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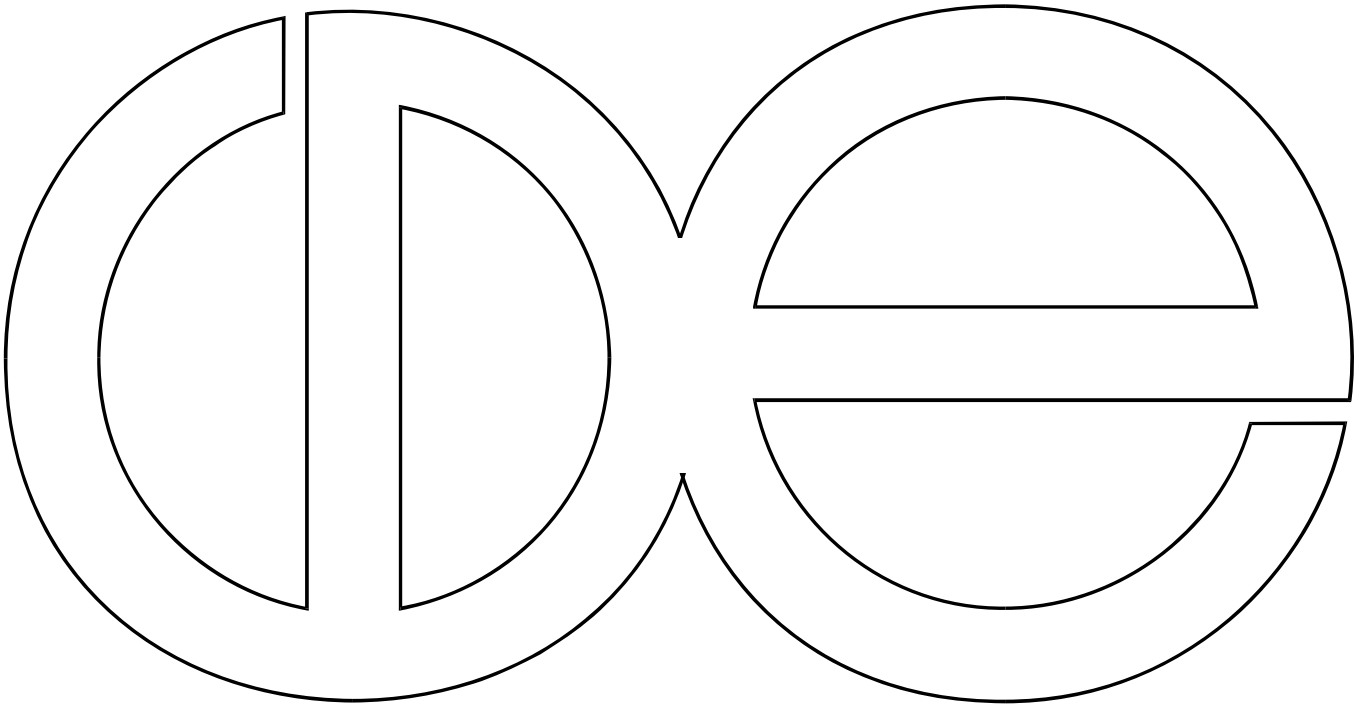

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Psychological Implications of Motherhood and Fatherhood in Midlife: Evidence from Sibling Models

ABSTRACT

Using a sample comprising full, twin, half-, step-, and adopted siblings, I examine psychological consequences of motherhood and fatherhood in midlife. My analysis includes *between-family* models that treat siblings as independent observations, and *within-family* models accounting for unobserved shared genetic and environmental endowments that may confound the relationship between parenthood and well-being. Further, I examine whether the psychological impact of parenthood varies based on siblings' genetic similarity. The findings reveal that parenthood has similar psychological implications for middle-aged mothers and fathers. The main differences arise from specific structural contexts of parenthood. The association between parenthood and mental health at midlife partly reflects shared and nonshared genetic influences. In contrast, shared early-life environment does not explain the psychological impact of parenthood.

KEYWORDS: parenthood, midlife, gender, siblings, psychological well-being

Psychological Implications of Motherhood and Fatherhood in Midlife: Evidence from Sibling Models

Psychological implications of parenthood in midlife have received relatively little attention from researchers. Yet, midlife is an important stage of parenthood when parents develop adult-to-adult relationships with their children and begin to see children's early accomplishments in adult roles (Ryff & Seltzer, 1996). Moreover, midlife is characterized by a diversity of the structural configurations of the parental role. Many parents may simultaneously have minor children at home and adult children who live independently (Umberson, 1996), whereas some parents coreside with their adult children (Goldscheider & Goldscheider, 1999). Therefore, Ryff and Seltzer (1996) emphasize the necessity of exploring heterogeneity among middle-aged parents to uncover conditions under which midlife parenthood is stressful or gratifying.

Using a sample of middle-aged men and women who graduated from Wisconsin high schools in 1957 and their siblings, I examine psychological consequences of the structural configurations of the parental role, including the number and age of children, the presence of nonbiological children, and coresidence of parents with adult children. In addition, I analyze the extent to which the psychological impact of parenthood differs for mothers and fathers. Finally, genetic and environmental early-life endowments can potentially influence both the configurations of the parental role and mental health and, thus, confound the relationship between parenthood and psychological well-being observed in adulthood (Kohler, Behrman, & Skytthe, 2005). My data enable me to control for a wide array of family background characteristics measured in 1957 and 1975-1977. In addition to these observed measures, I use fixed-effects sibling models and compare siblings of various degrees of genetic similarity to

account for unobserved genetic and early-life environmental factors that may affect the association between parenthood and mental health at midlife.

Diversity among Parents

The psychological consequences of parenthood may differ depending on the specific configurations of the parental role (Umberson, 1996; Umberson & Williams, 1999). I examine variation in the psychological impact of parenthood based on the number of children, children's age and living arrangements, and biological relatedness between parents and children.

The number of children. Parents with large numbers of children report higher levels of parental role strain and lower levels of psychological well-being (McLanahan & Adams, 1987). Among mothers, each additional child appears to increase anger (Ross & Van Willigen, 1996) and to decrease subjective well-being (Kohler et al., 2005). Yet, it is possible that the relationship between the number of children and parents' mental health is nonlinear because there may be an optimal family size associated with the highest level of well-being. Most respondents in my study came of age in the late 1950s and early 1960s when an average family had about three children (Casper & Bianchi, 2002). Therefore, I examine whether parents who had a normative family size of three children report higher levels of psychological well-being than their peers with smaller or larger families. Yet, an adequate consideration of the effects of family size on well-being should take into account the ages of children because the demands and rewards of parenthood are highly contingent on the stage in the family life course (Umberson, 1996).

Children's age and parental coresidence with minor children. Parents of minor children tend to report lower levels of psychological well-being than their childfree peers (Evenson & Simon, 2005; McLanahan & Adams, 1987). Yet, it is not parenthood per se that contributes to elevated distress, but the demands and strains that are often associated with having young

children at home (Umberson & Williams, 1999). The strains of parenthood attenuate when children become adults and leave the parental household (Koropeckyj-Cox, 1998). Therefore, I hypothesize that having minor children at home is associated with elevated distress among parents.

Coresidence of adult children and older parents may reflect either the needs of parents or the needs of children. On the one hand, adult children may use the parental home as a safety net in response to failures in marital or work roles. On the other hand, older parents may coreside with children because of the needs associated with declining health or widowhood (Ward, Logan, & Spitze, 1992). Yet, research shows that coresidence is more often a response to the needs and circumstances of adult children than parents, especially in midlife when parents are relatively young (Aquilino, 1990; Ward et al., 1992). Thus, coresidence with adult children may be stressful for parents because it may indicate children's failure to establish normative adult roles (Pillemer & Suitor, 2002). I hypothesize that parents who coreside with adult children report higher levels of psychological distress compared to parents whose children live independently. To capture the circumstances that might underlie intergenerational coresidence, my analysis includes indicators of parental health, marital and socioeconomic statuses, which can reflect parents' need for assistance or, conversely, parents' resources to help their children (Ward et al., 1992).

Step- and adopted children. Parenting nonbiological children may result in additional stressors and demands compared to having only biological children. Because remarriage is an incomplete institution lacking clear social norms and expectations, both mothers and fathers in stepfamilies may experience elevated distress and problematic relationships (Cherlin, 1978; Stewart, 2005). Being an adoptive parent may be also stressful to some extent. Adoptive families tend to be devalued in American society due to the prevailing emphasis on genetic ties

(Hamilton, Cheng, & Powell, 2007). In addition, research based on clinical psychiatric samples indicates that adopted children may be particularly prone to behavioral and psychological problems, although community studies typically find only small differences between adopted and nonadopted children, with adopted children exhibiting slightly elevated levels of distress and problematic behavior (Fisher, 2003). Thus, I hypothesize that having adult stepchildren or adopted children may introduce a potential for stress in parents' lives. I examine this hypothesis taking into account parents' marital status because it may influence both psychological well-being and the structural context of parenthood, particularly, the presence of stepchildren.

The quality of parent-child relationships. Existing research emphasizes the importance of the quality of relationships with adult children for parents' mental health. Studies consistently indicate that gratifying parent-adult child relationships are associated with high levels of parents' psychological well-being, whereas poorer intergenerational ties are linked to worse psychological outcomes for both mothers and fathers (Connidis & McMullin, 1993; Koropeckyj-Cox, 2002; Pillemer & Suitor, 1991). These findings suggest that the psychological benefits of parenthood are conditional on satisfying relationships with adult children (Koropeckyj-Cox 2002). Thus, the psychological implications of the structural characteristics of parenthood may depend on the quality of parent-child relationships. Therefore, my analysis includes indicators of intergenerational closeness and similarity to examine whether the quality of the parent-child relationships explains or moderates the impact of the structural characteristics.

Are Middle-Aged Mothers and Fathers Different?

The psychological implications of parenthood tend to differ by gender (McLanahan & Adams, 1987; Nomaguchi & Milkie, 2003). Existing research suggests two views regarding gender differences in psychological well-being of parents: the parental role and the gendered role perspectives. The *parental role perspective* (Scott & Alwin, 1989) holds that mothers of young

children experience more distress than fathers because the maternal role is more demanding and stressful (Ross & Van Willigen, 1996; Umberson, 1996). Yet, as children grow up and become self-sufficient adults, the parenting roles of mothers and fathers may gradually converge because women are no longer involved in labor-intensive and time-consuming childcare. In turn, comparable role involvement appears to have similar psychological consequences for men and women (Barnett, Brennan, Raudenbush, & Marshall, 1994). Conversely, the *gendered role perspective* suggests that regardless of the life-course stage, women are more responsive than men to psychological costs and rewards of parenthood because women were socialized to be particularly attuned to family roles. Women invest more emotionally in the parental role, and their sense of self is tied more closely to parenthood than is men's (Simon, 1992). Scott and Alwin (1989) show that the higher levels of the parental strain reported by mothers compared to fathers stem not only from the "objective" differences in the experience of the parenting role, but also from the differential orientations men and women bring to parenthood.

Thus, the parental role hypothesis predicts that because men's and women's parenting roles tend to converge in mid- and later life, the number of children, coresidence with adult children, and nonbiological parenthood are related in a similar way to mothers' and fathers' mental health. According to the gendered role hypothesis, women are more strongly than men affected by the structural characteristics of parenthood, regardless of the life-course stage.

Unobserved Genetic and Early-Life Environmental Influences

The associations between parenthood and psychological well-being observed in previous studies may reflect the causal effect of parenthood on mental health or, alternatively, the impact of factors that select individuals into specific configurations of the parental role and at the same time influence mental health. Genetic and early-life environmental endowments are important

selection factors that remain unaccounted for in most studies but may create a spurious relationship between parenthood and psychological well-being (Kohler et al., 2005).

Researchers have examined a wide array of early-life factors that can potentially influence both parenthood and mental health. Sociological studies emphasize the role of socioeconomic and demographic characteristics of the family of origin, including family size (Barber, 2001), parental divorce (McLanahan & Sandefur, 1994), parents' socioeconomic resources (Cherlin, Kiernan, & Chase-Lansdale, 1995), religious beliefs and affiliation (Pearce, 2002). Research in developmental psychology reveals the importance of parenting styles (Baumrind, 1993; Maccoby, 2000) and parent-child relationships (Jacob & Johnson, 2001). Whereas sociologists and developmental psychologists focus on environmental characteristics shared by siblings within families, behavioral genetics shows the importance of nonshared environment and genetic endowments. Twin and adoption studies indicate that roughly 50% of variability in personality and mental health is due to heredity, although heritability estimates are different for other psychological traits, such as mental ability and vocational interests (Bouchard, 2004). The proportion of variance in psychological outcomes unexplained by genetic influences is mostly due to environmental factors that are not shared by siblings who were reared together, whereas the contribution of shared environment tends to be small (Plomin, 1994; Plomin, DeFries, McClearn, & McGuffin, 2000).

Ideally, to examine how heredity and early-life family factors influence outcomes in adulthood, one would need direct and prospective measures of genetic and environmental early-life endowments. Because few data sets have these, researchers have relied on other approaches. First, most researchers studying psychological well-being of middle-aged and older adults use retrospective measures of early-life characteristics that are subject to cognitive biases. The strength of the data set used in this study is that it has sociodemographic indicators of family

background, such as family structure, family size, parents' education and income, measured prospectively in 1957 and 1975-1977 when respondents were adolescents and young adults. The availability of these measures enables me to assess directly the extent to which family background characteristics examined in sociological research affect the association between parenthood and psychological well-being at midlife.

Second, it is possible to account for early-life endowments indirectly. One approach is the fixed-effects sibling models that compare siblings from the same family to factor out the influences of unobserved environmental and genetic factors shared by individuals within families. The unobserved family influences are eliminated by differencing all variables between siblings and regressing the difference in the outcome variable on differences in the predictor variables (Powers, 2001). The fixed-effects models can be viewed as *within-family* models—because they compare members of the same family to each other. Fixed-effects sibling models have been widely used in sociology, economics, and demography (e.g., Conley & Bennett, 2001; Geronimus & Korenman, 1992; Kohler et al., 2005). For example, using a sample of Danish twins and fixed-effects estimation, Kohler and colleagues (2005) show that the associations between partnership/fertility behaviors and subjective well-being are affected by genetic dispositions.

The limitation of this approach is that it does not account for genetic and environmental influences that are not shared by siblings. Moreover, fixed-effects models do not assess which proportions of variance in the outcome variable are due to genetic and environmental factors. I can overcome these limitations to some extent by comparing sibling dyads of different genetic similarity. My sample includes full nontwin siblings, identical and fraternal twins, half-siblings, step- and adopted siblings. This diversity enables me to examine whether the association between parenthood and mental health differs significantly depending on the type of a sibling

dyad. Because fixed-effects models control for unobserved factors shared by siblings, the part of the psychological impact of parenthood left unexplained in these models can reflect confounding influences of nonshared genes and nonshared environment, in addition to reflecting a causal effect of parenthood. Among identical twins, the fixed-effects models account for all genetic influences, among fraternal twins and full nontwin siblings for 50%, and among half-siblings for 25%. In contrast, no genetic effect is eliminated among step- and adopted siblings who have no shared genes.

I examine the contribution of genetic endowments by testing interactive effects of parenthood and the type of a sibling dyad in the fixed-effects models. If the psychological impact of parenthood is similar regardless of the degree of siblings' genetic similarity, nonshared genetic dispositions do not contribute to the association between parenthood and psychological well-being. Conversely, if the relationship between parenthood and mental health is significantly weaker (a) among identical twins compared to all other types of sibling dyads, and (b) among full nontwin siblings and fraternal twins compared to half-, step-, and adopted siblings, this will provide evidence that the psychological implications of parenthood at midlife are partly explained by genetic influences because the more genes the two siblings share, the weaker the association between parenthood and mental health will be. In addition, I analyze the extent to which the psychological impact of parenthood differs among siblings who grew up in the same household and siblings who grew up separately. Although siblings growing up together do not share all environmental influences (Deater-Deckard, 2004), siblings reared together have more overlapping environments than siblings reared apart. Thus, if the effect of parenthood differs significantly among siblings who grew up together and siblings who did not share a household in childhood, this will suggest that shared early-life environment affects the association between parenthood and mental health observed in adulthood.

In sum, I examine the associations between structural configurations of the parental role and psychological well-being, and the ways that these associations differ by gender and the quality of parent-child relationships. Further, I assess how the psychological implications of parenthood change when sociodemographic characteristics of family background and unobserved genetic and environmental early-life influences are taken into account. First, I estimate between-family models that treat siblings as if they were unrelated individuals. In these models, I also include observed prospective measures of family background. Second, I compare between-family estimates to the coefficients from within-family fixed-effects models that account for unobserved genetic and environmental influences shared by siblings. Finally, I examine whether the relationship between parenthood and psychological well-being depends on siblings' genetic similarity and shared household environment in childhood.

METHOD

Sample

The analyses are based on data from the Wisconsin Longitudinal Study, a long-term study of a random sample of 10,317 men and women who graduated from Wisconsin high schools in 1957. The respondents were first interviewed during their senior year in high school, when they were 17 - 18 years old (1957). Subsequent interviews were completed at ages 36 (in 1975), 53 - 54 (in 1993), and 64 - 65 (in 2004). In 1977, the study was expanded with a survey of siblings of the main respondents. If a primary respondent had several siblings, only one randomly selected sibling was interviewed; thus, the sample consists of sibling dyads. In 1993 - 1994, four surveys were conducted: telephone and mail surveys of primary respondents ("graduates") and similar surveys of their siblings.

The present analysis is based on the 1993 - 1994 graduate and sibling data. My sample includes 4,432 full nontwin siblings, 18 monozygotic (MZ) twins, 68 dizygotic (DZ) twins, 148

half-siblings, 46 step-siblings, and 32 adopted siblings. The total sample includes 4,744 siblings and comprises 848 sister-sister dyads, 656 brother-brother dyads, and 868 sister-brother dyads. The data for graduates and siblings were combined to create a pooled data set, in which each variable has two values: one for the main respondent and the other for his or her sibling. Individual variables had between 0% and 1% missing values that were handled using the Stata command *ice* for multiple imputation (Acock, 2005).

Measures

Genetic similarity between two siblings in each dyad is represented with five mutually exclusive dummy variables: *full nontwin siblings* (reference category), *MZ twins*, *DZ twins*, *half-siblings*, and *adopted and stepsiblings*. Because my sample contains only 18 MZ twins, I created two additional dummy variables for sensitivity analysis: *same-gender twins* (n = 54) that includes MZ twins and same-gender DZ twins, and *opposite-gender twins* (n = 32) that includes opposite-gender DZ twins.

An indicator of *shared household* was obtained in 1994 and is coded 1 if two siblings had lived in the same household until at least one of them was 16. If siblings grew up in different households, this variable is assigned a value of 0.

Respondents' *mental health* ($\alpha = .83$) was evaluated using the 20-item Center for Epidemiologic Studies Depression Scale (CES-D). Respondents were asked to indicate the number of days in the past week that they experienced specific symptoms, such as feeling sad, depressed, or bothered by things that usually did not bother them. Response categories ranged from *0 to 7 days*. Responses to all items were averaged to create an index; higher scores reflect a greater number of depressive symptoms. To reduce the positive skew, I took a started log of the CES-D scale.

Independent variables. *Parental status* is coded 1 if a respondent had at least one living biological or nonbiological child at the time of the interview. Individuals who reported no children were assigned a value of 0. Parents were further categorized based on the *number of children*. I created three mutually exclusive dummy variables to capture potential nonlinearity in the relationship between family size and psychological well-being: *1 or 2 children; 3 children* (reference category); *4 or more children*. I chose these categories because three children is the mean value for the sample, and only about 8% of all parents had one child. The *presence of minor children* is coded 1 if a respondent had at least one living child 18 years or younger. *Coresidence with adult children* is coded 1 if at least one child aged 18 or older was living in the respondent's household at the time of the interview. *Adopted children* is coded 1 if an individual had at least one adopted child, and *stepchildren* is coded 1 if an individual had at least one stepchild.

Whereas the structural variables reflect *all* children, the *quality of parent-child relationships* was assessed with two questions about a randomly *selected child* of each respondent: similarity between the respondent's and the child's general outlook on life, and closeness between the respondent and the child. There are four response categories ranging from "*not at all similar/close*" to "*very similar/close*." The two items were averaged to create a scale ($\alpha = .70$). Because relationship quality was assessed only among graduates but not their siblings, I use this scale in an auxiliary analysis based on a sub-sample of graduates only.

Gender is coded 1 for women and 0 for men. A*ge at the time of the interview* is measured in years. Graduates were roughly the same age in 1993 (53 - 54 years), whereas siblings' ages ranged between 41 and 66, with a mean and median age of 54 years. *Education* refers to the years of schooling one has completed; categories include 12 or fewer years (reference category), 13 to 15 years, 16 years, and 17 or more years. All primary respondents, yet not all siblings,

graduated from high school. *Net worth* reflects the respondent's total household assets. To reduce the positive skew, I took a started natural log of income. *Employment status* is coded 1 if a respondent was working for pay at the time of the interview. *Marital status* is represented with four dummy variables: married (reference category), divorced, widowed, and never married. *Self-rated health* was assessed with a question: "How would you rate your health at the present time?" Response choices range from "1 = *very poor*" to "5 = *excellent*."

Sociodemographic family background characteristics were reported on several occasions: in 1957 and 1975 by graduates and in 1977 by siblings. Additional information was obtained from Wisconsin tax records in early 1960s. In most cases, there are at least two measurements of each characteristic. Only the number of siblings and early-life religious affiliation were assessed once in the 1975 graduate survey. Where possible, I include variables for graduates based on graduates' reports and variables for siblings based on sibling's reports in the between-family models. Yet, separate family background indicators available for graduates and siblings cannot be used in the within-family fixed-effects models because inter-sibling variation in these variables is negligible. My analysis includes indicators of *family structure* (coded 1 if the family was intact), *the total number of siblings born*, *years of education completed by the household head*, *farm origin* (coded 1 if the respondent's father was a farmer), *family income*, and *religious affiliation* represented by three mutually exclusive dummy variables: *Catholic* (reference category), *Protestant*, and *other religion*.

Analytic Strategy

My analysis includes two types of models. First, I use ordinary least squares (OLS) regression models with robust standard errors. These are between-family models because they treat siblings from the same family as independent observations. Second, I use fixed-effects, or

within-family, models that account for unobserved genetic and environmental endowments shared by siblings and can be represented by the following equation:

$$Y_{ij} - Y_j = (\alpha_j - \alpha_j) + \beta_1(X_{ij1} - X_{j1}) + \beta_2(X_{ij2} - X_{j2}) + ... + \beta_n(X_{ijn} - X_{jn}),$$

where Y_{ij} is the expected psychological well-being for sibling *i* from family *j*; α_j is a fixed term capturing the influence of unobserved factors related to family *j* and shared by both siblings from family *j*; X_{ijn} denotes the values of independent variables for sibling *i* from family *j*; Y_j and X_{jn} are overall family means that are subtracted from individual values.

Because fixed-effects models eliminate the effects of observed and unobserved variables that are invariant between siblings, such covariates cannot be included as predictors in the equation. Therefore, main effects of gender, genetic similarity, and shared household in childhood are not estimated in the within-family models. Yet, it is still possible to examine the interactive effects between sibling-invariant and sibling-varying measures (Johnson, 1995). Thus, I add these variables to the fixed-effects models as components of the respective interaction terms.

RESULTS

Summary statistics and correlations among the focal study variables are shown in Tables 1 and 2. As indicated in Table 1, 89% of all siblings grew up in the same household. Yet, this proportion varies dramatically across subsamples. Whereas over 90% of full nontwin siblings and all twins were raised together, only 54-56% of half-, step- and adopted siblings grew up in the same household.

With respect to parental characteristics, over 90% of all respondents are parents. Among parents, 38% have one or two children, 28% have three children, and 34% have four or more children. One fifth of respondents in the entire sample have minor children, and 27% coreside

with at least one adult child. Finally, 7% of respondents have at least one adopted child, whereas 8% have at least one stepchild. In addition, Table 1 shows summary statistics for each subgroup of siblings. Yet, due to a relatively small number of twins, adopted, and stepsiblings in my study, proportions for these subgroups should be treated as suggestive rather than robust estimates.

[Tables 1 and 2 about here]

Multivariate Analysis

In a preliminary analysis (available upon request), I examined whether parents differed from nonparents in terms of psychological well-being. Because there were no significant differences based on parental status, Table 3 shows the results from the analysis conducted among parents only.

[Table 3 about here]

Models 1 - 4 are based on the OLS regression analysis, whereas Models 5 - 7 are based on the fixed-effects analysis. Models 1 reveals that, in the between-family analysis, parents who have one or two children report elevated distress compared to parents of three children, and this effect remains virtually unchanged net of observed family background characteristics in Model 3. (I conducted a sensitivity analysis by excluding parents of one child, and the patterns were essentially the same.) Yet, in fixed-effects Model 5 that takes into account unobserved genetic and early-life endowments shared by siblings, the coefficient declines by 35% and becomes nonsignificant. In contrast, parents who have four or more children are similar to parents of three children in terms of depressive symptoms both in between-family Models 1 - 4 and within family Models 5 - 7.

Model 1 indicates that parents who have minor children report higher levels of distress than parents whose children are over 18 years old. This difference remains unchanged net of observed family background factors in Model 3. In within-family fixed-effects Model 5, the

coefficient for minor children increases by 47%, suggesting that this effect persists and even strengthens when shared genetic and environmental endowments are taken into account.

As shown in Models 1 - 7, coresidence with adult children and the presence of adopted children are not related significantly to parents' mental health either in the between- or within-family models. In contrast, having at least one stepchild is associated negatively with depressive symptoms in between-family Model 1, and this effect remains significant net of observed family background variables (Model 3). In within-family fixed-effects Model 5, the association between stepparenthood and depressive symptoms becomes nonsignificant due to the increased standard error; yet, the coefficient itself declines in magnitude only slightly, suggesting that this effect largely persists even when unobserved genetic and environmental endowments shared by siblings are taken into account.

Model 2 is based on a subsample of main respondents for whom the measure of the quality of parent-child relationships is available. The model reveals that closeness and similarity with a selected child are strongly and negatively related to parents' depressive symptoms. Yet, the associations between the structural characteristics of the parental role and mental health are significant net of the quality of intergenerational ties, and the coefficients for structural characteristics remain basically unchanged compared to the baseline model without the measure of relationship quality (not shown). In addition, as indicated by nonsignificant interaction terms (available upon request), the quality of parent-child relationships is equally important to mothers and fathers; moreover, it does not moderate the psychological impact of the structural aspects of parenthood.

As for gender differences, of all structural configurations of the parental role, gender interacted significantly only with the number of children. The interaction terms are based on three mutually exclusive dummy variables (1 or 2 children, 3 children, and 4 or more children);

thus, only two interaction terms are included because "three children" is omitted from the model as the reference category. The analysis of interactive effects simultaneously compares mothers to fathers and parents of three children to the other two categories of parents. A significant negative coefficient for the "1 or 2 children × gender" interaction term in between-family Model 4 means that fathers who have one or two children are more distressed than fathers of three children, whereas mothers who have one or two children are similar in terms of depressive symptoms to mothers of three children. Conversely, the coefficient for the "4 or more children × gender" interaction term is not statistically significant, which suggests that both mothers and fathers who have four or more children are not different from parents of three children in terms of depressive symptoms. Yet, in within-family Model 6, the coefficient for the "1 or 2 children × gender" interaction term declines almost by half and becomes nonsignificant, which implies that this gender difference is explained by unobserved genetic and early-life environmental endowments shared by siblings.

Within-family Model 7 examines whether the psychological impact of the structural characteristics of the parental role depends on the degree of genetic similarity between siblings. The model includes interaction terms that compare the association between parenthood and mental health in each subgroup of siblings to the reference category, i.e. to full nontwin siblings. Significant interaction coefficients are shown in Model 7. First, the negative "minor children × MZ twins" interaction term indicates that the association between the presence of minor children and parents' mental health is significantly weaker among MZ twins than among full nontwin siblings. Because my sample contains only 18 MZ twins, I conducted a sensitivity analysis by creating a variable for same-gender twin dyads that includes all MZ twins and same-gender DZ twins. As shown in Model 7, the two interaction terms are consistent with each other. To

interpret this interactive effect, I fitted separate models indicating that among full nontwin siblings, the coefficient for minor children is $b = .199$, $SE = .050$, $t = 4.03$, $p < .001$, whereas among same-gender twins, the effect size is $b = -.265$, $SE = .799$, $t = -.33$, $p = .745$. In contrast, other types of sibling dyads do not differ from full nontwin siblings with respect to the psychological impact of minor children.

Second, the effect of having at least one adopted child is weaker among full nontwin siblings than among adopted and stepsiblings who are not related genetically. Models fitted separately for each group of siblings indicate that among full nontwin siblings, the coefficient representing the psychological impact of having an adopted child is $b = -.041$, $SE = .078$, $t = -.53$, $p = .599$, whereas among nonbiological siblings the effect size is much larger: $b = 1.771$, $SE = .563$, $t = 3.15$, $p < .01$. This pattern is also evident when adopted and stepsiblings are analyzed as two separate categories rather than being combined in one group (not shown). Yet, because only half of adopted and stepsiblings in my sample grew up in the same household, this effect may also reflect nonshared environmental factors in addition to genetic influences.

Thus, the effects of minor children and adopted children on parents' mental health are moderated by siblings' genetic similarity such that each effect is weaker among siblings who share a larger proportion of genes and stronger among siblings who share a smaller proportion of genes or are not biologically related. In other words, the strength of each effect is negatively related to the degree of genetic similarity between siblings. These patterns suggest that genes not shared by siblings and, thus, not taken into account in the fixed-effects models are partly responsible for the associations between the presence of minor and adopted children and parents' mental health.

Finally, I examine whether growing up in the same household moderates the association between parenthood and mental health at midlife. Nonsignificant interaction terms (not shown)

indicate that the effect of parenthood is similar among siblings who were reared together and siblings who were reared apart. If growing up in the same household had explained the psychological impact of parenthood, the effects of the structural characteristics of the parental role would have been weaker among siblings who grew up together than among siblings who were raised separately. In contrast, my analysis shows that sharing a household in childhood does not make siblings more similar with respect to the psychological consequences of parenthood in middle age.

DISCUSSION

Using a sample of predominantly middle-aged siblings, I examined the association between parenthood and psychological well-being with a focus on three major themes: (a) heterogeneity among parents based on the structural configurations of the parental role; (b) gender differences and similarities in the psychological implications of parenthood; (c) unobserved genetic and early-life environmental influences on the relationship between parenthood and mental health.

When broadly categorized, parents do not differ from nonparents in terms of depressive symptoms. The main differences in mental health arise due to specific configurations of the parental role, which underscores the importance of examining heterogeneity among middle-aged parents. Consistent with previous research (Connidis & McMullin, 1993; Koropeckyj-Cox, 2002), the quality of parent-child relationships is strongly related to mental health of both mothers and fathers, as predicted by the parental role hypothesis. The structural and qualitative aspects of the parental role are significantly related to mental health net of each other. At least in the subsample of main respondents, relationship quality appears to have deeper psychological implications for parents at midlife than most structural configuration of the parental role. Moreover, it is possible that the association between the quality of intergenerational ties and

parents' well-being is influenced by unobserved genetic and early-life environmental endowments; yet, I could not explore this question with my data.

The number of children. Between-family models reveal that men who have one or two children are more distressed than fathers of three children, whereas mothers' depressive symptoms are similar regardless of the number of children. This gender difference may be explained by cohort and period influences. Most respondents in my study came of age in the late 1950s and early 1960s, a period characterized by a unique set of demographic conditions: early marriage, early childbearing, and large families with over three children on average (Casper & Bianchi, 2002). Under conditions of high fertility, failure to achieve the normative and desired family size of at least three children was likely to be distressing (White & McQuillan, 2006). Because women were expected to maintain the household and to take care of children (Carr, 2004), the psychological benefits of achieving the desirable family size among mothers might have been offset by strains of caring for a large family, whereas psychological costs of underachieved family size might have been buffered by fewer family demands.

Had I used the between-family models only, I would have concluded that family size triggered different psychological consequences in this cohort of mothers and fathers. Yet, within-family fixed-effects models show that these gender differences are explained either by shared genes (consistent with behavioral genetics) and/or by shared early-life environment (consistent with developmental psychology). In other words, certain genetic and environmental early-life endowments might have simultaneously elevated men's distress and prevented men from achieving a normative family size. In addition, the effect of the number of children is similar across all types of sibling dyads in the fixed-effects models, which suggests that once genes shared by siblings are taken into account, nonshared genes do not contribute further to the association between family size and parents' mental health.

Minor children. Middle-aged parents who have minor children report higher levels of depressive symptoms than parents whose children are over 18 years old. Moreover, this association is not moderated by gender—consistent both with the parental role perspective and research demonstrating very small gender differences in parenting stress (Deater-Deckard, 2004). Because older fathers are more involved in childrearing than their younger counterparts (Cooney, Pedersen, Indelicato, & Palkovitz, 1993), middle-aged men may experience demands and strains of caring for young children comparable to women's. In addition, a developmental perspective suggests that parents in midlife may experience a gender role crossover. Agentic qualities and the pursuit of personal accomplishments emerge for midlife women, whereas communal qualities, family, and fatherhood become more salient for men (Lachman, 2004).

Higher levels of depressive symptoms among parents of minor children persist in the within-family model, which indicates that shared genes and shared environment do not explain this effect. Yet, the analysis of interactive effects shows that the association between minor children and mental health is significantly stronger among full nontwin siblings who share 50% of genes than among MZ twins and same-gender twin who share, respectively, 100% and 75% of their genes. Although this finding is only suggestive because of a small number of MZ twins is my sample, nonshared genetic endowments appear to affect the relationship between the presence of minor children and parents' psychological well-being. In other words, certain genes may influence both the likelihood of having minor children at midlife and parents' mental health. Recent research has identified at least two genetic markers that are associated both with reproductive behaviors and psychological well-being: a functional polymorphism in the promoter region of the serotonin transporter gene (5-HTTLPR) and the dopamine D4 receptor exon III repeat (DRD4) (Guo & Tong, 2006; Hamer, 2002; Leonardo & Hen, 2006; Lesch et al., 1996; Krawczak et al., 2005; Tochigi et al., 2006).

Coresidence. The presence of a coresident adult child in the parents' household is unrelated to parents' psychological distress, and the psychological impact of coresidence with adult children does not depend on the quality of parent-child relationships. In addition, as predicted by the parental role perspective, the association between coresidence and mental health is similar for mothers and fathers. This finding is consistent with previous research documenting that most parents report high levels of satisfaction with the presence of adult children at home (e.g., Aquilino & Supple, 1991). Moreover, because of the rising importance of higher education and soaring housing costs, coresidence with adult children is becoming increasingly normative, especially when children are still in their 20s (Casper & Bianchi, 2002).

Nonbiological children. Adoptive parenthood is unrelated to distress, whereas having at least one stepchild is associated negatively with depressive symptoms both in the between- and within-family models. Consistent with the parental role perspective, the association between nonbiological parenthood and mental health is similar for mothers and fathers. These findings provide further evidence of resilience and adjustment of parents and children in nonbiological families. For example, Stewart (2005) suggests that the stress of boundary ambiguity in stepfamilies declines with the passage of time, whereas Brodzinsky and colleagues (1998) conclude that adult adoptees are similar to nonadopted adult children in terms of mental health.

Yet, the psychological impact of having adopted children is moderated by siblings' genetic similarity. Specifically, adoptive parenthood is not significantly related to distress among full nontwin siblings who share 50% of their genes, whereas there is a strong positive association among step- and adopted siblings who are not biologically related to each other. Thus, when genetic influences are not controlled, parents of adoptive children are more depressed than parents who have no adopted children; yet, this difference disappears when 50% of genetic endowments are taken account. This suggests that certain genetic dispositions may be associated

both with elevated distress and an increased likelihood of being an adoptive parent. Yet, this association may also reflect nonshared environmental influences because only half of nonbiological siblings in my study grew up in the same household.

Finally, my findings suggest that early-life shared household environment contributes little to the psychological impact of parenthood observed at midlife. First, sociodemographic characteristics of the family of origin have no effect on the relationships between configurations of the parental role and mental health. Second, the association between parenthood and psychological well-being is similar among siblings who were reared together and siblings who grew up in different households.

In sum, this study documents a complexity of parenthood experiences at midlife and psychological differences arising from specific configurations of the parental role. Consistent with the parental role perspective, my analysis reveals few gender differences in the association between parenthood and psychological well-being in midlife. Moreover, the findings indicate the importance of using family-level models for the analysis of parents' mental health because what appears to be psychological costs or rewards of parenthood in individual-level approaches may be a reflection of unobserved genetic and early-life environmental endowments that simultaneously affect parents' mental health and configurations of the parental role.

Limitations and Future Directions

Although the sample used in this study comprises sibling dyads of different genetic similarity, the number of identical twins is too small to yield robust estimates. Therefore, the extent to which the psychological impact of parenthood differs across the types of sibling dyads should be examined with data sets containing a larger proportion of twins. Further, because insufficient numbers of respondents in certain groups did not allow a detailed categorization, I could not test three-way interactions between parenthood, genetic similarity, and gender.

Another limitation of my data is that the quality of parent-child relationships was assessed with respect to *one* randomly selected child. A better measure of relationship quality should incorporate parents' ties with each of their children. In addition, it will be interesting to examine whether the psychological impact of relationship quality is partly explained by genetic and early-life environmental endowments. Finally, although the meaning, experiences, and psychological implications of parenthood differ by race, the sample I use is overwhelmingly based on White respondents. Future studies of parenthood and psychological well-being should rely on data that allow detailed racial comparisons. Yet, despite these limitations, my study reveals the diversity of parental experience in midlife and the importance of using within-family approaches to the analysis of psychological implications of parenthood rather than traditional individual-level models.

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Table 1. Summary Statistics for the Structural Characteristics of the Parental Role and Shared Household in Childhood: Wisconsin Longitudinal Study, 1993-1994

Variable	Total sample (N = 4,744)	Full nontwin siblings (n = 4,432)	MZ twins (n = 18)	DZ twins (n = 68)	Same-gender twins (n = 54)	Opposite-gender twins (n = 32)	Half-siblings (n = 148)	Adopted and stepsiblings (n = 78)
Shared household[a]	.890	.905	1.000**	1.000*	1.000**	1.000*	.541***	.564***
Parental status[b]	.912	.907	.875	.944	.875	.944	.911	.922
Number of children:								
1 or 2 children[c]	.378	.375	.389	.324	.259	.469	.459*	.462
3 children[d]	.282	.283	.278	.324	.370	.219	.223	.308
4 or more children[e]	.340	.342	.333	.353	.371	.312	.318	.230*
Minor children[f]	.199	.201	.278	.103*	.204	.009*	.229	.154
Coresident adult children[g]	.276	.275	.333	.412*	.426*	.344	.236	.333
Adopted children[h]	.068	.069	.111	.044	.037	.063	.068	.064
Stepchildren[i]	.084	.085	.111	.029	.037	.020	.101	.051

Note. [a]Shared household: 0 = *siblings were reared apart*; 1 = *siblings grew up in the same household*. [b]Parental status: 0 = *nonparent*; 1 = *parent of at least one biological or nonbiological child*. [c]1 or 2 children: 0 = *parent of 3 or more children*; 1 = *parent of 1 or 2 children*. [d]3 children: 0 = *parent of 1, 2, 4 or more children*; 1 = *parent of 3 children*. [e]4 or more children: 0 = *parent of 1, 2, or 3 children*; 1 = *parent of 4 or more children*. [f]Minor children: 0 = *no minor children*; 1 = *at least one child under 18*. [g]Coresident adult children: 0 = *no coresident adult children*; 1 = *at least one coresident child over 18*. [h]Adopted children: 0 = *no adopted children*; 1=*at least one adopted child*. [i]Stepchildren: 0 = *no stepchildren*; 1 = *at least one stepchild*.

*p < .05. **p < .01. ***p < .001 (asterisks denote significant differences between full nontwin siblings and other types of sibling dyads).

Table 2. Correlation Matrix for the Focal Study Variables: Men below Diagonal (n = 2,199), Women above Diagonal (n = 2,545), Wisconsin Longitudinal Study, 1993-1994

Variable	1.	2.	3.	4.	5.	6.	7.	8.
1. Depressive symptoms (CES-D)	——	.019	-.026	.005	.075***	.056**	-.001	-.022
2. One or two children[a]	.099***	——	——	——	-.030	-.097***	.065**	-.156***
3. Three children[b]	-.030	——	——	——	-.068***	-.038*	-.028	-.100***
4. Four or more children[c]	-.076***	——	——	——	.094***	.133***	-.039*	.249***
5. Minor children[d]	.067**	-.052*	-.007	.063**	——	-.026	.033	.087***
6. Coresident adult children[e]	.008	-.080***	.030	.056**	-.075***	——	.026	-.087***
7. Adopted children[f]	-.034	.048*	-.037	-.014	.080***	.006	——	.033
8. Stepchildren[g]	-.055**	-.150***	-.097***	.255***	.060**	-.049*	-.061**	——

Note. [a]1 or 2 children: 0 = *parent of 3 or more children*; 1 = *parent of 1 or 2 children*. [b]3 children: 0 = *parent of 1, 2, 4 or more children*; 1 = *parent of 3 children*. [c]4 or more children: 0 = *parent of 1, 2, or 3 children*; 1 = *parent of 4 or more children*. [d]Minor children: 0 = *no minor children*; 1 = *at least one child under 18*. [e]Coresident adult children: 0 = *no coresident adult children*; 1 = *at least one coresident child over 18*. [f]Adopted children: 0 = *no adopted children*; 1=*at least one adopted child*. [g]Stepchildren: 0 = *no stepchildren*; 1 = *at least one stepchild*.

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

Table 3. Summary of Ordinary Least Squares (OLS) and Fixed-Effects Regression Analyses for Variables Predicting Parents' Depressive Symptoms (*N* of observations = 4,744; *N* of groups = 2,372): Wisconsin Longitudinal Study, 1993-1994

Variables	OLS				Fixed-Effects		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Parental Characteristics:							
3 children (omitted category)[a]							
1 or 2 children[b]	.099**	.088*	.102**	.157**	.064	.094	.055
	(.034)	(.045)	(.034)	(.050)	(.047)	(.058)	(.048)
4 or more children[c]	.008	-.039	.005	-.026	-.078	-.158*	-.090
	(.037)	(.048)	(.037)	(.056)	(.049)	(.067)	(.051)
Minor children[d]	.129***	.097*	.129***	.131***	.190***	.163***	.190***
	(.039)	(.048)	(.040)	(.040)	(.048)	(.062)	(.047)
Coresident adult children[e]	.059	.046	.057	.056	.047	-.027	.047
	(.031)	(.041)	(.031)	(.031)	(.043)	(.061)	(.043)
Adopted children[f]	-.087	-.064	-.085	-.085	-.027	-.099	-.021
	(.054)	(.072)	(.054)	(.054)	(.075)	(.101)	(.076)
Stepchildren[g]	-.127*	-.172*	-.119*	-.117*	-.112	-.120	-.112
	(.052)	(.076)	(.053)	(.053)	(.069)	(.095)	(.069)
Quality of parent-child relationships	___	-.172***	___	___	___	___	___
		(.051)					
Genetic Similarity and Shared Household							
Full nontwin siblings (omitted category)[h]							
MZ twins[i]	-.073	___	-.077	-.076	___	___	___
	(.150)		(.151)	(.151)			
DZ twins[j]	.071	___	.081	.084	___	___	___
	(.160)		(.160)	(.162)			
Half-siblings[k]	.104	___	.120	.122	___	___	___
	(.067)		(.073)	(.072)			
Step- and adopted siblings[l]	-.040	___	-.023	-.021	___	___	___
	(.114)		(.115)	(.115)			
Shared household[m]	-.002	___	-.002	-.002	___	___	___
	(.048)		(.048)	(.048)			

Table 3 *(cont'd)*

Variables	OLS				Fixed-Effects		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Gender[n]	.117*** (.029)	.115** (.039)	.115*** (.029)	. 141** (.052)	___	___	___
Family Background Characteristics:							
Family structure[o]	___	___	.038 (.054)	.039 (.054)	___	___	___
Number of siblings born	___	___	-.001 (.007)	-.001 (.007)	___	___	___
Education of household head	___	___	-.004 (.005)	-.004 (.005)	___	___	___
Farm origin[p]	___	___	-.069 (.039)	-.067 (.039)	___	___	___
Family income	___	___	-.001 (.001)	-.001 (.001)	___	___	___
Catholic (omitted category)[q]							
Protestant[r]	___	___	-.054 (.031)	-.053 (.031)	___	___	___
Other religion[s]	___	___	-.019 (.068)	-.019 (.068)	___	___	___
Interactions by Gender:							
3 children × Gender (omitted category)							
1 or 2 children × Gender	___	___	___	-.132* (.067)	___	-.069 (.068)	___
4 or more children × Gender	___	___	___	.038 (.073)	___	.132 (.078)	___
Interactions by the Type of a Sibling Dyad:							
Minor children × MZ twins	___	___	___	___	___	___	-1.774* (.904)
Minor children × Same-gender twins	___	___	___	___	___	___	-.835* (.425)
Adopted children × Step- and adopted siblings	___	___	___	___	___	___	1.391* (.576)

Table 3 *(cont'd)*

Variables	OLS				Fixed-Effects		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Constant	4.808	1.288	4.861	4.821	3.814	3.785	3.824
R^2	.105	.084	.107	.109	——	——	——
σ_u	——	——	——	——	.692	.690	.699
σ_e	——	——	——	——	.901	.899	.899
Fraction of variance due to u_i	——	——	——	——	.371	.371	.377

Note. Model 2 is based on a subsample of graduates only (n = 2,372). All models adjust for age, education, net worth, employment status, marital status, and self-rated health (omitted from the table). Robust standard errors are given in parentheses.

[a]3 children: 0 = *parent of 1, 2, 4 or more children*; 1 = *parent of 3 children*. [b]1 or 2 children: 0 = *parent of 3 or more children*; 1 = *parent of 1 or 2 children*. [c]4 or more children: 0 = *parent of 1, 2, or 3 children*; 1 = *parent of 4 or more children*. [d]Minor children: 0 = *no minor children*; 1 = *at least one child under 18*. [e]Coresident adult children: 0 = *no coresident adult children*; 1 = *at least one coresident child over 18*. [f]Adopted children: 0 = *no adopted children*; 1=*at least one adopted child*. [g]Stepchildren: 0 = *no stepchildren*; 1 = *at least one stepchild*. [h]Full nontwin siblings: 0 = *other type of sibling dyads*; 1 = *full nontwin siblings*. [i]MZ twins: 0 = *other type of sibling dyads*; 1 = *identical twins*. [j]DZ twins: 0 = *other type of sibling dyads*; 1 = *fraternal twins*. [k]Half-siblings: 0 = *other type of sibling dyads*; 1 = *half-siblings*. [l]Step- and adopted siblings: 0 = *other type of sibling dyads*; 1 = *step- or adopted siblings*. [m]Shared household: 0 = *siblings were reared apart*; 1 = *siblings grew up in the same household*. [n]Gender: 0= *male*; 1 = *female*. [o]Family structure: 0 = *both parents present*; 1 = *one parent present*. [p]Farm origin: 0 = *household head was not a farmer*; 1 = *household head was a farmer*. [q]Catholic: 0 = *Protestant or other denomination*; 1 = *Catholic denomination*. [r]Protestant: 0 = *Catholic or other denomination*; 1 = *Protestant denomination.* [s]Other religion: 0 = *Catholic or Protestant denomination*; 1 = *other denomination.* $*p < .05$. $**p < .01$. $***p < .001$.

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