	-0.56	.572	-0.01	[-0.08, 0.06]	-0.20	.838
Before-slope, $\hat{\gamma}_{10}$	0.00	[-0.01, 0.00]	-0.25	.802	-0.01	[-0.01, 0.00]	-1.81	.070
After-slope, $\hat{\gamma}_{20}$	-0.02	[-0.02, -0.01]	-6.76	$< .001$	-0.01	[-0.01, 0.00]	-3.32	.001
Shift, $\hat{\gamma}_{30}$	0.04	[0.01, 0.06]	3.12	.002	0.03	[0.00, 0.05]	1.98	.048
Grandparent, $\hat{\gamma}_{01}$	0.06	[-0.03, 0.15]	1.33	.183	0.01	[-0.08, 0.11]	0.30	.768
Before-slope * Grandparent, $\hat{\gamma}_{11}$	-0.01	[-0.02, 0.01]	-1.06	.289	0.00	[-0.01, 0.01]	-0.26	.791
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.02	[0.01, 0.03]	2.99	.003	0.01	[0.00, 0.02]	1.44	.149
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.01	[-0.06, 0.04]	-0.37	.714	0.00	[-0.06, 0.06]	0.08	.937
HRS								
Intercept, $\hat{\gamma}_{00}$	3.46	[3.43, 3.50]	196.32	$< .001$	3.48	[3.44, 3.52]	166.19	$< .001$
Propensity score, $\hat{\gamma}_{02}$	0.08	[0.02, 0.14]	2.51	.012	0.05	[-0.01, 0.11]	1.51	.131
Before-slope, $\hat{\gamma}_{10}$	0.01	[0.00, 0.02]	1.37	.169	-0.01	[-0.02, 0.00]	-1.33	.184
After-slope, $\hat{\gamma}_{20}$	-0.01	[-0.02, 0.00]	-2.87	.004	-0.02	[-0.02, -0.01]	-5.16	$< .001$
Shift, $\hat{\gamma}_{30}$	0.01	[-0.01, 0.03]	0.71	.476	0.04	[0.02, 0.06]	4.30	$< .001$
Grandparent, $\hat{\gamma}_{01}$	0.02	[-0.03, 0.08]	0.88	.378	0.01	[-0.04, 0.07]	0.44	.662
Before-slope * Grandparent, $\hat{\gamma}_{11}$	-0.01	[-0.04, 0.01]	-0.87	.384	0.00	[-0.02, 0.03]	0.28	.781
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.01	[0.00, 0.03]	1.71	.088	0.02	[0.01, 0.04]	2.78	.006
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.01	[-0.05, 0.04]	-0.35	.729	-0.04	[-0.09, 0.00]	-1.97	.049

Note. Two models were computed for each of the two samples (LISS, HRS): grandparents matched with parent controls and with nonparent controls. CI = confidence interval.

Table S8

Linear Contrasts for Agreeableness.

	Parent controls			Nonparent controls		
Linear Contrast	$\hat{\gamma}_c$	χ^2	p	$\hat{\gamma}_c$	χ^2	p
LISS						
Shift of the controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30}$)	0.02	4.00	.046	0.02	2.22	.136
Shift of the grandparents vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.03	1.79	.181	0.03	1.51	.219
Shift of the controls vs. shift of the grandparents ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.01	0.08	.779	0.01	0.18	.668
Before-slope of the grandparents vs. 0 ($\hat{\gamma}_{10} + \hat{\gamma}_{11}$)	-0.01	1.72	.189	-0.01	1.45	.228
After-slope of the grandparents vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{21}$)	0.00	0.01	.934	0.00	0.00	.958
HRS						
Shift of the controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30}$)	0.00	0.12	.725	0.03	10.76	.001
Shift of the grandparents vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.00	0.03	.859	0.00	0.03	.862
Shift of the controls vs. shift of the grandparents ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.01	0.10	.751	-0.02	1.77	.183
Before-slope of the grandparents vs. 0 ($\hat{\gamma}_{10} + \hat{\gamma}_{11}$)	0.00	0.09	.762	0.00	0.11	.743
After-slope of the grandparents vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{21}$)	0.00	0.23	.633	0.00	0.28	.596

Note. The linear contrasts are needed in cases where estimates of interest are represented by multiple fixed-effects coefficients and are computed using the *linearHypothesis* function from the *car* R package (Fox & Weisberg, 2019) based on the models from Table S7. $\hat{\gamma}_c$ = combined fixed-effects estimate.

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Table S9

Fixed Effects of Agreeableness Over the Transition to Grandparenthood Moderated by Gender.

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
LISS								
Intercept, $\hat{\gamma}_{00}$	3.65	[3.58, 3.73]	93.02	$< .001$	3.66	[3.57, 3.75]	79.73	$< .001$
Propensity score, $\hat{\gamma}_{04}$	-0.01	[-0.08, 0.07]	-0.21	.833	0.02	[-0.05, 0.08]	0.45	.653
Before-slope, $\hat{\gamma}_{10}$	0.00	[-0.01, 0.01]	0.02	.984	0.00	[-0.01, 0.01]	-0.37	.712
After-slope, $\hat{\gamma}_{20}$	-0.02	[-0.03, -0.02]	-6.37	$< .001$	-0.01	[-0.02, 0.00]	-2.49	.013
Shift, $\hat{\gamma}_{30}$	0.03	[-0.01, 0.07]	1.66	.097	0.07	[0.03, 0.11]	3.66	$< .001$
Grandparent, $\hat{\gamma}_{01}$	0.06	[-0.06, 0.17]	0.92	.356	0.04	[-0.09, 0.17]	0.60	.550
Female, $\hat{\gamma}_{02}$	0.38	[0.27, 0.48]	7.16	$< .001$	0.44	[0.32, 0.56]	7.11	$< .001$
Before-slope * Grandparent, $\hat{\gamma}_{11}$	-0.01	[-0.03, 0.01]	-0.73	.466	0.00	[-0.02, 0.01]	-0.50	.615
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.03	[0.01, 0.05]	3.43	.001	0.01	[0.00, 0.03]	1.64	.101
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.01	[-0.09, 0.07]	-0.33	.739	-0.05	[-0.14, 0.03]	-1.23	.217
Before-slope * Female, $\hat{\gamma}_{12}$	0.00	[-0.01, 0.01]	-0.26	.799	-0.01	[-0.02, 0.00]	-1.14	.254
After-slope * Female, $\hat{\gamma}_{22}$	0.01	[0.00, 0.02]	2.34	.019	0.00	[-0.01, 0.01]	0.28	.781
Shift * Female, $\hat{\gamma}_{32}$	0.02	[-0.03, 0.06]	0.60	.550	-0.08	[-0.14, -0.03]	-3.18	.001
Grandparent * Female, $\hat{\gamma}_{03}$	0.01	[-0.15, 0.17]	0.15	.883	-0.05	[-0.22, 0.12]	-0.57	.568
Before-slope * Grandparent * Female, $\hat{\gamma}_{13}$	0.00	[-0.03, 0.02]	-0.05	.959	0.00	[-0.02, 0.03]	0.35	.728
After-slope * Grandparent * Female, $\hat{\gamma}_{23}$	-0.02	[-0.04, 0.00]	-1.92	.056	-0.01	[-0.03, 0.01]	-0.93	.351
Shift * Grandparent * Female, $\hat{\gamma}_{33}$	0.01	[-0.10, 0.12]	0.21	.836	0.11	[-0.01, 0.23]	1.87	.061
HRS								
Intercept, $\hat{\gamma}_{00}$	3.27	[3.23, 3.32]	132.82	$< .001$	3.38	[3.33, 3.43]	122.35	$< .001$
Propensity score, $\hat{\gamma}_{04}$	0.09	[0.03, 0.15]	2.91	.004	0.04	[-0.03, 0.10]	1.12	.261
Before-slope, $\hat{\gamma}_{10}$	0.02	[0.01, 0.04]	2.98	.003	-0.01	[-0.02, 0.01]	-1.12	.262
After-slope, $\hat{\gamma}_{20}$	-0.02	[-0.03, -0.01]	-3.95	$< .001$	-0.02	[-0.03, -0.01]	-3.43	.001
Shift, $\hat{\gamma}_{30}$	0.04	[0.01, 0.07]	2.77	.006	0.03	[0.00, 0.06]	1.68	.093
Grandparent, $\hat{\gamma}_{01}$	0.08	[0.00, 0.16]	1.97	.048	-0.01	[-0.09, 0.08]	-0.16	.877
Female, $\hat{\gamma}_{02}$	0.33	[0.27, 0.39]	10.55	$< .001$	0.20	[0.13, 0.26]	5.76	$< .001$
Before-slope * Grandparent, $\hat{\gamma}_{11}$	-0.04	[-0.08, 0.00]	-2.18	.030	-0.01	[-0.04, 0.03]	-0.47	.640
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.04	[0.01, 0.06]	3.00	.003	0.03	[0.01, 0.05]	2.85	.004
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.05	[-0.12, 0.02]	-1.50	.133	-0.03	[-0.10, 0.03]	-1.04	.298
Before-slope * Female, $\hat{\gamma}_{12}$	-0.03	[-0.05, -0.01]	-2.84	.004	0.00	[-0.02, 0.02]	0.38	.702
After-slope * Female, $\hat{\gamma}_{22}$	0.02	[0.01, 0.03]	2.74	.006	0.00	[-0.01, 0.01]	0.08	.937
Shift * Female, $\hat{\gamma}_{32}$	-0.06	[-0.11, -0.02]	-3.07	.002	0.03	[-0.01, 0.07]	1.50	.134

Table S9 continued

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
Grandparent * Female, $\hat{\gamma}_{03}$	-0.10	[-0.20, 0.01]	-1.77	.077	0.03	[-0.07, 0.14]	0.64	.521
Before-slope * Grandparent * Female, $\hat{\gamma}_{13}$	0.06	[0.01, 0.11]	2.20	.028	0.02	[-0.03, 0.07]	0.86	.392
After-slope * Grandparent * Female, $\hat{\gamma}_{23}$	-0.04	[-0.07, -0.01]	-2.48	.013	-0.02	[-0.05, 0.01]	-1.34	.180
Shift * Grandparent * Female, $\hat{\gamma}_{33}$	0.08	[-0.01, 0.17]	1.73	.084	-0.01	[-0.10, 0.07]	-0.31	.758

Note. Two models were computed for each of the two samples (LISS, HRS): grandparents matched with parent controls and with nonparent controls. CI = confidence interval.

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Table S10

Linear Contrasts for Agreeableness (Moderated by Gender).

	Parent controls			Nonparent controls		
Linear Contrast	$\hat{\gamma}_c$	χ^2	p	$\hat{\gamma}_c$	χ^2	p
LISS						
Shift of male controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30}$)	0.01	0.19	.665	0.06	13.04	$< .001$
Shift of female controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{22} + \hat{\gamma}_{32}$)	0.03	5.25	.022	-0.02	1.90	.168
Shift of grandfathers vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.02	0.47	.493	0.02	0.40	.525
Shift of grandmothers vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	0.04	1.79	.181	0.04	1.56	.212
Shift of male controls vs. grandfathers ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.01	0.17	.678	-0.04	1.05	.305
Before-slope of female controls vs. grandmothers ($\hat{\gamma}_{11} + \hat{\gamma}_{13}$)	-0.01	0.78	.376	0.00	0.00	.971
After-slope of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{23}$)	0.01	0.78	.377	0.00	0.15	.695
Shift of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	0.00	0.02	.886	0.06	3.02	.082
Shift of male vs. female controls ($\hat{\gamma}_{22} + \hat{\gamma}_{32}$)	0.03	1.51	.219	-0.08	12.80	$< .001$
Before-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{12} + \hat{\gamma}_{13}$)	0.00	0.03	.853	0.00	0.03	.857
After-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{23}$)	-0.01	0.92	.337	-0.01	0.82	.366
Shift of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	0.02	0.15	.695	0.02	0.14	.712
HRS						
Shift of male controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30}$)	0.02	3.34	.067	0.01	0.41	.520
Shift of female controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{22} + \hat{\gamma}_{32}$)	-0.02	4.49	.034	0.04	14.19	$< .001$
Shift of grandfathers vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.01	0.05	.818	0.01	0.05	.815
Shift of grandmothers vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	0.00	0.01	.927	0.00	0.01	.936
Shift of male controls vs. grandfathers ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.02	0.39	.531	0.00	0.01	.929
Before-slope of female controls vs. grandmothers ($\hat{\gamma}_{11} + \hat{\gamma}_{13}$)	0.01	0.74	.390	0.01	0.58	.445
After-slope of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{23}$)	0.00	0.15	.701	0.01	1.32	.250
Shift of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	0.02	1.07	.301	-0.04	2.61	.106
Shift of male vs. female controls ($\hat{\gamma}_{22} + \hat{\gamma}_{32}$)	-0.04	7.70	.006	0.03	3.92	.048
Before-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{12} + \hat{\gamma}_{13}$)	0.02	1.17	.279	0.02	1.28	.258
After-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{23}$)	-0.02	1.94	.163	-0.02	2.13	.144
Shift of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	0.00	0.01	.912	0.00	0.01	.904

Note. The linear contrasts are based on the models from Table S9. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S11

Fixed Effects of Agreeableness Over the Transition to Grandparenthood Moderated by Performing Paid Work.

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
Intercept, $\hat{\gamma}_{00}$	3.50	[3.45, 3.54]	157.26	$< .001$	3.48	[3.43, 3.52]	138.40	$< .001$
Propensity score, $\hat{\gamma}_{02}$	0.09	[0.03, 0.15]	2.93	.003	0.04	[-0.03, 0.10]	1.14	.253
Before-slope, $\hat{\gamma}_{20}$	0.01	[-0.01, 0.03]	0.91	.363	0.00	[-0.02, 0.02]	-0.23	.819
After-slope, $\hat{\gamma}_{40}$	-0.02	[-0.03, -0.01]	-4.07	$< .001$	-0.03	[-0.04, -0.02]	-5.38	$< .001$
Shift, $\hat{\gamma}_{60}$	-0.01	[-0.04, 0.02]	-0.53	.594	0.07	[0.03, 0.10]	3.93	$< .001$
Grandparent, $\hat{\gamma}_{01}$	-0.11	[-0.20, -0.02]	-2.33	.020	-0.07	[-0.16, 0.02]	-1.49	.137
Working, $\hat{\gamma}_{10}$	-0.06	[-0.10, -0.02]	-2.77	.006	0.01	[-0.03, 0.05]	0.61	.540
Before-slope * Grandparent, $\hat{\gamma}_{21}$	0.04	[-0.01, 0.09]	1.55	.121	0.05	[0.00, 0.10]	2.09	.037
After-slope * Grandparent, $\hat{\gamma}_{41}$	0.02	[0.00, 0.05]	1.96	.050	0.03	[0.01, 0.05]	2.68	.007
Shift * Grandparent, $\hat{\gamma}_{61}$	0.00	[-0.08, 0.07]	-0.07	.947	-0.08	[-0.15, -0.01]	-2.17	.030
Before-slope * Working, $\hat{\gamma}_{30}$	0.00	[-0.03, 0.02]	-0.30	.767	0.00	[-0.03, 0.02]	-0.37	.712
After-slope * Working, $\hat{\gamma}_{50}$	0.02	[0.01, 0.04]	2.87	.004	0.02	[0.01, 0.03]	2.83	.005
Shift * Working, $\hat{\gamma}_{70}$	0.02	[-0.03, 0.06]	0.77	.441	-0.04	[-0.08, 0.00]	-1.87	.061
Grandparent * Working, $\hat{\gamma}_{11}$	0.18	[0.08, 0.28]	3.68	$< .001$	0.11	[0.02, 0.20]	2.40	.017
Before-slope * Grandparent * Working, $\hat{\gamma}_{31}$	-0.06	[-0.12, -0.01]	-2.15	.032	-0.06	[-0.12, -0.01]	-2.22	.026
After-slope * Grandparent * Working, $\hat{\gamma}_{51}$	-0.02	[-0.05, 0.02]	-0.97	.333	-0.01	[-0.05, 0.02]	-0.94	.347
Shift * Grandparent * Working, $\hat{\gamma}_{71}$	-0.01	[-0.10, 0.09]	-0.11	.914	0.05	[-0.04, 0.14]	1.08	.282

Note. Two models were computed (only HRS): grandparents matched with parent controls and with nonparent controls. CI = confidence interval. *working* = 1 indicates being employed in paid work.

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Table S12

Linear Contrasts for Agreeableness (Moderated by Paid Work; only HRS).

	Parent controls			Nonparent controls		
Linear Contrast	$\hat{\gamma}_c$	χ^2	p	$\hat{\gamma}_c$	χ^2	p
Shift of not-working controls vs. 0 ($\hat{\gamma}_{40} + \hat{\gamma}_{60}$)	-0.03	5.08	.024	0.04	7.79	.005
Shift of working controls vs. 0 ($\hat{\gamma}_{40} + \hat{\gamma}_{60} + \hat{\gamma}_{50} + \hat{\gamma}_{70}$)	0.01	0.52	.472	0.02	3.86	.049
Shift of not-working grandparents vs. 0 ($\hat{\gamma}_{40} + \hat{\gamma}_{60} + \hat{\gamma}_{41} + \hat{\gamma}_{61}$)	-0.01	0.14	.713	-0.01	0.15	.699
Shift of working grandparents vs. 0 ($\hat{\gamma}_{40} + \hat{\gamma}_{60} + \hat{\gamma}_{41} + \hat{\gamma}_{61} + \hat{\gamma}_{50} + \hat{\gamma}_{70} + \hat{\gamma}_{51} + \hat{\gamma}_{71}$)	0.01	0.10	.755	0.01	0.09	.768
Shift of not-working controls vs. not-working grandparents ($\hat{\gamma}_{41} + \hat{\gamma}_{61}$)	0.02	0.44	.505	-0.05	2.76	.097
Before-slope of working controls vs. working grandparents ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.02	2.73	.099	-0.01	0.76	.383
After-slope of working controls vs. working grandparents ($\hat{\gamma}_{41} + \hat{\gamma}_{51}$)	0.01	0.36	.548	0.02	2.00	.157
Shift of working controls vs. working grandparents ($\hat{\gamma}_{41} + \hat{\gamma}_{61} + \hat{\gamma}_{51} + \hat{\gamma}_{71}$)	0.00	0.00	.966	-0.01	0.35	.553
Shift of not-working controls vs. working controls ($\hat{\gamma}_{50} + \hat{\gamma}_{70}$)	0.04	4.89	.027	-0.02	1.43	.232
Before-slope of not-working grandparents vs. working grandparents ($\hat{\gamma}_{30} + \hat{\gamma}_{31}$)	-0.07	6.12	.013	-0.07	6.87	.009
After-slope of not-working grandparents vs. working grandparents ($\hat{\gamma}_{50} + \hat{\gamma}_{51}$)	0.01	0.12	.734	0.01	0.13	.714
Shift of not-working grandparents vs. working grandparents ($\hat{\gamma}_{50} + \hat{\gamma}_{70} + \hat{\gamma}_{51} + \hat{\gamma}_{71}$)	0.02	0.22	.637	0.02	0.23	.633

Note. The linear contrasts are based on the models from Table S11. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S13

Fixed Effects of Agreeableness Over the Transition to Grandparenthood Moderated by Grandchild Care.

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
Intercept, $\hat{\gamma}_{00}$	3.47	[3.43, 3.52]	155.84	$< .001$	3.47	[3.42, 3.53]	130.92	$< .001$
Propensity score, $\hat{\gamma}_{02}$	0.16	[0.08, 0.24]	3.91	$< .001$	0.15	[0.07, 0.23]	3.67	$< .001$
After-slope, $\hat{\gamma}_{20}$	-0.02	[-0.03, -0.01]	-4.36	$< .001$	-0.02	[-0.03, -0.01]	-3.63	$< .001$
Grandparent, $\hat{\gamma}_{01}$	-0.04	[-0.11, 0.03]	-1.16	.246	-0.05	[-0.12, 0.02]	-1.49	.137
Caring, $\hat{\gamma}_{10}$	0.00	[-0.04, 0.03]	-0.27	.784	0.02	[-0.01, 0.05]	1.09	.276
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.03	[0.00, 0.05]	2.36	.018	0.02	[0.00, 0.04]	2.02	.044
After-slope * Caring, $\hat{\gamma}_{30}$	0.00	[-0.01, 0.02]	0.29	.773	0.00	[-0.02, 0.01]	-0.60	.550
Grandparent * Caring, $\hat{\gamma}_{11}$	0.02	[-0.07, 0.11]	0.46	.645	0.00	[-0.09, 0.08]	-0.09	.925
After-slope * Grandparent * Caring, $\hat{\gamma}_{31}$	0.01	[-0.02, 0.04]	0.57	.572	0.02	[-0.02, 0.05]	1.00	.319

Note. Two models were computed (only HRS): grandparents matched with parent controls and with nonparent controls. CI = confidence interval. *caring* = 1 indicates more than 100 hours of grandchild care since the last assessment.

Table S14

Linear Contrasts for Agreeableness (Moderated by Grandchild Care; only HRS).

	Parent controls			Nonparent controls		
Linear Contrast	$\hat{\gamma}_c$	χ^2	p	$\hat{\gamma}_c$	χ^2	p
After-slope of caring controls vs. caring grandparents ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.04	7.62	.006	0.04	9.15	.002
After-slope of not-caring grandparents vs. caring grandparents ($\hat{\gamma}_{30} + \hat{\gamma}_{31}$)	0.01	0.61	.434	0.01	0.66	.415

Note. The linear contrasts are based on the models from Table S13. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S15

Fixed Effects of Conscientiousness Over the Transition to Grandparenthood.

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
LISS								
Intercept, $\hat{\gamma}_{00}$	3.77	[3.72, 3.83]	130.27	$< .001$	3.82	[3.75, 3.88]	112.10	$< .001$
Propensity score, $\hat{\gamma}_{02}$	0.00	[-0.08, 0.08]	-0.02	.987	0.01	[-0.06, 0.08]	0.24	.813
Before-slope, $\hat{\gamma}_{10}$	0.00	[-0.01, 0.00]	-0.84	.402	0.00	[-0.01, 0.01]	-0.26	.796
After-slope, $\hat{\gamma}_{20}$	-0.02	[-0.02, -0.01]	-6.17	$< .001$	0.01	[0.00, 0.01]	3.45	.001
Shift, $\hat{\gamma}_{30}$	0.04	[0.02, 0.07]	3.14	.002	0.00	[-0.03, 0.02]	-0.15	.881
Grandparent, $\hat{\gamma}_{01}$	-0.01	[-0.10, 0.08]	-0.24	.813	-0.06	[-0.15, 0.04]	-1.22	.225
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.00	[-0.01, 0.02]	0.77	.439	0.00	[-0.01, 0.02]	0.50	.617
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.02	[0.00, 0.03]	2.73	.006	-0.01	[-0.02, 0.00]	-1.61	.107
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.04	[-0.10, 0.01]	-1.49	.137	0.00	[-0.06, 0.06]	0.01	.989
HRS								
Intercept, $\hat{\gamma}_{00}$	3.41	[3.38, 3.44]	206.26	$< .001$	3.35	[3.31, 3.38]	172.70	$< .001$
Propensity score, $\hat{\gamma}_{02}$	0.08	[0.03, 0.14]	2.86	.004	0.17	[0.11, 0.23]	5.74	$< .001$
Before-slope, $\hat{\gamma}_{10}$	0.00	[-0.01, 0.01]	0.31	.754	0.00	[-0.01, 0.01]	0.72	.473
After-slope, $\hat{\gamma}_{20}$	-0.01	[-0.02, -0.01]	-4.11	$< .001$	-0.01	[-0.02, -0.01]	-3.84	$< .001$
Shift, $\hat{\gamma}_{30}$	0.02	[0.00, 0.04]	1.93	.053	0.00	[-0.02, 0.02]	0.01	.991
Grandparent, $\hat{\gamma}_{01}$	0.02	[-0.04, 0.07]	0.60	.547	0.03	[-0.02, 0.08]	1.08	.280
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.01	[-0.02, 0.03]	0.55	.580	0.00	[-0.02, 0.03]	0.43	.664
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.02	[0.01, 0.04]	3.06	.002	0.02	[0.01, 0.04]	3.01	.003
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.05	[-0.09, -0.01]	-2.36	.018	-0.03	[-0.07, 0.01]	-1.59	.111

Note. Two models were computed for each of the two samples (LISS, HRS): grandparents matched with parent controls and with nonparent controls. CI = confidence interval.

Table S16

Linear Contrasts for Conscientiousness.

	Parent controls			Nonparent controls		
Linear Contrast	$\hat{\gamma}_c$	χ^2	p	$\hat{\gamma}_c$	χ^2	p
LISS						
Shift of the controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30}$)	0.02	4.71	.030	0.01	0.40	.525
Shift of the grandparents vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.00	0.01	.928	0.00	0.01	.932
Shift of the controls vs. shift of the grandparents ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.03	1.14	.286	-0.01	0.13	.718
Before-slope of the grandparents vs. 0 ($\hat{\gamma}_{10} + \hat{\gamma}_{11}$)	0.00	0.20	.655	0.00	0.18	.667
After-slope of the grandparents vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{21}$)	0.00	0.01	.942	0.00	0.01	.943
HRS						
Shift of the controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30}$)	0.01	0.47	.491	-0.01	2.83	.092
Shift of the grandparents vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.02	2.49	.114	-0.02	2.82	.093
Shift of the controls vs. shift of the grandparents ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.03	2.96	.085	-0.01	0.54	.462
Before-slope of the grandparents vs. 0 ($\hat{\gamma}_{10} + \hat{\gamma}_{11}$)	0.01	0.59	.444	0.01	0.68	.409
After-slope of the grandparents vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{21}$)	0.01	1.88	.170	0.01	2.13	.145

Note. The linear contrasts are needed in cases where estimates of interest are represented by multiple fixed-effects coefficients and are computed using the *linearHypothesis* function from the *car* R package (Fox & Weisberg, 2019) based on the models from Table S15. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S17

Fixed Effects of Conscientiousness Over the Transition to Grandparenthood Moderated by Gender.

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
LISS								
Intercept, $\hat{\gamma}_{00}$	3.69	[3.60, 3.77]	87.30	$< .001$	3.70	[3.61, 3.80]	75.84	$< .001$
Propensity score, $\hat{\gamma}_{04}$	0.00	[-0.08, 0.07]	-0.03	.976	0.01	[-0.06, 0.08]	0.34	.732
Before-slope, $\hat{\gamma}_{10}$	0.00	[-0.01, 0.01]	0.64	.524	0.00	[-0.01, 0.01]	0.75	.455
After-slope, $\hat{\gamma}_{20}$	-0.01	[-0.02, -0.01]	-3.43	.001	0.00	[0.00, 0.01]	0.71	.477
Shift, $\hat{\gamma}_{30}$	0.04	[0.00, 0.08]	2.16	.031	0.00	[-0.03, 0.04]	0.14	.892
Grandparent, $\hat{\gamma}_{01}$	0.03	[-0.09, 0.16]	0.48	.634	0.01	[-0.13, 0.14]	0.12	.907
Female, $\hat{\gamma}_{02}$	0.16	[0.05, 0.27]	2.88	.004	0.22	[0.09, 0.34]	3.26	.001
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.00	[-0.02, 0.02]	-0.01	.994	0.00	[-0.02, 0.02]	-0.06	.953
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.02	[0.00, 0.04]	2.53	.011	0.01	[-0.01, 0.02]	0.65	.513
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.04	[-0.13, 0.04]	-1.07	.286	-0.01	[-0.09, 0.08]	-0.14	.886
Before-slope * Female, $\hat{\gamma}_{12}$	-0.01	[-0.02, 0.00]	-1.61	.108	-0.01	[-0.02, 0.00]	-1.23	.218
After-slope * Female, $\hat{\gamma}_{22}$	-0.01	[-0.02, 0.00]	-1.11	.268	0.01	[0.00, 0.02]	2.38	.017
Shift * Female, $\hat{\gamma}_{32}$	0.00	[-0.05, 0.05]	-0.04	.970	-0.01	[-0.06, 0.04]	-0.41	.683
Grandparent * Female, $\hat{\gamma}_{03}$	-0.07	[-0.24, 0.10]	-0.81	.418	-0.12	[-0.30, 0.06]	-1.30	.193
Before-slope * Grandparent * Female, $\hat{\gamma}_{13}$	0.01	[-0.02, 0.03]	0.61	.542	0.01	[-0.02, 0.03]	0.44	.663
After-slope * Grandparent * Female, $\hat{\gamma}_{23}$	-0.01	[-0.03, 0.01]	-0.84	.403	-0.03	[-0.05, 0.00]	-2.37	.018
Shift * Grandparent * Female, $\hat{\gamma}_{33}$	0.01	[-0.11, 0.12]	0.11	.916	0.02	[-0.10, 0.13]	0.27	.787
HRS								
Intercept, $\hat{\gamma}_{00}$	3.35	[3.30, 3.39]	143.72	$< .001$	3.26	[3.21, 3.31]	124.79	$< .001$
Propensity score, $\hat{\gamma}_{04}$	0.09	[0.03, 0.14]	3.00	.003	0.17	[0.11, 0.23]	5.65	$< .001$
Before-slope, $\hat{\gamma}_{10}$	0.01	[-0.01, 0.02]	1.19	.234	0.01	[0.00, 0.03]	2.08	.037
After-slope, $\hat{\gamma}_{20}$	-0.01	[-0.02, 0.00]	-2.42	.016	0.00	[-0.01, 0.01]	-0.10	.920
Shift, $\hat{\gamma}_{30}$	0.02	[-0.01, 0.05]	1.18	.237	-0.01	[-0.04, 0.02]	-0.74	.462
Grandparent, $\hat{\gamma}_{01}$	-0.03	[-0.10, 0.05]	-0.74	.461	0.01	[-0.07, 0.09]	0.28	.780
Female, $\hat{\gamma}_{02}$	0.11	[0.05, 0.17]	3.81	$< .001$	0.15	[0.09, 0.22]	4.67	$< .001$
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.01	[-0.02, 0.05]	0.74	.460	0.01	[-0.03, 0.04]	0.45	.651
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.03	[0.01, 0.05]	2.64	.008	0.02	[0.00, 0.04]	1.71	.088
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.08	[-0.15, -0.02]	-2.57	.010	-0.06	[-0.12, 0.00]	-1.85	.064
Before-slope * Female, $\hat{\gamma}_{12}$	-0.01	[-0.03, 0.01]	-1.34	.180	-0.02	[-0.04, 0.00]	-2.16	.031
After-slope * Female, $\hat{\gamma}_{22}$	0.00	[-0.02, 0.01]	-0.39	.695	-0.02	[-0.03, -0.01]	-3.05	.002
Shift * Female, $\hat{\gamma}_{32}$	0.00	[-0.04, 0.04]	0.13	.895	0.02	[-0.02, 0.05]	0.92	.356

Table S17 continued

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
Grandparent * Female, $\hat{\gamma}_{03}$	0.08	[-0.02, 0.18]	1.64	.101	0.03	[-0.07, 0.13]	0.62	.538
Before-slope * Grandparent * Female, $\hat{\gamma}_{13}$	-0.01	[-0.06, 0.03]	-0.47	.637	0.00	[-0.05, 0.04]	-0.21	.836
After-slope * Grandparent * Female, $\hat{\gamma}_{23}$	-0.01	[-0.04, 0.02]	-0.79	.428	0.00	[-0.02, 0.03]	0.29	.770
Shift * Grandparent * Female, $\hat{\gamma}_{33}$	0.06	[-0.03, 0.14]	1.34	.181	0.05	[-0.04, 0.13]	1.11	.269

Note. Two models were computed for each of the two samples (LISS, HRS): grandparents matched with parent controls and with nonparent controls. CI = confidence interval.

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Table S18

Linear Contrasts for Conscientiousness (Moderated by Gender).

	Parent controls			Nonparent controls		
Linear Contrast	$\hat{\gamma}_c$	χ^2	p	$\hat{\gamma}_c$	χ^2	p
LISS						
Shift of male controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30}$)	0.03	2.83	.092	0.01	0.10	.750
Shift of female controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{22} + \hat{\gamma}_{32}$)	0.02	1.93	.165	0.01	0.22	.640
Shift of grandfathers vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.00	0.02	.883	0.00	0.02	.886
Shift of grandmothers vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	-0.01	0.04	.849	-0.01	0.03	.857
Shift of male controls vs. grandfathers ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.02	0.40	.528	0.00	0.00	.991
Before-slope of female controls vs. grandmothers ($\hat{\gamma}_{11} + \hat{\gamma}_{13}$)	0.01	0.81	.368	0.01	0.34	.560
After-slope of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{23}$)	0.01	2.25	.133	-0.02	7.67	.006
Shift of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	-0.03	0.64	.422	-0.01	0.14	.709
Shift of male vs. female controls ($\hat{\gamma}_{22} + \hat{\gamma}_{32}$)	-0.01	0.09	.763	0.00	0.01	.930
Before-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{12} + \hat{\gamma}_{13}$)	0.00	0.02	.901	0.00	0.02	.899
After-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{23}$)	-0.02	2.25	.134	-0.02	2.12	.146
Shift of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	-0.01	0.06	.812	-0.01	0.05	.820
HRS						
Shift of male controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30}$)	0.01	0.21	.648	-0.01	1.00	.317
Shift of female controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{22} + \hat{\gamma}_{32}$)	0.01	0.26	.609	-0.01	1.95	.163
Shift of grandfathers vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.05	4.94	.026	-0.05	5.72	.017
Shift of grandmothers vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	0.00	0.01	.906	0.00	0.01	.912
Shift of male controls vs. grandfathers ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.05	4.78	.029	-0.04	2.75	.097
Before-slope of female controls vs. grandmothers ($\hat{\gamma}_{11} + \hat{\gamma}_{13}$)	0.00	0.02	.900	0.00	0.04	.839
After-slope of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{23}$)	0.02	2.96	.085	0.02	5.42	.020
Shift of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	-0.01	0.11	.737	0.01	0.27	.600
Shift of male vs. female controls ($\hat{\gamma}_{22} + \hat{\gamma}_{32}$)	0.00	0.00	.998	0.00	0.02	.877
Before-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{12} + \hat{\gamma}_{13}$)	-0.02	1.36	.244	-0.03	1.58	.208
After-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{23}$)	-0.01	1.17	.279	-0.02	1.43	.232
Shift of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	0.05	2.47	.116	0.05	2.90	.089

Note. The linear contrasts are based on the models from Table S17. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S19

Fixed Effects of Conscientiousness Over the Transition to Grandparenthood Moderated by Performing Paid Work.

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
Intercept, $\hat{\gamma}_{00}$	3.41	[3.37, 3.45]	165.13	$< .001$	3.37	[3.33, 3.42]	146.02	$< .001$
Propensity score, $\hat{\gamma}_{02}$	0.06	[0.00, 0.12]	2.13	.033	0.14	[0.09, 0.20]	4.83	$< .001$
Before-slope, $\hat{\gamma}_{20}$	-0.01	[-0.03, 0.00]	-1.55	.121	0.00	[-0.02, 0.02]	-0.28	.779
After-slope, $\hat{\gamma}_{40}$	-0.02	[-0.03, -0.01]	-3.55	$< .001$	-0.02	[-0.03, -0.01]	-4.10	$< .001$
Shift, $\hat{\gamma}_{60}$	0.02	[-0.01, 0.05]	1.49	.137	-0.02	[-0.05, 0.01]	-1.30	.193
Grandparent, $\hat{\gamma}_{01}$	-0.09	[-0.18, -0.01]	-2.19	.029	-0.10	[-0.18, -0.01]	-2.30	.022
Working, $\hat{\gamma}_{10}$	0.01	[-0.03, 0.05]	0.45	.650	-0.03	[-0.06, 0.01]	-1.60	.109
Before-slope * Grandparent, $\hat{\gamma}_{21}$	0.08	[0.04, 0.13]	3.54	$< .001$	0.07	[0.03, 0.12]	3.16	.002
After-slope * Grandparent, $\hat{\gamma}_{41}$	0.03	[0.01, 0.05]	2.66	.008	0.03	[0.01, 0.05]	2.96	.003
Shift * Grandparent, $\hat{\gamma}_{61}$	-0.09	[-0.16, -0.02]	-2.64	.008	-0.05	[-0.11, 0.02]	-1.46	.145
Before-slope * Working, $\hat{\gamma}_{30}$	0.02	[0.00, 0.05]	2.21	.027	0.01	[-0.01, 0.03]	0.91	.362
After-slope * Working, $\hat{\gamma}_{50}$	0.01	[0.00, 0.03]	1.92	.055	0.02	[0.01, 0.03]	2.96	.003
Shift * Working, $\hat{\gamma}_{70}$	-0.01	[-0.05, 0.03]	-0.45	.653	0.03	[-0.01, 0.06]	1.30	.194
Grandparent * Working, $\hat{\gamma}_{11}$	0.14	[0.05, 0.23]	3.16	.002	0.17	[0.09, 0.26]	4.05	$< .001$
Before-slope * Grandparent * Working, $\hat{\gamma}_{31}$	-0.10	[-0.16, -0.05]	-3.69	$< .001$	-0.09	[-0.14, -0.04]	-3.31	.001
After-slope * Grandparent * Working, $\hat{\gamma}_{51}$	-0.01	[-0.04, 0.02]	-0.76	.449	-0.02	[-0.05, 0.01]	-1.17	.240
Shift * Grandparent * Working, $\hat{\gamma}_{71}$	0.06	[-0.03, 0.15]	1.31	.191	0.02	[-0.06, 0.11]	0.56	.578

Note. Two models were computed (only HRS): grandparents matched with parent controls and with nonparent controls. CI = confidence interval. *working* = 1 indicates being employed in paid work.

Table S20

Linear Contrasts for Conscientiousness (Moderated by Paid Work; only HRS).

	Parent controls			Nonparent controls		
Linear Contrast	$\hat{\gamma}_c$	χ^2	p	$\hat{\gamma}_c$	χ^2	p
Shift of not-working controls vs. 0 ($\hat{\gamma}_{40} + \hat{\gamma}_{60}$)	0.01	0.23	.635	-0.04	9.72	.002
Shift of working controls vs. 0 ($\hat{\gamma}_{40} + \hat{\gamma}_{60} + \hat{\gamma}_{50} + \hat{\gamma}_{70}$)	0.01	1.06	.304	0.00	0.28	.598
Shift of not-working grandparents vs. 0 ($\hat{\gamma}_{40} + \hat{\gamma}_{60} + \hat{\gamma}_{41} + \hat{\gamma}_{61}$)	-0.06	5.20	.023	-0.06	5.93	.015
Shift of working grandparents vs. 0 ($\hat{\gamma}_{40} + \hat{\gamma}_{60} + \hat{\gamma}_{41} + \hat{\gamma}_{61} + \hat{\gamma}_{50} + \hat{\gamma}_{70} + \hat{\gamma}_{51} + \hat{\gamma}_{71}$)	-0.01	0.09	.768	-0.01	0.13	.717
Shift of not-working controls vs. not-working grandparents ($\hat{\gamma}_{41} + \hat{\gamma}_{61}$)	-0.06	5.09	.024	-0.02	0.46	.498
Before-slope of working controls vs. working grandparents ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.02	1.75	.185	-0.02	1.50	.221
After-slope of working controls vs. working grandparents ($\hat{\gamma}_{41} + \hat{\gamma}_{51}$)	0.02	2.59	.107	0.01	1.83	.176
Shift of working controls vs. working grandparents ($\hat{\gamma}_{41} + \hat{\gamma}_{61} + \hat{\gamma}_{51} + \hat{\gamma}_{71}$)	-0.02	0.52	.469	-0.01	0.31	.578
Shift of not-working controls vs. working controls ($\hat{\gamma}_{50} + \hat{\gamma}_{70}$)	0.00	0.06	.809	0.04	8.10	.004
Before-slope of not-working grandparents vs. working grandparents ($\hat{\gamma}_{30} + \hat{\gamma}_{31}$)	-0.08	9.38	.002	-0.08	10.44	.001
After-slope of not-working grandparents vs. working grandparents ($\hat{\gamma}_{50} + \hat{\gamma}_{51}$)	0.00	0.01	.920	0.00	0.02	.879
Shift of not-working grandparents vs. working grandparents ($\hat{\gamma}_{50} + \hat{\gamma}_{70} + \hat{\gamma}_{51} + \hat{\gamma}_{71}$)	0.05	2.62	.106	0.05	2.89	.089

Note. The linear contrasts are based on the models from Table S19. $\hat{\gamma}_c$ = combined fixed-effects estimate.

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Table S21

Fixed Effects of Conscientiousness Over the Transition to Grandparenthood Moderated by Grandchild Care.

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
Intercept, $\hat{\gamma}_{00}$	3.44	[3.40, 3.48]	168.69	$< .001$	3.34	[3.30, 3.39]	138.33	$< .001$
Propensity score, $\hat{\gamma}_{02}$	0.08	[0.00, 0.15]	2.03	.042	0.29	[0.22, 0.37]	7.78	$< .001$
After-slope, $\hat{\gamma}_{20}$	-0.02	[-0.03, -0.01]	-3.80	$< .001$	-0.01	[-0.02, 0.00]	-2.74	.006
Grandparent, $\hat{\gamma}_{01}$	-0.02	[-0.08, 0.05]	-0.51	.610	-0.02	[-0.09, 0.04]	-0.74	.462
Caring, $\hat{\gamma}_{10}$	0.00	[-0.03, 0.03]	0.03	.972	0.02	[0.00, 0.05]	1.64	.102
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.01	[-0.01, 0.03]	1.37	.170	0.01	[-0.01, 0.02]	0.73	.468
After-slope * Caring, $\hat{\gamma}_{30}$	0.00	[-0.01, 0.01]	0.01	.993	-0.01	[-0.02, 0.00]	-1.72	.085
Grandparent * Caring, $\hat{\gamma}_{11}$	-0.04	[-0.12, 0.04]	-0.93	.355	-0.07	[-0.14, 0.01]	-1.74	.081
After-slope * Grandparent * Caring, $\hat{\gamma}_{31}$	0.03	[0.00, 0.06]	1.88	.060	0.04	[0.01, 0.07]	2.82	.005

Note. Two models were computed (only HRS): grandparents matched with parent controls and with nonparent controls. CI = confidence interval. *caring* = 1 indicates more than 100 hours of grandchild care since the last assessment.

Table S22

Linear Contrasts for Conscientiousness (Moderated by Grandchild Care; only HRS).

	Parent controls			Nonparent controls		
Linear Contrast	$\hat{\gamma}_c$	χ^2	p	$\hat{\gamma}_c$	χ^2	p
After-slope of caring controls vs. caring grandparents ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.04	13.75	$< .001$	0.05	19.49	$< .001$
After-slope of not-caring grandparents vs. caring grandparents ($\hat{\gamma}_{30} + \hat{\gamma}_{31}$)	0.03	4.48	.034	0.03	5.28	.022

Note. The linear contrasts are based on the models from Table S21. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S23

Fixed Effects of Extraversion Over the Transition to Grandparenthood.

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
LISS								
Intercept, $\hat{\gamma}_{00}$	3.25	[3.18, 3.33]	87.65	$< .001$	3.29	[3.20, 3.39]	67.72	$< .001$
Propensity score, $\hat{\gamma}_{02}$	-0.01	[-0.10, 0.07]	-0.26	.793	0.01	[-0.07, 0.08]	0.18	.860
Before-slope, $\hat{\gamma}_{10}$	-0.01	[-0.01, 0.00]	-1.77	.077	0.00	[0.00, 0.01]	0.65	.515
After-slope, $\hat{\gamma}_{20}$	0.00	[-0.01, 0.00]	-1.47	.141	-0.01	[-0.02, 0.00]	-3.62	$< .001$
Shift, $\hat{\gamma}_{30}$	-0.01	[-0.04, 0.01]	-0.97	.332	-0.01	[-0.03, 0.02]	-0.41	.683
Grandparent, $\hat{\gamma}_{01}$	0.06	[-0.05, 0.17]	1.03	.306	0.01	[-0.12, 0.14]	0.19	.849
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.00	[-0.02, 0.01]	-0.40	.690	-0.01	[-0.02, 0.00]	-1.44	.150
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.00	[-0.01, 0.02]	0.57	.569	0.01	[0.00, 0.02]	1.45	.146
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.02	[-0.08, 0.05]	-0.51	.607	-0.02	[-0.08, 0.04]	-0.73	.467
HRS								
Intercept, $\hat{\gamma}_{00}$	3.20	[3.16, 3.24]	159.82	$< .001$	3.11	[3.07, 3.16]	133.29	$< .001$
Propensity score, $\hat{\gamma}_{02}$	0.02	[-0.05, 0.08]	0.56	.577	0.05	[-0.02, 0.12]	1.44	.150
Before-slope, $\hat{\gamma}_{10}$	0.00	[-0.01, 0.01]	-0.52	.604	0.01	[-0.01, 0.02]	0.99	.321
After-slope, $\hat{\gamma}_{20}$	0.00	[-0.01, 0.01]	-0.64	.520	0.00	[-0.01, 0.01]	-0.35	.729
Shift, $\hat{\gamma}_{30}$	0.02	[0.00, 0.04]	1.68	.093	0.01	[-0.01, 0.03]	1.07	.285
Grandparent, $\hat{\gamma}_{01}$	0.00	[-0.06, 0.06]	0.05	.957	0.07	[0.01, 0.14]	2.20	.028
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.00	[-0.02, 0.03]	0.31	.757	0.00	[-0.03, 0.02]	-0.35	.728
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.01	[0.00, 0.03]	1.46	.143	0.01	[0.00, 0.03]	1.38	.169
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.04	[-0.09, 0.01]	-1.55	.121	-0.03	[-0.08, 0.02]	-1.30	.193

Note. Two models were computed for each of the two samples (LISS, HRS): grandparents matched with parent controls and with nonparent controls. CI = confidence interval.

Table S24

Linear Contrasts for Extraversion.

	Parent controls			Nonparent controls		
Linear Contrast	$\hat{\gamma}_c$	χ^2	p	$\hat{\gamma}_c$	χ^2	p
LISS						
Shift of the controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30}$)	-0.02	2.12	.145	-0.02	1.73	.188
Shift of the grandparents vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.03	1.58	.208	-0.03	1.47	.225
Shift of the controls vs. shift of the grandparents ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.01	0.21	.647	-0.01	0.25	.620
Before-slope of the grandparents vs. 0 ($\hat{\gamma}_{10} + \hat{\gamma}_{11}$)	-0.01	1.77	.183	-0.01	1.65	.200
After-slope of the grandparents vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{21}$)	0.00	0.01	.912	0.00	0.03	.852
HRS						
Shift of the controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30}$)	0.02	3.63	.057	0.01	1.51	.219
Shift of the grandparents vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.01	0.34	.561	-0.01	0.36	.548
Shift of the controls vs. shift of the grandparents ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.03	1.90	.168	-0.02	1.19	.275
Before-slope of the grandparents vs. 0 ($\hat{\gamma}_{10} + \hat{\gamma}_{11}$)	0.00	0.01	.925	0.00	0.01	.929
After-slope of the grandparents vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{21}$)	0.01	1.73	.189	0.01	1.86	.173

Note. The linear contrasts are needed in cases where estimates of interest are represented by multiple fixed-effects coefficients and are computed using the *linearHypothesis* function from the *car* R package (Fox & Weisberg, 2019) based on the models from Table S23. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S25

Fixed Effects of Extraversion Over the Transition to Grandparenthood Moderated by Gender.

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
LISS								
Intercept, $\hat{\gamma}_{00}$	3.28	[3.18, 3.39]	60.26	$< .001$	3.22	[3.08, 3.35]	46.79	$< .001$
Propensity score, $\hat{\gamma}_{04}$	-0.01	[-0.09, 0.08]	-0.15	.881	0.01	[-0.06, 0.09]	0.30	.765
Before-slope, $\hat{\gamma}_{10}$	-0.01	[-0.02, 0.00]	-1.82	.069	0.02	[0.01, 0.03]	4.00	$< .001$
After-slope, $\hat{\gamma}_{20}$	-0.01	[-0.02, 0.00]	-2.56	.011	0.00	[-0.01, 0.00]	-1.08	.280
Shift, $\hat{\gamma}_{30}$	-0.04	[-0.08, 0.01]	-1.68	.094	-0.05	[-0.09, -0.01]	-2.43	.015
Grandparent, $\hat{\gamma}_{01}$	0.01	[-0.15, 0.17]	0.09	.929	0.07	[-0.11, 0.26]	0.78	.435
Female, $\hat{\gamma}_{02}$	-0.06	[-0.20, 0.09]	-0.78	.436	0.13	[-0.05, 0.31]	1.45	.148
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.00	[-0.02, 0.02]	0.14	.893	-0.03	[-0.05, -0.01]	-2.49	.013
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.01	[-0.01, 0.03]	1.19	.236	0.00	[-0.01, 0.02]	0.48	.628
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.01	[-0.10, 0.08]	-0.12	.903	0.01	[-0.08, 0.10]	0.22	.825
Before-slope * Female, $\hat{\gamma}_{12}$	0.01	[-0.01, 0.02]	0.87	.386	-0.03	[-0.04, -0.02]	-4.83	$< .001$
After-slope * Female, $\hat{\gamma}_{22}$	0.01	[0.00, 0.02]	2.10	.035	-0.01	[-0.02, 0.00]	-2.03	.043
Shift * Female, $\hat{\gamma}_{32}$	0.04	[-0.02, 0.09]	1.36	.174	0.08	[0.03, 0.14]	2.91	.004
Grandparent * Female, $\hat{\gamma}_{03}$	0.09	[-0.13, 0.31]	0.82	.411	-0.11	[-0.36, 0.13]	-0.90	.369
Before-slope * Grandparent * Female, $\hat{\gamma}_{13}$	-0.01	[-0.04, 0.02]	-0.53	.593	0.03	[0.00, 0.06]	2.09	.037
After-slope * Grandparent * Female, $\hat{\gamma}_{23}$	-0.01	[-0.04, 0.01]	-1.11	.266	0.01	[-0.02, 0.03]	0.71	.475
Shift * Grandparent * Female, $\hat{\gamma}_{33}$	-0.02	[-0.14, 0.10]	-0.29	.768	-0.06	[-0.18, 0.06]	-0.98	.328
HRS								
Intercept, $\hat{\gamma}_{00}$	3.15	[3.09, 3.21]	108.70	$< .001$	3.11	[3.04, 3.17]	96.32	$< .001$
Propensity score, $\hat{\gamma}_{04}$	0.02	[-0.04, 0.09]	0.64	.520	0.05	[-0.02, 0.12]	1.31	.191
Before-slope, $\hat{\gamma}_{10}$	0.01	[-0.01, 0.02]	0.70	.482	0.00	[-0.02, 0.01]	-0.37	.709
After-slope, $\hat{\gamma}_{20}$	0.01	[0.00, 0.02]	2.05	.040	0.00	[-0.01, 0.01]	0.51	.609
Shift, $\hat{\gamma}_{30}$	-0.01	[-0.04, 0.02]	-0.52	.601	-0.01	[-0.04, 0.03]	-0.41	.685
Grandparent, $\hat{\gamma}_{01}$	-0.01	[-0.10, 0.08]	-0.28	.782	0.02	[-0.08, 0.11]	0.39	.697
Female, $\hat{\gamma}_{02}$	0.08	[0.01, 0.16]	2.24	.025	0.01	[-0.07, 0.09]	0.30	.767
Before-slope * Grandparent, $\hat{\gamma}_{11}$	-0.02	[-0.06, 0.02]	-0.85	.397	-0.01	[-0.05, 0.03]	-0.41	.684
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.00	[-0.02, 0.03]	0.35	.730	0.01	[-0.01, 0.04]	1.09	.276
Shift * Grandparent, $\hat{\gamma}_{31}$	0.00	[-0.08, 0.07]	-0.12	.905	-0.01	[-0.08, 0.06]	-0.19	.853
Before-slope * Female, $\hat{\gamma}_{12}$	-0.02	[-0.04, 0.01]	-1.44	.150	0.02	[-0.01, 0.04]	1.40	.161
After-slope * Female, $\hat{\gamma}_{22}$	-0.03	[-0.04, -0.01]	-3.28	.001	-0.01	[-0.02, 0.01]	-0.98	.327
Shift * Female, $\hat{\gamma}_{32}$	0.05	[0.00, 0.09]	2.17	.030	0.03	[-0.01, 0.07]	1.45	.146

Table S25 continued

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
Grandparent * Female, $\hat{\gamma}_{03}$	0.03	[-0.09, 0.15]	0.45	.649	0.10	[-0.03, 0.22]	1.51	.131
Before-slope * Grandparent * Female, $\hat{\gamma}_{13}$	0.04	[-0.01, 0.09]	1.42	.155	0.01	[-0.05, 0.06]	0.23	.817
After-slope * Grandparent * Female, $\hat{\gamma}_{23}$	0.01	[-0.02, 0.05]	0.79	.431	0.00	[-0.04, 0.03]	-0.27	.790
Shift * Grandparent * Female, $\hat{\gamma}_{33}$	-0.06	[-0.16, 0.04]	-1.19	.234	-0.04	[-0.14, 0.05]	-0.87	.383

Note. Two models were computed for each of the two samples (LISS, HRS): grandparents matched with parent controls and with nonparent controls. CI = confidence interval.

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Table S26

Linear Contrasts for Extraversion (Moderated by Gender).

	Parent controls			Nonparent controls		
Linear Contrast	$\hat{\gamma}_c$	χ^2	p	$\hat{\gamma}_c$	χ^2	p
LISS						
Shift of male controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30}$)	-0.05	6.28	.012	-0.05	9.10	.003
Shift of female controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{22} + \hat{\gamma}_{32}$)	0.01	0.09	.763	0.02	0.95	.330
Shift of grandfathers vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.04	1.25	.264	-0.04	1.16	.281
Shift of grandmothers vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	-0.02	0.45	.500	-0.02	0.41	.520
Shift of male controls vs. grandfathers ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.01	0.02	.891	0.01	0.13	.716
Before-slope of female controls vs. grandmothers ($\hat{\gamma}_{11} + \hat{\gamma}_{13}$)	-0.01	0.42	.518	0.00	0.13	.720
After-slope of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{23}$)	0.00	0.13	.722	0.01	2.45	.117
Shift of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	-0.03	0.54	.461	-0.04	1.03	.311
Shift of male vs. female controls ($\hat{\gamma}_{22} + \hat{\gamma}_{32}$)	0.05	4.20	.040	0.07	8.22	.004
Before-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{12} + \hat{\gamma}_{13}$)	0.00	0.03	.871	0.00	0.01	.943
After-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{23}$)	0.00	0.03	.857	0.00	0.04	.834
Shift of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	0.02	0.14	.709	0.02	0.13	.717
HRS						
Shift of male controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30}$)	0.00	0.06	.812	0.00	0.09	.765
Shift of female controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{22} + \hat{\gamma}_{32}$)	0.03	5.44	.020	0.02	3.52	.061
Shift of grandfathers vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.00	0.01	.905	0.00	0.01	.903
Shift of grandmothers vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	-0.02	0.73	.393	-0.02	0.78	.377
Shift of male controls vs. grandfathers ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.00	0.00	.999	0.01	0.06	.805
Before-slope of female controls vs. grandmothers ($\hat{\gamma}_{11} + \hat{\gamma}_{13}$)	0.02	1.42	.234	0.00	0.01	.909
After-slope of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{23}$)	0.02	2.40	.122	0.01	0.65	.419
Shift of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	-0.05	3.28	.070	-0.04	2.65	.104
Shift of male vs. female controls ($\hat{\gamma}_{22} + \hat{\gamma}_{32}$)	0.02	1.88	.171	0.02	2.10	.147
Before-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{12} + \hat{\gamma}_{13}$)	0.02	0.79	.373	0.02	0.85	.357
After-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{23}$)	-0.01	0.57	.452	-0.01	0.62	.431
Shift of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	-0.02	0.44	.508	-0.02	0.47	.495

Note. The linear contrasts are based on the models from Table S25. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S27

Fixed Effects of Extraversion Over the Transition to Grandparenthood Moderated by Performing Paid Work.

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
Intercept, $\hat{\gamma}_{00}$	3.18	[3.13, 3.23]	129.04	$< .001$	3.12	[3.07, 3.17]	112.49	$< .001$
Propensity score, $\hat{\gamma}_{02}$	0.01	[-0.06, 0.08]	0.31	.757	0.03	[-0.04, 0.10]	0.77	.439
Before-slope, $\hat{\gamma}_{20}$	0.02	[0.00, 0.04]	1.69	.091	0.00	[-0.02, 0.02]	0.09	.927
After-slope, $\hat{\gamma}_{40}$	0.00	[-0.01, 0.01]	0.12	.901	-0.01	[-0.02, 0.00]	-1.24	.213
Shift, $\hat{\gamma}_{60}$	-0.04	[-0.08, -0.01]	-2.48	.013	0.02	[-0.02, 0.05]	0.91	.364
Grandparent, $\hat{\gamma}_{01}$	-0.06	[-0.16, 0.04]	-1.23	.217	-0.01	[-0.11, 0.09]	-0.18	.853
Working, $\hat{\gamma}_{10}$	0.03	[-0.02, 0.07]	1.19	.232	0.00	[-0.05, 0.04]	-0.12	.902
Before-slope * Grandparent, $\hat{\gamma}_{21}$	0.02	[-0.03, 0.07]	0.74	.460	0.04	[-0.02, 0.09]	1.38	.169
After-slope * Grandparent, $\hat{\gamma}_{41}$	0.02	[0.00, 0.04]	1.65	.099	0.03	[0.00, 0.05]	2.32	.021
Shift * Grandparent, $\hat{\gamma}_{61}$	-0.02	[-0.10, 0.06]	-0.46	.643	-0.08	[-0.16, 0.00]	-2.02	.044
Before-slope * Working, $\hat{\gamma}_{30}$	-0.03	[-0.05, -0.01]	-2.38	.017	0.01	[-0.02, 0.03]	0.59	.556
After-slope * Working, $\hat{\gamma}_{50}$	0.00	[-0.02, 0.01]	-0.19	.848	0.01	[0.00, 0.03]	1.79	.074
Shift * Working, $\hat{\gamma}_{70}$	0.10	[0.05, 0.14]	4.18	$< .001$	-0.01	[-0.06, 0.04]	-0.43	.667
Grandparent * Working, $\hat{\gamma}_{11}$	0.08	[-0.02, 0.18]	1.53	.126	0.11	[0.01, 0.21]	2.13	.034
Before-slope * Grandparent * Working, $\hat{\gamma}_{31}$	-0.01	[-0.08, 0.05]	-0.46	.646	-0.05	[-0.11, 0.01]	-1.69	.092
After-slope * Grandparent * Working, $\hat{\gamma}_{51}$	-0.01	[-0.05, 0.02]	-0.80	.425	-0.03	[-0.06, 0.00]	-1.69	.090
Shift * Grandparent * Working, $\hat{\gamma}_{71}$	-0.03	[-0.13, 0.08]	-0.49	.623	0.08	[-0.02, 0.18]	1.57	.115

Note. Two models were computed (only HRS): grandparents matched with parent controls and with nonparent controls. CI = confidence interval. $working = 1$ indicates being employed in paid work.

Table S28

Linear Contrasts for Extraversion (Moderated by Paid Work; only HRS).

	Parent controls			Nonparent controls		
Linear Contrast	$\hat{\gamma}_c$	χ^2	p	$\hat{\gamma}_c$	χ^2	p
Shift of not-working controls vs. 0 ($\hat{\gamma}_{40} + \hat{\gamma}_{60}$)	-0.04	9.28	.002	0.01	0.42	.515
Shift of working controls vs. 0 ($\hat{\gamma}_{40} + \hat{\gamma}_{60} + \hat{\gamma}_{50} + \hat{\gamma}_{70}$)	0.05	22.76	$<$ .001	0.01	1.67	.196
Shift of not-working grandparents vs. 0 ($\hat{\gamma}_{40} + \hat{\gamma}_{60} + \hat{\gamma}_{41} + \hat{\gamma}_{61}$)	-0.04	2.05	.152	-0.04	2.20	.138
Shift of working grandparents vs. 0 ($\hat{\gamma}_{40} + \hat{\gamma}_{60} + \hat{\gamma}_{41} + \hat{\gamma}_{61} + \hat{\gamma}_{50} + \hat{\gamma}_{70} + \hat{\gamma}_{51} + \hat{\gamma}_{71}$)	0.01	0.40	.526	0.01	0.42	.517
Shift of not-working controls vs. not-working grandparents ($\hat{\gamma}_{41} + \hat{\gamma}_{61}$)	0.00	0.00	.957	-0.05	2.60	.107
Before-slope of working controls vs. working grandparents ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.01	0.12	.729	-0.02	1.06	.303
After-slope of working controls vs. working grandparents ($\hat{\gamma}_{41} + \hat{\gamma}_{51}$)	0.01	0.28	.598	0.00	0.00	.948
Shift of working controls vs. working grandparents ($\hat{\gamma}_{41} + \hat{\gamma}_{61} + \hat{\gamma}_{51} + \hat{\gamma}_{71}$)	-0.04	2.46	.117	0.00	0.00	.987
Shift of not-working controls vs. working controls ($\hat{\gamma}_{50} + \hat{\gamma}_{70}$)	0.10	27.75	$<$ .001	0.00	0.04	.852
Before-slope of not-working grandparents vs. working grandparents ($\hat{\gamma}_{30} + \hat{\gamma}_{31}$)	-0.04	2.34	.126	-0.04	2.52	.113
After-slope of not-working grandparents vs. working grandparents ($\hat{\gamma}_{50} + \hat{\gamma}_{51}$)	-0.02	0.97	.325	-0.02	1.01	.314
Shift of not-working grandparents vs. working grandparents ($\hat{\gamma}_{50} + \hat{\gamma}_{70} + \hat{\gamma}_{51} + \hat{\gamma}_{71}$)	0.06	2.24	.135	0.06	2.38	.123

Note. The linear contrasts are based on the models from Table S27. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S29

Fixed Effects of Extraversion Over the Transition to Grandparenthood Moderated by Grandchild Care.

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
Intercept, $\hat{\gamma}_{00}$	3.19	[3.14, 3.24]	128.26	$< .001$	3.12	[3.06, 3.18]	102.87	$< .001$
Propensity score, $\hat{\gamma}_{02}$	0.13	[0.04, 0.22]	2.98	.003	0.08	[-0.01, 0.17]	1.67	.096
After-slope, $\hat{\gamma}_{20}$	-0.01	[-0.03, 0.00]	-2.61	.009	0.00	[-0.01, 0.01]	-0.39	.694
Grandparent, $\hat{\gamma}_{01}$	-0.04	[-0.11, 0.03]	-1.05	.296	0.04	[-0.04, 0.12]	1.06	.288
Caring, $\hat{\gamma}_{10}$	0.00	[-0.03, 0.04]	0.23	.815	0.02	[-0.02, 0.05]	0.86	.391
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.02	[-0.01, 0.04]	1.32	.186	0.00	[-0.02, 0.02]	0.30	.767
After-slope * Caring, $\hat{\gamma}_{30}$	0.00	[-0.02, 0.02]	-0.04	.965	0.00	[-0.02, 0.01]	-0.42	.676
Grandparent * Caring, $\hat{\gamma}_{11}$	-0.04	[-0.13, 0.06]	-0.74	.461	-0.05	[-0.14, 0.04]	-1.04	.299
After-slope * Grandparent * Caring, $\hat{\gamma}_{31}$	0.03	[-0.01, 0.06]	1.56	.119	0.03	[0.00, 0.07]	1.83	.067

Note. Two models were computed (only HRS): grandparents matched with parent controls and with nonparent controls. CI = confidence interval. *caring* = 1 indicates more than 100 hours of grandchild care since the last assessment.

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Table S30

Linear Contrasts for Extraversion (Moderated by Grandchild Care; only HRS).

	Parent controls			Nonparent controls		
Linear Contrast	$\hat{\gamma}_c$	χ^2	p	$\hat{\gamma}_c$	χ^2	p
After-slope of caring controls vs. caring grandparents ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.04	10.45	.001	0.04	7.39	.007
After-slope of not-caring grandparents vs. caring grandparents ($\hat{\gamma}_{30} + \hat{\gamma}_{31}$)	0.03	2.98	.084	0.03	3.37	.066

Note. The linear contrasts are based on the models from Table S29. $\hat{\gamma}_c$ = combined fixed-effects estimate.

1749

Table S31

Fixed Effects of Neuroticism Over the Transition to Grandparenthood.

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
LISS								
Intercept, $\hat{\gamma}_{00}$	2.48	[2.40, 2.56]	63.09	$< .001$	2.45	[2.35, 2.54]	51.88	$< .001$
Propensity score, $\hat{\gamma}_{02}$	0.01	[-0.09, 0.11]	0.19	.852	0.00	[-0.09, 0.09]	0.04	.967
Before-slope, $\hat{\gamma}_{10}$	0.00	[-0.01, 0.01]	-0.56	.575	-0.01	[-0.02, -0.01]	-3.66	$< .001$
After-slope, $\hat{\gamma}_{20}$	0.00	[0.00, 0.01]	0.94	.350	0.00	[0.00, 0.01]	1.31	.190
Shift, $\hat{\gamma}_{30}$	-0.05	[-0.08, -0.02]	-2.96	.003	-0.03	[-0.06, 0.01]	-1.58	.115
Grandparent, $\hat{\gamma}_{01}$	-0.08	[-0.20, 0.03]	-1.37	.170	-0.04	[-0.17, 0.08]	-0.67	.500
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.00	[-0.01, 0.02]	0.43	.668	0.02	[0.00, 0.03]	1.83	.067
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.00	[-0.02, 0.01]	-0.33	.744	0.00	[-0.02, 0.01]	-0.48	.635
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.02	[-0.09, 0.06]	-0.41	.684	-0.04	[-0.12, 0.04]	-1.01	.312
HRS								
Intercept, $\hat{\gamma}_{00}$	2.07	[2.03, 2.11]	94.42	$< .001$	2.07	[2.02, 2.12]	79.36	$< .001$
Propensity score, $\hat{\gamma}_{02}$	0.00	[-0.07, 0.08]	0.12	.902	0.15	[0.07, 0.23]	3.70	$< .001$
Before-slope, $\hat{\gamma}_{10}$	-0.01	[-0.03, 0.00]	-1.90	.057	-0.03	[-0.04, -0.02]	-4.70	$< .001$
After-slope, $\hat{\gamma}_{20}$	-0.01	[-0.01, 0.00]	-1.20	.230	-0.01	[-0.02, -0.01]	-3.18	.001
Shift, $\hat{\gamma}_{30}$	0.01	[-0.02, 0.03]	0.42	.675	-0.03	[-0.06, -0.01]	-2.36	.018
Grandparent, $\hat{\gamma}_{01}$	-0.06	[-0.13, 0.01]	-1.64	.100	-0.12	[-0.19, -0.05]	-3.31	.001
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.02	[-0.01, 0.05]	1.28	.201	0.04	[0.01, 0.07]	2.42	.016
After-slope * Grandparent, $\hat{\gamma}_{21}$	-0.02	[-0.04, 0.00]	-1.52	.127	-0.01	[-0.03, 0.01]	-0.80	.424
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.06	[-0.12, 0.00]	-2.12	.034	-0.03	[-0.08, 0.03]	-0.88	.381

Note. Two models were computed for each of the two samples (LISS, HRS): grandparents matched with parent controls and with nonparent controls. CI = confidence interval.

Table S32

Linear Contrasts for Neuroticism.

	Parent controls			Nonparent controls		
Linear Contrast	$\hat{\gamma}_c$	χ^2	p	$\hat{\gamma}_c$	χ^2	p
LISS						
Shift of the controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30}$)	-0.05	10.12	.001	-0.02	2.26	.133
Shift of the grandparents vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.07	4.99	.025	-0.07	4.74	.029
Shift of the controls vs. shift of the grandparents ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.02	0.30	.587	-0.04	1.62	.203
Before-slope of the grandparents vs. 0 ($\hat{\gamma}_{10} + \hat{\gamma}_{11}$)	0.00	0.04	.842	0.00	0.05	.830
After-slope of the grandparents vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{21}$)	0.00	0.01	.914	0.00	0.02	.900
HRS						
Shift of the controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30}$)	0.00	0.00	.993	-0.04	20.02	$< .001$
Shift of the grandparents vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.08	15.10	$< .001$	-0.08	15.78	$< .001$
Shift of the controls vs. shift of the grandparents ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.08	12.06	.001	-0.03	2.29	.130
Before-slope of the grandparents vs. 0 ($\hat{\gamma}_{10} + \hat{\gamma}_{11}$)	0.01	0.25	.618	0.01	0.19	.666
After-slope of the grandparents vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{21}$)	-0.02	5.29	.021	-0.02	6.13	.013

Note. The linear contrasts are needed in cases where estimates of interest are represented by multiple fixed-effects coefficients and are computed using the *linearHypothesis* function from the *car* R package (Fox & Weisberg, 2019) based on the models from Table S31. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S33

Fixed Effects of Neuroticism Over the Transition to Grandparenthood Moderated by Gender.

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
LISS								
Intercept, $\hat{\gamma}_{00}$	2.45	[2.34, 2.56]	43.45	$< .001$	2.32	[2.19, 2.45]	34.99	$< .001$
Propensity score, $\hat{\gamma}_{04}$	0.02	[-0.09, 0.12]	0.30	.767	0.02	[-0.08, 0.11]	0.33	.744
Before-slope, $\hat{\gamma}_{10}$	-0.01	[-0.02, 0.00]	-1.89	.059	-0.01	[-0.02, 0.00]	-1.12	.263
After-slope, $\hat{\gamma}_{20}$	0.01	[0.00, 0.02]	2.82	.005	0.01	[0.00, 0.02]	2.43	.015
Shift, $\hat{\gamma}_{30}$	-0.06	[-0.11, -0.01]	-2.24	.025	-0.05	[-0.10, 0.00]	-1.95	.052
Grandparent, $\hat{\gamma}_{01}$	-0.18	[-0.35, -0.01]	-2.11	.035	-0.05	[-0.23, 0.13]	-0.56	.574
Female, $\hat{\gamma}_{02}$	0.05	[-0.09, 0.20]	0.72	.474	0.22	[0.05, 0.40]	2.52	.012
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.01	[-0.01, 0.04]	0.82	.413	0.01	[-0.02, 0.03]	0.46	.643
After-slope * Grandparent, $\hat{\gamma}_{21}$	-0.02	[-0.04, 0.01]	-1.36	.173	-0.01	[-0.04, 0.01]	-1.15	.250
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.03	[-0.14, 0.08]	-0.51	.612	-0.04	[-0.15, 0.08]	-0.63	.529
Before-slope * Female, $\hat{\gamma}_{12}$	0.02	[0.00, 0.03]	2.03	.043	-0.01	[-0.03, 0.00]	-1.83	.067
After-slope * Female, $\hat{\gamma}_{22}$	-0.02	[-0.03, -0.01]	-2.99	.003	-0.01	[-0.03, 0.00]	-2.10	.036
Shift * Female, $\hat{\gamma}_{32}$	0.01	[-0.05, 0.08]	0.39	.700	0.04	[-0.03, 0.11]	1.19	.234
Grandparent * Female, $\hat{\gamma}_{03}$	0.18	[-0.05, 0.40]	1.54	.123	0.01	[-0.24, 0.25]	0.06	.951
Before-slope * Grandparent * Female, $\hat{\gamma}_{13}$	-0.01	[-0.05, 0.02]	-0.66	.508	0.02	[-0.02, 0.05]	1.08	.279
After-slope * Grandparent * Female, $\hat{\gamma}_{23}$	0.02	[-0.01, 0.05]	1.48	.138	0.02	[-0.01, 0.05]	1.08	.282
Shift * Grandparent * Female, $\hat{\gamma}_{33}$	0.03	[-0.12, 0.18]	0.35	.730	0.00	[-0.16, 0.15]	-0.03	.975
HRS								
Intercept, $\hat{\gamma}_{00}$	1.98	[1.91, 2.04]	62.73	$< .001$	2.01	[1.94, 2.08]	56.33	$< .001$
Propensity score, $\hat{\gamma}_{04}$	0.01	[-0.07, 0.09]	0.26	.798	0.15	[0.07, 0.23]	3.58	$< .001$
Before-slope, $\hat{\gamma}_{10}$	-0.02	[-0.04, 0.00]	-2.11	.035	-0.03	[-0.05, -0.01]	-3.18	.001
After-slope, $\hat{\gamma}_{20}$	-0.02	[-0.03, 0.00]	-2.40	.017	-0.02	[-0.03, -0.01]	-2.92	.003
Shift, $\hat{\gamma}_{30}$	0.08	[0.04, 0.12]	4.02	$< .001$	0.00	[-0.03, 0.04]	0.21	.834
Grandparent, $\hat{\gamma}_{01}$	-0.06	[-0.16, 0.04]	-1.10	.272	-0.16	[-0.26, -0.05]	-2.89	.004
Female, $\hat{\gamma}_{02}$	0.17	[0.09, 0.25]	4.19	$< .001$	0.10	[0.01, 0.19]	2.23	.026
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.06	[0.01, 0.10]	2.26	.024	0.06	[0.02, 0.11]	2.72	.007
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.00	[-0.03, 0.03]	0.31	.755	0.01	[-0.02, 0.04]	0.48	.630
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.16	[-0.25, -0.07]	-3.60	$< .001$	-0.08	[-0.17, 0.00]	-1.89	.059
Before-slope * Female, $\hat{\gamma}_{12}$	0.01	[-0.01, 0.04]	1.04	.300	0.00	[-0.03, 0.03]	0.09	.926
After-slope * Female, $\hat{\gamma}_{22}$	0.02	[0.00, 0.04]	2.19	.029	0.01	[-0.01, 0.03]	1.15	.250
Shift * Female, $\hat{\gamma}_{32}$	-0.14	[-0.19, -0.08]	-5.02	$< .001$	-0.06	[-0.11, -0.01]	-2.33	.020

Table S33 continued

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
Grandparent * Female, $\hat{\gamma}_{03}$	0.00	[-0.14, 0.13]	-0.01	.993	0.06	[-0.08, 0.20]	0.82	.410
Before-slope * Grandparent * Female, $\hat{\gamma}_{13}$	-0.06	[-0.12, 0.00]	-1.85	.065	-0.05	[-0.11, 0.01]	-1.49	.138
After-slope * Grandparent * Female, $\hat{\gamma}_{23}$	-0.04	[-0.08, 0.00]	-1.80	.073	-0.03	[-0.07, 0.01]	-1.35	.176
Shift * Grandparent * Female, $\hat{\gamma}_{33}$	0.17	[0.06, 0.29]	2.90	.004	0.10	[-0.01, 0.21]	1.71	.087

Note. Two models were computed for each of the two samples (LISS, HRS): grandparents matched with parent controls and with nonparent controls. CI = confidence interval.

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Table S34

Linear Contrasts for Neuroticism (Moderated by Gender).

	Parent controls			Nonparent controls		
Linear Contrast	$\hat{\gamma}_c$	χ^2	p	$\hat{\gamma}_c$	χ^2	p
LISS						
Shift of male controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30}$)	-0.04	3.64	.056	-0.04	2.76	.096
Shift of female controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{22} + \hat{\gamma}_{32}$)	-0.05	6.02	.014	-0.01	0.24	.621
Shift of grandfathers vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.09	3.89	.048	-0.09	3.67	.055
Shift of grandmothers vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	-0.04	1.25	.263	-0.05	1.20	.273
Shift of male controls vs. grandfathers ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.04	0.80	.371	-0.05	0.97	.325
Before-slope of female controls vs. grandmothers ($\hat{\gamma}_{11} + \hat{\gamma}_{13}$)	0.00	0.01	.935	0.03	4.48	.034
After-slope of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{23}$)	0.01	0.51	.476	0.00	0.12	.730
Shift of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	0.01	0.01	.904	-0.03	0.57	.451
Shift of male vs. female controls ($\hat{\gamma}_{22} + \hat{\gamma}_{32}$)	-0.01	0.06	.799	0.03	0.76	.382
Before-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{12} + \hat{\gamma}_{13}$)	0.00	0.08	.783	0.00	0.09	.765
After-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{23}$)	0.00	0.02	.882	0.00	0.02	.875
Shift of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	0.04	0.50	.481	0.04	0.46	.498
HRS						
Shift of male controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30}$)	0.06	17.37	$< .001$	-0.02	1.08	.299
Shift of female controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{22} + \hat{\gamma}_{32}$)	-0.05	13.66	$< .001$	-0.07	25.37	$< .001$
Shift of grandfathers vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.09	9.12	.003	-0.09	9.50	.002
Shift of grandmothers vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	-0.07	6.49	.011	-0.07	6.77	.009
Shift of male controls vs. grandfathers ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.16	20.99	$< .001$	-0.07	5.10	.024
Before-slope of female controls vs. grandmothers ($\hat{\gamma}_{11} + \hat{\gamma}_{13}$)	0.00	0.05	.821	0.02	0.73	.392
After-slope of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{23}$)	-0.03	5.41	.020	-0.02	2.20	.138
Shift of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	-0.02	0.37	.541	0.00	0.01	.943
Shift of male vs. female controls ($\hat{\gamma}_{22} + \hat{\gamma}_{32}$)	-0.12	31.04	$< .001$	-0.05	6.32	.012
Before-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{12} + \hat{\gamma}_{13}$)	-0.05	2.41	.120	-0.05	2.56	.109
After-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{23}$)	-0.02	0.84	.360	-0.02	0.88	.349
Shift of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	0.02	0.30	.584	0.02	0.31	.577

Note. The linear contrasts are based on the models from Table S33. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S35

Fixed Effects of Neuroticism Over the Transition to Grandparenthood Moderated by Performing Paid Work.

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
Intercept, $\hat{\gamma}_{00}$	2.02	[1.96, 2.07]	72.21	$< .001$	2.02	[1.96, 2.08]	63.73	$< .001$
Propensity score, $\hat{\gamma}_{02}$	0.00	[-0.08, 0.08]	0.01	.993	0.15	[0.06, 0.23]	3.46	.001
Before-slope, $\hat{\gamma}_{20}$	0.00	[-0.02, 0.03]	0.18	.860	-0.01	[-0.04, 0.02]	-0.84	.400
After-slope, $\hat{\gamma}_{40}$	-0.01	[-0.02, 0.01]	-0.79	.429	-0.01	[-0.02, 0.00]	-1.41	.159
Shift, $\hat{\gamma}_{60}$	0.04	[0.00, 0.08]	1.91	.056	-0.03	[-0.07, 0.01]	-1.32	.188
Grandparent, $\hat{\gamma}_{01}$	0.13	[0.02, 0.25]	2.28	.022	0.07	[-0.04, 0.19]	1.27	.203
Working, $\hat{\gamma}_{10}$	0.08	[0.03, 0.13]	2.94	.003	0.07	[0.02, 0.12]	2.63	.009
Before-slope * Grandparent, $\hat{\gamma}_{21}$	-0.07	[-0.13, 0.00]	-2.04	.042	-0.06	[-0.12, 0.01]	-1.73	.084
After-slope * Grandparent, $\hat{\gamma}_{41}$	-0.02	[-0.05, 0.01]	-1.55	.122	-0.02	[-0.05, 0.01]	-1.37	.170
Shift * Grandparent, $\hat{\gamma}_{61}$	-0.05	[-0.15, 0.05]	-1.03	.303	0.02	[-0.07, 0.11]	0.45	.655
Before-slope * Working, $\hat{\gamma}_{30}$	-0.02	[-0.05, 0.01]	-1.43	.153	-0.02	[-0.05, 0.01]	-1.54	.123
After-slope * Working, $\hat{\gamma}_{50}$	0.00	[-0.02, 0.02]	-0.23	.820	-0.01	[-0.02, 0.01]	-0.73	.463
Shift * Working, $\hat{\gamma}_{70}$	-0.05	[-0.11, 0.00]	-1.90	.058	0.00	[-0.05, 0.06]	0.13	.893
Grandparent * Working, $\hat{\gamma}_{11}$	-0.25	[-0.38, -0.13]	-4.08	$< .001$	-0.25	[-0.37, -0.13]	-4.20	$< .001$
Before-slope * Grandparent * Working, $\hat{\gamma}_{31}$	0.11	[0.04, 0.19]	2.95	.003	0.12	[0.04, 0.19]	3.13	.002
After-slope * Grandparent * Working, $\hat{\gamma}_{51}$	0.01	[-0.03, 0.05]	0.51	.613	0.02	[-0.02, 0.06]	0.75	.451
Shift * Grandparent * Working, $\hat{\gamma}_{71}$	-0.02	[-0.15, 0.10]	-0.33	.740	-0.08	[-0.20, 0.04]	-1.23	.217

Note. Two models were computed (only HRS): grandparents matched with parent controls and with nonparent controls. CI = confidence interval. *working* = 1 indicates being employed in paid work.

Table S36

Linear Contrasts for Neuroticism (Moderated by Paid Work; only HRS).

	Parent controls			Nonparent controls		
Linear Contrast	$\hat{\gamma}_c$	χ^2	p	$\hat{\gamma}_c$	χ^2	p
Shift of not-working controls vs. 0 ($\hat{\gamma}_{40} + \hat{\gamma}_{60}$)	0.04	4.30	.038	-0.04	4.61	.032
Shift of working controls vs. 0 ($\hat{\gamma}_{40} + \hat{\gamma}_{60} + \hat{\gamma}_{50} + \hat{\gamma}_{70}$)	-0.02	2.18	.140	-0.04	11.64	.001
Shift of not-working grandparents vs. 0 ($\hat{\gamma}_{40} + \hat{\gamma}_{60} + \hat{\gamma}_{41} + \hat{\gamma}_{61}$)	-0.04	1.12	.290	-0.04	1.24	.266
Shift of working grandparents vs. 0 ($\hat{\gamma}_{40} + \hat{\gamma}_{60} + \hat{\gamma}_{41} + \hat{\gamma}_{61} + \hat{\gamma}_{50} + \hat{\gamma}_{70} + \hat{\gamma}_{51} + \hat{\gamma}_{71}$)	-0.10	15.38	$< .001$	-0.10	16.09	$< .001$
Shift of not-working controls vs. not-working grandparents ($\hat{\gamma}_{41} + \hat{\gamma}_{61}$)	-0.07	3.47	.063	0.00	0.00	.974
Before-slope of working controls vs. working grandparents ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.05	5.89	.015	0.06	11.29	.001
After-slope of working controls vs. working grandparents ($\hat{\gamma}_{41} + \hat{\gamma}_{51}$)	-0.01	0.72	.396	0.00	0.11	.743
Shift of working controls vs. working grandparents ($\hat{\gamma}_{41} + \hat{\gamma}_{61} + \hat{\gamma}_{51} + \hat{\gamma}_{71}$)	-0.08	8.11	.004	-0.06	4.48	.034
Shift of not-working controls vs. working controls ($\hat{\gamma}_{50} + \hat{\gamma}_{70}$)	-0.06	6.36	.012	0.00	0.02	.895
Before-slope of not-working grandparents vs. working grandparents ($\hat{\gamma}_{30} + \hat{\gamma}_{31}$)	0.09	6.73	.009	0.09	7.45	.006
After-slope of not-working grandparents vs. working grandparents ($\hat{\gamma}_{50} + \hat{\gamma}_{51}$)	0.01	0.20	.651	0.01	0.23	.634
Shift of not-working grandparents vs. working grandparents ($\hat{\gamma}_{50} + \hat{\gamma}_{70} + \hat{\gamma}_{51} + \hat{\gamma}_{71}$)	-0.07	2.14	.143	-0.06	2.17	.141

Note. The linear contrasts are based on the models from Table S35. $\hat{\gamma}_c$ = combined fixed-effects estimate.

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Table S37

Fixed Effects of Neuroticism Over the Transition to Grandparenthood Moderated by Grandchild Care.

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
Intercept, $\hat{\gamma}_{00}$	2.04	[1.99, 2.09]	75.41	$< .001$	1.97	[1.91, 2.04]	59.05	$< .001$
Propensity score, $\hat{\gamma}_{02}$	-0.02	[-0.12, 0.07]	-0.45	.652	0.14	[0.03, 0.24]	2.59	.010
After-slope, $\hat{\gamma}_{20}$	0.00	[-0.01, 0.01]	-0.02	.982	-0.02	[-0.03, 0.00]	-2.67	.008
Grandparent, $\hat{\gamma}_{01}$	-0.10	[-0.18, -0.02]	-2.45	.014	-0.11	[-0.20, -0.02]	-2.43	.015
Caring, $\hat{\gamma}_{10}$	0.01	[-0.04, 0.05]	0.33	.740	0.00	[-0.04, 0.04]	-0.09	.930
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.00	[-0.03, 0.02]	-0.17	.865	0.01	[-0.01, 0.04]	1.06	.291
After-slope * Caring, $\hat{\gamma}_{30}$	-0.01	[-0.03, 0.01]	-1.01	.311	0.01	[-0.01, 0.03]	0.68	.494
Grandparent * Caring, $\hat{\gamma}_{11}$	0.09	[-0.02, 0.20]	1.57	.117	0.09	[-0.02, 0.21]	1.67	.095
After-slope * Grandparent * Caring, $\hat{\gamma}_{31}$	-0.03	[-0.07, 0.01]	-1.34	.182	-0.04	[-0.09, 0.00]	-2.07	.038

Note. Two models were computed (only HRS): grandparents matched with parent controls and with nonparent controls. CI = confidence interval. *caring* = 1 indicates more than 100 hours of grandchild care since the last assessment.

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Table S38

Linear Contrasts for Neuroticism (Moderated by Grandchild Care; only HRS).

	Parent controls			Nonparent controls		
Linear Contrast	$\hat{\gamma}_c$	χ^2	p	$\hat{\gamma}_c$	χ^2	p
After-slope of caring controls vs. caring grandparents ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.03	3.78	.052	-0.03	3.60	.058
After-slope of not-caring grandparents vs. caring grandparents ($\hat{\gamma}_{30} + \hat{\gamma}_{31}$)	-0.04	4.06	.044	-0.04	3.90	.048

Note. The linear contrasts are based on the models from Table S37. $\hat{\gamma}_c$ = combined fixed-effects estimate.

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Table S39

Fixed Effects of Openness Over the Transition to Grandparenthood.

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
LISS								
Intercept, $\hat{\gamma}_{00}$	3.48	[3.42, 3.53]	118.77	$< .001$	3.52	[3.45, 3.59]	104.18	$< .001$
Propensity score, $\hat{\gamma}_{02}$	0.00	[-0.08, 0.07]	-0.07	.944	0.03	[-0.03, 0.09]	1.02	.309
Before-slope, $\hat{\gamma}_{10}$	0.00	[-0.01, 0.00]	-1.58	.114	0.00	[-0.01, 0.00]	-0.68	.494
After-slope, $\hat{\gamma}_{20}$	-0.01	[-0.01, 0.00]	-2.36	.018	0.00	[0.00, 0.01]	1.95	.051
Shift, $\hat{\gamma}_{30}$	0.02	[0.00, 0.05]	1.88	.061	0.00	[-0.02, 0.02]	0.00	.998
Grandparent, $\hat{\gamma}_{01}$	0.01	[-0.08, 0.09]	0.16	.872	-0.05	[-0.14, 0.04]	-1.06	.290
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.01	[0.00, 0.02]	1.23	.220	0.01	[-0.01, 0.02]	0.87	.384
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.00	[-0.01, 0.01]	0.11	.910	-0.01	[-0.02, 0.00]	-1.92	.055
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.03	[-0.08, 0.03]	-1.05	.296	-0.01	[-0.06, 0.04]	-0.21	.832
HRS								
Intercept, $\hat{\gamma}_{00}$	3.04	[3.00, 3.08]	149.49	$< .001$	3.01	[2.96, 3.06]	129.29	$< .001$
Propensity score, $\hat{\gamma}_{02}$	0.03	[-0.04, 0.09]	0.82	.411	0.00	[-0.06, 0.07]	0.13	.895
Before-slope, $\hat{\gamma}_{10}$	-0.02	[-0.03, -0.01]	-3.29	.001	0.00	[-0.01, 0.01]	-0.68	.495
After-slope, $\hat{\gamma}_{20}$	-0.02	[-0.03, -0.01]	-5.28	$< .001$	-0.02	[-0.02, -0.01]	-4.83	$< .001$
Shift, $\hat{\gamma}_{30}$	0.06	[0.03, 0.08]	4.92	$< .001$	0.03	[0.01, 0.05]	3.26	.001
Grandparent, $\hat{\gamma}_{01}$	-0.02	[-0.08, 0.05]	-0.55	.582	0.02	[-0.04, 0.09]	0.75	.451
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.02	[-0.01, 0.04]	1.36	.172	0.00	[-0.02, 0.03]	0.19	.850
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.02	[0.00, 0.03]	2.01	.044	0.01	[0.00, 0.03]	1.74	.083
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.07	[-0.12, -0.02]	-2.86	.004	-0.05	[-0.09, 0.00]	-2.16	.031

Note. Two models were computed for each of the two samples (LISS, HRS): grandparents matched with parent controls and with nonparent controls. CI = confidence interval.

Table S40

Linear Contrasts for Openness.

	Parent controls			Nonparent controls		
Linear Contrast	$\hat{\gamma}_c$	χ^2	p	$\hat{\gamma}_c$	χ^2	p
LISS						
Shift of the controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30}$)	0.02	2.57	.109	0.00	0.21	.650
Shift of the grandparents vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.01	0.25	.618	-0.01	0.30	.585
Shift of the controls vs. shift of the grandparents ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.03	1.38	.241	-0.02	0.48	.489
Before-slope of the grandparents vs. 0 ($\hat{\gamma}_{10} + \hat{\gamma}_{11}$)	0.00	0.34	.561	0.00	0.40	.528
After-slope of the grandparents vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{21}$)	-0.01	1.15	.284	-0.01	1.36	.244
HRS						
Shift of the controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30}$)	0.03	16.48	$< .001$	0.02	4.36	.037
Shift of the grandparents vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.02	1.31	.253	-0.02	1.57	.210
Shift of the controls vs. shift of the grandparents ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.05	8.14	.004	-0.04	4.25	.039
Before-slope of the grandparents vs. 0 ($\hat{\gamma}_{10} + \hat{\gamma}_{11}$)	0.00	0.00	.946	0.00	0.01	.908
After-slope of the grandparents vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{21}$)	0.00	0.14	.709	0.00	0.20	.658

Note. The linear contrasts are needed in cases where estimates of interest are represented by multiple fixed-effects coefficients and are computed using the *linearHypothesis* function from the *car* R package (Fox & Weisberg, 2019) based on the models from Table S39. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S41

Fixed Effects of Openness Over the Transition to Grandparenthood Moderated by Gender.

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
LISS								
Intercept, $\hat{\gamma}_{00}$	3.47	[3.39, 3.55]	81.39	$< .001$	3.54	[3.45, 3.64]	73.02	$< .001$
Propensity score, $\hat{\gamma}_{04}$	0.00	[-0.08, 0.07]	-0.04	.970	0.03	[-0.03, 0.09]	0.94	.347
Before-slope, $\hat{\gamma}_{10}$	0.00	[-0.01, 0.01]	0.17	.864	0.01	[0.00, 0.02]	2.39	.017
After-slope, $\hat{\gamma}_{20}$	0.00	[-0.01, 0.00]	-1.05	.292	0.01	[0.00, 0.01]	1.53	.126
Shift, $\hat{\gamma}_{30}$	-0.02	[-0.05, 0.02]	-0.93	.353	-0.01	[-0.04, 0.02]	-0.64	.523
Grandparent, $\hat{\gamma}_{01}$	0.11	[-0.01, 0.24]	1.78	.076	0.03	[-0.10, 0.16]	0.44	.661
Female, $\hat{\gamma}_{02}$	0.01	[-0.10, 0.12]	0.16	.871	-0.05	[-0.17, 0.08]	-0.69	.488
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.00	[-0.02, 0.01]	-0.39	.694	-0.01	[-0.03, 0.00]	-1.42	.156
After-slope * Grandparent, $\hat{\gamma}_{21}$	-0.01	[-0.02, 0.01]	-0.88	.380	-0.02	[-0.03, 0.00]	-2.16	.031
Shift * Grandparent, $\hat{\gamma}_{31}$	0.03	[-0.05, 0.12]	0.84	.400	0.03	[-0.05, 0.10]	0.75	.452
Before-slope * Female, $\hat{\gamma}_{12}$	-0.01	[-0.02, 0.00]	-1.64	.102	-0.02	[-0.03, -0.01]	-3.89	$< .001$
After-slope * Female, $\hat{\gamma}_{22}$	0.00	[-0.01, 0.01]	-0.79	.431	0.00	[-0.01, 0.01]	-0.24	.812
Shift * Female, $\hat{\gamma}_{32}$	0.08	[0.03, 0.13]	2.98	.003	0.02	[-0.03, 0.06]	0.84	.402
Grandparent * Female, $\hat{\gamma}_{03}$	-0.20	[-0.37, -0.03]	-2.31	.021	-0.15	[-0.33, 0.03]	-1.59	.113
Before-slope * Grandparent * Female, $\hat{\gamma}_{13}$	0.02	[0.00, 0.05]	1.70	.090	0.03	[0.01, 0.06]	2.80	.005
After-slope * Grandparent * Female, $\hat{\gamma}_{23}$	0.01	[-0.01, 0.04]	1.29	.197	0.01	[-0.01, 0.03]	1.14	.255
Shift * Grandparent * Female, $\hat{\gamma}_{33}$	-0.12	[-0.23, -0.01]	-2.11	.035	-0.06	[-0.16, 0.04]	-1.21	.225
HRS								
Intercept, $\hat{\gamma}_{00}$	3.06	[3.00, 3.12]	108.70	$< .001$	3.03	[2.97, 3.09]	97.90	$< .001$
Propensity score, $\hat{\gamma}_{04}$	0.03	[-0.04, 0.09]	0.86	.391	0.00	[-0.06, 0.07]	0.03	.976
Before-slope, $\hat{\gamma}_{10}$	-0.02	[-0.04, 0.00]	-2.44	.015	-0.01	[-0.03, 0.00]	-1.90	.058
After-slope, $\hat{\gamma}_{20}$	-0.03	[-0.04, -0.02]	-5.75	$< .001$	-0.01	[-0.02, 0.00]	-2.04	.042
Shift, $\hat{\gamma}_{30}$	0.11	[0.07, 0.14]	6.34	$< .001$	0.00	[-0.03, 0.03]	-0.29	.772
Grandparent, $\hat{\gamma}_{01}$	-0.03	[-0.12, 0.06]	-0.62	.535	0.01	[-0.08, 0.10]	0.24	.813
Female, $\hat{\gamma}_{02}$	-0.03	[-0.09, 0.04]	-0.80	.423	-0.04	[-0.11, 0.04]	-0.98	.328
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.01	[-0.03, 0.05]	0.41	.685	0.00	[-0.03, 0.04]	0.05	.960
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.03	[0.01, 0.06]	2.66	.008	0.01	[-0.01, 0.03]	0.94	.346
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.15	[-0.22, -0.07]	-3.93	$< .001$	-0.03	[-0.10, 0.03]	-1.00	.316
Before-slope * Female, $\hat{\gamma}_{12}$	0.00	[-0.02, 0.03]	0.28	.781	0.02	[0.00, 0.04]	1.97	.049
After-slope * Female, $\hat{\gamma}_{22}$	0.02	[0.01, 0.04]	3.05	.002	-0.01	[-0.02, 0.00]	-1.47	.141
Shift * Female, $\hat{\gamma}_{32}$	-0.09	[-0.14, -0.05]	-4.11	$< .001$	0.06	[0.03, 0.10]	3.21	.001

Table S41 continued

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
Grandparent * Female, $\hat{\gamma}_{03}$	0.02	[-0.10, 0.13]	0.30	.763	0.03	[-0.09, 0.14]	0.45	.652
Before-slope * Grandparent * Female, $\hat{\gamma}_{13}$	0.02	[-0.04, 0.07]	0.67	.504	0.00	[-0.05, 0.05]	0.08	.939
After-slope * Grandparent * Female, $\hat{\gamma}_{23}$	-0.03	[-0.06, 0.00]	-1.75	.079	0.00	[-0.03, 0.03]	0.27	.790
Shift * Grandparent * Female, $\hat{\gamma}_{33}$	0.14	[0.04, 0.23]	2.71	.007	-0.02	[-0.11, 0.06]	-0.52	.603

Note. Two models were computed for each of the two samples (LISS, HRS): grandparents matched with parent controls and with nonparent controls. CI = confidence interval.

Table S42

Linear Contrasts for Openness (Moderated by Gender).

	Parent controls			Nonparent controls		
Linear Contrast	$\hat{\gamma}_c$	χ^2	p	$\hat{\gamma}_c$	χ^2	p
LISS						
Shift of male controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30}$)	-0.02	1.70	.192	-0.01	0.14	.706
Shift of female controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{22} + \hat{\gamma}_{32}$)	0.05	11.29	.001	0.01	0.84	.359
Shift of grandfathers vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.01	0.03	.853	0.01	0.04	.833
Shift of grandmothers vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	-0.03	0.78	.378	-0.03	0.93	.335
Shift of male controls vs. grandfathers ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.03	0.57	.450	0.01	0.13	.721
Before-slope of female controls vs. grandmothers ($\hat{\gamma}_{11} + \hat{\gamma}_{13}$)	0.02	4.38	.036	0.02	6.74	.009
After-slope of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{23}$)	0.01	0.91	.341	0.00	0.42	.517
Shift of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	-0.08	5.37	.020	-0.04	1.63	.202
Shift of male vs. female controls ($\hat{\gamma}_{22} + \hat{\gamma}_{32}$)	0.07	10.45	.001	0.02	0.82	.366
Before-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{12} + \hat{\gamma}_{13}$)	0.01	1.16	.282	0.01	1.41	.236
After-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{23}$)	0.01	1.10	.294	0.01	1.33	.249
Shift of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	-0.03	0.53	.466	-0.03	0.65	.421
HRS						
Shift of male controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30}$)	0.07	32.25	$< .001$	-0.02	1.67	.197
Shift of female controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{22} + \hat{\gamma}_{32}$)	0.00	0.15	.698	0.04	15.02	$< .001$
Shift of grandfathers vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.04	2.39	.122	-0.04	2.82	.093
Shift of grandmothers vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	0.00	0.01	.919	0.00	0.02	.899
Shift of male controls vs. grandfathers ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.11	15.71	$< .001$	-0.02	0.80	.372
Before-slope of female controls vs. grandmothers ($\hat{\gamma}_{11} + \hat{\gamma}_{13}$)	0.03	2.17	.141	0.00	0.03	.863
After-slope of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{23}$)	0.00	0.10	.747	0.01	2.08	.150
Shift of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	-0.01	0.07	.791	-0.04	3.38	.066
Shift of male vs. female controls ($\hat{\gamma}_{22} + \hat{\gamma}_{32}$)	-0.07	15.92	$< .001$	0.05	12.31	$< .001$
Before-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{12} + \hat{\gamma}_{13}$)	0.02	0.76	.382	0.02	1.04	.307
After-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{23}$)	-0.01	0.19	.660	-0.01	0.19	.663
Shift of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	0.04	1.17	.280	0.04	1.35	.245

Note. The linear contrasts are based on the models from Table S41. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S43

Fixed Effects of Openness Over the Transition to Grandparenthood Moderated by Performing Paid Work.

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
Intercept, $\hat{\gamma}_{00}$	3.02	[2.97, 3.06]	121.17	$< .001$	3.03	[2.97, 3.08]	111.81	$< .001$
Propensity score, $\hat{\gamma}_{02}$	0.01	[-0.06, 0.07]	0.25	.800	-0.01	[-0.08, 0.05]	-0.39	.693
Before-slope, $\hat{\gamma}_{20}$	-0.01	[-0.03, 0.01]	-1.03	.303	-0.01	[-0.03, 0.01]	-0.96	.339
After-slope, $\hat{\gamma}_{40}$	-0.03	[-0.04, -0.02]	-5.25	$< .001$	-0.02	[-0.03, -0.01]	-4.51	$< .001$
Shift, $\hat{\gamma}_{60}$	0.06	[0.02, 0.09]	3.20	.001	0.04	[0.00, 0.07]	2.21	.027
Grandparent, $\hat{\gamma}_{01}$	-0.05	[-0.15, 0.05]	-1.04	.299	-0.06	[-0.15, 0.04]	-1.17	.243
Working, $\hat{\gamma}_{10}$	0.05	[0.01, 0.09]	2.26	.024	-0.02	[-0.06, 0.02]	-0.88	.378
Before-slope * Grandparent, $\hat{\gamma}_{21}$	0.04	[-0.02, 0.09]	1.30	.194	0.03	[-0.01, 0.08]	1.38	.167
After-slope * Grandparent, $\hat{\gamma}_{41}$	0.05	[0.02, 0.07]	3.86	$< .001$	0.04	[0.02, 0.06]	3.73	$< .001$
Shift * Grandparent, $\hat{\gamma}_{61}$	-0.14	[-0.22, -0.06]	-3.37	.001	-0.12	[-0.19, -0.04]	-3.14	.002
Before-slope * Working, $\hat{\gamma}_{30}$	-0.01	[-0.04, 0.01]	-0.86	.389	0.01	[-0.01, 0.03]	0.82	.414
After-slope * Working, $\hat{\gamma}_{50}$	0.02	[0.01, 0.04]	2.94	.003	0.02	[0.00, 0.03]	2.15	.031
Shift * Working, $\hat{\gamma}_{70}$	-0.01	[-0.06, 0.04]	-0.44	.661	-0.01	[-0.05, 0.03]	-0.52	.606
Grandparent * Working, $\hat{\gamma}_{11}$	0.04	[-0.06, 0.14]	0.79	.429	0.11	[0.02, 0.20]	2.33	.020
Before-slope * Grandparent * Working, $\hat{\gamma}_{31}$	-0.02	[-0.08, 0.04]	-0.56	.578	-0.04	[-0.10, 0.02]	-1.34	.179
After-slope * Grandparent * Working, $\hat{\gamma}_{51}$	-0.06	[-0.10, -0.03]	-3.46	.001	-0.05	[-0.08, -0.02]	-3.35	.001
Shift * Grandparent * Working, $\hat{\gamma}_{71}$	0.13	[0.02, 0.23]	2.37	.018	0.12	[0.03, 0.22]	2.62	.009

Note. Two models were computed (only HRS): grandparents matched with parent controls and with nonparent controls. CI = confidence interval. *working* = 1 indicates being employed in paid work.

Table S44

Linear Contrasts for Openness (Moderated by Paid Work; only HRS).

	Parent controls			Nonparent controls		
Linear Contrast	$\hat{\gamma}_c$	χ^2	p	$\hat{\gamma}_c$	χ^2	p
Shift of not-working controls vs. 0 ($\hat{\gamma}_{40} + \hat{\gamma}_{60}$)	0.03	3.80	.051	0.01	1.06	.303
Shift of working controls vs. 0 ($\hat{\gamma}_{40} + \hat{\gamma}_{60} + \hat{\gamma}_{50} + \hat{\gamma}_{70}$)	0.04	13.84	$<$ .001	0.02	3.72	.054
Shift of not-working grandparents vs. 0 ($\hat{\gamma}_{40} + \hat{\gamma}_{60} + \hat{\gamma}_{41} + \hat{\gamma}_{61}$)	-0.06	4.22	.040	-0.06	5.04	.025
Shift of working grandparents vs. 0 ($\hat{\gamma}_{40} + \hat{\gamma}_{60} + \hat{\gamma}_{41} + \hat{\gamma}_{61} + \hat{\gamma}_{50} + \hat{\gamma}_{70} + \hat{\gamma}_{51} + \hat{\gamma}_{71}$)	0.02	0.61	.433	0.02	0.75	.385
Shift of not-working controls vs. not-working grandparents ($\hat{\gamma}_{41} + \hat{\gamma}_{61}$)	-0.09	7.30	.007	-0.07	6.07	.014
Before-slope of working controls vs. working grandparents ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.02	1.23	.267	0.00	0.10	.751
After-slope of working controls vs. working grandparents ($\hat{\gamma}_{41} + \hat{\gamma}_{51}$)	-0.01	1.08	.299	-0.01	1.00	.317
Shift of working controls vs. working grandparents ($\hat{\gamma}_{41} + \hat{\gamma}_{61} + \hat{\gamma}_{51} + \hat{\gamma}_{71}$)	-0.02	0.93	.336	0.00	0.00	.951
Shift of not-working controls vs. working controls ($\hat{\gamma}_{50} + \hat{\gamma}_{70}$)	0.01	0.48	.487	0.00	0.05	.818
Before-slope of not-working grandparents vs. working grandparents ($\hat{\gamma}_{30} + \hat{\gamma}_{31}$)	-0.03	0.96	.327	-0.03	1.22	.270
After-slope of not-working grandparents vs. working grandparents ($\hat{\gamma}_{50} + \hat{\gamma}_{51}$)	-0.04	5.78	.016	-0.04	7.17	.007
Shift of not-working grandparents vs. working grandparents ($\hat{\gamma}_{50} + \hat{\gamma}_{70} + \hat{\gamma}_{51} + \hat{\gamma}_{71}$)	0.08	4.30	.038	0.08	5.16	.023

Note. The linear contrasts are based on the models from Table S43. $\hat{\gamma}_c$ = combined fixed-effects estimate.

1763

Table S45

Fixed Effects of Openness Over the Transition to Grandparenthood Moderated by Grandchild Care.

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
Intercept, $\hat{\gamma}_{00}$	3.06	[3.01, 3.10]	125.52	$< .001$	3.00	[2.95, 3.06]	103.68	$< .001$
Propensity score, $\hat{\gamma}_{02}$	0.08	[-0.01, 0.16]	1.81	.070	0.22	[0.13, 0.30]	5.00	$< .001$
After-slope, $\hat{\gamma}_{20}$	-0.04	[-0.05, -0.03]	-6.73	$< .001$	-0.02	[-0.03, -0.01]	-4.90	$< .001$
Grandparent, $\hat{\gamma}_{01}$	-0.06	[-0.14, 0.01]	-1.74	.082	-0.08	[-0.16, -0.01]	-2.21	.027
Caring, $\hat{\gamma}_{10}$	-0.02	[-0.06, 0.02]	-1.09	.275	0.01	[-0.02, 0.04]	0.67	.503
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.02	[0.00, 0.05]	2.10	.036	0.01	[-0.01, 0.03]	0.88	.377
After-slope * Caring, $\hat{\gamma}_{30}$	0.01	[0.00, 0.03]	1.52	.129	0.00	[-0.02, 0.01]	-0.24	.807
Grandparent * Caring, $\hat{\gamma}_{11}$	0.00	[-0.10, 0.10]	0.02	.985	-0.04	[-0.12, 0.05]	-0.79	.432
After-slope * Grandparent * Caring, $\hat{\gamma}_{31}$	0.01	[-0.02, 0.05]	0.74	.457	0.03	[0.00, 0.06]	1.73	.084

Note. Two models were computed (only HRS): grandparents matched with parent controls and with nonparent controls. CI = confidence interval. *caring* = 1 indicates more than 100 hours of grandchild care since the last assessment.

1764

Table S46

Linear Contrasts for Openness (Moderated by Grandchild Care; only HRS).

	Parent controls			Nonparent controls		
Linear Contrast	$\hat{\gamma}_c$	χ^2	p	$\hat{\gamma}_c$	χ^2	p
After-slope of caring controls vs. caring grandparents ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.04	7.78	.005	0.04	9.46	.002
After-slope of not-caring grandparents vs. caring grandparents ($\hat{\gamma}_{30} + \hat{\gamma}_{31}$)	0.03	2.58	.108	0.03	3.26	.071

Note. The linear contrasts are based on the models from Table S45. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S47

Fixed Effects of Life Satisfaction Over the Transition to Grandparenthood.

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
LISS								
Intercept, $\hat{\gamma}_{00}$	5.11	[4.99, 5.23]	85.63	$< .001$	5.13	[4.99, 5.27]	72.47	$< .001$
Propensity score, $\hat{\gamma}_{02}$	0.07	[-0.10, 0.24]	0.78	.433	0.01	[-0.15, 0.17]	0.17	.863
Before-slope, $\hat{\gamma}_{10}$	-0.01	[-0.02, 0.01]	-1.06	.288	0.02	[0.00, 0.03]	2.18	.029
After-slope, $\hat{\gamma}_{20}$	0.01	[0.00, 0.02]	2.13	.033	-0.01	[-0.02, 0.01]	-0.93	.351
Shift, $\hat{\gamma}_{30}$	0.02	[-0.04, 0.08]	0.72	.470	-0.11	[-0.17, -0.05]	-3.42	.001
Grandparent, $\hat{\gamma}_{01}$	0.07	[-0.11, 0.25]	0.73	.464	0.07	[-0.13, 0.26]	0.66	.510
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.02	[-0.01, 0.04]	1.03	.301	-0.01	[-0.04, 0.02]	-0.47	.637
After-slope * Grandparent, $\hat{\gamma}_{21}$	-0.02	[-0.05, 0.00]	-1.78	.075	0.00	[-0.03, 0.02]	-0.33	.741
Shift * Grandparent, $\hat{\gamma}_{31}$	0.05	[-0.08, 0.18]	0.79	.428	0.18	[0.04, 0.32]	2.57	.010
HRS								
Intercept, $\hat{\gamma}_{00}$	4.81	[4.69, 4.92]	82.17	$< .001$	4.58	[4.45, 4.72]	66.89	$< .001$
Propensity score, $\hat{\gamma}_{02}$	0.40	[0.19, 0.61]	3.78	$< .001$	0.33	[0.11, 0.54]	3.01	.003
Before-slope, $\hat{\gamma}_{10}$	-0.03	[-0.07, 0.01]	-1.53	.125	0.05	[0.01, 0.08]	2.50	.013
After-slope, $\hat{\gamma}_{20}$	0.01	[-0.01, 0.04]	0.83	.405	0.04	[0.01, 0.06]	3.14	.002
Shift, $\hat{\gamma}_{30}$	0.02	[-0.05, 0.10]	0.58	.564	-0.05	[-0.12, 0.02]	-1.50	.135
Grandparent, $\hat{\gamma}_{01}$	-0.02	[-0.21, 0.16]	-0.24	.812	0.20	[0.00, 0.39]	1.98	.048
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.12	[0.03, 0.21]	2.58	.010	0.05	[-0.04, 0.13]	1.06	.290
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.03	[-0.02, 0.09]	1.17	.241	0.01	[-0.05, 0.06]	0.31	.753
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.08	[-0.24, 0.09]	-0.93	.351	-0.01	[-0.17, 0.15]	-0.13	.897

Note. Two models were computed for each of the two samples (LISS, HRS): grandparents matched with parent controls and with nonparent controls. CI = confidence interval.

Table S48

Linear Contrasts for Life Satisfaction.

	Parent controls			Nonparent controls		
Linear Contrast	$\hat{\gamma}_c$	χ^2	p	$\hat{\gamma}_c$	χ^2	p
LISS						
Shift of the controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30}$)	0.03	1.76	.185	-0.12	17.14	$< .001$
Shift of the grandparents vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.06	1.51	.219	0.06	1.29	.256
Shift of the controls vs. shift of the grandparents ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.03	0.24	.622	0.18	8.25	.004
Before-slope of the grandparents vs. 0 ($\hat{\gamma}_{10} + \hat{\gamma}_{11}$)	0.01	0.39	.532	0.01	0.32	.574
After-slope of the grandparents vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{21}$)	-0.01	0.84	.358	-0.01	0.70	.403
HRS						
Shift of the controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30}$)	0.03	1.26	.262	-0.02	0.30	.581
Shift of the grandparents vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.01	0.04	.833	-0.02	0.10	.754
Shift of the controls vs. shift of the grandparents ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.04	0.49	.485	0.00	0.00	.978
Before-slope of the grandparents vs. 0 ($\hat{\gamma}_{10} + \hat{\gamma}_{11}$)	0.09	4.51	.034	0.09	5.61	.018
After-slope of the grandparents vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{21}$)	0.04	2.98	.084	0.05	3.67	.055

Note. The linear contrasts are needed in cases where estimates of interest are represented by multiple fixed-effects coefficients and are computed using the *linearHypothesis* function from the *car* R package (Fox & Weisberg, 2019) based on the models from Table S47. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S49

Fixed Effects of Life Satisfaction Over the Transition to Grandparenthood Moderated by Gender.

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
LISS								
Intercept, $\hat{\gamma}_{00}$	5.05	[4.89, 5.21]	61.49	< .001	5.05	[4.86, 5.24]	51.98	< .001
Propensity score, $\hat{\gamma}_{04}$	0.06	[-0.11, 0.23]	0.70	.485	0.01	[-0.15, 0.17]	0.17	.866
Before-slope, $\hat{\gamma}_{10}$	-0.01	[-0.03, 0.01]	-1.13	.258	0.02	[0.00, 0.05]	2.28	.023
After-slope, $\hat{\gamma}_{20}$	0.01	[0.00, 0.03]	1.55	.122	-0.03	[-0.04, -0.01]	-2.76	.006
Shift, $\hat{\gamma}_{30}$	0.10	[0.01, 0.18]	2.25	.025	0.00	[-0.09, 0.09]	-0.01	.988
Grandparent, $\hat{\gamma}_{01}$	0.21	[-0.04, 0.46]	1.67	.096	0.23	[-0.04, 0.50]	1.65	.099
Female, $\hat{\gamma}_{02}$	0.12	[-0.08, 0.32]	1.18	.239	0.16	[-0.08, 0.40]	1.28	.203
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.00	[-0.04, 0.04]	0.10	.922	-0.03	[-0.08, 0.01]	-1.38	.168
After-slope * Grandparent, $\hat{\gamma}_{21}$	-0.03	[-0.07, 0.01]	-1.62	.104	0.01	[-0.03, 0.05]	0.36	.718
Shift * Grandparent, $\hat{\gamma}_{31}$	0.01	[-0.18, 0.20]	0.10	.919	0.11	[-0.10, 0.31]	1.03	.303
Before-slope * Female, $\hat{\gamma}_{12}$	0.01	[-0.02, 0.03]	0.55	.581	-0.02	[-0.04, 0.01]	-1.10	.273
After-slope * Female, $\hat{\gamma}_{22}$	0.00	[-0.02, 0.02]	-0.11	.913	0.04	[0.01, 0.06]	2.95	.003
Shift * Female, $\hat{\gamma}_{32}$	-0.14	[-0.26, -0.02]	-2.37	.018	-0.21	[-0.33, -0.08]	-3.28	.001
Grandparent * Female, $\hat{\gamma}_{03}$	-0.27	[-0.59, 0.05]	-1.67	.097	-0.31	[-0.66, 0.05]	-1.71	.088
Before-slope * Grandparent * Female, $\hat{\gamma}_{13}$	0.03	[-0.03, 0.08]	0.87	.385	0.05	[-0.02, 0.11]	1.48	.138
After-slope * Grandparent * Female, $\hat{\gamma}_{23}$	0.01	[-0.04, 0.07]	0.51	.607	-0.03	[-0.08, 0.03]	-0.90	.369
Shift * Grandparent * Female, $\hat{\gamma}_{33}$	0.08	[-0.17, 0.34]	0.63	.530	0.15	[-0.13, 0.43]	1.07	.283
HRS								
Intercept, $\hat{\gamma}_{00}$	4.67	[4.52, 4.82]	60.70	< .001	4.54	[4.37, 4.71]	52.50	< .001
Propensity score, $\hat{\gamma}_{04}$	0.41	[0.20, 0.62]	3.84	< .001	0.30	[0.08, 0.51]	2.71	.007
Before-slope, $\hat{\gamma}_{10}$	0.01	[-0.04, 0.07]	0.49	.625	0.05	[-0.01, 0.10]	1.61	.107
After-slope, $\hat{\gamma}_{20}$	0.00	[-0.04, 0.04]	0.09	.931	0.02	[-0.01, 0.06]	1.31	.190
Shift, $\hat{\gamma}_{30}$	0.07	[-0.04, 0.18]	1.23	.220	-0.16	[-0.27, -0.05]	-2.91	.004
Grandparent, $\hat{\gamma}_{01}$	0.11	[-0.15, 0.37]	0.81	.419	0.25	[-0.02, 0.51]	1.82	.070
Female, $\hat{\gamma}_{02}$	0.24	[0.07, 0.41]	2.75	.006	0.10	[-0.10, 0.29]	0.98	.329
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.00	[-0.13, 0.14]	0.03	.978	-0.02	[-0.15, 0.11]	-0.33	.745
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.04	[-0.04, 0.13]	1.05	.294	0.03	[-0.05, 0.10]	0.62	.536
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.08	[-0.33, 0.16]	-0.65	.514	0.14	[-0.10, 0.37]	1.16	.246
Before-slope * Female, $\hat{\gamma}_{12}$	-0.08	[-0.16, 0.00]	-2.08	.037	0.01	[-0.07, 0.08]	0.14	.887
After-slope * Female, $\hat{\gamma}_{22}$	0.02	[-0.03, 0.07]	0.64	.525	0.02	[-0.03, 0.07]	0.84	.399
Shift * Female, $\hat{\gamma}_{32}$	-0.09	[-0.24, 0.06]	-1.14	.254	0.19	[0.05, 0.33]	2.59	.010

Table S49 continued

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
Grandparent * Female, $\hat{\gamma}_{03}$	-0.23	[-0.55, 0.09]	-1.42	.156	-0.08	[-0.40, 0.25]	-0.47	.637
Before-slope * Grandparent * Female, $\hat{\gamma}_{13}$	0.21	[0.03, 0.39]	2.28	.023	0.11	[-0.05, 0.28]	1.34	.181
After-slope * Grandparent * Female, $\hat{\gamma}_{23}$	-0.02	[-0.13, 0.09]	-0.37	.714	-0.03	[-0.13, 0.08]	-0.50	.615
Shift * Grandparent * Female, $\hat{\gamma}_{33}$	0.01	[-0.32, 0.34]	0.06	.954	-0.26	[-0.57, 0.05]	-1.63	.103

Note. Two models were computed for each of the two samples (LISS, HRS): grandparents matched with parent controls and with nonparent controls. CI = confidence interval.

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Table S50

Linear Contrasts for Life Satisfaction (Moderated by Gender).

	Parent controls			Nonparent controls		
Linear Contrast	$\hat{\gamma}_c$	χ^2	p	$\hat{\gamma}_c$	χ^2	p
LISS						
Shift of male controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30}$)	0.11	8.55	.003	-0.03	0.42	.515
Shift of female controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{22} + \hat{\gamma}_{32}$)	-0.03	0.77	.379	-0.20	26.82	$< .001$
Shift of grandfathers vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.09	1.42	.233	0.09	1.17	.279
Shift of grandmothers vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	0.04	0.39	.531	0.04	0.35	.552
Shift of male controls vs. grandfathers ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.02	0.07	.794	0.12	1.58	.208
Before-slope of female controls vs. grandmothers ($\hat{\gamma}_{11} + \hat{\gamma}_{13}$)	0.03	1.96	.161	0.01	0.47	.493
After-slope of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{23}$)	-0.02	0.99	.320	-0.02	0.86	.353
Shift of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	0.07	0.92	.338	0.24	8.27	.004
Shift of male vs. female controls ($\hat{\gamma}_{22} + \hat{\gamma}_{32}$)	-0.14	7.55	.006	-0.17	9.46	.002
Before-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{12} + \hat{\gamma}_{13}$)	0.03	1.56	.211	0.03	1.23	.267
After-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{23}$)	0.01	0.27	.602	0.01	0.22	.638
Shift of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	-0.05	0.21	.647	-0.04	0.16	.690
HRS						
Shift of male controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30}$)	0.07	2.68	.101	-0.14	10.20	.001
Shift of female controls vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{22} + \hat{\gamma}_{32}$)	0.00	0.00	.973	0.07	4.01	.045
Shift of grandfathers vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.04	0.17	.680	0.03	0.12	.732
Shift of grandmothers vs. 0 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	-0.05	0.37	.541	-0.05	0.48	.489
Shift of male controls vs. grandfathers ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.04	0.15	.700	0.16	3.22	.073
Before-slope of female controls vs. grandmothers ($\hat{\gamma}_{11} + \hat{\gamma}_{13}$)	0.21	12.04	.001	0.09	2.72	.099
After-slope of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{23}$)	0.02	0.38	.540	0.00	0.00	.953
Shift of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	-0.05	0.31	.575	-0.12	2.31	.129
Shift of male vs. female controls ($\hat{\gamma}_{22} + \hat{\gamma}_{32}$)	-0.07	1.44	.229	0.21	13.91	$< .001$
Before-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{12} + \hat{\gamma}_{13}$)	0.13	2.33	.127	0.12	2.41	.121
After-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{23}$)	0.00	0.01	.931	-0.01	0.02	.894
Shift of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	-0.08	0.52	.471	-0.08	0.52	.470

Note. The linear contrasts are based on the models from Table S49. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S51

Fixed Effects of Life Satisfaction Over the Transition to Grandparenthood Moderated by Performing Paid Work.

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
Intercept, $\hat{\gamma}_{00}$	4.78	[4.63, 4.93]	62.86	$< .001$	4.55	[4.38, 4.71]	53.96	$< .001$
Propensity score, $\hat{\gamma}_{02}$	0.36	[0.15, 0.57]	3.33	.001	0.28	[0.06, 0.50]	2.50	.012
Before-slope, $\hat{\gamma}_{20}$	-0.06	[-0.13, 0.01]	-1.77	.077	-0.02	[-0.09, 0.05]	-0.51	.613
After-slope, $\hat{\gamma}_{40}$	-0.03	[-0.07, 0.00]	-1.73	.083	0.08	[0.04, 0.12]	4.32	$< .001$
Shift, $\hat{\gamma}_{60}$	0.13	[0.01, 0.25]	2.11	.034	0.07	[-0.05, 0.19]	1.17	.243
Grandparent, $\hat{\gamma}_{01}$	-0.02	[-0.33, 0.30]	-0.09	.925	0.22	[-0.09, 0.53]	1.37	.169
Working, $\hat{\gamma}_{10}$	0.07	[-0.07, 0.22]	0.99	.324	0.12	[-0.02, 0.25]	1.64	.102
Before-slope * Grandparent, $\hat{\gamma}_{21}$	0.14	[-0.04, 0.32]	1.50	.134	0.10	[-0.07, 0.27]	1.12	.264
After-slope * Grandparent, $\hat{\gamma}_{41}$	0.07	[-0.02, 0.15]	1.57	.116	-0.05	[-0.12, 0.03]	-1.20	.231
Shift * Grandparent, $\hat{\gamma}_{61}$	-0.04	[-0.31, 0.22]	-0.31	.755	0.01	[-0.24, 0.27]	0.10	.917
Before-slope * Working, $\hat{\gamma}_{30}$	0.05	[-0.03, 0.14]	1.21	.225	0.09	[0.00, 0.17]	1.99	.047
After-slope * Working, $\hat{\gamma}_{50}$	0.10	[0.05, 0.15]	3.83	$< .001$	-0.08	[-0.13, -0.03]	-3.16	.002
Shift * Working, $\hat{\gamma}_{70}$	-0.20	[-0.35, -0.04]	-2.50	.012	-0.15	[-0.30, 0.00]	-1.94	.052
Grandparent * Working, $\hat{\gamma}_{11}$	-0.02	[-0.36, 0.32]	-0.11	.912	-0.07	[-0.39, 0.25]	-0.42	.676
Before-slope * Grandparent * Working, $\hat{\gamma}_{31}$	-0.03	[-0.24, 0.18]	-0.28	.777	-0.06	[-0.26, 0.13]	-0.63	.527
After-slope * Grandparent * Working, $\hat{\gamma}_{51}$	-0.08	[-0.20, 0.03]	-1.40	.161	0.10	[-0.01, 0.21]	1.79	.073
Shift * Grandparent * Working, $\hat{\gamma}_{71}$	-0.03	[-0.38, 0.32]	-0.18	.859	-0.09	[-0.42, 0.24]	-0.54	.590

Note. Two models were computed (only HRS): grandparents matched with parent controls and with nonparent controls. CI = confidence interval. *working* = 1 indicates being employed in paid work.

Table S52

Linear Contrasts for Life Satisfaction (Moderated by Paid Work; only HRS).

	Parent controls			Nonparent controls		
Linear Contrast	$\hat{\gamma}_c$	χ^2	p	$\hat{\gamma}_c$	χ^2	p
Shift of not-working controls vs. 0 ($\hat{\gamma}_{40} + \hat{\gamma}_{60}$)	0.10	3.85	.050	0.15	9.24	.002
Shift of working controls vs. 0 ($\hat{\gamma}_{40} + \hat{\gamma}_{60} + \hat{\gamma}_{50} + \hat{\gamma}_{70}$)	0.00	0.00	.969	-0.08	5.03	.025
Shift of not-working grandparents vs. 0 ($\hat{\gamma}_{40} + \hat{\gamma}_{60} + \hat{\gamma}_{41} + \hat{\gamma}_{61}$)	0.12	1.47	.226	0.12	1.63	.201
Shift of working grandparents vs. 0 ($\hat{\gamma}_{40} + \hat{\gamma}_{60} + \hat{\gamma}_{41} + \hat{\gamma}_{61} + \hat{\gamma}_{50} + \hat{\gamma}_{70} + \hat{\gamma}_{51} + \hat{\gamma}_{71}$)	-0.09	1.57	.210	-0.10	2.13	.144
Shift of not-working controls vs. not-working grandparents ($\hat{\gamma}_{41} + \hat{\gamma}_{61}$)	0.02	0.04	.834	-0.03	0.10	.746
Before-slope of working controls vs. working grandparents ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.11	3.95	.047	0.03	0.44	.505
After-slope of working controls vs. working grandparents ($\hat{\gamma}_{41} + \hat{\gamma}_{51}$)	-0.02	0.17	.676	0.05	1.82	.178
Shift of working controls vs. working grandparents ($\hat{\gamma}_{41} + \hat{\gamma}_{61} + \hat{\gamma}_{51} + \hat{\gamma}_{71}$)	-0.09	1.21	.270	-0.03	0.11	.746
Shift of not-working controls vs. working controls ($\hat{\gamma}_{50} + \hat{\gamma}_{70}$)	-0.10	2.47	.116	-0.23	13.96	$< .001$
Before-slope of not-working grandparents vs. working grandparents ($\hat{\gamma}_{30} + \hat{\gamma}_{31}$)	0.02	0.05	.823	0.02	0.05	.818
After-slope of not-working grandparents vs. working grandparents ($\hat{\gamma}_{50} + \hat{\gamma}_{51}$)	0.02	0.12	.727	0.02	0.17	.678
Shift of not-working grandparents vs. working grandparents ($\hat{\gamma}_{50} + \hat{\gamma}_{70} + \hat{\gamma}_{51} + \hat{\gamma}_{71}$)	-0.21	2.87	.090	-0.22	3.48	.062

Note. The linear contrasts are based on the models from Table S51. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S53

Fixed Effects of Life Satisfaction Over the Transition to Grandparenthood Moderated by Grandchild Care.

	Parent controls				Nonparent controls			
Parameter	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI	t	p
Intercept, $\hat{\gamma}_{00}$	4.86	[4.72, 5.00]	67.71	$< .001$	4.75	[4.58, 4.92]	55.25	$< .001$
Propensity score, $\hat{\gamma}_{02}$	0.27	[0.01, 0.53]	2.05	.040	0.05	[-0.21, 0.31]	0.35	.728
After-slope, $\hat{\gamma}_{20}$	0.00	[-0.04, 0.03]	-0.02	.986	0.03	[0.00, 0.06]	1.99	.047
Grandparent, $\hat{\gamma}_{01}$	0.00	[-0.22, 0.21]	-0.04	.967	0.17	[-0.06, 0.40]	1.45	.148
Caring, $\hat{\gamma}_{10}$	-0.10	[-0.22, 0.02]	-1.67	.094	0.02	[-0.09, 0.12]	0.34	.738
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.07	[0.00, 0.14]	1.85	.065	0.04	[-0.02, 0.11]	1.24	.216
After-slope * Caring, $\hat{\gamma}_{30}$	0.04	[-0.01, 0.10]	1.70	.089	-0.01	[-0.06, 0.03]	-0.59	.557
Grandparent * Caring, $\hat{\gamma}_{11}$	0.32	[0.02, 0.62]	2.08	.038	0.21	[-0.07, 0.48]	1.45	.147
After-slope * Grandparent * Caring, $\hat{\gamma}_{31}$	-0.08	[-0.19, 0.03]	-1.40	.162	-0.03	[-0.13, 0.08]	-0.51	.613

Note. Two models were computed (only HRS): grandparents matched with parent controls and with nonparent controls. CI = confidence interval. *caring* = 1 indicates more than 100 hours of grandchild care since the last assessment.

Table S54

Linear Contrasts for Life Satisfaction (Moderated by Grandchild Care; only HRS).

	Parent controls			Nonparent controls		
Linear Contrast	$\hat{\gamma}_c$	χ^2	p	$\hat{\gamma}_c$	χ^2	p
After-slope of caring controls vs. caring grandparents ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.01	0.10	.751	0.01	0.13	.722
After-slope of not-caring grandparents vs. caring grandparents ($\hat{\gamma}_{30} + \hat{\gamma}_{31}$)	-0.04	0.49	.486	-0.04	0.73	.392

Note. The linear contrasts are based on the models from Table S53. $\hat{\gamma}_c$ = combined fixed-effects estimate.

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Table S55

Tests of Heterogeneous Random Slope Variance Models for Agreeableness Against Comparison Models With a Uniform Random Slope Variance.

	Parent controls					Nonparent controls				
	Var.	SD	LR	p	GP greater	Var.	SD	LR	p	GP greater
LISS										
Before-slope: uniform	0.00	0.04				0.00	0.04			
Before-slope: heterogeneous (controls)	0.00	0.05				0.00	0.05			
Before-slope: heterogeneous (grandparents)	0.00	0.04	9.72	.021	no	0.00	0.03	17.01	< .001	no
After-slope: uniform	0.00	0.04				0.00	0.04			
After-slope: heterogeneous (controls)	0.00	0.04				0.00	0.04			
After-slope: heterogeneous (grandparents)	0.00	0.03	3.34	.343	no	0.00	0.03	9.22	.026	no
Shift: uniform	0.03	0.16				0.02	0.15			
Shift: heterogeneous (controls)	0.03	0.17				0.03	0.16			
Shift: heterogeneous (grandparents)	0.02	0.13	3.79	.285	no	0.01	0.12	7.32	.062	no
HRS										
Before-slope: uniform	0.01	0.12				0.01	0.12			
Before-slope: heterogeneous (controls)	0.02	0.15				0.02	0.15			
Before-slope: heterogeneous (grandparents)	0.01	0.12	75.87	< .001	no	0.02	0.14	82.20	< .001	no
After-slope: uniform	0.01	0.10				0.01	0.11			
After-slope: heterogeneous (controls)	0.01	0.11				0.02	0.13			
After-slope: heterogeneous (grandparents)	0.01	0.08	37.85	< .001	no	0.01	0.09	69.06	< .001	no
Shift: uniform	0.06	0.25				0.07	0.26			
Shift: heterogeneous (controls)	0.08	0.28				0.09	0.29			
Shift: heterogeneous (grandparents)	0.05	0.22	68.99	< .001	no	0.06	0.24	91.90	< .001	no

Note. The heterogeneous variance models ($df = 16$) differ only in the random effects from the comparison models ($df = 13$). In addition to two random slope variances (instead of one), the heterogeneous variance models estimate two additional random intercept/slope covariances. Both models estimate heterogeneous random intercept variances for the grandparent and control groups. *Var.* = random slope variance; *SD* = standard deviation; *LR* = likelihood ratio; *p* = *p*-value (of the LR test); *GP greater* = indicating if the random slope variance of the grandparents is larger than that of either control group.

Table S56

Tests of Heterogeneous Random Slope Variance Models for Conscientiousness Against Comparison Models With a Uniform Random Slope Variance.

	Parent controls					Nonparent controls				
	Var.	SD	LR	p	GP greater	Var.	SD	LR	p	GP greater
LISS										
Before-slope: uniform	0.00	0.04				0.00	0.04			
Before-slope: heterogeneous (controls)	0.00	0.05				0.00	0.05			
Before-slope: heterogeneous (grandparents)	0.00	0.02	45.09	< .001	no	0.00	0.02	26.46	< .001	no
After-slope: uniform	0.00	0.04				0.00	0.04			
After-slope: heterogeneous (controls)	0.00	0.05				0.00	0.04			
After-slope: heterogeneous (grandparents)	0.00	0.03	18.06	< .001	no	0.00	0.03	8.69	.034	no
Shift: uniform	0.03	0.16				0.02	0.14			
Shift: heterogeneous (controls)	0.04	0.19				0.02	0.16			
Shift: heterogeneous (grandparents)	0.02	0.12	21.47	< .001	no	0.01	0.11	8.86	.031	no
HRS										
Before-slope: uniform	0.01	0.11				0.01	0.11			
Before-slope: heterogeneous (controls)	0.02	0.14				0.02	0.14			
Before-slope: heterogeneous (grandparents)	0.01	0.11	92.92	< .001	no	0.02	0.13	103.88	< .001	no
After-slope: uniform	0.01	0.10				0.01	0.10			
After-slope: heterogeneous (controls)	0.01	0.11				0.01	0.12			
After-slope: heterogeneous (grandparents)	0.01	0.09	61.33	< .001	no	0.01	0.09	77.41	< .001	no
Shift: uniform	0.06	0.24				0.06	0.25			
Shift: heterogeneous (controls)	0.07	0.27				0.08	0.28			
Shift: heterogeneous (grandparents)	0.06	0.23	83.05	< .001	no	0.06	0.25	97.85	< .001	no

Note. The heterogeneous variance models ($df = 16$) differ only in the random effects from the comparison models ($df = 13$). In addition to two random slope variances (instead of one), the heterogeneous variance models estimate two additional random intercept/slope covariances. Both models estimate heterogeneous random intercept variances for the grandparent and control groups. *Var.* = random slope variance; *SD* = standard deviation; *LR* = likelihood ratio; *p* = *p*-value (of the LR test); *GP greater* = indicating if the random slope variance of the grandparents is larger than that of either control group.

Table S57

Tests of Heterogeneous Random Slope Variance Models for Extraversion Against Comparison Models With a Uniform Random Slope Variance.

	Parent controls					Nonparent controls				
	Var.	SD	LR	p	GP greater	Var.	SD	LR	p	GP greater
LISS										
Before-slope: uniform	0.00	0.05				0.00	0.05			
Before-slope: heterogeneous (controls)	0.00	0.06				0.00	0.06			
Before-slope: heterogeneous (grandparents)	0.00	0.04	14.67	.002	no	0.00	0.04	25.96	< .001	no
After-slope: uniform	0.00	0.04				0.00	0.05			
After-slope: heterogeneous (controls)	0.00	0.04				0.00	0.05			
After-slope: heterogeneous (grandparents)	0.00	0.03	7.37	.061	no	0.00	0.03	13.50	.004	no
Shift: uniform	0.03	0.17				0.03	0.18			
Shift: heterogeneous (controls)	0.04	0.19				0.04	0.21			
Shift: heterogeneous (grandparents)	0.01	0.12	11.13	.011	no	0.02	0.13	13.00	.005	no
HRS										
Before-slope: uniform	0.02	0.12				0.01	0.12			
Before-slope: heterogeneous (controls)	0.02	0.15				0.02	0.14			
Before-slope: heterogeneous (grandparents)	0.01	0.12	59.59	< .001	no	0.02	0.13	61.85	< .001	no
After-slope: uniform	0.01	0.10				0.01	0.12			
After-slope: heterogeneous (controls)	0.01	0.11				0.02	0.14			
After-slope: heterogeneous (grandparents)	0.01	0.09	27.05	< .001	no	0.01	0.10	61.55	< .001	no
Shift: uniform	0.07	0.26				0.08	0.29			
Shift: heterogeneous (controls)	0.08	0.29				0.10	0.32			
Shift: heterogeneous (grandparents)	0.06	0.25	44.54	< .001	no	0.07	0.26	70.11	< .001	no

Note. The heterogeneous variance models ($df = 16$) differ only in the random effects from the comparison models ($df = 13$). In addition to two random slope variances (instead of one), the heterogeneous variance models estimate two additional random intercept/slope covariances. Both models estimate heterogeneous random intercept variances for the grandparent and control groups. *Var.* = random slope variance; *SD* = standard deviation; *LR* = likelihood ratio; *p* = *p*-value (of the LR test); *GP greater* = indicating if the random slope variance of the grandparents is larger than that of either control group.

Table S58

Tests of Heterogeneous Random Slope Variance Models for Neuroticism Against Comparison Models With a Uniform Random Slope Variance.

	Parent controls					Nonparent controls				
	Var.	SD	LR	p	GP greater	Var.	SD	LR	p	GP greater
LISS										
Before-slope: uniform	0.00	0.06				0.00	0.07			
Before-slope: heterogeneous (controls)	0.00	0.06				0.01	0.08			
Before-slope: heterogeneous (grandparents)	0.00	0.06	3.74	.291	yes	0.00	0.06	19.38	< .001	no
After-slope: uniform	0.00	0.05				0.00	0.06			
After-slope: heterogeneous (controls)	0.00	0.05				0.00	0.07			
After-slope: heterogeneous (grandparents)	0.00	0.05	1.09	.781	no	0.00	0.05	6.22	.101	no
Shift: uniform	0.04	0.20				0.06	0.24			
Shift: heterogeneous (controls)	0.04	0.20				0.07	0.26			
Shift: heterogeneous (grandparents)	0.04	0.21	3.32	.344	yes	0.05	0.21	3.27	.352	no
HRS										
Before-slope: uniform	0.02	0.15				0.02	0.15			
Before-slope: heterogeneous (controls)	0.03	0.19				0.03	0.18			
Before-slope: heterogeneous (grandparents)	0.03	0.17	95.90	< .001	no	0.03	0.18	73.45	< .001	yes
After-slope: uniform	0.01	0.12				0.02	0.12			
After-slope: heterogeneous (controls)	0.02	0.13				0.02	0.15			
After-slope: heterogeneous (grandparents)	0.01	0.10	79.78	< .001	no	0.01	0.11	101.07	< .001	no
Shift: uniform	0.10	0.31				0.10	0.32			
Shift: heterogeneous (controls)	0.13	0.35				0.13	0.36			
Shift: heterogeneous (grandparents)	0.09	0.29	116.36	< .001	no	0.09	0.30	116.43	< .001	no

Note. The heterogeneous variance models ($df = 16$) differ only in the random effects from the comparison models ($df = 13$). In addition to two random slope variances (instead of one), the heterogeneous variance models estimate two additional random intercept/slope covariances. Both models estimate heterogeneous random intercept variances for the grandparent and control groups. *Var.* = random slope variance; *SD* = standard deviation; *LR* = likelihood ratio; *p* = *p*-value (of the LR test); *GP greater* = indicating if the random slope variance of the grandparents is larger than that of either control group.

Table S59

Tests of Heterogeneous Random Slope Variance Models for Openness Against Comparison Models With a Uniform Random Slope Variance.

	Parent controls					Nonparent controls				
	Var.	SD	LR	p	GP greater	Var.	SD	LR	p	GP greater
LISS										
Before-slope: uniform	0.00	0.04				0.00	0.03			
Before-slope: heterogeneous (controls)	0.00	0.05				0.00	0.04			
Before-slope: heterogeneous (grandparents)	0.00	0.04	19.82	< .001	no	0.00	0.04	25.90	< .001	yes
After-slope: uniform	0.00	0.04				0.00	0.03			
After-slope: heterogeneous (controls)	0.00	0.05				0.00	0.03			
After-slope: heterogeneous (grandparents)	0.00	0.02	26.80	< .001	no	0.00	0.02	9.20	.027	no
Shift: uniform	0.03	0.16				0.02	0.13			
Shift: heterogeneous (controls)	0.03	0.18				0.02	0.14			
Shift: heterogeneous (grandparents)	0.01	0.10	17.96	< .001	no	0.02	0.12	10.36	.016	no
HRS										
Before-slope: uniform	0.01	0.11				0.01	0.12			
Before-slope: heterogeneous (controls)	0.02	0.14				0.02	0.14			
Before-slope: heterogeneous (grandparents)	0.01	0.09	55.99	< .001	no	0.02	0.14	50.54	< .001	no
After-slope: uniform	0.01	0.10				0.01	0.11			
After-slope: heterogeneous (controls)	0.01	0.11				0.02	0.13			
After-slope: heterogeneous (grandparents)	0.01	0.09	37.59	< .001	no	0.01	0.10	50.64	< .001	no
Shift: uniform	0.07	0.26				0.07	0.27			
Shift: heterogeneous (controls)	0.08	0.28				0.09	0.30			
Shift: heterogeneous (grandparents)	0.06	0.24	58.39	< .001	no	0.07	0.26	67.21	< .001	no

Note. The heterogeneous variance models ($df = 16$) differ only in the random effects from the comparison models ($df = 13$). In addition to two random slope variances (instead of one), the heterogeneous variance models estimate two additional random intercept/slope covariances. Both models estimate heterogeneous random intercept variances for the grandparent and control groups. *Var.* = random slope variance; *SD* = standard deviation; *LR* = likelihood ratio; *p* = *p*-value (of the LR test); *GP greater* = indicating if the random slope variance of the grandparents is larger than that of either control group.

Table S60

Tests of Heterogeneous Random Slope Variance Models for Life Satisfaction Against Comparison Models With a Uniform Random Slope Variance.

	Parent controls					Nonparent controls				
	Var.	SD	LR	p	GP greater	Var.	SD	LR	p	GP greater
LISS										
Before-slope: uniform	0.01	0.11				0.01	0.10			
Before-slope: heterogeneous (controls)	0.02	0.13				0.01	0.12			
Before-slope: heterogeneous (grandparents)	0.02	0.14	41.47	< .001	yes	0.01	0.12	21.10	< .001	no
After-slope: uniform	0.01	0.11				0.01	0.12			
After-slope: heterogeneous (controls)	0.01	0.10				0.01	0.12			
After-slope: heterogeneous (grandparents)	0.02	0.13	11.74	.008	yes	0.02	0.12	5.26	.154	yes
Shift: uniform	0.20	0.45				0.18	0.42			
Shift: heterogeneous (controls)	0.19	0.44				0.17	0.41			
Shift: heterogeneous (grandparents)	0.25	0.50	10.00	.019	yes	0.21	0.46	4.50	.212	yes
HRS										
Before-slope: uniform	0.14	0.37				0.14	0.37			
Before-slope: heterogeneous (controls)	0.28	0.53				0.22	0.47			
Before-slope: heterogeneous (grandparents)	0.26	0.50	140.31	< .001	no	0.34	0.58	111.97	< .001	yes
After-slope: uniform	0.10	0.32				0.14	0.37			
After-slope: heterogeneous (controls)	0.13	0.36				0.21	0.46			
After-slope: heterogeneous (grandparents)	0.08	0.28	93.14	< .001	no	0.10	0.32	108.41	< .001	no
Shift: uniform	0.83	0.91				0.93	0.96			
Shift: heterogeneous (controls)	1.07	1.04				1.24	1.11			
Shift: heterogeneous (grandparents)	0.80	0.89	172.53	< .001	no	0.91	0.96	153.16	< .001	no

Note. The heterogeneous variance models ($df = 16$) differ only in the random effects from the comparison models ($df = 13$). In addition to two random slope variances (instead of one), the heterogeneous variance models estimate two additional random intercept/slope covariances. Both models estimate heterogeneous random intercept variances for the grandparent and control groups. *Var.* = random slope variance; *SD* = standard deviation; *LR* = likelihood ratio; *p* = *p*-value (of the LR test); *GP greater* = indicating if the random slope variance of the grandparents is larger than that of either control group.

Table S61

Rank-Order Stability.

	Parent controls				Nonparent controls			
Outcome	Cor_{all}	Cor_{GP}	Cor_{con}	p	Cor_{all}	Cor_{GP}	Cor_{con}	p
LISS								
Agreeableness	0.79	0.81	0.78	.619	0.76	0.81	0.75	.009
Conscientiousness	0.76	0.80	0.75	.102	0.79	0.80	0.78	.480
Extraversion	0.81	0.86	0.80	.768	0.86	0.86	0.85	.284
Neuroticism	0.71	0.77	0.68	.060	0.76	0.77	0.76	.262
Openness	0.75	0.79	0.74	.126	0.79	0.79	0.79	.531
Life Satisfaction	0.69	0.66	0.70	.647	0.63	0.66	0.62	.674
HRS								
Agreeableness	0.68	0.70	0.67	.506	0.73	0.70	0.74	.304
Conscientiousness	0.71	0.69	0.72	.201	0.70	0.69	0.70	.467
Extraversion	0.72	0.75	0.71	.007	0.74	0.75	0.74	.029
Neuroticism	0.66	0.71	0.65	.654	0.68	0.71	0.67	.709
Openness	0.69	0.73	0.67	.015	0.76	0.73	0.76	.241
Life Satisfaction	0.51	0.55	0.50	.090	0.55	0.55	0.55	.439

Note. Test-retest correlations as indicators of rank-order stability, and p-values indicating significant group differences therein between grandparents and each control group. The average retest intervals in years are 3.06 ($SD = 0.91$) for the LISS parent sample, 3.06 ($SD = 0.89$) for the LISS nonparent sample, 4.15 ($SD = 0.77$) for the HRS parent sample, and 4.11 ($SD = 0.67$) for the HRS nonparent sample. Cor = correlation; GP = grandparents; con = controls.

Table S62

Rank-Order Stability With Maximal Retest Interval.

	Parent controls				Nonparent controls			
Outcome	Cor_{all}	Cor_{GP}	Cor_{con}	p	Cor_{all}	Cor_{GP}	Cor_{con}	p
LISS								
Agreeableness	0.73	0.73	0.73	.754	0.60	0.73	0.57	$< .001$
Conscientiousness	0.68	0.77	0.66	.004	0.73	0.77	0.73	.091
Extraversion	0.76	0.82	0.74	.021	0.82	0.82	0.82	.568
Neuroticism	0.68	0.76	0.65	.001	0.72	0.76	0.71	.534
Openness	0.72	0.77	0.71	.290	0.81	0.77	0.82	.316
Life Satisfaction	0.65	0.53	0.68	.086	0.48	0.53	0.48	.309
HRS								
Agreeableness	0.67	0.68	0.67	.641	0.70	0.68	0.71	.498
Conscientiousness	0.65	0.68	0.65	.289	0.64	0.68	0.63	.819
Extraversion	0.70	0.73	0.70	.093	0.71	0.73	0.70	.038
Neuroticism	0.64	0.67	0.63	.704	0.64	0.67	0.63	.265
Openness	0.69	0.71	0.69	.894	0.75	0.71	0.76	.001
Life Satisfaction	0.53	0.54	0.53	.675	0.48	0.54	0.47	.166

Note. Test-retest correlations as indicators of rank-order stability, and p-values indicating significant group differences therein between grandparents and each control group. The average retest intervals in years are 8.08 ($SD = 2.06$) for the LISS parent sample, 8.13 ($SD = 1.95$) for the LISS nonparent sample, 6.83 ($SD = 2.23$) for the HRS parent sample, and 6.92 ($SD = 2.26$) for the HRS nonparent sample. Cor = correlation; GP = grandparents; con = controls.

Table S63

Rank-Order Stability Excluding Duplicate Control Observations.

	Parent controls				Nonparent controls			
Outcome	Cor_{all}	Cor_{GP}	Cor_{con}	p	Cor_{all}	Cor_{GP}	Cor_{con}	p
LISS								
Agreeableness	0.80	0.81	0.79	.760	0.80	0.81	0.80	.641
Conscientiousness	0.78	0.80	0.77	.315	0.80	0.80	0.80	.493
Extraversion	0.84	0.86	0.82	.832	0.87	0.86	0.88	.444
Neuroticism	0.78	0.77	0.78	.522	0.80	0.77	0.84	.914
Openness	0.79	0.79	0.79	.547	0.79	0.79	0.80	.467
Life Satisfaction	0.67	0.66	0.68	.708	0.69	0.66	0.72	.269
HRS								
Agreeableness	0.69	0.70	0.69	.504	0.71	0.70	0.74	.445
Conscientiousness	0.71	0.69	0.72	.208	0.70	0.69	0.72	.297
Extraversion	0.75	0.75	0.75	.315	0.74	0.75	0.73	.122
Neuroticism	0.69	0.71	0.67	.543	0.70	0.71	0.70	.367
Openness	0.75	0.73	0.76	.396	0.74	0.73	0.75	.855
Life Satisfaction	0.58	0.55	0.59	.317	0.58	0.55	0.61	.015

Note. Test-retest correlations as indicators of rank-order stability, and p-values indicating significant group differences therein between grandparents and each control group. The average retest intervals in years are 2.94 ($SD = 0.94$) for the LISS parent sample, 2.95 ($SD = 0.92$) for the LISS nonparent sample, 3.88 ($SD = 1.01$) for the HRS parent sample, and 3.87 ($SD = 0.96$) for the HRS nonparent sample. Cor = correlation; GP = grandparents; con = controls.

Supplemental Figures

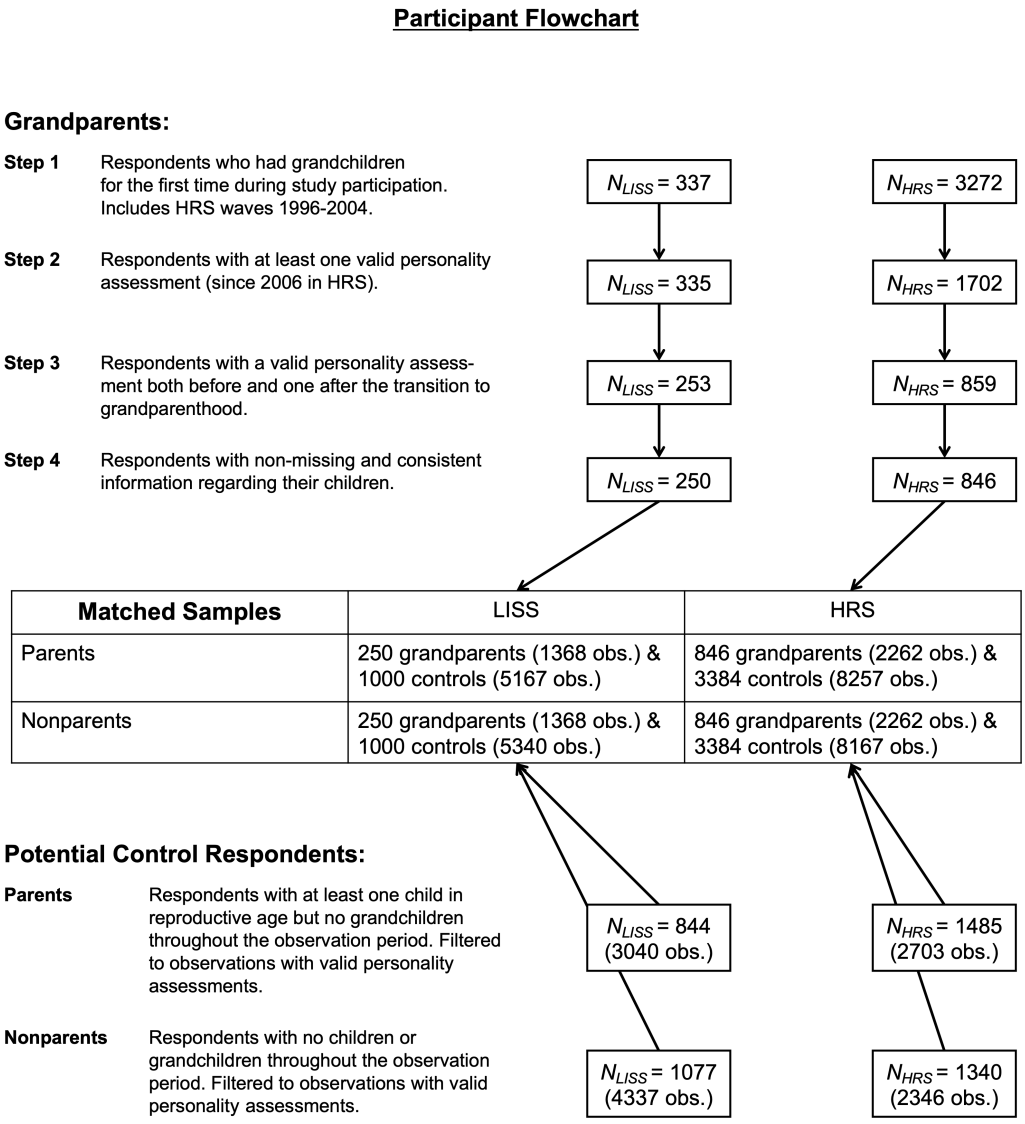

Figure S1

Participant flowchart demonstrating the composition of the four analysis samples via matching (1:4 matching ratio with replacement). obs. = longitudinal observations.

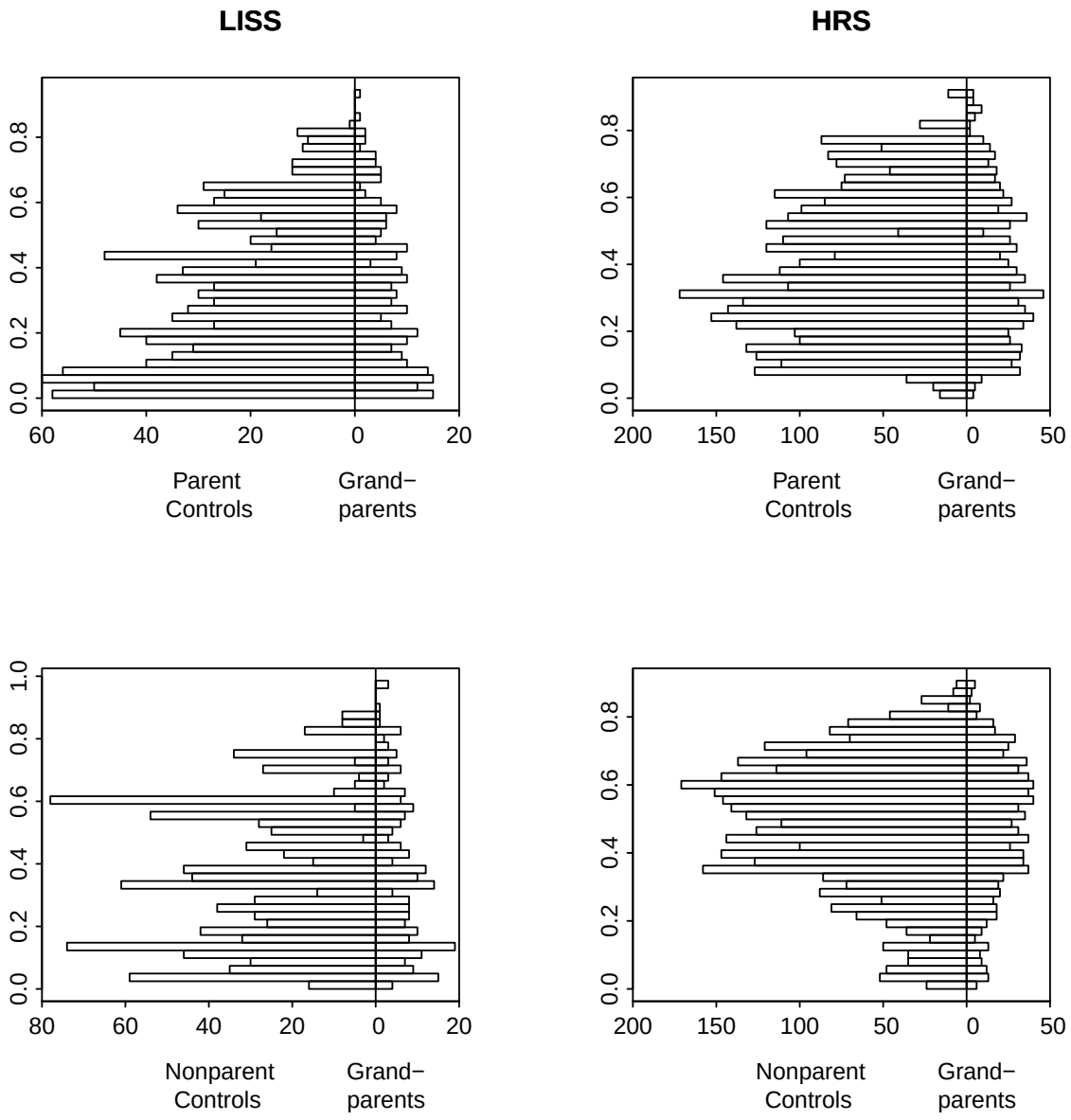

Figure S2

Distributional Overlap of the Propensity Score in the Four Analysis Samples at the Time of Matching.

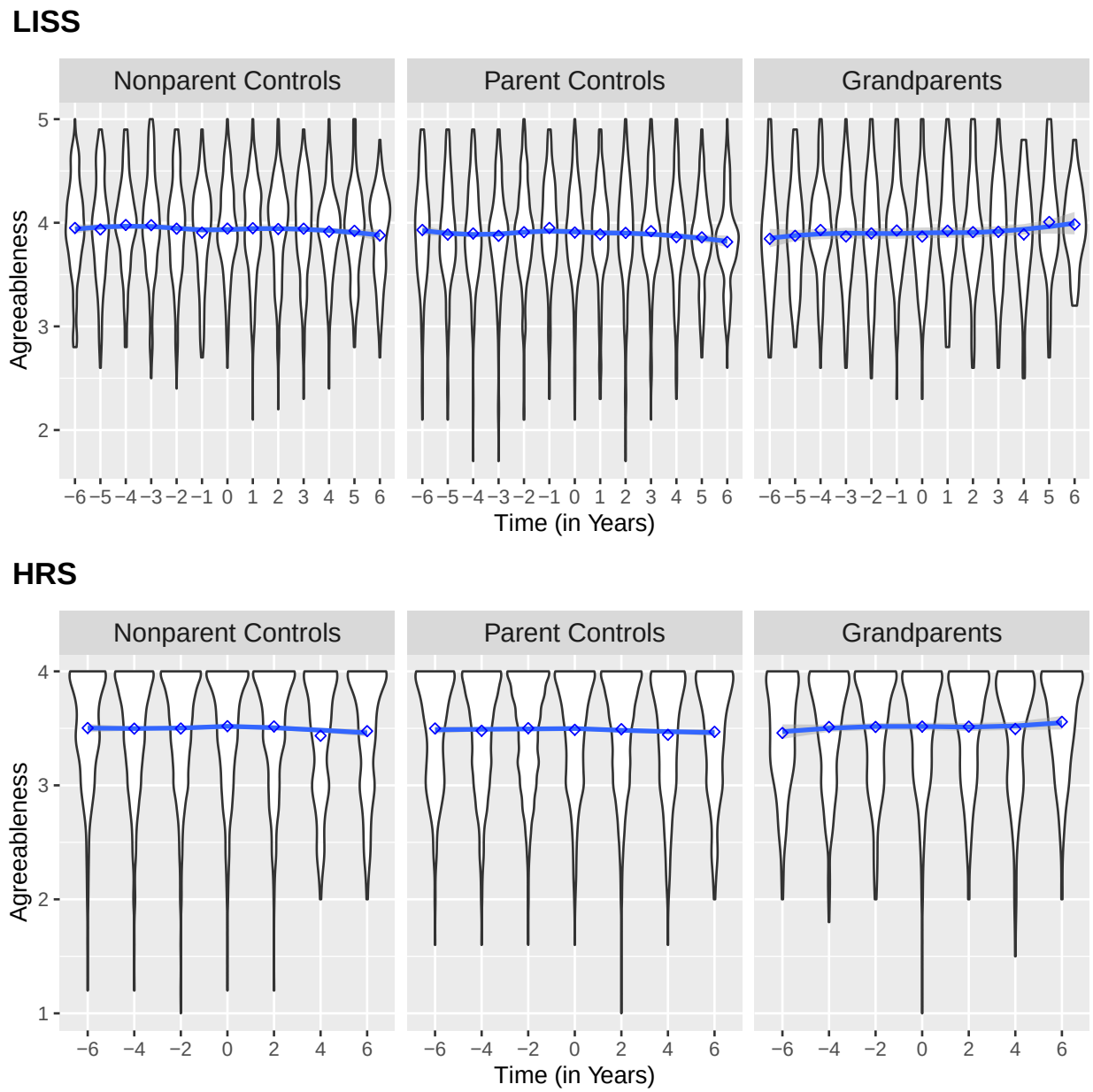

Figure S3

Violin Plots for Agreeableness Including Means Over Time and LOESS Line.

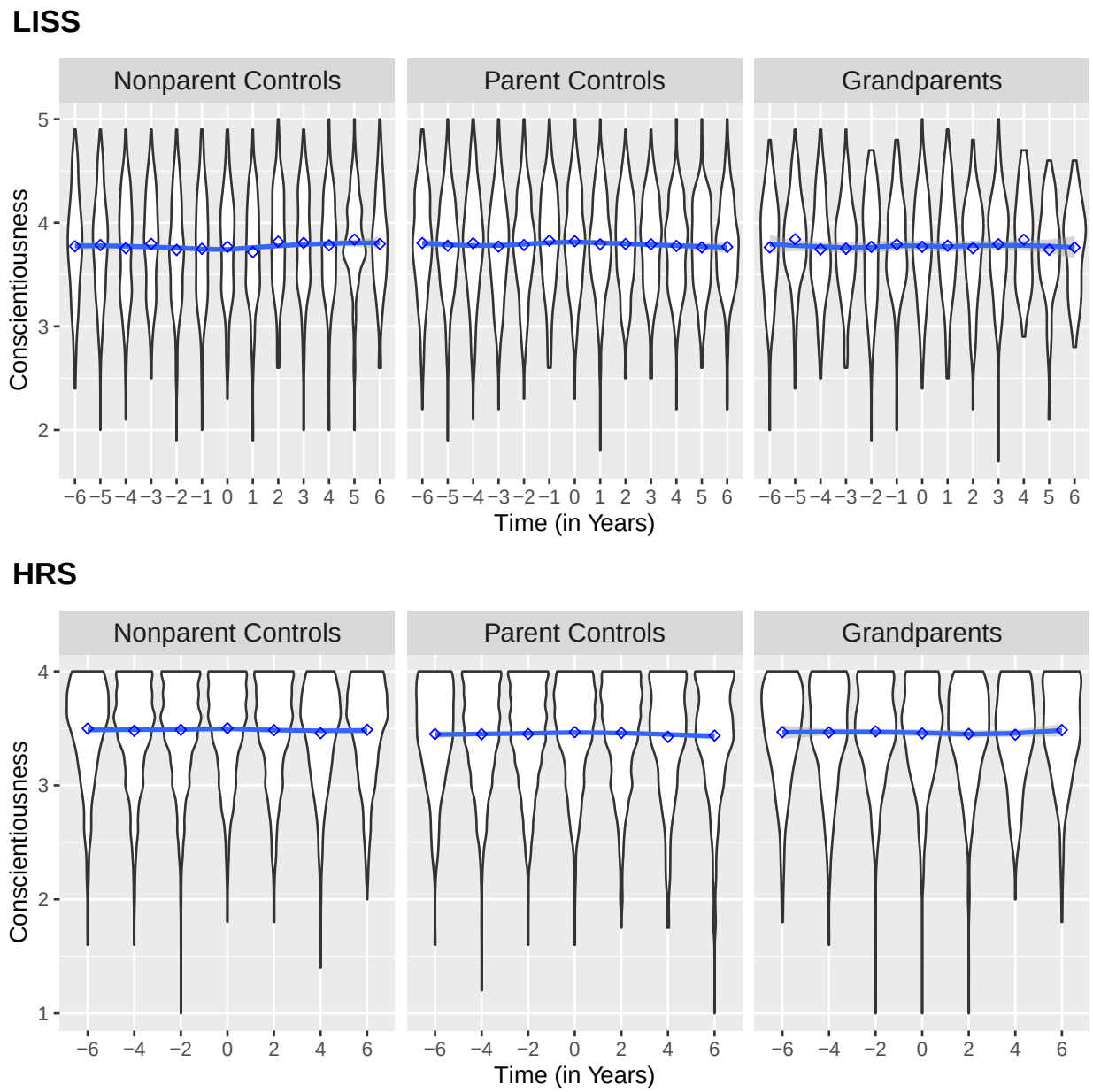

Figure S4

Violin Plots for Conscientiousness Including Means Over Time and LOESS Line.

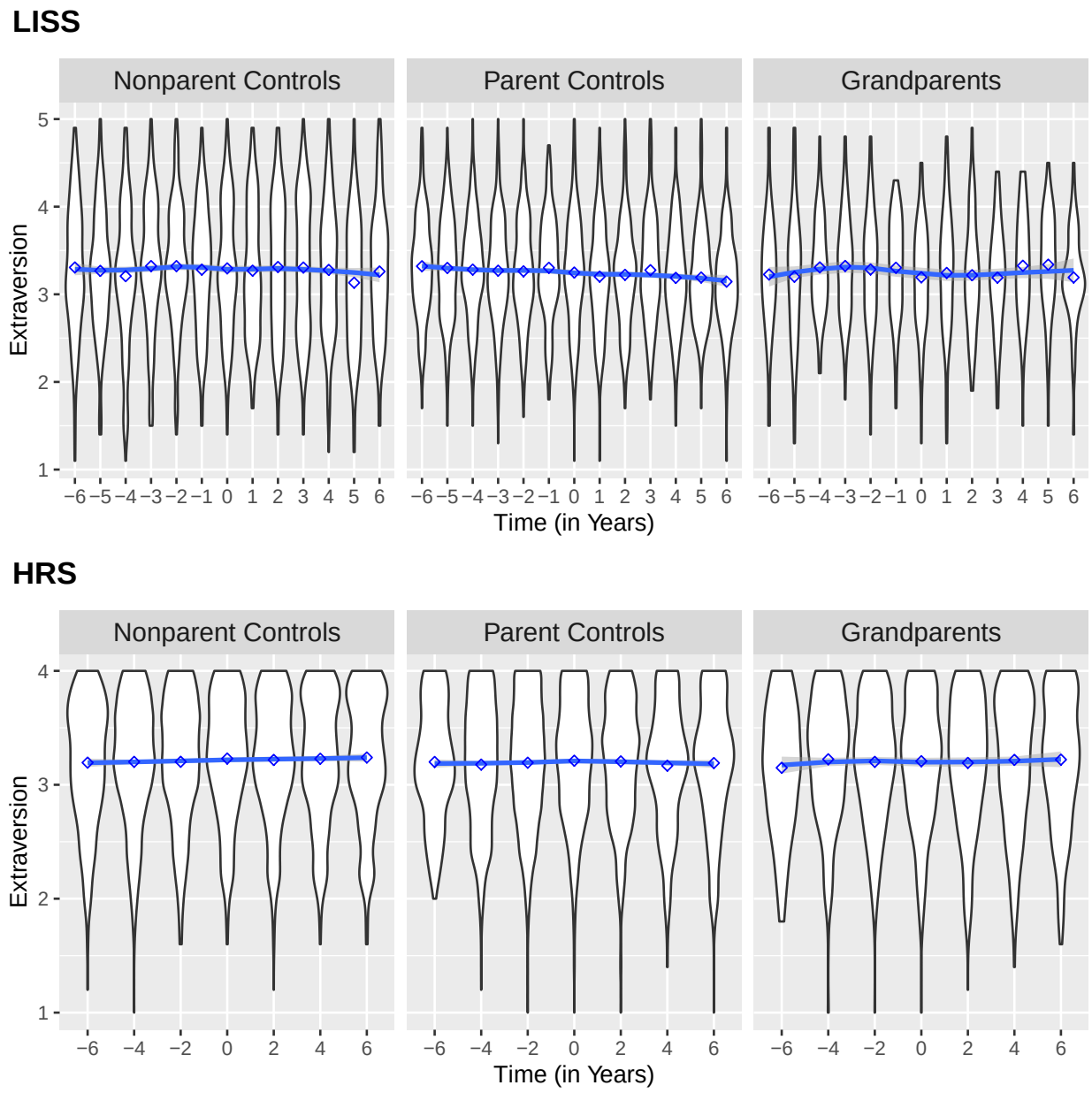

Figure S5

Violin Plots for Extraversion Including Means Over Time and LOESS Line.

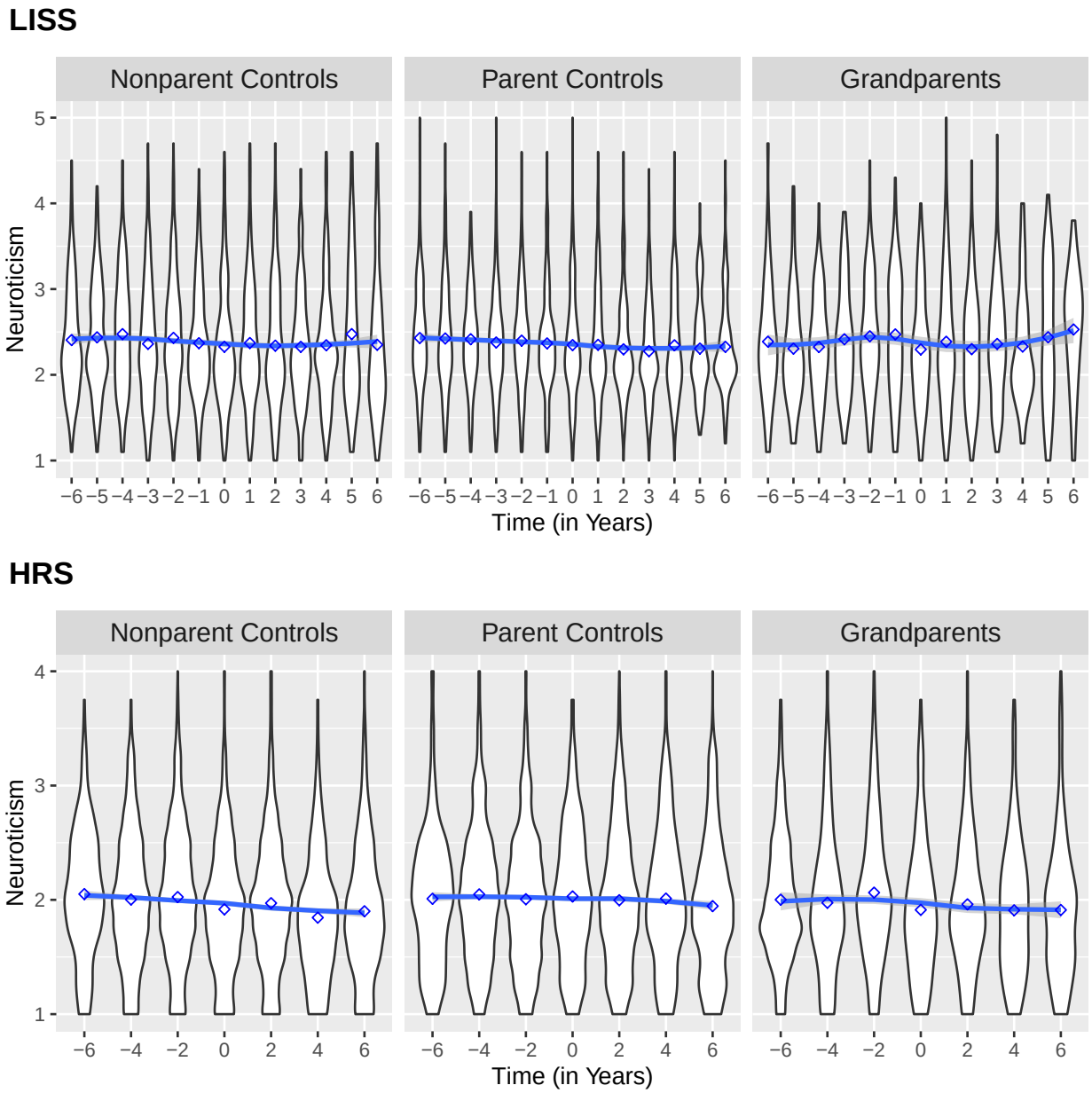

Figure S6

Violin Plots for Neuroticism Including Means Over Time and LOESS Line.

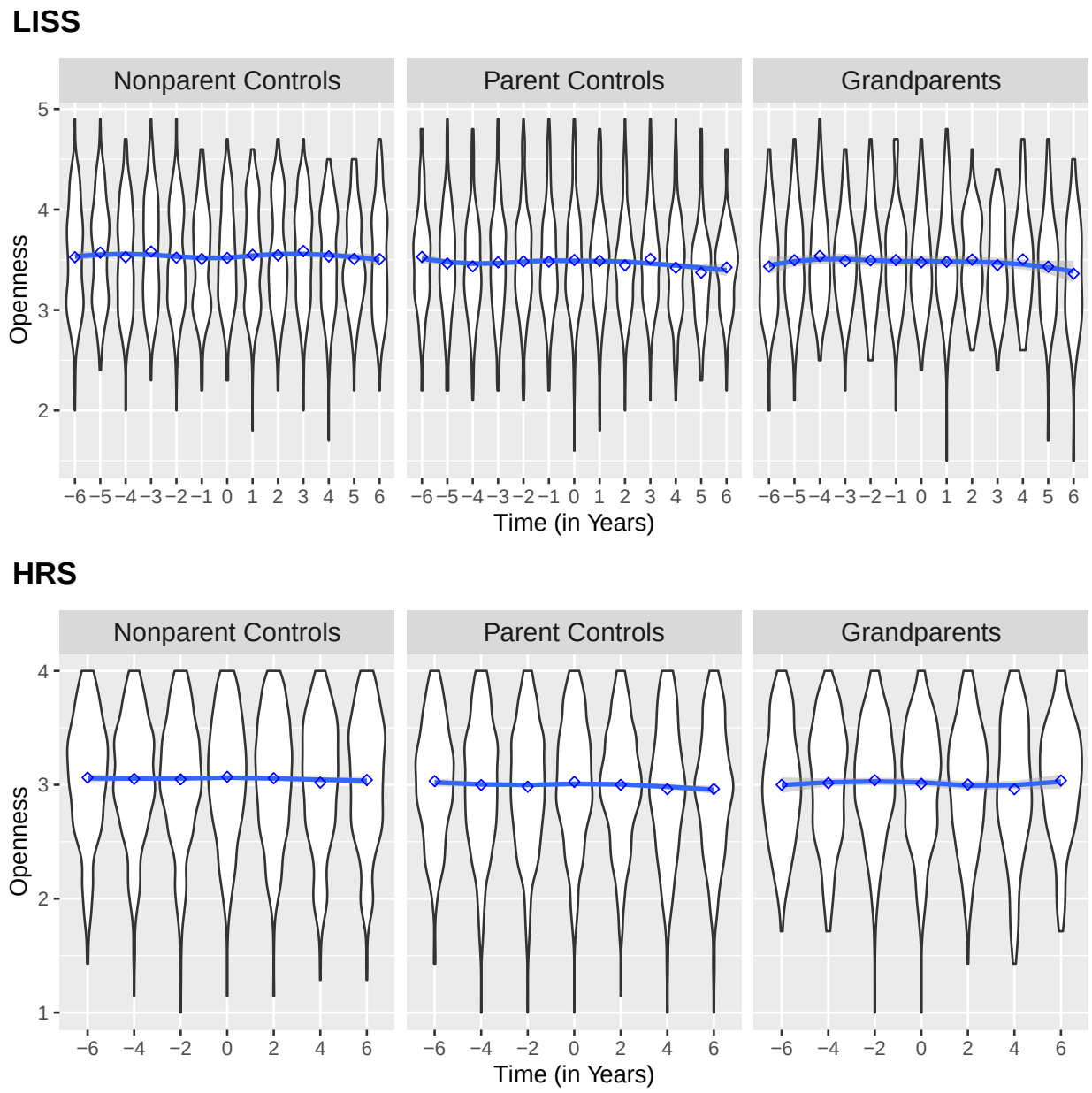

Figure S7

Violin Plots for Openness Including Means Over Time and LOESS Line.

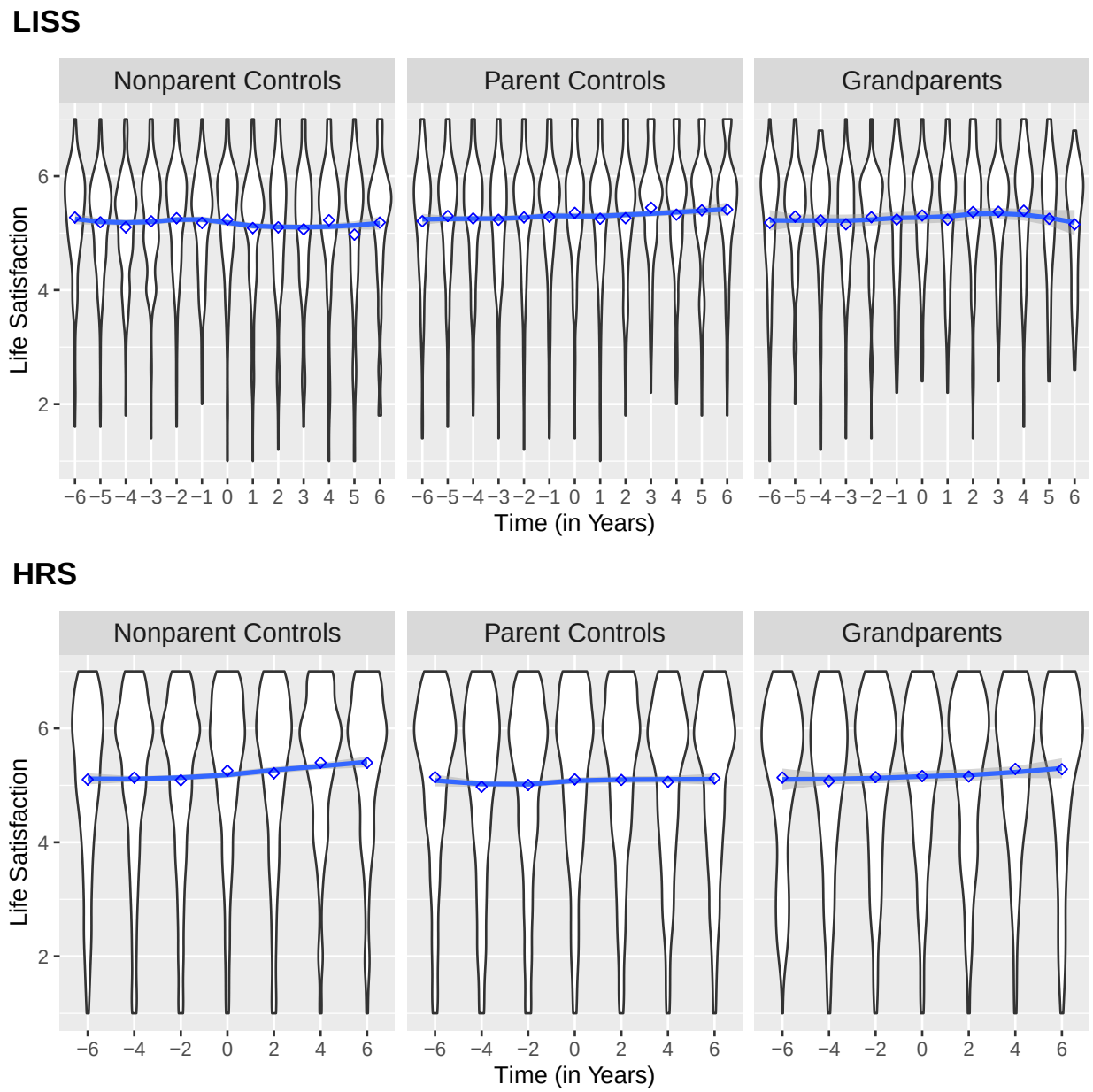

Figure S8

Violin Plots for Life Satisfaction Including Means Over Time and LOESS Line.

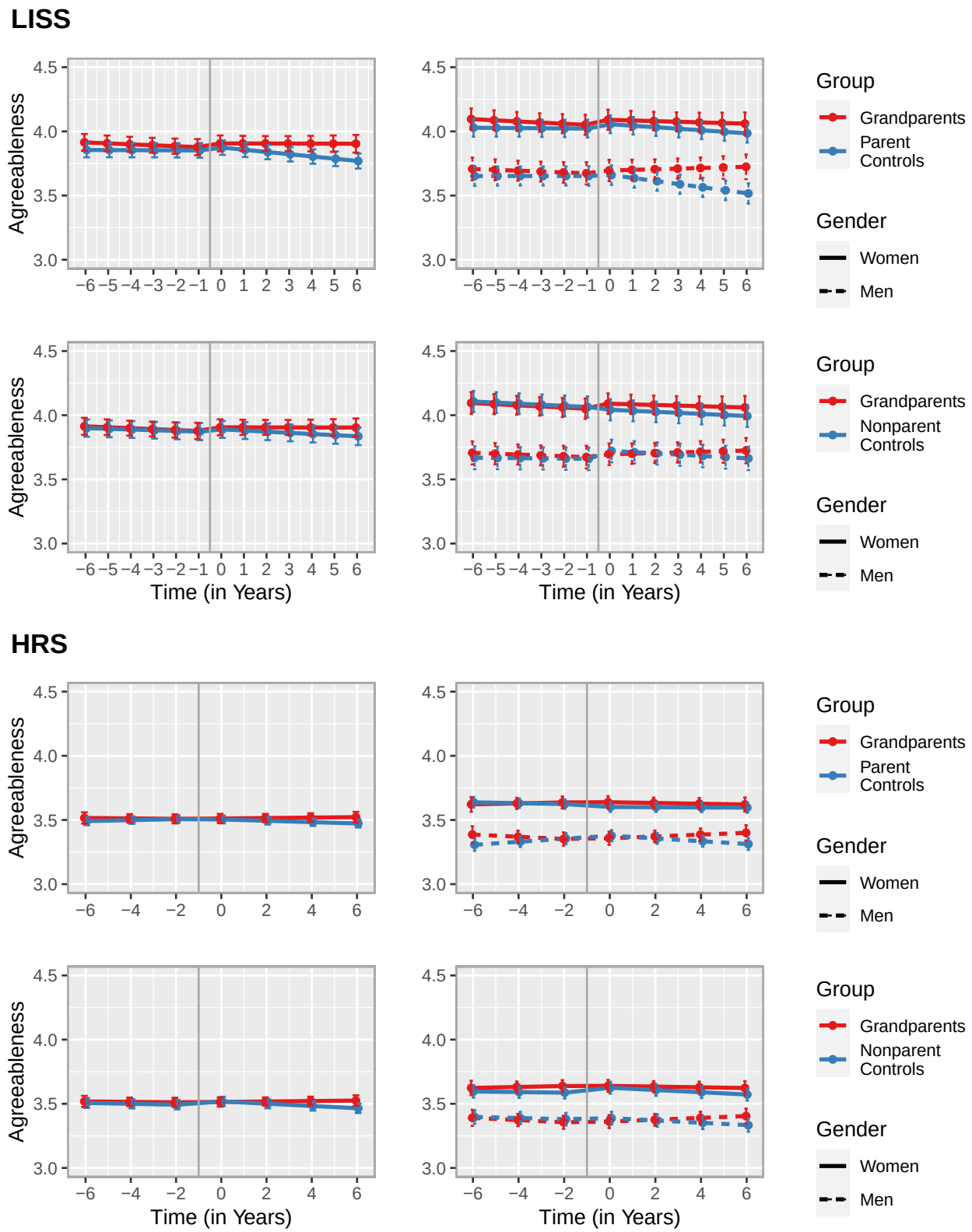

Figure S9

Change trajectories of agreeableness based on the basic models (left column) and the models including the gender interaction (right column). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The vertical line indicates the approximate time of the transition to grandparenthood.

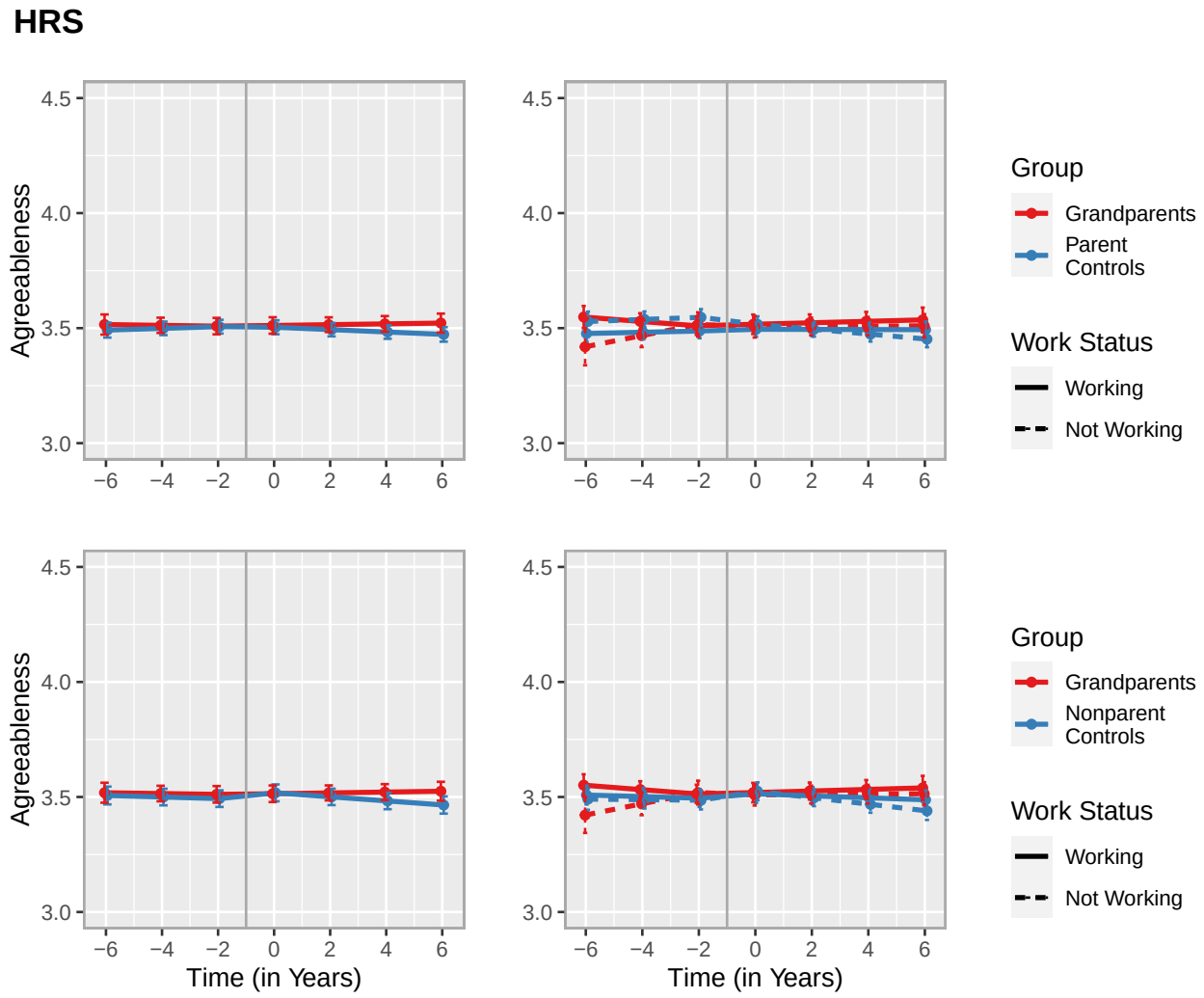

Figure S10

Change trajectories of agreeableness based on the models of moderation by paid work (see Table S11). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The vertical line indicates the approximate time of the transition to grandparenthood. The plots in the left column are the same as in Figure S9 (basic models) and added here for better comparability.

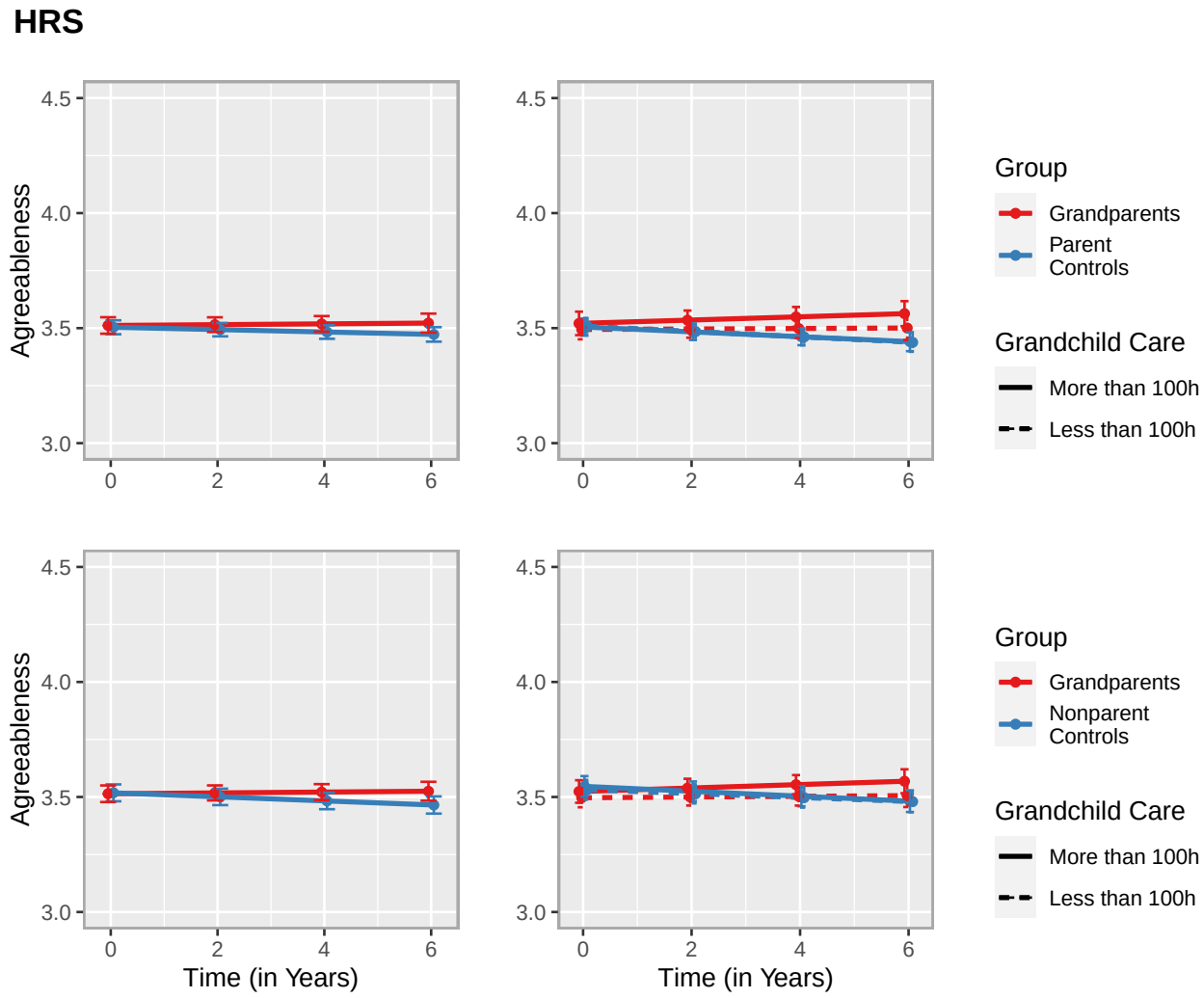

Figure S11

Change trajectories of agreeableness based on the models of moderation by grandchild care (see Table S13). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The plots in the left column are the same as in Figure S9 (basic models) but restricted to the post-transition period for better comparability.

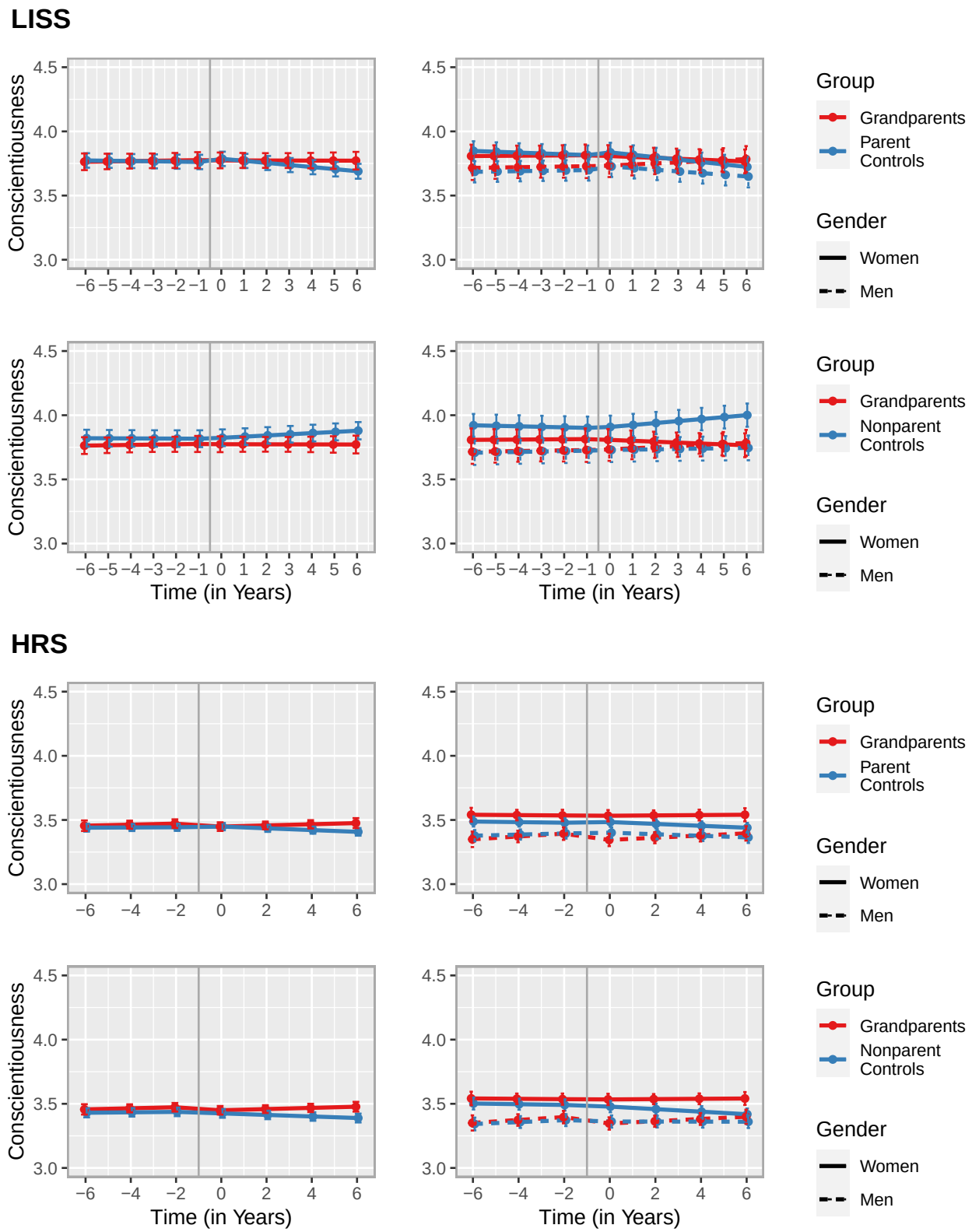

Figure S12

Change trajectories of conscientiousness based on the basic models (left column) and the models including the gender interaction (right column). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The vertical line indicates the approximate time of the transition to grandparenthood.

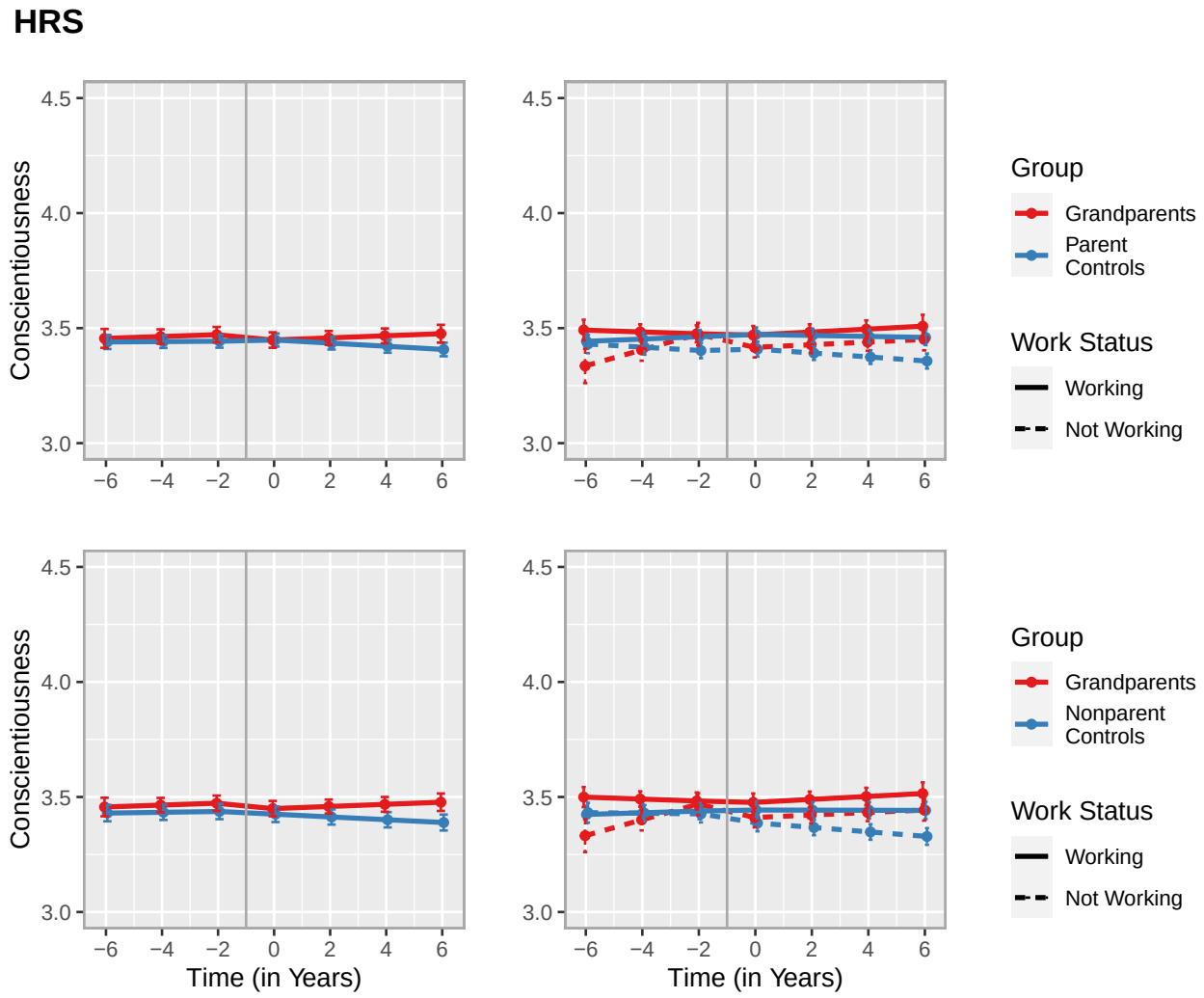

Figure S13

Change trajectories of conscientiousness based on the models of moderation by paid work (see Table S19). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The vertical line indicates the approximate time of the transition to grandparenthood. The plots in the left column are the same as in Figure S12 (basic models) and added here for better comparability.

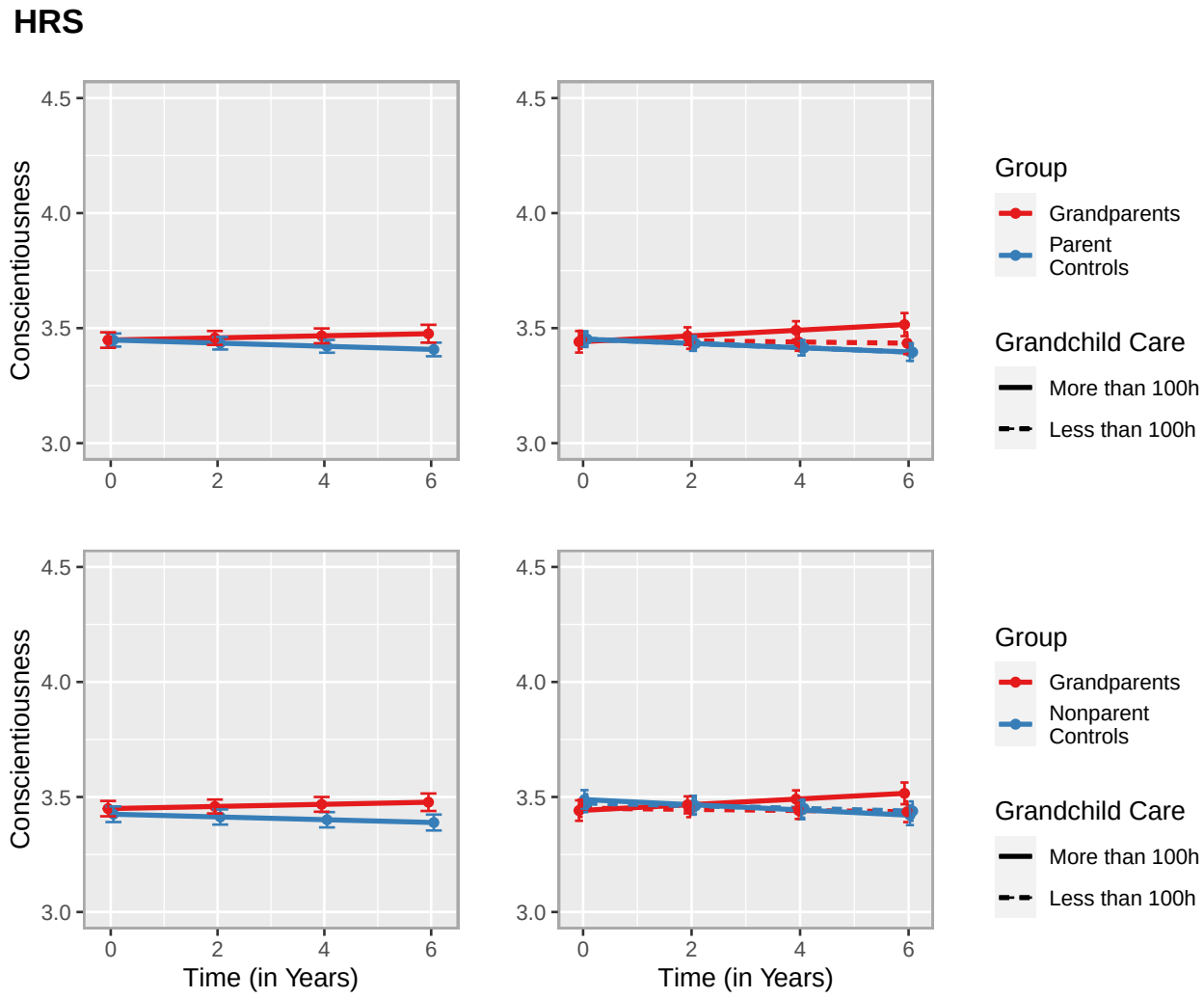

Figure S14

Change trajectories of conscientiousness based on the models of moderation by grandchild care (see Table S21). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The plots in the left column are the same as in Figure S12 (basic models) but restricted to the post-transition period for better comparability.

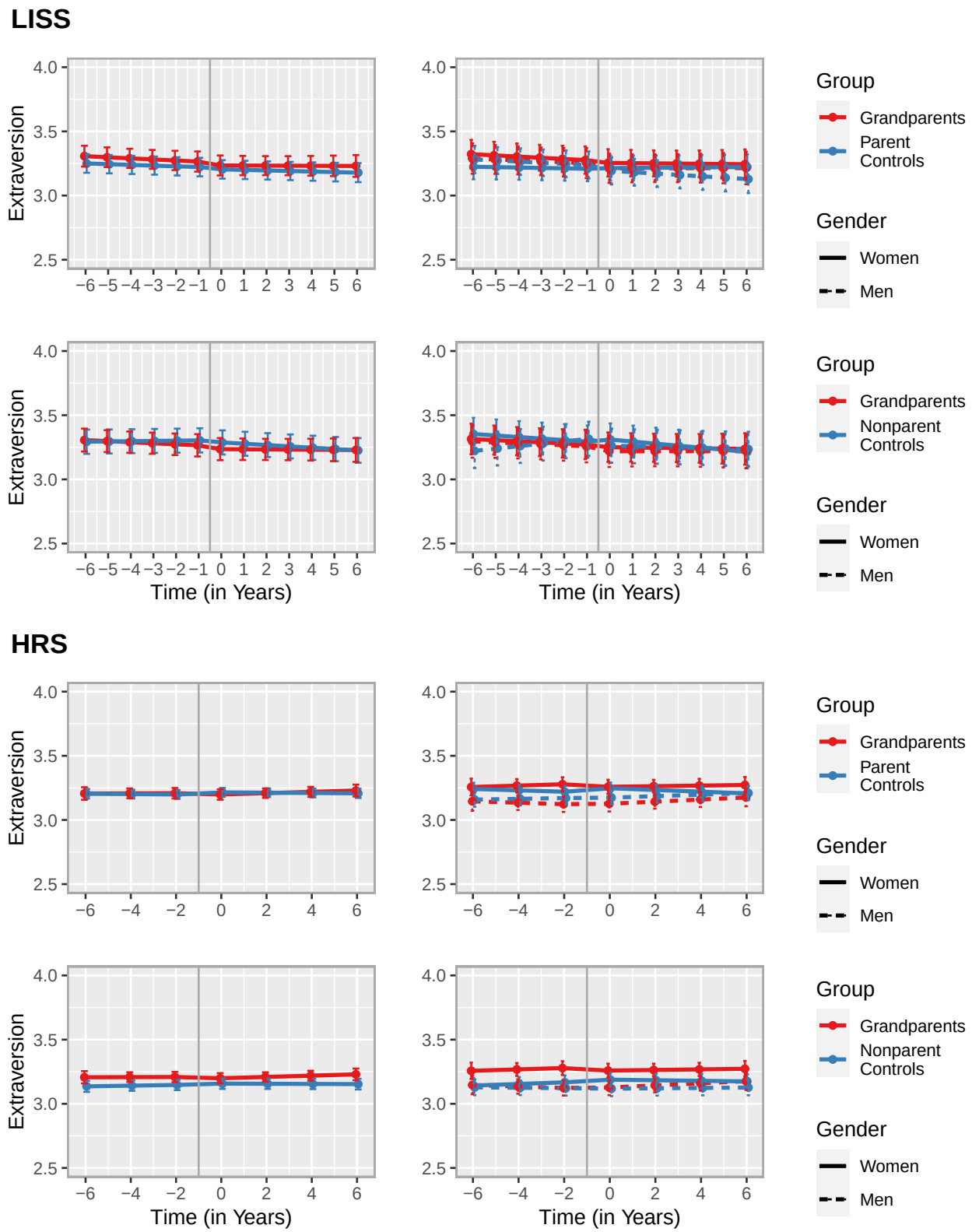

Figure S15

Change trajectories of extraversion based on the basic models (left column) and the models including the gender interaction (right column). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The vertical line indicates the approximate time of the transition to grandparenthood.

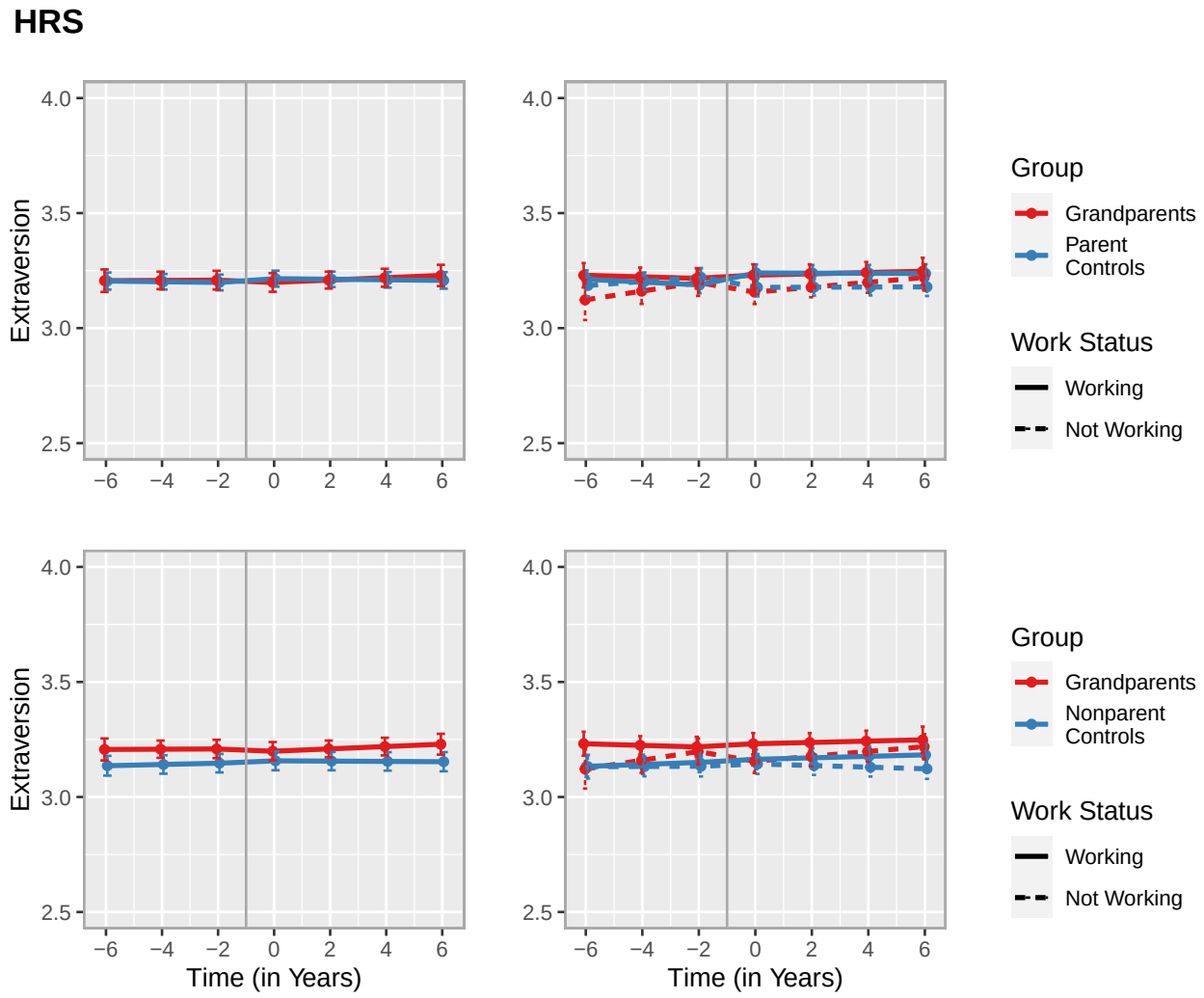

Figure S16

Change trajectories of extraversion based on the models of moderation by paid work (see Table S27). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The vertical line indicates the approximate time of the transition to grandparenthood. The plots in the left column are the same as in Figure S15 (basic models) and added here for better comparability.

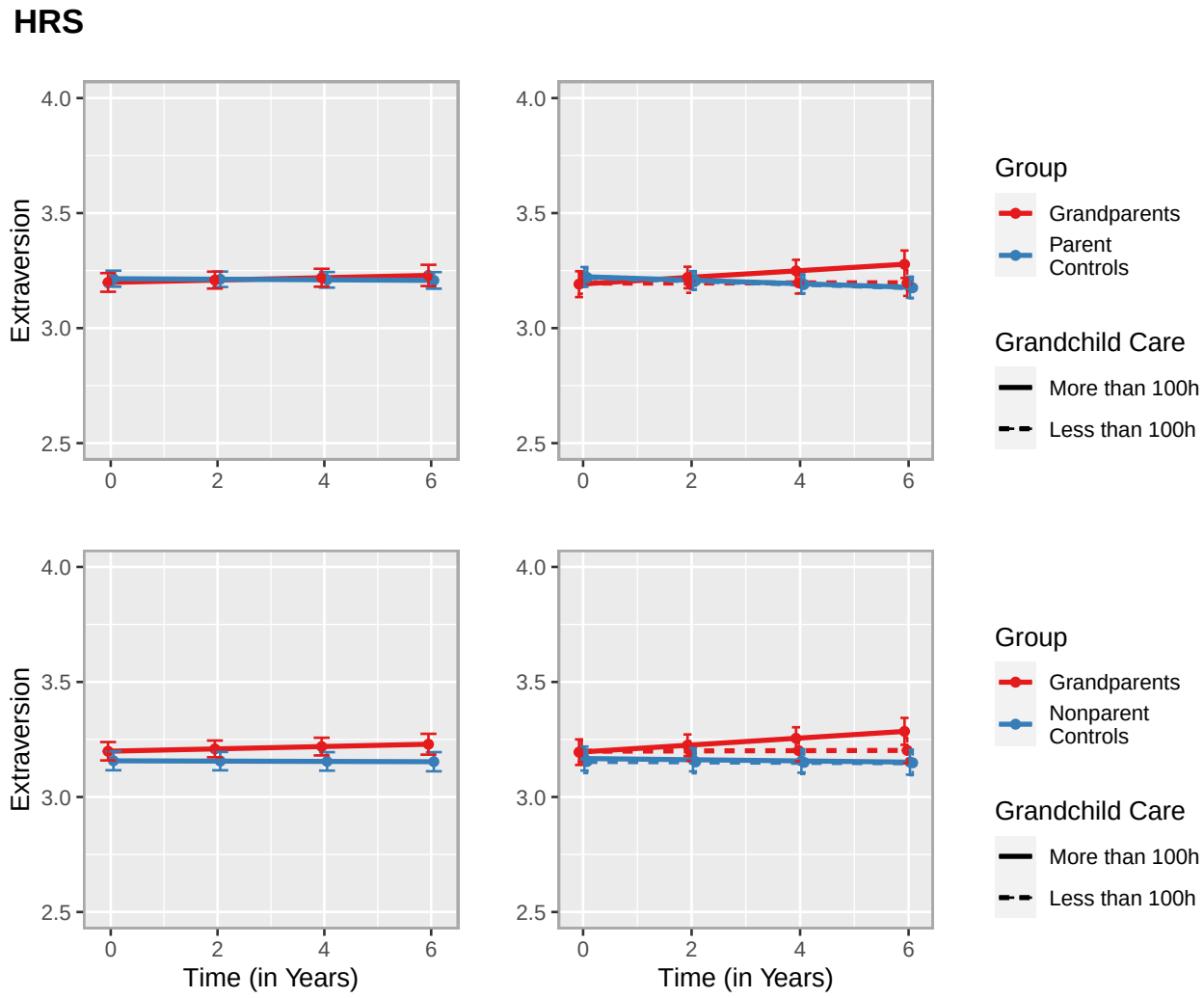

Figure S17

Change trajectories of extraversion based on the models of moderation by grandchild care (see Table S29). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The plots in the left column are the same as in Figure S15 (basic models) but restricted to the post-transition period for better comparability.

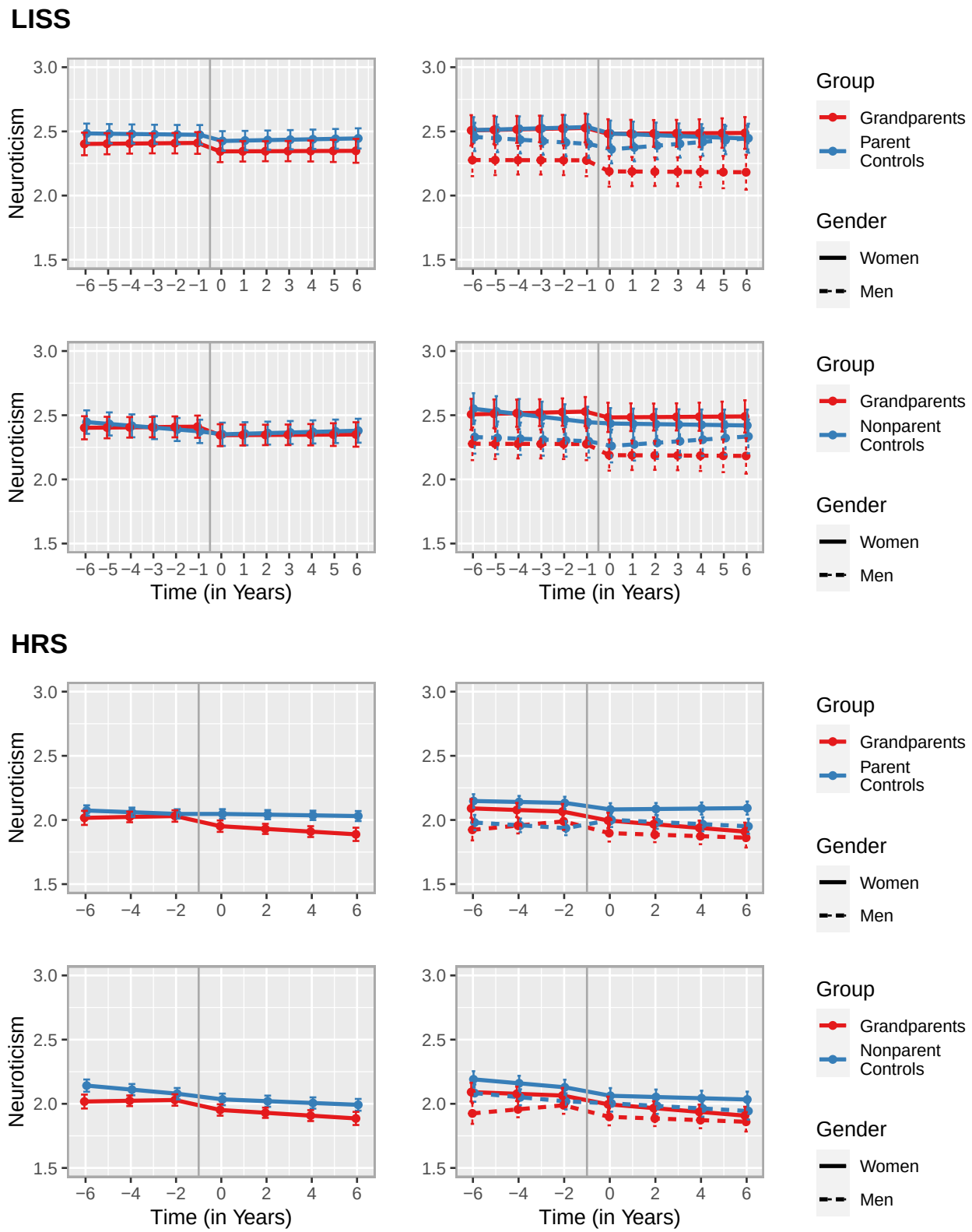

Figure S18

Change trajectories of neuroticism based on the basic models (left column) and the models including the gender interaction (right column). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The vertical line indicates the approximate time of the transition to grandparenthood.

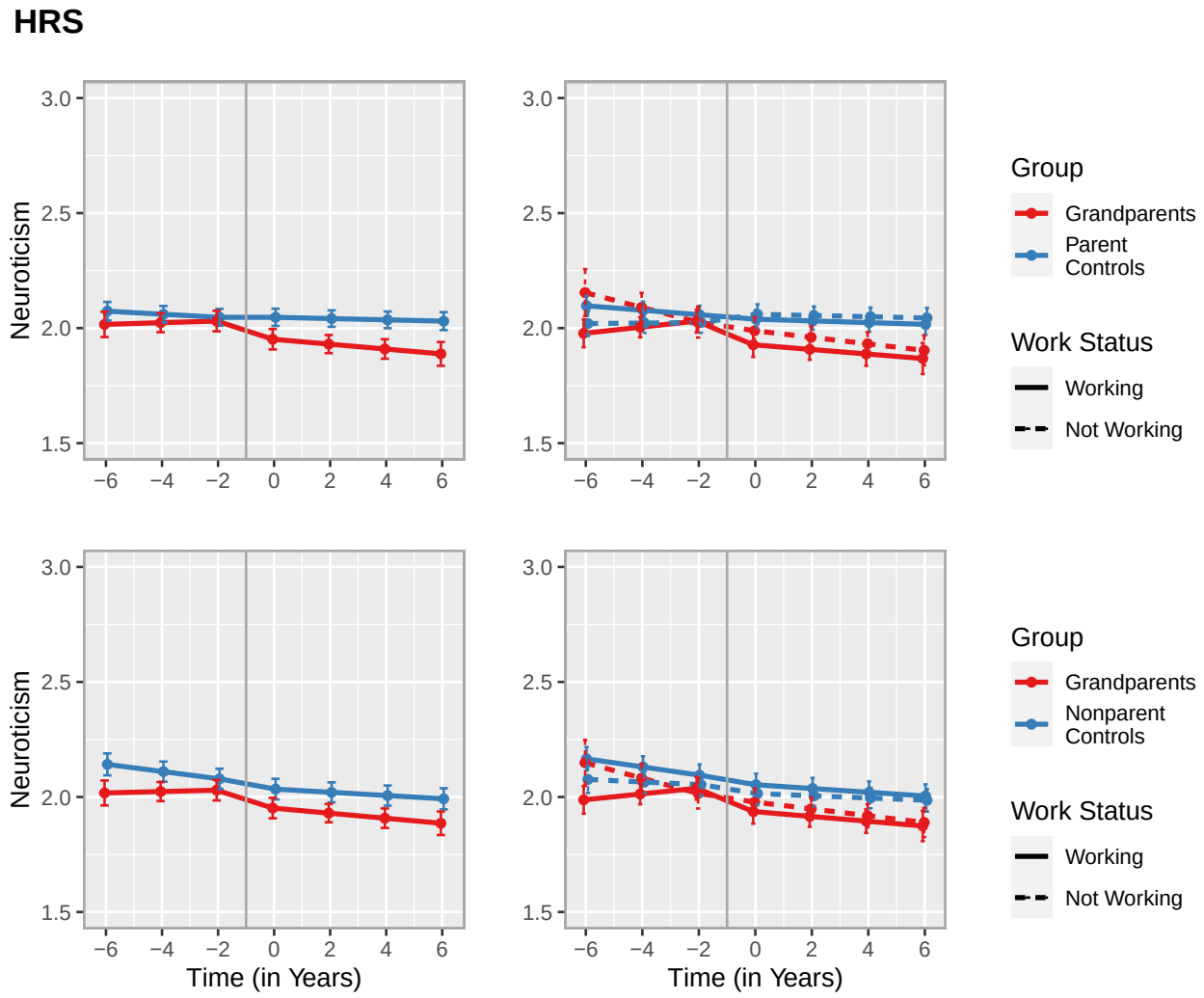

Figure S19

Change trajectories of neuroticism based on the models of moderation by paid work (see Table S35). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The vertical line indicates the approximate time of the transition to grandparenthood. The plots in the left column are the same as in Figure S18 (basic models) and added here for better comparability.

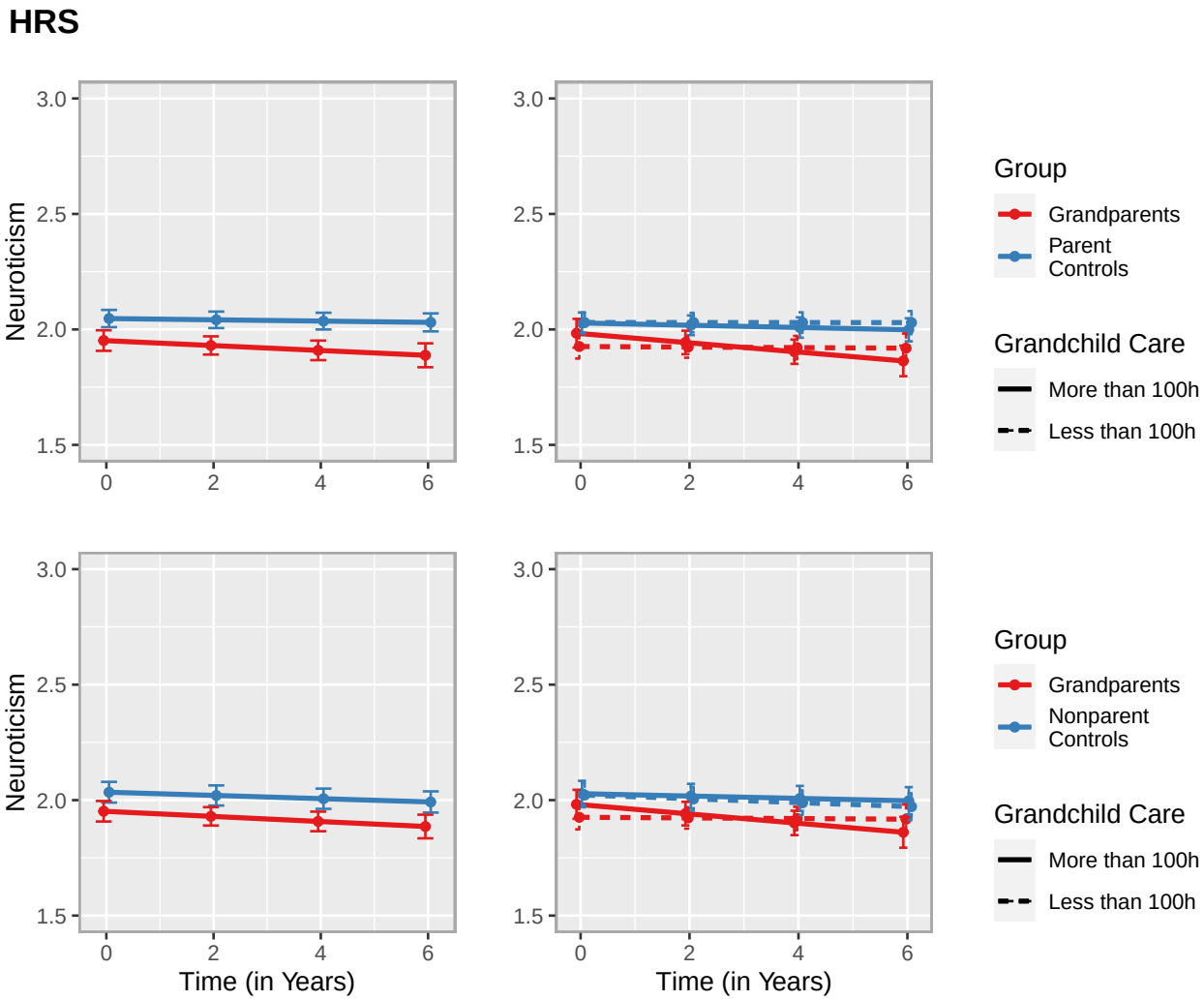

Figure S20

Change trajectories of neuroticism based on the models of moderation by grandchild care (see Table S37). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The plots in the left column are the same as in Figure S18 (basic models) but restricted to the post-transition period for better comparability.

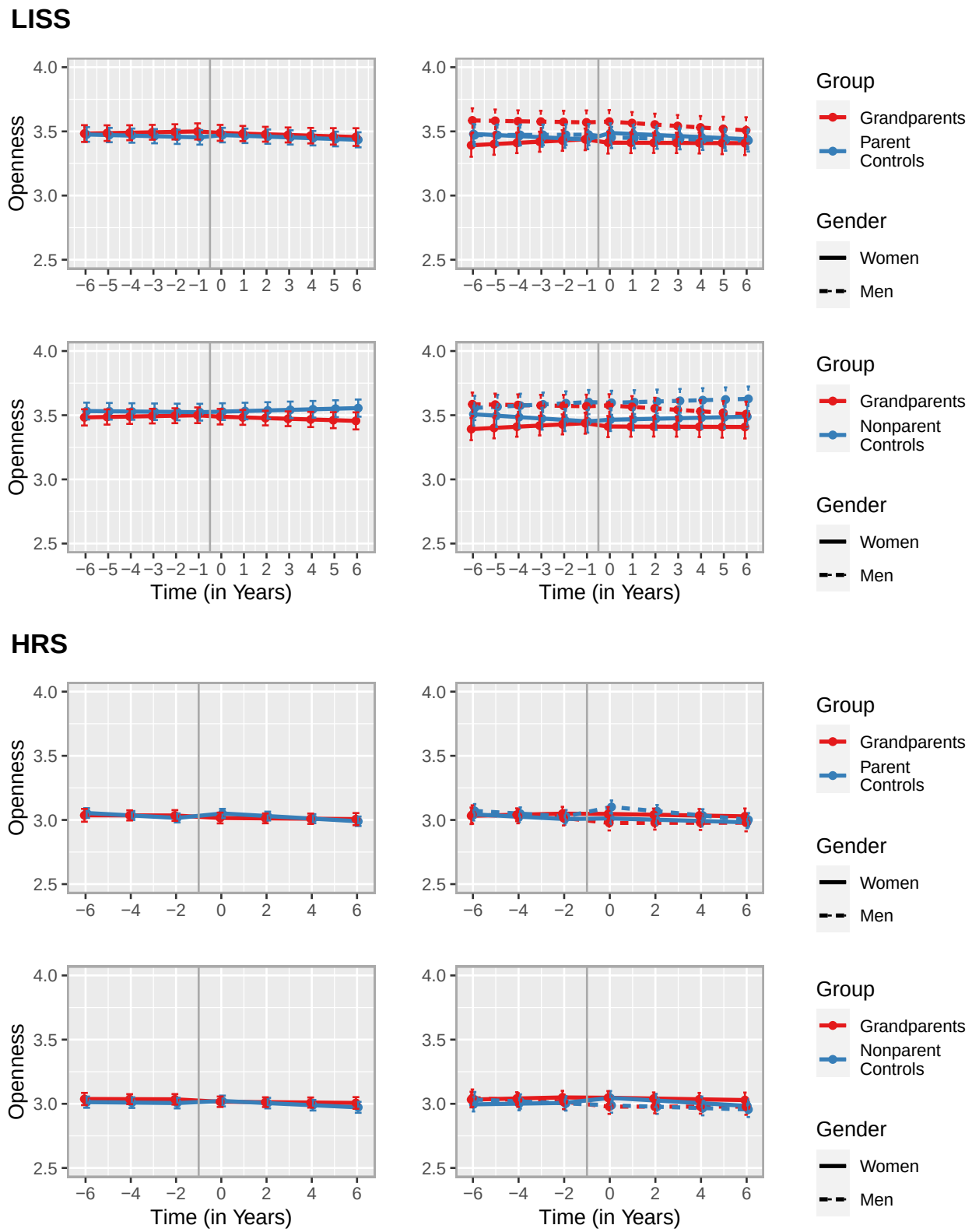

Figure S21

Change trajectories of openness based on the basic models (left column) and the models including the gender interaction (right column). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The vertical line indicates the approximate time of the transition to grandparenthood.

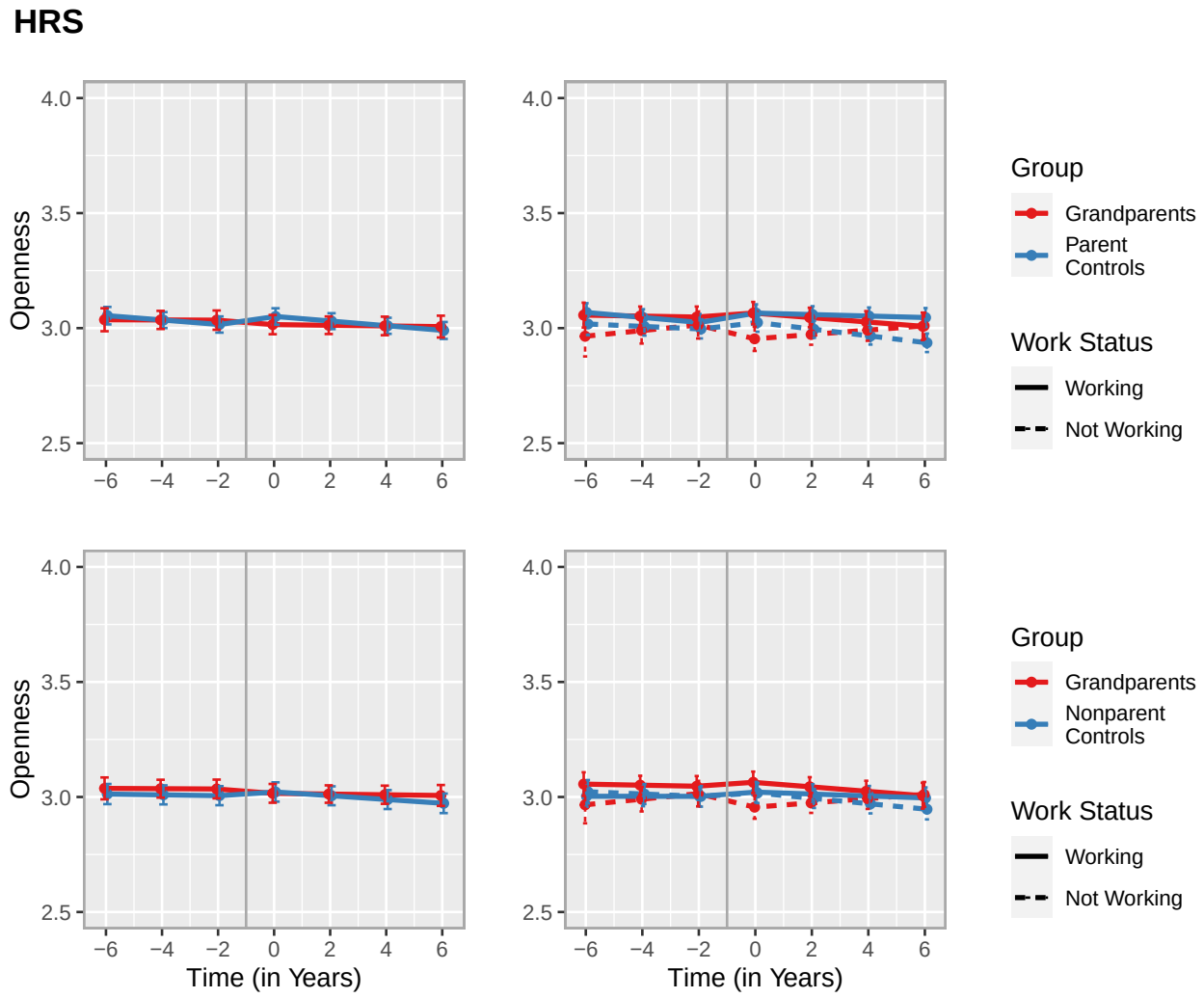

Figure S22

Change trajectories of openness based on the models of moderation by paid work (see Table S43). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The vertical line indicates the approximate time of the transition to grandparenthood. The plots in the left column are the same as in Figure S21 (basic models) and added here for better comparability.

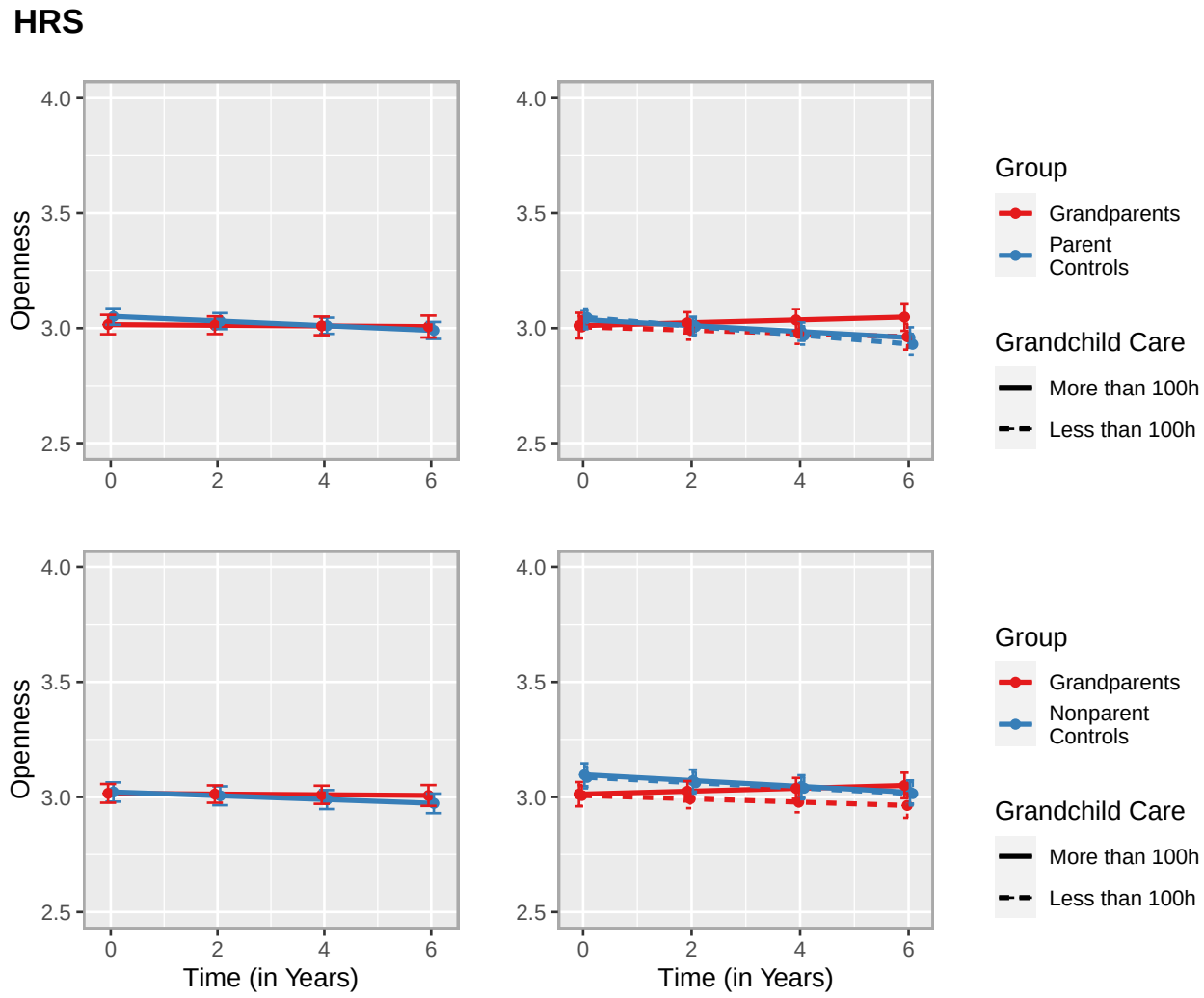

Figure S23

Change trajectories of openness based on the models of moderation by grandchild care (see Table S45). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The plots in the left column are the same as in Figure S21 (basic models) but restricted to the post-transition period for better comparability.

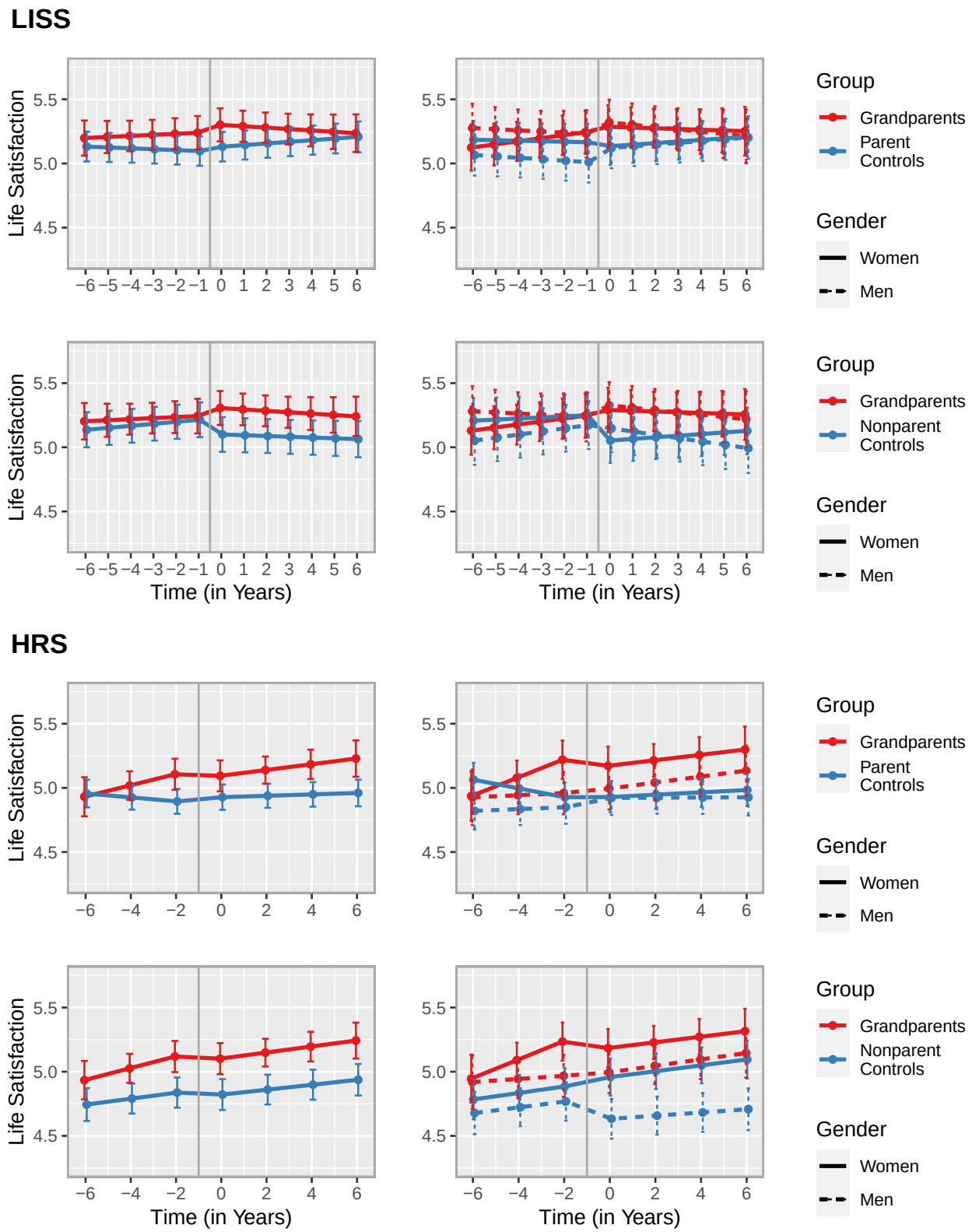

Figure S24

Change trajectories of life satisfaction based on the basic models (left column) and the models including the gender interaction (right column). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The vertical line indicates the approximate time of the transition to grandparenthood.

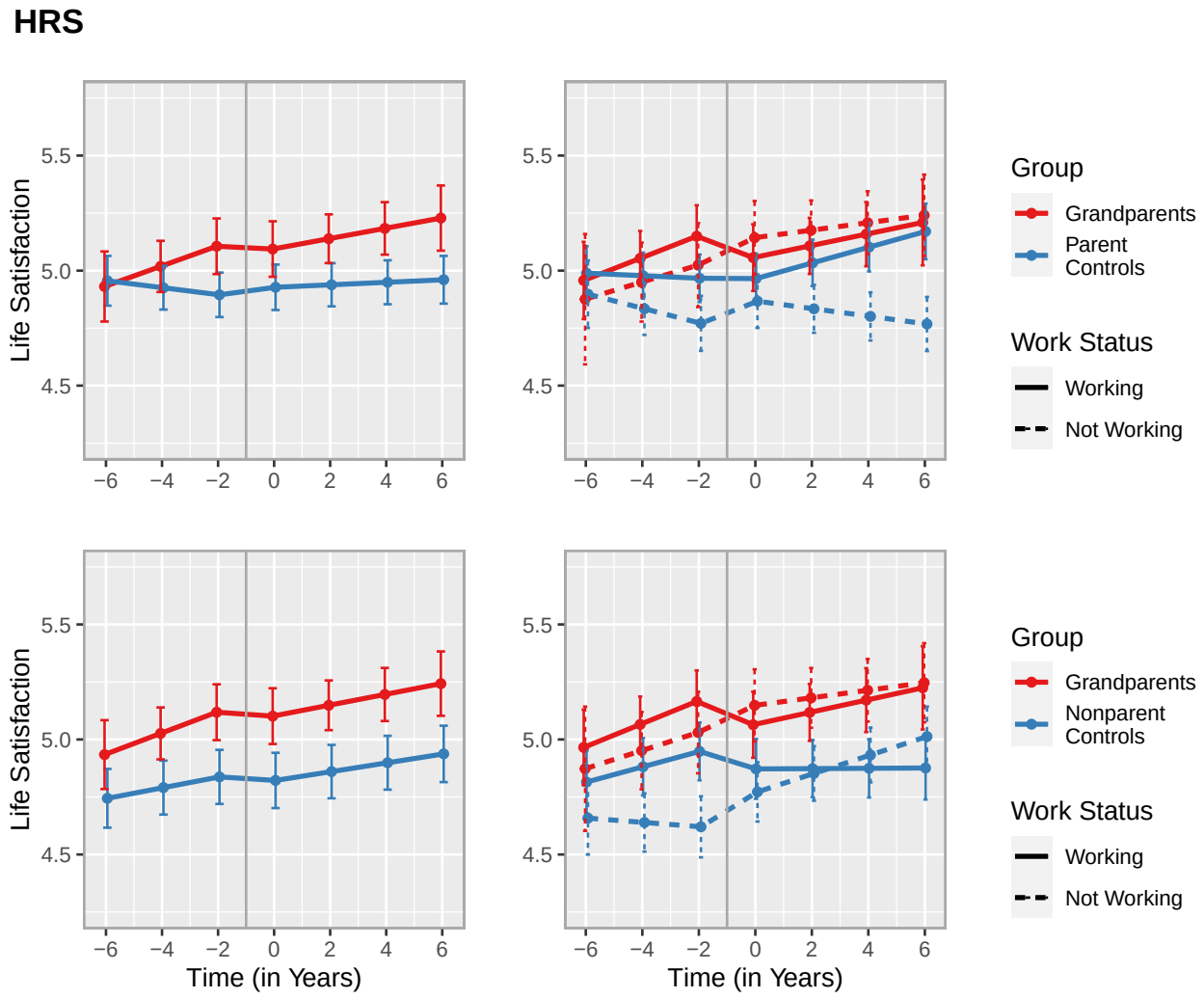

Figure S25

Change trajectories of life satisfaction based on the models of moderation by paid work (see Table S51). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The vertical line indicates the approximate time of the transition to grandparenthood. The plots in the left column are the same as in Figure S24 (basic models) and added here for better comparability.

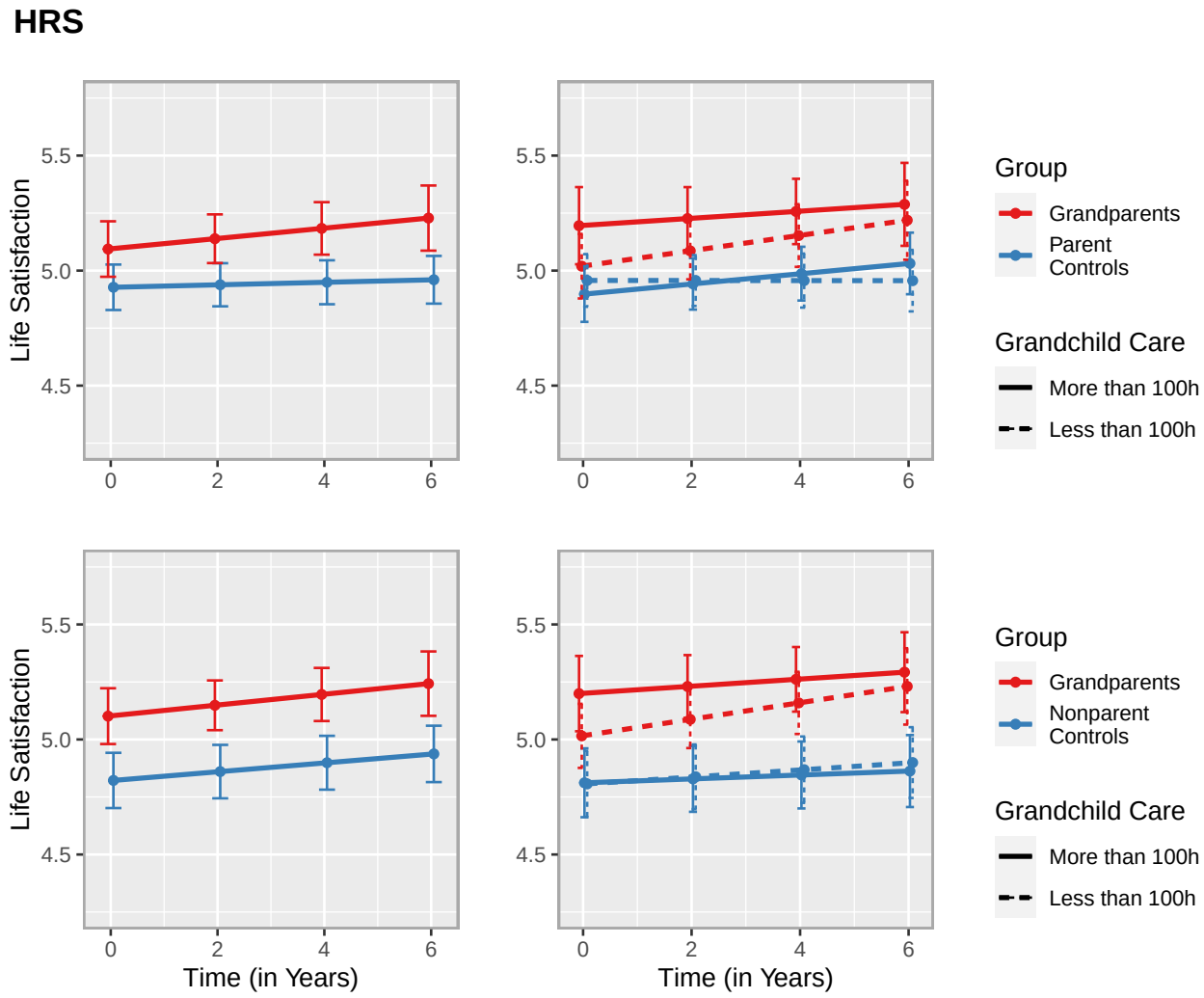

Figure S26

Change trajectories of life satisfaction based on the models of moderation by grandchild care (see Table S53). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The plots in the left column are the same as in Figure S24 (basic models) but restricted to the post-transition period for better comparability.

Complete Software and Session Information

We used R (Version 4.0.4; R Core Team, 2021) and the R-packages *car* (Version 3.0.10; Fox et al., 2020a, 2020b; Yentes & Wilhelm, 2018), *carData* (Version 3.0.4; Fox et al., 2020b), *careless* (Version 1.1.3; Yentes & Wilhelm, 2018), *citr* (Version 0.3.2; Aust, 2019), *corrplot2017* (Wei & Simko, 2017), *cowplot* (Version 1.1.0; Wilke, 2020), *dplyr* (Version 1.0.2; Wickham, François, et al., 2020), *effects* (Version 4.2.0; Fox & Weisberg, 2018; Fox, 2003; Fox & Hong, 2009), *forcats* (Version 0.5.0; Wickham, 2020a), *foreign* (Version 0.8.81; R Core Team, 2020), *Formula* (Version 1.2.4; Zeileis & Croissant, 2010), *ggplot2* (Version 3.3.5; Wickham, 2016), *ggplotify* (Version 0.0.7; Yu, 2021), *GPArotation* (Version 2014.11.1; Bernaards & I.Jennrich, 2005), *Hmisc* (Version 4.4.2; Harrell Jr et al., 2020), *interactions* (Version 1.1.3; Long, 2019), *jtools* (Version 2.1.1; Long, 2020), *knitr* (Version 1.30; Xie, 2015), *lattice* (Version 0.20.41; Sarkar, 2008), *lme4* (Version 1.1.26; Bates et al., 2015), *lmerTest* (Version 3.1.3; Kuznetsova et al., 2017), *magick* (Version 2.6.0; Ooms, 2021), *MASS* (Version 7.3.53; Venables & Ripley, 2002), *MatchIt* (Version 4.1.0; Ho et al., 2020), *Matrix* (Version 1.3.2; Bates & Maechler, 2021), *multcomp* (Version 1.4.17; Hothorn et al., 2008), *mvtnorm* (Version 1.1.1; Genz & Bretz, 2009), *papaja* (Version 0.1.0.9997; Aust & Barth, 2020), *patchwork* (Version 1.1.0.9000; Pedersen, 2020), *png* (Version 0.1.7; Urbanek, 2013), *psych* (Version 2.0.9; Revelle, 2020), *purrr* (Version 0.3.4; Henry & Wickham, 2020), *readr* (Version 1.4.0; Wickham & Hester, 2020), *readxl* (Version 1.3.1; Wickham & Bryan, 2019), *robustlmm* (Version 2.3; Koller, 2016), *scales* (Version 1.1.1; Wickham & Seidel, 2020), *shiny* (Version 1.5.0; Chang et al., 2020), *stringr* (Version 1.4.0; Wickham, 2019), *survival* (Version 3.2.7; Terry M. Therneau & Patricia M. Grambsch, 2000), *TH.data* (Version 1.0.10; Hothorn, 2019), *tibble* (Version 3.1.2; Müller & Wickham, 2020), *tidyr* (Version 1.1.2; Wickham, 2020b), *tidyverse* (Version 1.3.0; Wickham, Averick, et al., 2019), and *tinylabels* (Version 0.1.0; Barth, 2020) for data wrangling, analyses, and plots.

The following is the output of R's *sessionInfo()* command, which shows information

to aid analytic reproducibility of the analyses.

R version 4.0.4 (2021-02-15) Platform: x86_64-apple-darwin17.0 (64-bit) Running under: macOS Big Sur 10.16

Matrix products: default BLAS: /Library/Frameworks/R.framework/Versions/4.0/Resources/lib/libRblas.dylib LAPACK: /Library/Frameworks/R.framework/Versions/4.0/Resources/lib/libRlapack.dylib

locale: [1] en_US.UTF-8/en_US.UTF-8/en_US.UTF-8/C/en_US.UTF-8/en_US.UTF-8

attached base packages: [1] grid stats graphics grDevices utils datasets methods [8] base

other attached packages: [1] png_0.1-7 car_3.0-10 carData_3.0-4 [4] scales_1.1.1 cowplot_1.1.0 lmerTest_3.1-3 [7] lme4_1.1-26 Matrix_1.3-2 GPArotation_2014.11-1 [10] psych_2.0.9 forcats_0.5.0 stringr_1.4.0 [13] dplyr_1.0.2 purrr_0.3.4 readr_1.4.0 [16] tidyr_1.1.2 tibble_3.1.2 tidyverse_1.3.0 [19] Hmisc_4.4-2 ggplot2_3.3.5 Formula_1.2-4 [22] lattice_0.20-41 multcomp_1.4-17 TH.data_1.0-10 [25] MASS_7.3-53 survival_3.2-7 mvtnorm_1.1-1 [28] citr_0.3.2 papaja_0.1.0.9997 tinylabels_0.1.0

loaded via a namespace (and not attached): [1] minqa_1.2.4 colorspace_2.0-1 rio_0.5.16 [4] ellipsis_0.3.2 htmlTable_2.1.0 base64enc_0.1-3 [7] fs_1.5.0 rstudioapi_0.13 fansi_0.5.0 [10] lubridate_1.7.9.2 xml2_1.3.2 codetools_0.2-18 [13] splines_4.0.4 mnormt_2.0.2 knitr_1.30

```
[16] jsonlite_1.7.2 nloptr_1.2.2.2 broom_0.7.6
[19] cluster_2.1.0 dbplyr_1.4.4 shiny_1.5.0
[22] compiler_4.0.4 httr_1.4.2 backports_1.2.1
[25] assertthat_0.2.1 fastmap_1.0.1 cli_2.5.0
[28] later_1.1.0.1 htmltools_0.5.0 tools_4.0.4
[31] gtable_0.3.0 glue_1.4.2 Rcpp_1.0.6
[34] cellranger_1.1.0 vctrs_0.3.8 nlme_3.1-152
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[40] mime_0.9 miniUI_0.1.1.1 lifecycle_1.0.0
[43] statmod_1.4.35 zoo_1.8-8 hms_0.5.3
[46] promises_1.1.1 parallel_4.0.4 sandwich_3.0-0
[49] RColorBrewer_1.1-2 curl_4.3.1 yaml_2.2.1
[52] gridExtra_2.3 rpart_4.1-15 latticeExtra_0.6-29 [55] stringi_1.5.3
checkmate_2.0.0 zip_2.1.1
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