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Siblings of Adults With Mild Intellectual Deficits or Mental Illness: Differential Life Course Outcomes

Julie Lounds Taylor, Jan S. Greenberg, and Marsha Mailick Seltzer
Waisman Center, University of Wisconsin—Madison

Frank J. Floyd
Georgia State University

The present study contrasted the later life sibling relationships, patterns of family formation, and psychological distress and well-being of siblings of adults with disabilities to a nondisabled normative group. The authors identified 268 siblings of adults with mild intellectual deficits (ID) and 83 siblings of adults with mental illness (MI) from the Wisconsin Longitudinal Study (R. M. Hauser & W. H. Sewell, 1985; R. M. Hauser, J. Sheridan, & J. R. Warren, 1998), a prospective longitudinal study that followed participants from age 18 years to age 64 years. Compared with the norm ($n = 791$), siblings of adults with mild ID had more contact with family members and were more likely to live in the same state as the sibling with the disability but reported less affective closeness. Siblings of adults with MI reported more psychological distress, less psychological well-being, and less adaptive personality characteristics compared with the norm, particularly for siblings of men with MI. There were no differences between groups in the patterns of marriage and childbearing.

Keywords: sibling, adult development, intellectual disability, mental illness

Intellectual deficits (ID) and mental illness (MI) are prevalent in our society, with broad implications for stress and disruption for the many families affected by these disabilities (Marsh, 1992a; 1992b). Over 15% of the population has IQ scores indicating mild ID or ID (Neisser et al., 1996). Although their disability is often "hidden" in adulthood (Edgerton, 1967), these individuals remain at high risk for unemployment, unstable marital relationships, and psychological distress (Fujiura, 2003; Maughan, Collishaw, & Pickles, 1999; Richardson & Koller, 1996). Similarly, serious MI affects 5% of the adult population in the United States every year (Kessler et al., 1996). Despite the prevalence of these disorders, little is known about the impact that a person with mild ID or MI has on the development of his or her siblings, especially beyond childhood and during later adulthood. The present study examined how having a brother or sister with a disability influenced the sibling relationship, psychological development, family formation, and participation with the family of origin by the nondisabled sibling during later adulthood relative to a normative sample of nondisabled sibling pairs. The study was conducted with the Wisconsin Longitudinal Study (WLS; Hauser & Sewell, 1985; Hauser, Sheridan, & Warren, 1998), a population-based sample from Wisconsin that includes approximately 5,800 sibling pairs. The WLS provides a unique opportunity to identify sibling pairs in which one has a disability and examine outcomes over the entire adult lifespan, with the data extending from high school into early old age. In a critical review of sibling research, Hodapp, Glidden, and Kaiser (2005) discussed the importance of adopting a lifespan perspective and considering the development of siblings and sibling relationships into adulthood, as the reactions to the brother or sister with the disability may differ depending on the stage of the life course.

Hodapp and colleagues (2005) also advocated for the use of multiple contrast groups to determine the effects of different types of disabilities on sibling development. We were able to adopt this strategy with the WLS by identifying both siblings of adults with mild ID and siblings of adults with MI. By comparing both of these groups with a control group of siblings of adults with no known disabilities, we can examine the life course alterations that are common to both MI and mild ID, as well as the unique correlates of each of these disabilities.

There are a number of reasons why one would expect the life course of siblings of adults with mild ID or MI to differ from the norm. First, research with normative samples suggests that as adults move from middle into older age, the sibling relationship plays an increasingly significant role. Siblings tend to report feeling closer to each other as they age, and sibling instrumental and psychological support

Julie Lounds Taylor, Waisman Center, University of Wisconsin—Madison; Jan S. Greenberg and Marsha Mailick Seltzer, Waisman Center and Department of Social Work, University of Wisconsin—Madison; Frank J. Floyd, Department of Psychology, Georgia State University.

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Correspondence concerning this article should be addressed to Julie Lounds Taylor, who is now at the Department of Pediatrics and Special Education, Vanderbilt Kennedy Center, MRL 406A, Peabody Box 40, 230 Appleton Place, Nashville, TN 37203-5701. E-mail: julie.l.taylor@vanderbilt.edu

becomes more important (Cicirelli, 1995, 1996). Although scant research has examined the sibling relationship in later adulthood when one member has a lifelong disability, such relationships are likely different from the norm; these relationships tend to be less egalitarian, with the nondisabled sibling providing instrumental and emotional support that may not be fully reciprocated (G. B. Seltzer, Begun, Seltzer, & Krauss, 1991; Zetlin, 1986). A relationship with a brother or sister with a disability is more likely to be based on caregiving rather than companionship and mutual sharing, which could affect the intimacy and emotional closeness of the relationship. Indeed, studies of the normative sibling relationship suggest that these circumstances can reduce the quality of the sibling relationship and the mental health of the help giver (Cicirelli, 1995; 1996). The only study to look at the relationship between siblings beyond childhood when one had a disability that included a nonaffected comparison group confirms this premise. Begun (1989) found that there was less intimacy and perception of similarity in the sibling relationship when one had a disability, even though the siblings reported levels of affective closeness that were equal to those in nondisabled dyads.

Having a brother or sister with a disability may also affect the life course of the siblings by limiting their opportunities to establish and maintain their own families. Siblings of adults with developmental disabilities report that having a brother or sister with a disability impacts their decisions regarding life partners and having children of their own (M. M. Seltzer, Greenberg, Krauss, Gordon, & Judge, 1997). Hodapp and Urbano (2007) found that women under the age of 45 who have a brother or sister with developmental disabilities tend to marry and have children later than the norm but are just as likely to be married by mid and later adulthood. There may be long-term effects of delaying the acquisition of family roles, particularly on the number of children born to such siblings. Furthermore, M. M. Seltzer et al. (1997) found that siblings of adults with MI were even less likely than siblings of individuals with intellectual disabilities to be married in young adulthood. The increased support required by individuals with disabilities may make it more difficult for their siblings to sustain positive marital relationships.

Third, the life course of siblings of adults with disabilities may be affected by their having higher levels of solidarity with their families of origin, particularly among siblings of adults with mild ID. Bengtson and Roberts (1991), in their theory of family solidarity, suggested that having higher expectations about the importance of family roles and obligations is related to more frequent contact with family. The identification of an intellectual deficit generally occurs during early childhood, and past research has shown that siblings of individuals with such deficits learn early in their lives that the care of their brother or sister with disabilities is a shared family responsibility (Stoneman, 2005). Therefore, from a young age these siblings likely had higher expectations regarding their family obligations, which may be related to more family of origin involvement throughout their life course. On the other hand, MI is typically diagnosed during later adolescence or early adulthood, and therefore siblings of adults with MI would have had more typical socialization patterns regarding family obligations during childhood. Consequently, they may not experience higher levels of family solidarity.

Finally, differences in the nature of the behaviors associated with mild ID and MI, along with differential genetic risk for mental health problems, may have disparate effects on the mental health and personality characteristics of nondisabled siblings. Whereas ID is characterized by relative stability in the day-to-day functioning of the individual with the disability (Esbensen, Seltzer, & Krauss, in press), the symptoms of MI are more episodic and have a less predictable course (Marsh, 1992a). Some siblings of adults with MI also have an increased genetic risk of mental health problems themselves (Farmer et al., 2000; Kendler & Prescott, 1999), which, coupled with the stress of the brother's or sister's symptoms and behavior, may lead to increased rates of psychological distress, poorer psychological well-being, and less advantageous personality characteristics relative to siblings of adults with no known disabilities. Indeed, past research has shown that (a) siblings of adolescents and adults with MI—specifically siblings of individuals with a diagnosis of major depression—tend to have higher levels of depression and neuroticism and lower levels of cooperativeness and extraversion than do siblings of nondisabled brothers and sisters (Farmer et al., 2003, 2002; Masi et al., 2003) and (b) these less advantageous personality characteristics are due to both genetic and nongenetic causes (Farmer et al., 2002). In contrast, siblings of adults with intellectual disabilities are not generally vulnerable to mental health problems (Burton & Parks, 1994; Cleveland & Miller, 1977), perhaps because the symptoms of intellectual disabilities are more predictable and consequently easier to manage. These siblings may, in fact, develop more positive personality characteristics than the norm because of being socialized toward caregiving at an early age. Studies often report more conscientiousness and helpful behaviors for children who have a brother or sister with intellectual disabilities than for siblings with typically developing brothers and sisters (Cuskelly & Gunn, 2003; Stoneman, Brody, Davis, & Crapps, 1989), which could manifest itself in higher levels of conscientiousness and agreeableness as they age.

In using the WLS to examine life course outcomes for siblings, we are able to address and rectify some of the methodological limitations that have plagued past research focused on siblings of individuals with disabilities. First, as noted by Hodapp et al. (2005), much of the extant research on siblings of individuals with disabilities used small samples of convenience, which limits the statistical power available to examine interacting variables and also places substantial restrictions on the generalizability of findings. Because the WLS is a large unselected sample, concerns related to insufficient statistical power and selection biases are minimized. Second, Hodapp et al. (2005) also noted that the majority of sibling research focuses on a selected sibling who is the "most involved" or who has the closest emotional relationship with the person with the disability. It is therefore unclear whether the experiences of this most involved

sibling generalize to other siblings in the family. The WLS addresses this concern because the sibling chosen for study was randomly selected from all available siblings in the family. Third, previous research examined siblings of individuals with severe disabilities that are relatively rare—including developmental disabilities such as mental retardation, autism, and Down syndrome—and mental illnesses such as schizophrenia and bipolar disorder (Greenberg, Seltzer, Orsmond, & Krauss, 1999; Orsmond & Seltzer, 2000; G. B. Seltzer et al., 1991; M. M. Seltzer et al., 1997). In the present article, we focus on more prevalent nonnormative sibling experiences, namely having a sibling with mild ID or MI such as depression and anxiety.

The Present Study

On the basis of theory and previous research, we developed four hypotheses. First, we hypothesized that siblings of adults with mild ID would have a relationship with their brother or sister with the disability that is similar to the norm; in contrast, siblings of adults with MI would have a relationship with their brother or sister that is characterized by less closeness and less contact. We expected that the detrimental effects of less egalitarian sibling relationships would be offset by early socialization toward caregiving and more family solidarity among siblings of adults with mild ID, resulting in a sibling relationship similar to the norm in contact and closeness. For siblings of adults with MI, we did not expect the detrimental effects of unreciprocated support to be offset by family solidarity (as the diagnoses of MI occurred later in the lifespan). Thus, we hypothesized that emotional distance in the sibling relationship would persist into older age.

Second, we anticipated that siblings of adults with mild ID would have similar marital patterns to the norm in later life but would have fewer children due to their likelihood of being married at an older age. They also would be more involved with their family of origin because of higher family solidarity. We expected that siblings of adults with MI would be less likely to be married in later life due to the stress of providing support to their brother or sister with difficult, unpredictable symptoms and behaviors. Because we did not expect higher levels of family solidarity when one member has an MI, we hypothesized that siblings' patterns of family of origin involvement would not differ from the norm.

Third, we expected that siblings of adults with mild ID would experience similar levels of psychological distress and well-being compared with the norm but that siblings of adults with MI would have more distress and lower levels of well-being. We hypothesized that, in terms of personality, siblings of adults with mild ID would have higher levels of conscientiousness and agreeableness due to early socialization toward caregiving, and siblings of adults with MI would have more neuroticism, less extraversion, and less agreeableness due to both genetic vulnerability and as a reaction to providing support to their brother or sister with difficult symptoms.

Fourth, we hypothesized that gender would play an important role in the sibling relationship. In earlier research on siblings of adults with MI (Greenberg et al., 1999), siblings expressed that they were less inclined to provide future care for brothers with an MI as compared with sisters. We expected that these gender patterns would generalize to other aspects of the sibling relationship and predicted that siblings of brothers with MI would have less frequent contact and rate the relationship as less close than would siblings of brothers with no disability. However, we did not expect such gender differences for siblings of individuals with intellectual disabilities, as previous research has generally not found the gender of the sibling with intellectual disabilities to impact the sibling relationship (e.g., Greenberg et al., 1999; Orsmond & Seltzer, 2000).

Method

Wisconsin Longitudinal Study

The WLS is based on a random sample of 10,317 women and men who graduated from Wisconsin high schools in 1957. Follow-up surveys were conducted at these three time points: in 1975 with 9,138 (90.1%) surviving members of the original sample when they were, on average, 36 years old; in 1992 with 8,493 (87.2%) of the surviving original respondents when they were in their early 50s; and again in 2004 with 7,265 (80.0%) of the surviving respondents when they were in their mid 60s. In addition, parallel data collection procedures were conducted with one randomly selected sibling of the respondents in 1977, 1994, and 2005, with 5,823 siblings participating in one or more of these data collection points. At this later time, the siblings averaged 64 years of age, similar to the mean age of the original respondents. Family background data in 1957 and high school IQ scores were available for both the respondents and their randomly selected siblings. Data from the 2004–2005 wave, the primary data used in the present analyses, were collected via a telephone interview and a self-administered mail-back questionnaire.

Participants

We use the term *target individual* to refer to the sibling with the disability and *sibling of interest* to refer to the nondisabled member of the sibling pair. We identified three groups of sibling pairs for the current study from the combined sample of original respondents and their siblings.

We identified target individuals with mild ID by using IQ scores generated from the Henmon–Nelson Test of Mental Ability (Henmon & Nelson, 1937), administered in high school to all participants. Using similar cut-off scores as in previous research (M. M. Seltzer et al., 2005; Valliant & Davis, 2000), we classified individuals as having mild ID if they had IQs of 85 or below, with 61 being the lowest possible score on the Henmon–Nelson intelligence test. Because IQ tends to be quite stable across the life course (Deary, Whalley, Lemmon, Crawford, & Starr, 2000), this earlier measure of IQ is also indicative of intellectual functioning during middle and later adulthood.

We identified target individuals with MI by ascertaining all of the participants who self-reported ever being diagnosed with an MI, which was assessed in the 2004–2005 telephone survey. Fully 85.5% of individuals in this sample who answered affirmatively that they had been diagnosed with an MI had been diagnosed with either depressive disorder or anxiety disorder (or both). The remaining individuals were diagnosed with episodic mood disorders (n = 7, or 8.4%), schizophrenic disorders (n = 3, or 3.6%), or alcohol dependence syndrome (n = 2, or 2.4%). In order to reduce overlap across the groups, we excluded from this analysis any respondents with mild ID who also reported an MI or a major depressive episode.

Siblings of the target individual were eligible for the present study if they reported never having been diagnosed with an MI, had an IQ score of 100 or above (1 *SD* higher than the cut-off criterion for mild ID), and had completed both the telephone interview and mail-back survey in 2004–2005 (full inclusion criteria and detailed flow chart available by request from Julie Lounds Taylor). Although eliminating siblings who themselves have mild ID or MI places some limitations on the ability to generalize our findings to the full population, this selection criterion was necessary to ensure that any deviations from the norm in later life development and sibling relationships could not be attributed to the sibling's own disability. This selection process resulted in 268 nondisabled siblings who had a brother or sister with mild ID and 83 nondisabled siblings who had a brother or sister with MI.

The comparison group was constructed by ascertaining all of the sibling pairs in which neither member had mild ID and neither reported ever having been diagnosed with an MI. One person from each comparison group pair was randomly designated the "target individual" and the other was the "sibling of interest." In order to ensure comparable IQ scores across all groups, we included in the analyses only cases in which the sibling of interest had an IQ score of 100 or above. Finally, the sibling of interest must have completed both the telephone interview and mail-back survey in 2004–2005. This resulted in 791 siblings in the comparison group. In all groups, cases were excluded if either member of the selected sibling pair had died prior to the 2004–2005 interview.

Table 1 presents the demographic characteristics for each of the sibling groups, as well as analysis of variance (ANOVA) and chi-square tests to determine if there were significant differences between the groups in demographic and background characteristics. Follow-up tests for significant ANOVA effects are also presented in Table 1. When considering the characteristics of the nondisabled sibling, we found that few significant background differences emerged. Siblings in all three groups were slightly more likely to be women than men, which is consistent with the

Table 1
Descriptive Statistics and F Tests/Chi-Squares for Family of Origin and Background Variables

	Group means and percentages			Test statistics[a]		
Variable	Mild ID	MI	Comparison group	Overall	Mild ID vs. comparison group	MI vs. comparison group
Characteristics of nondisabled sibling and sibship						
Female	54.5%	55.4%	52.5%	0.51		
Age (yrs.) in 2004–2005	63.93 (4.76)	63.87 (4.42)	64.03 (4.42)	0.09		
Size of sibship	3.92 (1.96)	3.61 (1.58)	3.67 (1.88)	1.98		
Older than disabled sibling	50.8%	56.6%	52.2%	0.85		
Currently employed	47.4%	51.8%	48.8%	0.51		
IQ score in 1957	109.84 (7.84)	114.16 (9.74)	113.53 (9.90)	16.34**	30.59**	0.33
Years of education	13.75 (2.43)	14.32 (2.32)	14.56 (2.59)	10.06**	20.11**	0.64
Characteristics of disabled (target) sibling						
Female	44.8%	66.3%	47.8%	12.13**		
Currently married	80.6%	56.6%	82.0%	30.26**		
Age (yrs.) in 2004–2005	64.78 (4.39)	62.18 (4.95)	64.01 (5.03)	7.83**	3.45	10.39**
Currently employed	47.7%	42.0%	48.8%	1.39		
Family of origin characteristics measured in 1957						
Mother's education (yrs.)	10.17 (2.84)	11.42 (2.41)	11.03 (2.69)	12.03**	20.14**	1.59
Father's education (yrs.)	9.65 (2.84)	11.42 (3.47)	10.87 (3.27)	16.18**	27.21**	2.10
Father's SEI	266.84 (168.33)	357.00 (208.87)	370.96 (230.04)	23.30**	46.34**	0.31
Family income in hundreds	55.85 (54.76)	72.52 (47.78)	68.69 (49.75)	6.84**	12.23**	0.43
Population of town	28,448.69 (55,888.05)	48,207.83 (68,288.72)	44,543.93 (67,460.66)	6.68**	14.88**	0.22

Note. ID = intellectual deficits; MI = mental illness; SEI = socioeconomic index.
[a] The test statistic for percentages is a chi-square. The test statistic for means is an F test. Follow-up tests were only conducted for F tests when there was a significant difference in the overall test.
** $p < .01$.

gender composition of the WLS at this point of data collection. They averaged about 64 years of age and came from sibships averaging between three and four members, and just over 50% were older than the target brother or sister. Approximately half were employed in 2004–2005. Siblings of adults with mild ID had significantly lower IQ scores (by about 4 points) than did comparison siblings and had completed about one year less of education, on average.

There were differences between the MI and comparison groups when examining the characteristics of the disabled brother or sister. Individuals with MI were more likely to be women, were less likely to be currently married, and were significantly younger (by 2 years) than the comparison group; individuals with mild ID did not differ from the comparison group on these variables. There were no differences between the groups in the percentages who were employed in 2004–2005.

In terms of the family of origin variables (i.e., the variables measured in 1957, when the sibling was in high school), the mild ID group significantly differed from the comparison group on every measure. Specifically, mothers and fathers of individuals with mild ID completed fewer years of education and fathers had less prestigious occupations as measured by Duncan's socioeconomic index (Duncan, 1961; Hauser & Warren, 1997). The families of individuals with mild ID had a lower total household income and were living in towns and cities that were significantly smaller in population than those of the comparison group. There were no differences between the MI and comparison groups on any family of origin or background variable. All members of the present sample were Caucasian, reflective of Wisconsin's population at midcentury.

Measures

Measurement of IQ score. IQ was assessed with the Henmon–Nelson Test of Mental Ability: Grades 7–12 (Henmon & Nelson, 1937), a group-administered IQ test that was given to all Wisconsin high school students during their junior year of high school. A detailed description of the measure can be found in M. M. Seltzer et al. (2005). The original scale and subsequent revisions have been widely used in educational testing and research on mental ability, and psychometric data on the Henmon–Nelson indicate that it provides reliable and valid scores that reflect general intellectual functioning (Gregory, 2004).

Measures of the sibling relationship in 2004–2005. Information was obtained about the relationship between the sibling of interest (i.e., the nondisabled sibling) and the target brother or sister (i.e., the individual with mild ID or MI or the target individual in the comparison group) through four questions. Nondisabled siblings were asked whether they currently live in the same state as the target brother or sister (1 = *lived in the same state*, 0 = *did not live in the same state),* how close they feel to the target individual *(1 = not at all close* to 4 = *very close),* the number of days they had contact (including both in-person and telephone) with the brother or sister in the past year (range: 0–365), and how similar they are to the target brother or sister in terms of general outlook on life (1 = *not at all similar* to 4 = *very similar*).

Family formation and participation in 2004–2005. The following information was obtained about family formation in 2004–2005: the nondisabled sibling's current marital status (1 = *married*, 0 = *not married*), whether the sibling had been married more than one time (1 = *married more than once*; 0 = *not married more than once*), and the number of children born to the sibling (the number of children born to nondisabled siblings in the present sample ranged from 0 to 12, with approximately 95% of such siblings reporting 5 or fewer children). Involvement with the family of origin was measured by the number of times the sibling had visited with relatives during the 4 weeks prior to the interview, and whether the sibling felt he or she could talk to any brothers or sisters (not specifically the sibling with the disability) about his or her personal problems (1 = *yes*, 0 = *no*).

Measures of psychological distress, well-being, and personality in 2004–2005. Depression was measured by the Center for Epidemiological Studies–Depression Scale (CES-D; Radloff, 1977), which has been used extensively in samples of midlife and older adults (Gatz & Hurowicz, 1990). For each of 20 depressive symptoms, the nondisabled sibling was asked to indicate how many days in the past week the symptom was experienced. The data were recoded into four categories (0 = *never* to 3 = *5 to 7 days*), consistent with the conventional scoring of the CES-D. The total score is the sum of the category ratings for the 20 items ($\alpha = .82$), with higher scores indicating more depressive symptoms. In addition, siblings were asked in the 2004–2005 interview whether they ever had a depressive episode lasting 2 weeks or more (1 = *yes*, 0 = *no*). Siblings were counted as having a depressive episode if they responded affirmatively to that question, regardless of the cause of the episode.

The 2004–2005 survey also included a modified version of Ryff's Psychological Well-Being measure (Ryff, 1989), which consists of a series of 31 statements such as "I have the sense that I have developed a lot as a person over time" and "I judge myself by what I think is important, not by what others think is important," to which the siblings respond on a scale of 1 to 6 (1 = *disagree strongly* to 6 = *agree strongly*). Items are summed to form six dimensions of well-being: Self-Acceptance, Positive Relations With Others, Autonomy, Environmental Mastery, Purpose in Life, and Personal Growth. All subscales consisted of five items except the Purpose in Life scale, which consisted of six items. For the present analyses, all of the items were averaged to obtain an overall well-being score, with higher scores indicating more positive well-being ($\alpha = .92$).

Personality was measured in the 2004–2005 survey by a modified version of the Big Five Inventory (John, Donahue, & Kentle, 1991). This inventory was designed to allow assessment of the Big Five personality dimensions in a self-report format. The Extraversion (vs. Social Inhibition) scale captures gregarious, energetic, and expressive features of behavior ($\alpha = .79$). The Agreeableness (vs. Antagonism) scale reflects prosocial characteristics, describing the person who is empathic and makes an effort to establish positive

relationships with others ($\alpha = .68$). The Conscientiousness (vs. Lack of Direction) scale captures the multiple elements of persistence and impulse control in task and achievement settings ($\alpha = .67$). The Neuroticism (vs. Emotional Stability) scale reflects multiple elements of negative emotionality, such as nervous tension, fearfulness, and brittleness under stress ($\alpha = .73$). The Openness to Experience scale refers to persons who are imaginative, curious, and creative ($\alpha = .66$). Each item was measured on a 6-point scale (1 = *disagree strongly* to 6 = *agree strongly*). All scales consisted of six items except the Neuroticism scale, which consisted of five items. Items from each scale were averaged, with higher scores indicating higher levels of the personality trait.

Method of Data Analysis

The method of data analysis was two-way analysis of covariance (ANCOVA). The first independent variable was disability group, specifically, whether the participant was a sibling of a person with mild ID or MI or a comparison sibling. The second independent variable was the gender of the target individual, that is, the brother or sister with mild ID, MI, or the randomly selected target individual in the comparison group. Preliminary analyses suggested that the gender of the nondisabled sibling had a main effect on many of the outcomes but rarely interacted with disability group (analyses available from Julie Lounds Taylor). Thus, we chose to statistically control for gender of the nondisabled sibling and not include it as a factor in the models. Type III sums of squares was chosen as the method for obtaining marginal means; this implies an unweighted average of the cell means and thus insures that the mild ID and MI groups, which have smaller sample sizes, will not be weighted less strongly than the comparison group.

Because we were primarily interested in how siblings of adults with mild ID or MI differed from the norm, we conducted planned pairwise comparisons for all significant disability group main effects or Disability Group × Gender interactions. For main effects, the mild ID group was contrasted with the comparison group, and the MI group was contrasted with the comparison group. For Disability Group × Target Gender interactions, the following contrasts were tested: siblings of sisters with mild ID versus siblings of comparison sisters; siblings of brothers with mild ID versus siblings of comparison brothers; siblings of sisters with MI versus siblings of comparison sisters; and siblings of brothers with MI versus siblings of comparison brothers.

In order to disentangle the life course implications of having a brother or sister with mild ID or MI from the background characteristics for which group differences were found (see Table 1), we included statistical controls for mother's and father's education, father's occupational prestige, family income, population of 1957 town, and IQ of the nondisabled sibling in all subsequent analyses. Although it is not known whether the groups differed on other unmeasured variables, controlling for these background variables in effect makes the groups equivalent on those variables for which differences were observed. As noted earlier, statistical controls for the gender of the nondisabled sibling were also included.

Results

Are Sibling Relationships With Disabled Individuals Different From the Norm?

The ANCOVA for the sibling relationship variables and adjusted group means can be found in Table 2. There was a main effect of disability group for all four of the sibling relationship variables. Follow-up tests indicated that significant differences for the proportion of siblings living in the same state and closeness were between the mild ID and comparison groups (ts = 2.53 and –2.41, respectively, ps <

Table 2
2004–2005 Sibling Relationship Variables by Disability Group and Gender

Test, group, and gender	Proportion who live in same state	Closeness	No. of contacts in past year	Similarity in outlook on life
		F tests from analysis of covariance		
Disability group	3.52*	3.46*	3.77*	8.35**
Target gender[a]	0.84	8.54**	3.65	0.14
Disability Group × Target Gender	0.49	0.96	0.80	1.89
		Group means (*SE*)		
Siblings of adults with mild ID				
Target sister	0.58 (0.05)	3.18 (0.07)	39.73 (7.58)	2.88 (0.07)
Target brother	0.60 (0.04)	2.86 (0.07)	30.68 (6.88)	2.85 (0.06)
Siblings of adults with MI				
Target sister	0.42 (0.07)	3.04 (0.11)	32.70 (11.07)	2.71 (0.10)
Target brother	0.53 (0.09)	3.01 (0.15)	21.81 (15.57)	2.83 (0.14)
Siblings of comparison adults				
Target sister	0.50 (0.03)	3.29 (0.04)	59.20 (4.23)	3.13 (0.04)
Target brother	0.50 (0.02)	3.02 (0.04)	36.24 (4.06)	2.96 (0.04)

Note. Nondisabled sibling's IQ and gender, mother's and father's education, father's job prestige, family income in 1957, and size of 1957 town are controlled in all analyses. ID = intellectual deficits; MI = mental illness.
[a] Refers to the gender of the brother or sister with the disability (or the target sibling in the case of the comparison group).
* $p < .05$. ** $p < .01$.

.05). Siblings of adults with mild ID were more likely to be living in the same state as their brother or sister with the disability ($M = 0.59$, $SE = 0.03$) than were siblings of comparison adults ($M = 0.50$, $SE = 0.02$). However, despite this geographic proximity, siblings of adults with mild ID reported feeling less emotionally close to the target sibling than in the comparison group ($M = 3.02$, $SE = 0.05$, for mild ID group; $M = 3.16$, $SE = 0.03$, for comparison group). The post hoc tests revealed that both the mild ID and MI groups had significantly fewer contacts with the target sibling than did the comparison group (ts = –2.08 and –2.05, respectively, ps $< .05$), with the mild ID group averaging 35.20 ($SE = 5.17$) contacts per year and the MI group reporting an average of 27.25 ($SE = 9.56$) contacts per year, whereas the comparison group averaged 47.72 ($SE = 2.94$) contacts. Furthermore, siblings in both the mild ID and MI groups reported a more dissimilar outlook on life than that of the brother or sister with the disability ($M = 2.87$, $SE = 0.05$, for mild ID group; $M = 2.77$, $SE = 0.09$, for MI group) as compared with siblings in the comparison group ($M = 3.04$, $SE = 0.03$; ts = –3.20 and –2.94, respectively, ps $< .01$).

Patterns of Family Formation and Involvement With Family of Origin

Results from the ANCOVA for family formation and involvement as well as the adjusted subgroup means are presented in Table 3. Regarding family formation, there were no significant differences between the groups in the proportion of siblings who were currently married or had been married more than one time by their mid 60s or the number of children they had. However, regarding involvement with the family of origin, analyses indicated statistically significant main effects of disability group for the number of visits with relatives and ability to talk with siblings. Follow-up tests revealed that the differences were between siblings of adults with mild ID and siblings of comparison adults. Siblings of adults with mild ID visited with relatives nearly once a week, which is about one more visit per month than in the comparison group ($M = 3.78$, $SE = 0.20$, for mild ID group; $M = 3.07$, $SE = 0.12$, for comparison group; $t = 2.99$, $p < .01$). Although they had more visits with relatives, individuals who had a brother or sister with mild ID were significantly less likely to report being able to talk with siblings ($M = 0.44$, $SE = 0.03$) than individuals in the comparison group ($M = 0.54$, $SE = 0.02$; $t = –2.58$, $p < .05$).

Psychological Distress, Well-Being, and Personality

The results of the ANCOVA for psychological distress, well-being, and personality as well as adjusted group means are presented in Table 4. A significant main effect of disability group was found for lifetime history of depression; follow-up analyses revealed that the prevalence of the person ever having had a depressive episode was higher for siblings of individuals with MI ($M = 0.31$, $SE = 0.06$) than in the comparison group ($M = 0.19$, $SE = 0.01$; $t = 2.19$, $p < .05$). There were no differences among the groups in current depressive symptoms (as measured by the CES-D). Regarding psychological well-being of the sibling, there was a significant interaction between disability group and the gender of the target brother or sister (group means are presented in the lower section of Table 4). Follow-up tests indicated that siblings of brothers with MI had significantly lower well-being scores than had siblings of brothers in the comparison group ($t = –2.99$, $p < .01$). In contrast to the effects for the MI group, effects for siblings of individuals with mild ID did not differ from the norm in psychological distress or well-being.

Table 3
2004–2005 Family Formation and Involvement Variables by Disability Group and Gender

Test, group, and gender	Proportion currently married	Proportion married more than once	Total number of children	Number of visits with relatives	Proportion can talk with any sibling
			F tests from analysis of covariance		
Disability group	1.98	1.68	1.07	4.60**	3.50*
Target gender[a]	0.02	0.04	0.56	0.17	6.35*
Disability Group × Target Gender	0.07	0.50	0.34	1.12	0.39
			Group means (*SE*)		
Siblings of adults with mild ID					
Target sister	0.78 (0.04)	0.12 (0.04)	2.92 (0.15)	4.12 (0.30)	0.48 (0.05)
Target brother	0.77 (0.03)	0.16 (0.03)	2.66 (0.14)	3.44 (0.27)	0.40 (0.04)
Siblings of adults with MI					
Target sister	0.81 (0.05)	0.24 (0.05)	3.10 (0.22)	3.16 (0.45)	0.54 (0.07)
Target brother	0.84 (0.07)	0.17 (0.07)	3.11 (0.31)	3.67 (0.61)	0.42 (0.09)
Siblings of comparison adults					
Target sister	0.84 (0.02)	0.18 (0.02)	2.95 (0.09)	3.17 (0.17)	0.61 (0.03)
Target brother	0.83 (0.02)	0.20 (0.02)	2.86 (0.08)	2.98 (0.16)	0.47 (0.03)

Note. Nondisabled sibling's IQ and gender, mother's and father's education, father's job prestige, family income in 1957, and size of 1957 town are controlled in all analyses. ID = intellectual deficits; MI = mental illness.
[a]Refers to the gender of the brother or sister with the disability (or the target sibling in the case of the comparison group).
*$p < .05$. **$p < .01$.

Table 4
2004–2005 Distress, Well-Being, and Personality Variables by Disability Group and Gender

Test, group, and gender	Any lifetime history of depression	CES-D	Psychological well-being	Extraversion	Agreeableness	Conscientiousness	Neuroticism	Openness
			F tests from analysis of covariance					
Disability group	3.60*	2.52	2.82	5.56**	1.33	3.17*	0.84	0.24
Target gender[a]	0.47	0.50	3.66	1.31	4.01*	3.77	2.54	0.32
Disability Group × Target Gender	0.69	2.34	3.73*	2.91	3.10*	1.20	5.73**	0.22
			Group means (*SE*)					
Siblings of adults with mild ID								
Target sister	0.25 (0.04)	7.66 (0.57)	4.84 (0.06)	3.69 (0.08)	4.74 (0.06)	4.81 (0.06)	2.99 (0.08)	3.57 (0.07)
Target brother	0.23 (0.04)	5.77 (0.51)	4.87 (0.05)	3.84 (0.07)	4.75 (0.06)	4.75 (0.06)	2.90 (0.07)	3.64 (0.06)
Siblings of adults with MI								
Target sister	0.25 (0.06)	7.11 (0.82)	4.85 (0.08)	3.61 (0.12)	4.80 (0.09)	4.71 (0.09)	2.68 (0.12)	3.59 (0.10)
Target brother	0.37 (0.09)	8.25 (1.15)	4.48 (0.11)	3.21 (0.17)	4.41 (0.13)	4.43 (0.13)	3.27 (0.16)	3.63 (0.14)
Siblings of adults with MI								
Target sister	0.19 (0.02)	6.39 (0.31)	4.81 (0.03)	3.76 (0.05)	4.73 (0.04)	4.78 (0.03)	2.94 (0.05)	3.64 (0.04)
Target brother	0.18 (0.02)	5.97 (0.30)	4.83 (0.03)	3.74 (0.04)	4.74 (0.03)	4.76 (0.03)	2.82 (0.04)	3.64 (0.04)

Note. Nondisabled sibling's IQ and gender, mother's and father's education, father's job prestige, family income in 1957, and size of 1957 town are controlled in all analyses. ID = intellectual deficits; MI = mental illness.
[a]Refers to the gender of the brother or sister with the disability (or the target sibling in the case of the comparison group).
*$p < .05$. **$p < .01$.

There were statistically significant effects of disability group for four out of the five factors of personality. Specifically, there were main effects of disability group for extraversion and conscientiousness, and significant interactions between disability group and the gender of the target brother or sister for agreeableness and neuroticism. Follow-up tests for all of these variables revealed significant differences between the MI and comparison groups; there were no differences in personality measures for siblings of adults with mild ID. Consistent with expectations, siblings of individuals with MI had lower extraversion scores ($M = 3.41$, $SE = 0.10$) and conscientiousness scores ($M = 4.57$, $SE = 0.08$) than did siblings in the comparison group ($M = 3.75$, $SE = 0.03$, for extraversion; $M = 4.77$, $SE = 0.02$, for conscientiousness; ts = –3.27 and –2.47, respectively, ps $< .05$). Group means for the interactions are found in the lower section of Table 4. Siblings of brothers with MI had significantly lower agreeableness scores and higher neuroticism scores than did siblings of brothers in the comparison group (ts = –2.51 and 2.66, respectively, ps $< .05$). However, contrary to expectations, siblings of sisters with MI had lower neuroticism scores than did siblings of sisters in the comparison group ($t = –2.07$, $p < .05$).

Discussion

As expected, the results from the present study demonstrated a differential pattern of effects depending on the type of disability of the target sibling. For siblings of adults with mild ID, we observed an altered pattern in the quality of the relationship with the brother or sister with the disability as well as their involvement with their family of origin. Interestingly, siblings of adults with mild ID were more likely than the norm to live in the same state as their brother or sister with the disability and had more contact with their extended family but appeared to be less emotionally close to their extended family members (including the brother or sister with mild ID). These findings provide evidence for an "obligatory" type of relationship between the nondisabled sibling and the brother or sister with mild ID. Bengtson (2001) defines an *obligatory relationship* as one that has a high level of structural connectedness, that is, high levels of proximity and interaction. However, in obligatory relationships, structural connectedness is offset by a lower level of emotional attachment. Although we had hypothesized that high levels of family solidarity for siblings of adults with mild ID would contribute to normative emotional closeness between siblings and greater emotional closeness among extended family members, our results suggest that in older age the nondisabled siblings' relationships with their brother or sister and extended family may better be characterized by norms of obligation rather than feelings of closeness.

Differences were also observed in the sibling relationship for siblings of adults with MI, who, compared with the normative group, reported less contact with their brother or sister with the disability as well as a more dissimilar outlook on life. This pattern is corroborated by previous research in which siblings of young adults with MI coped by psychologically distancing themselves from their sibling (M. M. Seltzer et al., 1997). These findings may also be related to the downward mobility that is often experienced by indi-

viduals with disabilities (Jenkins, 1991), leading to a considerable gap in socioeconomic status among siblings. Disparities in social status may explain why nondisabled siblings rate their brother or sister with MI as being dissimilar to them and may also be related to declining contact, as individuals tend to prefer to spend time with others who have similar achievements (Verbrugge, 1977).

We found that siblings of adults with mild ID did not differ from the norm on any of the measures of psychological well-being, distress, or personality during later adulthood, nor did their patterns of family role acquisition (i.e., marriage, childbearing) differ from the norm. These patterns are mostly consistent with our hypotheses and with data from volunteer samples, which have generally found few negative psychological effects of having a sibling with an intellectual disability and marital patterns that appear similar to the norm during later adulthood (Burton & Parks, 1994; Cleveland & Miller, 1977; Hodapp & Urbano, 2007).

In contrast to the situation with the mild ID group, the most striking pattern of differences from the norm when one member had MI was in the psychological realm. Siblings of adults with MI had a higher likelihood of ever having a depressive episode and were less extraverted and less conscientious. These findings are corroborated by previous research (Farmer et al., 2000, 2002; Kendler & Prescott, 1999). In addition, siblings of brothers with MI (but not siblings of sisters with MI) had lower levels of psychological well-being, scored lower on agreeableness, and had higher levels of neuroticism than did siblings of brothers without disabilities. Although we had hypothesized that the gender of the adult with MI would influence the sibling relationship, its main influence was instead on the psychological functioning of the nondisabled sibling. It may be that the psychological well-being and personality dimensions are affected more for siblings of men because of the tendency for men with MI to have more severe symptoms than do women (Thorup et al., 2007).

Although the differences between siblings of individuals with MI and those in the comparison group might reflect underlying genetic vulnerability rather than the reactive effects of having a sibling with a disability, these gender-specific findings argue against a completely genetic explanation of the psychological effects of having a sibling with MI. Farmer and colleagues (2002) drew a similar conclusion; using a sibling pair design, they determined that both genetic and nongenetic factors contributed to the personality of siblings of individuals with major depression.

It is important to note that the cross-sectional nature of this study does not permit us to draw the conclusion that the adult with the disability is the cause of the group differences that emerged. As pointed out by Stoneman (2005), there are many other factors that influence the development of the sibling separate from the person with the disability him- or herself. In addition to having genetically linked vulnerabilities, siblings of brothers or sisters with disabilities likely grow up in more strained family environments than do normative sibling pairs, because of the stress that caring for a child with disabilities has on the whole family. Although this study is an important first step in describing the later life development of siblings of adults with disabilities, behavioral genetics and adoption studies are needed to tease apart the impacts of genetic predispositions and the family environment on the functioning of siblings.

There are three main limitations in the present study. As with any study, the generalizability of findings is limited by the characteristics of the sample. All participants in this sample attended high school in the same state, and all were European American, reflecting Wisconsin's population at midcentury. Although this sample is likely more representative of the population than the siblings from self-selected convenience samples, the findings are nonetheless limited by the geographic and age cohort from which the sample was drawn. Second, adults with mild ID and their siblings came from families of origin that consistently differed from the norm. Families that had a member with mild ID tended to be poorer and lived in smaller towns, and the parents tended to have less education than in the comparison group. Although these family of origin factors were statistically controlled in all of our analyses, they may be indicative of other unmeasured, preexisting dissimilarities between the groups that help contribute to the observed differences in siblings' later life outcomes. Third, beyond basic gender comparisons, the group comparison design used in this article masks heterogeneity in individual patterns of resilience and vulnerability within the sibling population. The next step in our program of research will be to examine the pathways leading to more or less favorable sibling relationships in later life and psychological well-being among aging individuals who have a brother or sister with a disability.

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