The Transition to Grandparenthood: No Consistent Evidence for Change in the Big Five Personality Traits and Life Satisfaction

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Abstract

Intergenerational relations have received increased attention in the context of population aging and increased childcare provision by grandparents. However, few studies have investigated the psychological consequences of becoming a grandparent. For the Big Five personality traits, the transition to grandparenthood has been proposed as a developmental task in middle adulthood and old age that contributes to personality development through the adoption of a new role—in line with the social investment principle. In this preregistered study, we used nationally representative panel data from the Netherlands (N = 520) and the United States (N = 2,239) to analyze first-time grandparents' development of the Big Five and life satisfaction in terms of mean-level changes, interindividual differences in change, and rank-order stability. We tested gender, paid work, and grandchild care as moderators of change trajectories. To address confounding bias, we employed propensity score matching using two procedures: matching grandparents with parents and with nonparents to achieve balance in different sets of carefully selected covariates. Longitudinal multilevel models demonstrated relative stability in the Big Five and life satisfaction over the transition to grandparenthood, and no consistent moderation effects. The few small effects of grandparenthood on personality development did not replicate across samples. Contrary to expectations, we also found no consistent evidence of larger interindividual differences in change in grandparents compared to the controls or of lower rank-order stability. Our findings add to recent critical re-examinations of the social investment principle and are discussed in light of characteristics of grandparenthood that might moderate personality development.

Keywords: grandparenthood, Big Five, life satisfaction, development, propensity score matching

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Becoming a grandparent is an important 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 an era of population aging, the time that grandparents are alive and in good health during grandparenthood is prolonged compared to previous generations (Bengtson, 2001; Leopold & Skopek, 2015; Margolis & Wright, 2017). In addition, grandparents fulfill an increased share of childcare responsibilities (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; Fingerman et al., 2020). In the research on personality development, the transition to grandparenthood has been posited as an important developmental task arising in old age (Hutteman et al., 2014). However, empirical research on the psychological consequences of grandparenthood still remains 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 conceptualizes aging as a lifelong process of development and adaptation (Baltes et al., 2006). Research embedded in this perspective has found personality traits to be subject to change across 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 majority 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 experience—which constitute a broad categorization of universal patterns of thought, affect, and behavior (John et al., 2008; John & Srivastava, 1999). 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 ordering of people relative to each other on trait dimensions (i.e., rank-order stability; Anusic & Schimmack, 2016; Roberts & DelVecchio, 2000). A lack of observed changes in mean trait levels does 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 (circa 30–60 years old; Hutteman et al., 2014) are typically characterized by greater maturity, as evidenced by increased agreeableness and conscientiousness and decreased neuroticism (Damian et al., 2019; Roberts et al., 2006). In old age (circa 60 years and older; Hutteman et al., 2014), research is generally more sparse, but there is some evidence of a *reversal* of the maturity effect 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 when health problems arise (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 it reaches a plateau in midlife, and decreases in old age. However, evidence is mixed on whether rank-order stability actually decreases again in old age (see Costa et al., 2019; Wagner et al., 2019). Nonetheless, the previously held 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) has been largely abandoned (Specht et al., 2014).

Theories explaining the mechanisms of personality development in middle adulthood and old age emphasize genetic influences and life experiences as interdependent sources of stability and change (Bleidorn et al., 2021; Specht et al., 2014; Wagner et al., 2020). We conceptualize the transition to grandparenthood as a life experience involving the adoption of a new social role according to the social investment principle of neo-socioanalytic theory (Lodi-Smith & Roberts, 2007; Roberts & Wood, 2006). The social investment principle states that 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 people's 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 a complimentary perspective on personality development through role transitions: It assumes that trait change is more likely whenever people transition into unknown environments where pre-existing behavioral responses are no longer appropriate and social expectations give clear indications how to behave instead. Environments that provide no clear guidance on how to behave favor stability. The finding that age-graded, normative life experiences, such as the transition to grandparenthood, drive personality development would therefore also be in line with the paradoxical theory of personality coherence (see Specht et al., 2014).

Empirically, certain life events such as the first romantic relationship (Wagner et al., 2015), the transition from high school to university, or the first job (Asselmann & Specht, 2021; Golle et al., 2019; Lüdtke et al., 2011) have been found to co-occur with mean-level changes that are (partly) consistent with the social investment principle (for a review, see Bleidorn et al., 2018). However, recent findings on the transition to parenthood fail to

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 life events produced limited support for the social investment principle: Small increases in emotional stability occurred following the transition to employment but not in the other traits or following the other life events theoretically linked to social investment (Denissen et al., 2019).

Overall, much remains unknown about the environmental factors that underlie personality development in middle adulthood and old age. Recent research on retirement offers an indication that age-graded, normative life experiences contribute to change following a period of relative stability in midlife (Bleidorn & Schwaba, 2018; Schwaba & Bleidorn, 2019). These results are only partly in line with the social investment principle in terms of mean-level changes and display substantial interindividual differences in change trajectories. Schwaba and Bleidorn described retirement as a "divestment" of social roles (2019, p. 660) that functions differently than *social investment*, which adds a role (another paper introduced the term *personality relaxation* in this context; see Asselmann & Specht, 2021). Grandparenthood could represent a psychological investment in a new role in middle adulthood and old age—given that grandparents have regular contact with their grandchild and actively take part in childcare (Lodi-Smith & Roberts, 2007).

Grandparenthood

The transition to grandparenthood 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 children; see also Arpino, Gumà, et al., 2018; Margolis & Verdery, 2019), but also predictable as soon as children reveal their family planning or pregnancy. The transition to grandparenthood has been labeled a countertransition due to this lack of direct control over its timing (Hagestad

& Neugarten, 1985; as cited in Arpino, Gumà, et al., 2018). Grandparenthood is also generally positive in valence and emotionally significant if the grandparent maintains a good relationship with their child.

Grandparenthood can be characterized as a developmental task (Hutteman et al., 2014) that generally takes place in (early) old age, although this varies considerably both within and between cultures (Leopold & Skopek, 2015; Skopek & Leopold, 2017). Still, the period in which parents experience the birth of their first grandchild coincides with the end of (relative) personality stability in midlife (Specht, 2017), when retirement, shifting social roles, and initial cognitive and health declines can disrupt life circumstances, setting processes of personality development in motion (e.g., Mueller et al., 2016; Stephan et al., 2014). As a developmental task, grandparenthood is considered part of a normative sequence of aging that is subject to societal expectations and values that differ across cultures and historical time (Baltes et al., 2006; Hutteman et al., 2014). Mastering developmental tasks (i.e., fulfilling roles and expectations) is hypothesized to drive personality development towards maturation similarly to propositions of 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). Grandparent's investments in their grandchildren have been discussed as beneficial in terms of the evolutionary, economic, and sociological advantages they provide for the intergenerational family structure (Coall et al., 2018; Coall & Hertwig, 2011).

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 positive because it (usually) does not impose the stressful demands of daily childcare on grandparents. However, societal expectations about how grandparents should behave are less clearly defined than expectations around parenthood, and depend heavily on the

degree of possible grandparental investment (Lodi-Smith & Roberts, 2007)—how close grandparents live to their children, the quality of their relationship, and sociodemographic factors that create conflicting role demands (Bordone et al., 2017; Lumsdaine & Vermeer, 2015; Silverstein & Marenco, 2001; cf. Muller & Litwin, 2011). In the entire population of first-time grandparents, this diversity of role investments might generate pronounced interindividual differences in intraindividual personality change.

While we could not find prior studies investigating the development of the Big Five over the transition to grandparenthood, there is some evidence of changes in life satisfaction across the transition to grandparenthood. In cross-sectional studies, grandparents who provide grandchild care or have close relationships with their older grandchildren often have higher life satisfaction (e.g., Mahne & Huxhold, 2014; Triadó et al., 2014). There are a few longitudinal studies but they have produced conflicting conclusions: Studies using data from the Survey of Health, Ageing and Retirement in Europe (SHARE) showed that the birth of a grandchild was followed by improvements in 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 demonstrated that grandparents who were 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 in depressive symptoms in grandmothers (Sheppard & Monden, 2019).

In a similar vein, some prospective studies have 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.,

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

2016a, 2016b). Again, the beneficial effects of grandparenthood on self-rated health did not persist in fixed effects analyses, such as Ates's (2017) analysis of longitudinal data from the German Aging Survey (DEAS).

We are not aware of any study investigating trait rank-order stability over the transition to grandparenthood. Other life events are associated with rank-order stability of personality and well-being, although only certain events and traits (e.g., Denissen et al., 2019; Hentschel et al., 2017; Specht et al., 2011). Altogether, evidence is lacking on the Big Five and inconclusive on life satisfaction (and related measures) which might be due to different methodological approaches that do not always account for confounding (i.e., selection effects).

Methodological Considerations

Effects of life events on psychological traits 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). 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, was recently 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 groups in their estimated propensity to experience the event (Thoemmes & Kim, 2011). This propensity is calculated from regressing the so-called treatment 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 against two propensity-score-matched control groups separately: first, parents (but not grandparents) with at least one child of reproductive age, and, second, nonparents. Adopting two control groups allows us to disentangle potential effects attributable to becoming a grandparent from effects attributable to already being a parent (i.e., parents who eventually become grandparents might share additional similarities with parents who do not). Thus, we are able to address selection effects into grandparenthood more comprehensively than previous research and we cover the first two of three causal pathways to not experiencing grandparenthood pointed out in demographic research (Margolis & Verdery, 2019): childlessness, childlessness of one's children, and not living long enough to become a grandparent. Our comparative design controls for average age-related and historical trends in the Big Five traits and life satisfaction (Luhmann et al., 2014). The design also 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).

We improve upon previous longitudinal studies using matched control groups (e.g., Anusic et al., 2014a, 2014b; Yap et al., 2012) by matching at a specific time point before the transition to grandparenthood (i.e., 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 reducing the risk of introducing confounding through collider bias (Elwert & Winship, 2014). Similar approaches in the study of life events have been adopted in recent studies (Balbo & Arpino, 2016; Krämer & Rodgers, 2020; van Scheppingen & Leopold, 2020).

Current Study

In the current study, we examine the development of the Big Five personality traits across the transition to grandparenthood in a prospective, quasi-experimental design, thereby extending previous research on the effects of this transition on well-being to psychological development in a more general sense. We also revisit the development of life satisfaction, which we define as the general, cognitive appraisal of one's well-being in life based on subjective criteria (Eid & Larsen, 2008). Three research questions motivate the current study which—to our knowledge—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 used two nationally representative panel data sets and compared grandparents' development over the transition to grandparenthood with that of matched respondents who did not become grandparents during the study period (Luhmann et al., 2014). Informed by the social investment principle and previous research on personality development in middle adulthood and old age, we preregistered the following hypotheses (see blinded file *Preregistration.pdf* on https://osf.io/75a4r/?view_only=ac929a2c41fb4afd9d1a64a3909848d0):

- 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.

Finally, commitments to other institutions necessarily constrain the amount of possible grandparental investment. Thus, exploratorily, we 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 survey population is a true probability sample of households drawn from the population register (Scherpenzeel & Das, 2010). While roughly half of invited households consented to participate, refresher samples were drawn to oversample previously underrepresented groups using information about response rates and their association with demographic variables (see

https://www.lissdata.nl/about-panel/sample-and-recruitment/). Data collection was carried out online, and respondents were provided the technical equipment if needed. We included yearly assessments from 2008 to 2020 as well as basic demographics assessed monthly. For later coding of covariates from these monthly demographic data we used the first available assessment in each year.

The HRS is an ongoing population-representative study of older adults in the United States (Sonnega et al., 2014) administered by the Survey Research Center (University of Michigan). Initiated in 1992 with a first cohort of individuals aged 51-61 and their spouses, the study has since been expanded through additional cohorts (see https://hrs.isr.umich.edu/documentation/survey-design/). In addition to the biennial in-person or telephone interview, since 2006 the study has included a leave-behind questionnaire covering 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. While the HRS provided a large sample with a wider age range, the LISS was smaller and younger but provided more frequent personality assessments spaced every one to two years. Included grandparents from the LISS were younger because 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. Even though we have published using the LISS and HRS data before (see preregistration, https://osf.io/75a4r/?view_only=ac929a2c41fb4afd9d1a64a3909848d0), these publications

do not overlap with the current study in the focus on grandparenthood.[2] The present study used de-identified archival data available in the public domain, which meant that it was not necessary to obtain ethical approval from an IRB.

Measures

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 trait, respondents answered ten 5-point Likert-scale items (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). In 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 administered yearly but with planned missingness in some years for certain cohorts (see Denissen et al., 2019).

In the HRS, the Midlife Development Inventory (MIDI) scales measured the Big Five (Lachman & Weaver, 1997) with 26 adjectives (five each for conscientiousness, agreeableness, and extraversion; four for neuroticism; seven for openness to experience). Respondents were asked to rate on a 4-point scale how well each item described them (1 =

[2] 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/.

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, in 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 that 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*)[3]. 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 the transition to grandparenthood generally followed the same steps in both samples. This coding was based on items that differed slightly, however: In the LISS, respondents performing paid work were asked "Do you have children and/or grandchildren?" and were offered the answer categories "children", "grandchildren", and "no children or grandchildren". In the HRS, all respondents were asked to state their total number of grandchildren: "Altogether, how many grandchildren do you (or your husband / wife / partner, or your late husband / wife / partner) have?

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

Include as grandchildren any children of your (or your [late] husband's / wife's / partner's) biological, step- or adopted children".[4]

In both samples, we tracked grandparenthood status over time. Due to longitudinally inconsistent data in some cases, we included in the grandparent group only respondents with one transition from 0 (*no grandchildren*) to 1 (*at least one grandchild*) in this status variable, and no transitions backwards (see Figure 1). We marked respondents who consistently 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 female gender (0 = *male*, 1 = *female*) acted as a moderator as indicated by research on life satisfaction (Di Gessa et al., 2019; Tanskanen et al., 2019).

Second, we tested whether performing paid work (0 = *no*, 1 = *yes*) was associated with divergent trajectories of the Big Five and life satisfaction (Schwaba & Bleidorn, 2019). Since the LISS subsample consisted solely of respondents performing paid work, we performed these analyses only in the HRS. This served two purposes. On the one hand, it allowed us to test how respondents in the workforce differed from those not working, which might shed light on role conflict and have implications for social investment mechanisms. On the other hand, these moderation analyses allowed us to assess whether potential differences in results between the LISS and HRS samples could be accounted for by including performing paid work as a moderator in HRS analyses. In other words, perhaps the results in the HRS respondents performing paid work were similar to those seen in the LISS sample, which had already been conditioned on this variable through filtering in the

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

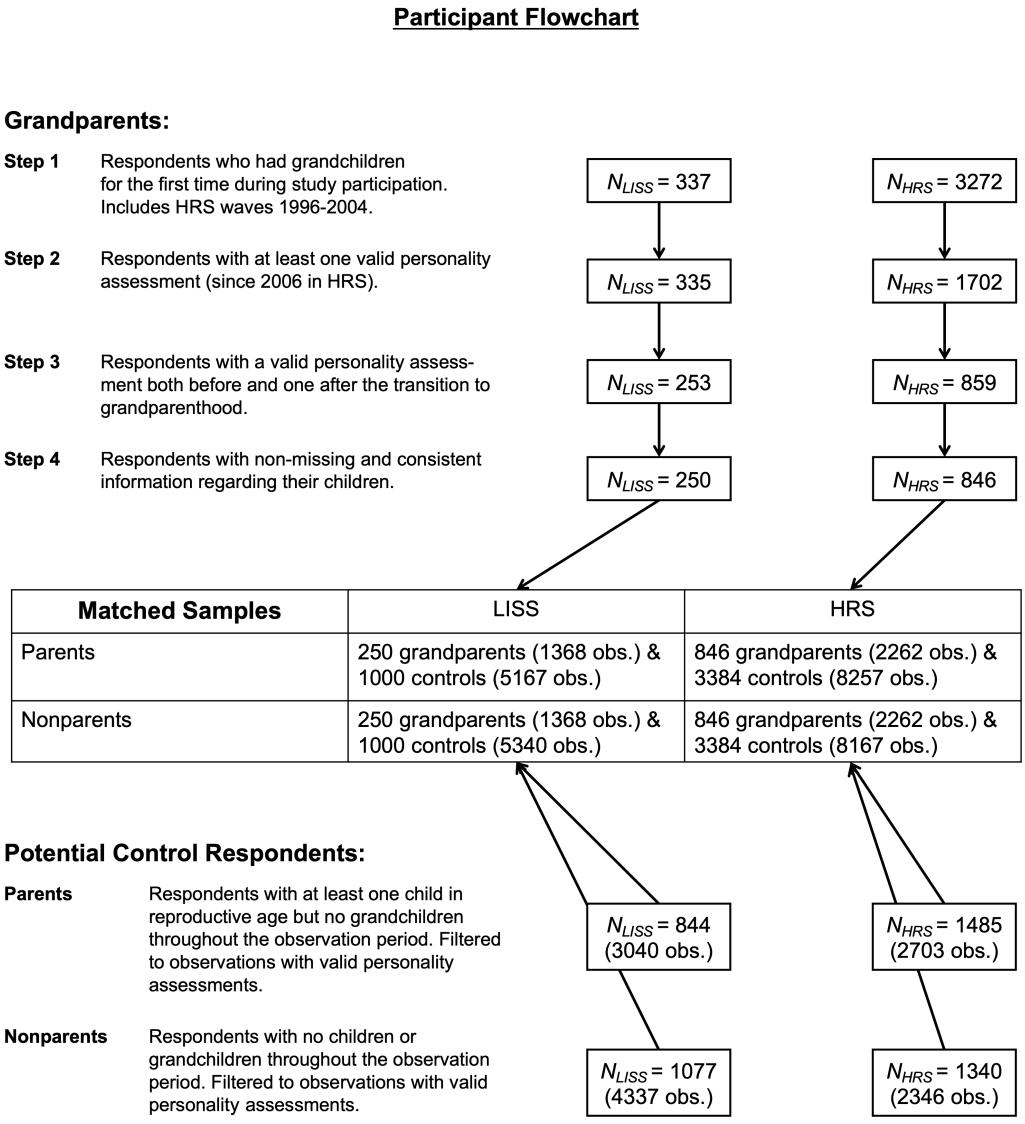

Figure 1

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

questionnaire.

Third, we examined how involvement in grandchild care moderated trajectories of the Big Five and life satisfaction (Arpino, Bordone, et al., 2018; Danielsbacka et al., 2019; Danielsbacka & Tanskanen, 2016). We coded a moderator variable (0 = *provided less than 100 hours of grandchild care*, 1 = *provided 100 or more hours of grandchild care*) 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?".[5] This information was only available for grandparents in the HRS; in the LISS, too few respondents answered respective follow-up questions to be included in analyses.

Procedure

Drawing on all available data, three main restrictions defined the final analysis samples of grandparents (see Figure 1): First, we identified respondents who indicated having grandchildren for the first time during study participation ($N_{LISS} = 337$; $N_{HRS} = 3272$, 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; $N_{LISS} = 335$; $N_{HRS} = 1702$).[6] Third, we included only respondents with both one valid personality assessment before and one after the transition to grandparenthood ($N_{LISS} = 253$; $N_{HRS} = 859$). Finally, a few respondents were excluded because of inconsistent or missing information regarding their children resulting in the final analysis samples of first-time grandparents, $N_{LISS} = 250$ (53.60% female; age at transition to grandparenthood $M = 57.94$, $SD = 4.87$) and $N_{HRS} = 846$ (54.85% female; age at transition to

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

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

grandparenthood $M = 61.80$, $SD = 6.88$).

We defined two pools of potential control subjects to be involved in the matching procedure: The first comprised parents who had at least one child of reproductive age (defined as $15 \leq age_{firstborn} \leq 65$) but no grandchildren during the observation period ($N_{LISS} = 844$ with 3040 longitudinal observations; $N_{HRS} = 1485$ with 2703 longitudinal observations). The second 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.

Covariates

To match each grandparent with the control respondent from each pool of potential controls who was most similar in terms of the included covariates, we used propensity score matching.

Although critical to the design, covariate selection has seldom been explicitly discussed in studies estimating effects of life events (e.g., in matching designs). We see two (in part conflicting) traditions that address covariate selection: First, classic recommendations from psychology are 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 (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 the involved variables (Pearl, 2009).

In selecting covariates, we followed the guidelines of VanderWeele et al. (2019; 2020), which reconcile both views and offer practical guidance when the underlying causal structures are not completely understood and when using large archival datasets. The

"modified disjunctive cause criterion" (VanderWeele, 2019, p. 218) recommends selecting 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. Variables that are 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) should be excluded from this selection. 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 to be relatively small. In addition, as mentioned above, the event of transition to grandparenthood is not planned by or under the direct control of the grandparents, which further reduces the risk of these biases.

Following these guidelines, we selected covariates covering respondents' demographics (e.g., age, 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 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). To match grandparents with the parent control group, we additionally selected covariates 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 (Arpino, Gumà, et al., 2018; Margolis & Verdery, 2019).

An overview of all covariates we used to compute the propensity scores can be found in the supplemental materials (see Tables S4 & S5). Importantly, as part of our preregistration we also provided a justification for each covariate explaining whether we assumed it to be related to the 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, 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.[7] 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 nonresponse in the outcome variables was negligible.

Propensity Score Matching

The time of matching preceded the survey year in which the transition to grandparenthood was first reported by at least two years (aside from that choosing the smallest available gap between matching and transition). This ensured that the covariates were not affected by the event itself or anticipation thereof (i.e., matching occurred well before children would have announced that they were expecting 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. 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

[7] 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.

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.[8] 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 good (see Tables S4 & S5), lying below 0.25 as recommended in the literature (Stuart, 2010), and below 0.10 with few exceptions (Austin, 2011). Graphically, group differences in the distribution of propensity scores were small and indicated no substantial missing overlap (see Figure S1).

After matching, each matched control observation was assigned the same value as the 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. We thus coded a counterfactual transition time frame for each 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 1.

The final LISS analysis samples (see Figure 1) 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). The final HRS analysis samples contained 846 grandparents with 2262 longitudinal

[8] In the LISS, 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, 846 grandparent observations were matched with 3384 control observations; 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.

Table 1

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 $N_{HRS} = 846$.

530

observations, matched with 3384 control respondents with either 8257 (parent control group) or 8167 longitudinal observations (nonparent control group). In the HRS, there were a few additional missing values in the outcomes ranging from 18 to 105 longitudinal observations, which were listwise deleted in the respective analyses.

Transparency and Openness

We used R (Version 4.0.4; R Core Team, 2021) and the R-packages *lme4* (Version 1.1.27.1; 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 materials. The preregistration and 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]). LISS and HRS data are available online after registering accounts. Following Benjamin et al. (2018), we set the α-level for confirmatory analyses to .005.

Analytical Strategy

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 (research question 1), we used linear piecewise regression coefficients in multilevel models with person-year observations nested within respondents and households (Hoffman, 2015). To model change over time in relation to the transition to grandparenthood, 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 1 for the coding scheme of these coefficients).[9] Other studies of personality development have recently adopted similar piecewise coefficients (e.g., Schwaba & Bleidorn, 2019; Krämer & Rodgers, 2020; 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 treatment variable (0 = *control*, 1 = *grandparent*). In additional models, we interacted these coefficients with the moderator variables, resulting in two- and 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* package (Fox & Weisberg, 2019). All models of mean-level changes were estimated using maximum likelihood and included random intercepts but no random slopes. We included the propensity score as a level-2 covariate for a double-robust approach (Austin, 2017). Model equations can be found in the supplemental materials.

Second, to assess interindividual differences in change (research question 2), we added random slopes to the models. 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 tests 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

[9] As an additional robustness check, we re-estimated the mean-level trajectories after further restricting the analysis time frame by excluding time points earlier than two years before the transition (i.e., before the latest time of matching). This served the purpose of assessing whether including time points from before matching (as preregistered) would distort the trajectories in any way. However, results were highly similar across all outcomes (see *gp_restricted_models.pdf* on https://osf.io/75a4r/?view_only=ac929a2c41fb4afd9d1a64a3909848d0).

respecified the models as heterogeneous variance models using the *nlme* R package (Pinheiro et al., 2021), which allowed for separate random slope variances to be estimated in the grandparent group and the control group within the same model. We compared the fit of these heterogeneous variance models to corresponding models with a homogeneous (single) random slope variance using likelihood ratio tests.

Third, to examine rank-order stability in the Big Five and life satisfaction over the transition to grandparenthood (research question 3), we computed the test-retest correlation of measurements prior to the transition to grandparenthood (at the time of matching) and the first available measurement afterwards. To test differences in test-retest correlations between grandparents and either of the control groups, we entered the pre-treatment measure, the treatment variable (0 = *control*, 1 = *grandparent*), and their interaction into regression models predicting the Big Five and life satisfaction. The interaction tests for significant differences in the rank-order stability between those who experienced the transition to grandparenthood and those who did not (see Denissen et al., 2019; McCrae, 1993).

Results

Throughout the results section, we referred to 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 S2 and S3. Visually represented (see Figures S2-S7), 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 of the total variance (ICC_{hid}, *median* = 0.03). For outcome-subsample combinations with ICC_{hid} below 0.05 we omitted the

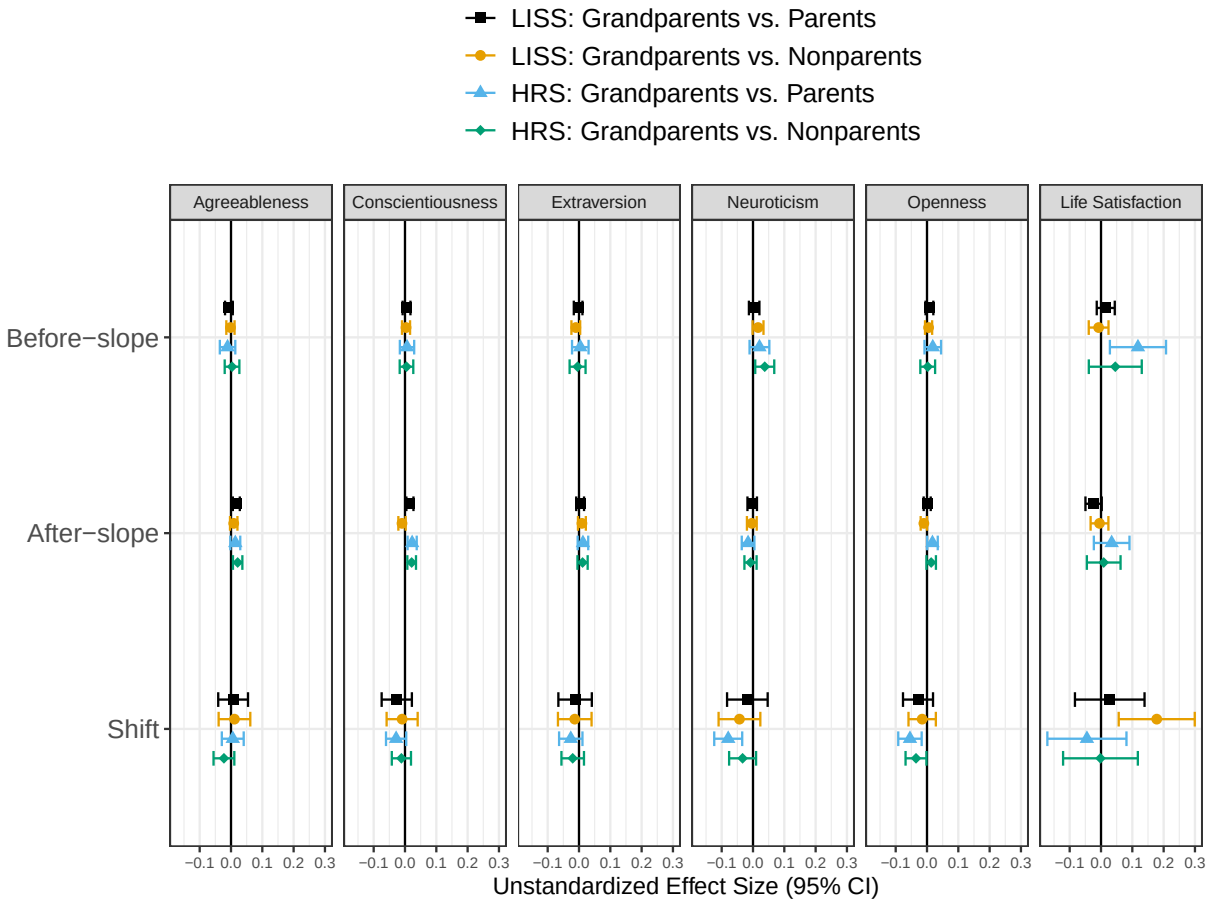

Figure 2

Unstandardized Effect Sizes of the Basic Models Across Analysis Samples (Regression Coefficients $\hat{\gamma}$ or Linear Contrasts $\hat{\gamma}_c$ From Multilevel Models, see Tables 2, S6, 5, S11, S17, S18, 7, S25, S32, S33, S40, S41). Error Bars Represent 95% Confidence Intervals.

household nesting factor from all models to bypass 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). Across all outcomes, the proportion of variance due to within-person factors was relatively low (*median* = 0.22).

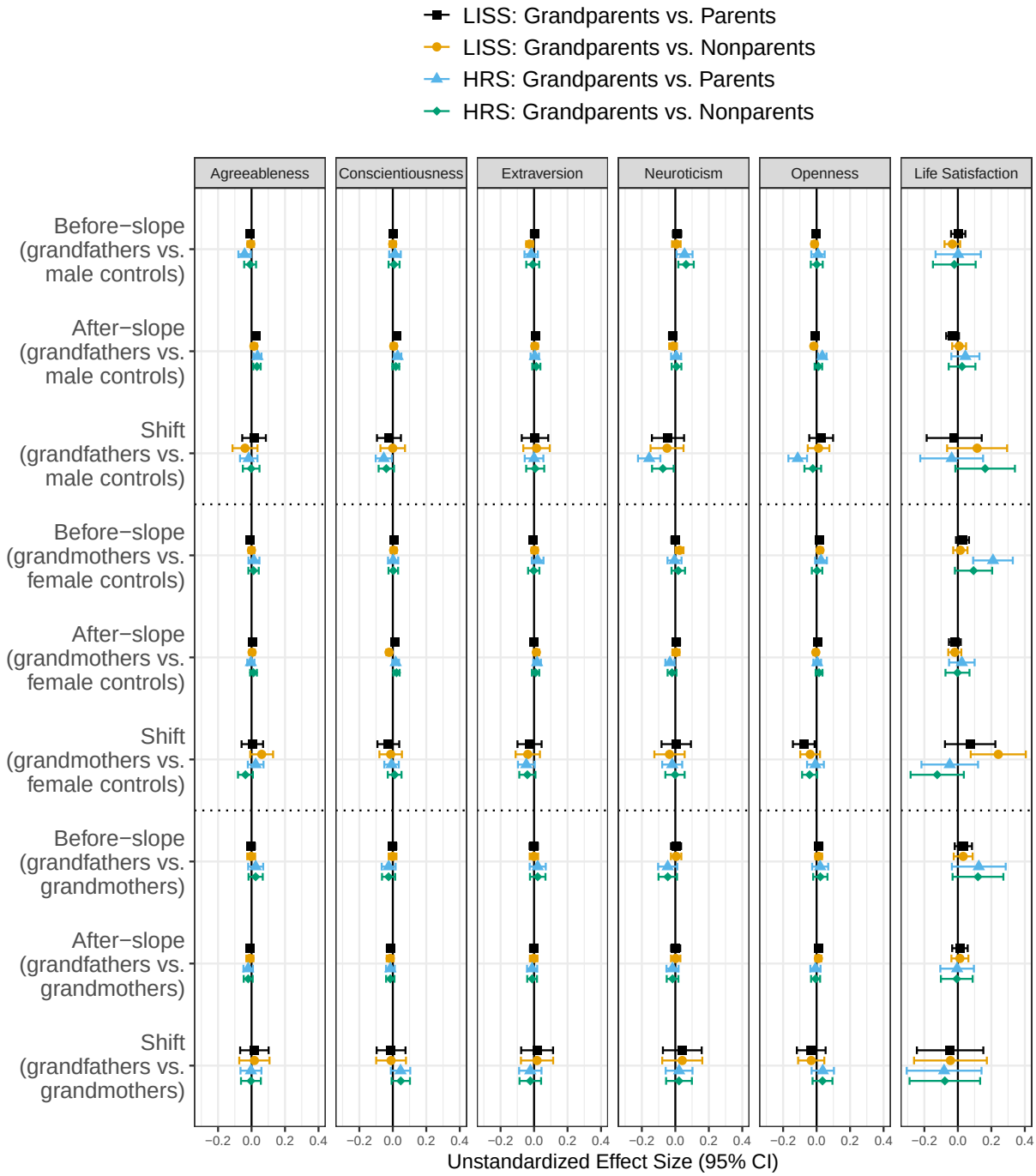

Figure 3

Unstandardized Effect Sizes of the Models Including the Gender Interaction Across Analysis Samples (Regression Coefficients $\hat{\gamma}$ or Linear Contrasts $\hat{\gamma}_c$ From Multilevel Models, see Tables 3, S7, S12, S13, S19, S20, S26, S27, S34, S35, S42, S43). Error Bars Represent 95% Confidence Intervals.

Mean-Level Changes

Figures 2 and 3 summarize the effects of the basic (i.e., unmoderated) models and those including the gender interaction for all outcomes and across the four analysis samples.

Agreeableness

In the basic models (see Tables 2 & S6 and Figure 4), 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 nonparent sample: $\hat{\gamma}_{21} = 0.02$, 95% CI $[0.01, 0.04]$, $p = .006$). The models including the gender interaction (see Tables 3 & S7 and Figure 4) indicated that grandfathers' post-transition increases in agreeableness were more pronounced as compared to the 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 the female controls.

There was no consistent evidence for moderation by paid work (see Tables S8 & S9 and Figure S8). 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 4 & S10 and Figure 5). However, differences between caring and non-caring grandparents—as specified in hypothesis H1b—were not significant in either sample.

Table 2

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 3

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 3 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.

634

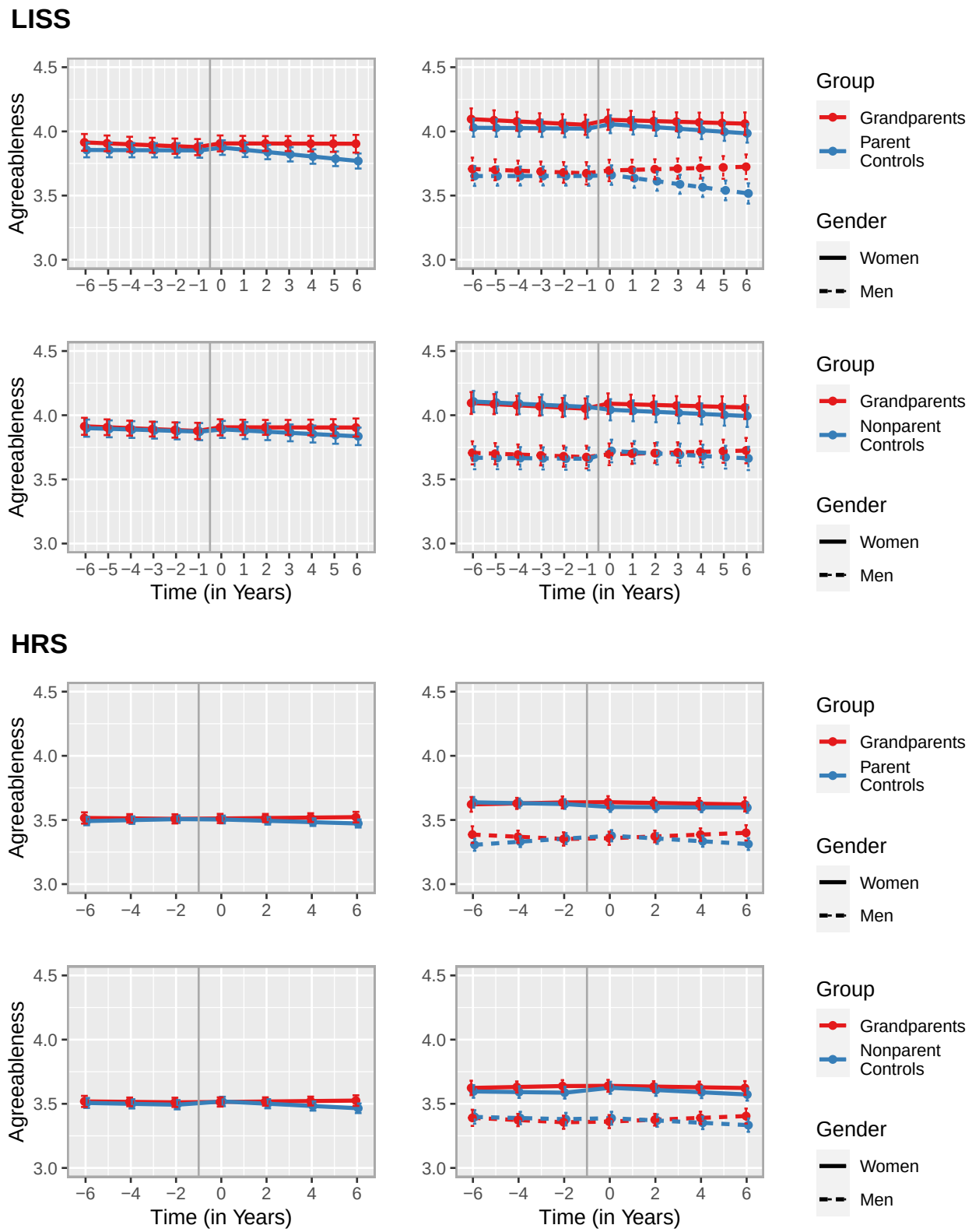

Figure 4

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.

Table 4

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.

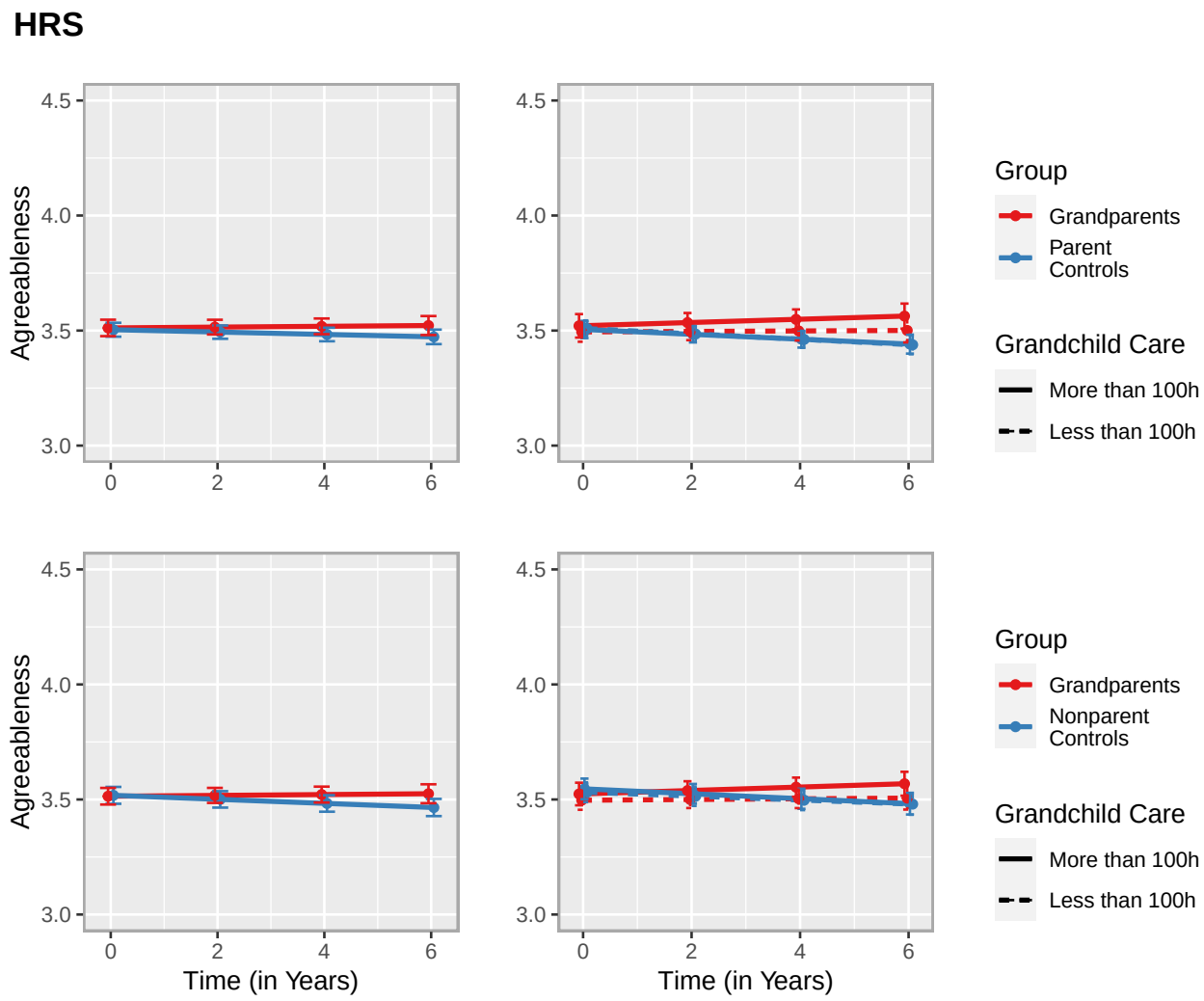

Figure 5

Change trajectories of agreeableness based on the models of moderation by grandchild care (see Table 4). 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 4 (basic models) but restricted to the post-transition period for better comparability.

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 5 & S11 and Figure 6). Grandparents' conscientiousness trajectories were not significantly moderated by gender (see Tables S12 & S13 and Figure 6).

There were significant differences in conscientiousness depending on grandparents' work status (see Tables S14 & S15 and Figure S9): 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], $p = .001$). Grandparents providing substantial grandchild care increased in conscientiousness to a greater degree than the matched respondents (difference in *after* parameter; parents: $[\hat{\gamma}_{21} + \hat{\gamma}_{31}] = 0.04$, 95% CI [0.02, 0.07], $p < .001$; nonparents: $[\hat{\gamma}_{21} + \hat{\gamma}_{31}] = 0.05$, 95% CI [0.03, 0.07], $p < .001$; see Tables 6 & S16 and Figure 7). There was only 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], $p = .022$).

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 S17 & S18 and Figure S10), the models including the gender interaction (see Tables S19 & S20 and Figure S10), or the models of moderation by paid work (see Tables S21 & S22 and Figure S11). The only significant effect for extraversion was found in the analysis of moderation by grandchild care (see Tables S23 & S24 and Figure S12): compared to matched parent controls, grandparents providing

Table 5

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.

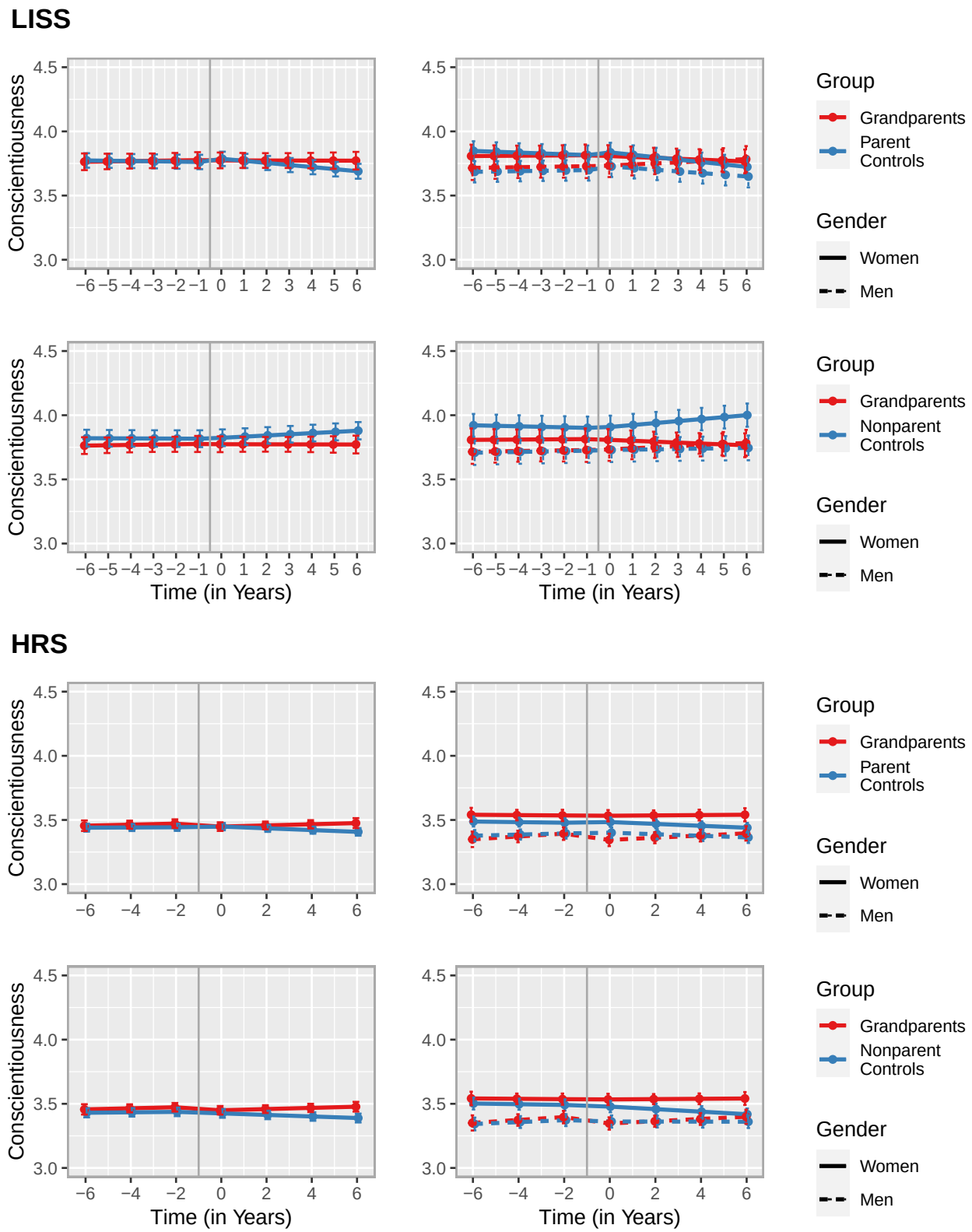

Figure 6

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.

Table 6

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.

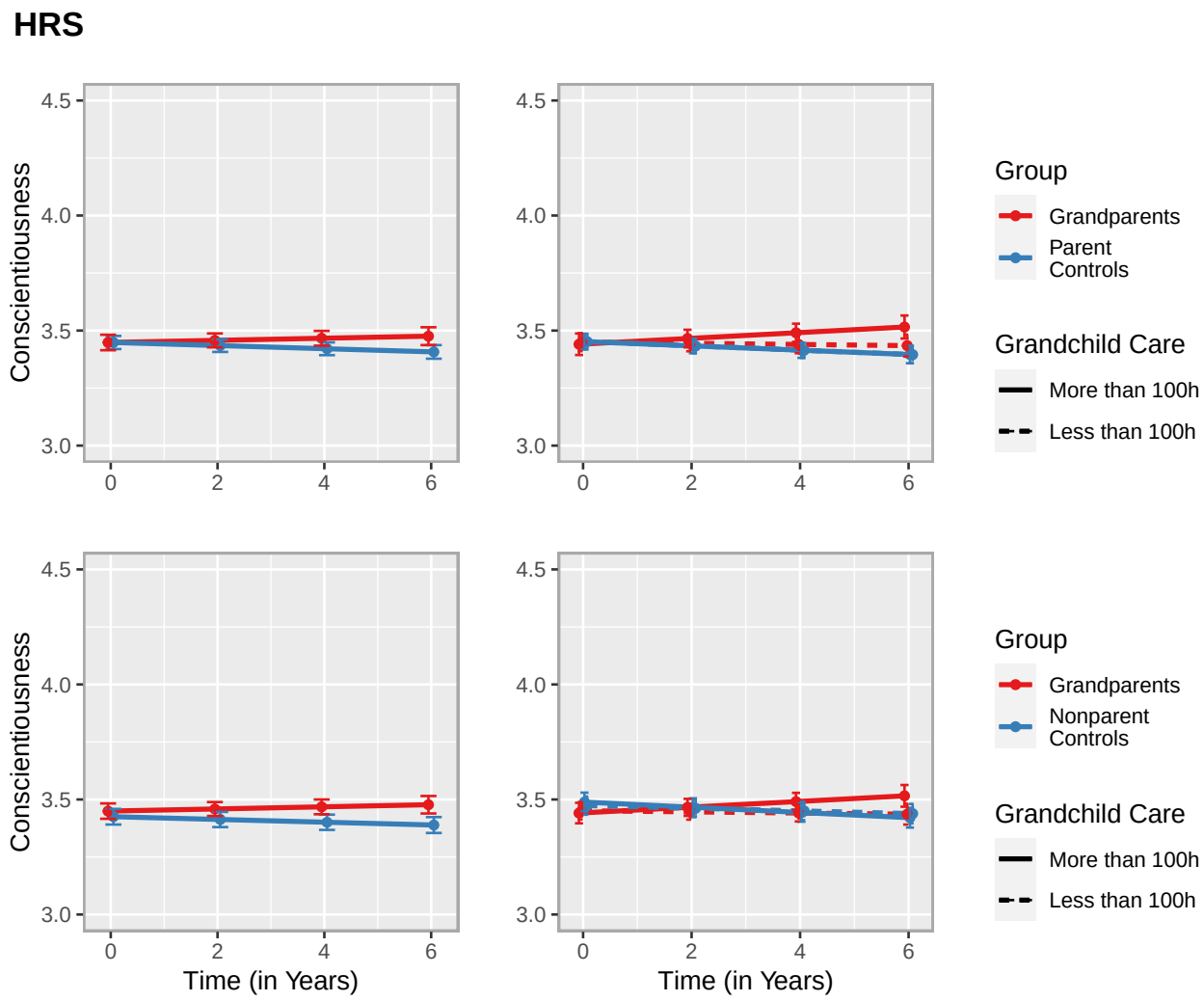

Figure 7

Change trajectories of conscientiousness based on the models of moderation by grandchild care (see Table 6). 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 6 (basic models) but restricted to the post-transition period for better comparability.

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 7 & S25 and Figure 8) showed only minor differences between grandparents and matched controls: Compared to HRS parent controls, HRS grandparents 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). The models including the gender interaction (see Tables S26 & S27 and Figure 8) showed one significant effect in the comparison of grandparents and controls: In the HRS, grandfathers, 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], $p = .024$). Thus, the effect 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 S28 & S29 and Figure S13): 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*

Table 7

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.

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 S30 & S31 and Figure S14).

Openness

For openness, we also found a high degree of similarity between grandparents and matched control respondents in their trajectories based on the basic models (see Tables S32 & S33 and Figure S15) and models including the gender interaction (see Tables S34 & S35 and Figure S15). 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], $p < .001$).

Performing paid work moderated grandparents' openness trajectories in subtle ways (see Tables S36 & S37 and Figure S16): 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

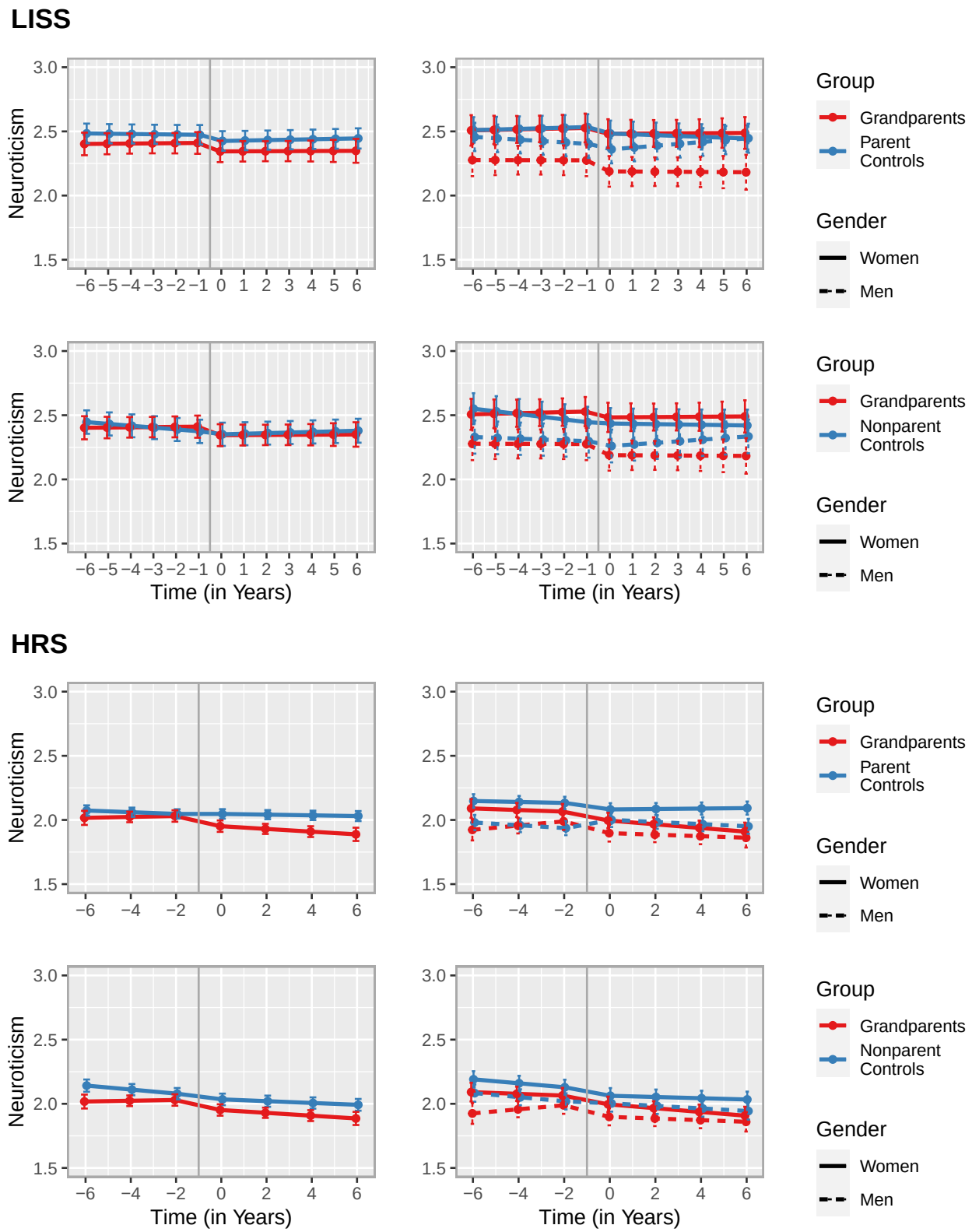

Figure 8

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.

care (see Tables S38 & S39 and Figure S17) 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 S40 & S41 and Figure S18) 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], $p = .004$). There was evidence in the models including the gender interaction (see Tables S42 & S43 and Figure S18) that this difference was 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], $p = .004$). HRS grandmothers increased more strongly before the transition to grandparenthood compared to female parent controls (difference in *before* parameter: $[\hat{\gamma}_{11} + \hat{\gamma}_{13}] = 0.21$, 95% CI [0.09, 0.33], $p < .001$).

There was no consistent evidence of a moderation of life satisfaction by performing paid work (see Tables S44 & S45 and Figure S19) or grandchild care (see Tables S46 & S47 and Figure S20).

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 of 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 S48, S49, & S50). In the two HRS samples, assuming group heterogeneity in the random slope variances led 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 change 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 S51). The other parameters of change in neuroticism did not differ significantly between groups in their random slope variances or—in the HRS—display significantly larger random slope variances in the respective control group.

For openness, interindividual differences in change 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 either did not differ between groups in their random slope variances or had significantly larger random slope variances in the respective control group (see Table S52).

We found partial evidence of larger interindividual differences in grandparents' changes in life satisfaction (see Table S53): 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, $p < .001$. Still, the majority of tests for heterogeneous random slope variances 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, and also separately for grandparents only and controls only (see Table 8). 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 grandparents and control respondents did not reach significance in any of these comparisons. Overall, we found no confirmatory evidence in support of hypothesis H3.[10]

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 increases in agreeableness and conscientiousness, and decreases in neuroticism (H1a), they were very small in size and also not consistent over the two analyzed panel studies (LISS and HRS) or the two matched

[10] In addition to the preregistered retest interval, we 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. There was only one significant difference in rank-order stability in accordance with our hypothesis: HRS grandparents' rank-order stability in openness was lower than that of the nonparents, $p < .001$ (see Table S54). Another analysis also failed to provide convincing evidence that grandparents' rank-order stability was lower: 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. Descriptively, 14 out of 24 comparisons showed lower rank-order stability in the grandparents compared to either control group (see Table S55). However, differences between groups were small and nonsignificant throughout.

Table 8

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.

control groups (parents and nonparents). We found suggestive evidence that grandparents providing substantial grandchild care increased slightly more strongly in conscientiousness and decreased slightly more strongly in neuroticism than grandparents who did not (H1b), as well as partial evidence for moderation of mean-level trajectories of conscientiousness, neuroticism, and openness by performing paid work. There was no consistent evidence that grandmothers reached higher levels of life satisfaction following the transition to grandparenthood (H1c). Although interindividual differences in change were present for all parameters of change, they were only greater in the grandparents compared to the controls in a small minority of the model comparisons conducted (H2). Finally, rank-order stability did not differ between grandparents and either control group, or it was lower 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, which posits that the transition to grandparenthood is a potentially important developmental task driving development of the Big Five personality traits (Hutteman et al., 2014). Across all analyzed traits, we found more evidence of trait stability than of change.

Still, whereas we did not find *consistent* evidence of personality development across the transition to grandparenthood, the direction of the (sparse) effects we found generally supported the social investment principle—in contrast to development following parenthood (Asselmann & Specht, 2020b; van Scheppingen et al., 2016). Below, we summarize our findings in support of the social investment principle because even small psychological 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 that were in 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 LISS or compared to HRS nonparents.

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). This has 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.[11] 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. One possible explanation is that (future) grandfathers were previously more invested in their work lives than in child rearing, and at the end of their career or after retirement, found investments 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 on the grandfather role is sparse (for a qualitative approach, see Mann & Leeson, 2010), while the demography of grandparenthood is undergoing sweeping changes, with rising proportions of grandfathers actively involved in grandchild care (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.

[11] 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 ($M = 0.41$, $SD = 0.49$).

To gain more insight into social investment mechanisms, we tested paid work and grandchild care as moderators. For conscientiousness, we found that grandparents who 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, when 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 the evidence was weak and indicates a need for temporally more fine-grained assessments with more extensive instruments of grandchild care (e.g., Vermote et al., 2021; see also Fingerman et al., 2020).

In total, evidence in favor of the social investment principle in our analyses was rather thin. This adds to other recent empirical tests in the context of parenthood and romantic relationships (Asselmann & Specht, 2020a, 2020b; Spikic et al., 2021; van Scheppingen et al., 2016) that have challenged the original core assumption of personality maturation through age-graded social role transitions. It now seems likely that distinct (or additional) theoretical assumptions and mechanisms are required to explain empirical findings of personality development in middle adulthood and old age. First steps in that direction include the recent distinction between social investment and divestment (Schwaba & Bleidorn, 2019) in the context of retirement (for the related distinction between personality maturation and relaxation, see Asselmann & Specht, 2021), as well as the

hypothesis that personality development is more closely tied to the subjective perceptions of adult role competency than to the transitions per se (Roberts & Davis, 2016).

Nonetheless, the possibility remains that preconditions we have not considered have to be met for grandparents to undergo personality development 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 (e.g., 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 in psychological characteristics like life satisfaction and personality.

Life Satisfaction

Similar to our findings on the Big Five personality traits, 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 of 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 grandparents' life satisfaction trajectories were also not moderated by employment status (Sheppard & Monden, 2019).

Overall, evidence 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 divergence is the presence of *selection* effects, that is, confounding which we have accounted for through the propensity score matching design, but which was present in previous within-person estimates of change (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. All parameters of change exhibited considerable interindividual differences. Similar to Denissen et al. (2019), who found significant model fit improvements of random slopes in most models (see also Doré & Bolger, 2018), this pattern indicates that respondents—both grandparents and matched controls—deviated to a considerable extent from the average trajectories that we reported on previously.

We expected larger interindividual differences in grandparents because life events differ in their impact on daily life and in the degree to which they are perceived 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 not significantly different between groups. Only in a small minority of tests were interindividual differences significantly larger in grandparents (concerning the linear slope in anticipation of grandparenthood for neuroticism, openness, and life satisfaction). Overall, we did not find evidence supporting the hypothesis that interindividual differences in change would be larger in the grandparents than the controls (H2).

When integrating this result into the literature, it is important to keep in mind that most previous studies did not compare interindividual differences in personality 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). As demonstrated by an analysis across the entire life span (i.e., irrespective of life events; Schwaba & Bleidorn, 2018), interindividual differences in personality change—although largest in emerging adulthood—were substantial up until around 70 years of age in most domains. Regarding the substantive question of how the transition to grandparenthood affects interindividual differences in change, we therefore propose that it is more informative to test grandparents' degree of variability in change against well-matched control groups than against no groups as often done previously.

Recently, Jackson and Beck (2021) presented evidence that the experience of sixteen commonly analyzed life events was mostly associated with decreases in interindividual variation in the Big Five compared to those not experiencing the respective event. 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 (i.e., without matching). Their results based on the German SOEP data suggested—contrary to their expectations—that most life events made people *more* similar to each other (Jackson & Beck, 2021). Thus, taken together with our results, it seems that the assumption that life events and transitions ostensibly 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 was lower than that of the matched controls. Conceptually, rank-order changes are possible in the absence of mean-level changes. Empirically, though, we did not find evidence supporting our hypothesis (H3): 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 particularly adverse events such as widowhood and disability significantly lowered respondents' rank-order stability (Chopik, 2018; 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). Grandparenthood might therefore 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 of reproductive age) and nonparents. To obtain a comprehensive picture of personality development, we analyzed mean-level changes, interindividual differences in change, and changes in rank-order stability. Both of the panel studies we used had their strengths and weaknesses: The HRS had a larger sample of first-time grandparents besides information on important moderators, but it assessed personality and life satisfaction only every four years. 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. Together, the strengths of one dataset partially compensated for the limitations of the other.

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 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; Infurna, 2021; 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 on 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 rests on a number of assumptions that are not directly testable with the data (Li, 2013; Stuart, 2010): Most importantly, we assumed 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 on covariate choice. Still, we believe that our procedure to select covariates following 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). Regarding the timing of measurements and the transition to grandparenthood, it also has to be emphasized that we might have missed more short-term effects playing out over months instead of years.

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. 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 that may demand different levels of grandparental involvement (Bordone et al., 2017; Hank & Buber, 2009). In the Netherlands, people become grandparents six years later on average than in the United States (Leopold & Skopek, 2015). Furthermore, although both countries have largely market-based systems for early child care, parents in the Netherlands on average have access to more extensive childcare services through (capped) governmental benefits (OECD, 2020). Despite these differences, our results from the Dutch and US samples did not indicate systematic discrepancies.

Finally, while we assessed our dependent variables using highly reliable scales, there was a conceptual difference in the Big Five measures (see John & Srivastava, 1999) in the two studies: The IPIP Big Five inventory used in the LISS (Goldberg, 1992) presented statements as items, and asked respondents to indicate how accurately these statements described them (using a bipolar response scale). However, the Midlife Development Inventory used in the HRS (Lachman & Weaver, 1997) presented adjectives as items, and asked respondents how well these adjectives 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 Figures S2-S7). The possibility should also be pointed out that our analyses on the domain-level of the Big Five could be too conceptually broad 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 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 and life satisfaction 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 development based on the social investment principle. However, these effects were minuscule and inconsistent across analysis samples. In addition, our analyses revealed (*1*) a lack of consistent moderation of personality development by grandparents providing substantial grandchild care, (*2*) interindividual differences in change that were mostly smaller in grandparents than in matched respondents, and (*3*) comparable rank-order stability in grandparents and matched respondents. Thus, we conclude that the transition to grandparenthood did not act as a straightforwardly important developmental task driving personality development in middle adulthood and old age (as previously proposed, see Hutteman et al., 2014). With more detailed assessment of the grandparent role, future research could investigate whether 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 (i.e., unmoderated) 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

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 S2 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 S3

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 S3 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 S4

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 S4 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).

1669

Table S5

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 S5 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 S6

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 2. $\hat{\gamma}_c$ = combined fixed-effects estimate.

1671

Table S7

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 3. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S8

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.

Table S9

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 S8. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S10

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 4. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S11

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 5. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S12

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 S12 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.

1677

Table S13

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 S12. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S14

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.

1679

Table S15

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 S14. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S16

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 6. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S17

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 S18

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 S17. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S19

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 S19 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.

1684

Table S20

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 S19. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S21

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 S22

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 S21. $\hat{\gamma}_c$ = combined fixed-effects estimate.

1687

Table S23

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.

Table S24

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 S23. $\hat{\gamma}_c$ = combined fixed-effects estimate.

1689

Table S25

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 7. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S26

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 S26 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.

1691

Table S27

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 S26. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S28

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.

1693

Table S29

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 S28. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S30

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.

Table S31

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 S30. $\hat{\gamma}_c$ = combined fixed-effects estimate.

1696

Table S32

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 S33

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 S32. $\hat{\gamma}_c$ = combined fixed-effects estimate.

1698

Table S34

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 S34 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 S35

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 S34. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S36

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 S37

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 S36. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S38

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.

1703

Table S39

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 S38. $\hat{\gamma}_c$ = combined fixed-effects estimate.

1704

Table S40

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 S41

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 S40. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S42

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 S42 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.

1707

Table S43

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 S42. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S44

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 S45

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 S44. $\hat{\gamma}_c$ = combined fixed-effects estimate.

Table S46

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.

1711

Table S47

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 S46. $\hat{\gamma}_c$ = combined fixed-effects estimate.

1712

Table S48

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 S49

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 S50

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 S51

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 S52

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 S53

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 S54

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 S55

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

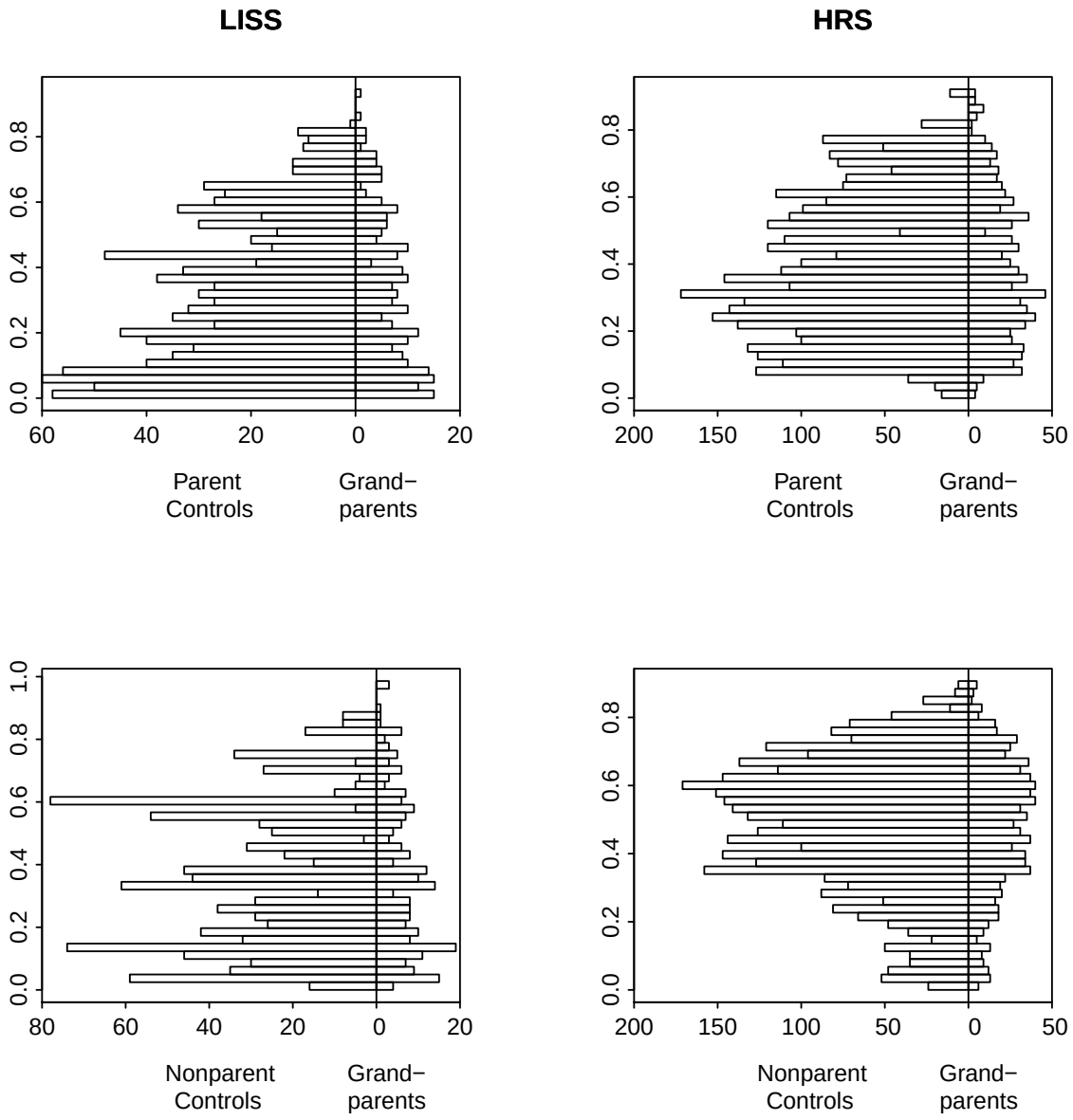

Figure S1

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

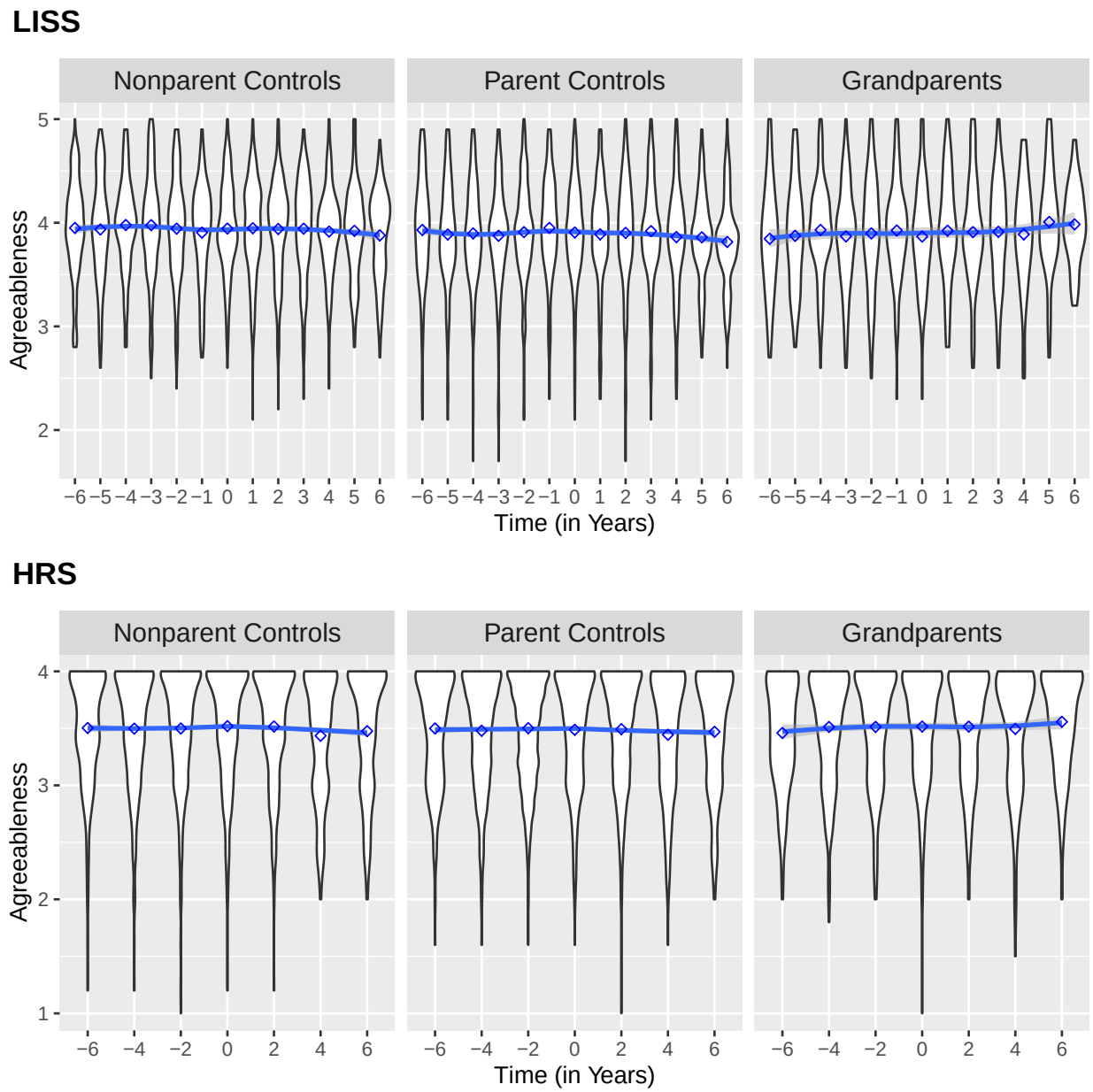

Figure S2

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

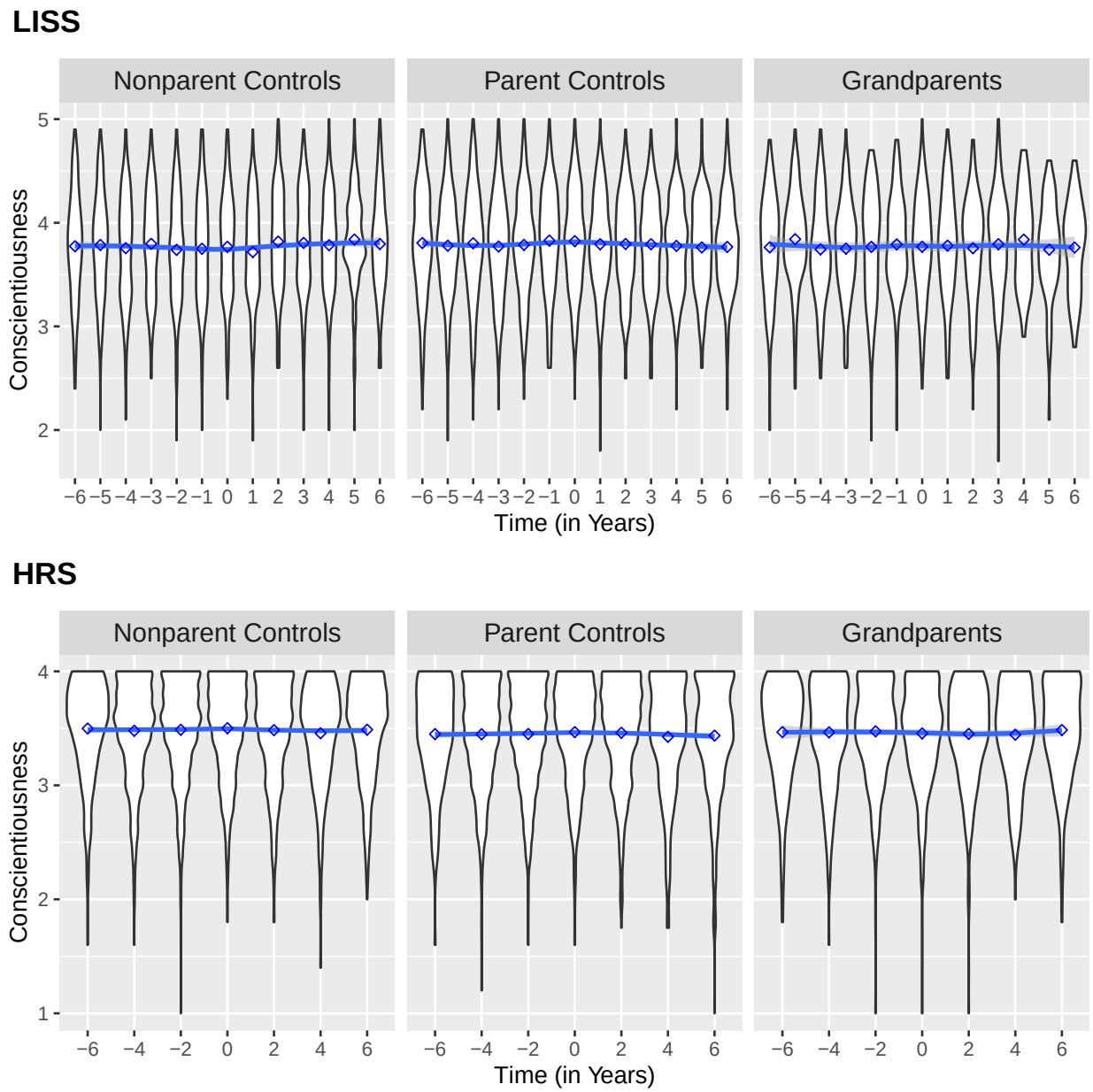

Figure S3

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

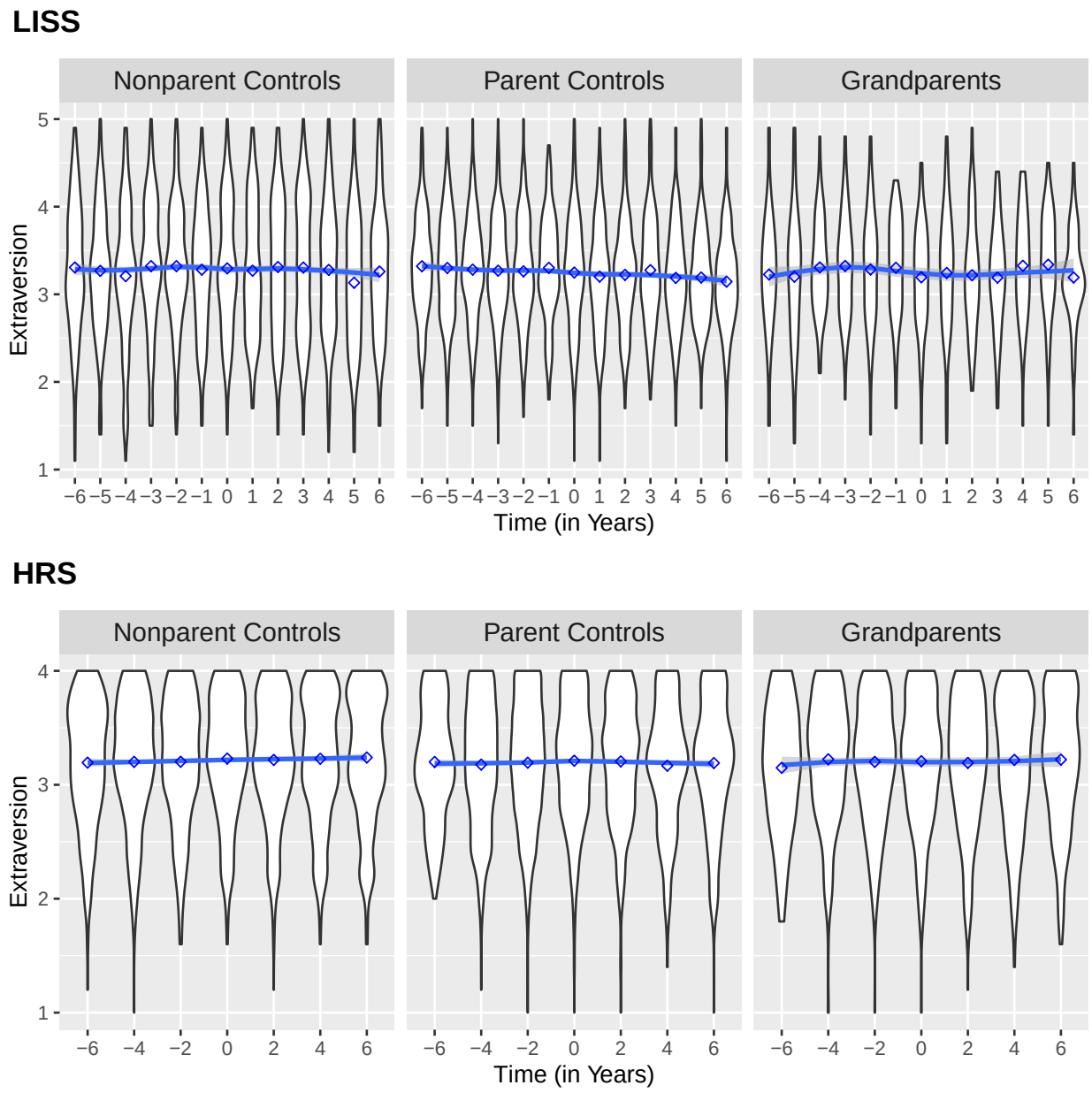

Figure S4

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

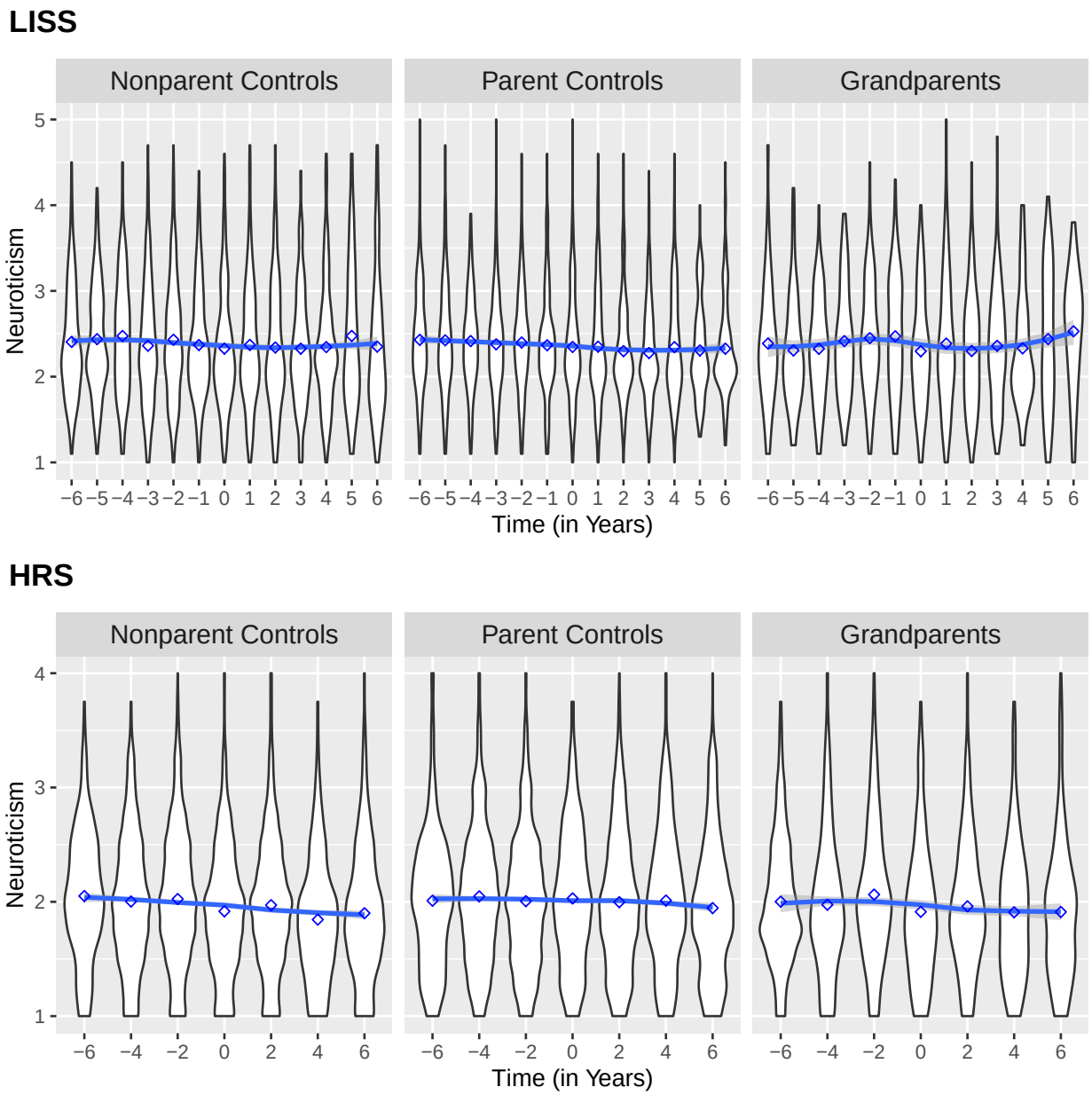

Figure S5

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

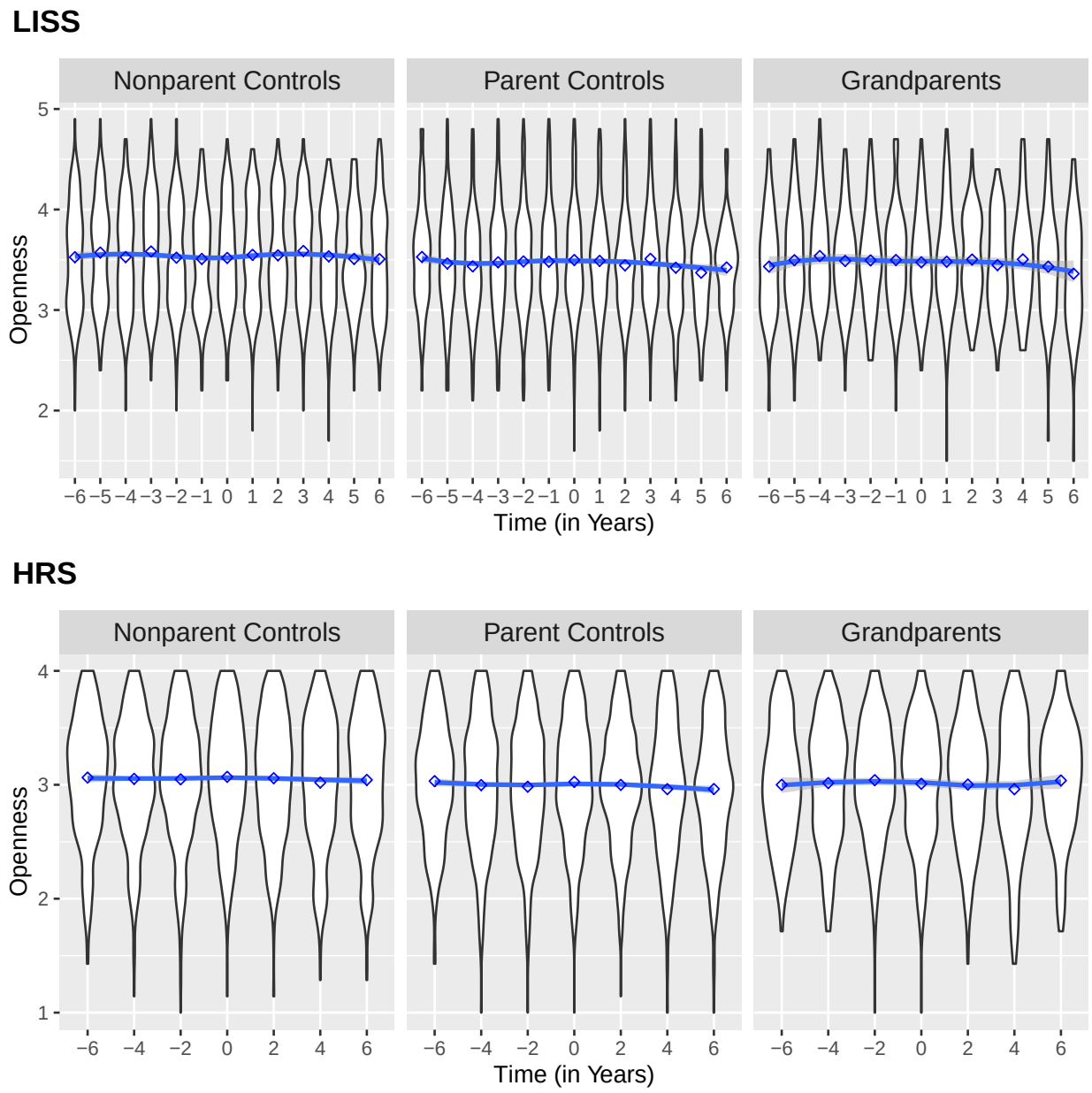

Figure S6

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

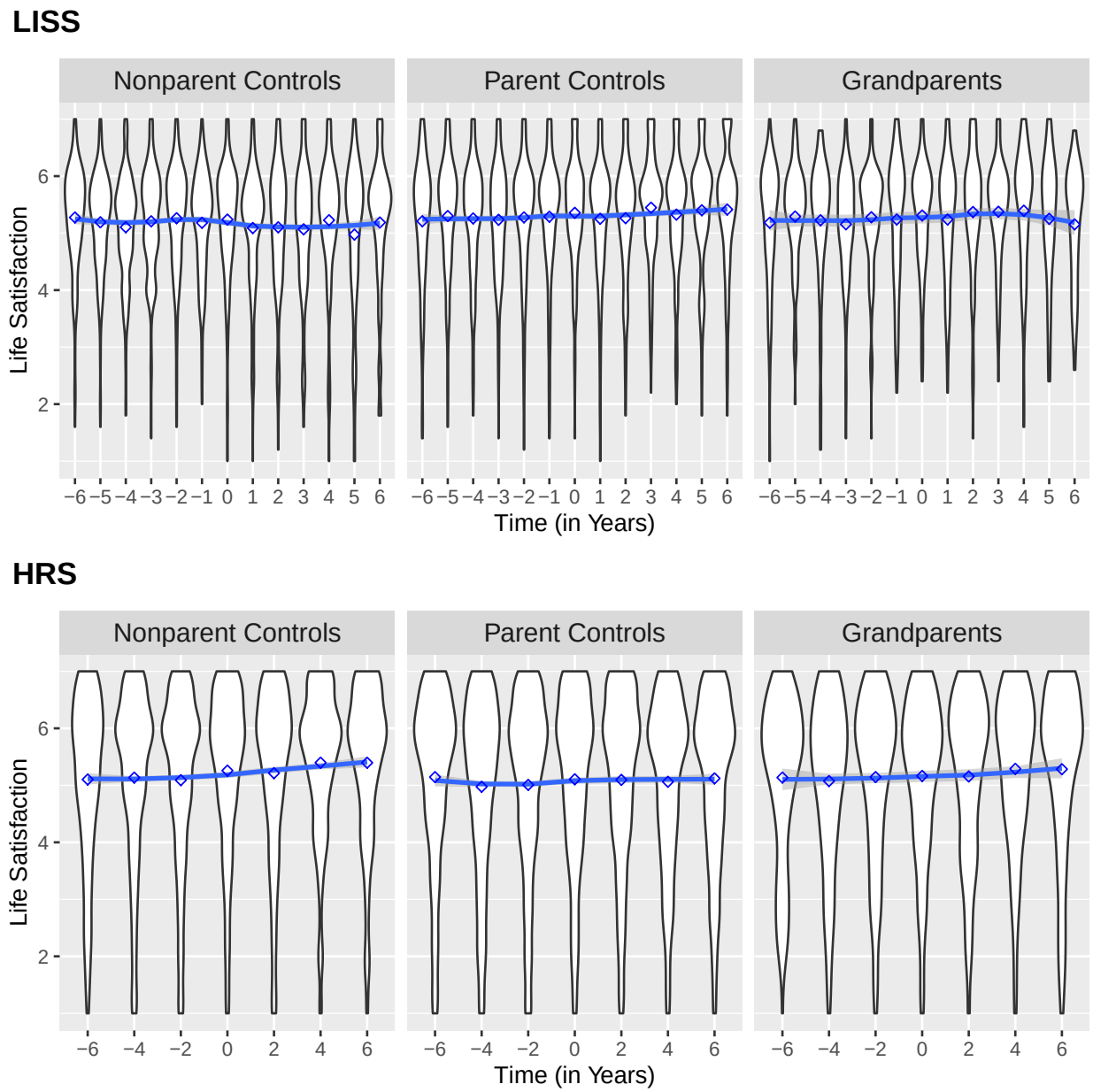

Figure S7

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

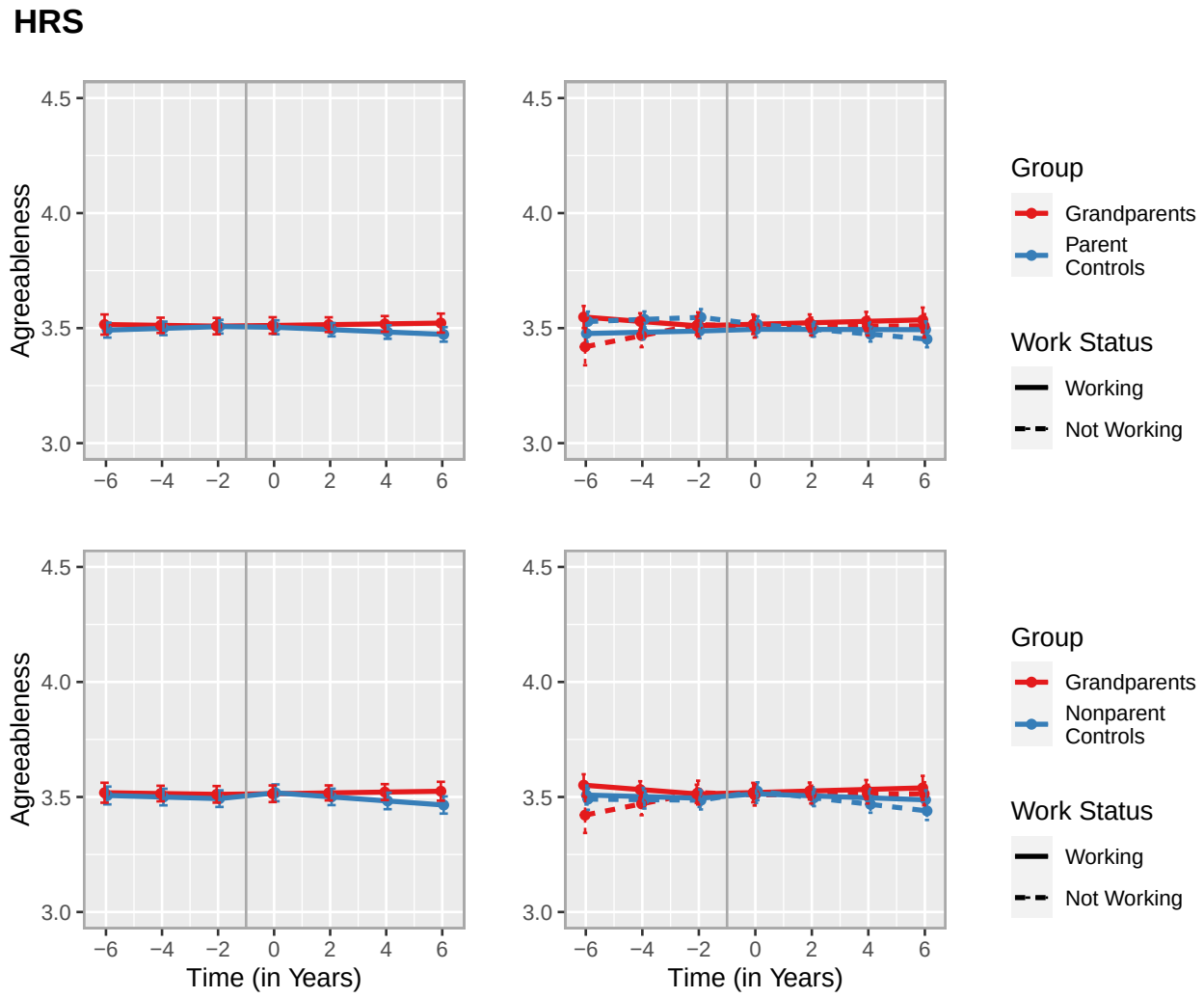

Figure S8

Change trajectories of agreeableness based on the models of moderation by paid work (see Table S8). 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 4 (basic models) and added here for better comparability.

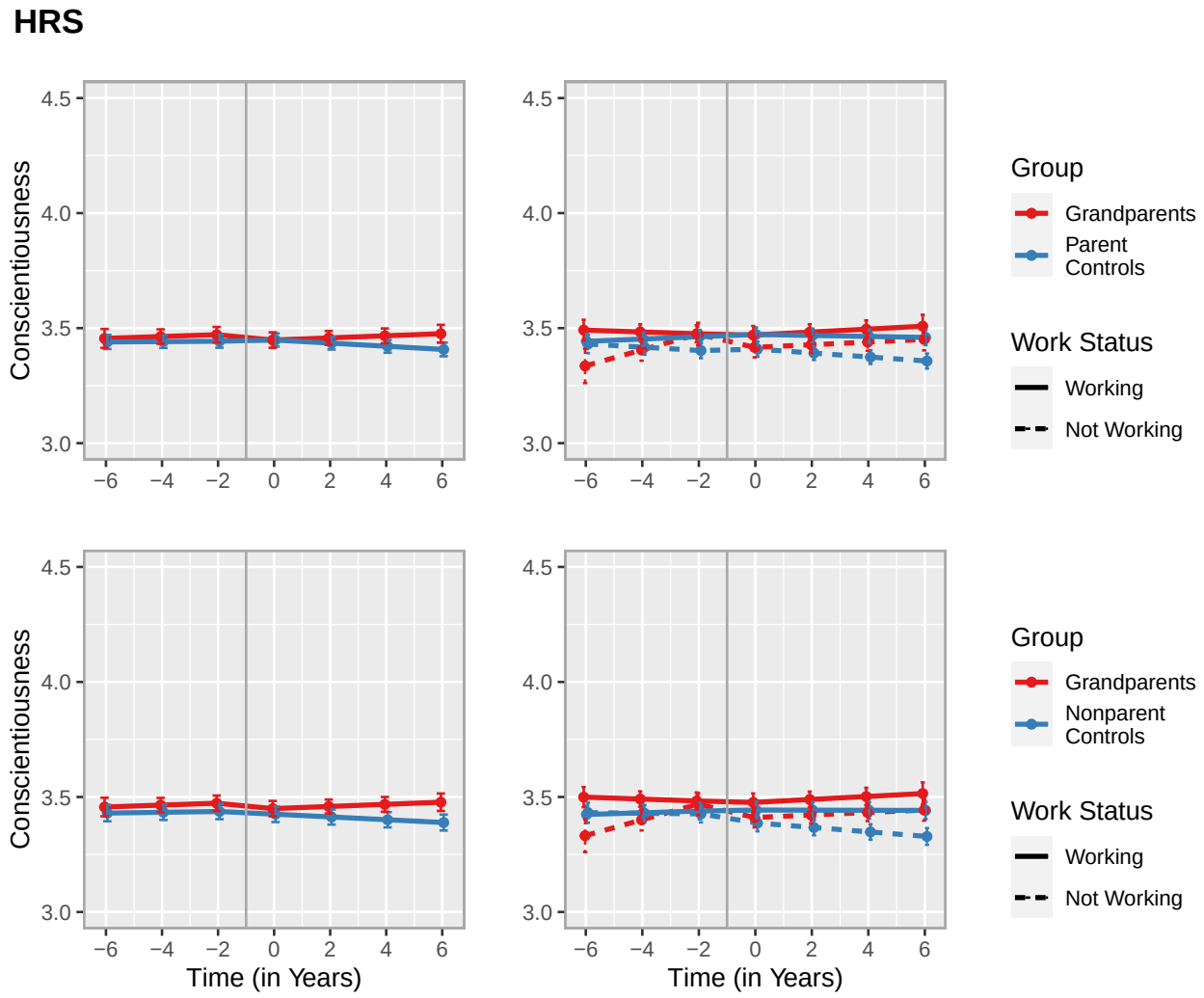

Figure S9

Change trajectories of conscientiousness based on the models of moderation by paid work (see Table S14). 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 6 (basic models) and added here for better comparability.

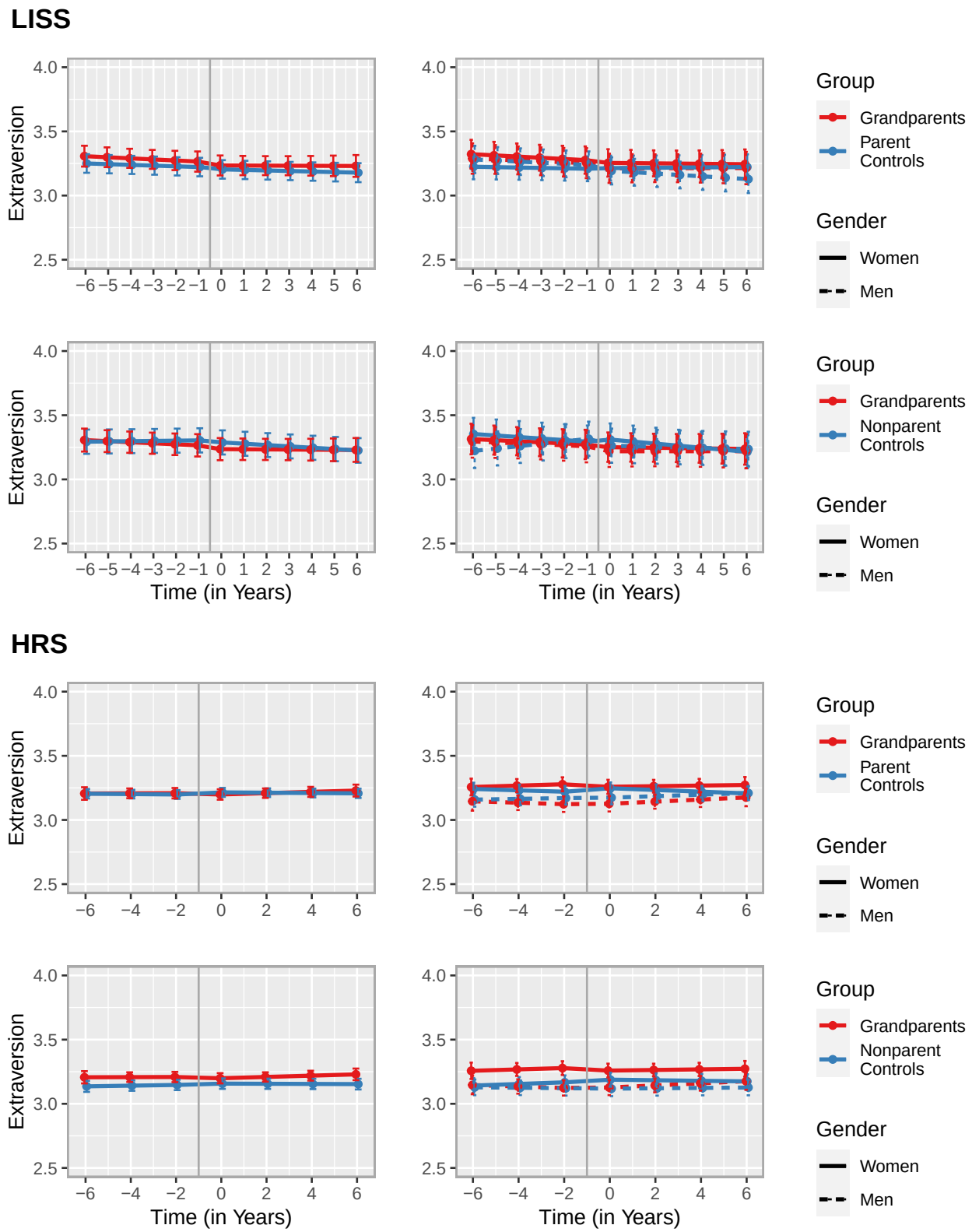

Figure S10

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.

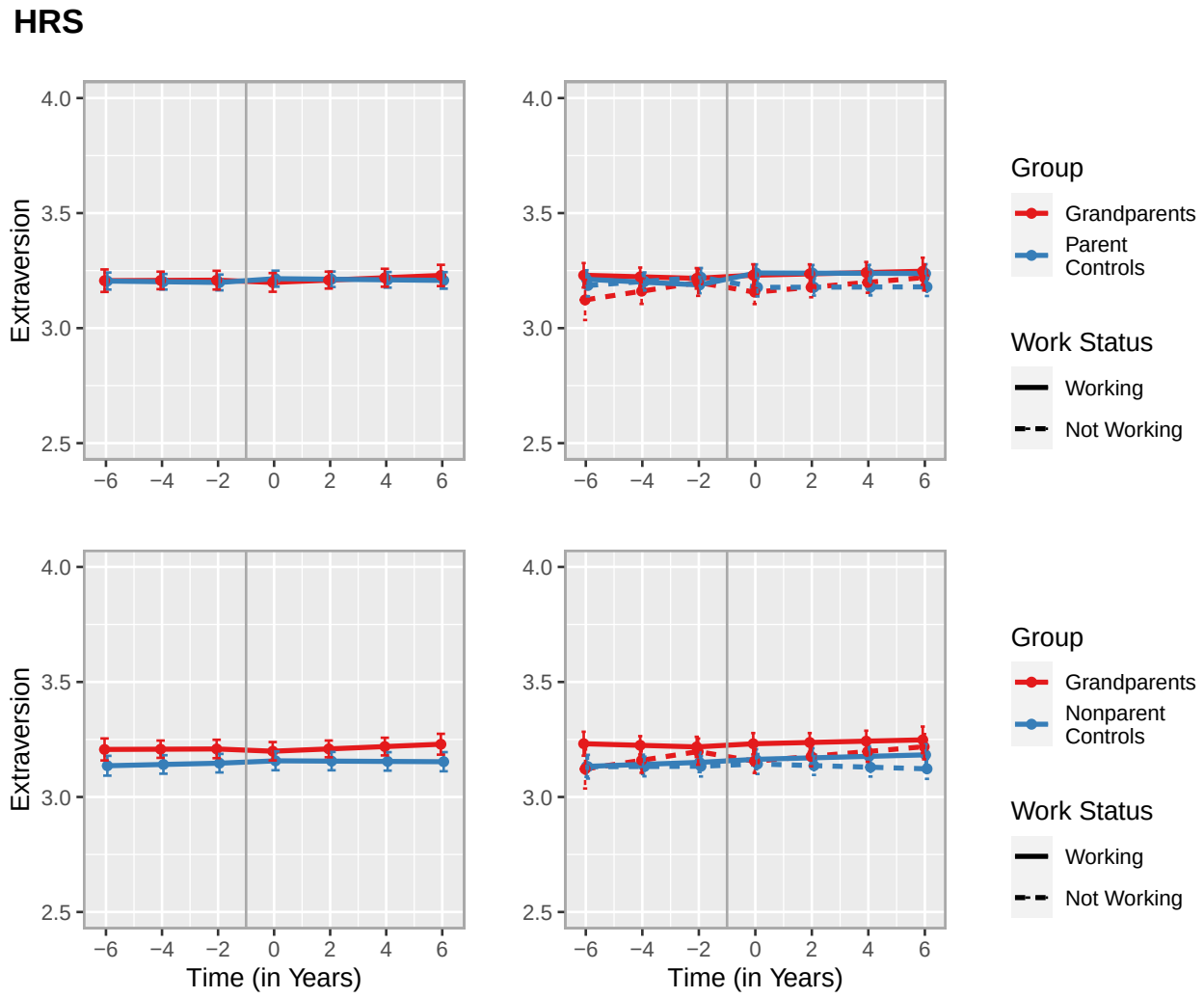

Figure S11

Change trajectories of extraversion based on the models of moderation by paid work (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 vertical line indicates the approximate time of the transition to grandparenthood. The plots in the left column are the same as in Figure S10 (basic models) and added here for better comparability.

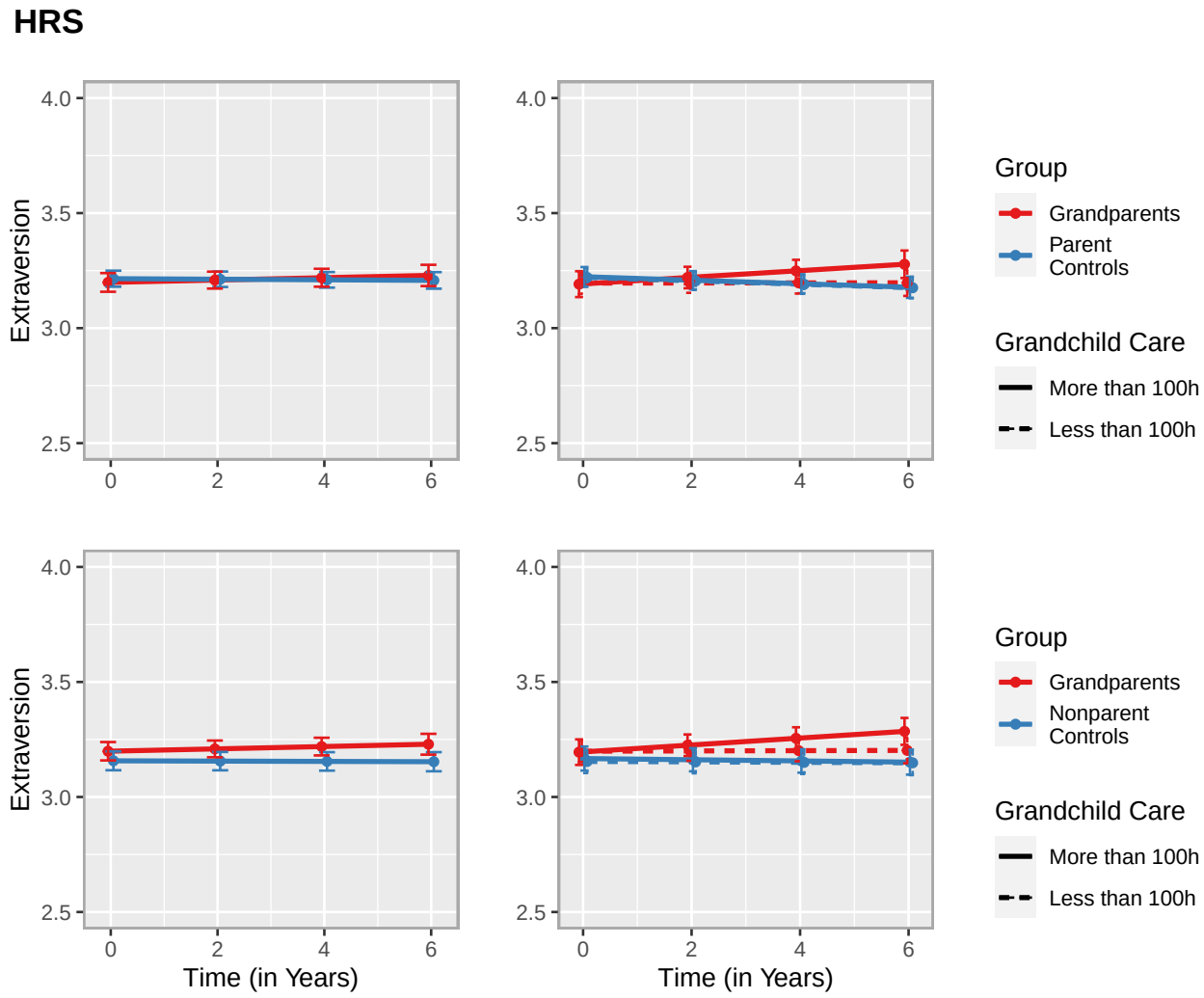

Figure S12

Change trajectories of extraversion based on the models of moderation by grandchild care (see Table S23). 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 S10 (basic models) but restricted to the post-transition period for better comparability.

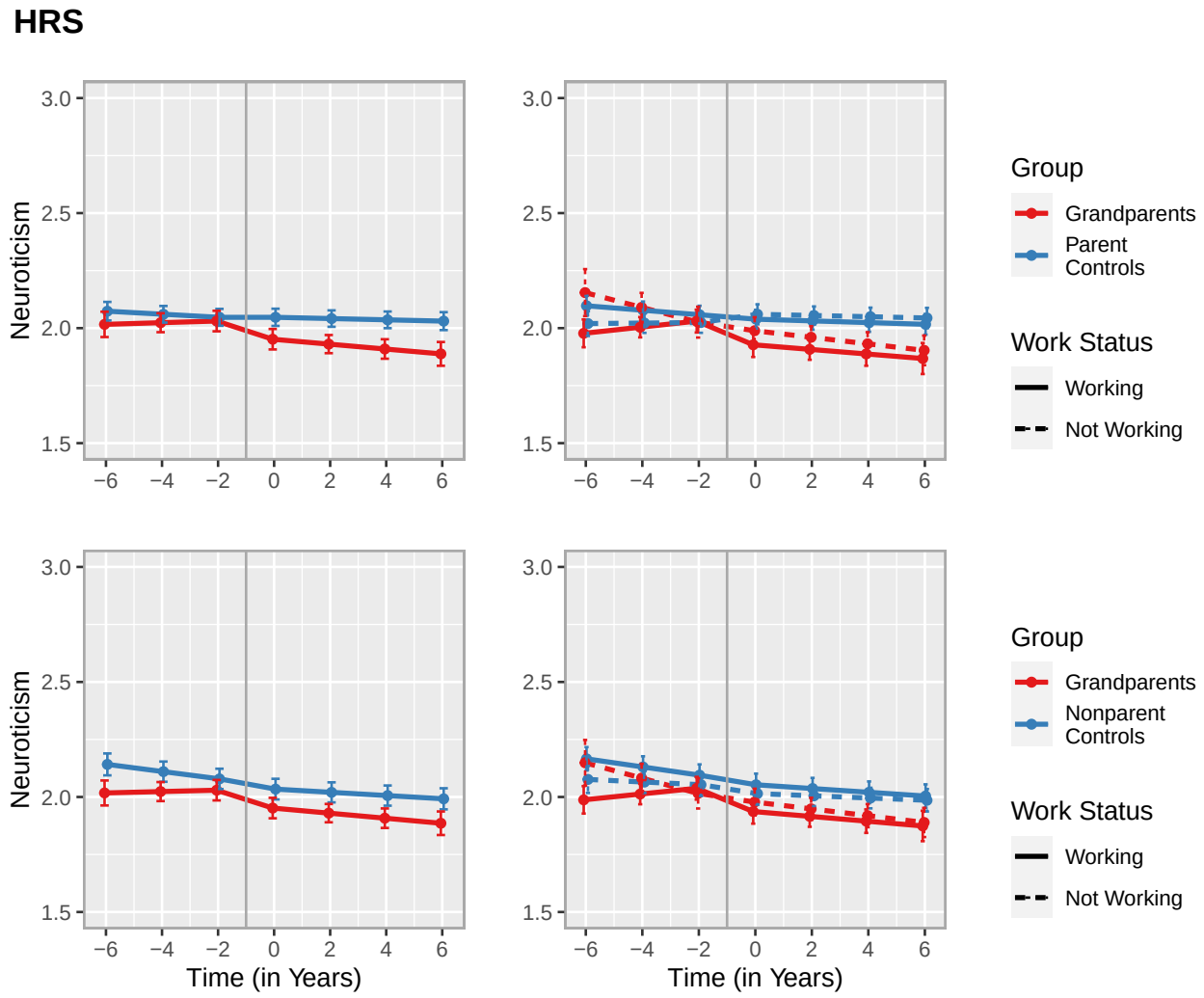

Figure S13

Change trajectories of neuroticism based on the models of moderation by paid work (see Table S28). 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 8 (basic models) and added here for better comparability.

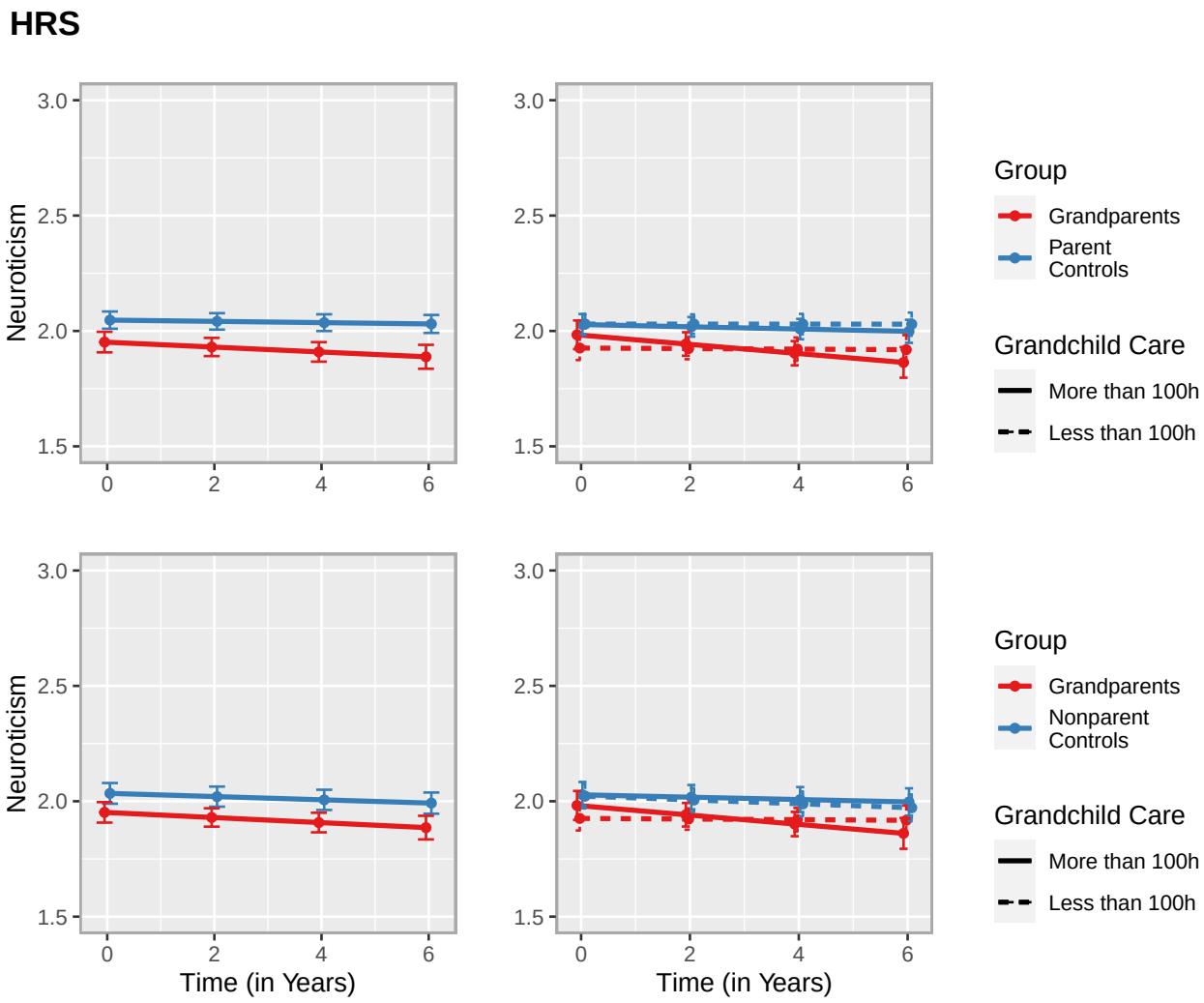

Figure S14

Change trajectories of neuroticism based on the models of moderation by grandchild care (see Table S30). 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 8 (basic models) but restricted to the post-transition period for better comparability.

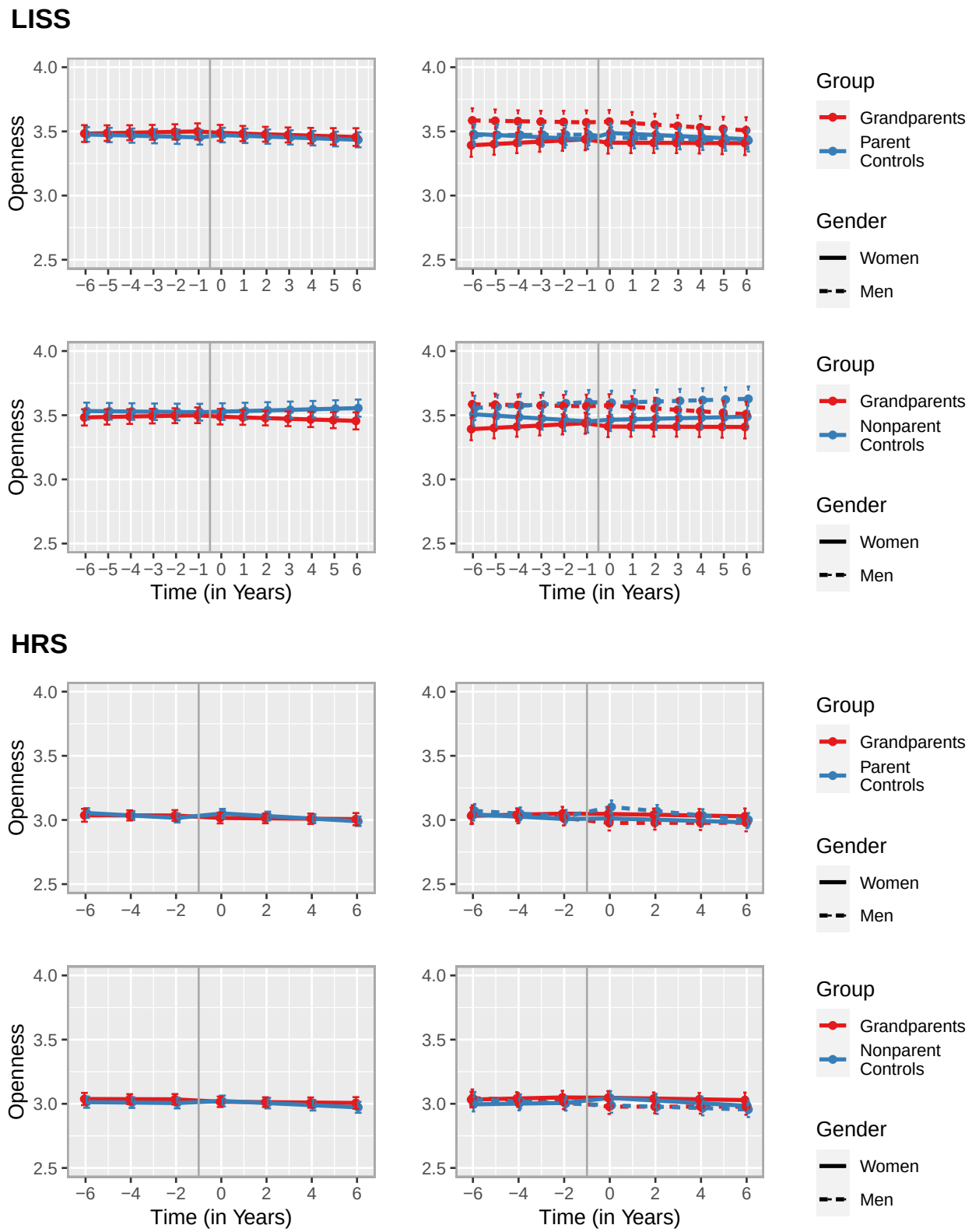

Figure S15

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.

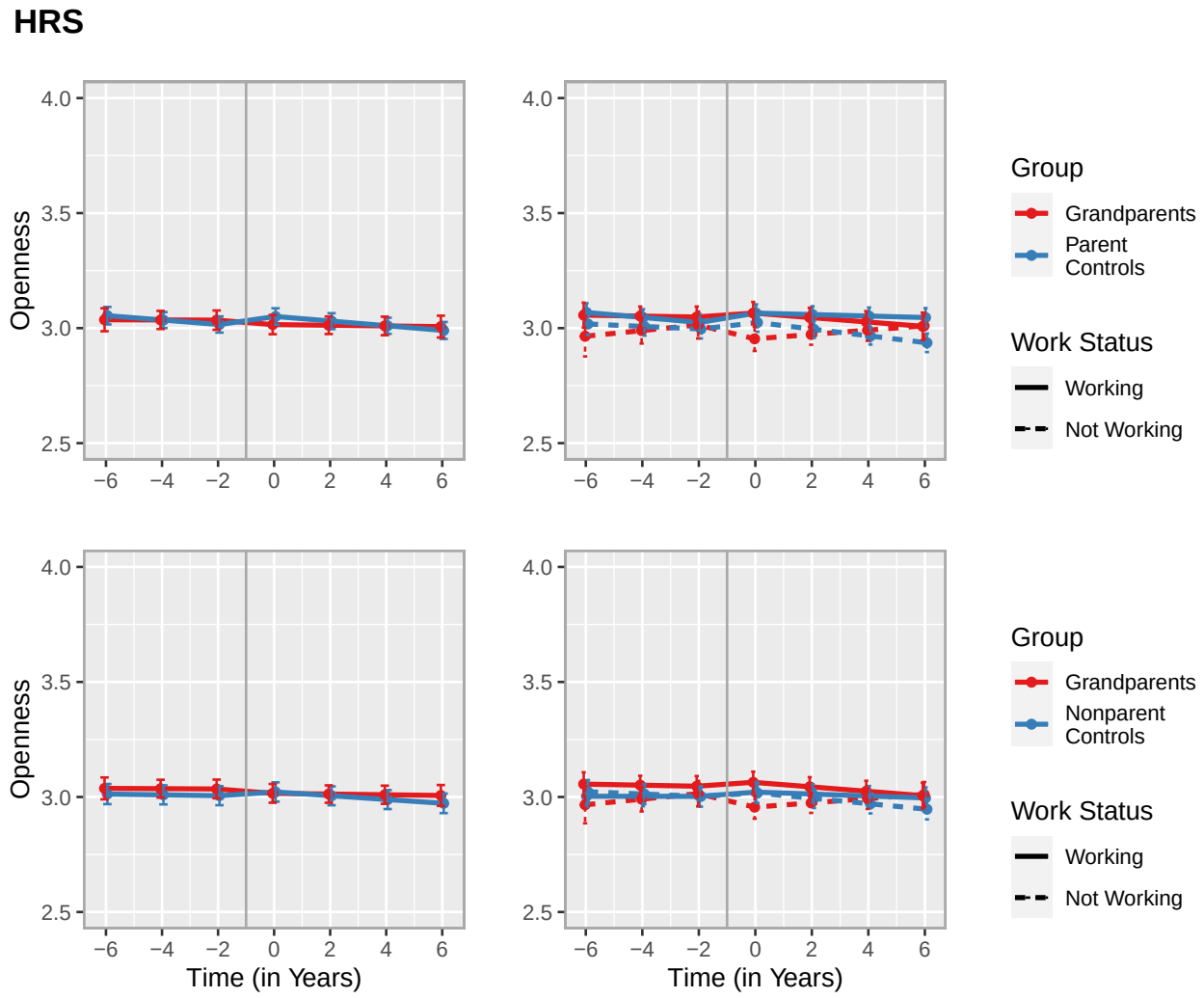

Figure S16

Change trajectories of openness based on the models of moderation by paid work (see Table S36). 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.

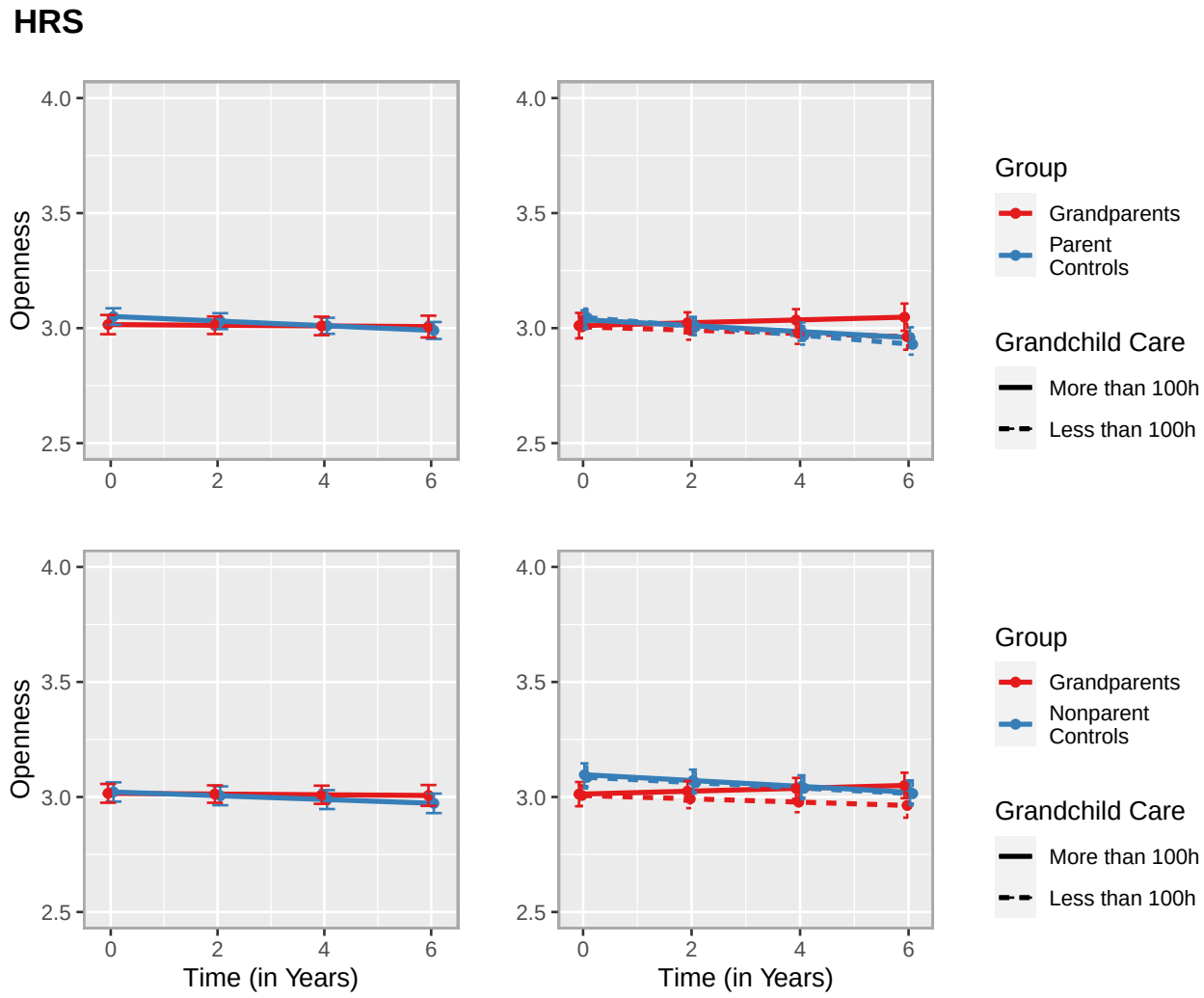

Figure S17

Change trajectories of openness based on the models of moderation by grandchild care (see Table S38). 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.

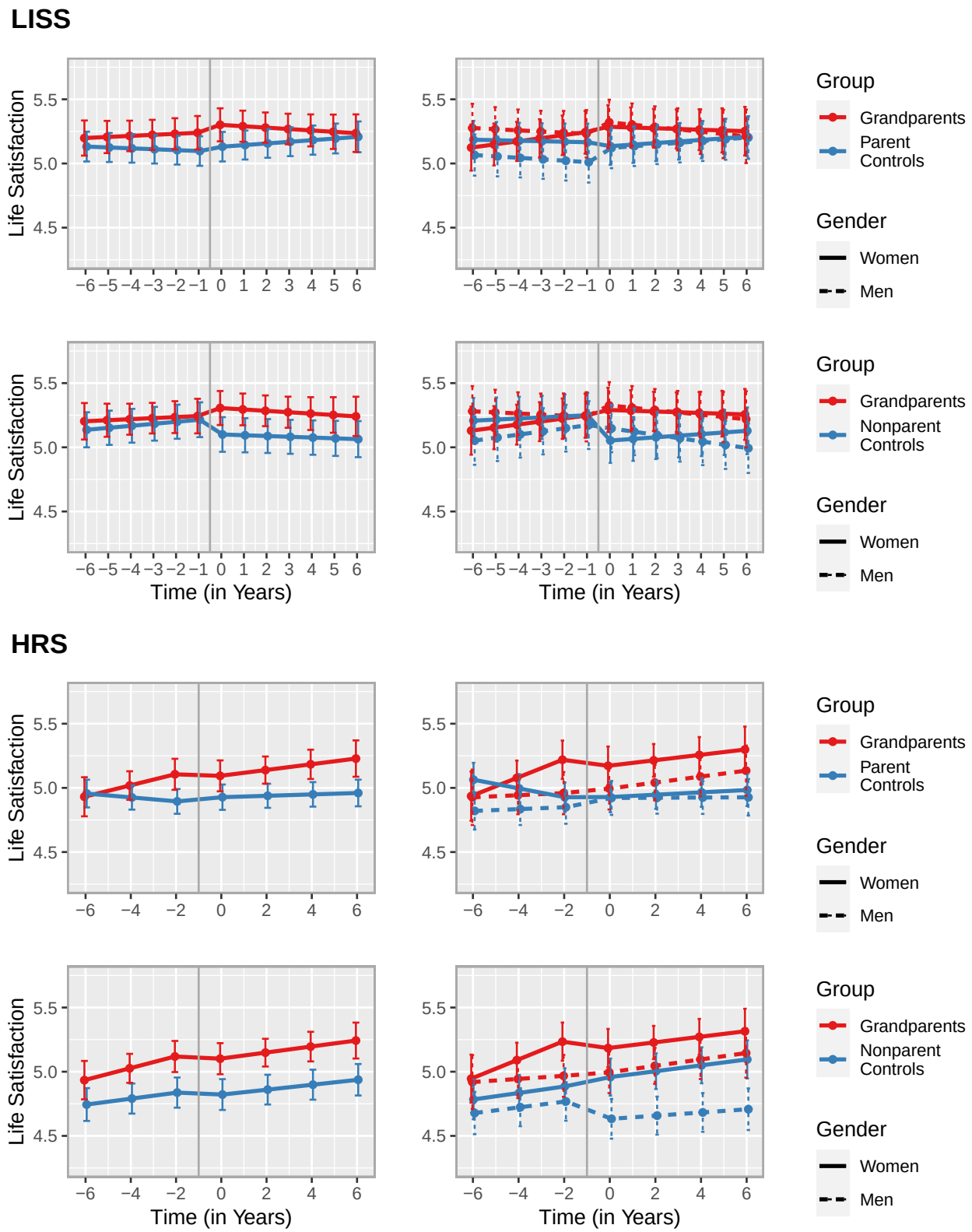

Figure S18

Change trajectories of 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.

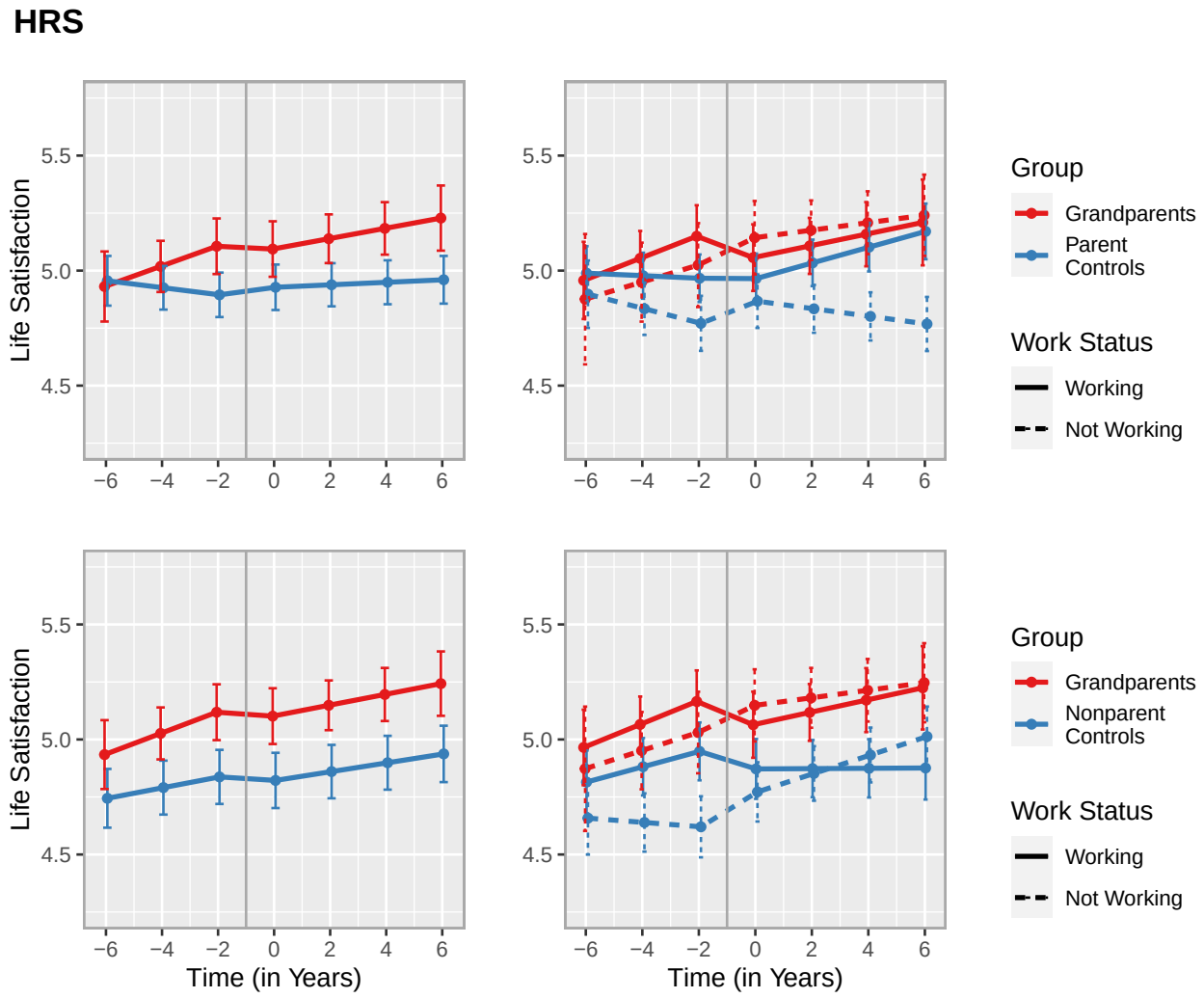

Figure S19

Change trajectories of life satisfaction based on the models of moderation by paid work (see Table S44). 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.

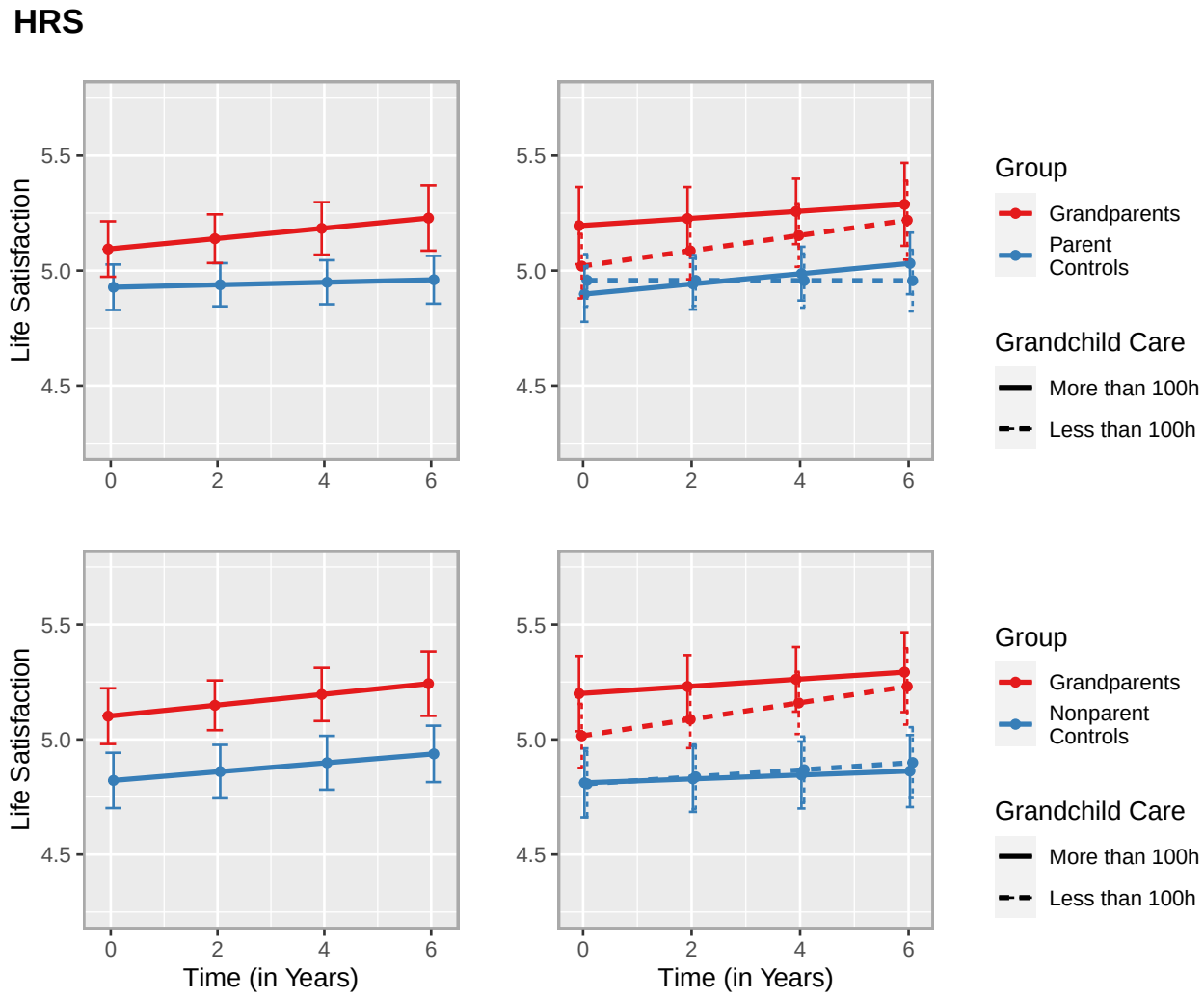

Figure S20

Change trajectories of life satisfaction based on the models of moderation by grandchild care (see Table S46). 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.

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 1.0.7; 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 1.1.27.1; 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 3.1.6; Müller & Wickham, 2020), *tidyr* (Version 1.1.4; 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 magick_2.6.0 car_3.0-10
[4] carData_3.0-4 scales_1.1.1 cowplot_1.1.0
[7] lmerTest_3.1-3 lme4_1.1-27.1 Matrix_1.3-2
[10] GPArotation_2014.11-1 psych_2.0.9 forcats_0.5.0
[13] stringr_1.4.0 dplyr_1.0.7 purrr_0.3.4
[16] readr_1.4.0 tidyr_1.1.4 tibble_3.1.6
[19] tidyverse_1.3.0 Hmisc_4.4-2 ggplot2_3.3.5
[22] Formula_1.2-4 lattice_0.20-41 multcomp_1.4-17
[25] TH.data_1.0-10 MASS_7.3-53 survival_3.2-7
[28] mvtnorm_1.1-1 citr_0.3.2 papaja_0.1.0.9997
[31] 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

```
1775          [13] splines_4.0.4 mnormt_2.0.2 knitr_1.30
1776          [16] jsonlite_1.7.2 nloptr_1.2.2.2 broom_0.7.10
1777          [19] cluster_2.1.0 dbplyr_1.4.4 shiny_1.5.0
1778          [22] compiler_4.0.4 httr_1.4.2 backports_1.2.1
1779          [25] assertthat_0.2.1 fastmap_1.1.0 cli_3.1.0
1780          [28] later_1.1.0.1 htmltools_0.5.2 tools_4.0.4
1781          [31] gtable_0.3.0 glue_1.4.2 Rcpp_1.0.7
1782          [34] cellranger_1.1.0 vctrs_0.3.8 nlme_3.1-152
1783          [37] xfun_0.19 openxlsx_4.2.3 rvest_0.3.6
1784          [40] mime_0.9 miniUI_0.1.1.1 lifecycle_1.0.0
1785          [43] zoo_1.8-8 hms_0.5.3 promises_1.1.1
1786          [46] parallel_4.0.4 sandwich_3.0-0 RColorBrewer_1.1-2 [49] curl_4.3.1 yaml_2.2.1
1787 gridExtra_2.3
1788          [52] rpart_4.1-15 latticeExtra_0.6-29 stringi_1.5.3
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1792          [64] bookdown_0.21 R6_2.5.0 generics_0.1.0
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