

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

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Abstract

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

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

Personality Development in Middle Adulthood and Old Age

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

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

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

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

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

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

102 Theories explaining the mechanisms of personality development in middle
103 adulthood and old age emphasize both genetic influences and life experiences as
104 interdependent sources of stability and change (Specht et al., 2014; Wagner et al., 2020). In
105 a behavior-genetic twin study, Kandler et al. (2015) found that non-shared environmental
106 factors were the main source of personality plasticity in old age. Here, we conceptualize the
107 transition to grandparenthood as a life experience that offers the adoption of a new social
108 role according to the social investment principle of neo-socioanalytic theory (Lodi-Smith &
109 Roberts, 2007; Roberts & Wood, 2006). According to the social investment principle,
110 normative life events or transitions such as entering the work force or becoming a parent
111 lead to personality maturation through the adoption of new social roles (Roberts et al.,
112 2005). These new roles encourage or compel people to act in a more agreeable,
113 conscientious, and emotionally stable (i.e., less neurotic) way, and the experiences in these
114 roles as well as societal expectations towards them are hypothesized to drive long-term
115 personality development (Lodi-Smith & Roberts, 2007; Wrzus & Roberts, 2017).
116 Conversely, consistent social roles foster personality stability.

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

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

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

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

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

Grandparenthood

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

one maintains a good relationship with their child.

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

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

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

over the transition to grandparenthood. In cross-sectional studies, the preponderance of evidence suggests that grandparents who provide grandchild care or have close relationships with their older grandchildren have higher life satisfaction (e.g., Mahne & Huxhold, 2014; Triadó et al., 2014). There are a few longitudinal studies, albeit they offer conflicting conclusions: Data from the Survey of Health, Ageing and Retirement in Europe (SHARE) showed that the birth of a grandchild was followed by improvements to quality of life and life satisfaction, but only among women (Tanskanen et al., 2019) and only in first-time grandmothers via their daughters (Di Gessa et al., 2019). Several studies emphasized that grandparents actively involved in childcare experienced larger increases in life satisfaction (Arpino, Bordone, et al., 2018; Danielsbacka et al., 2019; Danielsbacka & Tanskanen, 2016). On the other hand, fixed effects regression models¹ using SHARE data did not find any effects of first-time grandparenthood on life satisfaction regardless of grandparental investment and only minor decreases of grandmothers' depressive symptoms (Sheppard & Monden, 2019).

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

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

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

Current Study

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

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

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

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

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

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

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

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

Informed by the social investment principle and previous research on personality development in middle adulthood and old age, we preregistered the following hypotheses (prior to data analysis;

https://osf.io/a9zpc?view_only=22154f26307040ec9ba0f3a86051e549/):

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

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

Methods

Samples

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

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

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

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

These two panel studies provided the advantage that they contained several waves of personality data as well as information on grandparent status and a broad range of covariates at each wave. While the HRS provided a large sample with a wider age range, the LISS was smaller and younger³ but provided more frequent personality assessments spaced every one to two years. Note that [blinded] has previously used LISS data to analyze correlated changes between life satisfaction and Big Five traits across the lifespan (<https://osf.io/> [blinded]). [blinded] and [blinded] have previously used HRS data to analyze Big Five traits and relationship-related constructs ([blinded]). [blinded] has additionally used the HRS to analyze mean-level and rank-order changes in Big Five traits in response to bereavement [blinded] and other relationship-related or non-Big Five-related constructs (e.g., optimism; [blinded]). These publications do not overlap with the current study in the central focus of grandparenthood.⁴ The present study used de-identified archival data in the public domain, and, thus, it was not necessary to obtain ethical approval from an IRB.

Measures

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

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

345 *Personality*

346 In the LISS, the Big Five personality traits were assessed using the 50-item version
 347 of the IPIP Big-Five Inventory scales (Goldberg, 1992). For each Big Five trait, ten 5-point
 348 Likert-scale items were answered (1 = *very inaccurate*, 2 = *moderately inaccurate*, 3 =
 349 *neither inaccurate nor accurate*, 4 = *moderately accurate*, 5 = *very accurate*). Example
 350 items included “Like order” (conscientiousness), “Sympathize with others’ feelings”
 351 (agreeableness), “Worry about things” (neuroticism), “Have a vivid imagination” (openness
 352 to experience), and “Start conversations” (extraversion). At each wave, we took a
 353 respondent’s mean of each subscale as their trait score. Internal consistencies at the time of
 354 matching, as indicated by McDonald’s ω (McNeish, 2018), averaged $\omega = 0.83$ over all traits
 355 ranging from $\omega = 0.77$ (conscientiousness in the parent control group) to $\omega = 0.90$
 356 (extraversion in the nonparent control group). Other studies have shown measurement
 357 invariance for these scales across time and age groups, and convergent validity with the Big
 358 Five inventory (BFI-2) (Denissen et al., 2020; Schwaba & Bleidorn, 2018). The Big Five
 359 (and life satisfaction) were contained in the *Personality* module which was administered
 360 yearly but with planned missingness in some years for certain cohorts (see Denissen et al.,
 361 2019). Thus, there are one to two years between included assessments, given no other
 362 sources of missingness.

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

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

Life Satisfaction

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

Transition to Grandparenthood

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

⁵ In the LISS, the “somewhat” was omitted and instead of “or” “nor” was used.

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

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

Moderators

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

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

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

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

Procedure

Drawing on all available data, three main restrictions defined the final analysis samples of grandparents (see Figure S1): First, we identified respondents who indicated having grandchildren for the first time during study participation (see *Measures*; $N_{LISS} = 337$; $N_{HRS} = 3272$, including HRS waves 1996-2004 before personality assessments were introduced). Second, we restricted the sample to respondents with at least one valid personality assessment (valid in the sense that at least one of the six outcomes was non-missing; $N_{LISS} = 335$; $N_{HRS} = 1702$).⁸ Third, we included only respondents with both a valid personality assessment before and one after the transition to grandparenthood ($N_{LISS} = 253$; $N_{HRS} = 859$). Lastly, few respondents were excluded because of inconsistent or missing information regarding their children⁹ resulting in the final analysis samples of first-time grandparents, $N_{LISS} = 250$ (53.60% female; age at transition to grandparenthood

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

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

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

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

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

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

Covariates

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

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

In selecting covariates, we followed guidelines laid out by VanderWeele et al. (2019; 2020) which reconcile both views and offer practical guidance¹⁰ when complete knowledge of the underlying causal structures is unknown: These authors proposed a “modified disjunctive cause criterion” (VanderWeele, 2019, p. 218) recommending to select all available covariates which are assumed to be causes of the outcomes, treatment exposure (i.e., the transition to grandparenthood), or both, as well as any proxies for an unmeasured common cause of the outcomes and treatment exposure. To be excluded from this selection are variables assumed to be instrumental variables (i.e., assumed causes of treatment exposure that are unrelated to the outcomes except through the exposure) and collider variables (Elwert & Winship, 2014). Because all covariates we used for matching were measured at least two years before the birth of the grandchild, we judge the risk of introducing collider bias or overcontrol bias by controlling for these covariates to be relatively small. In addition, as mentioned in the *Introduction*, the event transition to grandparenthood is not planned by or under direct control of grandparents which further

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

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

An overview of all covariates we used to compute the propensity scores for matching can be found in the Supplemental Material (see Tables S5 & S6). Importantly, as part of our preregistration we also provided justification for each covariate on whether we assume it to be causally related to treatment assignment, the outcomes, or both (see

gp-covariates-overview.xlsx on

https://osf.io/75a4r/?view_only=ac929a2c41fb4afd9d1a64a3909848d0). We tried to find substantively equivalent covariates in both samples but had to compromise in a few cases (e.g., children’s educational level only in HRS vs. children living at home only in LISS).

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

Propensity Score Matching

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

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

itself or its anticipation (i.e., when one’s child was already pregnant with their first child; Greenland, 2003; Rosenbaum, 1984; VanderWeele et al., 2020). Propensity score matching was performed using the *MatchIt* R package (Ho et al., 2011) with exact matching on gender combined with Mahalanobis distance matching on the propensity score. In total, four matchings were performed; two per sample (LISS; HRS) and two per control group (parents; nonparents). We matched 1:4 with replacement because of the relatively small pools of available controls. This meant that each grandparent was matched with four control observations in each matching procedure, and that control observations were allowed to be used multiple times for matching (i.e., duplicated in the analysis samples¹²). We did not specify a caliper because our goal was to find matches for all grandparents, and because we achieved good covariate balance this way.

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

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

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

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

Analytical Strategy

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

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

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

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

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

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

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

Results

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

Descriptive Results

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

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

Mean-Level Changes

Agreeableness

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

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

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

Conscientiousness

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

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

671 *Extraversion*

672 The trajectories of grandparents' extraversion closely followed those of the matched
 673 controls. There were no significant effects indicating differences between grandparents and
 674 controls in the basic models (see Tables S23 & S24 and Figure S15), the models including
 675 the gender interaction (see Tables S25 & S26 and Figure S15), or the models of moderation
 676 by paid work (see Tables S27 & S28 and Figure S16). The only significant effect for
 677 extraversion was found in the analysis of moderation by grandchild care (see Tables S29 &
 678 S30 and Figure S17): compared to matched parent controls, grandparents providing
 679 substantial grandchild care increased slightly more strongly in extraversion after the
 680 transition to grandparenthood (difference in *after* parameter: $[\hat{\gamma}_{21} + \hat{\gamma}_{31}] = 0.04$, 95% CI
 681 $[0.02, 0.07]$, $p = .001$; suggestive evidence in the nonparent sample: $[\hat{\gamma}_{21} + \hat{\gamma}_{31}] = 0.04$, 95%
 682 CI $[0.01, 0.06]$, $p = .007$).

683 *Neuroticism*

684 The basic models for neuroticism (see Tables S31 & S32 and Figure S18) showed
 685 only minor differences between grandparents and matched controls: Compared to the
 686 parent controls, grandparents in the HRS shifted slightly downward in their neuroticism
 687 immediately after the transition to grandparenthood (difference in *shift* parameter: $[\hat{\gamma}_{21} +$
 688 $\hat{\gamma}_{31}] = -0.08$, 95% CI $[-0.12, -0.03]$, $p < .001$), which was not the case in the three other
 689 samples (HRS nonparents, LISS parents, and LISS nonparents). Further, in the HRS there
 690 was suggestive evidence that grandparents increased in neuroticism before the transition to
 691 grandparenthood compared to the nonparent controls, $\hat{\gamma}_{11} = 0.04$, 95% CI $[0.01, 0.07]$, $p =$
 692 $.016$. The models including the gender interaction (see Tables S33 & S34 and Figure S18)
 693 showed one significant effect in the comparison of grandparents and controls: In the HRS,
 694 grandfathers, as compared to male parent controls, shifted downward in neuroticism
 695 directly after the transition to grandparenthood (difference in *shift* parameter: $[\hat{\gamma}_{21} + \hat{\gamma}_{31}]$
 696 $= -0.16$, 95% CI $[-0.22, -0.09]$, $p < .001$; suggestive evidence in the nonparent sample: $[\hat{\gamma}_{21}$

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

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

Openness

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

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

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

Life Satisfaction

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

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

Interindividual Differences in Change

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

Second, we estimated models with heterogeneous random slope variances between

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

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

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

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

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

Rank-Order Stability

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

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

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

Discussion

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

Social Investment Principle

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

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

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

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

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

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

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

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

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

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

Life Satisfaction

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

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

Interindividual Differences in Change

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

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

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

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

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

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

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

Rank-Order Stability

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

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

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

Limitations and Future Directions

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

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

such as length and cost of travel between grandparent and grandchild. Lacking such precise contextual information, the multidimensionality of the grandparent role (Buchanan & Rotkirch, 2018; Findler et al., 2013; Thiele & Whelan, 2006) might lend itself to future investigations into grandparents' personality development using growth mixture models (Grimm & Ram, 2009; Ram & Grimm, 2009). On a similar note, we did not consider grandparents' subjective perception of the transition to grandparenthood in terms of the emotional significance, meaningfulness, and impact to daily lives which might be responsible for differential individual change trajectories (Kritzer 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 & Möttus, 2019; Möttus et al., 2019). Thus, our results might be influenced by common method bias (Podsakoff et al., 2003). Large-scale panel data incorporating both self- and other-reports of personality over time would be needed to address this issue (e.g., Oltmanns et al., 2020).

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

1055 uncontaminated by anticipation of the transition, and (2) the matched controls had a clear
1056 counterfactual timeline of transition (for similar recent approaches analyzing life events, see
1057 Balbo & Arpino, 2016; Krämer & Rodgers, 2020; van Scheppingen & Leopold, 2020).
1058 Inverse probability of treatment weighting (Hernán & Robins, 2020; Thoemmes & Ong,
1059 2016), which is able to directly account for the longitudinal effects of time-varying
1060 covariates, may constitute a valuable alternative analytical strategy for future studies.

1061 Fourth, our results only pertain to the countries for which our data are
1062 representative on a population-level, the Netherlands and the United States. Personality
1063 development, and more specifically personality maturation, have been examined
1064 cross-culturally (e.g., Bleidorn et al., 2013; Chopik & Kitayama, 2018). On the one hand,
1065 these studies showed universal average patterns of change towards greater maturity over
1066 the life span, and on the other hand they emphasized cultural differences regarding norms
1067 and values and the temporal onset of social roles. For grandparenthood, there are
1068 substantial demographic differences between countries (Leopold & Skopek, 2015), as well as
1069 differences in public child care systems which may demand different levels of grandparental
1070 involvement (Bordone et al., 2017; Hank & Buber, 2009). Compared to the US, Dutch
1071 people on average become grandparents six years later (Leopold & Skopek, 2015) and,
1072 although both countries have largely market-based systems for early child care, Dutch
1073 parents on average have access to more fully developed child care systems through
1074 (capped) governmental benefits (OECD, 2020). Despite these differences, our results from
1075 the Dutch and US samples did not indicate systematic discrepancies.

1076 Lastly, while we assessed our dependent variables through highly reliable scales in
1077 both samples, there was a conceptual difference in the Big Five measures (see John &
1078 Srivastava, 1999): In the LISS, the IPIP Big-Five Inventory (Goldberg, 1992) presented as
1079 items statements to which respondents indicated how accurately they described them
1080 (using a bipolar response scale). However, in the HRS, the Midlife Development Inventory
1081 (Lachman & Weaver, 1997) used adjectives as items to ask respondents how well they

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

Conclusion

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

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References

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1110 Aassve, A., Luppi, F., & Mencarini, L. (2021). A first glance into the black box of life
1111 satisfaction surrounding childbearing. *Journal of Population Research*.
1112 <https://doi.org/10.1007/s12546-021-09267-z>

1113 Allemand, M., Zimprich, D., & Martin, M. (2008). Long-term correlated change in
1114 personality traits in old age. *Psychology and Aging, 23*(3), 545–557.
1115 <https://doi.org/10.1037/a0013239>

1116 Anusic, I., & Schimmack, U. (2016). Stability and change of personality traits, self-esteem,
1117 and well-being: Introducing the meta-analytic stability and change model of retest
1118 correlations. *Journal of Personality and Social Psychology, 110*(5), 766–781.
1119 <https://doi.org/10.1037/pspp0000066>

1120 Anusic, I., Yap, S., & Lucas, R. E. (2014a). Does personality moderate reaction and
1121 adaptation to major life events? Analysis of life satisfaction and affect in an
1122 Australian national sample. *Journal of Research in Personality, 51*, 69–77.
1123 <https://doi.org/10.1016/j.jrp.2014.04.009>

1124 Anusic, I., Yap, S., & Lucas, R. E. (2014b). Testing set-point theory in a Swiss national
1125 sample: Reaction and adaptation to major life events. *Social Indicators Research,*
1126 *119*(3), 1265–1288. <https://doi.org/10.1007/s11205-013-0541-2>

1127 Ardelt, M. (2000). Still stable after all these years? Personality stability theory revisited.
1128 *Social Psychology Quarterly, 63*(4), 392–405. <https://doi.org/10.2307/2695848>

1129 Arpino, B., Bordone, V., & Balbo, N. (2018). Grandparenting, education and subjective
1130 well-being of older Europeans. *European Journal of Ageing, 15*(3), 251–263.
1131 <https://doi.org/10.1007/s10433-018-0467-2>

1132 Arpino, B., Gumà, J., & Julià, A. (2018). Family histories and the demography of
1133 grandparenthood. *Demographic Research, 39*(42), 1105–1150.

<https://doi.org/10.4054/DemRes.2018.39.42>

Ashton, M. C., & Lee, K. (2007). Empirical, Theoretical, and Practical Advantages of the HEXACO Model of Personality Structure. *Personality and Social Psychology Review*, 11(2), 150–166. <https://doi.org/10.1177/1088868306294907>

Ashton, M. C., & Lee, K. (2020). Objections to the HEXACO Model of Personality Structure and why those Objections Fail. *European Journal of Personality*, 34(4), 492–510. <https://doi.org/10.1002/per.2242>

Asselmann, E., & Specht, J. (2020a). Taking the ups and downs at the rollercoaster of love: Associations between major life events in the domain of romantic relationships and the Big Five personality traits. *Developmental Psychology*, 56(9), 1803–1816. <https://doi.org/10.1037/dev0001047>

Asselmann, E., & Specht, J. (2021). Personality maturation and personality relaxation: Differences of the Big Five personality traits in the years around the beginning and ending of working life. *Journal of Personality*, n/a(n/a). <https://doi.org/10.1111/jopy.12640>

Asselmann, E., & Specht, J. (2020b). Testing the Social Investment Principle Around Childbirth: Little Evidence for Personality Maturation Before and After Becoming a Parent. *European Journal of Personality*, n/a(n/a). <https://doi.org/10.1002/per.2269>

Ates, M. (2017). Does grandchild care influence grandparents' self-rated health? Evidence from a fixed effects approach. *Social Science & Medicine*, 190, 67–74. <https://doi.org/10.1016/j.socscimed.2017.08.021>

Aust, F., & Barth, M. (2020). *papaja: Prepare reproducible APA journal articles with R Markdown*. <https://github.com/crsh/papaja>

Austin, P. C. (2011). An introduction to propensity score methods for reducing the effects

of confounding in observational studies. *Multivariate Behavioral Research*, 46(3), 399–424. <https://doi.org/10.1080/00273171.2011.568786>

Austin, P. C. (2017). Double propensity-score adjustment: A solution to design bias or bias due to incomplete matching. *Statistical Methods in Medical Research*, 26(1), 201–222. <https://doi.org/10.1177/0962280214543508>

Baird, B. M., Lucas, R. E., & Donnellan, M. B. (2010). Life satisfaction across the lifespan: Findings from two nationally representative panel studies. *Social Indicators Research*, 99(2), 183–203. <https://doi.org/10.1007/s11205-010-9584-9>

Balbo, N., & Arpino, B. (2016). The role of family orientations in shaping the effect of fertility on subjective well-being: A propensity score matching approach. *Demography*, 53(4), 955–978. <https://doi.org/10.1007/s13524-016-0480-z>

Baltes, P. B., Lindenberger, U., & Staudinger, U. M. (2006). Life Span Theory in Developmental Psychology. In R. M. Lerner & W. Damon (Eds.), *Handbook of child psychology: Theoretical models of human development* (pp. 569–664). John Wiley & Sons Inc.

Bates, D., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software*, 67(1), 1–48. <https://doi.org/10.18637/jss.v067.i01>

Beck, E. D., & Jackson, J. J. (2021). A Mega-Analysis of Personality Prediction: Robustness and Boundary Conditions. *Journal of Personality and Social Psychology*, In Press. <https://doi.org/10.31234/osf.io/7pg9b>

Bengtson, V. L. (2001). Beyond the Nuclear Family: The Increasing Importance of Multigenerational Bonds. *Journal of Marriage and Family*, 63(1), 1–16. <https://doi.org/10.1111/j.1741-3737.2001.00001.x>

Benjamin, D. J., Berger, J. O., Clyde, M., Wolpert, R. L., Johnson, V. E., Johannesson,

M., Dreber, A., Nosek, B. A., Wagenmakers, E. J., Berk, R., & Brembs, B. (2018).
Redefine statistical significance. *Nature Human Behavior*, 2, 6–10.
<https://doi.org/10.1038/s41562-017-0189-z>

Bleidorn, W., Hill, P. L., Back, M. D., Denissen, J. J. A., Hennecke, M., Hopwood, C. J.,
Jokela, M., Kandler, C., Lucas, R. E., Luhmann, M., Orth, U., Wagner, J., Wrzus,
C., Zimmermann, J., & Roberts, B. W. (2019). The policy relevance of personality
traits. *American Psychologist*, 74(9), 1056–1067.
<https://doi.org/10.1037/amp0000503>

Bleidorn, W., Hopwood, C. J., Back, M. D., Denissen, J. J. A., Hennecke, M., Hill, P. L.,
Jokela, M., Kandler, C., Lucas, R. E., Luhmann, M., Orth, U., Roberts, B. W.,
Wagner, J., Wrzus, C., & Zimmermann, J. (2021). Personality Trait Stability and
Change. *Personality Science*, 2(1), 1–20. <https://doi.org/10.5964/ps.6009>

Bleidorn, W., Hopwood, C. J., & Lucas, R. E. (2018). Life events and personality trait
change. *Journal of Personality*, 86(1), 83–96. <https://doi.org/10.1111/jopy.12286>

Bleidorn, W., Klimstra, T. A., Denissen, J. J. A., Rentfrow, P. J., Potter, J., & Gosling, S.
D. (2013). Personality Maturation Around the World: A Cross-Cultural
Examination of Social-Investment Theory. *Psychological Science*, 24(12),
2530–2540. <https://doi.org/10.1177/0956797613498396>

Bleidorn, W., & Schwaba, T. (2018). Retirement is associated with change in self-esteem.
Psychology and Aging, 33(4), 586–594. <https://doi.org/10.1037/pag0000253>

Bleidorn, W., & Schwaba, T. (2017). Personality development in emerging adulthood. In
J. Specht (Ed.), *Personality Development Across the Lifespan* (pp. 39–51).
Academic Press. <https://doi.org/10.1016/B978-0-12-804674-6.00004-1>

Bordone, V., Arpino, B., & Aassve, A. (2017). Patterns of grandparental child care across
Europe: The role of the policy context and working mothers' need. *Ageing and
Society*, 37(4), 845–873. <https://doi.org/10.1017/S0144686X1600009X>

- 1210 Brüderl, J., & Ludwig, V. (2015). *Fixed-Effects Panel Regression* (H. Best & C. Wolf,
1211 Eds.). SAGE.
- 1212 Buchanan, A., & Rotkirch, A. (2018). Twenty-first century grandparents: Global
1213 perspectives on changing roles and consequences. *Contemporary Social Science*,
1214 13(2), 131–144. <https://doi.org/10.1080/21582041.2018.1467034>
- 1215 Burgette, L. F., & Reiter, J. P. (2010). Multiple Imputation for Missing Data via
1216 Sequential Regression Trees. *American Journal of Epidemiology*, 172(9), 1070–1076.
1217 <https://doi.org/10.1093/aje/kwq260>
- 1218 Caspi, A., & Moffitt, T. E. (1993). When do individual differences matter? A paradoxical
1219 theory of personality coherence. *Psychological Inquiry*, 4(4), 247–271.
1220 https://doi.org/10.1207/s15327965pli0404_1
- 1221 Choi, S.-w. E. (2020). Grandparenting and Mortality: How Does Race-Ethnicity Matter?
1222 *Journal of Health and Social Behavior*, 61(1), 96–112.
1223 <https://doi.org/10.1177/0022146520903282>
- 1224 Chopik, W. J., & Kitayama, S. (2018). Personality change across the life span: Insights
1225 from a cross-cultural, longitudinal study. *Journal of Personality*, 86(3), 508–521.
1226 <https://doi.org/10.1111/jopy.12332>
- 1227 Christiansen, S. G. (2014). The association between grandparenthood and mortality. *Social*
1228 *Science & Medicine*, 118, 89–96. <https://doi.org/10.1016/j.socscimed.2014.07.061>
- 1229 Chung, S., & Park, A. (2018). The longitudinal effects of grandchild care on depressive
1230 symptoms and physical health of grandmothers in South Korea: A latent growth
1231 approach. *Aging & Mental Health*, 22(12), 1556–1563.
1232 <https://doi.org/10.1080/13607863.2017.1376312>
- 1233 Coall, D. A., & Hertwig, R. (2011). Grandparental Investment: A Relic of the Past or a
1234 Resource for the Future? *Current Directions in Psychological Science*, 20(2), 93–98.

<https://doi.org/10.1177/0963721411403269>

Coall, D. A., Hilbrand, S., Sear, R., & Hertwig, R. (2016). A New Niche? The Theory of Grandfather Involvement. In A. Buchanan & A. Rotkirch (Eds.), *Grandfathers: Global Perspectives* (pp. 21–44). Palgrave Macmillan UK.

https://doi.org/10.1057/978-1-137-56338-5_2

Coall, D. A., Hilbrand, S., Sear, R., & Hertwig, R. (2018). Interdisciplinary perspectives on grandparental investment: A journey towards causality. *Contemporary Social Science*, 13(2), 159–174. <https://doi.org/10.1080/21582041.2018.1433317>

Condon, J., Corkindale, C., Luszcz, M., & Gamble, E. (2013). The Australian First-time Grandparents Study: Time spent with the grandchild and its predictors. *Australasian Journal on Ageing*, 32(1), 21–27.

<https://doi.org/10.1111/j.1741-6612.2011.00588.x>

Condon, J., Luszcz, M., & McKee, I. (2018). The transition to grandparenthood: A prospective study of mental health implications. *Aging & Mental Health*, 22(3), 336–343. <https://doi.org/10.1080/13607863.2016.1248897>

Cook, T. D., Zhu, N., Klein, A., Starkey, P., & Thomas, J. (2020). How much bias results if a quasi-experimental design combines local comparison groups, a pretest outcome measure and other covariates?: A within study comparison of preschool effects. *Psychological Methods*, Advance Online Publication, 0.

<https://doi.org/10.1037/met0000260>

Costa, P. T., McCrae, R. R., & Löckenhoff, C. E. (2019). Personality Across the Life Span. *Annual Review of Psychology*, 70(1), 423–448.

<https://doi.org/10.1146/annurev-psych-010418-103244>

Damian, R. I., Spengler, M., Sutu, A., & Roberts, B. W. (2019). Sixteen going on sixty-six: A longitudinal study of personality stability and change across 50 years. *Journal of Personality and Social Psychology*, 117(3), 674–695.

<https://doi.org/10.1037/pspp0000210>

Danielsbacka, M., & Tanskanen, A. O. (2016). The association between grandparental investment and grandparents' happiness in Finland. *Personal Relationships*, 23(4), 787–800. <https://doi.org/10.1111/pere.12160>

Danielsbacka, M., Tanskanen, A. O., Coall, D. A., & Jokela, M. (2019). Grandparental childcare, health and well-being in Europe: A within-individual investigation of longitudinal data. *Social Science & Medicine*, 230, 194–203. <https://doi.org/10.1016/j.socscimed.2019.03.031>

Danielsbacka, M., Tanskanen, A. O., Jokela, M., & Rotkirch, A. (2011). Grandparental Child Care in Europe: Evidence for Preferential Investment in More Certain Kin. *Evolutionary Psychology*, 9(1), 147470491100900102. <https://doi.org/10.1177/147470491100900102>

Denissen, J. J. A., Geenen, R., Soto, C. J., John, O. P., & van Aken, M. A. G. (2020). The Big Five Inventory2: Replication of Psychometric Properties in a Dutch Adaptation and First Evidence for the Discriminant Predictive Validity of the Facet Scales. *Journal of Personality Assessment*, 102(3), 309–324. <https://doi.org/10.1080/00223891.2018.1539004>

Denissen, J. J. A., Luhmann, M., Chung, J. M., & Bleidorn, W. (2019). Transactions between life events and personality traits across the adult lifespan. *Journal of Personality and Social Psychology*, 116(4), 612–633. <https://doi.org/10.1037/pspp0000196>

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction With Life Scale. *Journal of Personality Assessment*, 49(1), 71–75. https://doi.org/10.1207/s15327752jpa4901_13

Di Gessa, G., Bordone, V., & Arpino, B. (2019). Becoming a Grandparent and Its Effect on Well-Being: The Role of Order of Transitions, Time, and Gender. *The Journals*

of *Gerontology, Series B: Psychological Sciences and Social Sciences*, Advance
Online Publication. <https://doi.org/10.1093/geronb/gbz135>

Di Gessa, G., Glaser, K., & Tinker, A. (2016a). The Health Impact of Intensive and
Nonintensive Grandchild Care in Europe: New Evidence From SHARE. *The
Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*,
71(5), 867–879. <https://doi.org/10.1093/geronb/gbv055>

Di Gessa, G., Glaser, K., & Tinker, A. (2016b). The impact of caring for grandchildren on
the health of grandparents in Europe: A lifecourse approach. *Social Science &
Medicine*, 152, 166–175. <https://doi.org/10.1016/j.socscimed.2016.01.041>

Di Gessa, G., Zaninotto, P., & Glaser, K. (2020). Looking after grandchildren: Gender
differences in “when,” “what,” and “why”: Evidence from the English Longitudinal
Study of Ageing. *Demographic Research*, 43(53), 1545–1562.
<https://doi.org/10.4054/DemRes.2020.43.53>

Doré, B., & Bolger, N. (2018). Population- and individual-level changes in life satisfaction
surrounding major life stressors. *Social Psychological and Personality Science*, 9(7),
875–884. <https://doi.org/10.1177/1948550617727589>

Ellwardt, L., Hank, K., & Mendes de Leon, C. F. (2021). Grandparenthood and risk of
mortality: Findings from the Health and Retirement Study. *Social Science &
Medicine*, 268, 113371. <https://doi.org/10.1016/j.socscimed.2020.113371>

Elwert, F., & Winship, C. (2014). Endogenous Selection Bias: The Problem of
Conditioning on a Collider Variable. *Annual Review of Sociology*, 40(1), 31–53.
<https://doi.org/10.1146/annurev-soc-071913-043455>

Findler, L., Taubman - Ben-Ari, O., Nuttman-Shwartz, O., & Lazar, R. (2013).
Construction and Validation of the Multidimensional Experience of
Grandparenthood Set of Inventories. *Social Work Research*, 37(3), 237–253.
<https://doi.org/10.1093/swr/svt025>

- 1313 Fox, J., & Weisberg, S. (2019). *An R companion to applied regression* (Third). Sage.
- 1314 Goldberg, L. R. (1992). The development of markers for the Big-Five factor structure.
1315 *Psychological Assessment*, 4(1), 26–42. <https://doi.org/10.1037/1040-3590.4.1.26>
- 1316 Golle, J., Rose, N., Göllner, R., Spengler, M., Stoll, G., Hübner, N., Rieger, S., Trautwein,
1317 U., Lüdtke, O., Roberts, B. W., & Nagengast, B. (2019). School or Work? The
1318 Choice May Change Your Personality. *Psychological Science*, 30(1), 32–42.
1319 <https://doi.org/10.1177/0956797618806298>
- 1320 Götz, F. M., Gosling, S. D., & Rentfrow, P. J. (2021). Small Effects: The Indispensable
1321 Foundation for a Cumulative Psychological Science. *Perspectives on Psychological
1322 Science*, 1745691620984483. <https://doi.org/10.1177/1745691620984483>
- 1323 Graham, E. K., Weston, S. J., Gerstorf, D., Yoneda, T. B., Booth, T., Beam, C. R.,
1324 Petkus, A. J., Drewelies, J., Hall, A. N., Bastarache, E. D., Estabrook, R., Katz, M.
1325 J., Turiano, N. A., Lindenberger, U., Smith, J., Wagner, G. G., Pedersen, N. L.,
1326 Allemand, M., Spiro Iii, A., . . . Mroczek, D. K. (2020). Trajectories of Big Five
1327 Personality Traits: A Coordinated Analysis of 16 Longitudinal Samples. *European
1328 Journal of Personality*, n/a(n/a). <https://doi.org/10.1002/per.2259>
- 1329 Greenland, S. (2003). Quantifying biases in causal models: Classical confounding vs
1330 collider-stratification bias. *Epidemiology*, 14(3), 300–306.
1331 <https://doi.org/10.1097/01.EDE.0000042804.12056.6C>
- 1332 Greenland, S., & Finkle, W. D. (1995). A Critical Look at Methods for Handling Missing
1333 Covariates in Epidemiologic Regression Analyses. *American Journal of
1334 Epidemiology*, 142(12), 1255–1264.
1335 <https://doi.org/10.1093/oxfordjournals.aje.a117592>
- 1336 Grimm, K. J., & Ram, N. (2009). A second-order growth mixture model for developmental
1337 research. *Research in Human Development*, 6(2-3), 121–143.
1338 <https://doi.org/10.1080/15427600902911221>

- 1339 Hagestad, G. O., & Neugarten, B. L. (1985). Age and the life course. In E. Shanas & R.
1340 Binstock (Eds.), *Handbook of aging and the social sciences*. Van Nostrand and
1341 Reinhold.
- 1342 Hallberg, K., Cook, T. D., Steiner, P. M., & Clark, M. H. (2018). Pretest Measures of the
1343 Study Outcome and the Elimination of Selection Bias: Evidence from Three Within
1344 Study Comparisons. *Prevention Science, 19*(3), 274–283.
1345 <https://doi.org/10.1007/s11121-016-0732-6>
- 1346 Hank, K., & Buber, I. (2009). Grandparents Caring for their Grandchildren: Findings
1347 From the 2004 Survey of Health, Ageing, and Retirement in Europe. *Journal of*
1348 *Family Issues, 30*(1), 53–73. <https://doi.org/10.1177/0192513X08322627>
- 1349 Hayslip, B., Jr, Fruhauf, C. A., & Dolbin-MacNab, M. L. (2019). Grandparents Raising
1350 Grandchildren: What Have We Learned Over the Past Decade? *The Gerontologist,*
1351 *59*(3), e152–e163. <https://doi.org/10.1093/geront/gnx106>
- 1352 Hentschel, S., Eid, M., & Kutscher, T. (2017). The Influence of Major Life Events and
1353 Personality Traits on the Stability of Affective Well-Being. *Journal of Happiness*
1354 *Studies, 18*(3), 719–741. <https://doi.org/10.1007/s10902-016-9744-y>
- 1355 Hernán, M. A., & Robins, J. M. (2020). *Causal Inference: What If*. Chapman & Hall/CRC.
- 1356 Hilbrand, S., Coall, D. A., Gerstorf, D., & Hertwig, R. (2017). Caregiving within and
1357 beyond the family is associated with lower mortality for the caregiver: A
1358 prospective study. *Evolution and Human Behavior, 38*(3), 397–403.
1359 <https://doi.org/10.1016/j.evolhumbehav.2016.11.010>
- 1360 Ho, D. E., Imai, K., King, G., & Stuart, E. A. (2011). MatchIt: Nonparametric
1361 preprocessing for parametric causal inference. *Journal of Statistical Software, 42*(8),
1362 1–28.
- 1363 Hoffman, L. (2015). *Longitudinal analysis: Modeling within-person fluctuation and change*.

Routledge/Taylor & Francis Group.

Hutteman, R., Hennecke, M., Orth, U., Reitz, A. K., & Specht, J. (2014). Developmental Tasks as a Framework to Study Personality Development in Adulthood and Old Age. *European Journal of Personality*, 28(3), 267–278.
<https://doi.org/10.1002/per.1959>

Infurna, F. J., Gerstorf, D., & Lachman, M. E. (2020). Midlife in the 2020s: Opportunities and challenges. *American Psychologist*, 75(4), 470–485.
<https://doi.org/10.1037/amp0000591>

Jackson, J. J., & Beck, E. D. (2021). Personality Development Beyond the Mean: Do Life Events Shape Personality Variability, Structure, and Ipsative Continuity? *The Journals of Gerontology: Series B*, 76(1), 20–30.
<https://doi.org/10.1093/geronb/gbaa093>

John, O. P., Naumann, L. P., & Soto, C. J. (2008). Paradigm shift to the integrative Big Five trait taxonomy: History, measurement, and conceptual issues. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (pp. 114–158). The Guilford Press.

John, O. P., & Srivastava, S. (1999). The Big Five Trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research*, 2nd ed. (pp. 102–138). Guilford Press.

Johnson, A. B., & Rodgers, J. L. (2006). The impact of having children on the lives of women: The Effects of Children Questionnaire. *Journal of Applied Social Psychology*, 36(11), 2685–2714. <https://doi.org/10.1111/j.0021-9029.2006.00123.x>

Kandler, C., Kornadt, A. E., Hagemeyer, B., & Neyer, F. J. (2015). Patterns and sources of personality development in old age. *Journal of Personality and Social Psychology*, 109(1), 175–191. <https://doi.org/10.1037/pspp0000028>

- 1389 Krämer, M. D., & Rodgers, J. L. (2020). The impact of having children on domain-specific
1390 life satisfaction: A quasi-experimental longitudinal investigation using the
1391 Socio-Economic Panel (SOEP) data. *Journal of Personality and Social Psychology*,
1392 *119*(6), 1497–1514. <https://doi.org/10.1037/pspp0000279>
- 1393 Kritzler, S., Rakhshani, A., Terwiel, S., Fassbender, I., Donnellan, B., Lucas, R. E., &
1394 Luhmann, M. (2021). How Are Common Major Life Events Perceived? Exploring
1395 Differences Between and Variability of Different Typical Event Profiles and Raters.
1396 *PsyArXiv*. <https://doi.org/10.31234/osf.io/fncz3>
- 1397 Kuznetsova, A., Brockhoff, P. B., & Christensen, R. H. B. (2017). lmerTest package: Tests
1398 in linear mixed effects models. *Journal of Statistical Software*, *82*(13), 1–26.
1399 <https://doi.org/10.18637/jss.v082.i13>
- 1400 Lachman, M. E., & Weaver, S. L. (1997). *The Midlife Development Inventory (MIDI)*
1401 *personality scales: Scale construction and scoring*. Brandeis University.
- 1402 Leopold, T., & Skopek, J. (2015). The Demography of Grandparenthood: An International
1403 Profile. *Social Forces*, *94*(2), 801–832. <https://doi.org/10.1093/sf/sov066>
- 1404 Li, M. (2013). Using the Propensity Score Method to Estimate Causal Effects: A Review
1405 and Practical Guide. *Organizational Research Methods*, *16*(2), 188–226.
1406 <https://doi.org/10.1177/1094428112447816>
- 1407 Lodi-Smith, J., & Roberts, B. W. (2007). Social Investment and Personality: A
1408 Meta-Analysis of the Relationship of Personality Traits to Investment in Work,
1409 Family, Religion, and Volunteerism. *Personality and Social Psychology Review*,
1410 *11*(1), 68–86. <https://doi.org/10.1177/1088868306294590>
- 1411 Luan, Z., Hutteman, R., Denissen, J. J. A., Asendorpf, J. B., & van Aken, M. A. G. (2017).
1412 Do you see my growth? Two longitudinal studies on personality development from
1413 childhood to young adulthood from multiple perspectives. *Journal of Research in*
1414 *Personality*, *67*, 44–60. <https://doi.org/10.1016/j.jrp.2016.03.004>

- 1415 Lucas, R. E., & Donnellan, M. B. (2011). Personality development across the life span:
1416 Longitudinal analyses with a national sample from Germany. *Journal of Personality*
1417 *and Social Psychology*, 101(4), 847–861. <https://doi.org/10.1037/a0024298>
- 1418 Luhmann, M., Fassbender, I., Alcock, M., & Haehner, P. (2020). A dimensional taxonomy
1419 of perceived characteristics of major life events. *Journal of Personality and Social*
1420 *Psychology*, No Pagination Specified–No Pagination Specified.
1421 <https://doi.org/10.1037/pspp0000291>
- 1422 Luhmann, M., Hofmann, W., Eid, M., & Lucas, R. E. (2012). Subjective well-being and
1423 adaptation to life events: A meta-analysis. *Journal of Personality and Social*
1424 *Psychology*, 102(3), 592–615. <https://doi.org/10.1037/a0025948>
- 1425 Luhmann, M., Orth, U., Specht, J., Kandler, C., & Lucas, R. E. (2014). Studying changes
1426 in life circumstances and personality: It's about time. *European Journal of*
1427 *Personality*, 28(3), 256–266. <https://doi.org/10.1002/per.1951>
- 1428 Lumsdaine, R. L., & Vermeer, S. J. C. (2015). Retirement timing of women and the role of
1429 care responsibilities for grandchildren. *Demography*, 52(2), 433–454.
1430 <https://doi.org/10.1007/s13524-015-0382-5>
- 1431 Lüdtke, O., Roberts, B. W., Trautwein, U., & Nagy, G. (2011). A random walk down
1432 university avenue: Life paths, life events, and personality trait change at the
1433 transition to university life. *Journal of Personality and Social Psychology*, 101(3),
1434 620–637. <https://doi.org/10.1037/a0023743>
- 1435 MacCallum, R. C., Zhang, S., Preacher, K. J., & Rucker, D. D. (2002). On the practice of
1436 dichotomization of quantitative variables. *Psychological Methods*, 7(1), 19–40.
1437 <https://doi.org/10.1037/1082-989X.7.1.19>
- 1438 Mahne, K., & Huxhold, O. (2014). Grandparenthood and Subjective Well-Being:
1439 Moderating Effects of Educational Level. *The Journals of Gerontology: Series B*,
1440 70(5), 782–792. <https://doi.org/10.1093/geronb/gbu147>

- 1441 Mann, R. (2007). Out of the shadows?: Grandfatherhood, age and masculinities.
1442 *Masculinity and Aging*, 21(4), 281–291.
1443 <https://doi.org/10.1016/j.jaging.2007.05.008>
- 1444 Margolis, R., & Verdery, A. M. (2019). A Cohort Perspective on the Demography of
1445 Grandparenthood: Past, Present, and Future Changes in Race and Sex Disparities
1446 in the United States. *Demography*, 56(4), 1495–1518.
1447 <https://doi.org/10.1007/s13524-019-00795-1>
- 1448 Margolis, R., & Wright, L. (2017). Healthy Grandparenthood: How Long Is It, and How
1449 Has It Changed? *Demography*, 54(6), 2073–2099.
1450 <https://doi.org/10.1007/s13524-017-0620-0>
- 1451 Marsh, H. W., Nagengast, B., & Morin, A. J. S. (2013). Measurement invariance of big-five
1452 factors over the life span: ESEM tests of gender, age, plasticity, maturity, and la
1453 dolce vita effects. *Developmental Psychology*, 49(6), 1194–1218.
1454 <https://doi.org/10.1037/a0026913>
- 1455 McCrae, R. R. (1993). Moderated analyses of longitudinal personality stability. *Journal of*
1456 *Personality and Social Psychology*, 65(3), 577–585.
1457 <https://doi.org/10.1037/0022-3514.65.3.577>
- 1458 McCrae, R. R. (2018). Method biases in single-source personality assessments.
1459 *Psychological Assessment*, 30(9), 1160–1173. <https://doi.org/10.1037/pas0000566>
- 1460 McCrae, R. R., & Mõttus, R. (2019). What personality scales measure: A new
1461 psychometrics and its implications for theory and assessment. *Current Directions in*
1462 *Psychological Science*, 28(4), 415–420. <https://doi.org/10.1177/0963721419849559>
- 1463 McNeish, D. (2018). Thanks coefficient alpha, we'll take it from here. *Psychological*
1464 *Methods*, 23(3), 412–433. <https://doi.org/10.1037/met0000144>
- 1465 McNeish, D., & Kelley, K. (2019). Fixed effects models versus mixed effects models for

clustered data: Reviewing the approaches, disentangling the differences, and making recommendations. *Psychological Methods*, 24(1), 20–35.

<https://doi.org/10.1037/met0000182>

Meyer, M. H., & Kandic, A. (2017). Grandparenting in the United States. *Innovation in Aging*, 1(2), 1–10. <https://doi.org/10.1093/geroni/igx023>

Mitra, R., & Reiter, J. P. (2016). A comparison of two methods of estimating propensity scores after multiple imputation. *Statistical Methods in Medical Research*, 25(1), 188–204. <https://doi.org/10.1177/0962280212445945>

Mõttus, R., Allik, J., & Realo, A. (2019). Do Self-Reports and Informant-Ratings Measure the Same Personality Constructs? *European Journal of Psychological Assessment*, 1–7. <https://doi.org/10.1027/1015-5759/a000516>

Mõttus, R., Johnson, W., & Deary, I. J. (2012). Personality traits in old age: Measurement and rank-order stability and some mean-level change. *Psychology and Aging*, 27(1), 243–249. <https://doi.org/10.1037/a0023690>

Mõttus, R., Kandler, C., Bleidorn, W., Riemann, R., & McCrae, R. R. (2017). Personality traits below facets: The consensual validity, longitudinal stability, heritability, and utility of personality nuances. *Journal of Personality and Social Psychology*, 112(3), 474–490. <https://doi.org/10.1037/pspp0000100>

Mõttus, R., & Rozgonjuk, D. (2021). Development is in the details: Age differences in the Big Five domains, facets, and nuances. *Journal of Personality and Social Psychology*, 120(4), 1035–1048. <https://doi.org/10.1037/pspp0000276>

Mueller, S., Wagner, J., Drewelies, J., Duezel, S., Eibich, P., Specht, J., Demuth, I., Steinhagen-Thiessen, E., Wagner, G. G., & Gerstorf, D. (2016). Personality development in old age relates to physical health and cognitive performance: Evidence from the Berlin Aging Study II. *Journal of Research in Personality*, 65, 94–108. <https://doi.org/10.1016/j.jrp.2016.08.007>

- 1492 Muller, Z., & Litwin, H. (2011). Grandparenting and well-being: How important is
1493 grandparent-role centrality? *European Journal of Ageing*, 8, 109–118.
1494 <https://doi.org/10.1007/s10433-011-0185-5>
- 1495 OECD. (2020). *Is Childcare Affordable? Policy Brief On Employment, Labour And Social*
1496 *Affairs*.
- 1497 Oltmanns, J. R., Jackson, J. J., & Oltmanns, T. F. (2020). Personality change:
1498 Longitudinal self-other agreement and convergence with retrospective-reports.
1499 *Journal of Personality and Social Psychology*, 118(5), 1065–1079.
1500 <https://doi.org/10.1037/pspp0000238>
- 1501 Ozer, D. J., & Benet-Martínez, V. (2005). Personality and the Prediction of Consequential
1502 Outcomes. *Annual Review of Psychology*, 57(1), 401–421.
1503 <https://doi.org/10.1146/annurev.psych.57.102904.190127>
- 1504 Pearl, J. (2009). Causal inference in statistics: An overview. *Statistics Surveys*, 3, 96–146.
1505 <https://doi.org/10.1214/09-SS057>
- 1506 Pilkauskas, N. V., Amorim, M., & Dunifon, R. E. (2020). Historical Trends in Children
1507 Living in Multigenerational Households in the United States: 18702018.
1508 *Demography*, 57(6), 2269–2296. <https://doi.org/10.1007/s13524-020-00920-5>
- 1509 Pinheiro, J., Bates, D., & R-core. (2021). *Nlme: Linear and nonlinear mixed effects models*
1510 *[Manual]*.
- 1511 Podsakoff, P. M., MacKenzie, S. B., Jeong-Yeon, L., & Podsakoff, N. P. (2003). Common
1512 method biases in behavioral research: A critical review of the literature and
1513 recommended remedies. *Journal of Applied Psychology*, 88(5), 879–903.
1514 <https://doi.org/10.1037/0021-9010.88.5.879>
- 1515 Pusch, S., Mund, M., Hagemeyer, B., & Finn, C. (2019). Personality Development in
1516 Emerging and Young Adulthood: A Study of Age Differences. *European Journal of*

- 1517 *Personality*, 33(3), 245–263. <https://doi.org/10.1002/per.2181>
- 1518 Ram, N., & Grimm, K. J. (2009). Methods and Measures: Growth mixture modeling: A
1519 method for identifying differences in longitudinal change among unobserved groups.
1520 *International Journal of Behavioral Development*, 33(6), 565–576.
1521 <https://doi.org/10.1177/0165025409343765>
- 1522 R Core Team. (2021). *R: A language and environment for statistical computing*. R
1523 Foundation for Statistical Computing. <https://www.R-project.org/>
- 1524 Roberts, B. W., & Davis, J. P. (2016). Young Adulthood Is the Crucible of Personality
1525 Development. *Emerging Adulthood*, 4(5), 318–326.
1526 <https://doi.org/10.1177/2167696816653052>
- 1527 Roberts, B. W., & DelVecchio, W. F. (2000). The rank-order consistency of personality
1528 traits from childhood to old age: A quantitative review of longitudinal studies.
1529 *Psychological Bulletin*, 126(1), 3–25. <https://doi.org/10.1037/0033-2909.126.1.3>
- 1530 Roberts, B. W., Kuncel, N. R., Shiner, R., Caspi, A., & Goldberg, L. R. (2007). The Power
1531 of Personality: The Comparative Validity of Personality Traits, Socioeconomic
1532 Status, and Cognitive Ability for Predicting Important Life Outcomes. *Perspectives*
1533 *on Psychological Science*, 2(4), 313–345.
1534 <https://doi.org/10.1111/j.1745-6916.2007.00047.x>
- 1535 Roberts, B. W., Walton, K. E., & Viechtbauer, W. (2006). Patterns of mean-level change
1536 in personality traits across the life course: A meta-analysis of longitudinal studies.
1537 *Psychological Bulletin*, 132, 1–25. <https://doi.org/10.1037/0033-2909.132.1.1>
- 1538 Roberts, B. W., & Wood, D. (2006). Personality Development in the Context of the
1539 Neo-Socioanalytic Model of Personality. In D. K. Mroczek & T. D. Little (Eds.),
1540 *Handbook of Personality Development*. Routledge.
- 1541 Roberts, B. W., Wood, D., & Smith, J. L. (2005). Evaluating Five Factor Theory and

social investment perspectives on personality trait development. *Journal of Research in Personality*, 39(1), 166–184. <https://doi.org/10.1016/j.jrp.2004.08.002>

Roberts, B. W., & Yoon, H. J. (2021). Personality Psychology. *Annual Review of Psychology*, in press. <https://doi.org/10.1146/annurev-psych-020821-114927>

Rohrer, J. M. (2018). Thinking Clearly About Correlations and Causation: Graphical Causal Models for Observational Data. *Advances in Methods and Practices in Psychological Science*, 1(1), 27–42. <https://doi.org/10.1177/2515245917745629>

Rohrer, J. M., Hünermund, P., Arslan, R. C., & Elson, M. (2021). That’s a lot to PROCESS! Pitfalls of Popular Path Models. *PsyArXiv*. <https://doi.org/10.31234/osf.io/paeb7>

Rosenbaum, P. (1984). The consequences of adjustment for a concomitant variable that has been affected by the treatment. *Journal of the Royal Statistical Society. Series A (General)*, 147(5), 656–666. <https://doi.org/10.2307/2981697>

Scherpenzeel, A. (2011). Data Collection in a Probability-Based Internet Panel: How the LISS Panel Was Built and How It Can Be Used. *Bulletin of Sociological Methodology/Bulletin de Méthodologie Sociologique*, 109(1), 56–61. <https://doi.org/10.1177/0759106310387713>

Scherpenzeel, A. C., & Das, M. (2010). True” longitudinal and probability-based internet panels: Evidence from the Netherlands. In M. Das, P. Ester, & L. Kaczmirek (Eds.), *Social and behavioral research and the internet: Advances in applied methods and research strategies* (pp. 77–104). Taylor & Francis.

Schwaba, T., & Bleidorn, W. (2019). Personality trait development across the transition to retirement. *Journal of Personality and Social Psychology*, 116(4), 651–665. <https://doi.org/10.1037/pspp0000179>

Schwaba, T., & Bleidorn, W. (2018). Individual differences in personality change across the

adult life span. *Journal of Personality*, 86(3), 450–464.

<https://doi.org/10.1111/jopy.12327>

Seifert, I. S., Rohrer, J. M., Egloff, B., & Schmukle, S. C. (2021). The Development of the Rank-Order Stability of the Big Five Across the Life Span. *Journal of Personality and Social Psychology*. <https://doi.org/10.1037/pspp0000398>

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Houghton, Mifflin and Company.

Sheppard, P., & Monden, C. (2019). Becoming a First-Time Grandparent and Subjective Well-Being: A Fixed Effects Approach. *Journal of Marriage and Family*, 81(4), 1016–1026. <https://doi.org/10.1111/jomf.12584>

Silverstein, M., & Marengo, A. (2001). How Americans Enact the Grandparent Role Across the Family Life Course. *Journal of Family Issues*, 22(4), 493–522. <https://doi.org/10.1177/019251301022004006>

Skopek, J., & Leopold, T. (2017). Who becomes a grandparent and when? Educational differences in the chances and timing of grandparenthood. *Demographic Research*, 37(29), 917–928. <https://doi.org/10.4054/DemRes.2017.37.29>

Sonnega, A., Faul, J. D., Ofstedal, M. B., Langa, K. M., Phillips, J. W., & Weir, D. R. (2014). Cohort Profile: The Health and Retirement Study (HRS). *International Journal of Epidemiology*, 43(2), 576–585. <https://doi.org/10.1093/ije/dyu067>

Soto, C. J. (2021). Do Links Between Personality and Life Outcomes Generalize? Testing the Robustness of TraitOutcome Associations Across Gender, Age, Ethnicity, and Analytic Approaches. *Social Psychological and Personality Science*, 12(1), 118–130. <https://doi.org/10.1177/1948550619900572>

Soto, C. J. (2019). How Replicable Are Links Between Personality Traits and

Consequential Life Outcomes? The Life Outcomes of Personality Replication Project. *Psychological Science*, 30(5), 711–727.
<https://doi.org/10.1177/0956797619831612>

Specht, J. (2017). Personality development in adulthood and old age. In J. Specht (Ed.), *Personality Development Across the Lifespan* (pp. 53–67). Academic Press.
<https://doi.org/10.1016/B978-0-12-804674-6.00005-3>

Specht, J., Bleidorn, W., Denissen, J. J. A., Hennecke, M., Hutteman, R., Kandler, C., Luhmann, M., Orth, U., Reitz, A. K., & Zimmermann, J. (2014). What Drives Adult Personality Development? A Comparison of Theoretical Perspectives and Empirical Evidence. *European Journal of Personality*, 28(3), 216–230.
<https://doi.org/10.1002/per.1966>

Specht, J., Egloff, B., & Schmukle, S. C. (2011). Stability and change of personality across the life course: The impact of age and major life events on mean-level and rank-order stability of the Big Five. *Journal of Personality and Social Psychology*, 101(4), 862–882. <https://doi.org/10.1037/a0024950>

Spikic, S., Mortelmans, D., & Pasteels, I. (2021). Does divorce change your personality? Examining the effect of divorce occurrence on the Big Five personality traits using panel surveys from three countries. *Personality and Individual Differences*, 171, 110428. <https://doi.org/10.1016/j.paid.2020.110428>

Steiner, P., Cook, T., Shadish, W., & Clark, M. (2010). The Importance of Covariate Selection in Controlling for Selection Bias in Observational Studies. *Psychological Methods*, 15, 250–267. <https://doi.org/10.1037/a0018719>

Stephan, Y., Sutin, A. R., & Terracciano, A. (2014). Physical activity and personality development across adulthood and old age: Evidence from two longitudinal studies. *Journal of Research in Personality*, 49, 1–7.
<https://doi.org/10.1016/j.jrp.2013.12.003>

- 1618 StGeorge, J. M., & Fletcher, R. J. (2014). Men's experiences of grandfatherhood: A
1619 welcome surprise. *The International Journal of Aging & Human Development*,
1620 78(4), 351–378. <https://doi.org/10.2190/AG.78.4.c>
- 1621 Stuart, E. A. (2010). Matching methods for causal inference: A review and a look forward.
1622 *Statistical Science: A Review Journal of the Institute of Mathematical Statistics*,
1623 25(1), 1–21. <https://doi.org/10.1214/09-STS313>
- 1624 Tanskanen, A., Danielsbacka, M., Hämäläinen, H., & Solé-Auró, A. (2021). Does
1625 Transition to Retirement Promote Grandchild Care? Results from the Survey of
1626 Health, Ageing and Retirement in Europe. *PsyArXiv*.
1627 <https://doi.org/10.31235/osf.io/akme6>
- 1628 Tanskanen, A. O., Danielsbacka, M., Coall, D. A., & Jokela, M. (2019). Transition to
1629 Grandparenthood and Subjective Well-Being in Older Europeans: A Within-Person
1630 Investigation Using Longitudinal Data. *Evolutionary Psychology*, 17(3),
1631 1474704919875948. <https://doi.org/10.1177/1474704919875948>
- 1632 Thiele, D. M., & Whelan, T. A. (2006). The Nature and Dimensions of the Grandparent
1633 Role. *Marriage & Family Review*, 40(1), 93–108.
1634 https://doi.org/10.1300/J002v40n01_06
- 1635 Thoemmes, F. J., & Kim, E. S. (2011). A Systematic Review of Propensity Score Methods
1636 in the Social Sciences. *Multivariate Behavioral Research*, 46(1), 90–118.
1637 <https://doi.org/10.1080/00273171.2011.540475>
- 1638 Thoemmes, F., & Ong, A. D. (2016). A Primer on Inverse Probability of Treatment
1639 Weighting and Marginal Structural Models. *Emerging Adulthood*, 4(1), 40–59.
1640 <https://doi.org/10.1177/2167696815621645>
- 1641 Triadó, C., Villar, F., Celdrán, M., & Solé, C. (2014). Grandparents Who Provide
1642 Auxiliary Care for Their Grandchildren: Satisfaction, Difficulties, and Impact on
1643 Their Health and Well-being. *Journal of Intergenerational Relationships*, 12(2),

113–127. <https://doi.org/10.1080/15350770.2014.901102>

Turiano, N. A., Graham, E. K., Weston, S. J., Booth, T., Harrison, F., James, B. D.,
Lewis, N. A., Makkar, S. R., Mueller, S., Wisniewski, K. M., Zhaoyang, R., Spiro,
A., Willis, S., Schaie, K. W., Lipton, R. B., Katz, M., Sliwinski, M., Deary, I. J.,
Zelinski, E. M., . . . Mroczek, D. K. (2020). Is Healthy Neuroticism Associated with
Longevity? A Coordinated Integrative Data Analysis. *Collabra: Psychology*, 6(33).
<https://doi.org/10.1525/collabra.268>

van Buuren, S., & Groothuis-Oudshoorn, K. (2011). mice: Multivariate imputation by
chained equations in r. *Journal of Statistical Software*, 45(3), 1–67.

van der Laan, J. (2009). *Representativity of the LISS panel (Discussion Paper 09041)*.
Statistics Netherlands.

VanderWeele, T. J. (2019). Principles of confounder selection. *European Journal of
Epidemiology*, 34(3), 211–219. <https://doi.org/10.1007/s10654-019-00494-6>

VanderWeele, T. J., Mathur, M. B., & Chen, Y. (2020). Outcome-Wide Longitudinal
Designs for Causal Inference: A New Template for Empirical Studies. *Statistical
Science*, 35(3), 437–466. <https://doi.org/10.1214/19-STS728>

van Scheppingen, M. A., Jackson, J. J., Specht, J., Hutteman, R., Denissen, J. J. A., &
Bleidorn, W. (2016). Personality Trait Development During the Transition to
Parenthood: A Test of Social Investment Theory. *Social Psychological and
Personality Science*, 7(5), 452–462. <https://doi.org/10.1177/1948550616630032>

van Scheppingen, M. A., & Leopold, T. (2020). Trajectories of life satisfaction before, upon,
and after divorce: Evidence from a new matching approach. *Journal of Personality
and Social Psychology*, 119(6), 1444–1458. <https://doi.org/10.1037/pspp0000270>

Vermote, M., Deliens, T., Deforche, B., & D’Hondt, E. (2021). The impact of
non-residential grandchild care on physical activity and sedentary behavior in

- people aged 50 years and over: Study protocol of the Healthy Grandparenting Project. *BMC Public Health*, 21. <https://doi.org/10.1186/s12889-020-10024-9>
- Wagner, J., Becker, M., Lüdtke, O., & Trautwein, U. (2015). The First Partnership Experience and Personality Development: A Propensity Score Matching Study in Young Adulthood. *Social Psychological and Personality Science*, 6(4), 455–463. <https://doi.org/10.1177/1948550614566092>
- Wagner, J., Lüdtke, O., & Robitzsch, A. (2019). Does personality become more stable with age? Disentangling state and trait effects for the big five across the life span using local structural equation modeling. *Journal of Personality and Social Psychology*, 116(4), 666–680. <https://doi.org/10.1037/pspp0000203>
- Wagner, J., Orth, U., Bleidorn, W., Hopwood, C. J., & Kandler, C. (2020). Toward an Integrative Model of Sources of Personality Stability and Change. *Current Directions in Psychological Science*, 29(5), 438–444. <https://doi.org/10.1177/0963721420924751>
- Wagner, J., Ram, N., Smith, J., & Gerstorf, D. (2016). Personality trait development at the end of life: Antecedents and correlates of mean-level trajectories. *Journal of Personality and Social Psychology*, 111(3), 411–429. <https://doi.org/10.1037/pspp0000071>
- Wickham, H., Averick, M., Bryan, J., Chang, W., McGowan, L. D., François, R., Grolemond, G., Hayes, A., Henry, L., Hester, J., Kuhn, M., Pedersen, T. L., Miller, E., Bache, S. M., Müller, K., Ooms, J., Robinson, D., Seidel, D. P., Spinu, V., ... Yutani, H. (2019). Welcome to the tidyverse. *Journal of Open Source Software*, 4(43), 1686. <https://doi.org/10.21105/joss.01686>
- Wortman, J., Lucas, R. E., & Donnellan, M. B. (2012). Stability and change in the Big Five personality domains: Evidence from a longitudinal study of Australians. *Psychology and Aging*, 27(4), 867–874. <https://doi.org/10.1037/a0029322>

- 1695 Wrzus, C., & Roberts, B. W. (2017). Processes of personality development in adulthood:
1696 The TESSERA framework. *Personality and Social Psychology Review*, 21(3),
1697 253–277. <https://doi.org/10.1177/1088868316652279>
- 1698 Yap, S., Anusic, I., & Lucas, R. E. (2012). Does personality moderate reaction and
1699 adaptation to major life events? Evidence from the British Household Panel Survey.
1700 *Journal of Research in Personality*, 46(5), 477–488.
1701 <https://doi.org/10.1016/j.jrp.2012.05.005>

Supplemental Material

1702 Model Equations

1703 Model equation for the basic models (ignoring the additional nesting in households
1704 applied to the majority of models):

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

1705 where at time t for person i $e_{ti} \sim N(0, \sigma_e^2)$ and $v_{0i} \sim N(0, \tau_{00})$. y_{ti} represented one of the
1706 Big Five or life satisfaction. Separate models were computed for LISS and HRS samples,
1707 and for parent and nonparent matched controls.

1708 Model equation for the models including the gender interaction (moderator variable
1709 *female_i*):

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

1710 where $e_{ti} \sim N(0, \sigma_e^2)$ and $v_{0i} \sim N(0, \tau_{00})$. Again, we estimated separate models for each
1711 sample (LISS, HRS) and each comparison group (parents, nonparents).

1712 Model equation for the models including the interaction by paid work (moderator
1713 variable $working_{ti}$):

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

1714 where $e_{ti} \sim N(0, \sigma_e^2)$ and $v_{0i} \sim N(0, \tau_{00})$. We estimated separate models for each
1715 comparison group (parents, nonparents) in the HRS.

1716 Model equation for the models including the interaction by grandchild care
1717 (moderator variable $caring_{ti}$):

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

1718 where $e_{ti} \sim N(0, \sigma_e^2)$ and $v_{0i} \sim N(0, \tau_{00})$. Restricted to the HRS post-transition period, we
1719 estimated separate models for each comparison group (parents, nonparents).

1720 **Supplemental Tables****Table S1***Intra-Class Correlations of Grandparents and Matched Controls in the Four Analysis Samples.*

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

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

Table S2*Longitudinal Sample Size in the Analysis Samples and Coding Scheme for the Piecewise Regression Coefficients.*

	Pre-transition years						Post-transition years						
	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
LISS: Analysis samples													
Grandparents: obs.	92	105	108	121	156	116	133	138	108	108	69	62	52
Grandparents: % women	51.09	48.57	52.78	51.24	56.41	62.93	47.37	52.90	51.85	50.00	56.52	66.13	53.85
Parent controls: obs.	335	425	381	540	740	351	450	488	333	394	365	164	201
Parent controls: % women	57.61	51.06	55.12	51.48	55.00	56.13	53.11	54.10	56.76	51.27	56.99	59.76	48.76
Nonparent controls: obs.	331	399	407	554	739	354	473	516	367	477	375	146	202
Nonparent controls: % women	52.57	54.89	57.99	52.71	55.21	54.52	49.26	54.46	52.86	52.83	54.67	48.63	51.49
LISS: Coding scheme													
Before-slope	0	1	2	3	4	5	5	5	5	5	5	5	5
After-slope	0	0	0	0	0	0	1	2	3	4	5	6	7
Shift	0	0	0	0	0	0	1	1	1	1	1	1	1
HRS: Analysis samples													
Grandparents: obs.	162	388	461	380	444	444	380	444	444	195	195	232	232
Grandparents: % women	57.41	54.12	55.53	53.95	55.41	55.41	53.95	55.41	55.41	56.41	56.41	53.45	53.45
Parent controls: obs.	619	1540	1844	1228	1504	1504	1228	1504	1504	658	658	864	864
Parent controls: % women	55.41	54.03	55.53	54.64	55.45	56.45	54.64	56.45	56.45	56.08	56.08	57.64	57.64
Nonparent controls: obs.	620	1541	1844	1205	1448	1448	1205	1448	1448	688	688	821	821
Nonparent controls: % women	56.45	54.06	55.53	56.10	57.56	57.56	56.10	57.56	57.56	57.56	57.56	60.54	60.54
HRS: Coding scheme													
Before-slope	0	1	2	2	2	2	2	2	2	2	2	2	2
After-slope	0	0	0	0	0	1	1	2	2	3	3	4	4
Shift	0	0	0	0	0	1	1	1	1	1	1	1	1

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

Table S3

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

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

Table S3 continued

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

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

Table S4*Means and Standard Deviations of the Big Five and Life Satisfaction over Time in the HRS.*

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

Table S4 continued

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

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

Table S5

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

Covariate	Description	Raw variables	Parent control group		Nonparent control group	
			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	oplnet	0.07	-0.06	-0.07	0.12
degreevocational	Intermediate vocational education	oplnet	-0.20	-0.06	-0.02	0.00
degreecollege	Higher vocational education	oplnet	0.00	0.05	0.02	-0.09
degreedegree	University degree	oplnet	-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	aatalki	-0.71	0.02	NA	NA
secondkid	Has two or more children	cf*455 / cf*036	0.20	0.04	NA	NA
thirdkid	Has three or more children	cf*455 / cf*036	0.26	0.01	NA	NA
kid1female	Gender of first child (f.=1, m.=0)	cf*068	0.04	0.04	NA	NA
kid2female	Gender of second child (f.=1, m.=0)	cf*069	0.01	-0.06	NA	NA
kid3female	Gender of third child (f.=1, m.=0)	cf*070	0.17	0.02	NA	NA
kid1age	Age of first child	cf*456 / cf*037	1.70	-0.17	NA	NA
kid2age	Age of second child	cf*457 / cf*038	0.87	-0.01	NA	NA
kid3age	Age of third child	cf*458 / cf*039	0.40	0.01	NA	NA
kid1home	First child living at home	cf*083	-1.56	0.05	NA	NA

Table S5 continued

Covariate	Description	Raw variables	Parent control group		Nonparent control group	
			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).

Table S6

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

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

Table S6 continued

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

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

Table S7

Fixed Effects of Agreeableness Over the Transition to Grandparenthood.

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

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

Table S8

Linear Contrasts for Agreeableness.

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

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

Table S9

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

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

Table S9 continued

Parameter	Parent controls				Nonparent controls			
	$\hat{\gamma}$	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.

Table S10

Linear Contrasts for Agreeableness (Moderated by Gender).

Linear Contrast	Parent controls			Nonparent controls		
	$\hat{\gamma}_c$	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 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{22} + \hat{\gamma}_{23} + \hat{\gamma}_{32} + \hat{\gamma}_{33}$)	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 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{22} + \hat{\gamma}_{23} + \hat{\gamma}_{32} + \hat{\gamma}_{33}$)	0.00	0.01	.927	0.00	0.01	.936
Shift of male controls vs. grandfathers ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	-0.02	0.39	.531	0.00	0.01	.929
Before-slope of female controls vs. grandmothers ($\hat{\gamma}_{11} + \hat{\gamma}_{13}$)	0.01	0.74	.390	0.01	0.58	.445
After-slope of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{23}$)	0.00	0.15	.701	0.01	1.32	.250
Shift of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	0.02	1.07	.301	-0.04	2.61	.106
Shift of male vs. female controls ($\hat{\gamma}_{22} + \hat{\gamma}_{32}$)	-0.04	7.70	.006	0.03	3.92	.048
Before-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{12} + \hat{\gamma}_{13}$)	0.02	1.17	.279	0.02	1.28	.258
After-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{23}$)	-0.02	1.94	.163	-0.02	2.13	.144
Shift of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	0.00	0.01	.912	0.00	0.01	.904

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

Table S11

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

Parameter	Parent controls			Nonparent controls		
	$\hat{\gamma}$	95% CI	t	$\hat{\gamma}$	95% CI	t
Intercept, $\hat{\gamma}_{00}$	3.50	[3.45, 3.54]	157.26	3.48	[3.43, 3.52]	138.40
Propensity score, $\hat{\gamma}_{02}$	0.09	[0.03, 0.15]	2.93	0.04	[-0.03, 0.10]	1.14
Before-slope, $\hat{\gamma}_{20}$	0.01	[-0.01, 0.03]	0.91	0.00	[-0.02, 0.02]	-0.23
After-slope, $\hat{\gamma}_{40}$	-0.02	[-0.03, -0.01]	-4.07	-0.03	[-0.04, -0.02]	-5.38
Shift, $\hat{\gamma}_{60}$	-0.01	[-0.04, 0.02]	-0.53	0.07	[0.03, 0.10]	3.93
Grandparent, $\hat{\gamma}_{01}$	-0.11	[-0.20, -0.02]	-2.33	-0.07	[-0.16, 0.02]	-1.49
Working, $\hat{\gamma}_{10}$	-0.06	[-0.10, -0.02]	-2.77	0.01	[-0.03, 0.05]	0.61
Before-slope * Grandparent, $\hat{\gamma}_{21}$	0.04	[-0.01, 0.09]	1.55	0.05	[0.00, 0.10]	2.09
After-slope * Grandparent, $\hat{\gamma}_{41}$	0.02	[0.00, 0.05]	1.96	0.03	[0.01, 0.05]	2.68
Shift * Grandparent, $\hat{\gamma}_{61}$	0.00	[-0.08, 0.07]	-0.07	-0.08	[-0.15, -0.01]	-2.17
Before-slope * Working, $\hat{\gamma}_{30}$	0.00	[-0.03, 0.02]	-0.30	0.00	[-0.03, 0.02]	-0.37
After-slope * Working, $\hat{\gamma}_{50}$	0.02	[0.01, 0.04]	2.87	0.02	[0.01, 0.03]	2.83
Shift * Working, $\hat{\gamma}_{70}$	0.02	[-0.03, 0.06]	0.77	-0.04	[-0.08, 0.00]	-1.87
Grandparent * Working, $\hat{\gamma}_{11}$	0.18	[0.08, 0.28]	3.68	0.11	[0.02, 0.20]	2.40
Before-slope * Grandparent * Working, $\hat{\gamma}_{31}$	-0.06	[-0.12, -0.01]	-2.15	-0.06	[-0.12, -0.01]	-2.22
After-slope * Grandparent * Working, $\hat{\gamma}_{51}$	-0.02	[-0.05, 0.02]	-0.97	-0.01	[-0.05, 0.02]	-0.94
Shift * Grandparent * Working, $\hat{\gamma}_{71}$	-0.01	[-0.10, 0.09]	-0.11	0.05	[-0.04, 0.14]	1.08

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 S12

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

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

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

Table S13

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

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

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

Table S14

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

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

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

Table S15

Fixed Effects of Conscientiousness Over the Transition to Grandparenthood.

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

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

Table S16
Linear Contrasts for Conscientiousness.

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

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

Table S17

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

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

Table S17 continued

Parameter	Parent controls				Nonparent controls			
	$\hat{\gamma}$	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.

Table S18

Linear Contrasts for Conscientiousness (Moderated by Gender).

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

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

Table S20*Linear Contrasts for Conscientiousness (Moderated by Paid Work; only HRS).*

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

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

Table S22

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

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

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

Table S23

Fixed Effects of Extraversion Over the Transition to Grandparenthood.

Parameter	Parent controls			Nonparent controls		
	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI
LISS						
Intercept, $\hat{\gamma}_{00}$	3.25	[3.18, 3.33]	87.65	< .001	3.29	[3.20, 3.39]
Propensity score, $\hat{\gamma}_{02}$	-0.01	[-0.10, 0.07]	-0.26	.793	0.01	[-0.07, 0.08]
Before-slope, $\hat{\gamma}_{10}$	-0.01	[-0.01, 0.00]	-1.77	.077	0.00	[0.00, 0.01]
After-slope, $\hat{\gamma}_{20}$	0.00	[-0.01, 0.00]	-1.47	.141	-0.01	[-0.02, 0.00]
Shift, $\hat{\gamma}_{30}$	-0.01	[-0.04, 0.01]	-0.97	.332	-0.01	[-0.03, 0.02]
Grandparent, $\hat{\gamma}_{01}$	0.06	[-0.05, 0.17]	1.03	.306	0.01	[-0.12, 0.14]
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.00	[-0.02, 0.01]	-0.40	.690	-0.01	[-0.02, 0.00]
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.00	[-0.01, 0.02]	0.57	.569	0.01	[0.00, 0.02]
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.02	[-0.08, 0.05]	-0.51	.607	-0.02	[-0.08, 0.04]
HRS						
Intercept, $\hat{\gamma}_{00}$	3.20	[3.16, 3.24]	159.82	< .001	3.11	[3.07, 3.16]
Propensity score, $\hat{\gamma}_{02}$	0.02	[-0.05, 0.08]	0.56	.577	0.05	[-0.02, 0.12]
Before-slope, $\hat{\gamma}_{10}$	0.00	[-0.01, 0.01]	-0.52	.604	0.01	[-0.01, 0.02]
After-slope, $\hat{\gamma}_{20}$	0.00	[-0.01, 0.01]	-0.64	.520	0.00	[-0.01, 0.01]
Shift, $\hat{\gamma}_{30}$	0.02	[0.00, 0.04]	1.68	.093	0.01	[-0.01, 0.03]
Grandparent, $\hat{\gamma}_{01}$	0.00	[-0.06, 0.06]	0.05	.957	0.07	[0.01, 0.14]
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.00	[-0.02, 0.03]	0.31	.757	0.00	[-0.03, 0.02]
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.01	[0.00, 0.03]	1.46	.143	0.01	[0.00, 0.03]
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.04	[-0.09, 0.01]	-1.55	.121	-0.03	[-0.08, 0.02]

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

Table S24
Linear Contrasts for Extraversion.

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

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

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

Parameter	Parent controls				Nonparent controls			
	$\hat{\gamma}$	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 S26

Linear Contrasts for Extraversion (Moderated by Gender).

Linear Contrast	Parent controls			Nonparent controls		
	$\hat{\gamma}_c$	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 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{22} + \hat{\gamma}_{23} + \hat{\gamma}_{32} + \hat{\gamma}_{33}$)	-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 ($\hat{\gamma}_{20} + \hat{\gamma}_{30} + \hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{22} + \hat{\gamma}_{23} + \hat{\gamma}_{32} + \hat{\gamma}_{33}$)	-0.02	0.73	.393	-0.02	0.78	.377
Shift of male controls vs. grandfathers ($\hat{\gamma}_{21} + \hat{\gamma}_{31}$)	0.00	0.00	.999	0.01	0.06	.805
Before-slope of female controls vs. grandmothers ($\hat{\gamma}_{11} + \hat{\gamma}_{13}$)	0.02	1.42	.234	0.00	0.01	.909
After-slope of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{23}$)	0.02	2.40	.122	0.01	0.65	.419
Shift of female controls vs. grandmothers ($\hat{\gamma}_{21} + \hat{\gamma}_{31} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	-0.05	3.28	.070	-0.04	2.65	.104
Shift of male vs. female controls ($\hat{\gamma}_{22} + \hat{\gamma}_{32}$)	0.02	1.88	.171	0.02	2.10	.147
Before-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{12} + \hat{\gamma}_{13}$)	0.02	0.79	.373	0.02	0.85	.357
After-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{23}$)	-0.01	0.57	.452	-0.01	0.62	.431
Shift of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	-0.02	0.44	.508	-0.02	0.47	.495

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

Table S27*Fixed Effects of Extraversion Over the Transition to Grandparenthood Moderated by Performing Paid Work.*

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

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

Table S28

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

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

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

Table S29

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

Parameter	Parent controls			Nonparent controls		
	$\hat{\gamma}$	95% CI	t	$\hat{\gamma}$	95% CI	t
Intercept, $\hat{\gamma}_{00}$	3.19	[3.14, 3.24]	128.26	3.12	[3.06, 3.18]	102.87
Propensity score, $\hat{\gamma}_{02}$	0.13	[0.04, 0.22]	2.98	0.08	[-0.01, 0.17]	1.67
After-slope, $\hat{\gamma}_{20}$	-0.01	[-0.03, 0.00]	-2.61	0.00	[-0.01, 0.01]	-0.39
Grandparent, $\hat{\gamma}_{01}$	-0.04	[-0.11, 0.03]	-1.05	0.04	[-0.04, 0.12]	1.06
Caring, $\hat{\gamma}_{10}$	0.00	[-0.03, 0.04]	0.23	0.02	[-0.02, 0.05]	0.86
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.02	[-0.01, 0.04]	1.32	0.00	[-0.02, 0.02]	0.30
After-slope * Caring, $\hat{\gamma}_{30}$	0.00	[-0.02, 0.02]	-0.04	0.00	[-0.02, 0.01]	-0.42
Grandparent * Caring, $\hat{\gamma}_{11}$	-0.04	[-0.13, 0.06]	-0.74	-0.05	[-0.14, 0.04]	-1.04
After-slope * Grandparent * Caring, $\hat{\gamma}_{31}$	0.03	[-0.01, 0.06]	1.56	0.03	[0.00, 0.07]	1.83

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 S30
Linear Contrasts for Extraversion (Moderated by Grandchild Care; only HRS).

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

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

Table S31

Fixed Effects of Neuroticism Over the Transition to Grandparenthood.

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

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

Table S32

Linear Contrasts for Neuroticism.

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

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

Table S33

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

Parameter	Parent controls			Nonparent controls		
	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI
LISS						
Intercept, $\hat{\gamma}_{00}$	2.45	[2.34, 2.56]	43.45	< .001	2.32	[2.19, 2.45]
Propensity score, $\hat{\gamma}_{04}$	0.02	[-0.09, 0.12]	0.30	.767	0.02	[-0.08, 0.11]
Before-slope, $\hat{\gamma}_{10}$	-0.01	[-0.02, 0.00]	-1.89	.059	-0.01	[-0.02, 0.00]
After-slope, $\hat{\gamma}_{20}$	0.01	[0.00, 0.02]	2.82	.005	0.01	[0.00, 0.02]
Shift, $\hat{\gamma}_{30}$	-0.06	[-0.11, -0.01]	-2.24	.025	-0.05	[-0.10, 0.00]
Grandparent, $\hat{\gamma}_{01}$	-0.18	[-0.35, -0.01]	-2.11	.035	-0.05	[-0.23, 0.13]
Female, $\hat{\gamma}_{02}$	0.05	[-0.09, 0.20]	0.72	.474	0.22	[0.05, 0.40]
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.01	[-0.01, 0.04]	0.82	.413	0.01	[-0.02, 0.03]
After-slope * Grandparent, $\hat{\gamma}_{21}$	-0.02	[-0.04, 0.01]	-1.36	.173	-0.01	[-0.04, 0.01]
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.03	[-0.14, 0.08]	-0.51	.612	-0.04	[-0.15, 0.08]
Before-slope * Female, $\hat{\gamma}_{12}$	0.02	[0.00, 0.03]	2.03	.043	-0.01	[-0.03, 0.00]
After-slope * Female, $\hat{\gamma}_{22}$	-0.02	[-0.03, -0.01]	-2.99	.003	-0.01	[-0.03, 0.00]
Shift * Female, $\hat{\gamma}_{32}$	0.01	[-0.05, 0.08]	0.39	.700	0.04	[-0.03, 0.11]
Grandparent * Female, $\hat{\gamma}_{03}$	0.18	[-0.05, 0.40]	1.54	.123	0.01	[-0.24, 0.25]
Before-slope * Grandparent * Female, $\hat{\gamma}_{13}$	-0.01	[-0.05, 0.02]	-0.66	.508	0.02	[-0.02, 0.05]
After-slope * Grandparent * Female, $\hat{\gamma}_{23}$	0.02	[-0.01, 0.05]	1.48	.138	0.02	[-0.01, 0.05]
Shift * Grandparent * Female, $\hat{\gamma}_{33}$	0.03	[-0.12, 0.18]	0.35	.730	0.00	[-0.16, 0.15]
HRS						
Intercept, $\hat{\gamma}_{00}$	1.98	[1.91, 2.04]	62.73	< .001	2.01	[1.94, 2.08]
Propensity score, $\hat{\gamma}_{04}$	0.01	[-0.07, 0.09]	0.26	.798	0.15	[0.07, 0.23]
Before-slope, $\hat{\gamma}_{10}$	-0.02	[-0.04, 0.00]	-2.11	.035	-0.03	[-0.05, -0.01]
After-slope, $\hat{\gamma}_{20}$	-0.02	[-0.03, 0.00]	-2.40	.017	-0.02	[-0.03, -0.01]
Shift, $\hat{\gamma}_{30}$	0.08	[0.04, 0.12]	4.02	< .001	0.00	[-0.03, 0.04]
Grandparent, $\hat{\gamma}_{01}$	-0.06	[-0.16, 0.04]	-1.10	.272	-0.16	[-0.26, -0.05]
Female, $\hat{\gamma}_{02}$	0.17	[0.09, 0.25]	4.19	< .001	0.10	[0.01, 0.19]
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.06	[0.01, 0.10]	2.26	.024	0.06	[0.02, 0.11]
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.00	[-0.03, 0.03]	0.31	.755	0.01	[-0.02, 0.04]
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.16	[-0.25, -0.07]	-3.60	< .001	-0.08	[-0.17, 0.00]
Before-slope * Female, $\hat{\gamma}_{12}$	0.01	[-0.01, 0.04]	1.04	.300	0.00	[-0.03, 0.03]
After-slope * Female, $\hat{\gamma}_{22}$	0.02	[0.00, 0.04]	2.19	.029	0.01	[-0.01, 0.03]
Shift * Female, $\hat{\gamma}_{32}$	-0.14	[-0.19, -0.08]	-5.02	< .001	-0.06	[-0.11, -0.01]
Intercept, $\hat{\gamma}_{00}$	1.98	[1.91, 2.04]	62.73	< .001	2.01	[1.94, 2.08]
Propensity score, $\hat{\gamma}_{04}$	0.01	[-0.07, 0.09]	0.26	.798	0.15	[0.07, 0.23]
Before-slope, $\hat{\gamma}_{10}$	-0.02	[-0.04, 0.00]	-2.11	.035	-0.03	[-0.05, -0.01]
After-slope, $\hat{\gamma}_{20}$	-0.02	[-0.03, 0.00]	-2.40	.017	-0.02	[-0.03, -0.01]
Shift, $\hat{\gamma}_{30}$	0.08	[0.04, 0.12]	4.02	< .001	0.00	[-0.03, 0.04]
Grandparent, $\hat{\gamma}_{01}$	-0.06	[-0.16, 0.04]	-1.10	.272	-0.16	[-0.26, -0.05]
Female, $\hat{\gamma}_{02}$	0.17	[0.09, 0.25]	4.19	< .001	0.10	[0.01, 0.19]
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.06	[0.01, 0.10]	2.26	.024	0.06	[0.02, 0.11]
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.00	[-0.03, 0.03]	0.31	.755	0.01	[-0.02, 0.04]
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.16	[-0.25, -0.07]	-3.60	< .001	-0.08	[-0.17, 0.00]
Before-slope * Female, $\hat{\gamma}_{12}$	0.01	[-0.01, 0.04]	1.04	.300	0.00	[-0.03, 0.03]
After-slope * Female, $\hat{\gamma}_{22}$	0.02	[0.00, 0.04]	2.19	.029	0.01	[-0.01, 0.03]
Shift * Female, $\hat{\gamma}_{32}$	-0.14	[-0.19, -0.08]	-5.02	< .001	-0.06	[-0.11, -0.01]

Table S33 continued

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

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 S34*Linear Contrasts for Neuroticism (Moderated by Gender).*

Linear Contrast	Parent controls			Nonparent controls		
	$\hat{\gamma}_c$	χ^2	<i>p</i>	$\hat{\gamma}_c$	χ^2	<i>p</i>
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 ($\hat{\gamma}_{21} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	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 ($\hat{\gamma}_{21} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	-0.02	0.37	.541	0.00	0.01	.943
Shift of male vs. female controls ($\hat{\gamma}_{22} + \hat{\gamma}_{32}$)	-0.12	31.04	< .001	-0.05	6.32	.012
Before-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{12} + \hat{\gamma}_{13}$)	-0.05	2.41	.120	-0.05	2.56	.109
After-slope of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{23}$)	-0.02	0.84	.360	-0.02	0.88	.349
Shift of grandfathers vs. grandmothers ($\hat{\gamma}_{22} + \hat{\gamma}_{32} + \hat{\gamma}_{23} + \hat{\gamma}_{33}$)	0.02	0.30	.584	0.02	0.31	.577

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

Table S35

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

Parameter	Parent controls			Nonparent controls		
	$\hat{\gamma}$	95% CI	t	$\hat{\gamma}$	95% CI	t
Intercept, $\hat{\gamma}_{00}$	2.02	[1.96, 2.07]	72.21	2.02	[1.96, 2.08]	63.73
Propensity score, $\hat{\gamma}_{02}$	0.00	[-0.08, 0.08]	0.01	0.15	[0.06, 0.23]	3.46
Before-slope, $\hat{\gamma}_{20}$	0.00	[-0.02, 0.03]	0.18	-0.01	[-0.04, 0.02]	-0.84
After-slope, $\hat{\gamma}_{40}$	-0.01	[-0.02, 0.01]	-0.79	-0.01	[-0.02, 0.00]	-1.41
Shift, $\hat{\gamma}_{60}$	0.04	[0.00, 0.08]	1.91	-0.03	[-0.07, 0.01]	-1.32
Grandparent, $\hat{\gamma}_{01}$	0.13	[0.02, 0.25]	2.28	0.07	[-0.04, 0.19]	1.27
Working, $\hat{\gamma}_{10}$	0.08	[0.03, 0.13]	2.94	0.07	[0.02, 0.12]	2.63
Before-slope * Grandparent, $\hat{\gamma}_{21}$	-0.07	[-0.13, 0.00]	-2.04	-0.06	[-0.12, 0.01]	-1.73
After-slope * Grandparent, $\hat{\gamma}_{41}$	-0.02	[-0.05, 0.01]	-1.55	-0.02	[-0.05, 0.01]	-1.37
Shift * Grandparent, $\hat{\gamma}_{61}$	-0.05	[-0.15, 0.05]	-1.03	0.02	[-0.07, 0.11]	0.45
Before-slope * Working, $\hat{\gamma}_{30}$	-0.02	[-0.05, 0.01]	-1.43	-0.02	[-0.05, 0.01]	-1.54
After-slope * Working, $\hat{\gamma}_{50}$	0.00	[-0.02, 0.02]	-0.23	-0.01	[-0.02, 0.01]	-0.73
Shift * Working, $\hat{\gamma}_{70}$	-0.05	[-0.11, 0.00]	-1.90	0.00	[-0.05, 0.06]	0.13
Grandparent * Working, $\hat{\gamma}_{11}$	-0.25	[-0.38, -0.13]	-4.08	-0.25	[-0.37, -0.13]	-4.20
Before-slope * Grandparent * Working, $\hat{\gamma}_{31}$	0.11	[0.04, 0.19]	2.95	0.12	[0.04, 0.19]	3.13
After-slope * Grandparent * Working, $\hat{\gamma}_{51}$	0.01	[-0.03, 0.05]	0.51	0.02	[-0.02, 0.06]	0.75
Shift * Grandparent * Working, $\hat{\gamma}_{71}$	-0.02	[-0.15, 0.10]	-0.33	-0.08	[-0.20, 0.04]	-1.23
						.217

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

Table S36*Linear Contrasts for Neuroticism (Moderated by Paid Work; only HRS).*

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

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

Table S37*Fixed Effects of Neuroticism Over the Transition to Grandparenthood Moderated by Grandchild Care.*

Parameter	Parent controls			Nonparent controls		
	$\hat{\gamma}$	95% CI	t	$\hat{\gamma}$	95% CI	t
Intercept, $\hat{\gamma}_{00}$	2.04	[1.99, 2.09]	75.41	1.97	[1.91, 2.04]	59.05
Propensity score, $\hat{\gamma}_{02}$	-0.02	[-0.12, 0.07]	-0.45	0.14	[0.03, 0.24]	2.59
After-slope, $\hat{\gamma}_{20}$	0.00	[-0.01, 0.01]	-0.02	-0.02	[-0.03, 0.00]	-2.67
Grandparent, $\hat{\gamma}_{01}$	-0.10	[-0.18, -0.02]	-2.45	-0.11	[-0.20, -0.02]	-2.43
Caring, $\hat{\gamma}_{10}$	0.01	[-0.04, 0.05]	0.33	0.00	[-0.04, 0.04]	-0.09
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.00	[-0.03, 0.02]	-0.17	0.01	[-0.01, 0.04]	1.06
After-slope * Caring, $\hat{\gamma}_{30}$	-0.01	[-0.03, 0.01]	-1.01	0.01	[-0.01, 0.03]	0.68
Grandparent * Caring, $\hat{\gamma}_{11}$	0.09	[-0.02, 0.20]	1.57	0.09	[-0.02, 0.21]	1.67
After-slope * Grandparent * Caring, $\hat{\gamma}_{31}$	-0.03	[-0.07, 0.01]	-1.34	-0.04	[-0.09, 0.00]	-2.07

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 S38
Linear Contrasts for Neuroticism (Moderated by Grandchild Care; only HRS).

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

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

Table S39

Fixed Effects of Openness Over the Transition to Grandparenthood.

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

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

Table S40

Linear Contrasts for Openness.

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

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

Table S41

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

Parameter	Parent controls			Nonparent controls		
	$\hat{\gamma}$	95% CI	t	p	$\hat{\gamma}$	95% CI
LISS						
Intercept, $\hat{\gamma}_{00}$	3.47	[3.39, 3.55]	81.39	< .001	3.54	[3.45, 3.64]
Propensity score, $\hat{\gamma}_{04}$	0.00	[-0.08, 0.07]	-0.04	.970	0.03	[-0.03, 0.09]
Before-slope, $\hat{\gamma}_{10}$	0.00	[-0.01, 0.01]	0.17	.864	0.01	[0.00, 0.02]
After-slope, $\hat{\gamma}_{20}$	0.00	[-0.01, 0.00]	-1.05	.292	0.01	[0.00, 0.01]
Shift, $\hat{\gamma}_{30}$	-0.02	[-0.05, 0.02]	-0.93	.353	-0.01	[-0.04, 0.02]
Grandparent, $\hat{\gamma}_{01}$	0.11	[-0.01, 0.24]	1.78	.076	0.03	[-0.10, 0.16]
Female, $\hat{\gamma}_{02}$	0.01	[-0.10, 0.12]	0.16	.871	-0.05	[-0.17, 0.08]
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.00	[-0.02, 0.01]	-0.39	.694	-0.01	[-0.03, 0.00]
After-slope * Grandparent, $\hat{\gamma}_{21}$	-0.01	[-0.02, 0.01]	-0.88	.380	-0.02	[-0.03, 0.00]
Shift * Grandparent, $\hat{\gamma}_{31}$	0.03	[-0.05, 0.12]	0.84	.400	0.03	[-0.05, 0.10]
Before-slope * Female, $\hat{\gamma}_{12}$	-0.01	[-0.02, 0.00]	-1.64	.102	-0.02	[-0.03, -0.01]
After-slope * Female, $\hat{\gamma}_{22}$	0.00	[-0.01, 0.01]	-0.79	.431	0.00	[-0.01, 0.01]
Shift * Female, $\hat{\gamma}_{32}$	0.08	[0.03, 0.13]	2.98	.003	0.02	[-0.03, 0.06]
Grandparent * Female, $\hat{\gamma}_{03}$	-0.20	[-0.37, -0.03]	-2.31	.021	-0.15	[-0.33, 0.03]
Before-slope * Grandparent * Female, $\hat{\gamma}_{13}$	0.02	[0.00, 0.05]	1.70	.090	0.03	[0.01, 0.06]
After-slope * Grandparent * Female, $\hat{\gamma}_{23}$	0.01	[-0.01, 0.04]	1.29	.197	0.01	[-0.01, 0.03]
Shift * Grandparent * Female, $\hat{\gamma}_{33}$	-0.12	[-0.23, -0.01]	-2.11	.035	-0.06	[-0.16, 0.04]
HRS						
Intercept, $\hat{\gamma}_{00}$	3.06	[3.00, 3.12]	108.70	< .001	3.03	[2.97, 3.09]
Propensity score, $\hat{\gamma}_{04}$	0.03	[-0.04, 0.09]	0.86	.391	0.00	[-0.06, 0.07]
Before-slope, $\hat{\gamma}_{10}$	-0.02	[-0.04, 0.00]	-2.44	.015	-0.01	[-0.03, 0.00]
After-slope, $\hat{\gamma}_{20}$	-0.03	[-0.04, -0.02]	-5.75	< .001	-0.01	[-0.02, 0.00]
Shift, $\hat{\gamma}_{30}$	0.11	[0.07, 0.14]	6.34	< .001	0.00	[-0.03, 0.03]
Grandparent, $\hat{\gamma}_{01}$	-0.03	[-0.12, 0.06]	-0.62	.535	0.01	[-0.08, 0.10]
Female, $\hat{\gamma}_{02}$	-0.03	[-0.09, 0.04]	-0.80	.423	-0.04	[-0.11, 0.04]
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.01	[-0.03, 0.05]	0.41	.685	0.00	[-0.03, 0.04]
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.03	[0.01, 0.06]	2.66	.008	0.01	[-0.01, 0.03]
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.15	[-0.22, -0.07]	-3.93	< .001	-0.03	[-0.10, 0.03]
Before-slope * Female, $\hat{\gamma}_{12}$	0.00	[-0.02, 0.03]	0.28	.781	0.02	[0.00, 0.04]
After-slope * Female, $\hat{\gamma}_{22}$	0.02	[0.01, 0.04]	3.05	.002	-0.01	[-0.02, 0.00]
Shift * Female, $\hat{\gamma}_{32}$	-0.09	[-0.14, -0.05]	-4.11	< .001	0.06	[0.03, 0.10]
Intercept, $\hat{\gamma}_{00}$	3.06	[3.00, 3.12]	108.70	< .001	3.03	[2.97, 3.09]
Propensity score, $\hat{\gamma}_{04}$	0.03	[-0.04, 0.09]	0.86	.391	0.00	[-0.06, 0.07]
Before-slope, $\hat{\gamma}_{10}$	-0.02	[-0.04, 0.00]	-2.44	.015	-0.01	[-0.03, 0.00]
After-slope, $\hat{\gamma}_{20}$	-0.03	[-0.04, -0.02]	-5.75	< .001	-0.01	[-0.02, 0.00]
Shift, $\hat{\gamma}_{30}$	0.11	[0.07, 0.14]	6.34	< .001	0.00	[-0.03, 0.03]
Grandparent, $\hat{\gamma}_{01}$	-0.03	[-0.12, 0.06]	-0.62	.535	0.01	[-0.08, 0.10]
Female, $\hat{\gamma}_{02}$	-0.03	[-0.09, 0.04]	-0.80	.423	-0.04	[-0.11, 0.04]
Before-slope * Grandparent, $\hat{\gamma}_{11}$	0.01	[-0.03, 0.05]	0.41	.685	0.00	[-0.03, 0.04]
After-slope * Grandparent, $\hat{\gamma}_{21}$	0.03	[0.01, 0.06]	2.66	.008	0.01	[-0.01, 0.03]
Shift * Grandparent, $\hat{\gamma}_{31}$	-0.15	[-0.22, -0.07]	-3.93	< .001	-0.03	[-0.10, 0.03]
Before-slope * Female, $\hat{\gamma}_{12}$	0.00	[-0.02, 0.03]	0.28	.781	0.02	[0.00, 0.04]
After-slope * Female, $\hat{\gamma}_{22}$	0.02	[0.01, 0.04]	3.05	.002	-0.01	[-0.02, 0.00]
Shift * Female, $\hat{\gamma}_{32}$	-0.09	[-0.14, -0.05]	-4.11	< .001	0.06	[0.03, 0.10]

Table S41 continued

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

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

Table S42

Linear Contrasts for Openness (Moderated by Gender).

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

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

Table S43

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

Parameter	Parent controls			Nonparent controls		
	$\hat{\gamma}$	95% CI	t	$\hat{\gamma}$	95% CI	t
Intercept, $\hat{\gamma}_{00}$	3.02	[2.97, 3.06]	121.17	3.03	[2.97, 3.08]	111.81
Propensity score, $\hat{\gamma}_{02}$	0.01	[-0.06, 0.07]	0.25	-0.01	[-0.08, 0.05]	-0.39
Before-slope, $\hat{\gamma}_{20}$	-0.01	[-0.03, 0.01]	-1.03	-0.01	[-0.03, 0.01]	-0.96
After-slope, $\hat{\gamma}_{40}$	-0.03	[-0.04, -0.02]	-5.25	-0.02	[-0.03, -0.01]	-4.51
Shift, $\hat{\gamma}_{60}$	0.06	[0.02, 0.09]	3.20	0.04	[0.00, 0.07]	2.21
Grandparent, $\hat{\gamma}_{01}$	-0.05	[-0.15, 0.05]	-1.04	-0.06	[-0.15, 0.04]	-1.17
Working, $\hat{\gamma}_{10}$	0.05	[0.01, 0.09]	2.26	-0.02	[-0.06, 0.02]	-0.88
Before-slope * Grandparent, $\hat{\gamma}_{21}$	0.04	[-0.02, 0.09]	1.30	0.03	[-0.01, 0.08]	1.38
After-slope * Grandparent, $\hat{\gamma}_{41}$	0.05	[0.02, 0.07]	3.86	0.04	[0.02, 0.06]	3.73
Shift * Grandparent, $\hat{\gamma}_{61}$	-0.14	[-0.22, -0.06]	-3.37	-0.12	[-0.19, -0.04]	-3.14
Before-slope * Working, $\hat{\gamma}_{30}$	-0.01	[-0.04, 0.01]	-0.86	0.01	[-0.01, 0.03]	0.82
After-slope * Working, $\hat{\gamma}_{50}$	0.02	[0.01, 0.04]	2.94	0.02	[0.00, 0.03]	2.15
Shift * Working, $\hat{\gamma}_{70}$	-0.01	[-0.06, 0.04]	-0.44	-0.01	[-0.05, 0.03]	-0.52
Grandparent * Working, $\hat{\gamma}_{11}$	0.04	[-0.06, 0.14]	0.79	0.11	[0.02, 0.20]	2.33
Before-slope * Grandparent * Working, $\hat{\gamma}_{31}$	-0.02	[-0.08, 0.04]	-0.56	-0.04	[-0.10, 0.02]	-1.34
After-slope * Grandparent * Working, $\hat{\gamma}_{51}$	-0.06	[-0.10, -0.03]	-3.46	-0.05	[-0.08, -0.02]	-3.35
Shift * Grandparent * Working, $\hat{\gamma}_{71}$	0.13	[0.02, 0.23]	2.37	0.12	[0.03, 0.22]	2.62

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

Table S44

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

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

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

Table S45

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

Parameter	Parent controls				Nonparent controls			
	$\hat{\gamma}$	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.

Table S46
Linear Contrasts for Openness (Moderated by Grandchild Care; only HRS).

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

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

Table S47

Fixed Effects of Life Satisfaction Over the Transition to Grandparenthood.

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

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

Table S48
Linear Contrasts for Life Satisfaction.

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

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

Table S49

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

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

Table S49 continued

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

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 S50

Linear Contrasts for Life Satisfaction (Moderated by Gender).

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

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

Table S51

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

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

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

Table S52*Linear Contrasts for Life Satisfaction (Moderated by Paid Work; only HRS).*

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

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

Table S54

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

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

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

Table S55

Tests of Heterogeneous Random Slope Variance Models for Agreeableness Against Comparison Models

With a Uniform Random Slope Variance.

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

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

Table S56

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

	Parent controls				Nonparent controls			
	Var.	SD	LR	p	Var.	SD	LR	p
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	no	26.46	< .001
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	no	8.69	.034
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	no	8.86	.031
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	no	103.88	< .001
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	no	77.41	< .001
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	no	97.85	< .001

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

Table S57

Tests of Heterogeneous Random Slope Variance Models for Extraversion Against Comparison Models

With a Uniform Random Slope Variance.

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

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

Table S58

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

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

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

Table S59

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

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

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

Table S60

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

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

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

Table S61
Rank-Order Stability.

Outcome	Parent controls			Nonparent controls			
	<i>Cor_{all}</i>	<i>Cor_{GP}</i>	<i>Cor_{con}</i>	<i>p</i>	<i>Cor_{all}</i>	<i>Cor_{GP}</i>	<i>Cor_{con}</i>
LISS							
Agreeableness	0.79	0.81	0.78	.619	0.76	0.81	0.75
Conscientiousness	0.76	0.80	0.75	.102	0.79	0.80	0.78
Extraversion	0.81	0.86	0.80	.768	0.86	0.86	0.85
Neuroticism	0.71	0.77	0.68	.060	0.76	0.77	0.76
Openness	0.75	0.79	0.74	.126	0.79	0.79	0.79
Life Satisfaction	0.69	0.66	0.70	.647	0.63	0.66	0.62
HRS							
Agreeableness	0.68	0.70	0.67	.506	0.73	0.70	0.74
Conscientiousness	0.71	0.69	0.72	.201	0.70	0.69	0.70
Extraversion	0.72	0.75	0.71	.007	0.74	0.75	0.74
Neuroticism	0.66	0.71	0.65	.654	0.68	0.71	0.67
Openness	0.69	0.73	0.67	.015	0.76	0.73	0.76
Life Satisfaction	0.51	0.55	0.50	.090	0.55	0.55	0.55

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

Table S62

Rank-Order Stability With Maximal Retest Interval.

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

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

Table S63

Rank-Order Stability Excluding Duplicate Control Observations.

Outcome	Parent controls				Nonparent controls			
	<i>Cor_{all}</i>	<i>Cor_{GP}</i>	<i>Cor_{con}</i>	<i>p</i>	<i>Cor_{all}</i>	<i>Cor_{GP}</i>	<i>Cor_{con}</i>	<i>p</i>
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.

1783 Supplemental Figures

Participant Flowchart**Grandparents:**

- Step 1** Respondents who had grandchildren for the first time during study participation. Includes HRS waves 1996-2004.
- Step 2** Respondents with at least one valid personality assessment (since 2006 in HRS).
- Step 3** Respondents with a valid personality assessment both before and one after the transition to grandparenthood.
- Step 4** Respondents with non-missing and consistent information regarding their children.

 $N_{LISS} = 337$ $N_{HRS} = 3272$ $N_{LISS} = 335$ $N_{HRS} = 1702$ $N_{LISS} = 253$ $N_{HRS} = 859$ $N_{LISS} = 250$ $N_{HRS} = 846$

Matched Samples	LISS	HRS
Parents	250 grandparents (1368 obs.) & 1000 controls (5167 obs.)	846 grandparents (2262 obs.) & 3384 controls (8257 obs.)
Nonparents	250 grandparents (1368 obs.) & 1000 controls (5340 obs.)	846 grandparents (2262 obs.) & 3384 controls (8167 obs.)

Potential Control Respondents:

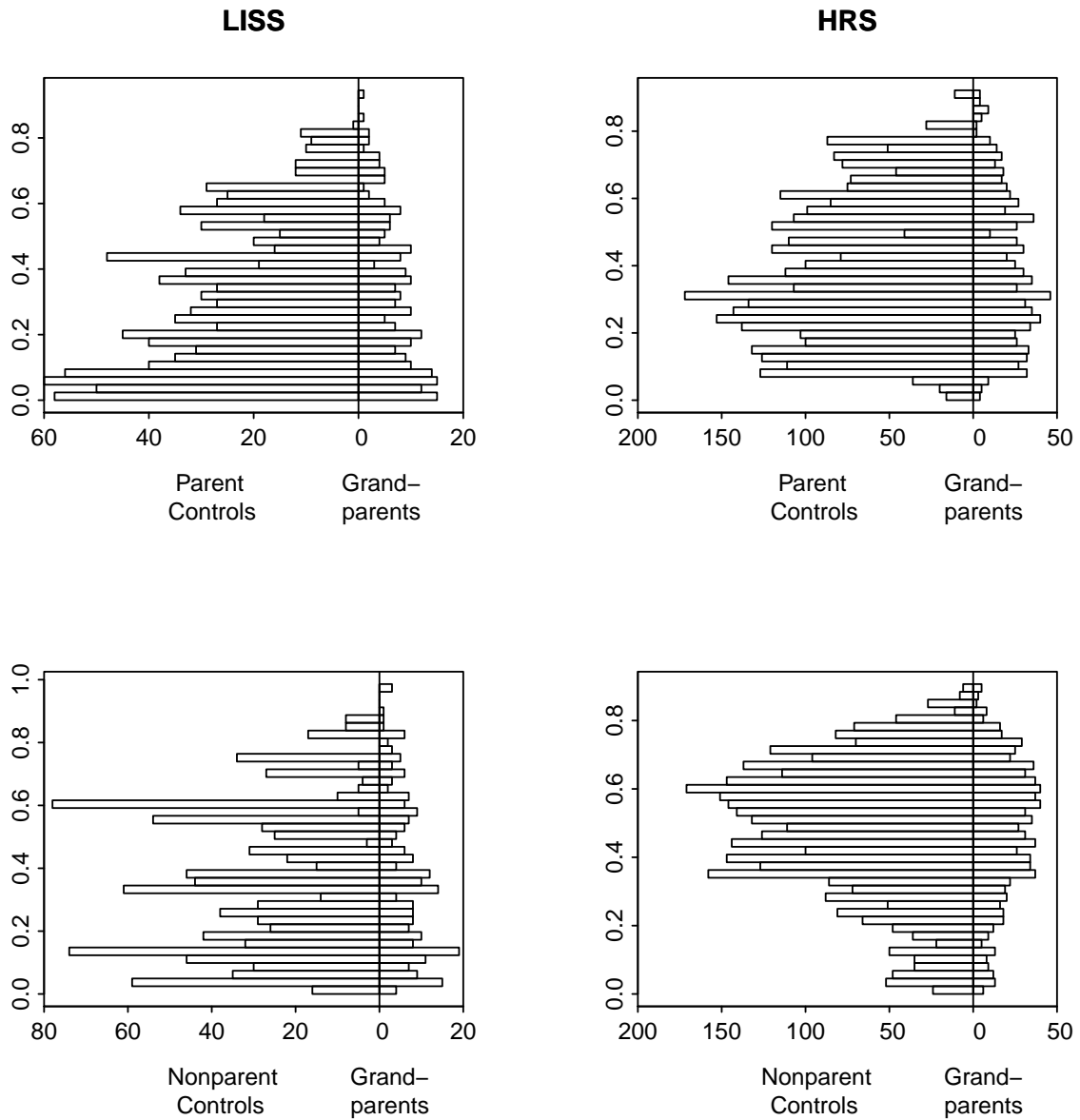
Parents Respondents with at least one child in reproductive age but no grandchildren throughout the observation period. Filtered to observations with valid personality assessments.

 $N_{LISS} = 844$
(3040 obs.) $N_{HRS} = 1485$
(2703 obs.)

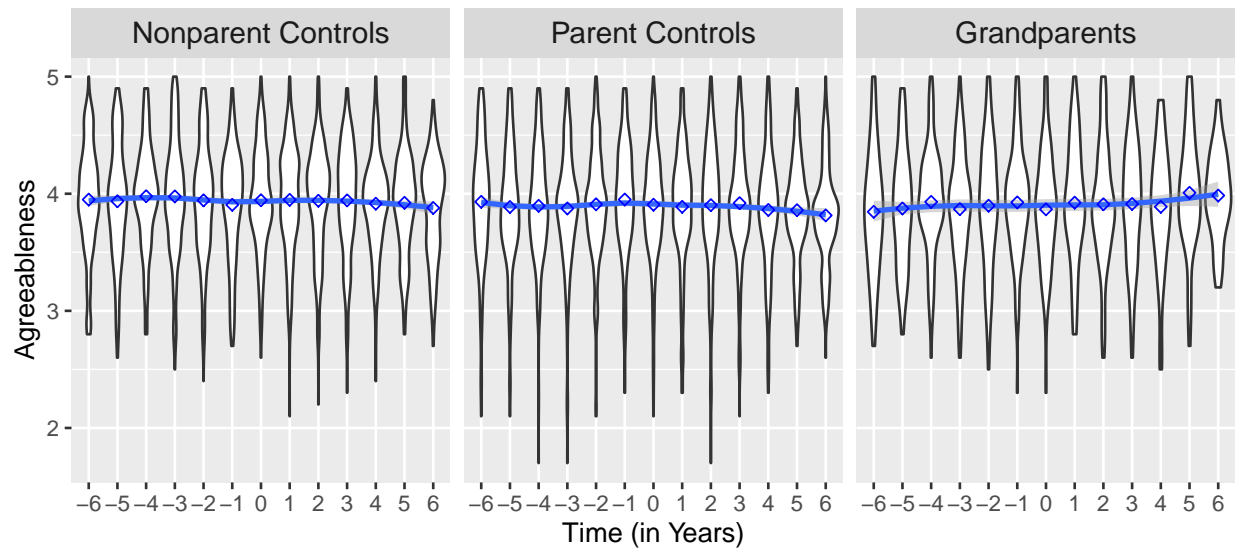
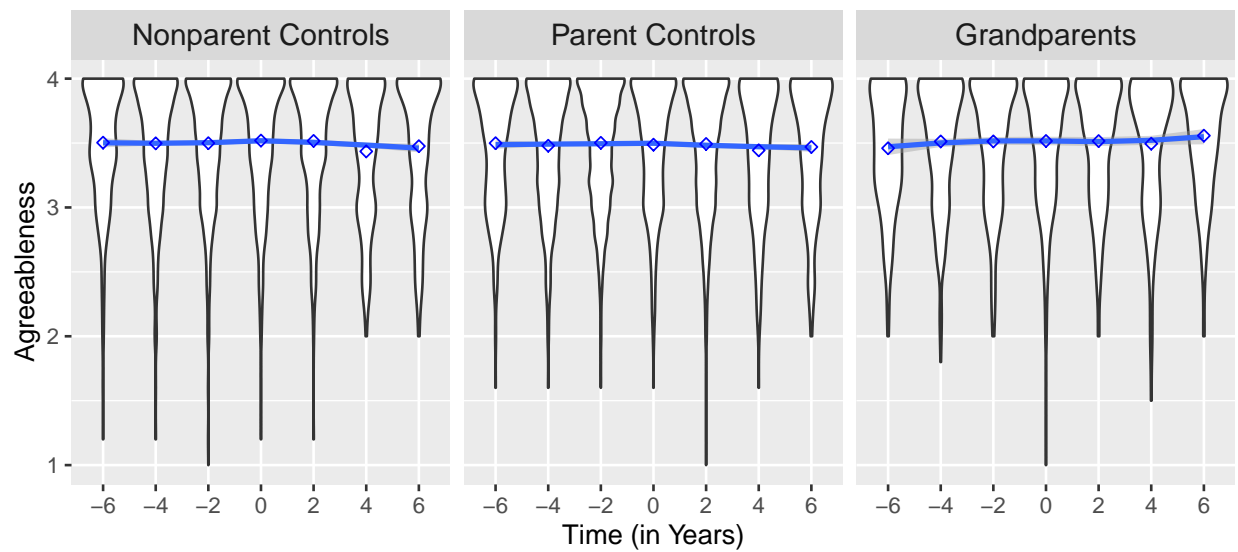
Nonparents Respondents with no children or grandchildren throughout the observation period. Filtered to observations with valid personality assessments.

 $N_{LISS} = 1077$
(4337 obs.) $N_{HRS} = 1340$
(2346 obs.)**Figure S1**

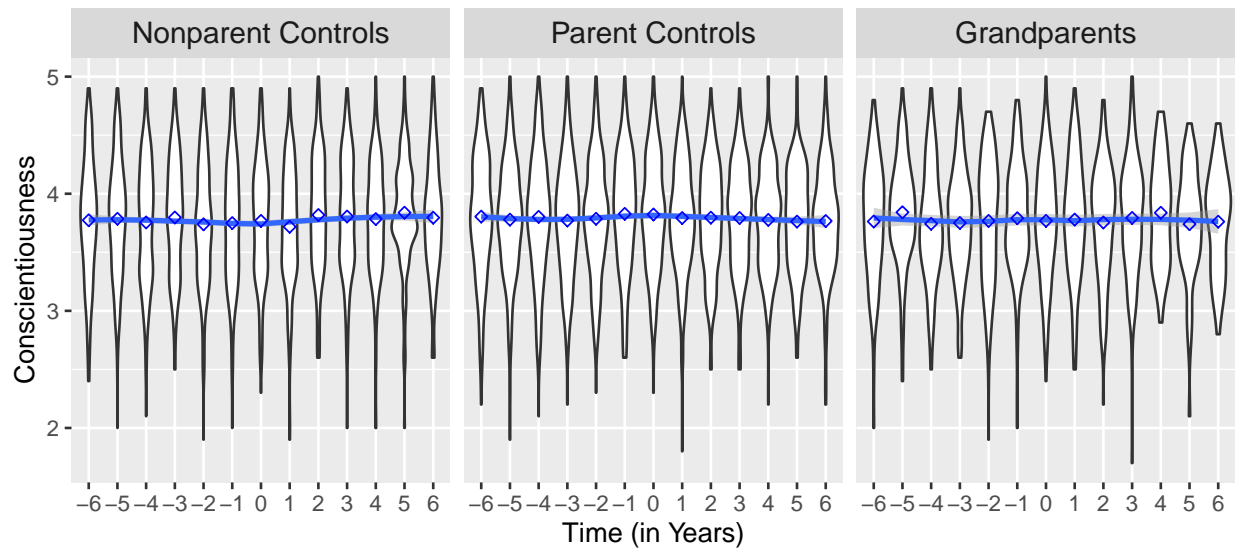
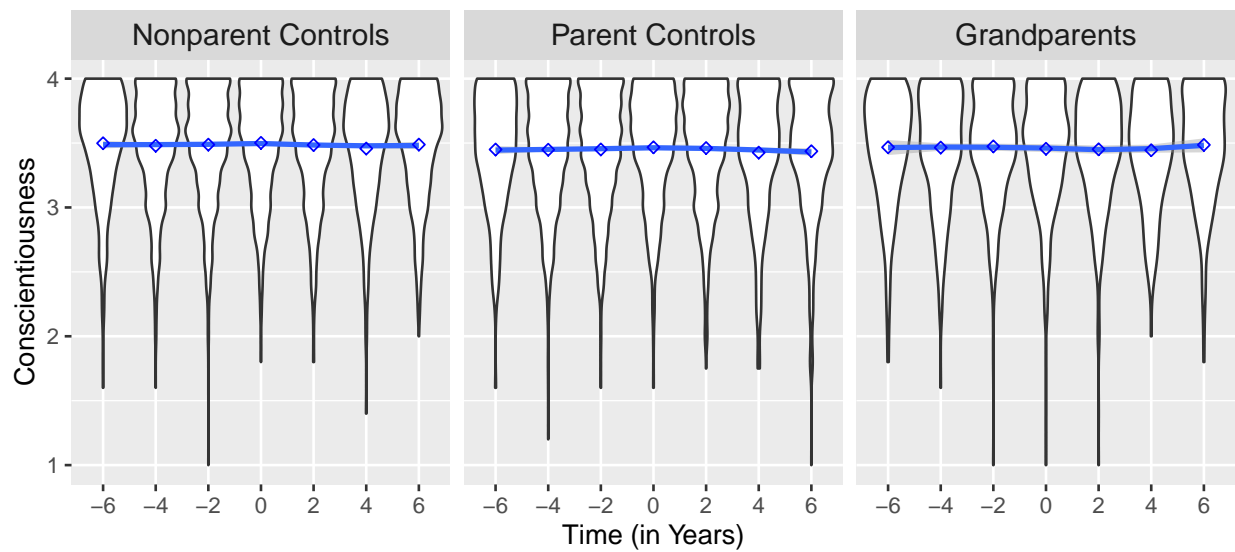
Participant flowchart demonstrating the composition of the four analysis samples via matching (1:4 matching ratio with replacement). obs. = longitudinal observations.

**Figure S2**

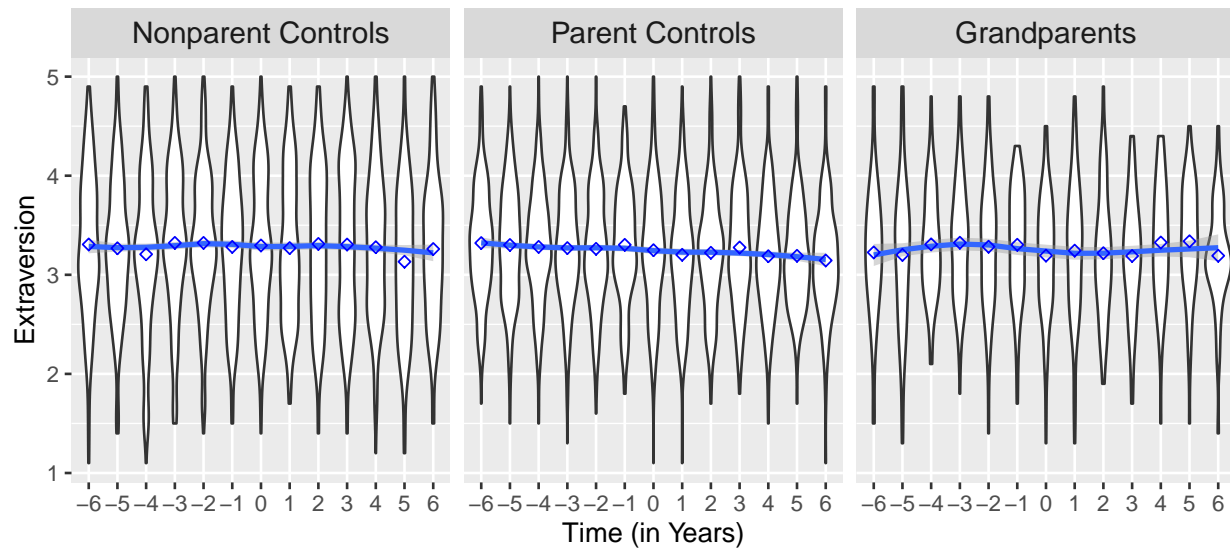
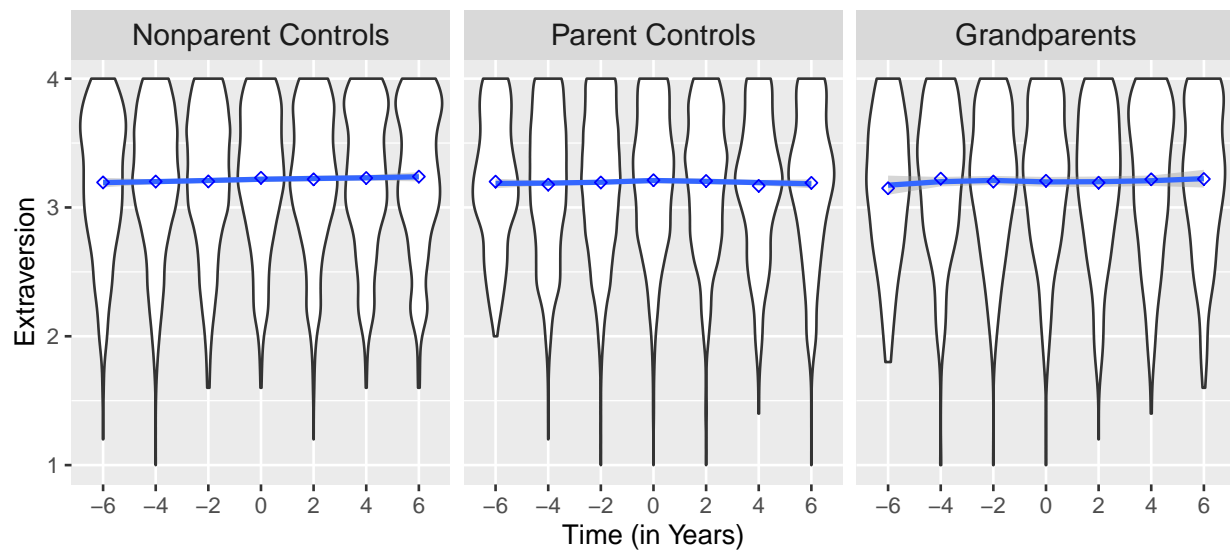
Distributional Overlap of the Propensity Score in the Four Analysis Samples at the Time of Matching.

LISS**HRS****Figure S3**

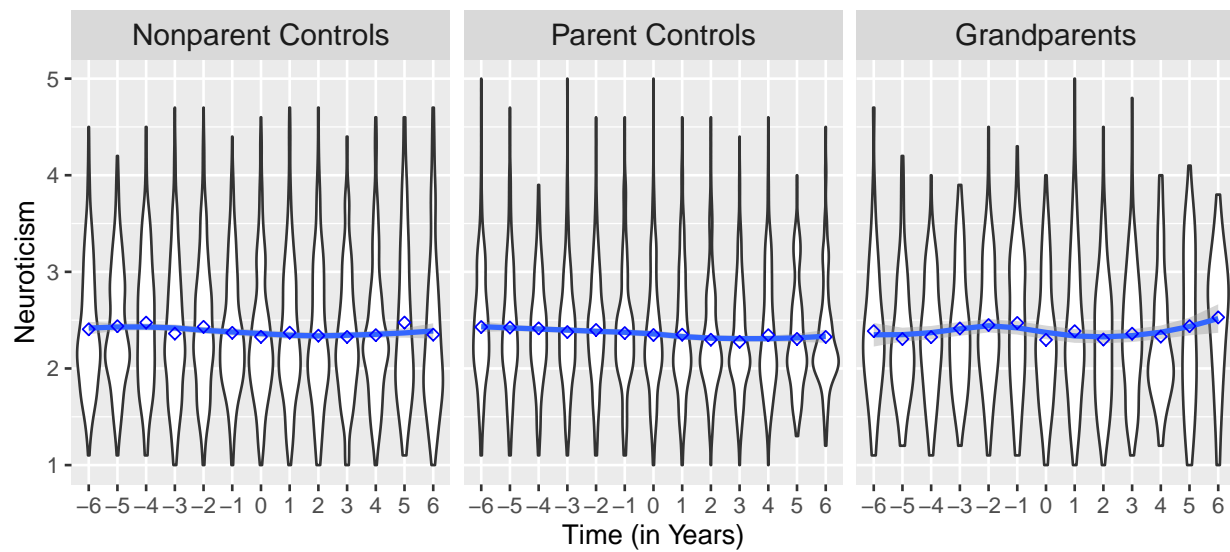
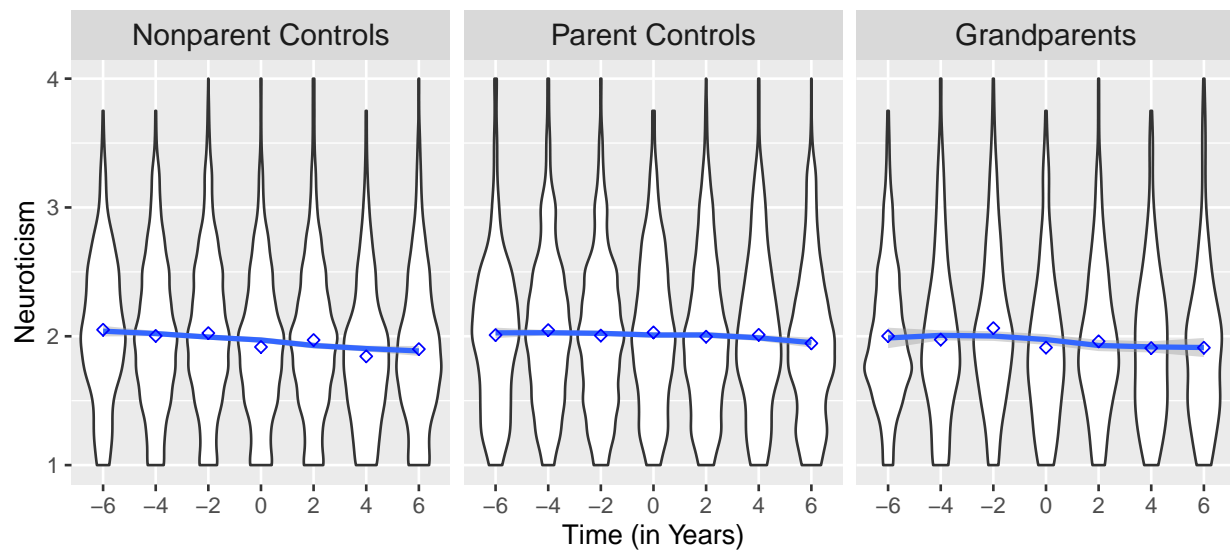
Violin Plots for Agreeableness Including Means Over Time and LOESS Line.

LISS**HRS****Figure S4**

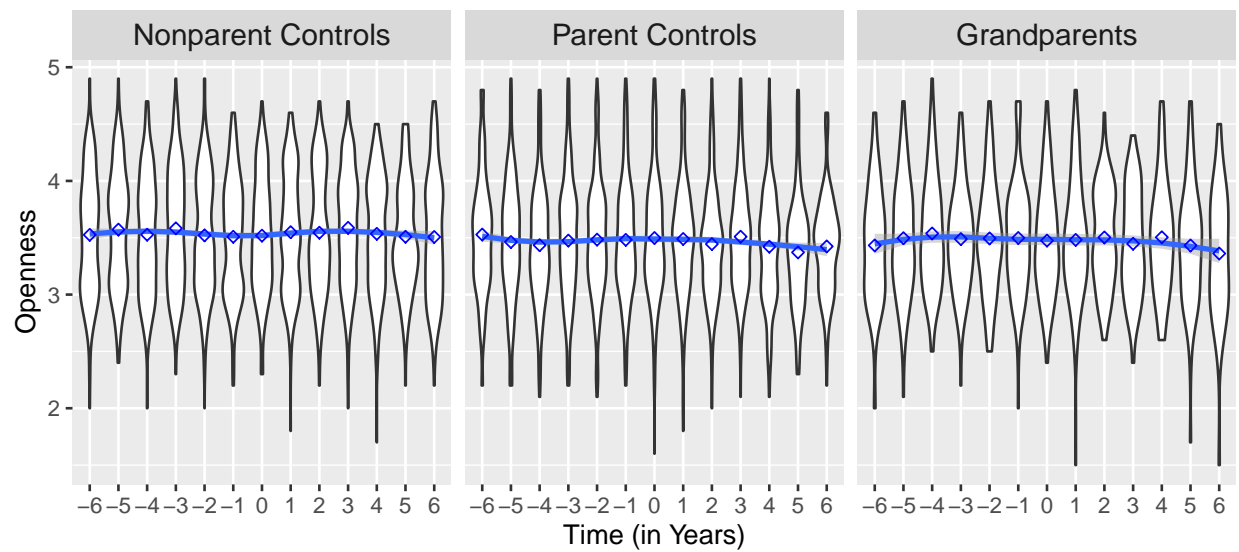
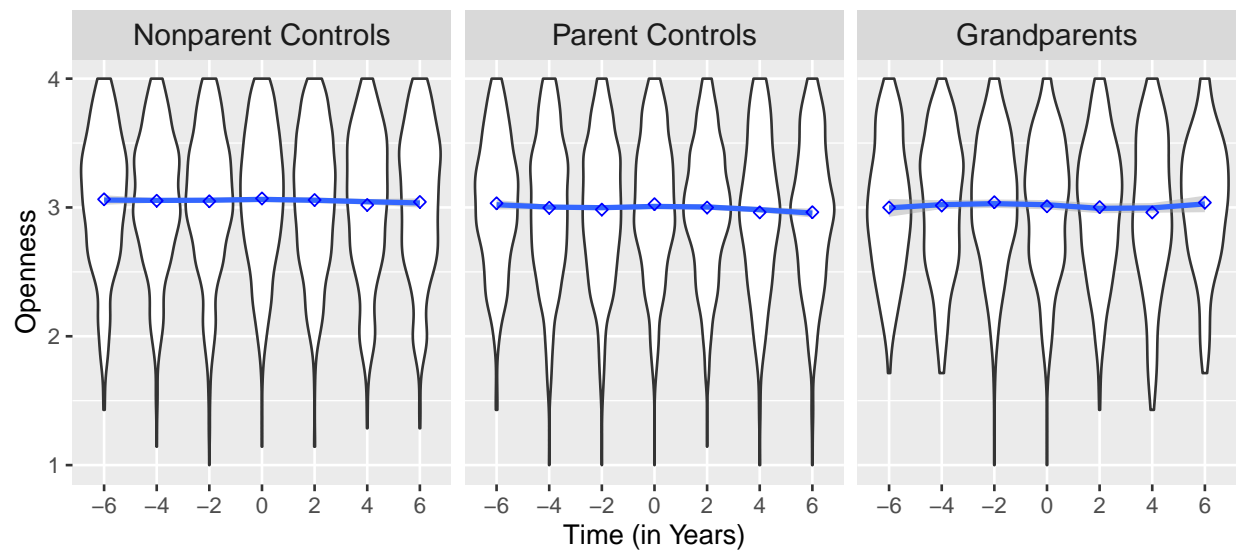
Violin Plots for Conscientiousness Including Means Over Time and LOESS Line.

LISS**HRS****Figure S5**

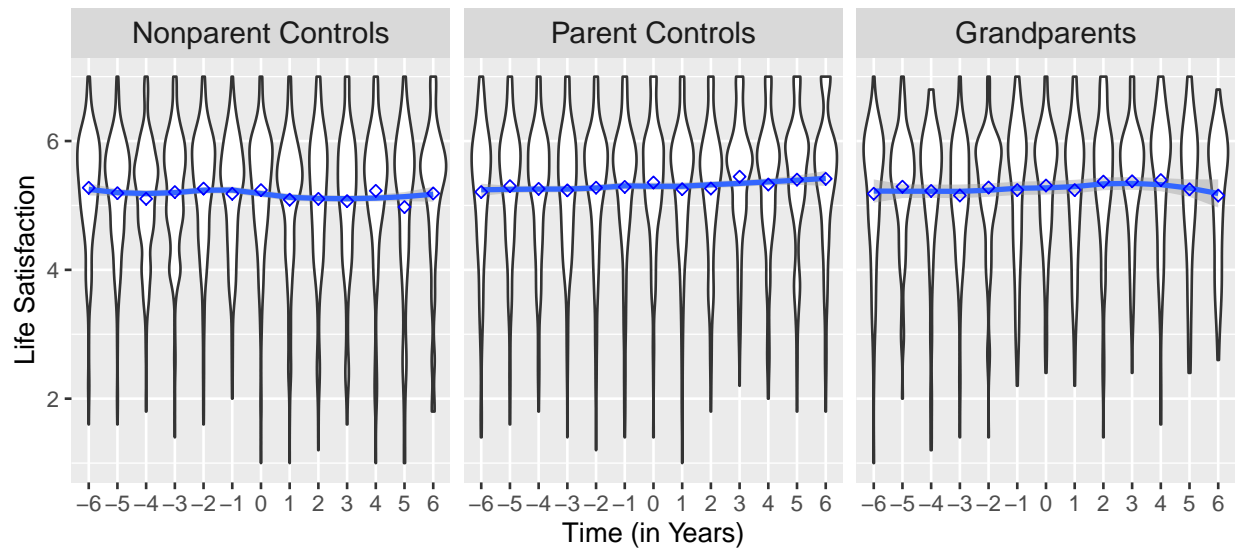
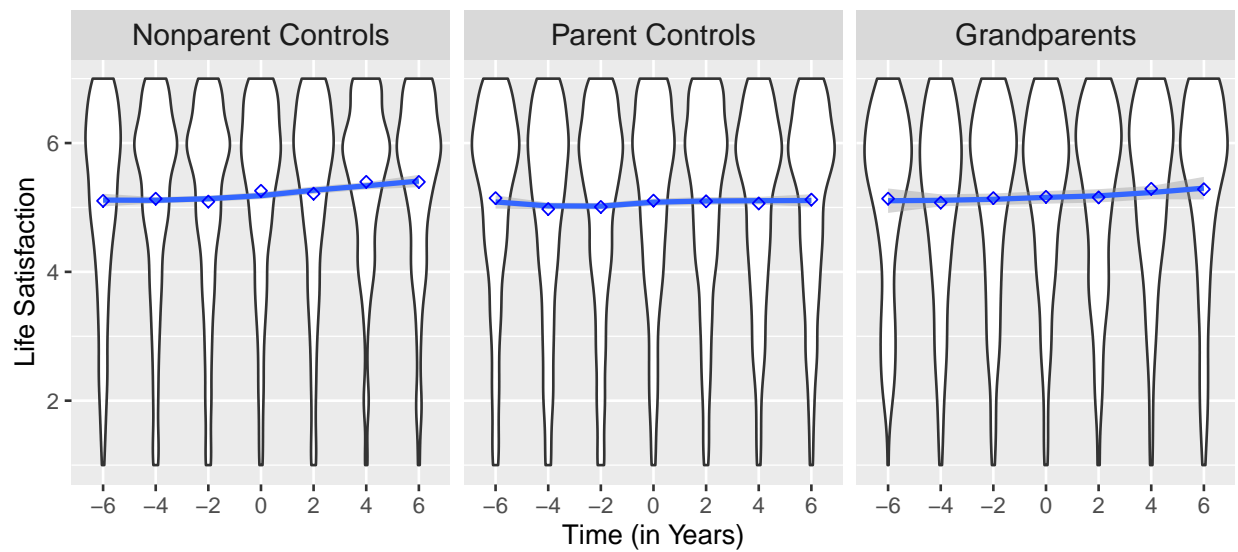
Violin Plots for Extraversion Including Means Over Time and LOESS Line.

LISS**HRS****Figure S6**

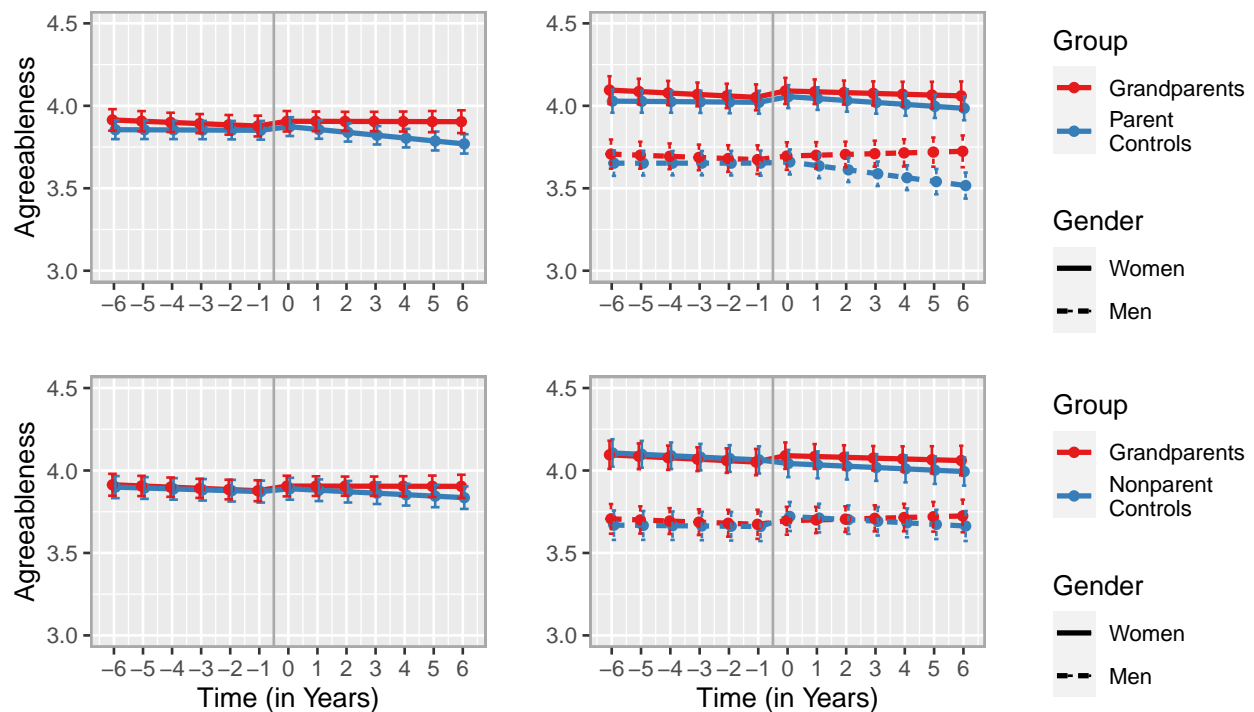
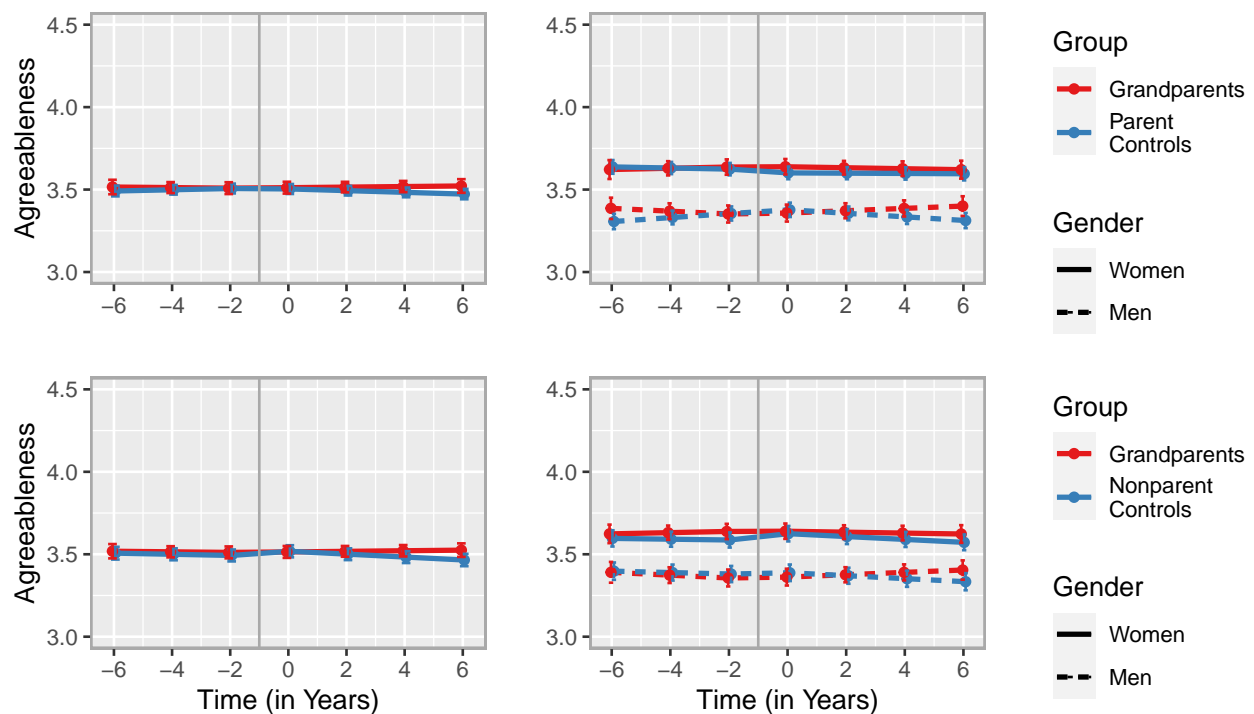
Violin Plots for Neuroticism Including Means Over Time and LOESS Line.

LISS**HRS****Figure S7**

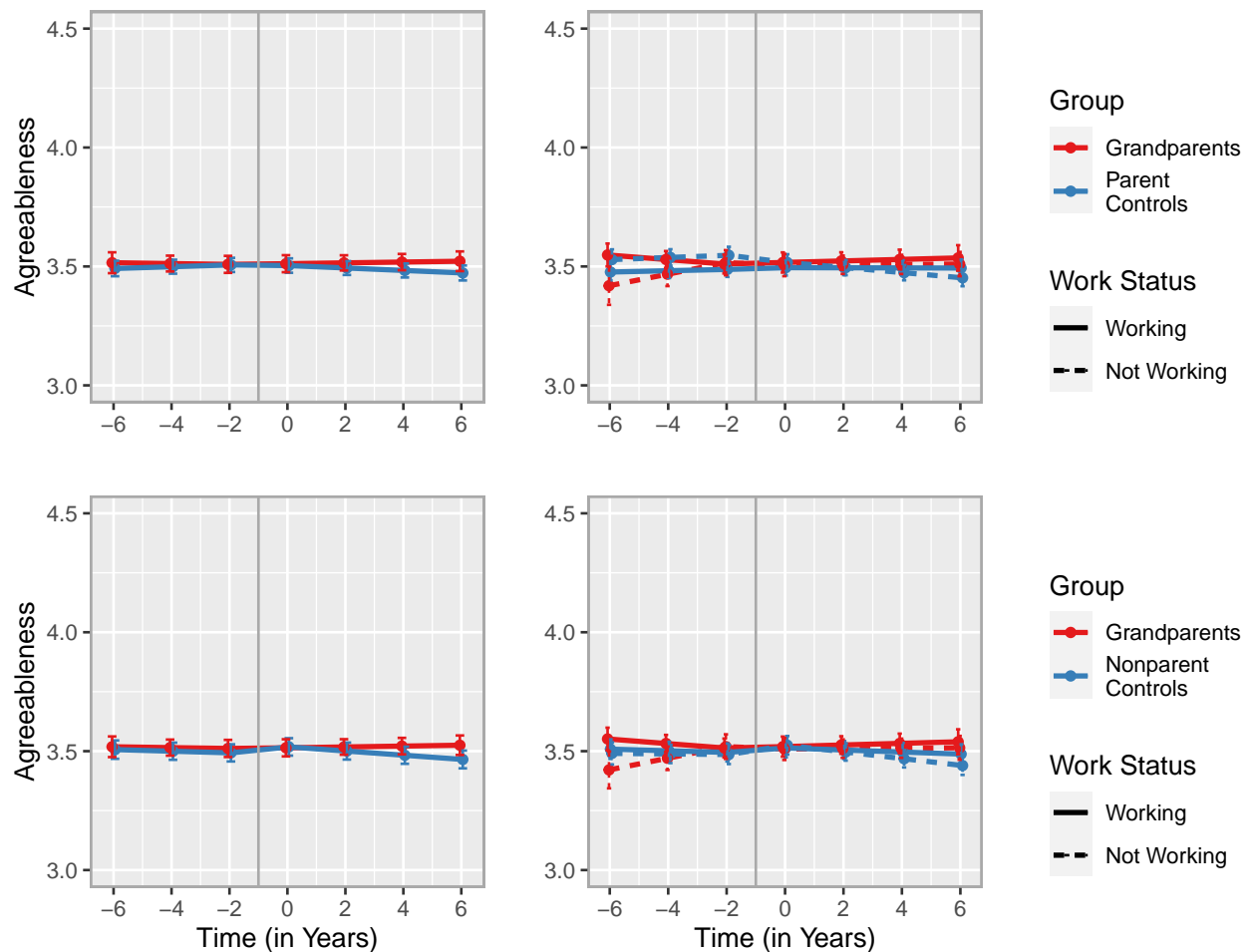
Violin Plots for Openness Including Means Over Time and LOESS Line.

LISS**HRS****Figure S8**

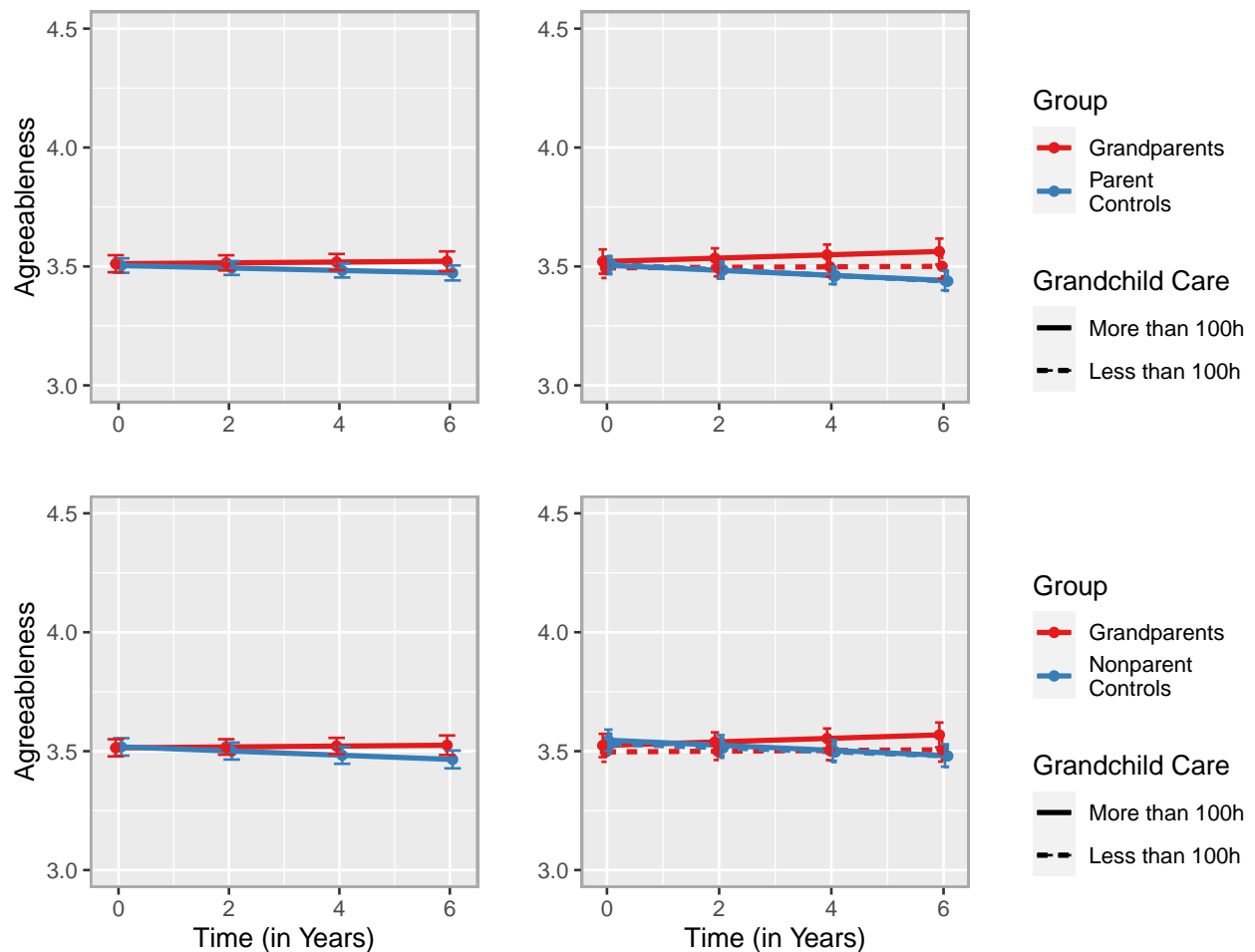
Violin Plots for Life Satisfaction Including Means Over Time and LOESS Line.

LISS**HRS****Figure S9**

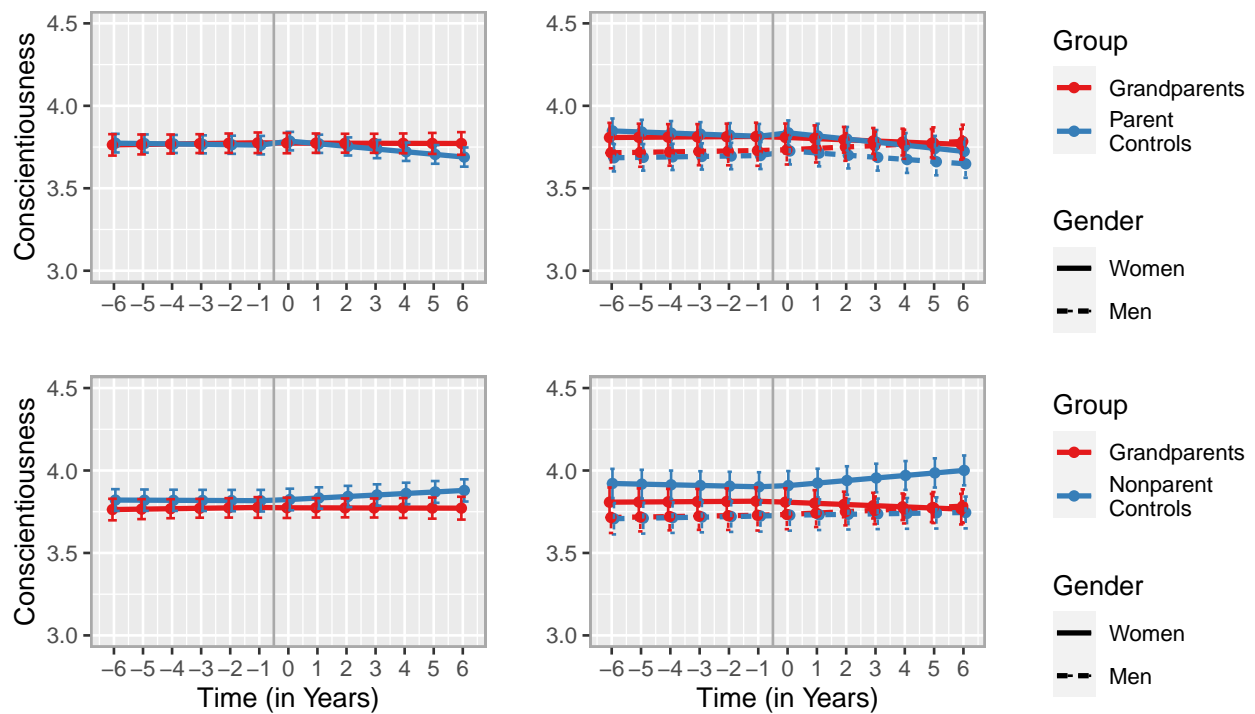
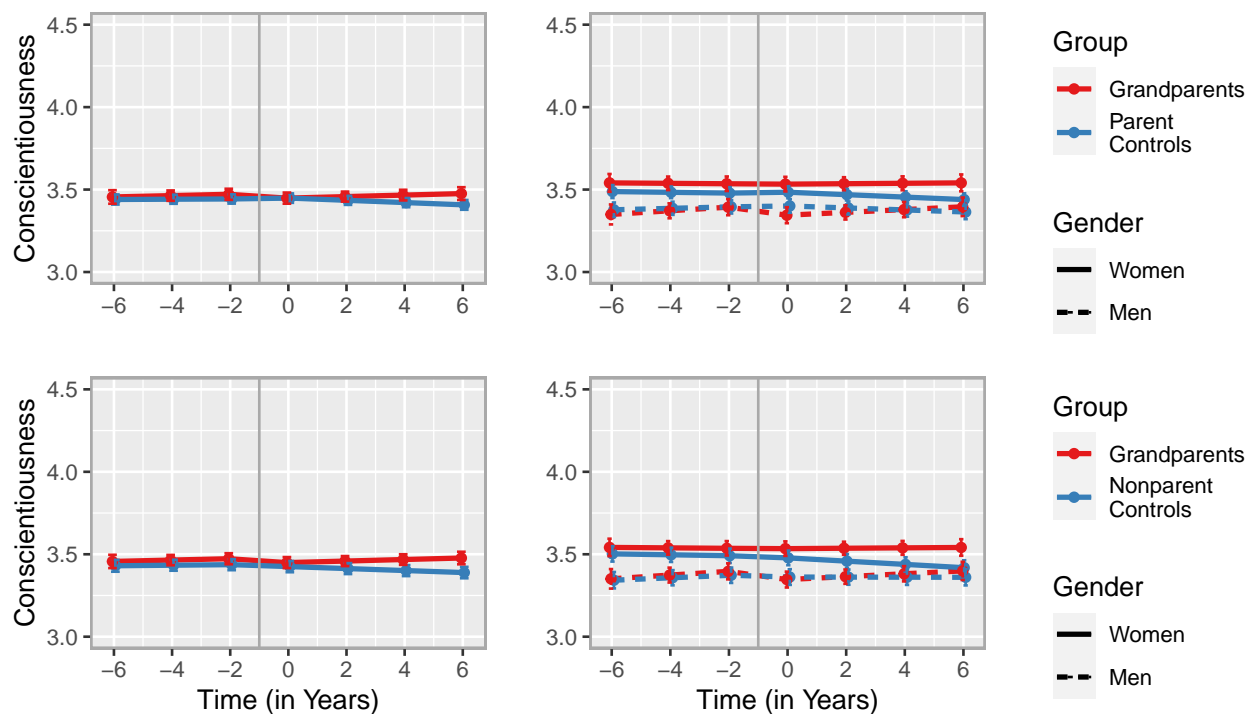
Change trajectories of agreeableness based on the basic models (left column) and the models including the gender interaction (right column). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The vertical line indicates the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

HRS**Figure S10**

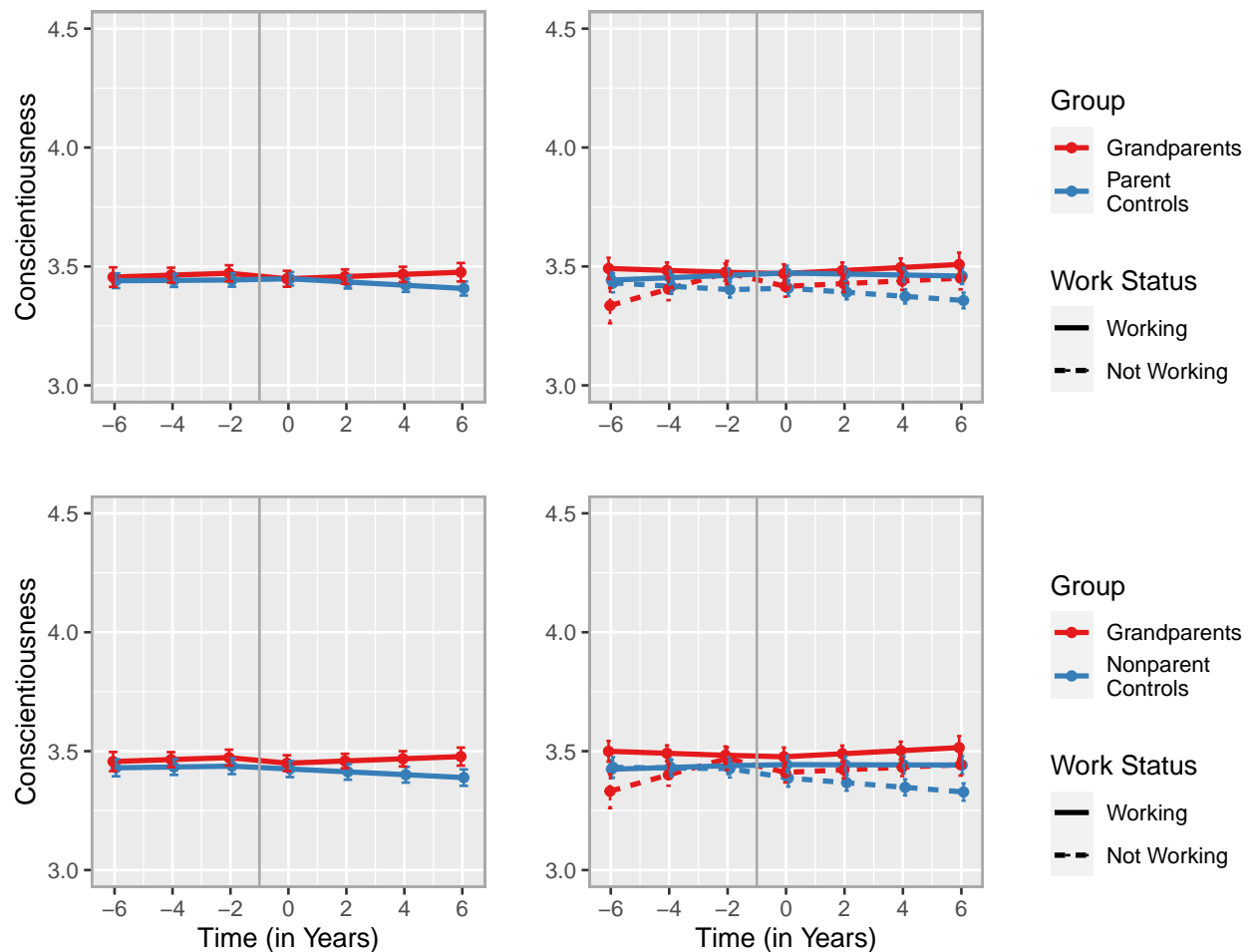
Change trajectories of agreeableness based on the models of moderation by paid work (see Table S11). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The vertical line indicates the approximate time of the transition to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

HRS**Figure S11**

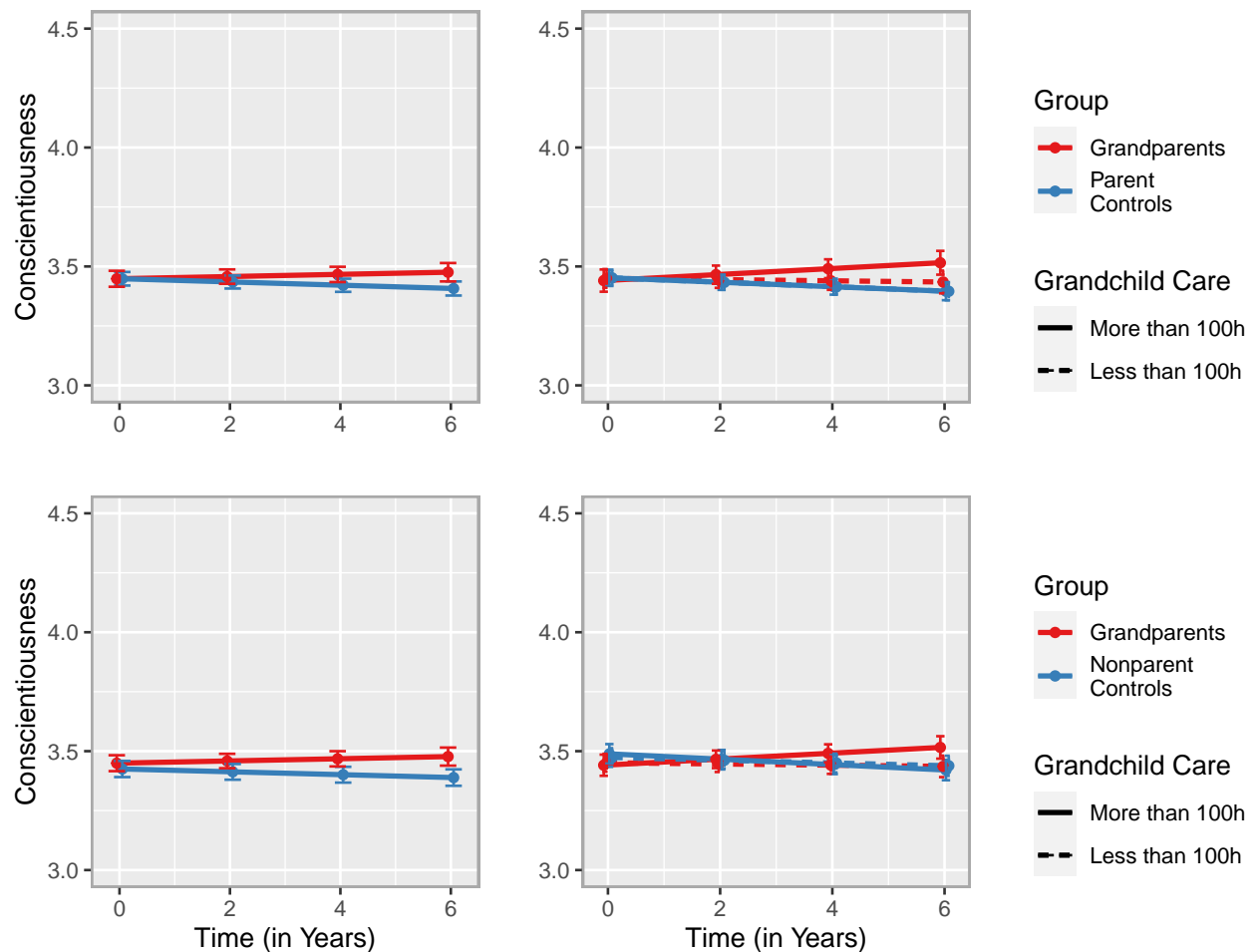
Change trajectories of agreeableness based on the models of moderation by grandchild care (see Table S13). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The plots in the left column are the same as in Figure S9 (basic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

LISS**HRS****Figure S12**

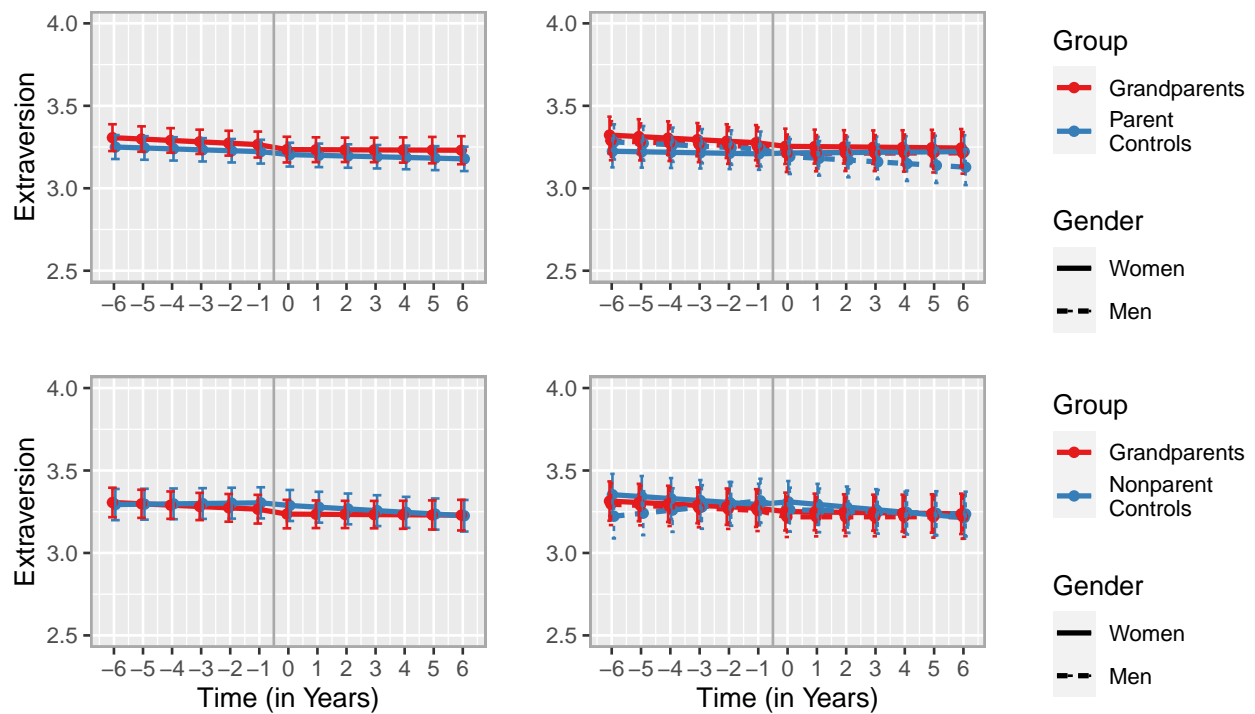
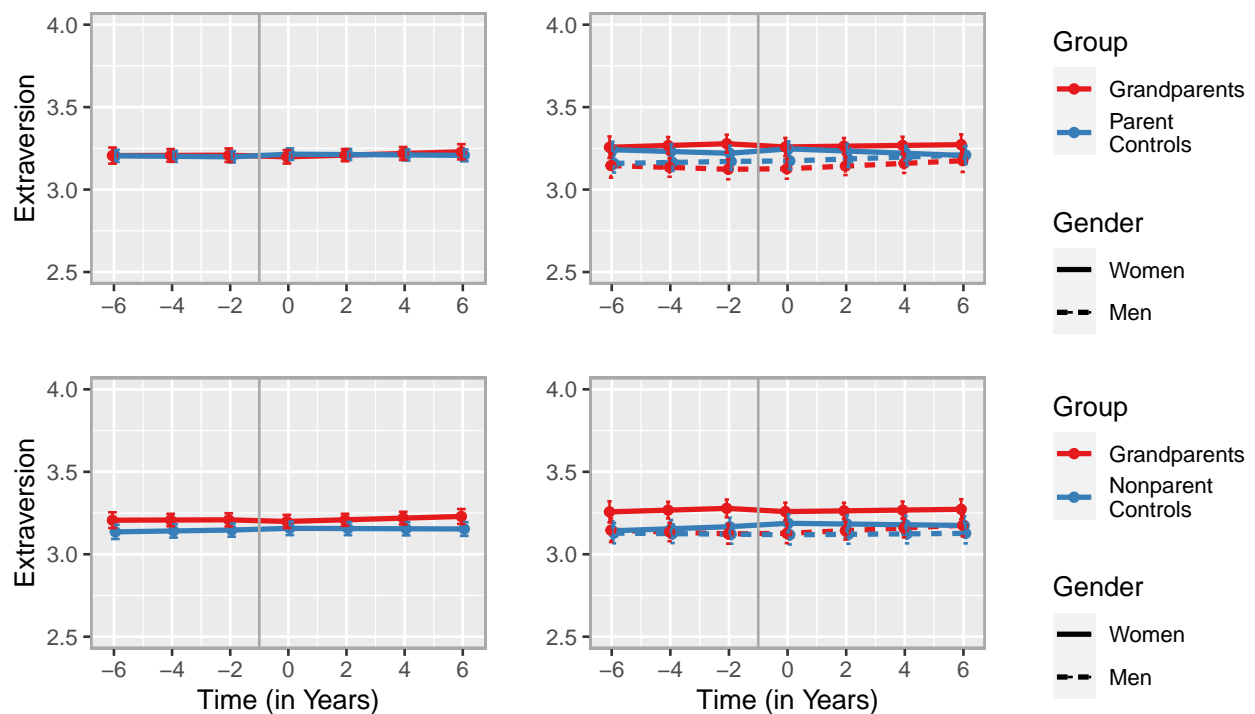
Change trajectories of conscientiousness based on the basic models (left column) and the models including the gender interaction (right column). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The vertical line indicates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

HRS**Figure S13**

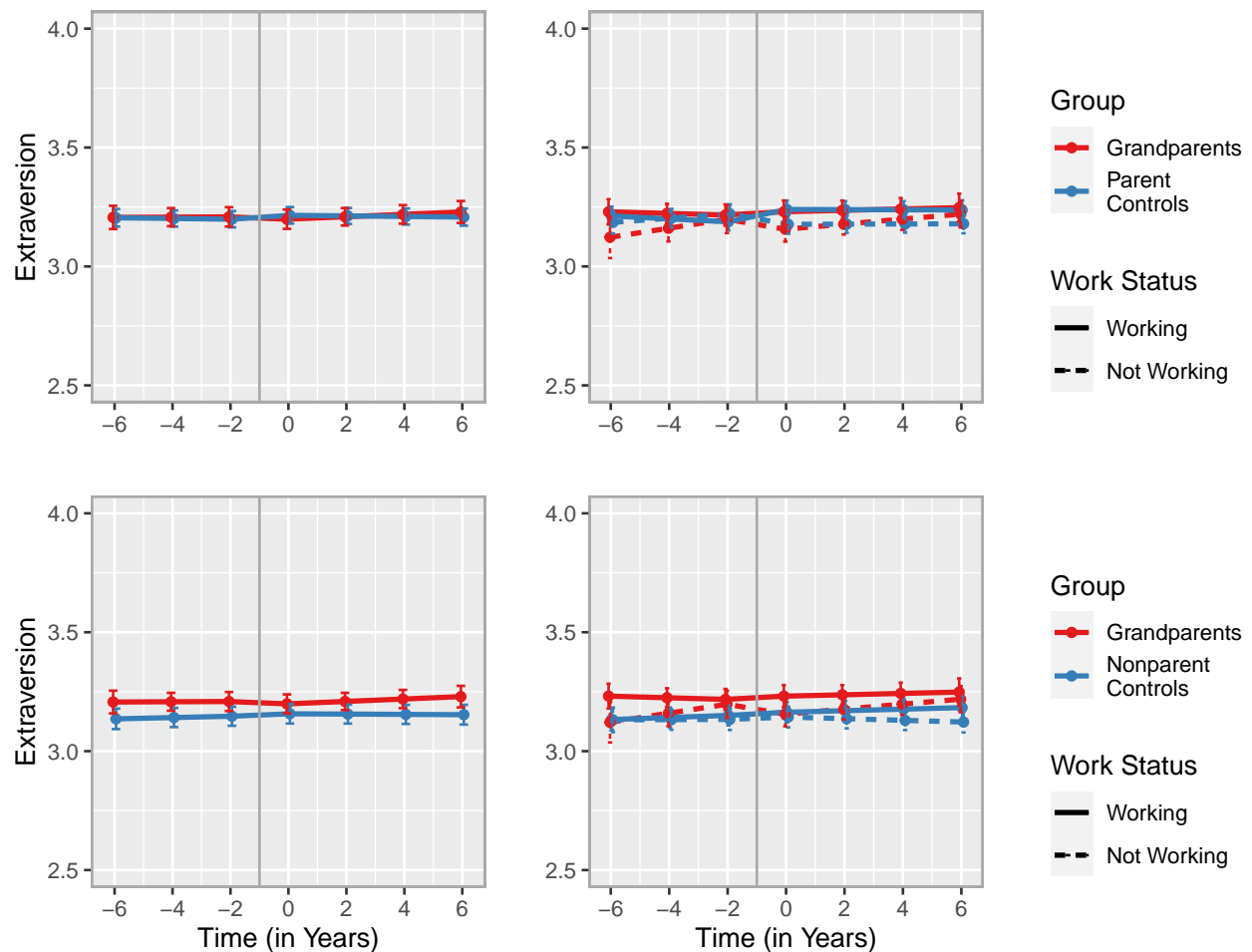
Change trajectories of conscientiousness based on the models of moderation by paid work (see Table S19). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The vertical line indicates the approximate time of the transition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

HRS**Figure S14**

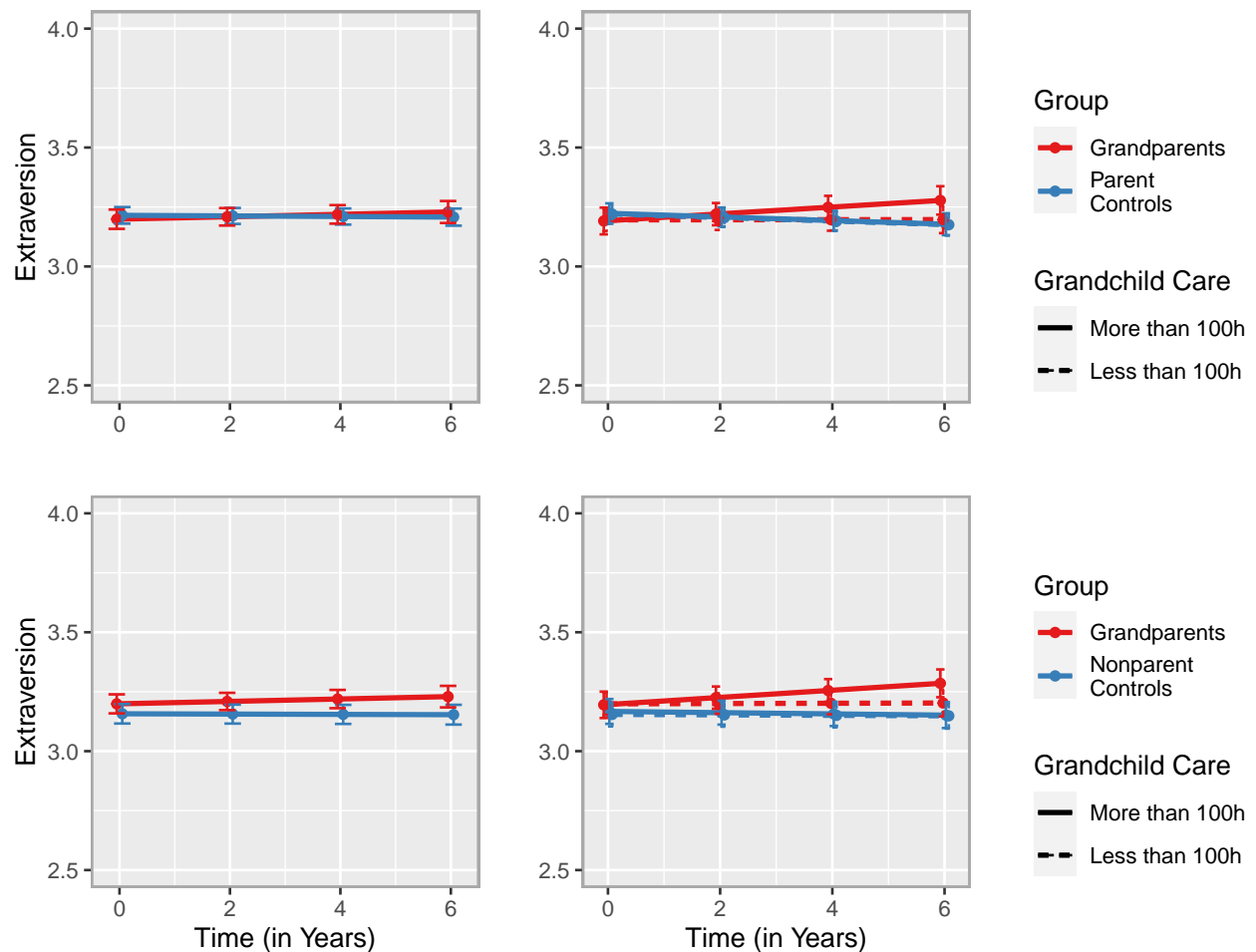
Change trajectories of conscientiousness based on the models of moderation by grandchild care (see Table S21). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The plots in the left column are the same as in Figure S12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

LISS**HRS****Figure S15**

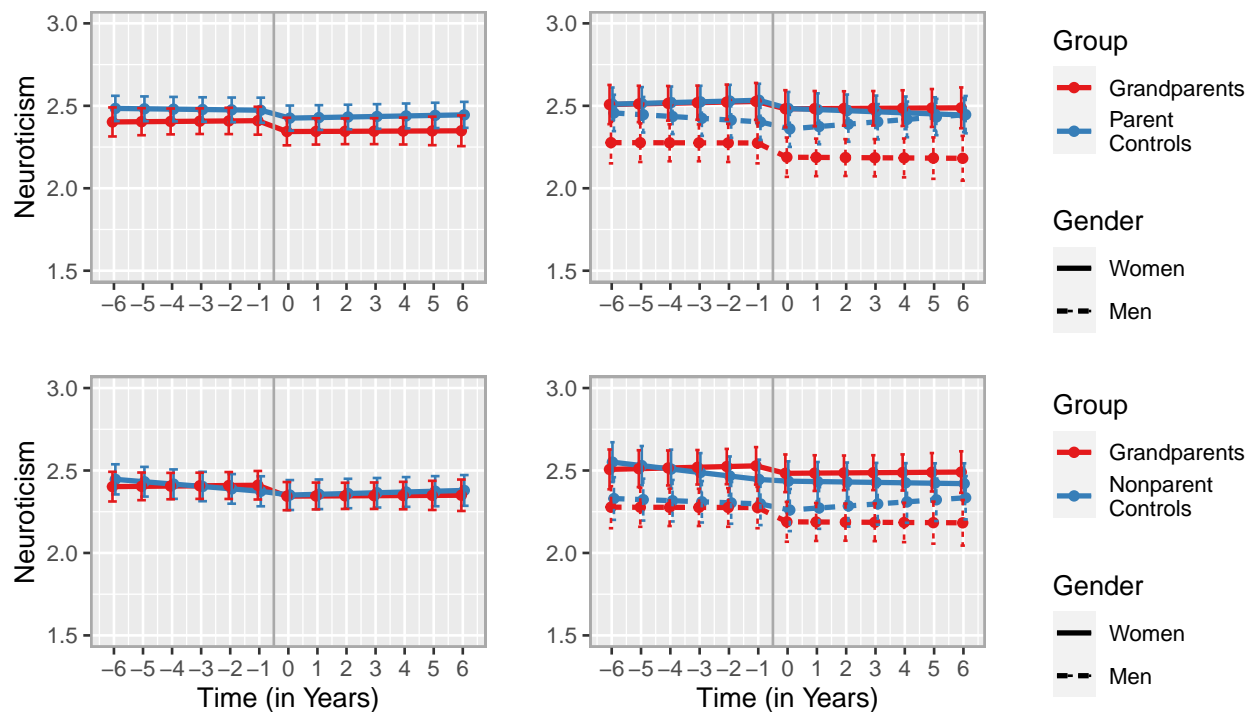
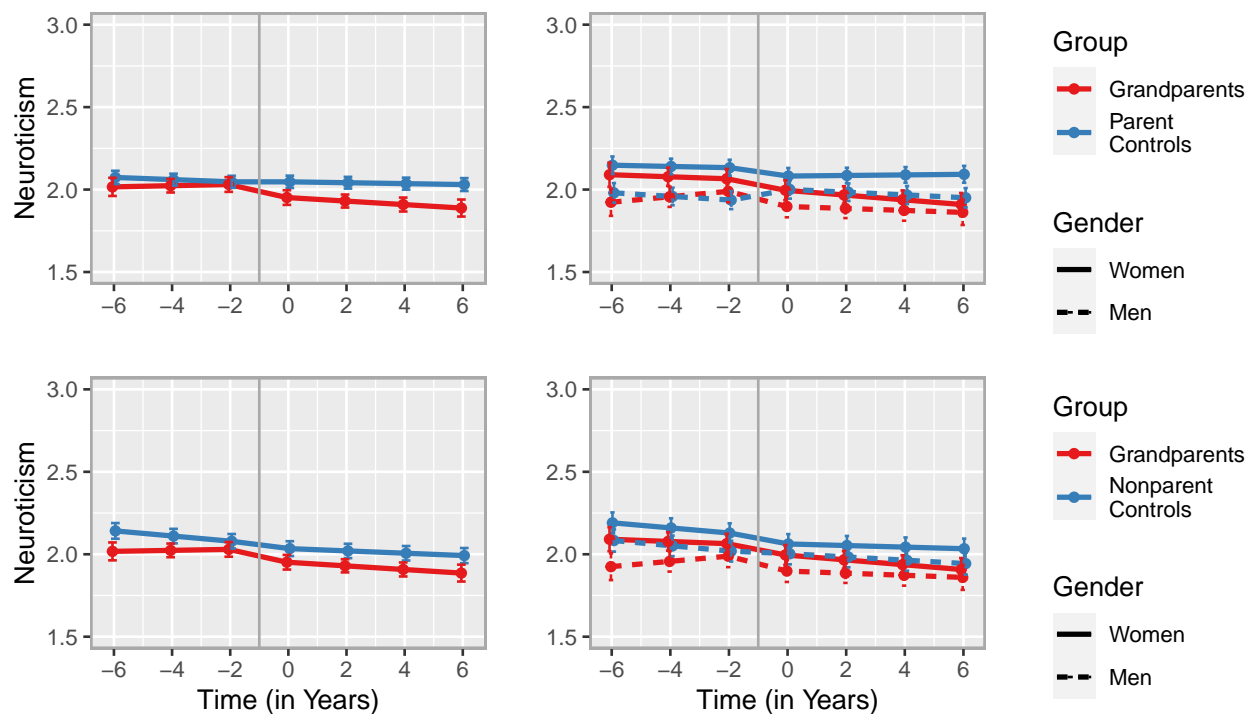
Change trajectories of extraversion based on the basic models (left column) and the models including the gender interaction (right column). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The vertical line indicates the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

HRS**Figure S16**

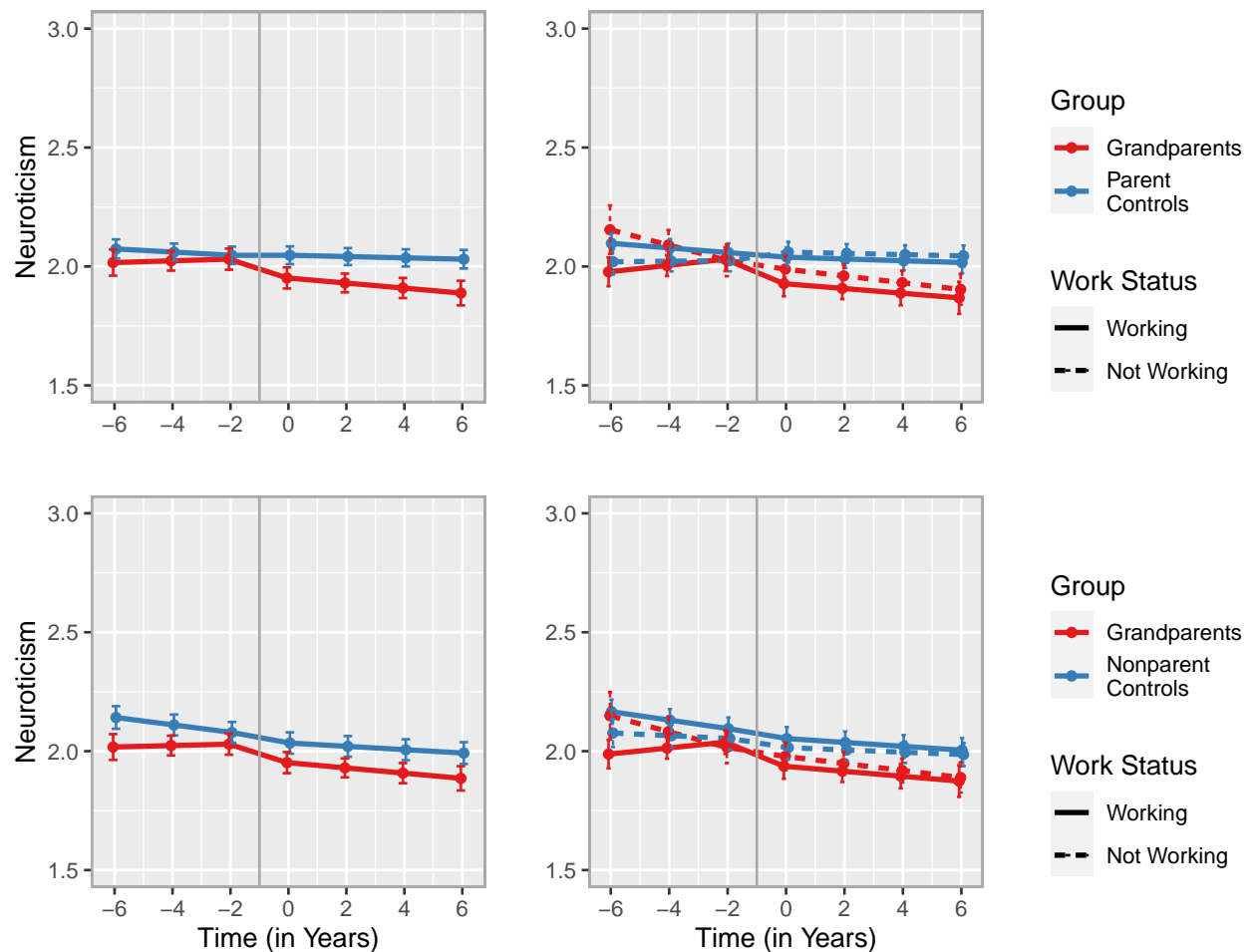
Change trajectories of extraversion based on the models of moderation by paid work (see Table S27). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The vertical line indicates the approximate time of the transition to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

HRS**Figure S17**

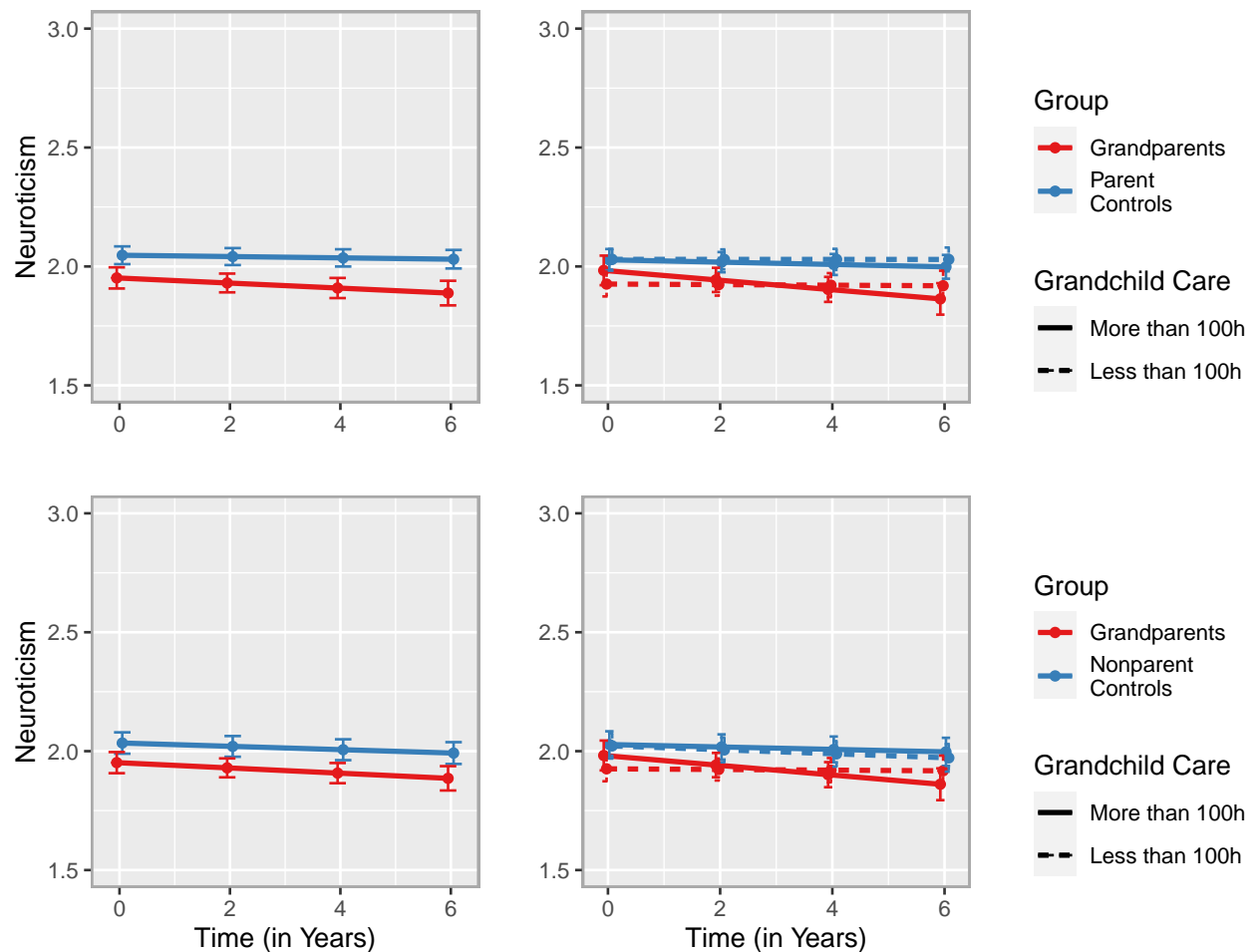
Change trajectories of extraversion based on the models of moderation by grandchild care (see Table S29). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The plots in the left column are the same as in Figure S15 (basic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

LISS**HRS****Figure S18**

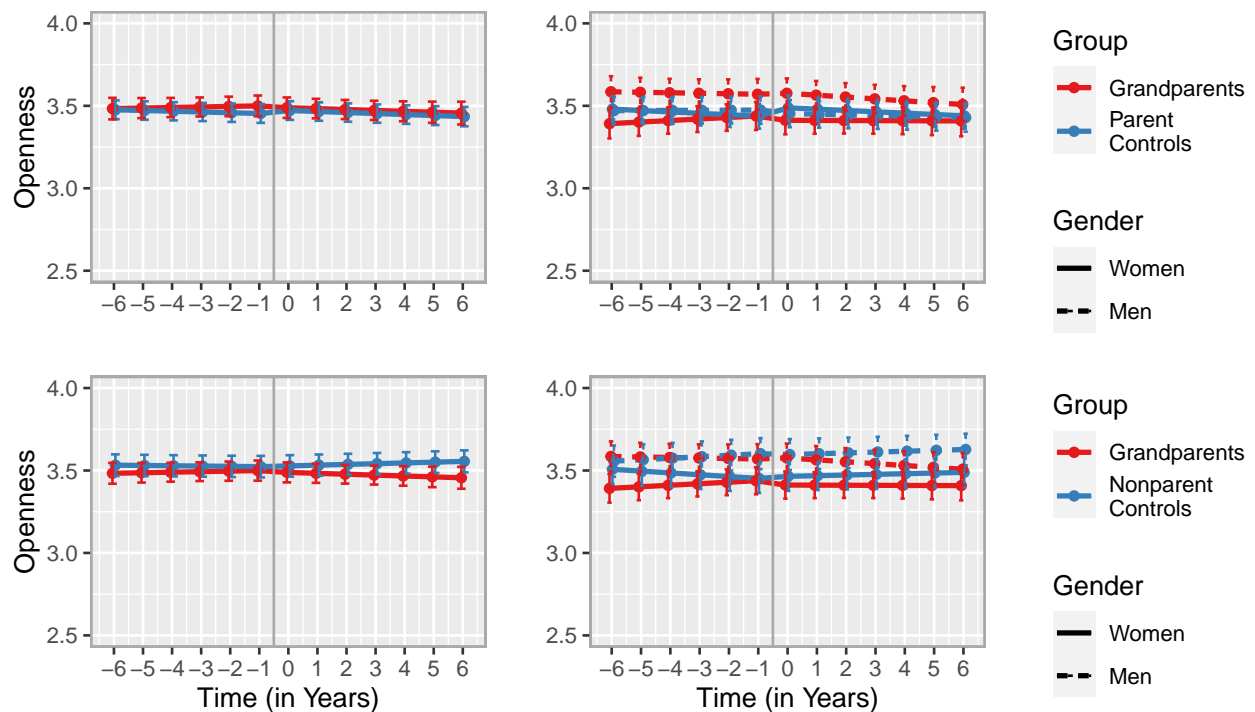
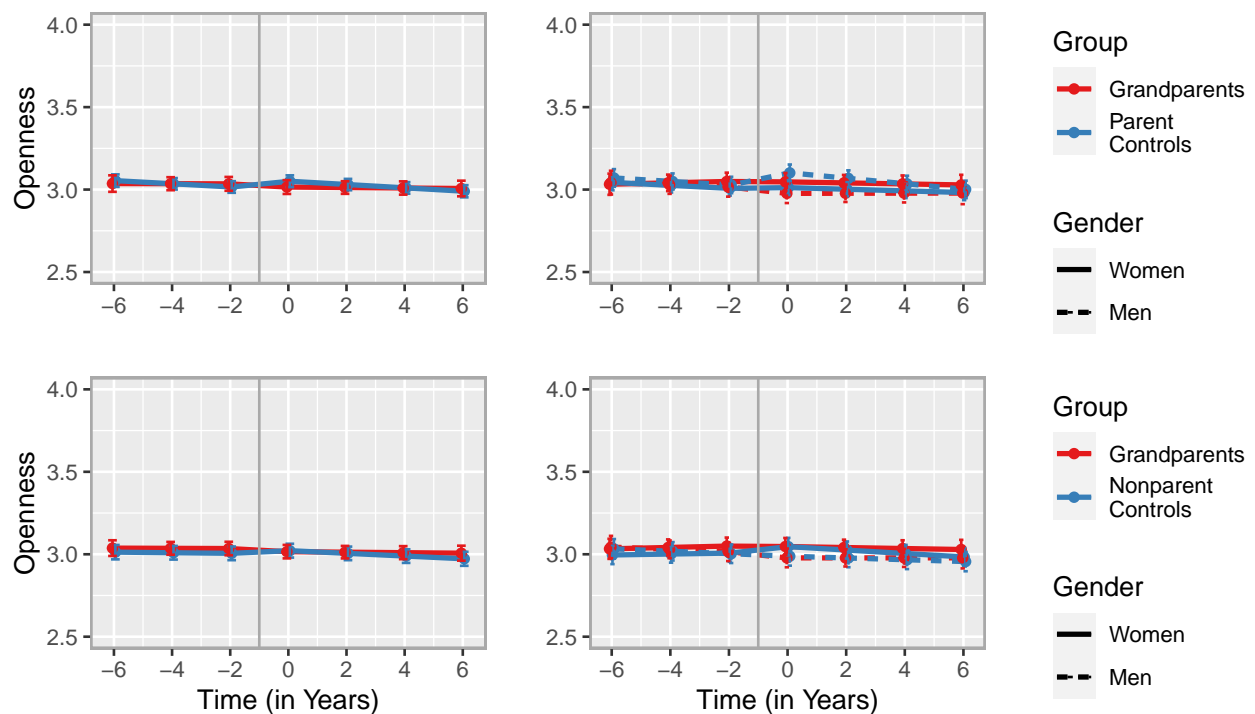
Change trajectories of neuroticism based on the basic models (left column) and the models including the gender interaction (right column). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The vertical line indicates the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

HRS**Figure S19**

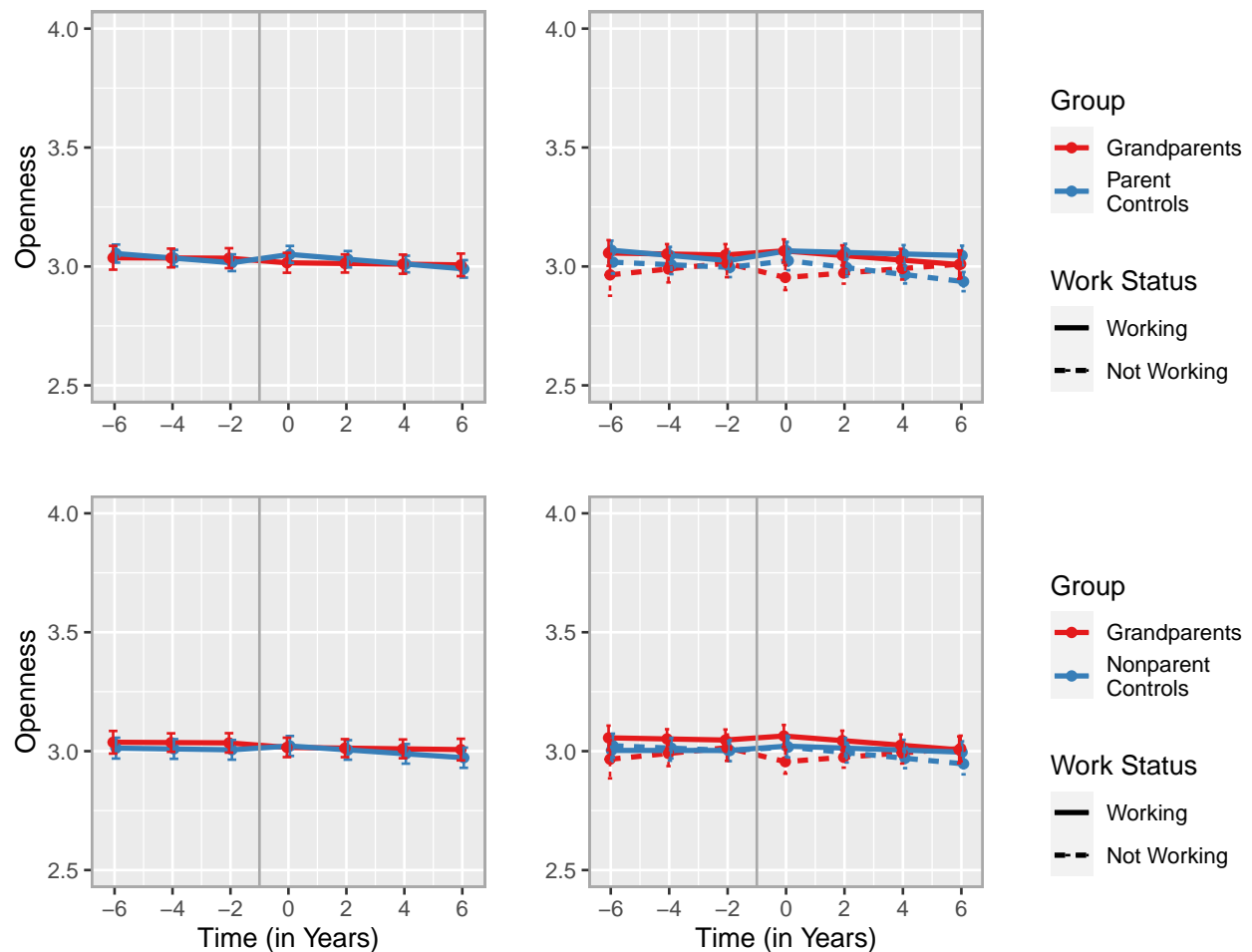
Change trajectories of neuroticism based on the models of moderation by paid work (see Table S35). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The vertical line indicates the approximate time of the transition to grandparenthood.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

HRS**Figure S20**

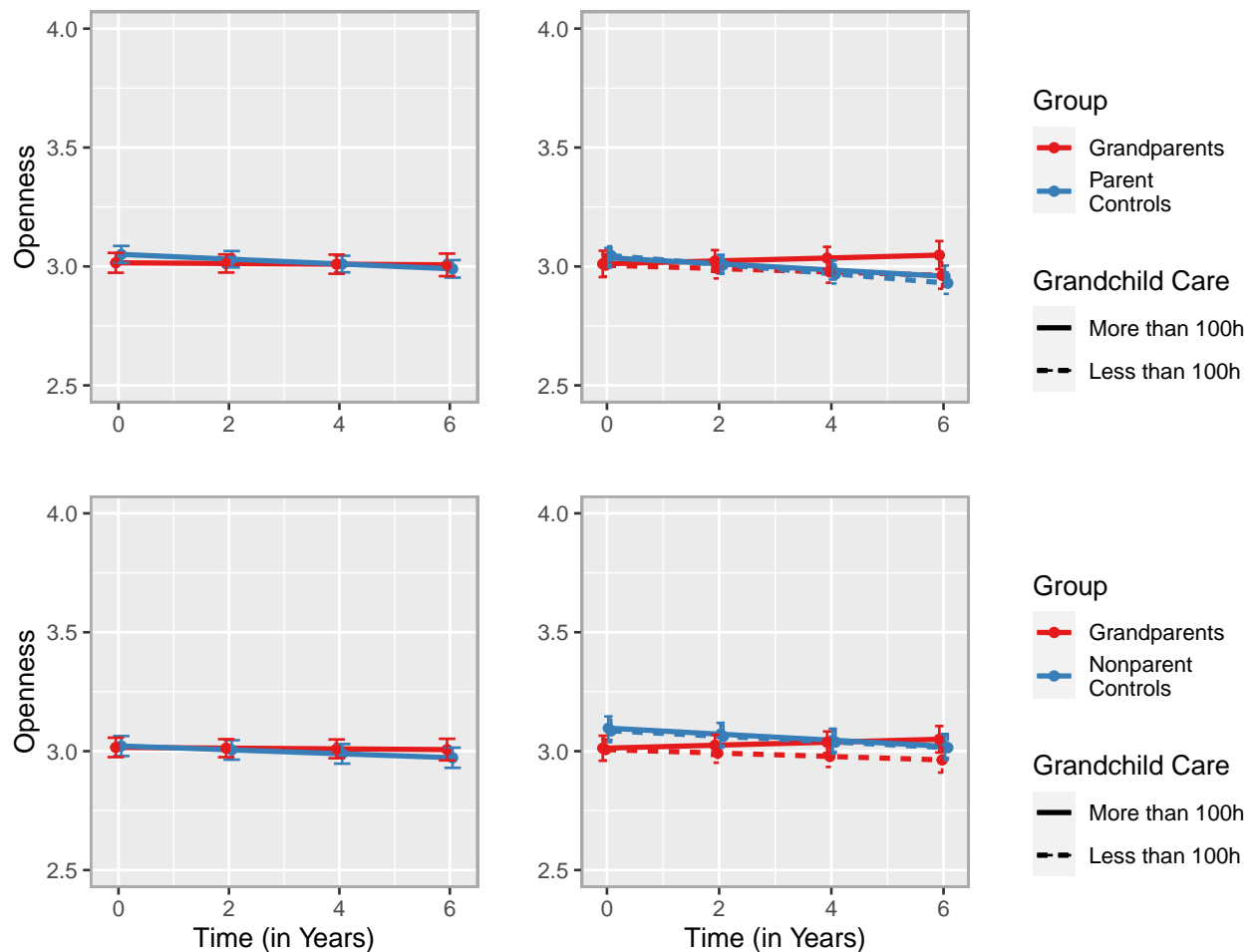
Change trajectories of neuroticism based on the models of moderation by grandchild care (see Table S37). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The plots in the left column are the same as in Figure S18 (basic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

LISS**HRS****Figure S21**

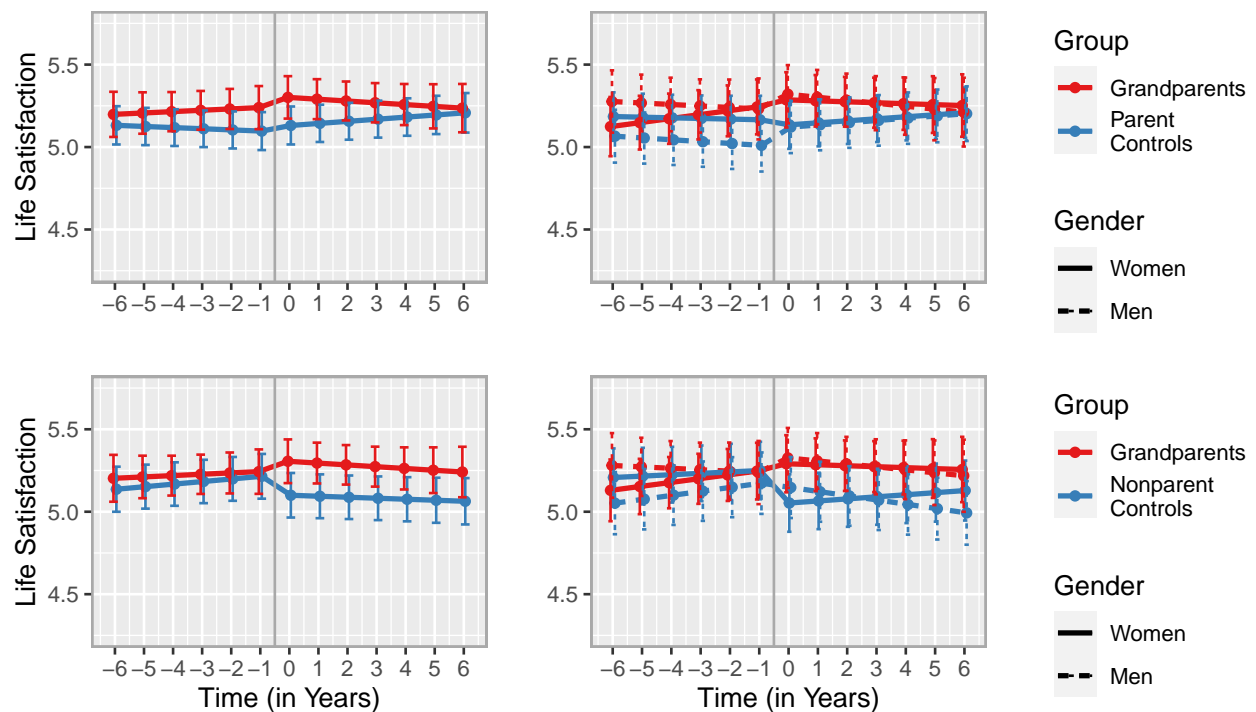
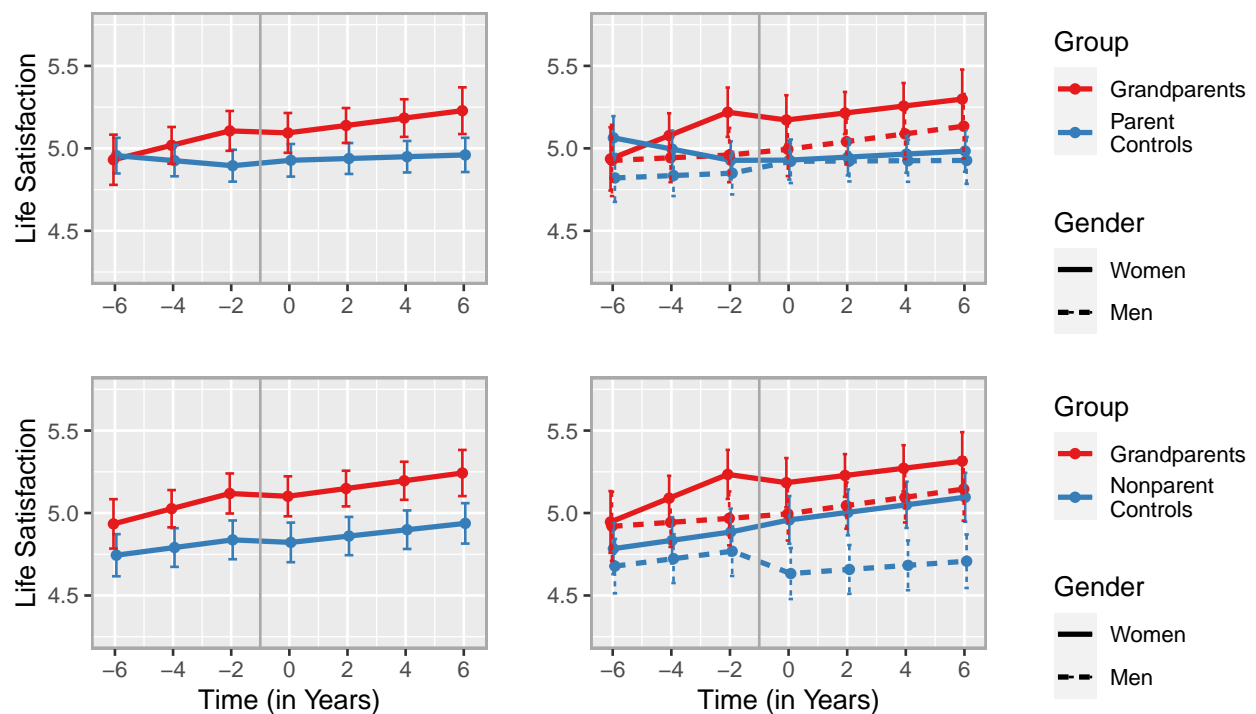
Change trajectories of openness based on the basic models (left column) and the models including the gender interaction (right column). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The vertical line indicates the approximate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

HRS**Figure S22**

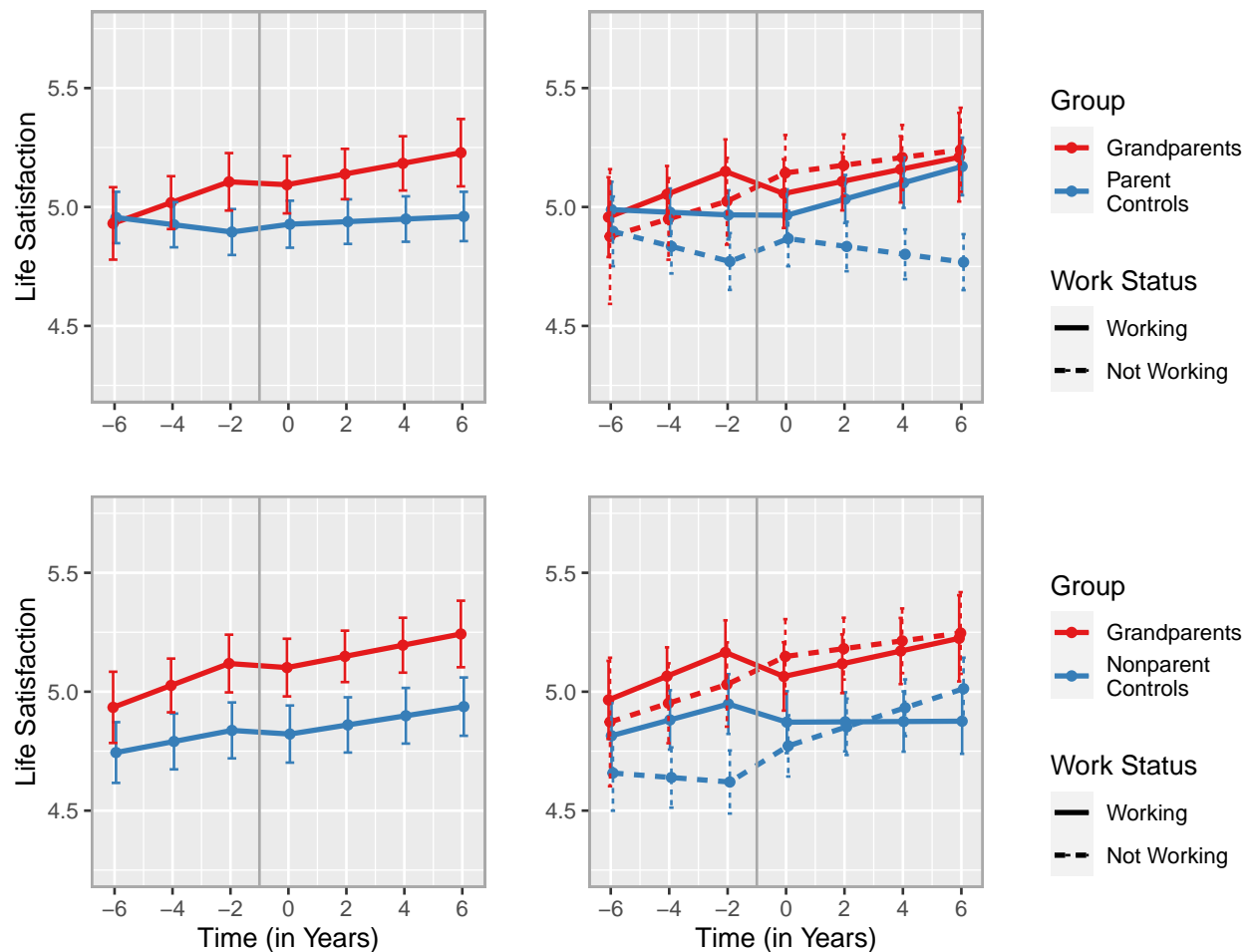
Change trajectories of openness based on the models of moderation by paid work (see Table S43). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The vertical line indicates the approximate time of the transition to grandparenthood.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

HRS**Figure S23**

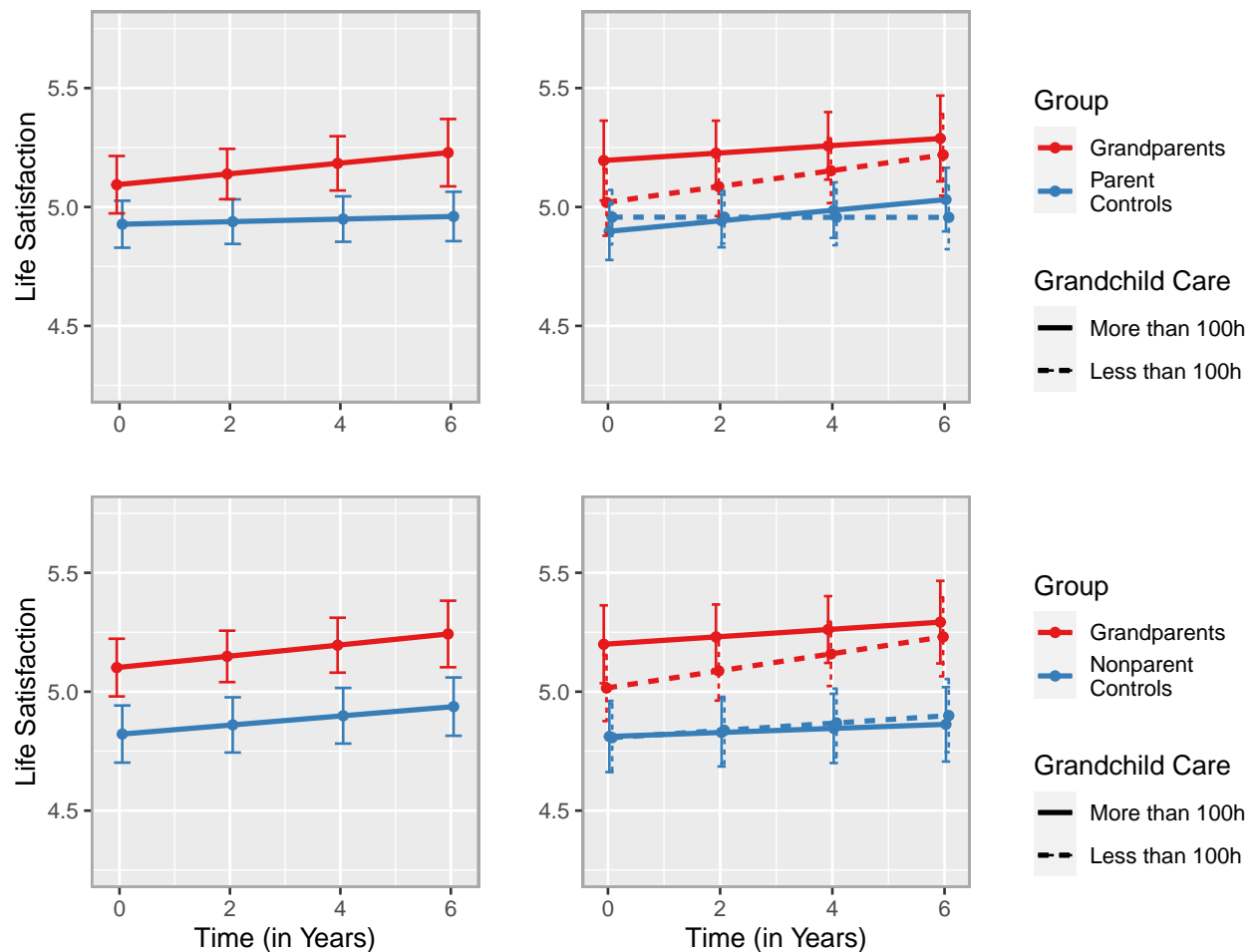
Change trajectories of openness based on the models of moderation by grandchild care (see Table S45). The error bars are 95% confidence intervals of the predicted values which only account for the fixed-effects portion of the model. The plots in the left column are the same as in Figure S21 (basic models)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

LISS**HRS****Figure S24**

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

HRS**Figure S25**

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

HRS**Figure S26**

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

Complete Software and Session Information

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

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

1811 to aid analytic reproducibility of the analyses.

1812 R version 4.0.4 (2021-02-15) Platform: x86_64-apple-darwin17.0 (64-bit) Running
1813 under: macOS Big Sur 10.16

1814 Matrix products: default BLAS:
1815 /Library/Frameworks/R.framework/Versions/4.0/Resources/lib/libRblas.dylib LAPACK:
1816 /Library/Frameworks/R.framework/Versions/4.0/Resources/lib/libRlapack.dylib

1817 locale: [1]
1818 en_US.UTF-8/en_US.UTF-8/en_US.UTF-8/C/en_US.UTF-8/en_US.UTF-8

1819 attached base packages: [1] grid stats graphics grDevices utils datasets methods
1820 [8] base

1821 other attached packages: [1] png_0.1-7 car_3.0-10 carData_3.0-4
1822 [4] scales_1.1.1 cowplot_1.1.0 lmerTest_3.1-3
1823 [7] lme4_1.1-26 Matrix_1.3-2 GPArotation_2014.11-1 [10] psych_2.0.9
1824 forcats_0.5.0 stringr_1.4.0

1825 [13] dplyr_1.0.2 purrr_0.3.4 readr_1.4.0
1826 [16] tidyr_1.1.2 tibble_3.1.2 tidyverse_1.3.0
1827 [19] Hmisc_4.4-2 ggplot2_3.3.5 Formula_1.2-4
1828 [22] lattice_0.20-41 multcomp_1.4-17 TH.data_1.0-10
1829 [25] MASS_7.3-53 survival_3.2-7 mvtnorm_1.1-1
1830 [28] citr_0.3.2 papaja_0.1.0.9997 tinylab_0.1.0

1831 loaded via a namespace (and not attached): [1] minqa_1.2.4 colorspace_2.0-1
1832 rio_0.5.16

1833 [4] ellipsis_0.3.2 htmlTable_2.1.0 base64enc_0.1-3
1834 [7] fs_1.5.0 rstudioapi_0.13 fansi_0.5.0
1835 [10] lubridate_1.7.9.2 xml2_1.3.2 codetools_0.2-18
1836 [13] splines_4.0.4 mnormt_2.0.2 knitr_1.30

- 1837 [16] jsonlite_1.7.2 nloptr_1.2.2.2 broom_0.7.6
- 1838 [19] cluster_2.1.0 dbplyr_1.4.4 shiny_1.5.0
- 1839 [22] compiler_4.0.4 httr_1.4.2 backports_1.2.1
- 1840 [25] assertthat_0.2.1 fastmap_1.0.1 cli_2.5.0
- 1841 [28] later_1.1.0.1 htmltools_0.5.0 tools_4.0.4
- 1842 [31] gtable_0.3.0 glue_1.4.2 Rcpp_1.0.6
- 1843 [34] cellranger_1.1.0 vctrs_0.3.8 nlme_3.1-152
- 1844 [37] xfun_0.19 openxlsx_4.2.3 rvest_0.3.6
- 1845 [40] mime_0.9 miniUI_0.1.1.1 lifecycle_1.0.0
- 1846 [43] statmod_1.4.35 zoo_1.8-8 hms_0.5.3
- 1847 [46] promises_1.1.1 parallel_4.0.4 sandwich_3.0-0
- 1848 [49] RColorBrewer_1.1-2 curl_4.3.1 yaml_2.2.1
- 1849 [52] gridExtra_2.3 rpart_4.1-15 latticeExtra_0.6-29 [55] stringi_1.5.3
- 1850 checkmate_2.0.0 zip_2.1.1
- 1851 [58] boot_1.3-26 rlang_0.4.11 pkgconfig_2.0.3
- 1852 [61] evaluate_0.14 htmlwidgets_1.5.2 tidyselect_1.1.0
- 1853 [64] magrittr_2.0.1 bookdown_0.21 R6_2.5.0
- 1854 [67] generics_0.1.0 DBI_1.1.0 pillar_1.6.1
- 1855 [70] haven_2.3.1 foreign_0.8-81 withr_2.4.2
- 1856 [73] abind_1.4-5 nnet_7.3-15 modelr_0.1.8
- 1857 [76] crayon_1.4.1 utf8_1.2.1 tmvnsim_1.0-2
- 1858 [79] rmarkdown_2.5 jpeg_0.1-8.1 readxl_1.3.1
- 1859 [82] data.table_1.13.2 blob_1.2.1 reprex_0.3.0
- 1860 [85] digest_0.6.27 xtable_1.8-4 httpuv_1.5.4
- 1861 [88] numDeriv_2016.8-1.1 munsell_0.5.0

References

- Aust, F. (2019). *Citr: 'RStudio' add-in to insert markdown citations*.
<https://github.com/crsh/citr>
- Aust, F., & Barth, M. (2020). *papaja: Prepare reproducible APA journal articles with R Markdown*. <https://github.com/crsh/papaja>
- Austin, P. C. (2011). An introduction to propensity score methods for reducing the effects of confounding in observational studies. *Multivariate Behavioral Research*, 46(3), 399–424. <https://doi.org/10.1080/00273171.2011.568786>
- Barth, M. (2020). *Tinylabels: Lightweight variable labels*.
<https://CRAN.R-project.org/package=tinylabels>
- Bates, D., & Maechler, M. (2021). *Matrix: Sparse and dense matrix classes and methods*.
<https://CRAN.R-project.org/package=Matrix>
- Bates, D., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software*, 67(1), 1–48.
<https://doi.org/10.18637/jss.v067.i01>
- Bernaards, C. A., & I. Jennrich, R. (2005). Gradient projection algorithms and software for arbitrary rotation criteria in factor analysis. *Educational and Psychological Measurement*, 65, 676–696.
- Chang, W., Cheng, J., Allaire, J., Xie, Y., & McPherson, J. (2020). *Shiny: Web application framework for r*. <https://CRAN.R-project.org/package=shiny>
- Fox, J. (2003). Effect displays in R for generalised linear models. *Journal of Statistical Software*, 8(15), 1–27. <https://www.jstatsoft.org/article/view/v008i15>
- Fox, J., & Hong, J. (2009). Effect displays in R for multinomial and proportional-odds logit models: Extensions to the effects package. *Journal of Statistical Software*, 32(1), 1–24. <https://www.jstatsoft.org/article/view/v032i01>

- 1887 Fox, J., & Weisberg, S. (2018). Visualizing fit and lack of fit in complex regression models
1888 with predictor effect plots and partial residuals. *Journal of Statistical Software*,
1889 87(9), 1–27. <https://doi.org/10.18637/jss.v087.i09>
- 1890 Fox, J., & Weisberg, S. (2019). *An R companion to applied regression* (Third). Sage.
- 1891 Fox, J., Weisberg, S., & Price, B. (2020a). *Car: Companion to applied regression* [Manual].
- 1892 Fox, J., Weisberg, S., & Price, B. (2020b). *CarData: Companion to applied regression data*
1893 *sets*. <https://CRAN.R-project.org/package=carData>
- 1894 Genz, A., & Bretz, F. (2009). *Computation of multivariate normal and t probabilities*.
1895 Springer-Verlag.
- 1896 Harrell Jr, F. E., Charles Dupont, & others. (2020). *Hmisc: Harrell miscellaneous*.
1897 <https://CRAN.R-project.org/package=Hmisc>
- 1898 Henry, L., & Wickham, H. (2020). *Purrr: Functional programming tools*.
1899 <https://CRAN.R-project.org/package=purrr>
- 1900 Ho, D., Imai, K., King, G., Stuart, E., & Greifer, N. (2020). *MatchIt: Nonparametric*
1901 *preprocessing for parametric causal inference* [Manual].
- 1902 Hothorn, T. (2019). *TH.data: TH's data archive*.
1903 <https://CRAN.R-project.org/package=TH.data>
- 1904 Hothorn, T., Bretz, F., & Westfall, P. (2008). Simultaneous inference in general parametric
1905 models. *Biometrical Journal*, 50(3), 346–363.
- 1906 Koller, M. (2016). robustlmm: An R package for robust estimation of linear mixed-effects
1907 models. *Journal of Statistical Software*, 75(6), 1–24.
1908 <https://doi.org/10.18637/jss.v075.i06>
- 1909 Kuznetsova, A., Brockhoff, P. B., & Christensen, R. H. B. (2017). lmerTest package: Tests
1910 in linear mixed effects models. *Journal of Statistical Software*, 82(13), 1–26.
1911 <https://doi.org/10.18637/jss.v082.i13>

- 1912 Long, J. A. (2019). *Interactions: Comprehensive, user-friendly toolkit for probing*
1913 *interactions*. <https://cran.r-project.org/package=interactions>
- 1914 Long, J. A. (2020). *Jtools: Analysis and presentation of social scientific data*.
1915 <https://cran.r-project.org/package=jtools>
- 1916 Müller, K., & Wickham, H. (2020). *Tibble: Simple data frames*.
1917 <https://CRAN.R-project.org/package=tibble>
- 1918 Ooms, J. (2021). *Magick: Advanced graphics and image-processing in r*.
1919 <https://CRAN.R-project.org/package=magick>
- 1920 Pedersen, T. L. (2020). *Patchwork: The composer of plots*.
- 1921 R Core Team. (2020). *Foreign: Read data stored by 'minitab', 's', 'sas', 'spss', 'stata',*
1922 *'systat', 'weka', 'dBase', ...* <https://CRAN.R-project.org/package=foreign>
- 1923 R Core Team. (2021). *R: A language and environment for statistical computing*. R
1924 Foundation for Statistical Computing. <https://www.R-project.org/>
- 1925 Revelle, W. (2020). *Psych: Procedures for psychological, psychometric, and personality*
1926 *research*. Northwestern University. <https://CRAN.R-project.org/package=psych>
- 1927 Sarkar, D. (2008). *Lattice: Multivariate data visualization with r*. Springer.
1928 <http://lmdvr.r-forge.r-project.org>
- 1929 Stuart, E. A. (2010). Matching methods for causal inference: A review and a look forward.
1930 *Statistical Science: A Review Journal of the Institute of Mathematical Statistics*,
1931 25(1), 1–21. <https://doi.org/10.1214/09-STS313>
- 1932 Terry M. Therneau, & Patricia M. Grambsch. (2000). *Modeling survival data: Extending*
1933 *the Cox model*. Springer.
- 1934 Urbanek, S. (2013). *Png: Read and write png images*.
1935 <https://CRAN.R-project.org/package=png>

- 1936 Venables, W. N., & Ripley, B. D. (2002). *Modern applied statistics with s* (Fourth).
1937 Springer. <http://www.stats.ox.ac.uk/pub/MASS4/>
- 1938 Wei, T., & Simko, V. (2017). *R package "corrplot": Visualization of a correlation matrix*.
1939 <https://github.com/taiyun/corrplot>
- 1940 Wickham, H. (2016). *Ggplot2: Elegant graphics for data analysis*. Springer-Verlag New
1941 York. <https://ggplot2.tidyverse.org>
- 1942 Wickham, H. (2019). *Stringr: Simple, consistent wrappers for common string operations*.
1943 <https://CRAN.R-project.org/package=stringr>
- 1944 Wickham, H. (2020a). *Forcats: Tools for working with categorical variables (factors)*.
1945 <https://CRAN.R-project.org/package=forcats>
- 1946 Wickham, H. (2020b). *Tidyr: Tidy messy data*.
1947 <https://CRAN.R-project.org/package=tidyr>
- 1948 Wickham, H., Averick, M., Bryan, J., Chang, W., McGowan, L. D., François, R.,
1949 Golemund, G., Hayes, A., Henry, L., Hester, J., Kuhn, M., Pedersen, T. L., Miller,
1950 E., Bache, S. M., Müller, K., Ooms, J., Robinson, D., Seidel, D. P., Spinu, V., ...
1951 Yutani, H. (2019). Welcome to the tidyverse. *Journal of Open Source Software*,
1952 4(43), 1686. <https://doi.org/10.21105/joss.01686>
- 1953 Wickham, H., & Bryan, J. (2019). *Readxl: Read excel files*.
1954 <https://CRAN.R-project.org/package=readxl>
- 1955 Wickham, H., François, R., Henry, L., & Müller, K. (2020). *Dplyr: A grammar of data*
1956 *manipulation*. <https://CRAN.R-project.org/package=dplyr>
- 1957 Wickham, H., & Hester, J. (2020). *Readr: Read rectangular text data*.
1958 <https://CRAN.R-project.org/package=readr>
- 1959 Wickham, H., & Seidel, D. (2020). *Scales: Scale functions for visualization*.
1960 <https://CRAN.R-project.org/package=scales>

- 1961 Wilke, C. O. (2020). *Cowplot: Streamlined plot theme and plot annotations for 'ggplot2'*.
1962 <https://CRAN.R-project.org/package=cowplot>
- 1963 Xie, Y. (2015). *Dynamic documents with R and knitr* (2nd ed.). Chapman; Hall/CRC.
1964 <https://yihui.org/knitr/>
- 1965 Yentes, R. D., & Wilhelm, F. (2018). *Careless: Procedures for computing indices of careless*
1966 *responding*.
- 1967 Yu, G. (2021). *Ggplotify: Convert plot to 'grob' or 'ggplot' object*.
1968 <https://CRAN.R-project.org/package=ggplotify>
- 1969 Zeileis, A., & Croissant, Y. (2010). Extended model formulas in R: Multiple parts and
1970 multiple responses. *Journal of Statistical Software*, 34(1), 1–13.
1971 <https://doi.org/10.18637/jss.v034.i01>