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Parenting with Mild Intellectual Deficits: Parental Expectations and the Educational Attainment of their Children

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Abstract

This study examined how educational expectations parents with mild intellectual deficits had for their children shaped their children's attainment, and how parents' own intellectual limitations affected this process. We identified 612 parents with mild intellectual deficits and 2712 comparison parents from the Wisconsin Longitudinal Study, a prospective longitudinal study that followed participants from ages 18 to 64. Compared to the norm, parents with mild intellectual deficits expected their children to complete less education, even after controlling for socio-demographic background variables, and children of parents with mild intellectual deficits completed fewer years of education. For both groups, parental expectations were the strongest predictor of attainment. Results suggest that disparities in education are shaped in part by parents' beliefs about educational opportunities.

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Being parented by an adult with mild intellectual deficits is a common occurrence, as approximately 15% of the population has an IQ score of 85 or below (Seltzer, Floyd, Greenberg, Lounds, Lindstrom, & Hong, 2005). However, studies have yet to examine the life course development of children born to parents with mild intellectual deficits past childhood and into adulthood. Previous research studying adults with mild intellectual deficits has been confined to small samples known to the service system (Edgerton, 1988; McConnell Llewellyn, Mayes, Russo, & Honey, 2003; Tymchuk, 1994). In the present study, however, we used population data to examine adult outcomes for individuals born to parents with mild intellectual deficits, focusing on their educational attainment. We also examined a possible mechanism through which having a parent with mild intellectual deficits might impact a child's educational

attainment, namely, through parents' early expectations for the amount of education their child will complete.

Educational Attainment of Children Born to Parents with Mild Intellectual Deficits

Although researchers have yet to examine the ultimate educational attainment of adult sons and daughters who have a parent with mild intellectual deficits, studies that have focused on early and middle childhood suggest that as children, these individuals evidence academic delays. One example of such research is the Notre Dame Adolescent Parenting Project, which has examined outcomes for adolescent mothers whose IQ scores averaged approximately one standard deviation below the mean ($M = 87.06$) and their children (Whitman, Borkowski, Keogh, & Weed, 2001). At birth, children born to these mothers were functioning cognitively and physically within typical ranges. However, by ages 3–5, over 70% of the children had delays in at least one area of development and 44% had multiple delays. Within this sample, lower maternal IQ score predicted poorer pre-academic skills in children as well as problems in school readiness.

Similar results were found in a study by Feldman and Walton-Allen (1997), who examined the developmental status of children who had mothers with an intellectual disability. They found that, relative to a comparison sample of children of mothers without disabilities, these children had lower reading, spelling, and math achievement scores and were eight times more likely to meet criteria for a learning disability (36.4% compared to 4.5%). In a later study, McConnell and colleagues (2003) examined five dimensions of development in preschool children born to mothers with learning or intellectual disabilities: physical, self-help, academic, social, and communication. They found that nearly one-quarter of children were functioning in the normal range, 57% had global developmental delays, as evidenced by delays in three or more domains, and 19% had delays in one or two domains.

Although children born to mothers with mild intellectual deficits appear to be at risk for problems in pre-academic and academic functioning, there is also significant variability within this group of children. Whitman et al. (2001) found that developmental delays were fairly pervasive, whereas McConnell and colleagues (2003) noted that outcomes of children in their study were highly variable and Gath (1998) reported that children born to mothers with intellectual disabilities tended to have IQs that were higher than their mothers, often approaching normal ranges. Differences between and within samples of children born to mothers with low IQ scores suggest that both biological and environmental factors influence academic outcomes.

Studies have yet to examine adult outcomes among those born to parents with mild intellectual deficits; however, it is likely that consequences of early problems in academic functioning accumulate over time, resulting in long-term implications for educational attainment and other adult outcomes (Ryff, Singer, Love, & Essex, 1998). Truncated educational attainment among adult children of parents with mild intellectual deficits is especially concerning given that fewer completed years of education is related to limitations in adult functioning in a number of different domains, including compromised physical and psychological health, lower socioeconomic status, and increased risk for divorce (Marmot, Fuhrer, Ettner, Marks, Bumpass, & Ryff, 1998; McClanahan, 2004; Seltzer, Floyd, Greenberg, Hong, Taylor, & Doescher, 2009).

Predictors of Educational Attainment: Parental Expectations for their Children's Education

Parents who have high expectations for the education of their children tend to have children who perform better on standardized achievement tests and get better grades while in school. This relation is evident across a number of ethnicities and cultural groups, including a United

States national probability sample (Hanson, McLanahan, & Thomson, 1997), first and second generation immigrant families with Asian, Hispanic, and European backgrounds (Aldous, 2006), low-income African American children (Reynolds & Gill, 1994), and a multi-ethnic Australian sample (Dandy & Nettelbeck, 2002). Not only do high parental educational expectations predict better academic performance while in school, but they also predict more years of completed education (Furstenberg & Hughes, 1995; Smith, Beaulieu, & Seraphine, 1995). Furthermore, having high expectations for the child's education may be more important than other parental attitudes toward education when predicting both the child's educational achievement while in school and the ultimate amount of education he or she will complete. Jacobs and Harvey (2005) examined the degree to which the educational achievement of 432 students (based on school rankings) was related to a number of different parental attitudes toward education, including parents' desires for the amount of education their children will complete, their realistic expectations for the amount of completed education, their satisfaction with the child's education, the extent to which parents push for high achievement, and the level of their interest in their child's schooling. Of these variables, parents' realistic expectations for their children's level of completed education was the strongest predictor of achievement. Moreover, Furstenberg and Hughes (1995) found that, among young adults born to adolescent mothers, parents' expectations about the amount of education they expected the son or daughter to ultimately complete was a better predictor of college enrollment than parental encouragement or parental expectations for their son or daughter's performance while in school.

Although studies have yet to examine educational expectations for parents with mild intellectual deficits, there is some evidence to suggest that these parents may have low expectations for the academic achievement of their children. Whitman and colleagues (2001) found that adolescent mothers with lower IQ scores had less knowledge about child development and about appropriate developmental milestones than those with higher IQ scores. For parents with mild intellectual deficits, difficulty defining appropriate expectations for their children may be coupled with being less likely to take advantage of educational resources to address their child's learning or academic needs (Johnson & Clark, 1984). All of these factors could lead parents with mild intellectual deficits to have lower educational expectations for their children, and lower parental expectations may be a mechanism through which their children attain less education. For example, having been encouraged by a parent to obtain post-secondary education was a significant predictor of both higher occupational attainment and better psychological adjustment for men with low IQ (Seltzer et al., 2009). Thus, interventions designed to raise parental expectations may significantly improve the educational attainment of these children.

Other Predictors of Educational Attainment: Socio-Demographic Factors and Environmental Enrichment

Because of the importance of educational success to socio-economic attainment, numerous studies have examined how socio-demographic background sets the stage for attainment in the next generation. Socio-demographic variables and variables related to environmental enrichment have all been implicated in promoting children's educational achievement. Therefore, when considering the impacts of parental educational expectations on the educational achievement of children born to parents with mild intellectual deficits, it is important to take such factors into account.

A number of socio-demographic variables have been studied in relation to children's educational attainment, such as the age of the mother at first birth and the child's birth order. Research comparing mothers who had their first child during adolescence to mothers who had their first child over the age of 20 suggests that older parental age at first birth is associated

with greater academic competence (East & Felice, 1990) and a smaller likelihood of children repeating a grade in school (Furstenberg, Brooks-Gunn, & Morgan, 1987). Although research findings have been mixed, the child's birth order may also contribute to his or her educational attainment. Early research suggested that there is no birth order effect on educational attainment (Edwards & Thacker, 1979; Hauser & Sewell, 1985; Kunz & Peterson, 1977), while other more recent studies have shown that, under certain conditions (larger families or those who are middle-class), birth order impacts the amount of education that children complete (Blake, 1989; Marjoribanks, 1991; Travis & Kohli, 1995).

Factors indicative of enriched family environments, such as parental education, family income, and living in a two-parent household, have also been shown to be powerful predictors of children's educational attainment. The amount of education completed by parents has direct effects on their children's educational achievement while in school (Magnuson, 2007; Reynolds & Gill, 1994) as well as the amount of education they ultimately complete (Axinn, Duncan, & Thornton, 1997; Featherman & Hauser, 1978). Parental education also has indirect effects on child's attainment; higher educated parents tend to have children who participate in more academically rigorous secondary school programs, and subsequently complete more years of education (Wolfe, 1985). Related to parental education, students from higher-income homes have more success in school and tend to complete more schooling than students from lower-income families (Martini, 1995; Smith et al., 1995). Finally, students from two-parent homes have greater success in school, on average, than students from single-parent homes (Amato & Keith, 1991; Astone & McLanahan, 1991; Downey, 1994; Walker, Grantham-McGregor, Himes, Williams, & Duff, 1998).

The educational environment of children is also enriched by the type of residential community in which they reside as well as parental involvement in school-related programs. Students who live in suburban communities exhibit higher educational achievement and have a lower likelihood of dropping out of school than students who live in the inner city and rural areas of the United States (Roscigno, Tomaskovic-Devey, & Crowley, 2006; Smith et al., 1995). Furthermore, children whose parents demonstrate more involvement in the educational process, such as by showing interest in their schooling or participating in school-related organizations, tend to have better achievement while in school and to complete more years of education (Furstenberg & Hughes, 1995; Jacobs & Harvey, 2005).

The Present Study

The purpose of this study was to examine the educational expectations that parents with mild intellectual deficits have for their children, as well as the educational attainment of their children, relative to a comparison group of parents with average or above-average IQ scores. Although the link between parental expectations and children's educational attainment has been studied in the general population, there are no studies that have examined the long-term educational outcomes of children born to parents with mild intellectual deficits, much less the relations between educational expectations and attainment for these individuals. We chose to focus on parents' educational expectations as a key factor in the educational attainment of the child due to its malleability and the implications for intervention. That is, many other factors that influence children's education such as parents' IQ score, family socio-economic status, or gender are difficult or impossible to change. However, if educational expectations predict attainment among children of parents with mild intellectual deficits similar to what has been found among children of parents with IQs in the normal range, there may be opportunities to encourage such parents to set higher expectations and subsequently to increase the amount of education that their children ultimately attain.

The present study addressed two research questions. First, we examined whether there were differences between parents with mild intellectual deficits and a comparison group of parents

with higher IQs in terms of how much education they expected their child to complete. Furthermore, we tested whether any differences remained after controlling for a number of socio-demographic and environmental enrichment variables found in previous research to be related to educational attainment (e.g., parental education, child birth order, parental marital status). Second, we examined whether children born to parents with mild intellectual deficits completed less education than children born to parents in the comparison group, and whether parents' educational expectations predicted children's educational attainment similarly in both groups. One unique feature of the design of this study is that parents' expectations were measured during their son or daughter's childhood, and educational attainment was assessed decades later when the son or daughter was well into adulthood.

Method

Wisconsin Longitudinal Study

Data for this study came from the Wisconsin Longitudinal Study (WLS). The WLS is a longitudinal study initiated in 1957 with a random sample of one-third of the high school seniors in the state of Wisconsin that year ($N = 10,317$; Hauser, Sheridan, & Warren, 1998). Data were collected from the original WLS respondents through phone and mail surveys at four points in time: 1957, 1975, 1992, and 2004–06. The first round of data collection was a written survey completed while the 18-year old respondent was a senior in high school. A measure of IQ taken during this time was obtained from school records, which we used to identify individual with low IQ (Seltzer et al., 2005, 2009). The second round of data collection occurred during 1975, when individuals in the sample were approximately 36 years of age; fully 9,138 of the surviving participants (90.1%) responded to this telephone survey. The third round of data collection occurred in 1992, when the respondents were in their early 50s. Fully 87% of the surviving participants ($N = 8,493$) responded to this survey. The fourth round of data collection occurred in 2004–06, where the response rate was 80% of surviving sample members (7,265 of 9,025 survivors), who were 65–68 years of age at the time. If participants had children at the 1975 interview, one child was randomly selected to serve as a focal child for survey questions. All focal children in the present analysis were biological children. The sample members in the present study included WLS participants who provided data on education expectations for the focal child in 1975, when the children averaged 10 years old, and reported on the child's ultimate educational attainment in 2004–06, when the children averaged 38 years old.

Participants

Parents with Mild Intellectual Deficits—The sample of parents with mild intellectual deficits consisted of WLS participants who had IQ scores of one standard deviation or more below the mean (resulting in IQs of 85 or below). We used four criteria for the selection of participants in the low IQ sample for these analyses: (a) they obtained an IQ score of 85 or less when they were in high school (a total of 1568 respondents met this criterion); (b) a focal child was chosen in 1975 (1131 respondents met the first two criteria); (c) both the respondent and the focal child were still alive at the 2004–06 round of data collection (972 cases met the first three criteria); and (d) valid data were available for the main variables of interest, namely, the participant's educational expectations for the focal child, and the focal child's ultimate educational attainment measured in 2004–06 (631 respondents met all four criteria). We excluded 19 of these cases where the participant had a child with a developmental disability, resulting in a sample size of 612 in the low IQ group.

To determine whether the study sample of 612 individuals with low IQ was representative of the sample of all 1131 parents with low IQs participating in the WLS in 1975, the study sample ($n = 612$) and those parents who were excluded ($n = 519$) were compared with respect to participant's IQ, gender, years of education, occupational prestige, size of their community,

involvement in educational organizations, age at the birth of their first child, and marital status as well as the focal child's gender and birth order (all measured in 1975). Low IQ parents in the present sample differed significantly on only two of the background variables (data available from the first author): IQ score and occupational prestige. Low IQ parents in the present sample averaged an IQ score of about 1 point higher than low IQ parents who were excluded (means = 78.30 vs. 77.28, respectively, $t(1129) = -2.96, p < .01$), and they had more prestigious jobs, on average (means = 364.29 vs. 321.81, respectively, $t(927) = -3.16, p < .01$). The overall pattern of similarity on the other variables suggests that low IQ participants in the present sample were similar to the overall sample of low IQ parents in the WLS.

Comparison Group—Similar criteria were used to construct a comparison group of parents who had average or higher IQ scores; that is, IQ scores of 100 or above. Individuals with IQ scores ranging from 86 to 99 (approximately one standard deviation) were not included in the analyses to ensure a meaningful IQ gap between the low IQ parents and the comparison group. The inclusion criteria for the comparison sample were as follows: (a) participants obtained an IQ score of 100 or above while they were in high school (a total of 5221 respondents met this criterion); (b) a focal child was chosen in 1975 (3991 respondents met the first two criteria); (c) both the respondent and the focal child were still alive at the 2004–06 round of data collection (3493 cases met the first three criteria); and (d) valid data were available for the main variables of interest, namely, the participant's educational expectations for the focal child, and the focal child's ultimate educational attainment measured in 2004–06 (2767 respondents met all four criteria). We excluded 55 of these cases where the participant had a child with a developmental disability, resulting in a sample size of 2712 in the comparison group.

Similar to the low IQ sample, the comparison sample ($n = 2712$) was contrasted with those parents who were excluded ($n = 1279$) with respect to participant's IQ, gender, years of education, occupational prestige, size of their community, involvement in educational organizations, age at the birth of their first child, and marital status as well as the focal child's gender and birth order (all collected in 1975). Comparison parents in the present sample differed significantly from those who were excluded on only two of the background variables: parent gender and involvement in educational organizations. Comparison parents in the present sample were more likely to be female, with 55% mothers in the study sample and 47% mothers in the excluded sample, $\chi^2(1) = 23.56, p < .01$. They were also more likely to be involved in educational organizations, with 48% of comparison parents in the study sample involved in educational organizations compared to 40% of excluded parents, $\chi^2(1) = 23.73, p < .01$. As in the low IQ sample, the overall pattern of similarities suggests that comparison parents in the present sample were similar with respect to most variables to the overall sample of parents with average or above-average IQ scores in the WLS.

Age of Sample Members in the Present Analyses—As noted, data from two points of the WLS were used in the present analysis. At the first point (1975), parents averaged 35 years of age (range = 33 to 38 years) and the children averaged about 10 years of age (range = less than 1 year to 18 years). Educational expectations, as well as socio-demographic and environmental enrichment variables were collected at this time.

The focal child's ultimate educational attainment was collected at the second point (2004–06), when parents were aged 64 on average (range = 63 to 67 years) and their adult children were age 38 on average (range = 28 to 47 years). Thus, the present analysis addresses parental expectations that were formulated during the child's early to middle childhood and examines whether such expectations predict the child's ultimate attainment well into adulthood. In a follow-up analysis, we examine this question in a sub-sample where the child was age five or younger when the parents' educational expectations were measured.

Measures

Main Study Variables

Measurement of 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 of the *Henmon-Nelson Test of Mental Ability* 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). For the present analyses, an IQ dummy variable was created with two values: 0 = *IQ of 100 or above*; 1 = *IQ of 85 or below*.

Parental expectations for focal child's education: In 1975, participants reported on their educational expectations for the focal child's education by stating how far they thought the child probably would go in school. Responses were coded as follows: 1 = *less than high school*; 2 = *high school graduate*; 3 = *some college or vocational school*; 4 = *college graduate*; 5 = *professional or graduate school*.

Child's educational attainment measured in 2004–06: In 2004–06, participants reported the highest grade ever attended or degree from regular school for the focal child. Responses were coded using the same 1–5 point scale as educational expectations.

Background Variables

Socio-demographic variables: The sex of the participants and the target children were recorded (0 = *father*, 1 = *mother*). In addition, the age of the participant at the birth of his or her first child was recorded, along with the focal child's year of birth and birth order.

Environmental enrichment variables: The highest level of education completed by the parent by age 36 was recorded and coded into the following categories: 1 = *less than high school*; 2 = *high school graduate*; 3 = *some college or vocational school*; 4 = *college graduate*; 5 = *professional or graduate school*.

Both the participant's and spouse's current or most recent job at that time was also recorded and then coded into occupational prestige scores using Duncan's Socio-Economic Index (SEI, Stevens & Featherman, 1981). The SEI is a weighted composite score of the average amount of education and income for a given profession. The occupational prestige scores range from 38 to 960, with higher scores reflecting higher job prestige. For these analyses, we determined which parent (mother or father) had a higher occupational prestige score and used that score as an indicator of family socio-economic advantage.

The size of the residential communities in which participants were living in 1975 was determined using United States census data. Participants reported on the degree to which they were currently involved in educational parent and teacher association organizations (0 = *none* to 2 = *very much involved*) as well as their marital status, coded as 0 = *not married*, 1 = *married*.

Missing data on background variables were minimal; only 2 of the 9 background variables had missing values. Specifically, 5% of the values were missing for community size and less than 1% of the values were missing for parent's job prestige. For all analyses pertaining to the main research questions, mean scores were substituted for these missing values.

Results

Differences in Background Variables for Low IQ versus Comparison Group Parents

Table 1a presents the group means and test statistics (independent samples t-tests and chi-squares) for low IQ and comparison group parents with respect to background characteristics measured when parents averaged 36 years of age. In order to account for multiple comparisons, we applied a Bonferroni correction; with five major hypotheses this resulted in a probability of .01 as the cut-off for statistical significance in all analyses. In addition to the expected difference in IQ scores, comparison group parents had jobs with higher prestige, had completed significantly more education, and were more likely to be involved in organizations related to their child's education. They also were more likely to live in communities above the median in population size. Comparison group parents tended to be nearly one year older than low IQ parents, on average, when they gave birth to their first child. There were no differences between the groups in the proportion of mothers, the proportion of parents who were married, the proportion of focal children who were daughters, or the birth order of the focal child.

Bivariate Differences between Low IQ and Comparison Group Parents in Educational Expectations and the Focal Child's Educational Attainment

Independent samples t-tests were used to examine bivariate IQ group differences (low IQ/ comparison group) in parent's educational expectations and the focal child's ultimate educational attainment; group means and t-values are presented in Table 1b. Low IQ parents' expectations for their children's education were significantly lower than those of comparison group parents, $t_s(3322) = 13.24, p < .001$. Parents with low IQ scores expected that their children would not go beyond some college or a vocational school education (averaging 3.09 on the 5-point scale of education). In contrast, parents in the comparison group had significantly higher expectations for their child, averaging 3.62, which can be interpreted as an expectation of achieving just under a 4-year college education.

In regards to children's ultimate educational attainment, children of parents with low IQ scores had achieved significantly less education (2.80, just under some college or vocational school) than children of parents in the comparison group, who averaged 3.47 (more than some college or vocational school), $t(3322) = 13.95, p < .001$.

Multivariate Prediction of Educational Expectations

Before testing the multivariate prediction of educational expectations, we examined the bivariate correlations between expectations, child's educational attainment, socio-demographic variables, and environmental enrichment variables. These correlations are presented in Table 2. Most of the larger correlations involved parental education and gender. Mothers tended to be younger than fathers when they gave birth to their first child, and they also had less education, were less likely to be married, but participated more often in

educational organizations. Parents who had more education were older at the birth of the first child, had higher family occupational prestige, and lived in larger communities.

We next examined whether the differences in educational expectations for the focal child remained statistically significant after controlling for socio-demographic and environmental enrichment differences by conducting a hierarchical regression analysis (see Table 3). The first step of the model included IQ group as predictor of parental expectations for their child's educational attainment; the second step added socio-demographic variables and the third step added environmental enrichment factors. Parental and child gender were included as socio-demographic factors in the regression analyses because of the associations between parent gender and other background variables in this sample (see Table 2), as well as known gender differences in educational attainment (Buchmann, DiPrete, & McDaniel, 2008). Table 3 presents the standardized beta weights resulting from the hierarchical regression model predicting expectations, as well as the amount of variance accounted for by each step of the model.

As shown in Table 3, 5% of the variance for educational expectations was explained by IQ group. Adding in socio-demographic variables (parental and child gender, parent age at first child's birth, child birth order) significantly improved the prediction of expectations, $F(5, 3318) = 67.31, p < .01$, accounting for an additional 4% of the variance. Parents had higher educational expectations for sons compared to daughters, and for focal children born earlier in the birth order (first-born versus later-born). Parents who had their first child at an older age also had higher expectations for their child's education. Parent's gender did not predict their expectations for their offspring. It is important to note that including socio-demographic variables into the model had little impact on the strength of the relation between IQ group and educational expectations.

As shown in Step 3, including environmental enrichment variables accounted for an additional 12% of the variance in parents' educational expectations, which is a statistically significant change from Step 2, $F(10, 3313) = 88.45, p < .01$. As predicted, parents with more prestigious jobs and who themselves had completed more years of education had higher expectations for the focal child's educational attainment. Parents who were more involved in educational organizations also had higher expectations for their child's education. There were no significant effects of size of the community or marital status on parents' expectations for the focal child's educational attainment.

After statistically controlling for both socio-demographic variables and environmental enrichment, parental IQ group continued to predict educational expectations, $\beta = -.08, p < .001$. Similar to what was found in the bivariate analyses, parents in the comparison group had higher educational expectations for the focal child compared to parents in the low IQ group, even when other factors were controlled. However, the magnitude of the effect of parental IQ was attenuated, though still significant, when socio-demographic and environmental enrichment factors were controlled.

Multivariate Prediction of Educational Attainment

In order to test whether educational expectations predicted the focal child's ultimate educational attainment, another hierarchical regression analysis was conducted (see Table 4). In the first step parental IQ group was entered. Socio-demographic variables were added in the second step, environmental enrichment factors were added in the third step, and educational expectations were added in the fourth step. Table 4 presents the standardized beta-weights for each step of this model, as well as the amount of variance in educational attainment accounted for at each step.

As shown in Table 4 (Step 1), 6% of the variance of children's educational attainment was explained by IQ group, with children of comparison parents completing more education than children of low IQ parents. The addition of socio-demographic factors significantly improved the prediction of the model, $F(5, 3318) = 94.78, p < .01$, accounting for an additional 7% of the variance. Most of this variance can be attributed to parental age at first birth; children born to older parents had higher levels of educational attainment than children born to younger parents. Including environmental enrichment variables (Step 3) accounted for an additional 11% of the variance in parents' educational expectations, which is a statistically significant change from Step 2, $F(10, 3313) = 105.17, p < .01$. Children of parents who had greater educational and occupational attainment completed more years of education themselves. Furthermore, children of parents who were more involved with educational organizations attained higher levels of education than children of parents who were less involved. Finally, children whose parents were married during the son or daughter's childhood years had higher levels of educational attainment than children whose parents who were not married during the formative years of their son or daughter's childhood.

Adding parental educational expectations in the fourth step significantly improved the prediction of educational attainment, $F(11, 3312) = 133.83, p < .01$, accounting for an additional 7% of the variance for children's educational attainment. Parents' expectations were predictive of the focal child's educational attainment, net of all other variables, with focal children achieving more education when their parents had higher expectations for their education. Again, it is interesting to note that even after controlling for socio-demographic variables, environmental enrichment, and educational expectations, parental IQ group continued to significantly predict the amount of education completed by offspring.

In order to test whether educational expectations predicted the focal child's educational attainment differently for low IQ versus comparison group parents, we also tested the interaction between expectations and IQ group. This interaction was not significant, suggesting that holding high expectations had similarly positive effects for low IQ and comparison group parents. Furthermore, these results suggest that parental IQ and parental expectations have additive effects. That is, the highest amount of education can be predicted for children born to comparison group parents who had high expectations for their child's education. The lowest amount of education would be expected for children of low IQ parents who had low expectations for their child's education.

Follow-up Analyses: Predicting Attainment for Focal Children who were Five Years of Age or Younger at the 1975 Interview

Although the temporal ordering of the variables in the present analyses reflects our hypothesis that low parental educational expectations (measured when parents were age 36 and the child averaged 10 years of age) predicted lower educational attainment for the focal child measured nearly 30 years later, the opposite direction of effects is also possible. If by age 10, some of the focal children were already having difficulty in school, parents may have adjusted their educational expectations accordingly. If this was the case, attainment would have predicted parents' expectations, and not vice versa. In order to sort out the direction of effects, we reran the analyses predicting child's educational attainment with a smaller group of parents ($Ns = 88$ for the low IQ group and 461 for the comparison group) whose focal child was 5 years of age or younger at the time the parents were asked about their educational expectations for that child. Because these children had yet to enter or only recently entered school, their educational achievement would likely not have had a chance to influence parents' expectations for the focal children's education. The results of these analyses mirrored those of the larger sample (results available from first author), strengthening the case for our hypothesized direction of effects, namely that educational expectations influence educational attainment.

Discussion

The analyses both confirmed the conclusions of past research, as well as extended our knowledge about parenting with mild intellectual deficits. We found that offspring born to adults with mild intellectual deficits completed fewer years of education than offspring of parents with IQ scores in the average range or above. Previous research has documented poorer school achievement for young children born to parents with mild intellectual deficits (McConnell et al., 2003; Whitman et al., 2001), and the present study extends these findings by suggesting that the earlier problems in academic achievement culminate in fewer years of completed education in adulthood. Because truncated educational attainment is linked to a number of problematic adult outcomes, offspring of individuals with mild intellectual deficits are likely at higher risk for socio-economic disadvantage, divorce, and poor physical and psychological health (Marmot et al., 1998; McClanahan, 2004; Seltzer et al., 2009).

Similar to what has been found in other studies (Gath, 1998; McConnell et al., 2003; Whitman et al., 2001), the educational attainment of children born to low IQ parents in the WLS was influenced by both biological and environmental factors. That is, even after controlling for disadvantages common to parents with mild intellectual deficits such as truncated educational attainment, less prestigious occupations, or having their first child at an earlier age, offspring of parents with mild intellectual deficits continued to achieve less education than the control group. Although the degree of environmental enrichment was an important influence on children's educational attainment, there also appears to be an intergenerational transmission of ability from parent to offspring outside of the impact of impoverished environment.

In general, the socio-demographic and environmental enrichment variables predicted educational attainment in much the same way as would be expected from the extant literature. Children born to parents with mild intellectual deficits who had completed more education and had more prestigious occupations completed more education themselves. Children also completed more education when their parents were more involved in their education, and when parents were married during their childhood years. Finally, when controlling for other background factors, children born to parents who were older when they had their first child tended to complete more education. Two factors that were related to educational attainment in the extant literature – community size and the child's birth order – did not predict attainment in the WLS sample. This is likely because both of these variables seem to exert their maximum effect on educational attainment at the extremes. For community size, those who live in rural areas and those who live in high-density urban areas complete less education on average than whose community size falls in the middle of the density range (Roscigno et al., 2006; Smith et al., 1995). For middle-class families, those who are middle-born tend to complete less education than those who are first born or last born (Marjoribanks, 1991; Travis & Kohli, 1995). Because we were mainly interested in community size and birth order as controls, we treated them as linear and likely averaged over the effects at the extremes.

A second major finding of this study was that low IQ parents in the WLS expected their children to complete less education relative to their peers with average or above average IQ scores, even after controlling for a number of disadvantages common to parents with mild intellectual deficits such as truncated educational attainment and earlier age at first birth,. Although other studies have found that parents with mild intellectual deficits have less knowledge about child development and difficulty setting appropriate developmental expectations when their children are very young (Whitman et al., 2001), the present study is the first to find that these parents also expect their children to complete fewer years of education than the norm.

Our third major finding was that, similar to what has been found in the extant research (Furstenberg & Hughes, 1995; Smith et al., 1995), parental expectations for the amount of

education their son or daughter would complete predicted their offspring's educational attainment. Expectations predicted attainment similarly for both parents with mild intellectual deficits and the comparison group. Somewhat more surprising, parental expectations were the strongest predictor of attainment in our model. Expectations accounted for a full 7% of the variance in educational attainment, with the next strongest predictors being parental education and parental age at first birth. Furthermore, the relationship between parental expectations and educational attainment remained strong even after limiting the sample in follow-up analyses to those who were less likely to have their expectations biased by poor early academic achievement. Although our follow-up findings do not fully address the issue of causality, as children's development could influence parents' expectations before children enter school; our results do, however, strengthen our hypothesis that parental expectations predicted their children's educational attainment and not vice versa. In all analyses, we eliminated cases where there was a child with a developmental or intellectual disability in the family. Regardless of these restrictions, parental expectations remained a powerful predictor of their offspring's educational attainment.

The importance of high parental expectations in predicting more years of completed education is encouraging. Expectations are likely more malleable than many of the factors related to educational attainment (such as parental educational attainment, IQ scores, or age at first birth), and encouraging high expectations may lead to increased educational attainment for all children, regardless of parental IQ score. However, children born to parents with mild intellectual deficits may benefit the most from raising parents' expectations for their education, as these parents have lower expectations and their children complete less education, on average, than parents with higher IQ scores and their children. Therefore, interventions targeted at increasing the amount of education parents with mild intellectual deficits expect for their children may increase the amount of education their children ultimately attain, reducing the risk of these offspring for other problematic adult outcomes.

Because of the importance of parental expectations in predicting child's educational attainment, future research should examine the mechanisms through which parents with mild intellectual deficits develop lower educational expectations. Although parental education and occupational prestige were controlled in our analyses, there may be other related factors that influence parents' expectations for their children. For example, children born to parents with mild intellectual deficits may be more likely to attend schools that are under-resourced, which may impact parents' expectations for their education. Even if their schools are adequately resourced, previous research suggests that parents with mild intellectual deficits may be less likely to take advantage of opportunities offered within the schools (Johnson & Clark, 1984), which may also influence the amount of education they expect their child to complete.

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 mid-century. Although this sample is likely more representative of the population than the self-selected convenience samples often used in studies of intellectual disabilities, the findings are nonetheless limited by the geographic, racial, and age cohorts from which the sample was drawn. Second, parents with mild intellectual deficits differed in many ways, other than IQ scores, from the norm. These parents tended to complete less education, had less prestigious occupations, lived in smaller towns, had their children younger, and were less involved in their children's education than the comparison group. Although these background characteristics were statistically controlled in all of our analyses, they may be indicative of other unmeasured, pre-existing dissimilarities between the groups that contribute to the observed differences in parental expectations and children's educational attainment. Finally, as this was a secondary data analysis, we were limited in the questions we could address by

the scope of the the WLS database. Although the advantages of using these data are substantial, allowing the analysis of data from more people and over a longer period of time than would be possible by any independent researcher, the WLS had limited information about the academic development of children born to low IQ parents beyond their ultimate educational attainment. Future research should continue to study the specific ways in which children's academic achievement is impacted by having parents with mild intellectual deficits.

In conclusion, this study extends our knowledge about parenting with mild intellectual deficits in ways that have important implications for future research and intervention. Our study was the first to find that the earlier academic difficulties in children born to parents with mild intellectual deficits observed in other studies result in fewer completed years of education in adulthood. Furthermore, truncated educational attainment can be accounted for, at least in part, by parents with mild intellectual deficits having lower expectations for the amount of education their children will complete. Future research should move beyond statistical significance to consider the clinical significance of parental expectations in this population. Designing interventions to help parents with mild intellectual deficits set higher expectations for their children could lead to more years of completed education, which in turn has the potential for lifelong occupational and financial impacts and improved quality of life. Finally, future research should examine the mechanisms through which parents with mild intellectual deficits come to develop lower expectations for their children's education, with interventions focused on raising these expectations.

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Table 1

Differences between Low IQ and Comparison Group Parents on Background and Main Study Variables

	M (SD) or Percentage for Low IQ n=612	M (SD) or Percentage for Comparison group n=2712	Test statistic (t-value or χ^2)
Table 1a. Background variables			
Parent IQ score	78.30 (5.53)	112.39 (9.17)	88.38*
Socio-demographic variables			
Parent gender (% mothers)	53.3%	55.0%	.59
Child gender (% daughters)	44.8%	48.4%	2.60
Parent age at first birth	23.49 (3.51)	24.19 (3.58)	4.43*
Child birth order	2.00 (1.10)	1.92 (1.04)	-1.75
Enrichment of environment			
Parent completed education	2.17 (.55)	3.01 (1.13)	17.74*
Family occupational prestige ^a	430.81 (218.73)	610.01 (207.46)	19.03*
Parent marital status (% married)	94.4%	94.9%	.22
Size of community ^b (% at median or above)	41.4%	50.9%	17.28*
Parent involvement in educational organizations (% involved)	37.7%	48.4%	22.93*
Table 1b. Main study variables			
Educational expectations	3.09 (.93)	3.62 (.87)	13.24*
Child educational attainment	2.80 (1.05)	3.47 (1.07)	13.95*

*
p<.01

Note. Independent sample t-tests were run for continuous variables, and chi-square tests were run for percentages. All variables related to education were coded as follows: 1 = less than high school education; 2 = high school graduate or equivalent; 3 = some college; 4 = bachelor degree; 5 = post-graduate education.

^aDue to missing data on occupational prestige, Ns=607 and 2686 for the low IQ and comparison sample, respectively.

^cDue to missing data on community size, Ns = 580 and 2570 for low IQ and comparison group samples, respectively.

Table 2

Bivariate Correlations between Expectations, Child's Educational Attainment, Socio-demographic Variables, and Indices of Environmental Enrichment.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Expectations	--										
2. Attainment	.44	--									
3. Parent gender	-.07	-.05	--								
4. Child gender	-.08	.03	.00	--							
5. Parent age at first birth	.20	.28	-.32	.01	--						
6. Child birth order	-.10	-.07	.08	-.00	-.28	--					
7. Parent education	.38	.42	-.23	.01	.37	-.11	--				
8. Occupational prestige	.35	.33	-.04	-.01	.16	-.10	.45	--			
9. Parent marital status	.02	.08	-.07	-.02	.06	.03	.03	.05	--		
10. Size of community	.04	.03	-.00	-.01	.11	-.03	.07	.05	-.02	--	
11. Participation in educational organizations	.12	.10	.20	.00	-.09	.05	.04	.09	.05	.02	--

Note. All correlations greater than .04 or less than -.04 were significant at $p < .01$.

Table 3

Standardized Beta-Weights for Hierarchical Regression Model Predicting Educational Expectations

	Expectations		
	Step 1	Step 2	Step 3
Parent group: Low IQ/Comparison group	-.22*	-.21*	-.08*
Parent gender	--	-.01	.00
Child gender	--	-.08*	-.08*
Parent age at first birth	--	.16*	.07*
Child birth order	--	-.05*	-.04*
Parent completed education	--	--	.23*
Family occupational prestige	--	--	.20*
Parent marital status	--	--	-.01
Size of community	--	--	.00
Parent participation in educational organizations	--	--	.10*
R ²	.05	.09	.21

*
p<.01

Table 4

Standardized Beta-Weights for Hierarchical Regression Model with Educational Expectations Predicting Child Educational Attainment

	Educational Attainment			
	Step 1	Step 2	Step 4	Step 4
Parent group: Low IQ/Comparison group	-.24*	-.21*	-.09*	-.07*
Parent gender	--	.03	.06*	.06*
Child gender	--	.02	.03	.05**
Parent age at first birth	--	.28*	.17*	.15*
Child birth order	--	.01	.01	.03
Parent completed education	--	--	.28*	.21*
Family occupational prestige	--	--	.15*	.09*
Parent marital status	--	--	.05*	.06*
Size of community	--	--	-.02	-.02
Parent participation in educational organizations	--	--	.07*	.04*
Educational expectations	--	--	--	.29*
R ²	.06	.13	.24	.31

* p<.01