

Personality and Having Children: A Two-Way Relationship

Markus Jokela and Mika Kivimäki
University of Helsinki and University College of London

Marko Elovainio
University of Helsinki, University College London, and National
Research and Development Centre for Welfare and Health

Liisa Keltikangas-Järvinen
University of Helsinki

Personality has been implicated in romantic and sexual relationships, but its association with childbearing is poorly understood. The authors assessed whether 3 personality traits—sociability, emotionality, and activity—predicted the probability of having children and whether having children predicted personality change. The participants were women and men from the Cardiovascular Risk in Young Finns study ($N = 1,839$) who were followed for 9 years. High emotionality decreased the probability of having children, whereas high sociability and, in men, high activity increased this probability. Having children predicted increasing emotionality, particularly in participants with high baseline emotionality and two or more children. In men, having children increased sociability in those with high baseline sociability and decreased sociability in those with low baseline sociability. These findings suggest a two-way relationship between personality and having children.

Keywords: evolutionary psychology, parenthood, fertility, personality change, temperament

Personality psychologists have been interested in several social behaviors potentially related to childbearing. Personality differences have been implicated, for instance, in mate choice, romantic relationships, marriage, and sexual behavior (e.g., Asendorpf & Wilpers, 1998; Botwin, Buss, & Shackelford, 1997; Eysenck, 1976; Jockin, McGue, & Lykken, 1996; Nettle, 2005). It is therefore reasonable to hypothesize that personality may also determine, in part, why some people have children, whereas others do not. Furthermore, parenthood is of interest in personality development because social transitions, such as having children, may act as catalysts in personality change (Feldman & Aschenbrenner, 1983; Paris & Helson, 2002). Still, with few exceptions (e.g., Eaves, Martin, Heath, Hewitt, & Neale, 1990; Mealey & Segal, 1993), the study of childbearing has largely been ignored by personality psychologists. In the present study, we examined whether personality predicts childbearing and whether having children predicts personality change over time.

Markus Jokela and Mika Kivimäki, Department of Psychology, University of Helsinki, Helsinki, Finland, and Department of Epidemiology and Public Health, University College London, London, England; Marko Elovainio, Department of Psychology, University of Helsinki, Department of Epidemiology and Public Health, University College London, and National Research and Development Centre for Welfare and Health, Helsinki, Finland; Liisa Keltikangas-Järvinen, Department of Psychology, University of Helsinki.

This study was supported by Academy of Finland Grants 111056, 124322, and 117604. Markus Jokela was supported by the Finnish Cultural Foundation, and Liisa Keltikangas-Järvinen was supported by the Yrjö Jahnsso Foundation.

Correspondence concerning this article should be addressed to Markus Jokela, Department of Psychology, University of Helsinki, P. O. Box 9, Helsinki FIN-00014, Finland. E-mail: markus.jokela@helsinki.fi

Personality and Personal Choice

In postindustrial societies, individual choices have largely replaced chance and necessity as determinants of childbearing (Miller, 1983; Potts, 1997; Rantakallio & Myhrman, 1990). The increasing role of individual choice may have increased the role of personal dispositions in influencing childbearing because such dispositions may surface as determinants of childbearing, particularly in societies in which people can decide on childbearing themselves (Udry, 1996). Supporting this view, Kohler, Rodgers, and Christensen (1999) found that there was no heritable individual variation in the number of children in Danish women in the early 20th century, but the heritability of childbearing began to increase in the second half of the century (see Kohler, Rodgers, Miller, Skytthe, & Christensen, 2005). The authors suggested that heritable tendencies in childbearing become expressed when women are able to influence their own reproductive decisions (see also Murphy & Wang, 2001).

Personality reflects individual differences in emotion, cognition, and behavior, and it is of interest to study whether personality is related to patterns of childbearing in modern low-fertility societies. Previous research on the issue is scarce. In a cross-sectional study of postmenopausal women, Eaves and colleagues (1990) found no linear association among extraversion, neuroticism, and the number of children, but they did observe a nonlinear interaction effect between the two traits. Women with high neuroticism and low extraversion and those with low neuroticism and high extraversion had more children than women on average. Mealey and Segal (1993) found no association between retrospectively reported childhood personality and adulthood fertility in a relatively small sample of twins. Roberts and Bogg (2004) found that conscientiousness (or social responsibility) was associated with increased number of children (see also Elder & MacInnis 1983). However,

prospective data from large, population-based samples seem to be lacking.

Recent research in behavioral ecology suggested that personality (or temperament) differences may be related to reproduction in many nonhuman animals, for example, in monkeys, sheep, and birds (e.g., Both, Dingemanse, Drent, & Tinbergen, 2005; see Smith & Blumstein, 2008). This literature implies that personality variation may be relevant in the process of evolution because variation in reproductive success is the engine of natural selection (see Dingemanse & Réale, 2005). Human evolutionary psychologists have studied individual differences in mating and other factors related to having children (e.g., Belsky, Steinberg, & Draper, 1991; Botwin et al., 1997; Nettle, 2005; see Buss & Greiling, 1999; Nettle, 2006; Penke, Denissen, & Miller 2007), but they have been less interested in the determinants of reproductive variation in contemporary humans (although see, e.g., Camperio-Ciani, Corna, & Capiluppi, 2004; Gottesman, 1965; Haukka, Suvisaari, & Lönnqvist, 2003) because modern social circumstances may not reflect our environment of evolutionary adaptedness (Crawford, 2000; Symons, 1987). The empirical literature of human personality differences and reproductive behavior is therefore also limited in the field of evolutionary psychology.

Parenthood and Personality Change

When people are asked about important turning points in their life, becoming a parent is one of the most often cited events, particularly among women (Rönkä, Oravala, & Pulkkinen, 2003). Having children is likely to be a source of joy and fulfillment to many (Belsky, 1986), and parenthood has been associated with increased social involvement with friends, relatives, and the wider community (Astone, Nathanson, Schoen, & Kim, 1999; Knoester & Eggebeen, 2006; Nomaguchi & Milkie, 2003). On the other hand, empirical evidence from several studies suggests that parenthood is generally associated with psychological stress, for example, parents of young children have slightly higher anxiety and lower marital satisfaction than do people with no children (Demo & Cox, 2000; Johnson & Rodgers, 2006; McLanahan & Adams, 1987; but see Helbig, Lampert, Klose, & Jacobi, 2006; Kohler, Behrman, & Skytthe 2005).

Previous studies of parenthood and personality have found transition to parenthood to be associated with changes in personality dimensions such as attachment, femininity, and self-esteem (e.g., Feldman & Aschenbrenner, 1983; Hawkins & Belsky, 1989; Roberts, Helson, & Klohnen, 2002), suggesting that having children may influence personality development. However, little is known about parenthood and change in basic personality traits, such as extraversion and neuroticism.

The Current Study

Here we examined the bidirectional association between personality and having children, using the temperament model of Buss and Plomin (1984). The model postulates three traits: sociability, emotionality, and activity. People with high sociability enjoy the company of others more than solitary life, and sociability is related to extraversion, one of the main dimensions of personality. Emotionality reflects the tendency to experience negative emotions, particularly fear and anger, and is related to neuroticism,

another central dimension of personality. High activity is expressed as energetic and vigorous behavior in daily routines. Although the model refers to these traits as temperament, that is, early appearing personality traits that are partly biological of origin, the difference between temperament and personality in adults is not clear cut: both are associated with biological and nonbiological factors (e.g., Oniszczenko et al., 2003; see Goldsmith et al., 1987; Saudino, 2005) and temperament-related personality traits in adults may reflect not only behavioral and emotional factors but also cognitive factors. Given that the participants of the present study were adolescents or adults, we refer to the three measures as personality traits.

The present study is a part of the prospective Cardiovascular Risk in Young Finns cohort study (Åkerblom et al., 1991; Juonala et al., 2004; Raitakari et al., in press) that includes repeated measurements of sociability, emotionality, and activity over a 9-year period, as well as information on the participants' children. These data provided an opportunity to examine whether personality predicts having children and whether having children is associated with personality change over time.

Hypotheses

Personality as a predictor of childbearing. On the basis of previous research on parenthood and personal relationships, we postulated three hypotheses on how personality may predict having children. First, Schoen, Kim, Nathanson, Fields, and Astone (1997) have suggested that childbearing is motivated, in part, by the social relations with friends and relatives that develop with parenthood and that people who value such relationships are most likely to have children. The authors provided empirical evidence for this suggestion by showing that people's intentions of having children were predicted by their perceptions of the social rewards of parenthood (Schoen et al., 1997). Given that individuals with high sociability prefer to be with other people, they may be more motivated to have children (and the accompanying social relationships with the child and others) than those with low sociability. Furthermore, previous research has associated personality traits related to sociability with increased mating behavior (e.g., Nettle, 2005) and involvement in romantic relationships (e.g., Asendorpf & Wilpers, 1998; Neyer & Voigt, 2004) that naturally precede childbearing. We therefore hypothesize that high sociability predicts increased probability of having children.

Second, as already noted above, being a parent of young children has been associated with increased psychological distress (McLanahan & Adams, 1987), and people often perceive parenthood to have negative psychological and social consequences for the parents (e.g., Johnson & Rodgers, 2006). Given that emotionality is related to high distress proneness, individuals with high emotionality may perceive parenthood as more stressful than do those with low emotionality, and they may hence be less likely to have children of their own. Furthermore, personality traits related to emotionality have been associated with low marital satisfaction and difficulties in romantic relationships (e.g., Caughlin, Huston, & Houts, 2000; Jockin et al., 1996; Lehnart & Neyer, 2006), and these difficulties are likely to decrease intentions of having children. We therefore hypothesized that high emotionality decreases the probability of having children.

Third, our previous research in the present sample has shown that activity, a basic behavioral dimension of personality, may influence complex adult social behaviors such as residential mobility (Jokela, Elovainio, Kivimäki, & Keltikangas-Järvinen, 2008). We are not aware of any theories or empirical findings that would predict that this personality dimension would be associated with parenthood. Insofar as activity is associated with childbearing, it is plausible that high activity increases the probability of having children. High activity in adults tends to be associated with a more general, outgoing, and extraverted disposition (Eaton, 1994; Graziano, Jensen-Campbell, & Sullivan-Logan, 1998), and such disposition may increase childbearing much in the same way as sociability (see above).

Childbearing as a predictor of personality change. Regarding parenthood and personality change, we considered four theoretical perspectives. The five factor theory (McCrae et al., 2000), the social investment theory (Roberts, Wood, & Smith, 2005), and the literature on the psychology of parenthood provide competing hypotheses on how parenthood may influence personality change, whereas the corresponsiveness principle (Roberts, Caspi, & Moffitt, 2003) may complement these perspectives, as we outline below.

The five factor theory suggests that the development of basic personality tendencies is systematically affected by genetic rather than environmental factors (McCrae et al., 2000). On the basis of this theory, one would expect social experiences such as parenthood to have no long-term consequences for personality change. The social investment theory, in turn, postulates that adulthood social transitions related to work, marriage, and family are likely to direct personality development toward greater psychological maturity, for example, increasing emotional stability, social responsibility, and interpersonal warmth and caring (Roberts et al., 2005; see also Allport, 1961; Roberts, Caspi, & Moffitt, 2001). For instance, Neyer and Asendorpf (2001) observed that engagement in a serious relationship decreased neuroticism and increased conscientiousness in young adults. In the present context, this perspective would suggest that parenthood might decrease emotionality because this is the trait most closely related to psychological maturity in the model of Buss and Plomin (1984).

Third, on the basis of psychological correlates of parenthood, it may be hypothesized that personality development associated with childbearing mirrors the experiences of parenthood. On the one hand, parenthood has been related to increased social involvement with relatives, friends, and the wider community (e.g., Knoester & Eggebeen, 2006), so having children may increase sociability. On the other hand, parenthood has been associated with increased psychological distress (McLanahan & Adams, 1987), so having children may also increase emotionality.

Previous research provides relatively little theoretical or empirical background for hypotheses of parenthood and potential change in activity. Hence, we had no specific hypotheses for activity, and we assumed that the change, if any, might go both ways. That is, having children might increase activity because being a parent of young children is likely to involve physical activity with children and also to involve a need to get daily activities carried out promptly. On the other hand, having young children might make parents physically more wary and careful, thus decreasing their activity level.

Finally, the personality change brought about by having children may depend on existing personality dispositions. According to the corresponsiveness principle of personality development (Roberts et al., 2003), life experiences contributing to personality change are most likely to strengthen people's existing personality dispositions rather than change them in a uniform way (see also Caspi & Moffitt, 1991, 1993). Roberts et al. (2003) provide evidence for this principle in the domain of work experiences. In the present context, we hypothesized that the increase in sociability and emotionality potentially associated with experiences of parenthood (see above) may be the strongest in individuals with high baseline sociability and high baseline emotionality, respectively, because these individuals may be most sensitive to the social rewards and demands of parenthood. We also expected the personality changes associated with parenthood to be cumulative, with greater number of children being related to greater likelihood of personality change.

Overview

In sum, we studied whether personality predicted childbearing and whether having children was associated with personality development over time. In predicting childbearing, we hypothesized that high sociability and low emotionality increase the probability of having children, and we expected that high activity might also increase this probability. We were interested in the association between personality and childbearing independently of sociodemographic factors associated with having children. We therefore included education level and urbanicity of residence as covariates because high education and urban residence have been associated with decreased probability of having children (Koskinen, Jalovaara, & Martelin, 2007). Furthermore, as having a partner is naturally associated with the likelihood of having children, and as personality has been associated with marital status (e.g., Asendorpf & Wilpers, 1998; Jockin et al., 1996), we included marital status as a covariate in order to assess whether the association between personality and childbearing was accounted for by the association between personality and marital status.

The second aim of the study was to assess whether having children predicts change in personality over time. We hypothesized that having children increases sociability. With respect to emotionality, we tested competing hypotheses derived from social investment theory (decreasing emotionality reflecting psychological maturity) and parenthood research (increasing emotionality reflecting stress associated with being a parent). We had no specific hypotheses for activity, so we expected that the potential change in activity could go either way. We also hypothesized that personality change associated with having children is dependent on people's initial personality dispositions, as postulated by the corresponsiveness principle of personality development. Finally, we assessed gender differences in all the associations between personality and having children because parenthood may involve gender differences in many domains of life.

Methods

Participants

The participants were 1,839 women ($n = 1,058$) and men ($n = 781$) participating in the population-based Cardiovascular Risk in

Young Finns study (Åkerblom et al., 1991; Juonala et al., 2004; Raitakari et al., in press). The original sample consisted of 3,596 Finnish healthy children and adolescents derived from six birth cohorts, aged 3 years, 6 years, 9 years, 12 years, 15 years, and 18 years at baseline in 1980. To select a broadly representative sample in terms of sociodemographic background, researchers divided Finland into five areas according to the locations of university cities with a medical school (Helsinki, Kuopio, Oulu, Tampere, and Turku). In each area, urban and rural boys and girls were randomly selected on the basis of their unique, personal social security number. The sample has been described in detail elsewhere (Åkerblom et al., 1991; Juonala et al., 2004; Raitakari et al., in press).

The baseline in the present study was the follow-up phase of 1992 (referred to as Year 0), when the participants were administered the personality assessment for the first time. The most recent follow-up was carried out in 2001 (referred to as Year 9), which provided us a 9-year prospective longitudinal study follow-up period. The participants were 15–30 years of age in Year 0 and

24–39 years in Year 9. Depending on the variables included in the models, 1,502–1,839 participants had complete data and formed the sample of this study. Descriptive statistics of the main sample are shown in Table 1.

The present sample represented 73.2% of the original baseline sample. Previous attrition analyses (Juonala et al., 2004; Raitakari et al., in press) have shown male gender and younger age to predict attrition. We examined whether attrition between years 1992 and 2001 was related to personality or to having children in 1992. Analyses of covariance (adjusted for age and gender) indicated that participants who dropped out of the study between 1992 and 2001 had slightly higher emotionality than did those who participated in both follow-up phases (emotionality scores of 30.5 vs. 30.2, representing a difference of 0.04 standard deviations, $p = .05$) but did not differ in other personality traits or in the number of children in 1992 (all $ps > .74$). Although the difference in emotionality was statistically significant, it was small in magnitude and was unlikely to substantially bias the results.

Table 1
Descriptive Statistics of the Main Sample

Variable	Value							
	Women				Men			
	<i>M</i>	<i>SD</i>	<i>n</i>	%	<i>M</i>	<i>SD</i>	<i>n</i>	%
Year-0 measures								
Place of residence								
Urban	165	15.6			106	13.6		
Suburban	466	44.1			334	42.8		
Rural	236	22.3			177	22.7		
Remote rural	191	18.1			164	21.0		
Marital status								
Married/cohabiting			450	42.5			234	30.0
Not living with a partner			608	57.5			547	70.0
Number of children								
None			827	78.2			677	86.7
One			111	10.5			57	7.3
Two			95	9.0			36	4.6
Three			18	1.7			8	1.0
Four or more			7	0.7			3	0.4
Age (years)								
Sociability	19.9	3.6			18.6	3.5		
Emotionality	32.0	7.8			28.1	7.4		
Activity	29.6	5.7			28.8	5.4		
Year-9 measures								
Year-9 education (years)	14.9	2.9			14.4	3.1		
Sociability	17.5	3.7			16.2	3.5		
Emotionality	32.6	7.2			29.1	6.9		
Activity	31.1	5.9			30.4	5.4		
Marital status								
Married/cohabiting			756	71.8			511	66.1
Not living with a partner			297	28.2			262	33.9
Number of children								
None			448	42.3			433	55.4
One			186	17.6			121	15.5
Two			261	24.7			151	19.3
Three			120	11.3			59	7.6
Four or more			43	4.1			17	2.1

Note. $N = 1,839$. For women, $n = 1,058$. For men, $n = 781$.

Measures

Personality was assessed in Years 0 and 9 with the model of Buss and Plomin (1984). The 5 items of sociability (e.g., “I enjoy spending time with other people”; “I prefer to work with other people rather than alone”), 12 items of emotionality (e.g., “I am easily frightened”; “I tend to become nervous in new situations”), and 10 items of activity (e.g., “My life is fast-paced”; “I enjoy activities that require physical strength”) were presented to the participants with a five-point response scale (1 = *totally disagree*, 5 = *totally agree*). The Cronbach’s alpha reliabilities of sociability, emotionality, and activity were 0.78, 0.82, and 0.65, respectively, in Year 0 and 0.78, 0.80, and 0.72, respectively, in Year 9, indicating moderate internal reliabilities. Table 2 shows the correlations between the traits in Year 0 and Year 9. Corrected for attenuation due to measurement error, the temporal stability coefficients were $r = .60$ for sociability, $r = .65$ for emotionality, and $r = .83$ for activity, implying moderate to high stability of individual differences in personality over the 9-year period. Previous studies in which the model was applied have shown the three traits to be associated with other related traits assessed by different models (e.g., Hagekull & Bohlin, 1998, 2003) and to exhibit satisfactory psychometric properties (Naerde, Røysamb, & Tambs, 2004). In the present sample, the traits have been related to measures of childhood temperament (Pesonen, Räikkönen, Keskivaara, & Keltikangas-Järvinen, 2003) and have been found to predict social behaviors, for example, residential mobility (Jokela, et al., 2008).

In Years 0 and 9, the participants reported the number of their children and the years of their births. This allowed us to determine whether the participants had children at the beginning of the study and to determine which year, between Years 1 and 9, they had children. During this time, only 2.7% ($n = 51$) of the participants had a fourth child, so we restricted our analyses on the births of the first, second, and third child.

Urban residence was assessed on the basis of the participants self-reports on whether they were living in a remote rural area (1), a rural area (2), a suburban area (3), or a city (4) in Year 0. This variable was used as a continuous covariate in the analyses. Education was assessed on the basis of years of completed education in Year 9. In Years 0 and 9, the participants reported their marital

status and, in Year 9, how long they had had their current marital status. From these data, we created a time-varying variable of marital status in Year 0 to Year 9, which was used as a control variable in survival analysis models. Marital status was coded as a dichotomous indicator (0 = not living with a partner, 1 = living with a partner, that is, married or cohabiting) in each year.

Results

Personality and Having Children

The association between personality and having children was assessed with discrete-time survival analysis, which is the appropriate method to study whether and when an event of interest occurs within a specified time period (Singer & Willett, 2003). Survival analysis models provided estimates of hazard functions of childbearing, that is, the probability of having a child at a given year for participants who had not yet had a child before that year. The statistical estimates were presented as odds ratios (OR), comparing differences in hazard functions, that is, in probabilities of having a child, associated with one unit difference in the independent variable. Potential gender differences were tested with Gender \times Personality interaction effects in all models, and only statistically significant ($p < .05$) interactions were reported.

In Year 0, the participants were 15 years to 30 years of age, so some of them already had children at that time. More specifically, 18.4% ($n = 338$) of the original sample had already had the first child, 9.2% ($n = 169$) had the second child, and 1.9% ($n = 37$) had the third child by Year 0. To maintain a completely prospective study setting, we dropped these cases from the respective analyses, that is, the birth of the n th child was analyzed only in participants who did not have an n th child at Year 0. Thus, the number of participants in models predicting the birth of the first, second, and third child were $n = 1,501$, $n = 1,670$, and $n = 1,839$, respectively.

Due to left censoring (i.e., some of the participants having children before Year 0) and the assessment of personality at different ages in different birth cohorts, we assessed how personality predicted having children over the 9-year study period rather than over age. The passage of time was therefore clocked with study years (ranging from 1 to 9). During the follow-up period, the

Table 2
Correlations Between Independent Variables

Variable	1	2	3	4	5	6	7	8	9	10
1. Gender	—									
2. Age	-.02	—								
3. Residence	.06**	-.11*	—							
4. Education	-.11*	-.04***	-.18*	—						
5. Marital status	-.14*	.57*	-.06**	-.07**	—					
6. Year-0 sociability	-.19*	-.05***	-.09*	.05***	.00	—				
7. Year-0 emotionality	-.22*	-.13*	.04***	-.11*	-.05***	-.25*	—			
8. Year-0 activity	-.08*	.06**	-.06**	.11*	.02	.16*	.10*	—		
9. Year-9 sociability	-.17*	-.07*	-.03	.06***	.01	.47*	-.13*	.16*	—	
10. Year-9 emotionality	-.24*	-.01	.04	-.10*	.00	-.19*	.53*	.03	-.26*	—
11. Year-9 activity	-.06**	-.01	-.02	.07**	.03	.12*	.02	.57*	.22*	.05***

Note. $N = 1502$. For gender, 0 = women, and 1 = men. For place of residence, 1 = urban, 2 = suburban, 3 = rural, and 4 = remote rural. For marital status, 0 = not living with a partner, and 1 = married/cohabiting.
* $p < .001$. ** $p < .01$. *** $p < .05$.

youngest cohort was followed from 15 years to 24 years of age, and the oldest cohort was followed from 30 years to 39 years of age, with the age periods of the four other cohorts falling between these age periods, that is, 18–27 years, 21–30 years, 24–33 years, and 27–36 years of age. As these age periods are characterized by different probabilities of childbearing, we included an interaction effect between time and age at baseline to control for these birth-cohort differences.

Before examining the association between personality and childbearing, we assessed the correlations between independent variables (see Table 2) and the associations between covariates and personality traits (see Table 3). With the exception of gender, the sociodemographic covariates were only weakly associated with personality traits, as shown in Table 2. The survival analyses shown in Table 3 indicated that education, marital status, and gender were consistently associated with childbearing, whereas urbanicity of residence predicted only the birth of the first child. Significant Age \times Time interaction effects indicated that individuals belonging to different birth cohorts had different probabilities of having children during the follow-up period, that is, this probability increased over time in younger participants but remained stable or decreased slightly in older participants.

We then assessed whether personality traits predicted the probability of having children. For each personality trait, separate survival analyses were fitted, assessing the birth of the first, second, and third child. All the analyses were carried out with age, gender, completed years of education at Year 9 and place of residence at Year 0 as covariates. In order to facilitate the interpretation and comparison of the ORs in the survival analyses, the personality traits were standardized ($M = 0$, $SD = 1$) so that the ORs expressed the difference in the odds of having a child at any given year by 1 SD difference in the personality trait level.

Model 1 of Table 4 shows the results of the survival analyses of personality traits and having children. Sociability predicted the birth of the first and second child but not the third child, so that one SD difference in sociability was associated with a 15% increase and a 14% increase in the odds of having the first child and second child, respectively, at any given age. Emotionality did not predict the first child but did predict the second and third child, so that on SD , difference in emotionality decreased the odds of having the

second and third child by 11% and 15%, respectively. Activity did not predict the birth of the first, second, or the third child in the total cohort (p values > 0.10). However, there was a significant Gender \times Activity interaction effect when predicting the birth of the first ($p = .03$) and second ($p = .01$) child, indicating that activity predicted the first and second child in men, but not in women. Men with an activity score one SD above the mean had 19% and 21% increased odds of having their first and second child, respectively, at any given age. Activity did not predict the birth of the third child in men or women (see Table 4).

To further illustrate the effects sizes of the associations between personality and childbearing, we calculated the cumulative probabilities of having the first, second, and third child by the end of the 9-year follow up (i.e., $P = 1$ —value of survival function at Year 9; calculated from Model 1) by personality trait levels (see Table 4). In these predictions, other covariates were assigned their mean values. As shown by the percentages in Table 4, 1 SD differences in personality traits were associated with a 1% to 5% point differences in the probabilities of having children during the study period.

We then assessed whether the three personality traits had independent associations with childbearing when entered together in the same models. When sociability and emotionality were entered together in the survival analysis models, only sociability predicted the first (sociability: OR = 1.15, $SE = 0.05$, $p = .002$; emotionality: OR = 0.99, $SE = 0.05$, $p = .92$) and the second child (sociability: OR = 1.11, $SE = 0.06$, $p = .05$; emotionality: OR = 0.93, $SE = 0.05$, $p = .17$), whereas only emotionality predicted the third child (sociability: OR = 1.03, $SE = 0.08$, $p = .74$; emotionality: OR = 0.86, $SE = 0.07$, $p = .06$). In men, the effects of sociability and activity were independent of each other, that is, they both were significant (or marginally significant) when predicting the first (sociability: OR = 1.13, $SE = 0.08$, $p = .08$; activity: OR = 1.17, $SE = 0.08$, $p = .02$), and second child (sociability: OR = 1.19, $SE = 0.10$, $p = .03$; activity: OR = 1.19, $SE = 0.10$, $p = .03$).

Finally, we assessed whether the association between personality and childbearing changed over the study period and whether personality was differently associated with childbearing in participants differing in age at baseline. These were assessed in the

Table 3
Predicting the Birth of the First, Second, and Third Child During a 9-Year Follow-Up Period by Sociodemographic Covariates and Time

Variable	First child		Second child		Third child	
	Odds ratio	SE	Odds ratio	SE	Odds ratio	SE
Gender	0.76**	0.07	0.77**	0.08	0.70***	0.11
Time	1.44*	0.12	1.53*	0.16	1.52***	0.28
Age	1.14*	0.02	1.18*	0.03	1.20*	0.06
Time \times Age	0.99*	0.00	0.99*	0.00	0.99***	0.01
Place of residence	0.88**	0.04	0.93	0.05	0.99	0.08
Education (years)	0.91*	0.01	0.95*	0.02	0.94***	0.02
Marital status	7.06*	0.70	10.59*	1.55	11.69*	3.45

Note. The table presents odds ratios and standard errors of three separate survival analysis models. Coding of the variables: For gender, 0 = women; and 1 = men; for time, range is from 1 to 9; for place of residence, 1 = urban; 2 = suburban; 3 = rural; and 4 = remote rural; for marital status, 0 = not living with a partner; and 1 = married/cohabiting.

* $p < .001$. ** $p < .01$. *** $p < .05$.

Table 4

The Predicted Probability of Having the First, Second, and Third Child by Personality Trait Levels

Child	Probability					Model 1		Model 2	
	-2 SD	-1 SD	M	+1 SD	+2 SD	OR	SE	OR	SE
Sociability									
First child	0.35	0.39	0.43	0.48	0.52	1.15*	0.05	1.13**	0.05
Second child	0.21	0.24	0.26	0.29	0.32	1.14**	0.06	1.12***	0.06
Third child	0.07	0.08	0.08	0.09	0.09	1.08	0.08	1.07	0.08
Emotionality									
First child	0.47	0.45	0.43	0.42	0.40	0.95	0.04	1.00	0.05
Second child	0.32	0.29	0.26	0.24	0.22	0.89***	0.04	0.96	0.05
Third child	0.11	0.09	0.08	0.07	0.06	0.85***	0.06	0.89	0.07
Activity: Men									
First child	0.27	0.31	0.35	0.40	0.46	1.19***	0.08	1.12	0.08
Second child	0.15	0.17	0.21	0.24	0.28	1.21***	0.10	1.17	0.10
Third child	0.06	0.06	0.05	0.05	0.04	0.89	0.12	0.83	0.12
Activity: Women									
First child	0.50	0.50	0.50	0.50	0.49	1.00	0.05	1.00	0.05
Second child	0.32	0.31	0.3	0.29	0.29	0.96	0.06	0.97	0.06
Third child	0.11	0.11	0.10	0.10	0.10	0.99	0.08	1.01	0.09

Note. The table presents standardized odds ratios (OR) and standard errors (SE) of twelve separate, nested survival analysis models. The probabilities were present the predicted cumulative probabilities of having children during a 9-year follow-up period by personality trait level (from 2 SD below the mean to 2 SD above the mean) calculated from Model 1. Model 1 adjusts for age, gender, education, place of residence. Model 2 adjusts for Model 1 and marital status.

* $p < .001$. ** $p < .01$. *** $p < .05$.

survival analysis models presented above by testing interaction effects between personality and time (whether the association changed over time), between personality and birth year (whether the association differed by baseline age), and between personality, time, and birth year (whether the association changed over time differently in different age groups). Of the 27 interaction effects tested, only one was statistically significant at the $p = .05$ level, which might be expected on the basis of chance alone (data not shown). Thus, the interaction effects suggested that the personality traits predicted childbearing in a similar fashion across different age groups and also over the study period. We also examined whether there was a nonlinear Extraversion \times Neuroticism interaction effect reported by Eaves et al. (1990) by replacing extraversion with sociability and neuroticism with emotionality, that is, a regression equation of $Y = b_0 + b_1\text{Soc} + b_2\text{Emo} + b_3\text{Soc}^2 + b_4\text{Emo}^2 + b_5\text{Soc} \times \text{Emo}$, where Soc = sociability, Emo = emotionality, and b = regression coefficient, but this interaction was not significant when predicting the birth of the first, second or third child in survival analysis models ($ps > 0.10$).

Personality and Marital Status

The association between personality and marital status was assessed prospectively in a logistic regression analysis in which marital status in Year 9 was predicted by Year-0 personality, while controlling for Year-0 marital status, age, gender, education, and place of residence. Logistic regression models, fitted separately for the three traits (controlling for Year-0 marital status, age, gender, education, and place of residence), indicated that Year-0 sociability (OR = 1.19, SE = 0.06, $p = .002$) and activity (OR = 1.14,

SE = 0.06, $p = .02$) increased the likelihood of living with a partner in Year 9, whereas emotionality tended to decrease this likelihood (OR = 0.90, SE = 0.05, $p = .07$). In these models, the likelihood of living with a partner was increased by approximately 4 percentage points per one SD difference in sociability and activity and was decreased by approximately 3 percentage points per one SD difference in emotionality.

Given that personality predicted marital status, which in turn predicted having children (see Table 3), we examined whether the association between personality traits and childbearing remained when marital status was taken into account (see Table 4, Model 2). In the survival analyses, marital status was used as a time-varying covariate, that is, allowing it to have different values in different years of the follow-up period. When survival analyses of childbearing were adjusted for marital status over the study period, sociability still predicted an increased probability of having the first and second child, whereas emotionality and activity (in men) were no longer significant predictors of childbearing (see Table 4, Model 2). In other words, sociability predicted childbearing independently of marital status, whereas the effect of emotionality and activity were accounted for by marital status.

Having Children and Personality Change

In analyses of personality change, having children between Years 1 and 9 was coded with two dummy variables (one child or two or more children, with participants having no children forming the reference group). Personality change was first assessed with repeated measures analysis of covariance (ANCOVA), with having children as a between-subjects factor (three levels: no children,

one child, two or more children), and with personality as a within-subjects factor (two levels: personality in Years 0 and 9). In all the following models of personality change, age, gender, and number of children in Year 0 were entered as covariates. Gender interactions were examined in all models, and only statistically significant interaction effects ($p < .05$) were reported. The effect sizes of personality change were expressed with the Cohen's d metric. Repeated assessments of personality traits in Year 0 and Year 9 were available on 1,545 participants. Of them, 850 (55.2%) did not have children during the study period, 330 (21.4%) had one, and 361 (23.4%) had two or more children.

First we examined the general patterns of change in the personality traits over the follow-up period. Repeated-measure ANCOVA indicated that in general there was a small increase in emotionality (mean difference [MD] = 0.40, $p = .03$, Cohen's $d = 0.05$), a decrease in sociability ($MD = -2.23$, $p < .001$, $d = -0.62$), and an increase in activity ($MD = 1.60$, $p < .001$, $d = 0.28$) over time. As we were interested in whether having children moderated the change in personality over time, we then examined Childbearing \times Personality change interaction effects. A significant interaction effect ($p = .01$) between having children and change in emotionality indicated that there was no change in emotionality in individuals with no children ($MD = -0.34$, $p = .18$, $d = -0.04$) but that emotionality increased in individuals who had one ($MD = 1.03$, $p = .01$, $d = 0.14$) or two or more children ($MD = 1.52$, $p < .001$, $d = 0.20$; Figure 1) during the follow-up. There were no interaction effects between having children and change in sociability or activity ($ps > .10$), suggesting that having children was not associated with change in sociability and activity in the total cohort.

Next we tested the hypothesis that the impact of having children may depend on baseline personality, as suggested by the responsiveness principle. This was assessed with linear regression analysis in which Year-9 personality was predicted by Year-0 personality, having children, and the interaction effect between Year-0 personality and having children. If having children was dependent on existing personality trait level, one would expect a significant interaction effect between baseline personality and having children when predicting the personality trait in Year 9.

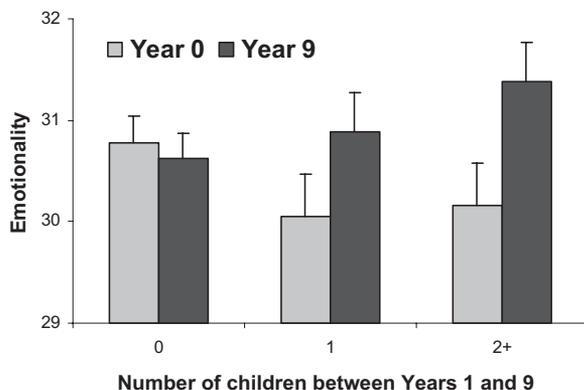


Figure 1. Mean level (+standard error) of emotionality in Year 0 and Year 9 by the number of children the participant had between Years 1 and 9.

First we examined whether the change in emotionality associated with having children was depended on Year-0 emotionality. In a linear regression model predicting Year-9 emotionality, there was a significant interaction effect between having children and Year-0 emotionality (Table 5), indicating that having two or more children during the follow-up predicted increasing emotionality in individuals who had high emotionality in Year 0 but not in those who had low Year-0 emotionality (Figure 2). The predicted difference in Year-9 emotionality between an individual with no children and a parent with two or more children (i.e., the vertical difference between the lines in Figure 2) was 1.0 scale unit at the mean level of Year-0 emotionality, 1.9 units at 1 SD above the Year-0 mean, and 2.7 units at 2 SD above the Year-0 mean. These differences equaled effect sizes of $d = 0.13$, $d = 0.25$, and $d = 0.36$, respectively.

The same analysis was then applied to change in sociability. The findings differed by gender (gender interaction $p = .03$), indicating that the Having Children \times Year-0 Sociability interaction effect was significant in men but not in women (see Table 5). Having children predicted an increase in sociability among men with high Year-0 sociability and a decrease in sociability among men with low Year-0 sociability (Figure 3). The interaction effect between having one child and Year-0 sociability was not significant, but it was half the size of the Two or More Children \times Sociability Effect, suggesting a linear interaction effect. The predicted difference in Year-9 sociability between a father with two or more children and a man with no children (i.e., the vertical difference between the lines in Figure 3) was -1.7 , -1.0 , -0.3 , $+0.4$, and $+1.1$ scale units at the level of $-2 SD$, $-1 SD$, mean, $+1 SD$, and $+2 SD$ of Year-0 sociability, respectively. These differences equaled effect sizes of $d = -0.46$, $d = -0.27$, $d = -0.08$, $d = 0.11$, and $d = 0.30$, respectively.

There was no significant interaction effect between having children and Year-0 activity on Year-9 activity ($p > .10$), implying that change in activity related to having children was not depended on Year-0 activity.

Discussion

The present findings suggest a two-way relationship between personality and having children. In the first part of the study, we found that personality traits prospectively predicted the probability of having children within a 9-year follow-up period. High sociability increased the likelihood of having the first and second child but not the third child. Emotionality did not predict the birth of the first child, but individuals with high emotionality were less likely to have the second and third child. In men, high activity increased the likelihood of having the first and second child, whereas no association between activity and childbearing was observed in women. Individuals with high sociability, high activity, and low emotionality were also more likely to live with a partner. Marital status largely accounted for the associations between emotionality, men's activity, and having children, whereas sociability predicted childbearing even when marital status was taken into account.

The second part of the study indicated that having children may be related to personality development. Emotionality remained relatively stable over time in participants who had no children during the follow-up, but increased in individuals who had one or more children. Moreover, the association between increasing family size

Table 5
The Associations Between Having Children and Personality Change Over a 9-Year Follow-Up Period

Variable	<i>B</i>	<i>SE</i>	β
Year-9 emotionality: All			
Gender (0 = women, 1 = men)	-1.94*	0.32	-.13
Age	0.06	0.04	.04
Year-0 number of children	0.04	0.24	.00
Year-0 emotionality	0.44*	0.03	.49
Having children between Years 1 and 9			
No children (reference)			
One child	0.31	1.58	.02
Two or more children	-2.14	1.48	-.13
Year-0 Emotionality \times One Child	0.01	0.05	.02
Year-0 Emotionality \times Two or More Children	0.10****	0.05	.19
Year-9 sociability: Women			
Age	-0.06****	0.03	-.08
Year-0 number of children	0.17	0.16	.04
Year-0 sociability	0.51*	0.04	.51
Having children between Years 1 and 9			
No children (reference)			
One child	1.96	1.49	.22
Two or more children	1.51	1.42	.18
Year-0 Sociability \times One Child	-0.07	0.07	-.16
Year-0 Sociability \times Two or More Children	-0.06	0.07	-.15
Year-9 sociability: Men			
Age	-0.07****	0.03	-.10
Year-0 number of children	-0.01	0.21	.00
Year-0 sociability	0.34*	0.04	.35
Having children between Years 1 and 9			
No children (reference)			
One child	-1.77	1.96	-.20
Two or more children	-3.89****	1.69	-.46
Year-0 Sociability \times One Child	0.11	0.10	.23
Year-0 Sociability \times Two or More Children	0.20****	0.09	.45

Note. $N = 1,542$. For women, $n = 931$. For men, $n = 611$. The table presents the unstandardized *B*, standard errors, and standardized β regression coefficients of three linear regression models. The statistically significant interaction effects are illustrated in Figures 2 and 3.

* $p < .001$. **** $p < .05$.

and emotionality was dependent on baseline level of emotionality: Having two or more children predicted increasing emotionality most strongly among participants who already had high emotionality at baseline. Overall, having children was not related to change in sociability in men or women. However, in men, having children was associated with baseline-dependent change in sociability, so that increasing family size predicted increasing sociability in men with high baseline sociability and decreasing sociability in men with low baseline sociability. Having children did not predict any kind of change in activity.

Personality as a Predictor of Childbearing

Previous research has implicated personality differences in sexual and marital relationships (e.g., Caughlin et al., 2000; Jockin et al., 1996; Nettle, 2005). The present study demonstrates that personality may play an even more extensive role in family formation than previously considered. In line with our hypotheses, sociability and emotionality both predicted having children. However, their dynamics in affecting family size were different. It

appears that sociability is more important in predicting whether a person will become a parent, whereas emotionality may be more important in limiting the number of children beyond the first child. This is because sociability was associated with increased probability of having the first and second child but was not associated with having a third child, whereas emotionality did not predict having the first child but did predict decreased likelihood of having the second and third child.

The association between sociability and increased probability of childbearing suggests that highly sociable individuals may view parenthood as more rewarding than do nonsociable individuals. This is in agreement with the study of Schoen et al. (1997), showing that people's intentions of having a child are closely related to perceptions of the social rewards of parenthood. Our finding thus lends support for the hypothesis that social relationships related to parenthood may function as a motivating factor in having children. In future studies, the role of sociability in family formation might be further evaluated by assessing whether sociability is associated with the satisfaction of being a parent or the

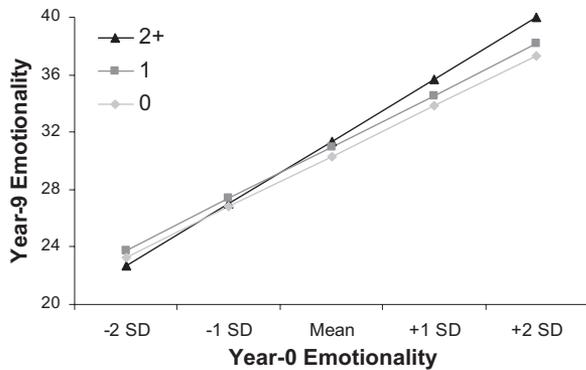


Figure 2. Predicted level of Year-9 emotionality by Year-0 emotionality (x-axis) and the number of children the participant had between Years 1 and 9 (separate lines: no children, one child, two or more children).

preference of spending time with children and other social activities related to parenthood.

The role of emotionality in predicting decreased probability of childbearing beyond the first child may be related to experiences of parenthood with the firstborn. It is reasonable to assume that the psychosocial stress associated with parenthood (McLanahan & Adams, 1987) becomes apparent along with the experiences with the first child because people will have a direct experience of parenthood only when they have a child of their own. We suggest that individuals with high emotionality may be more distressed by this experience than are those with low emotionality, and highly emotional individuals may therefore be less likely to have a second or third child. Future research could test this hypothesis in more detail by assessing whether perceived stress related to parenthood mediates the association between emotionality and decreased childbearing.

Activity has not been considered in detail in previous studies of family formation. We observed an association between high activity and increased probability of having a partner and an association between high activity and increased probability of having children in men. These associations suggest that even relatively simple behavioral tendencies, that is, the tempo and vigor expressed in daily activities, may be relevant in the formation of personal relationships (cf. Jokela et al., 2008). It is interesting to note that a German study (Schmitt & Atzwanger, 1995) found an association between fast walking pace and high social status in men. The authors suggested that a brisk pace may act as a display of social rank, which may be relevant in men's attractiveness to women. A similar phenomenon might contribute to the present association between men's high activity and reproduction, as women tend to consider men's social status as an important characteristic in mate selection (see Feingold, 1992). On the other hand, adulthood activity may reflect a facet of a more general outgoing and extraverted disposition (see Eaton, 1994; Graziano et al., 1998) and may thereby become associated with romantic relationships and family formation.

Personality Change Associated With Childbearing

Emotionality was the only personality trait that showed a uniform change associated with having children. On average, emo-

tionality remained relatively stable over time in individuals who remained without children but increased in those who had children. The latter finding contradicts the five factor theory of personality (McCrae et al., 2000), postulating that basic personality traits are unaffected by social experiences. The finding also contradicts the social investment theory (Roberts et al., 2005), according to which important adulthood social transitions, for example, marriage and parenthood, direct personality development toward increasing psychological maturity, that is, increasing emotional stability. We found that parenthood was associated with increasing rather than decreasing emotionality, suggesting that parenthood may not foster psychological maturity in this respect. Two caveats, however, should be acknowledged. First, it is possible that parenthood increases maturity in personality domains not assessed in our study. Second, the present study assessed only the changes associated with being a parent of young children (less than 10 years old), and personality development may show different kinds of changes in response to being a parent of older children.

The association between parenthood and increasing emotionality is in agreement with studies of parenthood showing that despite the joys children may bring, being a parent of young children tends to increase psychological distress (see McLanahan & Adams, 1987). Our study thus suggests that the experience of parenthood may be related not only to psychological well-being but also to the development of personality. Furthermore, our findings showed that initial level of emotionality may be related to how individuals adjust to increasing family size: Emotionality increased particularly in participants with high baseline emotionality and with two or more children during the follow-up period. This finding provides support for the hypothesis that life experiences may strengthen existing personality tendencies related to these life experiences (Roberts et al., 2003; see also Caspi & Moffitt, 1993).

Having children had a cumulative association with increasing emotionality, that is, having two or more children increased emotionality more than having only one child. Furthermore, although having one child did not strengthen high baseline emotionality, having two or more children did. These findings suggest that individual differences in emotionality may become more strongly expressed with increasing family size. A related pattern of emotionality and increasing family size was observed in the first part

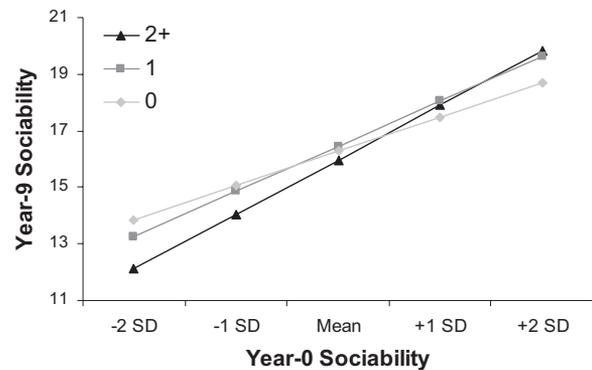


Figure 3. Predicted level of Year-9 sociability in men by Year-0 sociability (x-axis) and the number of children the participant had between Years 1 and 9 (separate lines: no children, one child, two or more children).

the study, in which emotionality did not predict the probability of having the first child but did decrease the probability of having more than one child. Thus, compared with less emotional individuals, highly emotional people appear to build smaller families and tend to become more distressed by large family sizes. Together these observations raise the hypothesis that high emotionality contributes to a preference for a small family size.

In contrast to our original hypothesis, having children did not increase sociability in the total cohort, suggesting that the relation between parenthood and increased social involvement observed in previous studies (Knoester & Eggebeen, 2006; Nomaguchi & Milkie, 2003) may be relevant to people's daily activities but not to personality development. However, having children strengthened men's baseline sociability, so that highly sociable men became more sociable fathers and less sociable men became even less sociable fathers. On the basis of this finding, we suggest that men's sociability may be related to how they adapt to their roles as fathers. Sociable men may be more likely to use the opportunities of social involvement offered by parenthood, whereas less sociable men may tend to direct their attention toward family life rather than other social activities. This hypothesis needs to be further tested with other measures of social relations. Moreover, it is not clear why this association was observed only in men, and further research with different personality measures is needed before making firm conclusions on this gender difference.

Limitations and Future Directions

The methodological strengths of the present study include a prospective longitudinal study design and a population-based sample. However, the findings need to be interpreted within three limitations. First, we only assessed three basic personality dimensions. Other personality characteristics, for example, agreeableness or conscientiousness, may also predict childbearing and may be differentially influenced by parenthood (e.g., Feldman & Aschenbrenner, 1983; Hawkins & Belsky, 1989; Roberts & Bogg, 2004). Second, we did not have data on characteristics of children or spouse, which may be important factors in adjusting to parenthood and increasing family size (e.g., Kohler, Behrman, & Skytthe, 2005; Sirignano & Lachman, 1985). Third, the participants were still in their reproductive years, so our study cannot tell how strongly personality is related to people's final number of children. Data spanning over longer periods of the life course are needed to evaluate this.

An important aim for future studies of personality and childbearing is to clarify the psychological and social mechanisms connecting personality traits to having children. In particular, the relationship between personality, marital status, and having children should merit more detailed study than was possible here. It may not be appropriate to consider marital status simply as a variable coming in between personality and childbearing. Having a partner naturally increases the probability of having children, but it is also likely that a preference for children will lead a person to seek for a partner. The present findings suggest that at least sociability may predict the probability of having children beyond its association with having a partner, whereas emotionality and activity may be important for childbearing due to their role in personal relationships. Future studies should include measures of childbearing motivation (Miller, 1992, 1994) and related prefer-

ences together with measures of personality, marriage, and childbearing, to clarify the temporal and causal relationships between these factors.

The present findings may have implications for research in evolutionary personality psychology (Buss & Greiling, 1999; Penke et al., 2007). Some evolutionary psychologists have argued that reproductive differentials in modern societies may tell us little about the evolved human mind, which has not adapted to our modern environment (Crawford, 2000; Symons, 1987). Evolutionary psychologists have therefore preferred to study mating and sexual behavior as modern proxies of reproductive success (e.g., Kanazawa, 2003; Pérusse, 1993). In light of this argument, it is interesting to note that our findings closely parallel previous findings of mating and marriage. High extraversion has been associated with increased number of sexual partners (e.g., Nettle, 2005), and low neuroticism has been shown to correlate with success in romantic relationships (e.g., Jockin et al., 1996). We found that high sociability (related to high extraversion) and low emotionality (related to low neuroticism) predicted an increased likelihood of having children. These parallels imply that mating behavior and having children may share common personality determinants in contemporary societies and that the study of reproductive differentials may offer interesting research avenues for evolutionarily oriented personality psychologists.

There are also potential practical implications arising from this study. The association between parenthood and change in emotionality may be important in understanding the etiology of hostile and maladaptive parenting, which is partly related to personality differences (e.g., Martorell & Bugental, 2006; Metsäpelto & Pulkkinen, 2003; Spinath & O'Connor, 2003). The observation that high emotionality is augmented by increasing family size suggests that parents with high emotionality may benefit the most from resources, such as family counseling and interventions or social and economic support for families with young children, which help them to cope with the demands associated with taking care of young children (Glade, Bean, & Vira, 2005). Obviously, the present findings need to be replicated with other measures of psychosocial well-being and parenting before their potential social implications should be considered further.

In conclusion, our study suggests that personality and having children are related to each other, with associations between them running both ways. Women and men with high sociability and men with high activity seem to be more likely to become parents, and individuals with high emotionality may be less likely to have children beyond the first child. When the family size of highly emotional individuals increases, they tend to become even more emotional. Likewise, sociable men who have children appear to become more sociable and less sociable men even less sociable. These findings clearly indicate that the study of childbearing and parenthood merits further attention from personality psychologists.

References

- Åkerblom, H. K., Uhari, M., Personen, E., Dahl, M., Kaprio, E. A., Nuutinen, E. M., et al. (1991). Cardiovascular risk in young Finns. *Annals of Medicine*, *23*, 35–40.
- Allport, G. W. (1961). *Pattern and growth in personality*. New York: Holt, Rinehart, & Winston.
- Asendorpf, J. B., & Wilpers, S. (1998). Personality effects on social

- relationships. *Journal of Personality and Social Psychology*, 74, 1531–1544.
- Astone, N. M., Nathanson, C. A., Schoen, R., & Kim, Y. J. (1999). Family demography, social theory, and investment in social capital. *Population and Development Review*, 25, 1–31.
- Belsky, J. (1986). Transition to parenthood. *Medical Aspects of Human Sexuality*, 20, 56–59.
- Belsky, J., Steinberg, L., & Draper, P. (1991). Childhood experience, interpersonal development, and reproductive strategy: An evolutionary theory of socialization. *Child Development*, 62, 647–670.
- Both, C., Dingemans, N. J., Drent, P. J., & Tinbergen, J. M. (2005). Pairs of extreme avian personalities have highest reproductive success. *Journal of Animal Ecology*, 74, 667–674.
- Botwin, M. D., Buss, D. M., & Shackelford, T. K. (1997). Personality and mate preferences: Five factors in mate selection and marital satisfaction. *Journal of Personality*, 65, 107–136.
- Buss, A. H., & Plomin, R. (1984). *Temperament: Early developing personality traits*. Hillsdale, NJ: Erlbaum.
- Buss, D. M., & Greiling, H. (1999). Adaptive individual differences. *Journal of Personality*, 67, 209–243.
- Camperio-Ciani, A., Corna, F., & Capiluppi, C. (2004). Evidence for maternally inherited factors favouring male homosexuality and promoting female fecundity. *Proceedings of the Royal Society of London Biological Sciences*, 271, 2217–2221.
- Caspi, A., & Moffitt, T. E. (1991). Individual differences are accentuated during periods of social change: The sample case of girls at puberty. *Journal of Personality and Social Psychology*, 61, 157–168.
- Caspi, A., & Moffitt, T. E. (1993). When do individual differences matter? A paradoxical theory of personality coherence. *Psychological Inquiry*, 4, 247–272.
- Caughlin, J. P., Huston, T. L., & Houts, R. M. (2000). How does personality matter in marriage? An examination of trait anxiety, interpersonal negativity, and marital satisfaction. *Journal of Personality and Social Psychology*, 78, 326–336.
- Crawford, C. (2000). Evolutionary psychology: Counting babies or studying information-processing mechanisms. *Annals of the New York Academy of Sciences*, 907, 21–38.
- Demo, D. H., & Cox, M. J. (2000). Families with young children: A review of research in the 1990s. *Journal of Marriage and the Family*, 62, 876–895.
- Dingemans, N. J., & Réale, D. (2005). Natural selection and animal personality. *Behaviour*, 142, 1165–1190.
- Eaton, W. O. (1994). Temperament, development, and the five factor model: Lessons from activity level. In C. F. Halverson, G. A. Kohnstamm, & R. P. Martin (Eds.), *The developing structure of temperament and personality from infancy to adulthood* (pp. 173–187). Hillsdale, NJ: Erlbaum.
- Eaves, L. J., Martin, N. G., Heath, A. C., Hewitt, J. K., & Neale, M. C. (1990). Personality and reproductive fitness. *Behavior Genetics*, 20, 563–568.
- Elder, G. H., & MacInnis, D. J. (1983). Achievement imagery in women's lives from adolescence to adulthood. *Journal of Personality and Social Psychology*, 45, 394–404.
- Eysenck, H. J. (1976). *Sex and personality*. Austin, TX: University of Texas Press.
- Feingold, A. (1992). Gender differences in mate selection preferences: A test of the parental investment model. *Psychological Bulletin*, 112, 125–139.
- Feldman, S. S., & Aschenbrenner, B. (1983). Impact of parenthood on various aspects of masculinity and femininity: A short-term longitudinal study. *Developmental Psychology*, 19, 278–289.
- Glade, A. C., Bean, R. A., & Vira, R. (2005). A prime time for marital/relational intervention: A review of the transition to parenthood literature with treatment recommendations. *The American Journal of Family Therapy*, 33, 319–336.
- Goldsmith, H. H., Buss, A. H., Plomin, R., Rothbart, M. K., Thomas, A., Chess, S., et al. (1987). Roundtable: What is temperament? Four approaches. *Child Development*, 58, 505–530.
- Gottesman, I. I. (1965). Personality and natural selection. In S. G. Vandenberg (Ed.), *Methods and goals in human behavior genetics* (pp. 63–80). New York: Academic Press.
- Graziano, W. G., Jensen-Campbell, L. A., & Sullivan-Logan, G. M. (1998). Temperament, activity, and expectations for later personality development. *Journal of Personality and Social Psychology*, 74, 1266–1277.
- Hagekull, B., & Bohlin, G. (1998). Preschool temperament and environmental factors related to the Five-Factor Model of personality in middle childhood. *Merrill-Palmer Quarterly*, 44, 194–215.
- Hagekull, B., & Bohlin, G. (2003). Early temperament and attachment as predictors of the five factor model of personality. *Attachment & Adult Development*, 5, 2–18.
- Haukka, J., Suvisaari, J., & Lönnqvist, J. (2003). Fertility of patients with schizophrenia, their siblings, and the general population: A cohort study from 1950 to 1959 in Finland. *American Journal of Psychiatry*, 160, 460–463.
- Hawkins, A. J., & Belsky, J. (1989). The role of father involvement in personality change in men across the transition to parenthood. *Family Relations*, 36, 378–384.
- Helbig, S., Lampert, T., Klose, M., & Jacobi, F. (2006). Is parenthood associated with mental health? *Social Psychiatry and Psychiatric Epidemiology*, 41, 889–896.
- Jockin, V., McGue, M., & Lykken, D. T. (1996). Personality and divorce: A genetic analysis. *Journal of Personality and Social Psychology*, 71, 288–299.
- 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, 2685–2714.
- Jokela, M., Elovainio, M., Kivimäki, M., & Keltikangas-Järvinen, L. (2008). Temperament and migration patterns in Finland. *Psychological Science*, 19, 831–837.
- Juonala, M., Viikari, J. S., Hutri-Kähönen, N., Pietikäinen, M., Jokinen, E., Taittonen, L., et al. (2004). The 21-year follow-up of the Cardiovascular Risk in Young Finns Study: Risk factor levels, secular trends and East–West difference. *Journal of Internal Medicine*, 255, 457–468.
- Kanazawa, S. (2003). Can evolutionary psychology explain reproductive behavior in the contemporary United States? *The Sociological Quarterly*, 44, 291–302.
- Knoester, C., & Eggebeen, D. J. (2006). The effects of the transition to parenthood and subsequent children on men's well-being and social participation. *Journal of Family Issues*, 27, 1532–1560.
- Kohler, H.-P., Behrman, J. R., & Skytthe, A. (2005). Partner + Children = Happiness? The effects of partnerships and fertility on well-being. *Population and Development Review*, 31, 407–445.
- Kohler, H.-P., Rodgers, J. L., & Christensen, K. (1999). Is fertility behavior in our genes? Findings from a Danish twin study. *Population and Development Review*, 25, 253–288.
- Kohler, H.-P., Rodgers, J. L., Miller, W. B., Skytthe, A., & Christensen, K. (2005). Bio-social determinants of fertility. *International Journal of Andrology*, 29, 46–53.
- Koskinen, S., Jalovaara, M., & Martelin, T. (2007). *Suomen väestö*. [The Finnish population]. Helsinki, Finland: Gaudeamus.
- Lehnart, J., & Neyer, F. J. (2006). Should I stay or should I go? Attachment and personality in stable and instable romantic relationships. *European Journal of Personality*, 20, 475–495.
- Martorell, G. A., & Bugental, D. B. (2006). Maternal variations in stress reactivity: Implications for harsh parenting practices with very young children. *Journal of Family Psychology*, 20, 641–647.

- McCrae, R. R., Costa, P. T., Jr., Ostendorf, F., Angleitner, A., Hrebicková, M., Avia, M. D., et al. (2000). Nature over nurture: Temperament, personality, and life span development. *Journal of Personality and Social Psychology*, 78, 173–186.
- McLanahan, S., & Adams, J. (1987). Parenthood and psychological well-being. *Annual Review of Sociology*, 13, 237–257.
- Mealey, L., & Segal, N. L. (1993). Heritable and environmental variables affect reproduction-related behaviors, but not ultimate reproductive success. *Personality and Individual Differences*, 14, 783–794.
- Metsäpelto, R.-L., & Pulkkinen, L. (2003). Personality traits and parenting: Neuroticism, extraversion, and openness to experience as discriminative factors. *European Journal of Personality*, 17, 59–78.
- Miller, W. B. (1983). Chance, choice, and the future of reproduction. *American Psychologist*, 38, 1198–1205.
- Miller, W. B. (1992). Personality traits and developmental experiences as antecedents of childbearing motivation. *Demography*, 29, 265–285.
- Miller, W. B. (1994). Childbearing motivations, desires, and intentions: A theoretical framework. *Genetic, Social and General Psychology Monographs*, 120, 223–253.
- Murphy, M., & Wang, D. (2001). Family level continuities in childbearing in low-fertility societies. *European Journal of Population*, 17, 75–96.
- Naerde, A., Røysamb, E., & Tambs, K. (2004). Temperament in adults—Reliability, stability, and factor structure of the EAS Temperament Survey. *Journal of Personality Assessment*, 82, 71–79.
- Nettle, D. (2005). An evolutionary approach to the extraversion continuum. *Evolution and Human Behavior*, 26, 363–373.
- Nettle, D. (2006). The evolution of personality variation in humans and other animals. *American Psychologist*, 61, 622–631.
- Neyer, F. J., & Asendorpf, J. B. (2001). Personality relationship transaction in young adulthood. *Journal of Personality Social Psychology*, 81, 1190–1204.
- Neyer, F. J., & Voigt, D. (2004). Personality and social network effects on romantic relationships: A dyadic approach. *European Journal of Personality*, 18, 279–299.
- Nomaguchi, K. M., & Milkie, M. A. (2003). Costs and rewards of children: The effects of becoming a parent on adults' lives. *Journal of Marriage and Family*, 65, 356–374.
- Oniszczenko, W., Zawadzki, B., Strelau, J., Riemann, R., Angleitner, A., & Spinath, F. M. (2003). Genetic and environmental determinants of temperament: A comparative study based on Polish and German samples. *European Journal of Personality*, 17, 207–220.
- Paris, R., & Helson, R. (2002). Early mothering experience and personality change. *Journal of Family Psychology*, 16, 172–185.
- Penke, L., Denissen, J. J. A., & Miller, G. F. (2007). Evolution, genes, and inter-disciplinary personality research. *European Journal of Personality*, 21, 639–665.
- Pérusse, D. (1993). Cultural and reproductive success in the industrial societies: Testing the relationship at the proximate and ultimate levels. *Behavioral and Brain Sciences*, 16, 267–322.
- Pesonen, A. K., Räikkönen, K., Keskivaara, P., & Keltikangas-Järvinen, L. (2003). Difficult temperament in childhood and adulthood: Continuity from maternal perceptions to self-ratings over 17 years. *Personality and Individual Differences*, 34, 19–31.
- Potts, M. (1997). Sex and the birth rate: Human biology, demographic change, and access to fertility-regulation methods. *Population and Development Review*, 23, 1–39.
- Raitakari, O. T., Juonala, M., Rönnemaa, T., Keltikangas-Järvinen, L., Räsänen, L., Pietikäinen, M., et al. (in press). Cohort profile: The Cardiovascular Risk in Young Finns Study. *International Journal of Epidemiology*.
- Rantakallio, P., & Myhrman, A. (1990). Changes in fertility and the acceptability of pregnancies in northern Finland during the last 20 years. *International Journal of Epidemiology*, 19, 109–114.
- Roberts, B. W., & Bogg, T. A. (2004). Longitudinal study of the relationships between conscientiousness and the social-environmental factors and substance-use behaviors that influence health. *Journal of Personality*, 72, 325–354.
- Roberts, B. W., Caspi, A., & Moffitt, T. E. (2001). The kids are alright: Growth and stability in personality development from adolescence to adulthood. *Journal of Personality and Social Psychology*, 81, 670–683.
- Roberts, B. W., Caspi, A., & Moffitt, T. E. (2003). Work experiences and personality development in young adulthood. *Journal of Personality and Social Psychology*, 84, 582–593.
- Roberts, B. W., Helson, R., & Klohnen, E. C. (2002). Personality development and growth in women across 30 years: Three perspectives. *Journal of Personality*, 70, 79–102.
- 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, 166–184.
- Rönkä, A., Oravala, S., & Pulkkinen, L. (2003). Turning points in adults' lives: The effects of gender and the amount of choice. *Journal of Adult Development*, 10, 203–215.
- Saudino, K. J. (2005). Behavioral genetics and child temperament. *Journal of Developmental and Behavioral Pediatrics*, 26, 214–223.
- Schmitt, A., & Atzwanger, K. (1995). Walking fast—Ranking high: A sociobiological perspective on pace. *Ethology and Sociobiology*, 16, 451–462.
- Schoen, R., Kim, Y. J., Nathanson, C. A., Fields, J., & Astone, N. M. (1997). Why do Americans want children? *Population and Development Review*, 23, 333–358.
- Singer, J. B., & Willett, J. B. (2003). *Applied longitudinal data analysis: Modeling change and event occurrence*. Oxford, Oxford University Press.
- Sirignano, S. W., & Lachman, M. E. (1985). Personality change during the transition to parenthood: The role of perceived infant temperament. *Developmental Psychology*, 21, 558–567.
- Smith, B. R., & Blumstein, D. T. (2008). Fitness consequences of personality: A meta-analysis. *Behavioral Ecology*, 19, 448–455.
- Spinath, F. M., & O'Connor, T. G. (2003). A behavioral genetic study of the overlap between personality and parenting. *Journal of Personality*, 71, 785–809.
- Symons, D. (1987). If we're all Darwinians, what's the fuss about? In C. Crawford, D. Krebs, & M. Smith (Eds.), *Sociobiology and psychology* (pp. 121–146). Hillsdale, NJ: Erlbaum.
- Udry, J. R. (1996). Biosocial models of low-fertility societies. *Population and Development Review*, 22(Suppl.), 325–336.

Received November 8, 2007

Revision received August 13, 2008

Accepted August 20, 2008 ■