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Predictors of Helping Profession Choice and Volunteerism among Siblings of Adults with Mild Intellectual Deficits

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Abstract

This study examined aspects of the sibling relationship that predicted altruistic behaviors in siblings of individuals with mild intellectual deficits at three time points in adulthood: in their mid 30s, early 50s, and mid 60s. We identified 393 such siblings from the Wisconsin Longitudinal Study, a prospective longitudinal study that followed participants from ages 18 to 64. Being an only sibling, being older than the brother or sister with mild intellectual deficits, as well as having more contact with and feeling closer to the brother or sister predicted more altruistic behavior in adulthood for female siblings, but not for males. Earlier measures of contact and closeness between siblings were better indicators of altruistic behaviors than concurrent measures.

Over 15% of the population has IQ scores that indicate some type of intellectual deficit (Neisser et al., 1996). Despite this prevalence, little is known about how the siblings of these individuals are affected by their brother or sister's disability, particularly in adulthood. Many of the extant studies exploring sibling development find negative effects related to having a brother or sister with intellectual disabilities. For example, typically developing siblings of children with intellectual disabilities have more symptoms of depression than siblings of typically developing individuals (Summers, Summers, & White, 1994); in adulthood, these siblings have relationships with their brother or sister with a disability that are less egalitarian (Seltzer, Begun, Seltzer, & Krauss, 1991) and more likely to be characterized by a sense of obligation (Taylor, Greenberg, Seltzer, & Floyd, 2008). However, meta-analysis shows that the negative effects of having a brother or sister with an intellectual disability are small (Rossiter & Sharpe, 2001). It is therefore important to also consider the positive impacts of having a brother or sister with a disability, as well as ascertain which siblings are most likely to manifest the positive outcomes. The present study focuses on the role of sibling relationship variables in predicting one such positive characteristic - altruism.

Altruistic behaviors, or behaviors with the ultimate goal of increasing another's welfare (Kruger, 2003), have been linked to numerous positive outcomes. On average, adults who practice volunteerism (an aspect of altruism) have lower mortality rates, report better mental and physical health, and have greater life satisfaction than adults who do not engage in volunteerism (Van Willigen, 2000; Warburton & Peel, 2008; Windsor, Anstey, & Rodgers, 2008). Furthermore, the benefits of altruistic behaviors are not merely due to greater social involvement; Piliavin, (2005) who distinguished between social activities directed toward helping others and those that were self-beneficial, found that other-directed activities were more highly correlated with positive well-being than activities that were self-beneficial.

Although findings are somewhat mixed, siblings of individuals with disabilities tend to exhibit more altruistic behaviors. Children who have a brother or sister with a disability tend

to demonstrate more helping behaviors (such as babysitting or teaching) within their family contexts and display higher levels of conscientiousness (Cuskelly & Gunn, 2003; Hannah & Midlarsky, 2005; Stoneman, Brody, Davis, & Crapps, 1989; Wilson, Blacher, & Baker, 1989). Findings have been less consistent among adults. Earlier studies found that siblings reported having a brother or sister with an intellectual disability as an important influence on their choice of entering a helping profession (Cleveland and Miller, 1977), especially for those who spent more time with the brother or sister with the disability (Farber, 1963). A more recent study by Marks, Matson, and Barraza (2005) suggested that having a brother or sister with an intellectual disability influenced siblings' choice to enter the field of special education. Burton and Parks (1994), however, found no differences in helping profession choices between siblings of individuals with intellectual disabilities and siblings of typically developing individuals.

Although there seems to be a trend toward more altruistic behavior among siblings who have a brother or sister with an intellectual disability, the extant research is limited in that it fails to account for heterogeneity within samples of siblings. Factors such as the gender of the sibling, the gender of the brother or sister with a disability, birth order, and the nature of the sibling relationship all contribute to variability in how siblings experience having a brother or sister with an intellectual disability (e.g. Lobato, 1983, Orsmond & Seltzer, 2000), and may also influence how having a brother or sister with a disability impacts helping profession choice or volunteerism (aspects of altruism). The present study addressed these issues by considering the roles of sibling relationship characteristics in predicting which siblings are most likely to display altruistic behaviors.

Furthermore, the extant studies of altruistic behavior among siblings of those with intellectual disabilities are primarily cross-sectional, focusing on siblings at specific points in the lifespan (e.g., childhood, early adulthood). In contrast, involvement in altruistic behaviors changes over adulthood, increasing through middle age and then declining in older adulthood (Van Willigen, 2000). Women, who are more likely to hold helping professions (Cleveland & Miller, 1977), may leave the workforce while their children are young (Cabrera, 2007) resulting in a developmental effect on helping profession choice. Research also suggests that the sibling relationship changes throughout adulthood. Older, typically-developing sibling pairs tend to report higher levels of closeness relative to younger cohorts (Cicirelli, 1996), whereas the opposite pattern may be true among siblings of adults with intellectual disabilities. Hodapp and Urbano (2007) found that siblings in middle adulthood reported less closeness to their brother or sister with intellectual disabilities than young adult siblings. It is therefore important to use longitudinal studies to consider how changes in the sibling relationship due to developmental stage (e.g., early adulthood, late adulthood) may impact altruistic behaviors at different points in adulthood. The present study addressed this issue by using a longitudinal design to follow siblings through adulthood, from their mid 30s to their early 60s.

Predicting Altruism from Aspects of the Sibling Relationship

Characteristics of the sibling relationship such as gender composition, birth order, number of siblings, and involvement are important predictors of siblings' caregiving activities directed toward their brother or sister with an intellectual disability. We hypothesized that the same factors that predict altruistic behaviors within the sibling relationship (such as taking care of the brother or sister with an intellectual disability) would also predict more general altruistic behaviors outside of the sibling relationship (volunteerism and helping profession choice).

Gender

Of all aspects of the sibling relationship, the gender of the non-disabled sibling has been most consistently related to caregiving behaviors and closeness between siblings. Compared to brothers, sisters spend more time with their sibling with an intellectual disability, consider themselves closer, and are more likely to co-reside with that sibling (Hodapp, Urbano, & Burke, 2010; Orsmond & Seltzer, 2000). The gender of the brother or sister with the disability can have an additional impact on the sibling relationship and potentially altruistic outcomes – particularly for male siblings. Orsmond and Seltzer (2000) reported that female siblings of adults with intellectual disabilities gave similar positive and negative responses about their involvement in the sibling relationship regardless of their brother or sister's gender. Male siblings, however, reported fewer positive feelings, more negative feelings, and more worry about their sibling's future if they had a sister with an intellectual disability compared to a brother. Assuming that those who had a more positive relationship with their brother or sister with a disability would have more altruistic behaviors, these findings suggest that female siblings might exhibit more altruistic behaviors regardless of the gender of the brother or sister with an intellectual disability, and male siblings might be more involved in altruism if they had a brother with a disability compared to a sister.

Birth order

Birth order also may play a role in the experience of having a sibling with an intellectual disability. During childhood, older siblings are more likely than younger siblings to be directive in interactions with their brothers or sisters with intellectual disabilities (Floyd, Purcell, Firchardson, & Kupersmidt, 2009); in adulthood, older siblings are more likely than younger siblings to provide custodial care and emotional support to their brother or sister with intellectual disabilities (Seltzer, Greenberg, Krauss, Gordon, & Judge, 1997). This expectation of increased care and altruistic behaviors within the family setting may generalize to more altruistic behaviors outside of the family in adulthood.

Number of siblings

Another aspect of the sibling relationship that may impact siblings' altruistic behaviors is the number of siblings in the family. In families of typically-developing individuals, children with fewer siblings exhibit more altruistic behavior than those with more siblings (Mulder, 2007). Among families of individuals with intellectual disabilities, smaller family size is associated with greater burden reported by siblings in childhood (McHale, Sloan, & Simeonsson, 1986). Having fewer siblings to share in helping tasks could increase the amount of helping behavior for typically developing children who have a brother or sister with a disability, leading to a habit of helping that carries over into altruism in adulthood.

Contact and closeness

The affective nature of the sibling relationship has also been shown to impact the degree of care that siblings provide for their brother or sister with an intellectual disability. Siblings who reported higher levels of closeness tend to provide more support to their brother or sister with an intellectual disability in adulthood (Greenberg, Seltzer, Orsmond, and Krauss, 1999; Orsmond & Seltzer, 2007). The amount of contact with the brother or sister with a disability also predicts sibling expectations of caregiving, with siblings who have increased contact more likely to plan to care for their brother or sister in the future (Heller & Kramer, 2009; Krauss, Seltzer, Gordon, & Friedman, 1996). Thus, we expected that increased contact and closeness with the brother or sister with an intellectual disability would be related to more general altruism.

The Present Study

The present study used data from a population-based study, the Wisconsin Longitudinal Study (WLS), to determine the sibling relationship factors associated with altruism among siblings of adults with mild intellectual deficits. Using the WLS to examine the development of siblings allowed us to address many of the limitations of past sibling research. First, most previous sibling studies 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, most sibling studies focus on the development of the most involved sibling or the sibling closest in age to the brother or sister with an intellectual disability (Hodapp, Glidden, & Kaiser, 2005). It is difficult to know whether the experiences of that sibling are reflective of other siblings in the family who may be less involved. Alternatively, siblings in the WLS were randomly selected from all children in the family, allowing us to examine the impact of having a brother or sister with mild intellectual deficits on the average sibling – not necessarily the most involved.

Second, much of the extant research compares siblings of individuals with intellectual disabilities to siblings of individuals without disabilities and does not examine within-group factors such as age, gender, or birth order (Stoneman, 2005). Because siblings of individuals with intellectual disabilities are heterogeneous, it is important to understand the factors within a group of siblings that are associated with optimal developmental outcomes. The WLS allows us to examine within-group factors to determine which aspects of the sibling relationship best predict involvement in volunteerism and helping professions.

Finally, the longitudinal nature of the WLS allows us to consider the changing nature of altruism and the sibling relationship throughout adulthood. Not only does the likelihood of engaging in altruistic behaviors change over time but, among typically developing siblings, the sibling relationship also changes (Cicirelli, 1996; White, 2001). These developmental variations in the sibling relationship and altruism may lead to different predictors of volunteerism and helping professions at different stages of adulthood. By collecting data on altruistic behavior at three time points – when siblings were in their mid 30s, early 50s, and mid 60s – the WLS allows us to examine age-specific predictors of altruistic behaviors.

Therefore, the overall goal of the present study was to examine aspects of the sibling relationship that predicted volunteerism and helping profession choice among siblings of adults with mild intellectual deficits at three time points: 1) when siblings were in their mid 30s, 2) when siblings were in their early 50s, and 3) when siblings were in their mid 60s. We hypothesized that the following relationship factors would predict more altruistic behaviors: 1) female gender of the non-disabled sibling, 2) having no siblings other than the brother or sister with a disability, 3) sibling being older than the brother or sister with a disability, and 4) high levels of sibling closeness and contact. Furthermore, because of the importance of gender in previous research (e.g. Hodapp, et al., 2010; Orsmond & Seltzer, 2000), we tested interactions to determine whether the impact of other sibling relationship variables depended on the gender of the non-disabled sibling.

Methods

Wisconsin Longitudinal Study

The Wisconsin Longitudinal Study (WLS) is a random sample of one-third of all high school seniors in the state of Wisconsin in 1957 ($N = 10,317$; Hauser et. al., 1998). These participants have been followed for nearly 40 years, with follow-up data collected in 1975

when the participants were in their mid 30s ($n = 9,138$; 90.1% of the surviving participants), 1992 when the participants were in their early 50s ($n = 8,493$; 87% of the surviving participants), and 2004–06 when the participants were in their mid 60s ($n = 7,265$; 80% of the surviving participants). Responses were collected via telephone interviews and self-administered questionnaires. For 56.4% of the graduates ($n = 6,036$), parallel data was gathered from one randomly selected biological sibling. Family background data, as well as IQ scores, were collected for both the graduate and the sibling.

Siblings of Adults with Mild Intellectual Deficits

Using the sibling-pair structure of the WLS, we were able to determine WLS respondents who were siblings to a brother or sister with mild intellectual deficits. To construct the sibling sample, we first examined the IQ scores of the randomly selected brother or sister; those who had an IQ score of 85 or below, one standard deviation below the population mean, fit the cut-off for mild intellectual deficits as used in previous research (Seltzer et al., 2005; Taylor et al., 2008). The original WLS respondent, therefore, was a sibling to a brother or sister with mild intellectual deficits. Out of the 6,036 biological sibling pairs, there were 659 siblings (10.91%) who had a brother or sister with IQ scores of 85 or below.

Siblings who had a brother or sister with mild intellectual deficits were then included in the final sample if both the sibling and the brother or sister with low IQ were alive in 2004 ($n = 569$) and the sibling had data on the dependent variables at all three time points ($n = 421$). Because one of the independent variables in the present study was whether or not the sibling had any brothers or sisters other than the one with low IQ, we eliminated an additional 28 respondents who became an only sibling at some point in their lives. This resulted in 393 siblings of a brother or sister with mild intellectual deficits. For clarity, the non-disabled sibling is hereafter referred to as the “sibling”, whereas the member of the sibling pair with low IQ is referred to as the “brother or sister with mild intellectual deficits” or “brother or sister”.

In order to determine whether siblings who had a brother or sister with mild intellectual deficits included in the present sample differed from the full sample of siblings of individuals with low IQ, we compared those who were included ($n = 393$) to those who were excluded ($n = 266$) on a number of background variables. These analyses are presented in Table 1. The siblings included in the final sample had brothers and sisters with IQ scores that averaged 1.66 points higher than those who were excluded. Siblings in the final sample were more likely to be older than their brother or sister with low IQ compared to those who were excluded. There were no differences between those who were included and excluded in terms of sibling gender, gender of the brother or sister with low IQ, sibling IQ, marital status, siblings' years of completed education, percentage with only one sibling, age interval between siblings, and family of origin income. Overall, there was much similarity between those siblings who were included in our final sample and those who were excluded.

Measures

IQ Score—The *Henmon-Nelson Test of Mental Ability: Grades 7–12* (Henmon & Nelson, 1937) was administered to participants during their junior year of high school to derive an IQ score. When scores from participants' junior year were unavailable, scores from their freshman year were used. The correlation between freshman and junior year scores (when both scores were available) was .83. This group-administered test yields a composite score, which reflects generalized intellectual functioning or IQ. The test measures various mental abilities including verbal, spatial, numerical knowledge, and reasoning. The original scale and revisions have been used widely in research on mental ability (Seltzer et al., 2009), and reliability coefficients are consistently high ($r = .90$; Buros, 1940). The scores from the

original version of the *Henmon-Nelson* demonstrate good validity in predicting academic success at the college level (Drake & Henmon, 1937). Furthermore, scores from a revised version of the assessment correlated .83 with IQ scores from an individually-administered test of cognitive abilities (Watson, 1981). Within the WLS sample, the IQ scores from the *Henmon-Nelson* are moderately correlated with class rank or grade point average in high school ($r = .60$), which is consistent with typical correlations between IQ and school achievement (Gregory, 2004). Even though there are limitations with using a group-administered test in assessing intelligence, the *Henmon-Nelson* has psychometric properties that support the validity of using this measure of IQ for identifying individuals with mild intellectual deficits (Seltzer et al., 2005). Though the participants took the *Henmon-Nelson* test at age 17, the scores are a reliable indicator of later intellectual functioning, as IQ tends to be relatively stable across the life course (Deary, Whalley, Lemmon, Crawford, & Starr, 2000).

Dependent Variables

Helping profession: Siblings were categorized as having either a helping profession or a non-helping profession based on their detailed occupation codes when they were in their mid 30s (1975) and early 50s (1992). At each of these time points, siblings provided information for their current or last job, which was then coded from a list of 981 different detailed occupations; 184 of the possible occupations were present in the sibling sample. To categorize the occupation information into helping versus non-helping professions, one researcher identified each of the 184 professions (i.e. those professions that were represented in this sibling sample) as either helping or non-helping. Helping professions described occupations in which the worker focused primarily on assisting other people whereas non-helping professions described individuals who worked with data or objects for the majority of their job. After the first researcher made her determinations, the list of 184 occupations was then given to 4 colleagues: one PhD level researcher, two B.A. level researchers, and one undergraduate student. These individuals were instructed to classify each occupation as either helping or non-helping. Of the original 19 professions that were classified as helping professions, all were verified by at least 3 out of 4 colleagues, with 9 receiving unanimous classification as a helping profession. Five occupations were further classified as helping professions after being identified by all 4 colleagues. Examples of helping professions included teachers, doctors, childcare workers, clergymen, and registered nurses; non-helping professions included occupations such as accountants, construction workers, and engineers. Helping professions were coded as 1 and non-helping professions were coded as 0.

Those who were not in the labor force at the time of data collection were missing occupation data. These siblings were therefore excluded from the analyses predicting helping professions at the time they were out of the labor force. This resulted in 337 siblings with helping profession codes in 1975, and 376 siblings with helping profession codes in 1992. Furthermore, although occupation data was included in the WLS when siblings were in their mid 60s (2004–06), they were not analyzed because many siblings had either partially (14.5%) or fully (48.6%) retired by this time.

Volunteerism: At all three time points (1975, 1992, and 2004–06), respondents were asked to indicate their level of involvement in 17 different social organizations (0=*no involvement* to 2=*much involvement*). Previous research has identified five of these organizations as representative of volunteer activities: parent-teacher associations, charity organizations, neighborhood improvement groups, youth groups, and community centers (Piliavin, 2005). Total volunteerism variables were created for each time point by summing the amount of participation in each of the volunteer activities. The possible scores ranged from 0 (no involvement in any of the 5 identified organizations) to 10 (much involvement in all 5 of the

identified organizations). The total volunteerism variables take into account both the number of volunteer activities and the level of involvement in each.

Independent Variables: Aspects of the Sibling Relationship

Gender: Gender was recorded for both members of the sibling pair (1 = *males*, 0 = *females*).

Birth order: Data collected about the birth years of both members of the sibling pair were used to create a dichotomous variable reflected whether the sibling was older or younger than the brother or sister with mild intellectual deficits (1 = *sibling is older*, 0 = *sibling is younger*).

Number of siblings: Using the total number of brothers and sisters reported by the sibling, we created a dichotomous variable indicating whether he or she had any brothers or sisters other than the one with mild intellectual deficits (1 = *brother/sister with low IQ is the only sibling*, 0 = *brother/sister with low IQ is not the only sibling*).

Sibling relationship: In 1992 and 2004–06, siblings responded to questions about the amount of contact they had with their brother or sister with mild intellectual deficits in the past year. This included contact in person, by phone, or by mail. In this sample, amount of contact in the past year ranged from never (0) to multiple times a day (739). Siblings also indicated how close they feel to their brother or sister with mild intellectual deficits, ranging from 1 = not at all close to 4 = very close.

Method of Data Analyses

Multiple regression was the primary method of data analysis used to predict sibling's involvement in helping professions and volunteerism from variables related to the sibling relationship. For analyses predicting helping professions and volunteerism when the siblings were in their mid 30s (1975), the following predictor variables were included: sibling gender, gender of the low IQ brother or sister, whether sibling was older than the brother or sister with low IQ (birth order), and whether the sibling had any brothers or sisters besides the one with low IQ (number of siblings). We also entered four targeted interactions into our regression models: non-disabled sibling gender by gender of brother or sister with low IQ; birth order by non-disabled sibling gender; number of siblings by non-disabled sibling gender and; number of siblings by birth order. All of the independent variables were centered before creating the interactions to reduce multicollinearity.

Beginning in 1992, when the siblings were in their early 50s, data was collected about the amount of contact between the sibling and the brother or sister with mild intellectual deficits, as well as how close the sibling felt to that brother or sister. Therefore, the regression models predicting helping profession when siblings were in their early 50s and volunteerism when siblings were in their early 50s and mid 60s included these contact and closeness variables in addition to the aforementioned sibling relationship variables. Because the distributions of the contact variables were positively skewed, we used a square root transformation to create more normal distributions. Finally, the interactions between contact and non-disabled sibling gender, and closeness and non-disabled sibling gender were included in these analyses.

Missing data for the independent variables was minimal. Five of the eight independent variables had no missing data. The remaining three variables were missing less than 1% of cases. Because of the small amount of missing data, mean substitution was used following the guidelines of Harrell (2001).

Because their own IQ, marital status, or family of origin socio-economic status could impact siblings' helping profession choice or amount of volunteerism, we statistically controlled for these variables (in addition to the IQ of the brother or sister with mild intellectual deficits) in all analyses.

Results

Descriptive Findings

When siblings were in their mid 30s, 13.2% of the sample ($n = 52$) were involved in helping professions. Females were more likely to have a helping occupation than males (20.4% versus 10.9%), $\chi^2 = 5.83, p < .05$. When siblings were in their early 50s, 13.5% of the sample ($n = 53$) held helping professions, with females again more likely to have a helping profession than males (17.9% versus 9.7%), $\chi^2 = 5.19, p < .05$.

The average amount of volunteerism declined over adulthood, with people in the sample performing significantly less volunteer activity when they were in their mid 60s than they did when they were in their mid 30s, $t(392) = -2.37, p < .05$. When they were in their mid 30s, siblings reported an average involvement of 1.11 (out of a possible 10), which corresponds to some involvement in one organization. Females reported significantly more volunteer activity than males (1.28 vs. .91), $t(392) = 2.43, p < .05$. When they were in their early 50s, both males and females reported involvement levels of 1.03. When they were in their mid 60s, the average amount of volunteerism was .96, with females again reporting more volunteer activities than males (1.11 versus .77), $t(392) = 2.59, p < .01$.

There were no significant relations between the amount of volunteerism and concurrent helping profession choice. Therefore, being in a helping profession did not seem to predispose siblings to participate in more volunteer activities.

Helping Profession Choice

Standardized beta weights for the regression analyses predicting helping professions when siblings were in their mid 30s (1975) and early 50s (1992) are presented in Table 2. After controlling for background variables (family of origin income, marital status, sibling IQ, and brother/sister IQ), there was a significant interaction between sibling gender and number of siblings on helping profession choice when siblings were in their mid 30s, $\beta = -.15, p < .05$. This interaction is depicted in Figure 1. When siblings had only one brother or sister (the brother/sister with low IQ), female siblings were more likely to be involved in helping professions in their mid 30s (37.5%) than male siblings (9.9%). When siblings had more than one brother or sister, the difference in percentages was much smaller (16.8% of males versus 22.2% of females).

In terms of helping profession choice when siblings were in their early 50's, only gender predicted helping profession. Female siblings were more likely than male siblings to be in a helping profession. None of the other aspects of the sibling relationship significantly predicted helping profession choice at this time.

Amount of Volunteerism

Standardized beta weights for the regression models predicting volunteerism when siblings were in their mid 30s (1975), early 50s (1992), and mid 60s (2004–06) are presented in Table 3. A significant interaction between sibling gender and birth order predicted volunteerism when siblings were in their mid 30s, $\beta = -.10, p < .05$. This interaction is depicted in the top panel of Figure 2. When siblings were older than the brother or sister with low IQ, female siblings were involved in more volunteer activity than male siblings (.

91 and .36, respectively). When siblings were younger than the brother or sister with low IQ, the difference was much smaller (.86 for females and .91 for males).

In terms of volunteerism when siblings were in their early 50s, there was a significant sibling gender by closeness interaction, $\beta = -.13, p < .05$. This interaction is depicted in the middle panel of Figure 2. For siblings who reported that they were not very close to their brother or sister with low IQ, males were involved in more volunteerism than females (.84 and .22, respectively). For siblings who reported that they were very close to their brother or sister with low IQ, females were involved in slightly more volunteerism than males, though the difference was smaller (1.27 versus 1.00, respectively).

When siblings were in their mid 60s (2004–06), previous measure of sibling closeness and contact (collected when they were in their early 50s), but not current closeness or contact, predicted volunteerism. Siblings who reported higher levels of closeness 12 years earlier were involved in more volunteer activity, $\beta = .15, p < .05$. Furthermore, there was a significant sibling gender by 1992 sibling contact interaction on volunteerism, $\beta = -.13, p < .05$. This interaction is depicted in the bottom panel of Figure 2. Siblings who had previously reported contact with their brother or sister with low IQ every other month (6 times per year) showed little difference in amount of volunteerism between males and females (.78 for males, .81 for females). For those siblings who reported contact with their brother or sister with low IQ once per week (52 times per year), females had nearly twice as much volunteer activity than males (.69 for males compared to 1.13 for females).

Discussion

As opposed to studies that focus on the negative effects of having a brother or sister with an intellectual disability, our analyses shed light on the sibling relationship factors that were associated with altruistic behavior. As expected, results showed that characteristics of the sibling relationship significantly predicted the amount of volunteerism and involvement in helping professions throughout adulthood for siblings who have a brother or sister with mild intellectual deficits.

Three main findings emerged from this research. First, characteristics of the sibling relationship that predispose a sibling to provide care for their brother or sister with an intellectual disability such as being the only sibling, being older than their brother or sister, or reporting more contact with their brother or sister (Heller & Kramer, 2009; Krauss et al., 1996; Seltzer et al., 1997), were related to more general altruistic behaviors for females siblings but not for male siblings. When these characteristics are not present (e.g., younger than the brother or sister with the disability, reporting less contact), there are no significant differences in levels of volunteerism or helping profession choice between males and females. Our analyses suggest that, for female siblings, the responsibility of caring for their brother or sister with a disability may lead to more general altruistic behavior.

Second, although most studies of siblings of adults with intellectual disabilities involve the most involved sibling or the sibling closest to the brother or sister with the disability (Hodapp et al., 2005), the WLS provides the unique opportunity to examine adult outcomes of siblings who express varying degrees of closeness to their brother or sister with mild intellectual deficits. Because high levels of sibling closeness are associated with more caregiving (Orsmond & Seltzer, 2007), we expected to see females who reported being closer to their brother or sister with mild intellectual deficits involved in significantly more volunteerism than males. However, the interaction between sibling gender and closeness in the sibling relationship on altruistic behavior did not follow this predicted pattern. Instead, the larger difference in volunteerism between male and female siblings was found for those

who reported lower levels of closeness. Female siblings who reported being less close to their brother or sister with mild intellectual deficits were less involved in volunteerism than male siblings who reported being less close to their brother or sister.

This finding may indicate a qualitative difference in relationship quality for female siblings who report feeling 'not very close' to their brother or sister with a disability. Females tend to report higher levels of sibling closeness compared to males (Cicirelli, 1991; Lee, Mancini, & Maxwell, 1990; Orsmond & Seltzer, 2000), and thus females who report low levels of closeness to their siblings are relatively rare. Female siblings who report low closeness with their brother or sister may have a particularly difficult sibling relationship or they may be more isolated in general. Future research should continue to study siblings who are less close to their brother or sister with intellectual disabilities in order to discern the life course impacts for all siblings and not just those who are the most involved or closest with their brother or sister.

Our third main finding arises from the longitudinal nature of the study. Earlier measures of sibling closeness and contact, collected when siblings were in their early 50s, were better measures of later volunteerism (when siblings were in their mid 60s) than concurrent measures of contact and closeness. This may be because sibling relationships become more important as other relationships decline. That is, in times of divorce or as children leave the home (as is common in people's early 50s), sibling relationships play an important role to fill the gap (Cantor, 1979). It is thus possible that sibling relationships measured when siblings are "empty nesting" are more salient than later measures of closeness and contact.

Alternatively, it may be that sibling contact and closeness early in adulthood (and potentially even in childhood) are most important for developing later altruistic behaviors. One limitation of the WLS is that questions related to sibling contact and closeness were first asked when the participants were in their early 50s. We thus have no information about the quality of the sibling relationship earlier in life. Future research should consider whether there is a time in the lifespan that the sibling relationship is most important to the development of those who have a brother or sister with intellectual disabilities. Our study suggests that developmental considerations are important, and should be explored in further study.

The present study has three main limitations. The WLS, though population-based, includes primarily European American individuals who all resided in Wisconsin in the mid-20th century. Generalization of our findings is thus limited by the geographic, race, and age restrictions of the cohort from which it was drawn. Second, the sample of siblings included in the study differed slightly from the sample of siblings of individuals with low IQ who were excluded in terms of brother or sister IQ and percentage of siblings who are older than their brother or sister. These differences are small but significant, and may limit the generalizability to siblings of those with the lowest IQs as well as siblings who are older than their brother or sister. Finally, this study did not explore how individual differences in ability level of the brother or sister may impact sibling altruism. Although we statistically controlled for intellectual functioning of the brother or sister with low IQ, those with IQ scores below 75 may need more support than brothers or sisters with IQs above 75, leading to a different sibling experience.

It is important to also note that the brothers and sisters in this study were identified by statistically low IQ scores rather than a specific diagnosis, so siblings may not engage in the type of caregiving typically seen in families of children with disabilities. Though these brothers and sisters most likely do not require physical care, they are at high risk for unemployment, unstable marriages, and psychological distress (Fujiura, 2003; Maughan,

Collishaw, & Pickles, 1999; Richardson & Koller, 1996; Seltzer et al., 2005). Based on these events, siblings still likely provide more emotional support than siblings of typically developing individuals. Additionally, the high prevalence of individuals with low IQ (Neisser et al., 1996) makes this an important population for consideration.

These limitations are offset, however, by a number of strengths. First, the main WLS sample was randomly selected from all high school seniors in Wisconsin in 1957, and the sibling pairs in the WLS were selected randomly from all siblings in the family. This study design provided us access to low IQ individuals who might not have self-selected to be in a study about low IQ, and allowed us to study in essence the “average” sibling in the family. The siblings who most often participate in studies related to having a brother or sister with a disability - female, closest to the brother or sister with a disability, etc. - may not provide an accurate picture of the sibling experience in general (Hodapp et al., 2005). By studying randomly selected siblings, we were able to get a better picture of which aspects of the sibling relationship have the greatest impact on the sibling experience. Thus, although this sample is limited by geography, the random selection of both the individual with low IQ and his or her sibling allows more generalization than small samples of convenience typically used in sibling research (Hodapp et al., 2005),

Relatedly, many studies that examine caregiving in siblings of individuals with intellectual disabilities have predominantly female samples (e.g. Breslau, 1982; Doody, Hastings, O’Neill, & Grey, 2010) and it is difficult to determine whether the findings apply to male siblings. The WLS included a large sample of both male and female siblings (due to being an unselected sample), thus allowing us to draw conclusions about being a male or female sibling of an individual with mild intellectual deficits.

Finally, the longitudinal nature of the WLS allowed us to study the impact of having a brother or sister with mild intellectual deficits over most of siblings’ adult lives, starting when they were in their late teens and ending when they were in their early 60s. Research suggests that the nature of the sibling relationship changes over adulthood (Cicirelli, 1996) and the experience of having a brother or sister with a disability differs depending on the stage of the life course (e.g. Meyer, Vadasy & Lassen, 1994). Thus, the WLS provides a substantial advantage over many cross-sectional sibling studies by allowing us to consider stage of the life course when examining how having a brother or sister with mild intellectual deficits impacts altruistic behavior in adulthood. Future research should continue to explore the developmental factors that promote optimal development among siblings of adults with intellectual disabilities.

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Figure 1.

The interaction between gender of the non-disabled sibling and number of sibling (only sibling versus more than 2 in sibship) on the proportion of siblings involved in helping professions when siblings were in their mid 30s (1975)

Figure 2.

Significant interactions between sibling relationship variables on volunteerism throughout adulthood. The top panel depicts the interaction between non-disabled sibling gender and birth order (older than brother/sister with low IQ versus younger than brother/sister with low IQ) on the amount of volunteerism when siblings were in their mid 30s (1975). The middle panel depicts the interaction between non-disabled sibling gender and sibling closeness in 1992 (very close versus not very close) on the amount of volunteerism when siblings were in their early 50s (1992). The bottom panel depicts the interaction between non-disabled sibling gender and sibling contact in 1992 (every other month versus once a week) on the amount of volunteerism when siblings were in their mid 60s (2004–06).

Table 1

Differences between Siblings Included in the Final Sample and Excluded Siblings on Background and Independent Variables

	M (SD) or Percentage for Final Sample (N=393)	M (SD) or Percentage for Excluded Sample (N=266)	Test Statistic (t-value or χ^2)
Background Variables			
Sibling IQ	94.58 (14.1)	91.39 (13.8)	.84
Brother or Sister IQ	77.78 (6.15)	76.12 (6.80)	4.26 *
Age Interval b/t Siblings	4.96 (3.73)	5.18 (4.20)	2.51
Sibling Marital Status (% ever married)	97.6%	97.8%	.01
Sibling Years of Education	12.79 (1.71)	12.74 (1.65)	.89
Family of Origin Income in 1957	48,863 (28.15)	46,323 (28.15)	.22
Independent Variables			
Sibling Gender (% Female)	55.5%	56%	.02
Low IQ brother or sister Gender (% Female)	48.1%	46.6%	.14
Percent Older than Low IQ Sibling	55.2%	47.4%	3.92 *
Percent with Only 1 Sibling	81.4%	85%	1.34

*
p<.05

Table 2

Standardized Beta-Weights for Multiple Regression Models Predicting Helping Profession Choice when Siblings were in their Mid 30s (1975) and Early 50s (1992)

	1975 Helping Profession	1992 Helping Profession
Main Effects		
Sibling Gender	-.23 **	-.21 **
Gender of Low IQ Brother/Sister	-.05	.02
Older than Low IQ Brother/Sister	-.01	.04
Only Sibling	.05	.05
1992 Sibling Closeness	-	-.01
1992 Sibling Contact	-	-.01
Interactions		
Sibling Gender by Brother/Sister Gender	.09	.05
Older by Sibling Gender	.02	.04
Only sibling by Sibling Gender	-.15 *	-.13
Only sibling by Older	.03	.01
1992 Closeness by Sibling Gender	-	-.05
1992 Contact by Sibling Gender	-	-.02
Model R ²	.09	.05

*
p<.05,

**
p<.01

Note: The following background variables were controlled in all regression models: sibling IQ, brother or sister IQ, family of origin income, and marital status. Closeness and contact were collected beginning in 1992, and are therefore not included in the prediction of 1975 helping profession

Table 3

Standardized Beta-Weights for Multiple Regression Models Predicting Volunteerism when Siblings were in their Mid 30s (1975), Early 50s (1992), and Mid 60s (2004–06)

	1975 Volunteerism	1992 Volunteerism	2004–06 Volunteerism
Main Effects			
Sibling Gender	–.08	.04	–.08
Gender of low IQ Brother/Sister	.03	.05	–.01
Older than low IQ Brother/Sister	–.09	–.06	–.04
Only sibling	–.07	–.06	–.06
1992 Sibling Closeness	-	.18 **	.15 *
1992 Sibling Contact	-	–.03	.06
2004 Sibling Closeness	-	-	–.01
2004 Sibling Contact	-	-	–.07
Interactions			
Sibling Gender by Brother/Sister Gender	–.08	–.05	–.10
Older by Sibling Gender	–.10 *	.02	.04
Only Sibling by Sibling Gender	.05	.01	.05
Only Sibling by Older	–.06	–.06	–.04
1992 Closeness by Sibling Gender	-	–.13 *	.02
1992 Contact by Sibling Gender	-	.02	–.13 *
2004 Closeness by Sibling Gender	-	-	–.01
2004 Contact by Sibling Gender	-	-	.04
Model R ²	.07	.08	.08

*
p<.05,

**
p<.01

Note: The following background variables were controlled in all regression models: sibling IQ, brother or sister IQ, family of origin income, and marital status. Closeness and contact were collected beginning in 1992, and are therefore not included in the prediction of 1975 volunteerism.