



The prospective power of personality for childbearing

A longitudinal study based on data from
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Abstract

Previous studies indicate that personality is associated with demographic processes such as mortality or family formation. However, research on the link between personality and fertility is relatively rare. In particular, longitudinal studies focusing on the predictive power of personality traits for childbearing are missing. The present study fills this gap by examining the predictive power of the Five Factor Model for the timing of the first and the second childbirth in Germany. Analyses are based on recent data (2005-2017) from the Socio-economic Panel Study. My findings from Cox Proportional Hazard Models demonstrate that personality associations with fertility differ between men and women. Contrary to previous research, no significant correlations between personality traits and fertility are found for females. Regarding extraversion, the present study shows evidence of positive associations with the first childbirth, and significant negative correlations with the second childbirth among males only. Furthermore, the analysis shows that agreeableness tends to accelerate the first and the second childbirth among men, but not among women. My study complements the current understanding of the personality-fertility association by exploring the impact of personality trait scores on subsequent fertility behavior. However, further research is needed to better understand the path from personality to childbearing; the mechanisms through which personality affects fertility; and how these links differ in various settings, such as in other cultures, for higher parities, or for births after re-partnering.

Keywords: Fertility, Personality, Five Factor Model, Timing of Childbirth

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Introduction

Previous research has shown that personality is correlated with family formation processes. It has, for example, been reported that extraversion increases the number of social contacts, which affects the chances of falling in love; whereas shyness is associated with lower chances of starting romantic relationships (Asendorpf & Wilpers 1998). Moreover, conscientiousness, extraversion, and agreeableness appear to be correlated with a higher probability of getting married, as well as with a younger age at first marriage; whereas openness has been linked to the opposite outcomes (Jokela et al. 2011; Lundberg 2012; Schmidt 2008). Additionally, studies have found that agreeableness and conscientiousness are associated with lower probabilities of relationship dissolution, while neuroticism and openness are correlated with higher probabilities (Lundberg 2012; Solomon & Jackson 2014). Furthermore, Sodermans and colleagues (2017) found that neurotic individuals tend to enter multiple subsequent relationships after divorce, whereas conscientious people do not. These results suggest that certain personality factors are correlated with partnership stability (Sodermans et al. 2017). However, most of the correlations reported above have been shown to vary between genders (e.g., Jokela et al. 2011; Lundberg 2012; Sodermans et al. 2017).

Although previous research has found an association between personality and family formation, the association between personality and childbearing is less explored. Some research on this topic has been done by Markus Jokela (2012) and colleagues, who found that leadership skills, extraversion, and agreeableness tend to be positively linked with fertility; whereas openness, neuroticism, and conscientiousness tend to be negatively associated with childbearing (Alvergne, Jokela, and Lummaa 2010; Jokela 2012; Jokela & Keltikangas-Järvinen 2009; Jokela et al. 2009; 2011). In the German context, previous research has shown that high self-esteem is linked with higher fertility, and that high levels of male aggressiveness are associated with lower fertility (Hutteman et al. 2013). In addition, research has indicated that correlations between personality and fertility differ between sexes; e.g., that extraversion is positively associated with fertility among males, but less so among females (Allen 2019; Jokela et al. 2009, 2011; Skirbekk & Blekesaune 2014).

The data situation in the past allowed researchers to focus on single facets of personality only, or to measure personality at the end of fertility history (Avison & Furnham 2015; Skirbekk & Blekesaune 2014; Tavares 2016). Additionally, most surveys collected personality information not before the early 2000s. For instance, the Socio-economic Panel Study (SOEP), the Health and Retirement Study (HRS), and the British Household Panel Survey (BHPS) did not start

collecting personality information until 2005 (SOEP, BHPS) or 2006 (HRS). Only a few earlier surveys, such as the Hawaii Personality and Health Cohort (1959-1967) or the Project Talent (1960), included personality information. This was also the case for the national registries of Sweden and Finland. However, these countries collected information on personality related to self-esteem and leadership skills as part of conscription data.

The present study contributes substantially to the existing research on personality and fertility outcomes. To my knowledge, this is the first study to examine the predictive power of personality traits from the Five Factor Model (FFM) on fertility over a 12-year follow-up period. This longitudinal design complements the current understanding of the link between personality and fertility, as previous research was either based on cross-sectional data (Alvergne, Jokela, and Lummaa 2010; Avison & Furnham 2015), used repeated measures with only two observations (Hutteman et al. 2013; Jokela et al. 2009; Jokela & Keltikangas-Järvinen 2009), or examined the correlation between personality and fertility at the end of a person's fertility history (Jokela et al. 2011; Skirbekk & Blekesaune 2014; Tavares 2016). Most researchers who have studied this topic are interested in the first childbirth only (Jokela et al. 2011; Tavares 2016). Some studies have examined the association between personality and higher birth orders as well, but they are not based on the FFM as a personality measure (Jokela et al. 2009; Jokela & Keltikangas-Järvinen 2009). The focus in this study on both the first and the second childbirth should provide deeper insights into the association between the FFM and childbearing. Regarding the German context, research on the link between personality and fertility is relatively rare. To my knowledge, the analysis by Hutteman and colleagues (2013) is the only study that used German data (PAIRFAM) to refer to this correlation, but it was based on personality traits such as self-esteem, shyness, and aggressiveness, and not on the FFM. The present study extends the current understanding of the personality-fertility link using German Survey data from the largest household-based Panel Study in Germany. Previous research on this association partly neglected males (Tavares 2016), although several studies have shown that the relation between personality and fertility differs by gender (Allen 2019; Skirbekk & Blekesaune 2014). Therefore, the results of this study are shown for the entire sample, as well as stratified by gender.

Theoretical Background

Personality is, by definition, the collection of thoughts, feelings, and behaviors that form an individual's distinctive character (Uher 2017). The individual combination of these facets accompanies people through various situations in their daily lives. One of the fundamental decisions people make over their life course is whether – and, if so, when – to have a child. When planning a pregnancy, an individual's personality will play an important role, as many factors need to be considered, such as the level of support from the person's social network, or the person's work situation (Bernardi & Klaerner 2014; Kaufman & Bernhardt 2012; McAllister et al. 2016; Pinquart et al. 2008). How people balance these factors depends very much on their individual personality. Conscientious people might plan very carefully whether and when to have a child, which would affect the timing of childbearing over their life course (Jokela et al. 2011; Tavares 2016). Agreeable people might aim for the closeness and coherence that having a child can provide, and might therefore be more motivated to start a family (Miller 1992). Extraverted individuals tend to create larger social networks, which can increase their chances of finding a partner with whom they might want to have a child (Asendorpf & Wilpers 1998). Neurotic individuals may think of specific reasons for or against having children. For instance, neurotic people tend to be emotionally unstable and might believe that they are unable to care for a child, which would lower their fertility (Skirbekk & Blekesaune 2014). On the other hand, neurotic people could see having a child as a stabilizing factor in their life, which would increase their fertility (Friedman et al. 1994; Tavares 2016).

Five Factor Model and Fertility

In psychological research, one particular model has been widely accepted as the most robust and reliable: namely, the Big Five Inventory (BFI), from which the Five Factor Model (FFM) has been developed (Ashton & Lee 2005). A helpful overview of the BFI history can be found in Goldberg (1993). The FFM consists of agreeableness, conscientiousness, extraversion, neuroticism, and openness to experience (McCrae & Costa 1987). Each of these dimensions covers a range of specific personality facets.

Agreeableness is the tendency towards being forgiving, sympathetic, friendly, and warm. This trait can be connected with fertility via various mechanisms. People report that personality facets like kindness and considerateness are among the characteristics they most desire in potential partners (Buss & Barnes 1986; Li et al. 2002). Additionally, agreeableness has been found to be positively associated with partnership quality and satisfaction (Holland & Roisman

2008; Orth 2013). Furthermore, it has been shown that less agreeable individuals tend to be more ambivalent about having children, which could lead to lower fertility (Pinquart et al. 2008). In line with this finding, nurturance (being sympathetic, helpful) and affiliation (enjoying time with other people, willing to make friends) – both correlated with agreeableness (Costa Jr. et al. 1991) – have been found to be positively associated with the motivation to have a child (Miller 1992). Therefore, in the present study, I expect to find a positive association between agreeableness and fertility.

Previous findings support this expectation. It has, for example, been shown that women with higher scores on agreeableness give birth to more children (Jokela et al. 2011), and are less likely to be childless; whereas these associations have not been found among men (Jokela 2012; Jokela et al. 2011; Tavares 2016). However, there is evidence that higher scores on agreeableness are associated with having children earlier in the life course among men, but not among women (Jokela et al. 2011).

Conscientious individuals are relatively well-organized, thorough, reliable, and hardworking. Some studies have suggested that conscientiousness has a negative impact on career outcomes (Boudreau et al. 2001; Bozionelos 2004; Gelissen & de Graaf 2006; Roberts & Bogg 2004). This could be explained by the focus of conscientiousness being on family rather than on work life (Elder Jr. & MacInnis 1983). Furthermore, conscientious individuals tend to have less ambivalence regarding general decision-making, higher levels of relationship quality and happiness, as well as lower risks of infidelity (Germeijs & Verschueren 2011; Holland & Roisman 2008; Orth 2013; Orzeck & Lung 2005). Thus, conscientiousness might be positively related to fertility (Jokela & Keltikangas-Järvinen 2009). On the other hand, conscientious individuals tend to clearly define their career goals (Judge & Ilies 2002), and feel more satisfied with their job (Sutin et al. 2009). Thus, experiencing conflicts between work and family could cause more career-oriented women to have lower fertility, or to postpone having children (Blossfeld & Huinink 1991; Gustafsson 2001; Skirbekk 2008; Van Bavel 2010). Therefore, in the present study, I expect to observe a negative association between conscientiousness and fertility.

This expectation is reinforced by previous research (Allen 2019), which found that conscientious individuals, and particularly females, tend to have fewer children (Jokela et al. 2011; Skirbekk & Blekesaune 2014). In line with this finding, it has been reported that

conscientious women have a lower likelihood of having a first child, but that conscientious men do not (Jokela et al. 2011).

Extraversion is defined as being sociable, talkative, active, and dominant. Extraverted people might have higher fertility because they have greater chances of establishing larger social networks with closer relationships (Neyer & Asendorpf 2001; Schmitt and Shackelford 2008). In line with this assumption, it has been shown that extraversion is positively associated with the number of sex partners a person has over time (Allen & Desille 2017; J. D. Miller et al. 2004; Nettle 2005, 2006; Schmitt 2004). Furthermore, being highly extraverted has been linked to a lower age at first marriage (Jokela et al. 2011), as well as a higher probability of being in a higher order marriage (Nettle 2005). High levels of extraversion have also been linked to having fewer difficulties with decision-making (Germeijs & Verschuere 2011), which could affect decisions regarding childbearing. More extraverted individuals report higher levels of relationship satisfaction, which could increase their partnership stability, and their fertility (Holland & Roisman 2008; Orth 2013). Consequently, in the present analysis, I expect to find a positive correlation between extraversion and fertility. However, extraversion is also positively associated with infidelity (Orzeck & Lung 2005), which might result in lower levels of partnership stability and fertility.

According to previous studies, among all personality traits of the FFM, extraversion has the strongest associations with sexual and fertility behavior (Allen 2019). High scores on this personality trait have been linked to a higher probability of having a first child (Jokela et al. 2011), earlier childbearing (Jokela et al. 2011; Tavares 2016), and lower rates of childlessness (Avison & Furnham 2015) for both sexes. However, previous research also reveals stronger extraversion associations with fertility among males. It has, for example, been shown that extraverted men tend to have a higher number of children, whereas no such correlation has been reported for women (Allen 2019; Jokela et al. 2011; Skirbekk & Blekesaune 2014).

Neurotic people tend to be nervous, emotionally unstable, insecure, and moody. Higher scores on neuroticism have been negatively linked with relationship quality and satisfaction (Donnellan et al. 2004; Fisher & McNulty 2008; Karney & Bradbury 1997; Malouff et al. 2010; McNulty 2008). More neurotic individuals have higher depression scores (Gershuny & Sher 1998). They tend to worry a lot about their partnership and might decide to not have a child since parenthood could be experienced as a burden for the relationship (Lillard & Waite 1993). This reluctance could result in delays in childbearing or the decision to have fewer children

(Jokela et al. 2009). Conversely, neurotic individuals may choose to have children to improve their own (life) stability in the future (Friedman et al. 1994; Johns et al. 2011). The previous findings are contradictory, but for the present study, a negative association between neuroticism and fertility is assumed.

Empirically, the link between neuroticism and fertility is less clear, but seems to be more important for females than for males. On the one hand, researchers have found negative correlations between neuroticism and the probability of having children for both sexes (Jokela 2012). In line with these findings, it has been shown that more neurotic women have fewer children over the life course (Jokela et al. 2011). On the other hand, it has been reported that females with higher neuroticism scores tend to enter parenthood earlier in the life course (Jokela et al. 2011; Tavares 2016).

People who are open to experiences tend to be creative, imaginative, curious, and broad-minded. This trait is associated with higher education and cognitive functioning (Wainwright et al. 2008), both of which are negatively linked with fertility outcomes (Hopcroft 2006; Retherford & Sewell 1989; Skirbekk 2008). Furthermore, higher openness scores are associated with a lower risk of early sex debut and a lower number of unprotected sex acts (Miller et al. 2004). Additionally, openness is negatively correlated with traditional attitudes (McCrae 1996; Van Hiel & Mervielde 2004). These values are positively linked with higher fertility, in particular for women (Holton et al. 2009; Kaufman 2000; Puur et al. 2008). Another mechanism through which openness can be connected with fertility is marital behavior. Jokela and colleagues (2011) found that openness tends to delay first marriage and reduce the probability of first marriage, which could reduce fertility. It has also been shown that higher openness scores are associated with a lower risk of early childbearing (Miller et al. 2004) and a higher risk of unfaithfulness (Orzeck & Lung 2005). Therefore, in this study, I expect to observe a negative association between openness and fertility.

Previous studies support this expectation. Having a higher openness score has been found to delay the first childbirth, particularly among women (Miller et al. 2004; Jokela et al. 2011; Tavares 2016); to decrease the probability of having children for both sexes (Jokela 2012; Jokela et al. 2011); and to reduce the number of children for both sexes (Jokela et al. 2011), or only among males (Skirbekk & Blekesaune 2014).

This brief overview of previous research could lead the reader to conclude that the correlation between the FFM and fertility is well understood. However, these previous studies have

fundamental weaknesses that do not allow for comprehensive conclusions about this association. One of these weaknesses has been the use of cross-sectional data (Alvergne, Jokela, and Lummaa 2010; Avison & Furnham 2015). Other studies based on longitudinal data had another key limitation: they collected data on personality at the end of people's fertility histories (Jokela 2012; Jokela et al. 2011; Skirbekk & Blekesaune 2014; Tavares 2016). This approach is problematic, as it does not account for the possibility that an individual's personality might change after having children. It is, for example, possible that a person's level of conscientiousness increased after the first childbirth. Therefore, these analyses face problems of reverse causality. This study builds on the strengths of previous studies, while overcoming most of their weaknesses.

Data and Methods

SOEP Data

This study uses data from the German Socio-Economic Panel Study (SOEP). The SOEP is the largest multidisciplinary follow-up survey in Germany regarding the number of participants. It is conducted by the German Institute for Economic Research (DIW), and provides information about German households and their members since 1984. Each year, approximately 30,000 individuals from around 14,000 households participate in this study (Britzke & Schupp 2018). In an effort to achieve greater representativeness, a number of subsamples and refreshments have been implemented over time. For instance, East Germans were included starting in 1990 in order to represent the country's total population after German reunification (Goebel et al. 2019). More details on all of the subsamples of the SOEP and their sizes can be found in Siegers, Belcheva, and Silbermann (2019). The SOEP provides data on a range of topics, including household composition, employment, and educational history; as well as on health and subjective indicators, like personal attitudes, and self-reported personality (Goebel et al. 2019).

Study Design

The present study focuses on the link between personality traits and the transition to the first and the second childbirth. The SOEP provides information on a monthly basis about childbirths and birth parity. Therefore, the data allow me to look at the first and the second childbirth separately. Analyses of higher birth orders were conducted as well, but are not shown here

because the confidence intervals were relatively large due to the very low number of such events over time. Therefore, two study samples were obtained. The first sample is used to examine the transition from being childless to (potentially) having a first child. It consists of individuals who had not entered parenthood before the first time the personality information was collected. Therefore, all respondents at risk must have been childless in 2005 (first wave including personality items), although they could have entered the study at a later point in time; e.g., in 2009, when the SOEP collected personality information for the second time. These individuals were followed until their first childbirth or the end of the study (after reaching 2017 or dropping out for any reason) – whichever came first. The second sample is used to study the transition to the second childbirth. The respondents in this sample are those who were considered at risk of having a second child nine months after the first childbirth, and for whom personality information is available. This sample includes all respondents who had a first child before 2005, or who had their first child during the study period, and were followed thereafter. As with the first sample, the individuals in the second sample were followed until their second childbirth or the end of the study. Both samples were right-censored for two reasons. First, age 50 is assumed to mark the end of fecundability for women, based on an international comparison of the mean ages at menopause (Thomas et al. 2001). While men are not subject to this biological restriction, having a child after age 50 was very rare among the men in this sample. Therefore, observations for both females and males over 50 years of age were excluded. Furthermore, the data were right-censored, since not all participants gave birth to a first or a second child by the end of the study. The applied Cox PH model could capture the problem of right-censoring as well as left-truncation, which occurred when individuals had a first or a second childbirth before the onset of the study, and were therefore excluded from the analyses.

Personality-related information has been available every four years since 2005. Since personality served as a predictor in this study, the childbirths had to have taken place after the personality information had been collected. Therefore, first childbirths before 2005 were not considered in the analysis on the age at first childbirth. Similarly, the individuals at risk of having a second childbirth were included in the analysis only if personality information was available for them. Personality values could change when new information was collected, but they were assumed to remain constant for the time between two observations of personality. This approach is in line with previous literature showing that personality remains relatively

stable over short time intervals (Ardelt 2000; Lucas & Donnellan 2011; Hopwood & Bleidorn 2018).

Personality Measure

The SOEP contains 15 items belonging to the FFM personality traits. The adjectives rude (reversed), forgiving, and kind reflect the trait “agreeableness”; (A) whereas thorough, lazy (reversed), and efficient reflect the characteristic “conscientiousness” (C). Talkative, sociable, and reserved (reversed) can be linked to “extraversion”; (E) and worrying, nervous, and relaxed (reversed) are associated with “neuroticism” (N). The assessment of “openness to new experiences” (O) is based on the adjectives original, valuing, and imaginative. The original version of the FFM covers more than these 15 items. However, previous research has shown that this short version can still be considered representative of the FFM (Boyce et al. 2016; Donnellan & Lucas 2008). Factor analyses have shown that the single facets belong to the personality traits, as indicated by factor loadings ranging from 0.35 to 0.68. Participants could answer the item “I am somebody who is...” by using a Likert scale ranging from one (not applicable at all) to seven (completely applicable). Missing values were excluded from these analyses. Thus, the study samples only contained observations with information on all three trait-specific items for each personality factor. In this case, the scores of these facets were summed up, and the mean was calculated for the respective individual and year. The mean values could range from one (trait does not suit the respondent at all) to seven (trait fits completely). Eventually, all of the personality trait variables were standardized (mean=0, standard deviation=1). Cronbach’s Alpha was used to measure the internal consistency of personality traits over time. Given that the Alpha depended on the number of tested items (Sijtsma 2009; Tavakol & Dennick 2011) and the SOEP only provided three items per trait, the low values of some of the facets were reasonable (A: 0.49; C: 0.61; E: 0.73; N: 0.64; O: 0.60). Additionally, the Intraclass Correlation Coefficients (ICC) were calculated to check the reliability of the personality measures over time. The results indicate that the coefficients were above 0.5 (A: 0.53; C: 0.55; E: 0.66; N: 0.59; O: 0.60), which can be interpreted as a moderate level of consistency (Koo & Li 2016).

Control Variables

Gender (“Female”, “Male”) was included as a time-independent covariate, and as a stratification factor based on inconsistent findings from previous research. Missing values for gender and all other covariates were excluded. Since age was the time scale of these analyses, a constant age-related covariate was included in the models: the year of birth. Previous research has shown that personality can change, particularly at younger ages (Hopwood & Bleidorn 2018; Specht et al. 2011). Among most people, a process of maturation – i.e., of increasing conscientiousness and agreeableness, as well as decreasing neuroticism – can be observed with age (Borghuis et al. 2017). Therefore, controlling for the birth year as an age measure can broaden our knowledge about the personality-fertility link.

Additionally, numerous studies have reported a link between education and fertility. Highly educated individuals tend to have lower fertility (Sobotka, Beaujouan, and Van Bavel 2017) and to postpone childbirths (Monstad et al. 2008). Furthermore, education appears to be associated with personality (Meyer et al. 2019; Sutin et al. 2017). Previous research has demonstrated the predictive power of personality for educational attainment, and that this association is stronger than the reverse relationship. Therefore, education – measured in years (centered around 13 years of education) and enrolment status – serves as a mediator for the link between personality and fertility (Sutin et al. 2017). A similar picture can be drawn for the association between personality and civil (relationship) status. Personality can predict relationship status, but partnerships do not change personality much (Neyer & Asendorpf 2001). However, the connection between divorce and personality is unclear (Bleidorn et al. 2018). Regarding fertility, the role of partnership status is well understood (Balbo et al. 2013): fertility is higher for married than for cohabiting couples (Baizán et al. 2003; Brien et al. 1999; Spéder & Kapitány 2009). Consequently, civil status (“Single”, “Cohabited”, “Married”, “Divorced/Widowed”) is included as another mediator in these analyses.

Income has been shown to have strong negative associations with fertility (Bar et al. 2018; Córdoba & Ripoll 2016). However, there is evidence indicating that higher income groups have increased their fertility in recent decades. This means that this correlation might have flattened instead of following a linear trend (Bar et al. 2018). Consequently, income (standardized logarithm of gross income in previous year) is included as a time-varying covariate.

Recent research has pointed to the potential influence of family background on fertility. Thus, ignoring family background can bias the results (Kramarz, Skans, and Rosenqvist 2019).

Family background includes the parents' fertility (Dahlberg & Kolk 2018) and education (Chen 2016). For this reason, the highest maternal and paternal school degree ("No degree", "Secondary school degree", "Intermediate school degree", "Technical or upper secondary school degree", and "Other degree") are included in the analysis. The associations between further family-related information (parental religiosity, number of own siblings) and fertility were checked but not listed, since most of them were not significant, and the personality trait coefficients did not change much.

At the starting point of this study (2005), the fertility rates in the former East Germany were lower than those in the former West Germany (Destatis 2020). Since 2005, the fertility levels in some states of the former East Germany have exceeded those in several states of the former West Germany. Over the past few years, the fertility levels of the two regions have converged (Destatis 2019). Consequently, region has been included in the present analysis, although the personality traits of East and West Germans do not seem to differ (Schimmack et al. 2008).

Statistical Methods

Cox Proportional Hazards (Cox PH) Survival analyses were performed to examine the link between personality traits and the timing of first and second childbirth. Equation (1) represents the model of the present analyses:

$$h(t|X_1, \dots, X_p) = h_0(t) * \exp(\beta_0 + \beta_1 Agree_i + \beta_2 Conscient_i + \beta_3 Extra_i + \beta_4 Neuro_i + \beta_5 Open_i + \beta_6 Gender_i + \beta_7 AgeBaseline_i + \beta_8 YearsEdu_i + \beta_9 EnrolStat_i + \beta_{10} CivilStat_i + \beta_{11} logIncome_i + \beta_{12} EduMom_i + \beta_{13} EduDad_i + \beta_{14} Region_i) + \varepsilon_i \quad (1)$$

The expression $h(t|X_1, \dots, X_p)$ represents the hazard rate for each respondent depending on time point t and vectors of considered covariates X_1, \dots, X_p . This rate is the product of the baseline hazard $h_0(t)$ and the exponentiated sum of covariate terms, where β_0 is the estimated intercept and $\beta_1 \dots \beta_{14}$ are the estimated coefficients of the covariates. The expression ε_i represents the error term. The underlying time scale of this model is age in months until the event (first or second childbirth). Individuals are followed until they experience the event or drop out of the study, or until the end of the study in 2017. Since SOEP is a household-based panel, this analysis adjusts for cluster effects coming from households using robust standard errors. Statistical and graphical tests using Schoenfeld residuals reveal no violation of the

proportionality assumption. In order to compare the results for men and women, statistical analyses are stratified by gender.

In further analyses, the formula above is extended to control for interactions. For this purpose, the product of factors from the model is included. The focus of the present study is on two-way interactions; i.e., interaction terms consisting of two factors only. As our main interest is in examining personality-related interactions, only personality traits are interacted with each other. This approach provides further insight into the personality-fertility association.

Results

Descriptive Results

The first sample contains individuals who were childless when their personality information was first collected (2005, 2009, or 2013). These participants either remained childless over time, or they gave birth to a first child between 2005 and 2017. Information is available for 5,758 participants and 28,008 observations in total. During the considered time period, 1,065 first childbirths were observed. Table 1 shows the mean values (before standardization of personality traits) and the frequencies of all included characteristics for the total sample, as well as stratified by gender. In general, the mean values of the personality traits are relatively high. In Sample 1, they range from 3.75 (neuroticism) to 5.61 (conscientiousness) on scales from one to seven. Women have higher mean values for all personality traits. The significance of these differences was tested by z-tests, which showed that women and men differ significantly for all five factors. The largest differences can be observed for neuroticism (females: 4.08 vs. males: 3.48). The most similar mean values can be found for conscientiousness (5.69 vs. 5.54).

Table 1: Descriptive Statistics (Sample 1)

Sample 1 - Age at first childbirth

Individuals:		5,758							
Observations:		28,008							
Events:		1,065							
<i>Baseline characteristics</i>					<i>Females</i>		<i>Males</i>		
Variable		Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Mean	Std. Dev.
Agreeableness		5.34	0.95	1	7	5.47	0.92	5.23	0.96
Conscientiousness		5.61	0.98	1	7	5.69	0.94	5.54	1.01
Extraversion		4.96	1.17	1	7	5.11	1.15	4.82	1.18
Neuroticism		3.75	1.22	1	7	4.08	1.20	3.48	1.17
Openness		4.65	1.16	1	7	4.78	1.17	4.55	1.13
Years of Education		12.63	2.59	7	18	12.87	2.57	12.43	2.59
Birth Year				1956	1995				
Income (log)		9.21	1.35	3.91	13.05	9.06	1.37	9.33	1.32
				N	%	N	%	N	%
Gender	Female			2,656	46.13	-	-	-	-
	Male			3,102	53.87	-	-	-	-
Enrolment Status	Not enrolled			3,669	63.72	1,593	59.98	2,076	66.92
	Enrolled			2,089	36.28	1,063	40.02	1,026	33.08
Civil Status	Single			3,598	62.49	1,572	59.19	2,026	65.31
	Cohabited			1,198	20.81	621	23.38	577	18.60
	Married			855	14.85	420	15.81	435	14.02
	Divorced/Widowed			107	1.86	43	1.62	64	2.06
Maternal Education	No Degree			172	2.99	79	2.97	93	3.00
	Secondary Degree			2,207	38.33	965	36.33	1,242	40.04
	Intermediate Degree			2,095	36.38	993	37.39	1,102	35.53
	Upper Secondary Degree			974	16.92	476	17.92	498	16.05
	Other			310	5.38	143	5.38	167	5.38
Paternal Education	No Degree			155	2.69	81	3.05	74	2.39
	Secondary Degree			2,404	41.75	1,060	39.91	1,344	43.33
	Intermediate Degree			1,508	26.19	712	26.81	796	25.66
	Upper Secondary Degree			1,372	23.83	673	25.34	699	22.53
	Other			319	5.54	130	4.89	189	6.09
Region	West			4,625	80.32	2,187	82.34	2,438	78.59
	East			1,133	19.68	469	17.66	664	21.41

Sample 2 refers to all participants with one child and their personality information. The sample consists of 2,740 individuals and 11,475 observations. 716 second childbirths were recorded.

Compared to the participants in Sample 1, the participants in Sample 2 had slightly higher personality scores (except on openness). In particular, increasing conscientiousness can be observed (Sample 1: 5.61 vs. Sample 2: 5.89). Other differences between the two samples can be detected for education and civil status: 36.28% of the participants in Sample 1, but only 5.22% of the participants in Sample 2, were enrolled in an education program. Furthermore, the civil status shifted from mainly living alone (62.49%) in Sample 1 to being married in Sample 2 (67.92%). Further details referring to Sample 2 can be seen in Table 2.

Table 2: Descriptive Statistics (Sample 2)

Sample 2 - Age at second childbirth

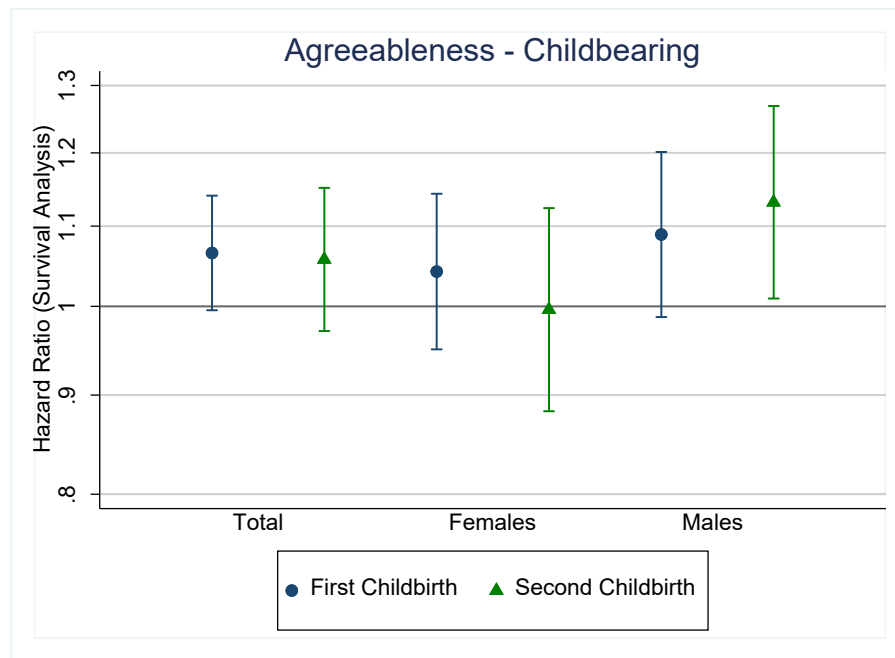
Individuals:		2,740							
Observations:		11,475							
Events:		716							
<i>Baseline characteristics</i>					<i>Females</i>		<i>Males</i>		
Variable		Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Mean	Std. Dev.
Agreeableness		5.40	0.94	1	7	5.50	0.92	5.26	0.94
Conscientiousness		5.89	0.89	2	7	5.94	0.87	5.82	0.91
Extraversion		4.98	1.12	1.33	7	5.07	1.11	4.87	1.12
Neuroticism		3.83	1.22	1	7	4.08	1.20	3.51	1.16
Openness		4.57	1.16	1	7	4.69	1.20	4.43	1.09
Years of Education		13.07	2.73	7	18	13.14	2.69	12.99	2.78
Birth Year				1956	1995				
Income (log)		9.77	1.13	3.69	13.14	9.37	1.15	10.29	0.87
				N	%	N	%	N	%
Gender	Female			1,532	55.91	-	-	-	-
	Male			1,208	44.09	-	-	-	-
Enrolment Status	Not enrolled			2,597	94.78	1,452	94.78	1,145	94.78
	Enrolled			143	5.22	80	5.22	63	5.22
Civil Status	Single			207	7.55	162	10.57	45	3.73
	Cohabited			590	21.53	341	22.26	249	20.61
	Married			1,861	67.92	963	62.86	898	74.34
	Divorced/Widowed			82	2.99	66	4.31	16	1.32
Maternal Education	No Degree			104	3.80	49	3.20	55	4.55
	Secondary Degree			1,385	50.55	752	49.09	633	52.40
	Intermediate Degree			817	29.82	478	31.20	339	28.06
	Upper Secondary Degree			316	11.53	189	12.34	127	10.51
	Other			118	4.31	64	4.18	54	4.47
Paternal Education	No Degree			87	3.18	44	2.87	43	3.56
	Secondary Degree			1,385	50.55	760	49.61	625	51.74
	Intermediate Degree			686	25.04	405	26.44	281	23.26
	Upper Secondary Degree			457	16.68	262	17.10	195	16.14
	Other			125	4.56	61	3.98	64	5.30
Region	West			2,020	73.72	1,115	72.78	905	74.92
	East			720	26.28	417	27.22	303	25.08

Survival Models

In the following, results from Cox PH Survival Models are shown for each trait from the FFM separately. Each graph displays point estimates of hazard ratios (HR) and the corresponding 95%-confidence intervals. Ratios above one indicate a higher likelihood and an acceleration of childbearing, with an increasing score on the respective standardized personality scale. Point estimates below one suggest lower chances of childbearing and postponement in childbearing with higher standardized scores. Each graph contains information about the total sample, females and males after controlling for gender, birth year, education variables, civil status, income, parental education, and region. Results are shown for the first and the second childbirth. The y-scale is logarithmic for visualization reasons, and its range can vary according to trait-specific results. Estimated coefficients of all considered covariates for the total sample and for women and men are listed in Tables 3 and 4 in the appendix.

Figure 1 shows the point-estimated HR of the association between agreeableness and childbearing for the total sample, as well as for women and men. Among the total sample, agreeableness tends to accelerate childbearing, which meets our expectations. The HR is 1.07 for first childbirths and 1.06 for second childbirths. These findings are mainly based on results among males, for whom a weakly significant coefficient of 1.09 is found for the first, and a significant one for the second childbirth (HR: 1.13). For women, no significant associations between agreeableness and the first or second childbirth can be found (HR: 1.04 and 1.00). In general, agreeableness appears to have positive associations with childbearing across the samples.

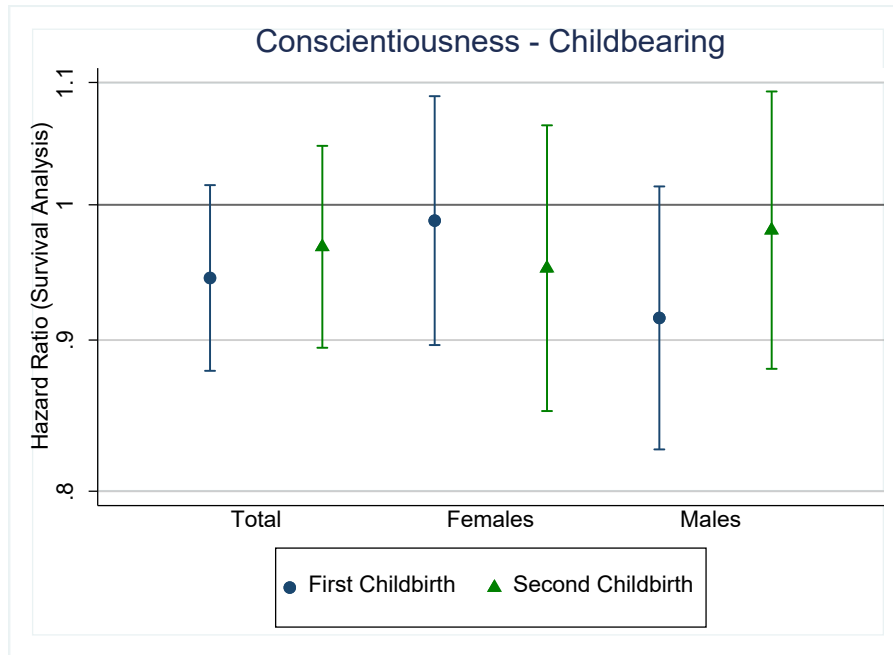
Fig. 1: Hazard Ratios Agreeableness - Childbearing



Note: Controlled for: gender (total sample), birth year, education (years and enrolment status), civil status, income, region, parental education

I expected to find a negative correlation between conscientiousness and childbearing. However, Fig. 2 shows that there are non-significant associations between this trait and the first and second childbirth among all samples. Only a very weak tendency can be detected across the total sample and the males suggesting a negative correlation between conscientiousness and the first childbirth (HR: 0.94). Again, these trends are found among men (HR: 0.92), but not among women. However, as the standard errors are relatively large, only weakly significant conclusions can be drawn. For the second childbirth, conscientiousness does not seem to play a role for any (sub-)sample.

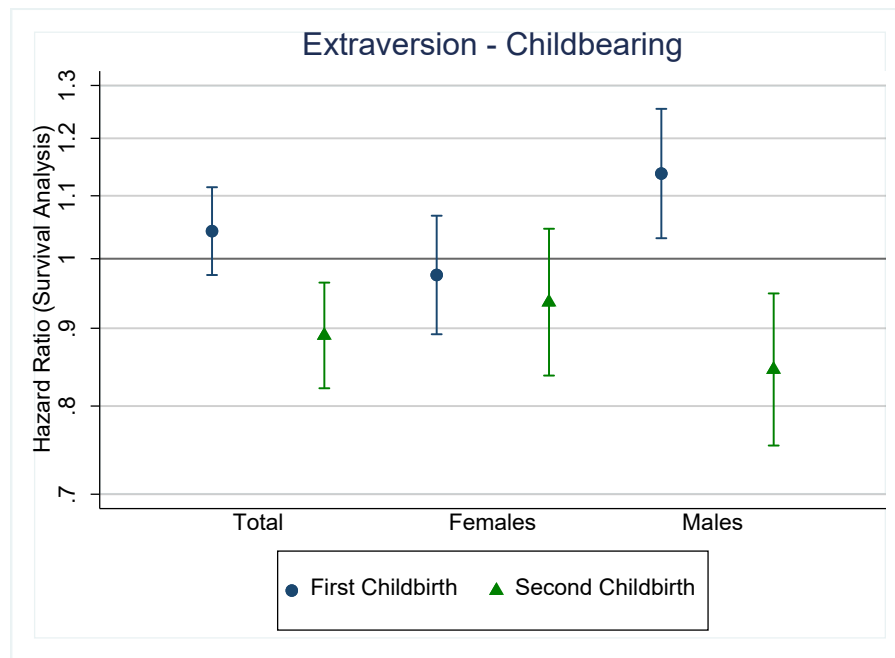
Fig. 2: Hazard Ratios Conscientiousness - Childbearing



Note: Controlled for: gender (total sample), birth year, education (years and enrolment status), civil status, income, region, parental education

Extraversion was expected to accelerate childbirths in the present study. This trait reveals the most striking association with childbearing among all personality traits, as illustrated in Fig. 3. It shows a positive, albeit non-significant coefficient (HR: 1.04) with the first childbirth among the entire sample. With respect to the second childbirth, however, a significantly negative link can be found among the total sample (HR: 0.89). Therefore, it appears that higher extraversion scores lead to postponements of second childbirth, which contradicts my expectations. These correlations are mainly based on the findings among males, for whom a strong positive association between extraversion and the first childbirth (HR: 1.14), but a negative link between extraversion and the second childbirth, are found (HR: 0.85). Contrary to my expectations, no correlations between extraversion and childbearing are observed among women.

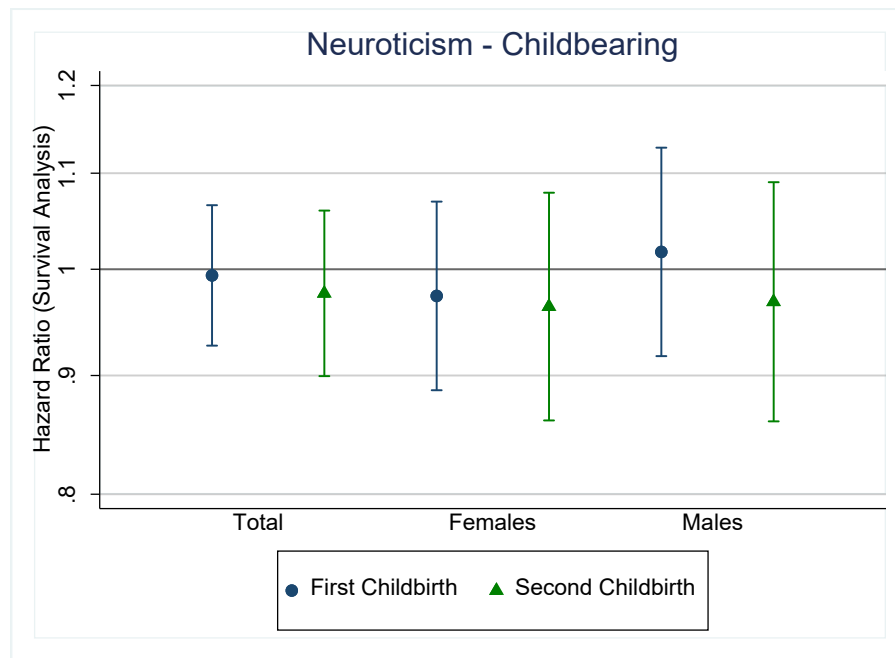
Fig. 3: Hazard Ratios Extraversion - Childbearing



Note: Controlled for: gender (total sample), birth year, education (years and enrolment status), civil status, income, region, parental education

Furthermore, it was assumed that neuroticism is negatively associated with childbearing. The correlations between neuroticism and childbearing are shown in Fig. 4. The findings do not confirm these expectations. As the results presented below indicate, neuroticism is not found to be linked with childbearing at all. This is the case for the total sample, males and females with respect to both the first and the second childbirth.

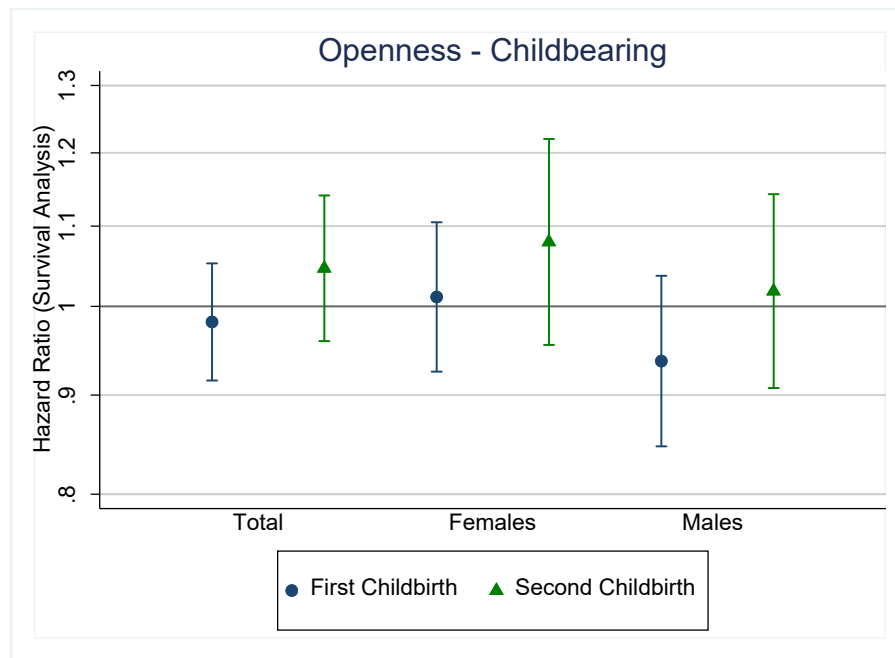
Fig. 4: Hazard Ratios Neuroticism - Childbearing



Note: Controlled for: gender (total sample), birth year, education (years and enrolment status), civil status, income, region, parental education

Moreover, I expected to find that openness was negatively related to childbearing. However, as Fig. 5 shows, this trait is not found to be correlated with the first childbirth. Additional analyses have shown that a possible negative association (HR: 0.90) vanishes when civil status is included in the model. If a negative link exists at all, it is for males (HR: 0.94). However, the confidence intervals are relatively large. For the second childbirth, a positive but not significant relationship can be observed across all samples, and in particular for women (HR: 1.08).

Fig. 5: Hazard Ratios Openness - Childbearing



Note: Controlled for: gender (total sample), birth year, education (years and enrolment status), civil status, income, region, parental education

Further analyses

Several robustness checks were conducted in addition to those that were already mentioned (e.g., ICC, Schoenfeld residuals). Multicollinearity among covariates was tested by a set of correlation measures between variables (Phi coefficient, Cramer's V, Spearman's and Pearson's correlation coefficients). These measures did not indicate multicollinearity within the present analyses, as Table 5 (first childbirths) and Table 6 (second childbirths) in the appendix show. Tests using Cox-Snell residuals indicate that the Cox model fits the data to an acceptable degree. Additional checks were performed for the effects of mediators and moderators. The models without these kinds of variables did not differ greatly in their personality trait coefficients.

All the models were run again while including interaction effects. Table 7 in the appendix shows the coefficients of the interaction terms among the personality traits for both the first and the second childbirth. All of the coefficients come from full models, including all of the covariates, and are listed with their corresponding 95%-confidence intervals. In particular, the association between extraversion and neuroticism is of interest, as different correlations have been suggested by the previous literature (Eaves et al. 1990; Jokela et al. 2011). For first

childbirths in Germany, no association between these traits can be found. For second childbirths, there is a significantly positive link between extraversion and neuroticism; i.e., among neurotic individuals, a stronger positive association with the second childbirth is found when the extraversion level is high. This finding contradicts the results reported by previous authors that there is a negative or no interaction effect between these two traits (Eaves et al. 1990; Jokela et al. 2011). Furthermore, conscientiousness and neuroticism are found to be negatively associated with respect to second childbirths. Therefore, it appears that neurotic individuals combine decreasing fertility with higher conscientiousness.

Regarding gender-specific interactions, several differences are found. Within the first sample, stronger positive openness correlations with fertility are observed for more agreeable women, whereas a negative but weakly significant interaction between these traits is found for males ($p < 0.1$). Furthermore, extraversion and openness are interacted positively for women, but no association can be detected among men. Among males, however, a negative interaction between conscientiousness and openness can be found, which indicates that among less conscientious males, there are stronger positive associations between openness and fertility.

Additional analyses using personality types instead of separate personality traits were run to examine potential correlations between personality trait combinations and fertility. Personality types were created based on Ward's hierarchical clustering procedure, as suggested by previous studies (Barbaranelli 2002; Perkins et al. 2013). However, the results show that there are no clear differences between certain personality types, regardless of whether the approach uses three, four, or five personality clusters. This is found to be the case among the entire sample, men and women for both the first and the second childbirth. Additionally, Poisson regression models were conducted to analyze the correlation between personality factors and the number of children. This perspective complements the present study, which focuses on the age at childbirth and the probability of having a first or a second child only. However, the number of children cannot be considered under a prospective design because the data follow-up is still not sufficiently extensive. Therefore, the number of children at the end of each individual's fertility history – i.e., above 40, 45, and 50 years of age – is used. The results indicate that agreeableness and extraversion are positively related to the number of children, whereas conscientiousness and openness are linked with having fewer children. The findings with respect to women are of particular interest, as significant fertility associations can be found with agreeableness (pos.), conscientiousness (neg.), and extraversion (pos.). This implies that personality can be correlated with fertility among women, a finding that did not emerge from the prospective

analyses of the present study. Why personality would be linked with the number of children a woman has, but not with the timing of her first and second childbirth, is a question that remains open. This could be explained by the point in time when the information on personality was collected (before childbirth vs. at the end of fertility history), since having and raising children can affect personality as well.

Discussion

This study examined the association between personality traits from the FFM and childbearing in Germany over a 12-year follow-up period. Based on German data from the SOEP, the findings indicated that agreeableness tended to accelerate the first childbirth, whereas conscientiousness, neuroticism, and openness did not affect childbearing after controlling for sociodemographic covariates. Extraversion was shown to have the most striking correlations with fertility. This trait tended to be positively connected with the first, but had significantly negative associations with the second childbirth. These results were mainly driven by males, as the personality traits of females did not appear to affect their childbearing. These gender-specific findings are partly in line with previous research. The strong and positive extraversion associations found among males but not among females may be attributed to the positive correlations of this trait with the number of sexual partners among men, but not among women (Allen & Desille 2017). Among males, there was weakly significant evidence that agreeableness accelerated the first and the second childbirth. For the other personality factors of conscientiousness, neuroticism, and openness, no correlations with childbearing were found. Again, this corresponded only partly with the findings of previous studies that uncovered correlations between agreeableness (positive) and fertility, as well as between conscientiousness (negative) and fertility (Allen 2019). However, no existing study has found significant associations between traits from the FFM and fertility only for males, and not for females. The findings of the present study indicate that females might choose to enter motherhood independent of their personality traits, whereas men seem to enter fatherhood due to specific personality dimensions. The different results for the first than for the second childbirth might be explained by the differences between these transitions. It may be the case that the transition from being childless to being a parent is characterized by larger adjustments in daily life than the transition to having a second child. When their first child is born, the social life of extraverted individuals could be restricted by their child care responsibilities, which may

prevent them from meeting with their friends. Therefore, these people could be trying to get their previous social life back by postponing the second childbirth, if they experience it at all.

To investigate whether the associations between personality and childbearing differed for specific groups, several models with interaction terms were run. The results showed that taking openness into account could help us better understand the transition to the first childbirth in Germany. This trait was found to interact positively with agreeableness and extraversion among females. The more open women were, the more positive the correlation was between agreeableness/extraversion and childbearing. Why these specific correlations were associated with higher fertility must remain a matter for speculation. Perhaps openness in combination with agreeableness and extraversion represent a desirable set of personality factors in a potential partner for men, which led to increased fertility for this group of women. It is also possible that individuals might consider these characteristics specifically worth passing on to offspring. Furthermore, openness was found to interact negatively with conscientiousness among males for the first childbirth, which indicated that conscientiousness had a decreasing impact on the first childbirth with higher levels of openness. The men with this combination of traits tended to be highly creative and imaginative, but less structured and organized, which might have made them less promising as potential fathers from a woman's perspective. Regarding the second childbirth, a significant, negative interaction term could be found between neuroticism and conscientiousness among the total sample. The more conscientious but less neurotic individuals were more likely to have a second childbirth. Again, the explanations for the interaction of these traits remain unclear. It could be argued that people who are less inclined to worry about life challenges, while also having a more structured character, may find it easier to plan to have a second childbirth over their life course.

Over the study period of the present analyses (2005-2017), the total fertility rate in Germany increased from 1.36 to 1.57 (Human Fertility Database 2020). In general, fertility has increased more among older people than it has decreased among younger people (Human Fertility Database 2020). Another possible explanation is that the number of immigrants, who usually have higher fertility levels than the indigenous population, increased over this period (Schmid & Kohls 2010). However, changes in personality traits across generations may have contributed to these trends as well. Indeed, Jean M. Twenge, in collaboration with others, observed for the U.S. context that several personality facets, such as anxiety/neuroticism, self-esteem, and narcissism, changed over time across generations of college students and children (Twenge 2000; Twenge et al. 2008; Twenge & Campbell 2001). In particular, Twenge found

that extraversion levels increased over time across generations of students in the U.S. (Twenge 2001). These changes in personality factors were identified among U.S. college students during the last decades of the 20th century only. However, it is reasonable to assume that similar developments have taken place in other societies as well, such as in Germany, although the empirical evidence that this is the case is missing. Personality changes on the population level are shaped by the societal context, as Twenge suggested in her studies. However, these changes can also affect fertility levels in the long run. If, for instance, people are encouraged to be more sociable and talkative – i.e., more extraverted – this could improve their chances of meeting a potential partner for a romantic relationship, which could increase their fertility.

The present study has several strengths and limitations. On the one hand, this study did not address certain issues, such as personality associations among higher birth orders. The sample sizes and number of events for third or higher order childbirths were too small to allow us to draw significant conclusions about the link between personality and fertility for these births. However, previous research has suggested that for higher parities, the associations between childbirth and personality traits might be different (Jokela et al. 2009; Jokela & Keltikangas-Järvinen 2009). To examine these questions, larger datasets are required. Another limitation of this study is that the respondents' personality traits were considered separately, even though each individual had all of these dimensions. Additional analyses did not reveal associations between personality clusters and the first or the second childbirth, but correlations with other fertility outcomes, such as number of children, remain to be explored. Therefore, personality types that include these five factors might be the focus of future research (Barbaranelli 2002; Cragar et al. 2005; Sava & Popa 2011). Moreover, there were some conceptual problems that could not be resolved within the present analyses. For instance, this study did not distinguish between planned and unplanned pregnancies, even though personality traits can affect planned and unplanned pregnancies differently, as Berg and colleagues (2013) have shown. Furthermore, while the FFM might represent the main personality traits very well, there are some other personality factors that might complement those included in the FFM, such as honesty-humility (Ashton & Lee 2005) or the willingness to take risks (Caliendo et al. 2014). The latter trait was controlled for in the models, but no associations between it and fertility could be found, and the personality trait coefficients did not change very much either.

This study also has certain strengths. First, several previous analyses focused on the first childbirth only. The present study, by contrast, has shown that there are differences in the personality coefficients between the first and the second childbirth. A couple of previous

studies distinguished between the first, the second, and the third childbirth. However, these analyses did not consider factors from the FFM, which is the most widely accepted personality inventory currently available. Moreover, many of these studies were based on cross-sectional data, whereas the present study was able to capture changes over time, as well as the predictive power of personality traits for childbearing using longitudinal data. This represents an important contribution, since the previous research on this relationship was either focused on repeated measurements – i.e., the information on personality was collected at one point in time and fertility was measured at some later point in time – or was based on personality measures taken at the end of people’s fertility histories, and could therefore only draw retrospective conclusions. These conclusions might have referred to the effects of fertility on personality, but not the other way around. By contrast, this study used longitudinal survey data in which the personality information was collected before (possible) childbearing. The present study illustrated that using the prospective approach can generate unexpected results, such as no associations among females. Furthermore, connections between personality and fertility have not previously been explored for the German context, except in one study by Hutteman and colleagues (2013), who used a smaller dataset (PAIRFAM) and other personality measures (self-esteem, shyness, and aggressiveness).

In general, the findings of the present study led to further inconsistencies in results, which tend to differ between countries and study designs. Thus, more research is required to disentangle the prospective impact of personality on childbearing. Longitudinal designs that consider personality changes over time will provide deeper insight into the causal effects of personality on fertility. In addition, to obtain a better understanding of fertility motivations, more attention should be paid to a wider range of personality traits and personality types. Furthermore, having access to population-based data would allow researchers to explore the link between personality and higher birth orders.

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Appendix

Table 3: Hazard Ratios of Childbearing (Timing of First Childbirth)

	Total	Females	Males
Agreeableness	1.07 (1.00; 1.14)	1.04 (0.95; 1.14)	1.09 (0.99; 1.20)
Conscientiousness	0.94 (0.88; 1.02)	0.99 (0.90; 1.09)	0.92 (0.83; 1.01)
Extraversion	1.04 (0.98; 1.11)	0.98 (0.89; 1.07)	1.14 (1.03; 1.25)
Neuroticism	0.99 (0.93; 1.07)	0.97 (0.89; 1.07)	1.02 (0.92; 1.13)
Openness	0.98 (0.92; 1.05)	1.01 (0.93; 1.11)	0.94 (0.85; 1.04)
Gender (ref.: Females)			
<i>Males</i>	0.89 (0.79; 1.00)	-	-
Years of Education	1.01 (0.98; 1.04)	0.99 (0.95; 1.03)	1.02 (0.98; 1.05)
Enrolment Status (ref.: Not Enrolled)			
<i>Enrolled</i>	0.71 (0.58; 0.87)	0.52 (0.39; 0.70)	1.02 (0.77; 1.36)
Birth Year	1.03 (1.01; 1.06)	1.04 (1.01; 1.06)	1.03 (1.01; 1.06)
Civil Status (ref.: Single)			
<i>Cohabited</i>	7.98 (6.09; 10.46)	5.59 (4.07; 7.67)	12.50 (7.83; 19.94)
<i>Married</i>	26.20 (19.99; 34.34)	16.53 (12.10; 22.58)	45.94 (28.79; 73.31)
<i>Divorced/Widowed</i>	3.03 (1.19; 7.76)	2.55 (0.74; 8.73)	3.73 (0.86; 16.16)
Income (log)	1.16 (1.04; 1.29)	1.04 (0.91; 1.18)	1.31 (1.12; 1.52)
Maternal Education (ref.: Secondary Degree)			
<i>No Degree</i>	0.86 (0.54; 1.38)	0.94 (0.52; 1.69)	0.94 (0.47; 1.86)
<i>Intermediate Degree</i>	1.05 (0.88; 1.24)	1.00 (0.79; 1.27)	1.14 (0.89; 1.45)
<i>Upper Secondary Degree</i>	1.11 (0.88; 1.40)	1.10 (0.82; 1.49)	1.18 (0.84; 1.67)
<i>Other</i>	1.57 (1.01; 2.46)	1.08 (0.56; 2.07)	2.49 (1.47; 4.21)
Paternal Education (ref.: Secondary Degree)			
<i>No Degree</i>	1.75 (1.04; 2.97)	2.51 (1.34; 4.73)	1.17 (0.59; 2.32)
<i>Intermediate Degree</i>	1.14 (0.95; 1.36)	1.17 (0.92; 1.49)	1.10 (0.85; 1.43)
<i>Upper Secondary Degree</i>	1.12 (0.92; 1.35)	1.30 (1.00; 1.69)	0.91 (0.67; 1.23)
<i>Other</i>	0.96 (0.61; 1.50)	1.06 (0.56; 2.02)	0.87 (0.48; 1.56)
Region (ref.: West)			
<i>East</i>	1.53	1.62	1.44

Table 4: Hazard Ratios of Childbearing (Timing of Second Childbirth)

	Total	Females	Males
Agreeableness	1.06 (0.97; 1.15)	1.00 (0.88; 1.12)	1.13 (1.01; 1.27)
Conscientiousness	0.97 (0.89; 1.05)	0.95 (0.85; 1.06)	0.98 (0.88; 1.09)
Extraversion	0.89 (0.82; 0.96)	0.94 (0.84; 1.05)	0.85 (0.75; 0.95)
Neuroticism	0.98 (0.90; 1.06)	0.96 (0.86; 1.08)	0.97 (0.86; 1.09)
Openness	1.05 (0.96; 1.14)	1.08 (0.96; 1.22)	1.02 (0.91; 1.14)
Gender (ref.: Females)			
<i>Males</i>	1.22 (1.05; 1.42)	-	-
Years of Education	1.08 (1.05; 1.12)	1.13 (1.08; 1.18)	1.05 (1.00; 1.10)
Enrolment Status (ref.: Not Enrolled)			
<i>Enrolled</i>	0.83 (0.59; 1.18)	0.72 (0.45; 1.14)	0.96 (0.59; 1.57)
Birth Year	1.08 (1.06; 1.09)	1.09 (1.07; 1.12)	1.07 (1.05; 1.09)
Civil Status (ref.: Single)			
<i>Cohabited</i>	5.05 (2.62; 9.76)	6.44 (2.94; 14.10)	4.24 (1.32; 13.62)
<i>Married</i>	7.28 (3.88; 13.65)	7.94 (3.76; 16.75)	7.03 (2.23; 22.17)
<i>Divorced/Widowed</i>	2.03 (0.67; 6.14)	2.08 (0.51; 8.41)	2.64 (0.43; 16.36)
Income (log)	1.04 (0.95; 1.12)	0.93 (0.84; 1.03)	1.21 (1.03; 1.42)
Maternal Education (ref.: Secondary Degree)			
<i>No Degree</i>	1.58 (1.08; 2.32)	1.09 (0.53; 2.24)	1.85 (1.20; 2.84)
<i>Intermediate Degree</i>	1.10 (0.89; 1.36)	0.99 (0.75; 1.32)	1.26 (0.94; 1.70)
<i>Upper Secondary Degree</i>	1.15 (0.88; 1.52)	0.99 (0.69; 1.40)	1.33 (0.89; 1.99)
<i>Other</i>	1.32 (0.79; 2.19)	1.39 (0.59; 3.29)	1.34 (0.71; 2.53)
Paternal Education (ref.: Secondary Degree)			
<i>No Degree</i>	0.82 (0.52; 1.30)	0.95 (0.43; 2.08)	0.77 (0.47; 1.29)
<i>Intermediate Degree</i>	1.06 (0.86; 1.31)	0.93 (0.70; 1.25)	1.20 (0.89; 1.63)
<i>Upper Secondary Degree</i>	1.00 (0.78; 1.27)	1.06 (0.77; 1.45)	0.97 (0.67; 1.41)
<i>Other</i>	1.08 (0.66; 1.78)	0.97 (0.40; 2.35)	1.07 (0.60; 1.92)
Region (ref.: West)			
<i>East</i>	0.76	0.88	0.66

Table 5: Correlation Matrix Sample 1

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Agreeableness													
2. Conscientiousness	0.26												
3. Extraversion	0.06	0.12											
4. Neuroticism	-0.09	-0.12	-0.17										
5. Openness	0.15	0.11	0.34	-0.01									
6. Gender	-0.13	-0.08	-0.12	-0.24	-0.10								
7. Education (years)	0.02	0.01	-0.01	-0.03	0.12	-0.08							
8. Enrolment Status	0.02	-0.19	0.06	0.03	0.06	0.07	-0.12						
9. Birth Year	0.01	-0.25	0.08	0.03	0.02	-0.08	-0.22	0.53					
10. Civil Status	0.05	0.11	0.07	0.06	0.07	0.07	0.22	0.33	0.32				
11. Income (log)*	-0.05	0.25	-0.02	-0.11	-0.06	0.10	0.24	-0.53	-0.57	0.25			
12. Maternal Degree	0.06	0.10	0.07	0.06	0.09	0.04	0.24	0.26	0.21	0.13	0.15		
13. Paternal Degree	0.07	0.09	0.06	0.06	0.09	0.05	0.25	0.21	0.16	0.10	0.12	0.26	
14. Region	0.00	0.01	-0.03	0.04	-0.02	0.05	-0.04	0.04	0.07	0.12	-0.16	0.51	0.28

Used measures include Pearson's r, point-biserial correlation, Cramer's V and Phi.

*variable categorized if required for statistical reasons

Table 6: Correlation Matrix Sample 2

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Agreeableness													
2. Conscientiousness	0.27												
3. Extraversion	0.08	0.16											
4. Neuroticism	-0.15	-0.10	-0.14										
5. Openness	0.11	0.11	0.33	-0.05									
6. Gender	-0.13	-0.07	-0.09	-0.23	-0.11								
7. Education (years)	0.02	-0.09	-0.01	-0.09	0.09	-0.03							
8. Enrolment Status	0.01	-0.05	0.00	-0.03	0.05	0.00	0.05						
9. Birth Year	-0.01	-0.17	0.02	0.00	-0.02	-0.08	0.00	0.17					
10. Civil Status	0.07	0.09	0.08	0.09	0.09	0.17	0.12	0.09	0.19				
11. Income (log)*	-0.05	0.03	-0.02	-0.18	-0.01	0.41	0.28	-0.14	-0.23	0.13			
12. Maternal Degree	0.08	0.09	0.09	0.08	0.09	0.06	0.22	0.16	0.23	0.10	0.08		
13. Paternal Degree	0.08	0.08	0.08	0.08	0.10	0.05	0.25	0.12	0.20	0.09	0.09	0.25	
14. Region	0.01	0.04	0.03	0.05	-0.02	0.02	0.01	0.06	-0.01	0.22	-0.12	0.56	0.23

Used measures include Pearson's r, point-biserial correlation, Cramer's V and Phi.

variable categorized if required for statistical reasons

Table 7: Interaction Effects (Personality Traits only)

First childbirth					Second childbirth				
<u>Total</u>	A	C	E	N		A	C	E	N
C	1.05 (0.98; 1.12)				C	1.00 (0.93; 1.08)			
E	1.00 (0.95; 1.07)	0.99 (0.93; 1.05)			E	0.93 (0.87; 1.01)	1.01 (0.94; 1.08)		
N	0.98 (0.92; 1.04)	1.01 (0.94; 1.08)	1.02 (0.96; 1.08)		N	0.99 (0.92; 1.07)	0.93 (0.87; 1.00)	1.08 (1.01; 1.16)	
O	1.02 (0.96; 1.08)	0.98 (0.92; 1.04)	1.05 (1.00; 1.11)	1.03 (0.96; 1.09)	O	0.94 (0.86; 1.02)	0.98 (0.92; 1.06)	0.97 (0.90; 1.04)	1.06 (0.98; 1.13)
<u>Females</u>									
C	1.03 (0.94; 1.12)				C	1.00 (0.90; 1.12)			
E	1.00 (0.91; 1.08)	0.99 (0.91; 1.08)			E	0.93 (0.84; 1.03)	1.04 (0.94; 1.16)		
N	0.99 (0.91; 1.09)	1.01 (0.92; 1.11)	1.05 (0.97; 1.13)		N	0.96 (0.86; 1.07)	0.91 (0.82; 1.00)	1.06 (0.96; 1.17)	
O	1.10 (1.02; 1.18)	1.04 (0.96; 1.13)	1.08 (1.02; 1.15)	0.98 (0.90; 1.07)	O	0.89 (0.79; 1.01)	1.05 (0.94; 1.18)	1.00 (0.90; 1.11)	1.03 (0.93; 1.15)
<u>Males</u>									
C	1.09 (1.00; 1.18)				C	1.00 (0.90; 1.11)			
E	1.03 (0.94; 1.13)	0.99 (0.90; 1.09)			E	0.93 (0.83; 1.04)	0.99 (0.90; 1.09)		
N	0.97 (0.89; 1.06)	1.00 (0.91; 1.11)	1.05 (0.95; 1.16)		N	1.06 (0.95; 1.19)	0.94 (0.84; 1.04)	1.10 (0.99; 1.23)	
O	0.92 (0.84; 1.01)	0.90 (0.81; 0.99)	1.02 (0.93; 1.11)	1.10 (0.99; 1.21)	O	0.96 (0.86; 1.07)	0.93 (0.84; 1.02)	0.93 (0.85; 1.03)	1.06 (0.95; 1.19)

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