The Effects of Having a Disabled Sibling during Childhood on Young Adults' Educational

Attainment

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This paper utilizes secondary data from the National Longitudinal Survey of Youth 1979 Children and Young Adults (CNLSY) to examine educational attainment among young adults who had a disabled sibling during childhood by measuring high school completion and number of years of education achieved. I also examine the gender differences in these outcomes. This study builds on previous research regarding disability effects on families and offers an additional view on sibling effects in general. I find that on average, respondents who had a disabled sibling as a child complete half a year less schooling and have substantially lower odds of graduating from high school than their peers who did not have a disabled sibling during childhood. The gap in educational attainment is particularly important to consider in light of policies that should be implemented to avoid unnecessary loss in educational attainment, particularly in light of the further cuts that may be made in this time of financial austerity.

Background and Significance

A large portion of disability research focuses on the effects of having a disabled child in a family. This research tends to focus on the effect on parents, and has only briefly examined effects on the family's non-disabled children. Additionally, there is a large body of research examining sibling effects on later life outcomes. Attention is also specifically focused on educational attainment among males and females. There is no research that considers the effect of having a disabled sibling on the educational attainment of young adults.

DISABILITY EFFECTS

Studies on the consequences of disability on the family focus primarily on the impact on parents and parental stress. Mothers' stress level, depression, and adaptation are common concerns of many studies (Ekas and Whitman, 2011; Baker, Seltzer, and Greenberg, 2011). If non-disabled siblings are considered in studies, it is often after their parents have been considered and the effects on the parents trickles down to the non-disabled siblings, rather than studying the non-disabled sibling firsthand (Dyson 2010; Meyer, Ingersoll, and Hambrick, 2011).

Consideration has also been given to the effect that placing a disabled child in a care facility rather than keeping him/her at home would have on young non-disabled siblings (Eisenberg, Baker, and Blacher, 1998). Additionally, the effect a disabled sibling has on sibling relationships has also been studied (Lardieri, Blacher, and Swanson, 2000). Research that specifically examines the siblings of disabled children often does not consider later life outcomes. Most

research looks at the immediate childhood impact (Stoneman, 1998). This is similar to studies on

the effects of having siblings on pre-school aged children's socialization as mentioned below in

the Sibling Effects section; however the effect of having a disabled sibling at a young age is

widely found to be negative rather than positive (Eisenberg, Baker, and Blacher, 1998). Research

that goes beyond preschool aged siblings focuses on behavioral adjustment (Meyer, Ingersoll,

and Hambrick, 2011), and there is no research on the educational outcomes of siblings of

disabled children.

Studies that do assess the later life effects of having a disabled sibling typically focus on the

relationships between the disabled and non-disabled siblings. There are substantial differences in

expectations for adolescents and young adults who have disabled siblings than those who do not

(Seltzer, Greenberg, Orsmond, and Lounds, 2005). When researching young adults who have a

disabled sibling two groups of disabilities are often compared, for example, those that are

mentally developmentally delayed and those with mental illness (Greenberg, Seltzer, Orsmond,

and Krauss, 1999). Many of the studies that examine sibling relationships also consider the

similarities and differences of having a sibling who is autistic or who has Downs syndrome

(Hodapp and Urbano, 2007), but none consider the educational attainment of the non-disabled

sibling.

In considering the impact of disability on family, there are studies that consider the impact of a

disabled child on parental stress, health, and marriage. While parental stress may affect children,

there is little research on families with disabled children that assesses the effects on the non-

disabled children later in life, and none that look at educational attainment. It is important to use

the literature on sibling effects on educational attainment to particularly assess siblings of disabled children. The little work that has been done on the life outcomes of having a disabled sibling focuses on the relationship between siblings and how it affects their career choices, but no work has been done using a population based-sample (Seltzer, Greenberg, Orsmond, and Lounds, 2005) or examines educational attainment which impacts career opportunities. It is important to look beyond conclusions reached in small sampled, quantitative or qualitative research to see what the larger implications are, and to look beyond the relationship between siblings to see in what ways having a disabled sibling impacts later life outcomes.

It is critical to utilize the information known about sibling effects in the study of disability consequences on educational attainment. Educational outcomes in many ways are the beginning of the transition to adulthood, and as such are a critical step in looking at the broader impacts of having a disabled sibling on later life outcomes. Any gap in educational attainment for those who have disabled siblings and those who have non-disabled siblings should be researched. This is particularly important given the large number of children who have disabled siblings who are negatively affected, given that those effects ultimately will impact the wider community and American educational attainment more broadly.

SIBLING EFFECTS

A significant amount of research has been completed focusing on the family's impact on people later in life. Factors such as family size and birth order greatly impact educational attainment (Powell and Steelman, 1990). The number of siblings is linked to educational outcomes due to

resource dilution (Downey, 2001). Resource dilution states that any given family has a set number of resources; if there is only one child in the family, that child receives all of those resources. In larger families, the resources must be divided up so that each child gets fewer resources—the larger the family size, the fewer resources each child receives. This idea corresponds with the confluence model (Zajonc, 1976), which says that in larger families, the intellectual performance drops with each child according to birth order, and that the youngest child has the most substantial decrease in intellectual performance from the sibling directly preceding him/her in birth order. Many studies consider both the size of the sibling set and birth order to examine educational outcomes as they are closely related and play an important role in educational attainment (de Haan, 2010; Downey, 2001). There is even consideration given to the number of siblings and their closeness in age (density) within the sibling set (Powell and Steelman, 1990).

The effect of having siblings during preschool has also been considered. While having a large number of siblings negatively affects educational attainment later in life, there is evidence that young children with siblings navigate relationships in the classroom better than children with no siblings (Downey and Condron, 2004). This suggests that while there are negative aspects to having a larger number of siblings for educational attainment overall, there are also benefits early in life because young children will be better socialized if they have siblings, than their peers with no siblings (Brody, 1998). This corresponds to disability studies that assess the effects siblings have on young autistic children and their socialization prior to entering school (Begum and Blacher, 2011).

THE CURRENT STUDY

Given research suggesting that women carry a disproportionate share of unpaid work such as caregiving (Hochschild, 1989), I examine whether the effects of having a disabled sibling vary for men and women. This is particularly relevant given research by Aronson et al. (1996) showing that gender differences in caregiving exist even among adolescents, with girls providing on average 8 hours more care a week for younger siblings than boys. This is particularly interesting considering recent research suggesting that women's educational attainment has recently surpassed men's (Buchmann and DiPrete, 2006).

I examine the effects of having a disabled sibling during childhood on American young adults' educational attainment, measured by both high school completion and the number of years of education competed. I hypothesized that young adults who had a disabled sibling in childhood would be less likely to complete high school and would complete fewer years of education than young adults who have a sibling or siblings who are not disabled. Secondly, I examine the gender differences in the effects of having a disabled sibling in childhood on American young adults' educational attainment. I hypothesized that the effects of having a disabled sibling in childhood will be particularly pronounced among females given the disproportionate share of caregiving they already shoulder in families without a disabled child.

This study acts as a test of the relative strength of the confluence model and the resource dilution theory in explaining educational attainment differences between young adults with and without disabled siblings. By using the resource dilution theory, a better understanding of sibling impacts

can be had in families with a disabled sibling. If children in larger families have lower

educational attainment, then it could be that children who have a disabled sibling experience an

even greater decrease due to greater resource dilution, since the disabled child consumes more of

the family resources than a non-disabled child typically would.

Data and Methods

DATA

I use data from the National Longitudinal Survey of Youth 1979 Children and Young Adults

(CNLSY) sample. The CNLSY data are ideally suited for this research as they provide a

nationally representative family-based sample. The National Longitudinal Survey of Youth is a

series of cohort surveys conducted by the United States Department of Labor, Bureau of Labor

Statistics. Starting in 1986, the CNLSY conducted surveys annually until 1994, at which point

they conducted surveyed biennially (The NLSY79, 2011). Prior to 1994, only child surveys were

administered, but starting in 1994 surveys targeting youths and young adults were also

implemented in all following surveys. Questionnaires included questions pertaining to

schooling, interactions with parents, and home responsibilities, among other things.

Beginning in 1986, surveys were administered to all of the children born to female respondents

of the National Longitudinal Survey of Youth 1979 (NLSY79) cohort. The mothers who

participated in the NLSY79 study were ages 14-22 in 1979, and by 1986 (the year the CNLSY

survey commenced) were 21-29 years old, and likely to have at least one child. Because the

respondents of the CNLSY survey are children who are linked to their mother's information in

the NLSY79 survey, sibling sets are easily identified. Many recent adolescent and young adult

studies, such as the NLSY97 or the National Longitudinal Survey of Adolescent Health focus

only on one adolescent in a family unit; some include multiple siblings, but the numbers are low

resulting in insufficient statistical power to examine questions around how disabled children

affect their siblings. In surveys focusing on one child in a family, if questions are asked about

siblings, it is difficult to ascertain if any siblings are disabled, making the CNLSY an ideal data

source for this type of analysis.

SAMPLE

My analytic sample includes 5,290 CNLSY respondents who were at least 19 years old. I restrict

analyses to respondents aged 19 or older (so as to allow respondents time to complete high

school while not unduly biasing the sample by selecting only children born to young mothers[1])

and who had at least one sibling; of these, 2,042 (38.6%) had at least one disabled sibling during

their childhood. Of the respondents, 51% are male, 49% are female. Descriptive statistics on key

variables are presented in Table 1.

[Insert Table 1 about here.]

DEPENDENT VARIABLE

Educational attainment is measured using two variables. The first captures whether the sample

member completed high school. The second captures the number of years of education

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[1] Given the design of the CNLSY, restricting to older children means that respondents were born to younger
mothers. It should be noted, however, that when using respondents aged 25 and older, the results were similar.

completed by the respondent. These data will come from the data collected by the CNLSY survey in years 1986 to 2010.

INDEPENDENT VARIABLES

Disability Measures. Having a disabled sibling is measured using information on the self-reported disabilities of respondents. Following the American's with Disabilities Act of 1990, disability is defined as "a physical or mental impairment that substantially limits one or more major life activities; a record of such an impairment; or being regarded as having such an impairment" (Americans with Disabilities Act, 2009). A respondent is classified as having a disability if they answered yes to being affected, or having, by the following survey options in the CNLSY: crippled; orthopedic handicap; epilepsy/seizures; hearing difficulty or deafness; learning disability; mental retardation; minimal brain dysfunction; chronic nervous disorder; and autism in any of the surveys from 1986 to 2010. After ascertaining whether a respondent had a disability, data is examined to see whether that respondent has a sibling. If that person has a sibling in the sample, the sibling is coded as having a disabled sibling.

Gender. Another key independent variable is gender. As noted above in the Background and Significance section, females are more likely to take on caregiving and household duties than males, and as such it is important to see if the additional time spent caring for a disabled sibling affects their educational attainment. Gender is also combined with the variable for having a disabled sibling to specifically see the interaction effect of having a disabled sibling on males and females.

Family Characteristics. Family often plays a large part in educational attainment in young

adults. I control for two family characteristics: the family's socioeconomic status and family

size. The family's socioeconomic status is controlled for using the mother's education. This

information is accessible through the NLSY79 data, and can be linked to the CNLSY data

through the mother's identification number. Family size is found in the CNLSY data by looking

at how many children are linked to the mother's identification number. As noted in the

Background and Significance section, family size plays a role in resource dilution and

educational attainment and thus is controlled for.

Respondent Characteristics. The characteristics of the respondents that I account for include

race, birth order, and age. Questions regarding the race of the respondents are among those asked

in the survey. Race is controlled for using a series of dummy variables. Birth order is found in

the CNLSY survey data as well. The age of respondents is calculated using the year of birth

subtracted from the survey year. The sample only includes respondents who are age 19 or older,

but age is controlled for after that to account for the fact that those who are older are more likely

to have graduated from high school and have more years of education.

METHODS

I use two sets of models for my analysis. In the first set of models I use OLS regression to

estimate the effects of having a disabled sibling on years of education completed. For the second

set of models, I examine the likelihood of graduating from high school using logistic regression

models. All models include cluster-robust standard errors to account for the clustering of

respondents within families.

To examine whether the effects of having a disabled sibling during childhood vary by gender, I

use the same models described above. Additionally, I consider the difference in educational

attainment between males and females, as well as examining the effects of being male and

having a disabled sibling together to ascertain the interaction effects are.

RESULTS

[Insert Table 2 about here.]

Table 2 reports results of OLS regressions examining years of education. Models 1-3

compare respondents who had a disabled sibling during childhood to respondents who did not,

while models 4-6 compare respondents who had a disabled sibling with other respondents who

had siblings. Model 1 presents results from a bivariate model comparing respondents with a

disabled sibling to all other respondents, and shows that they typically receive .64 years less

education. This is a substantial and highly significant difference, and confirms that individuals

with a disabled sibling are significantly disadvantaged relative to the general population,

showing a previously hidden cost of disability on society.

Model 2 examines whether the effect of having a disabled sibling varies by gender. I find

that women who had a disabled sibling complete a whole year (1.04) less than women without a

disabled sibling. Among men, however, individuals with a disabled sibling as children typically

received .23 fewer years (-1.04+.81) of education than men without a disabled sibling. These results are noteworthy insofar as they reveal that the difference between respondents with and without a disabled sibling as a child is almost entirely a function of the difference among women. The magnitude of these differences is also noteworthy as it reveals that women's advantage in educational attainment is completely eliminated among individuals with disabled siblings. That is, while women without a disabled sibling typically obtain half a year (.54) more education than men without a disabled sibling, women who have a disabled sibling earn, if anything, slightly less education than men with a disabled sibling.

Model 3 builds on the results presented in model 2 by introducing a host of control variables. To ensure that the results found above are not being driven by differences in factors such as race, socioeconomic status, birth order, and family size, I introduce controls for these into the model. The results in model 3 are largely the same as those presented in model 2, though the gap among women with and without a disabled sibling is only .63 years once these factors are taken into consideration. Thus, while the control variables account for a significant portion of the variance in educational attainment, they do not account for the difference between individuals with and without disabled siblings. Interestingly, however, while the coefficients for being male and having a disabled sibling and the interaction of being male and having a disabled sibling are all statistically significant, supplementary analyses reveal that the difference between men with and without disabled siblings is not statistically significant. Given that the main effect of having a disabled sibling and the interaction effect of being male and having a disabled sibling are of nearly equal magnitude and opposite sign, this is perhaps not surprising, but it does indicate that the differences between individuals with and without disabled siblings are driven almost entirely by the differences among women.

Models 4-6 mirror the format of models 1-3, but instead of comparing individuals with disabled siblings to all other respondents, I now restrict the respondents to those who have non-disabled siblings. This ensures that the results found in models 1-3 are not the results of differences between only children and children with siblings. As the results are similar in magnitude and significance, I do not discuss them in detail here.

[Insert Table 3 about here.]

Table 3 follows a similar format as Table 2, but instead of examining educational attainment in years, table 3 reports odds ratios from logistic regression models examining high school graduation rates. Model 1 shows that overall, the odds of graduating from high school are substantially lower (.51) for respondents who had a disabled sibling in childhood. As in the previous table, model 2 shows that women with disabled siblings do substantially worse, while men experiences less of a penalty for having a disabled sibling. Model 3 introduces controls, which as before do not substantially alter the results. As in table 2, women with a disabled sibling are substantially less likely to graduate from high school, while for men there is no statistically significant difference (as before, if anything, men with disabled siblings do slightly better than men without disabled siblings). Models 4-6 restrict the comparison to only respondents with siblings which does not appreciably change the results.

In sum, I find that respondents with disabled siblings have lower educational attainment than respondents who do not have a disabled sibling. Respondents with disabled siblings have lower educational attainment and are less likely to complete high school than their peers who do not have a disabled sibling possibly due to the additional stress placed on those with a disabled

sibling and more drastic resource dilution. Additionally, I find that female respondents'

propensity to have higher educational attainment than males is eliminated when they had a

disabled sibling during childhood.

DISCUSSION

Drawing on previous research that disabilities affect not just individuals but families as a whole,

I examine the effects of having a disabled sibling during childhood. Using unique data from the

CNLSY, a nationally representative sample, I examine disability in childhood with later life

educational attainment. In particular I examine educational attainment, as measured both in the

likelihood of graduating from high school and in years of education. I find that children growing

up with disabled siblings on average receive half a year less education and have 50 percent lower

odds of graduating from high school. Further, drawing on research highlighting the gendered

nature of carework, I examine gender differences in the effects of those with disabled siblings,

showing that differences among women entirely account for the differences we observe. Women

with disabled siblings have approximately 30 percent lower odds of graduating from high school

than women without a disabled sibling and on average earn 1 year less education. Men, by

contrast exhibit no statistically significant difference, and if anything have slightly better

educational outcomes when they have disabled siblings. The magnitude of the results is

substantial, and is large enough to offset the sizeable female advantage in educational attainment.

Finding that the penalty exists only among women has important policy implications. These

results suggest that sisters are being disproportionately saddled with care of disabled siblings

while brothers seem to be less so. Interestingly, supplementary analyses suggest that the effects of being the sister of a disabled child do not vary by whether respondents were older or younger than their disabled sibling, but younger brothers of disabled siblings had lower educational attainment than older brothers.

Additionally, this study lends itself to further research examining the effects of having a disabled sibling on delinquency and labor market outcomes. Further, this research addresses a previously unconsidered topic with major policy implications. The United States' high school graduation rate is below average among OECD countries (Tertiary Education Graduation Rates). While boosting graduation rates will likely require broad efforts to engage students, to the degree that gains might be attained by implementing policies and practices based on a better understanding of children with disabled siblings, this project will generate policy relevant results.

As women with a disabled sibling's educational attainment suffers more than men's, it is particularly important to implement helpful policies aimed at women. This may include better care options for the disabled child that allows their sisters not to be as concerned with caregving responsibilities. It is interesting to note, though, that girls typically spend more time than boys doing care-work as children and adolescents and yet still have higher educational attainment. As such, while providing alternate care options will likely help, there may be other programs that would also be beneficial to sisters of disabled children. Additional support may also include providing a support system geared specifically to siblings of disabled children that provide counseling or tutoring or even simply a place to be with other children whose siblings are disabled, giving them another support network to draw from. It is important to be aware of the

large negative effects as policy-makers continue making choices about further cuts during this time of financial austerity.

This study shows that disabilities have wide-ranging consequences not just for the disabled individuals, but for their families as well. While previous research focuses on parents, my results show that they have significant and substantial effects for siblings as well. In doing so, this study illuminates a previously hidden cost of disability on society.

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Table 1. Descriptive Statistics

Education (years)	12.66
Ever disabled (%)	26.52
Ever sibling of disabled (%)	34.78
Have siblings (%)	92.78
Number of siblings (among R's with siblings)	3.22
Birth order	1.92
Mother's education (years)	12.70
Age (years)	26.03
Male (%)	50.85
Black	35.06
Hispanic	22.37
Non-Hispanic, Non-Black	42.57
Number of cases	5,676

Note: Observations correspond to respondent most
recent appearance in the data, and are restricted to those
who were at least 19 years of age.

Table 2. Results from OLS regression models predicting educational attainment in years by having a disabled sibling

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Disabled Sibling	-.64*	-1.04***	-.63**	-.63*	-1.03**	-.62**
Male		-.60***	-.60***		-60***	-.59***
Disabled Sibling X Male		.81**	.71*		.81**	.69*
Number of Siblings			-.10**			-.13***
Mother's Education			.24***			.23***
Age			.07***			.06***
Black			-.11			-.11
Hispanic			.27**			.26**
Birth order			-.16***			-.16
Constant	12.68	12.99	8.71	12.67	12.97	9.04
R-squared	.0028	.0237	.1611	.0029	.0235	.1648
N	5,676	5,676	5,676	5,266	5,266	5,266

***p<.001, **p<.01, *p<.05 Note: All models restricted to respondents age 19 or greater. Models 1-3 compare respondents with disabled siblings to all other respondents. Models 4-6 restrict the analysis to examine only respondents with siblings.

Table 3. Odds ratios from logistic regression models predicting high school graduation
by having a disabled sibling

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Disabled Sibling	.51**	.33***	.47**	.52**	.34***	.47**
Male		.56***	.53***		.56***	.54***
Disabled Sibling X Male		2.30**	2.28*		2.27**	2.23*
Number of Siblings			.86***			.84***
Mother's Education			1.22***			1.22***
Age			1.08***			1.08***
Black			1.06			1.02
Hispanic			1.22			1.18
Birth order			.86**			.86**
Psuedo R-squared	.0024	.0155	.0957	.0032	.0151	.0971
N	5,676	5,676	5,676	5,266	5,266	5,266

***p<.001, **p<.01, *p<.05 Note: All models restricted to respondents age 19 or
greater. Models 1-3 compare respondents with disabled siblings to all other
respondents. Models 4-6 restrict the analysis to examine only respondents with siblings.