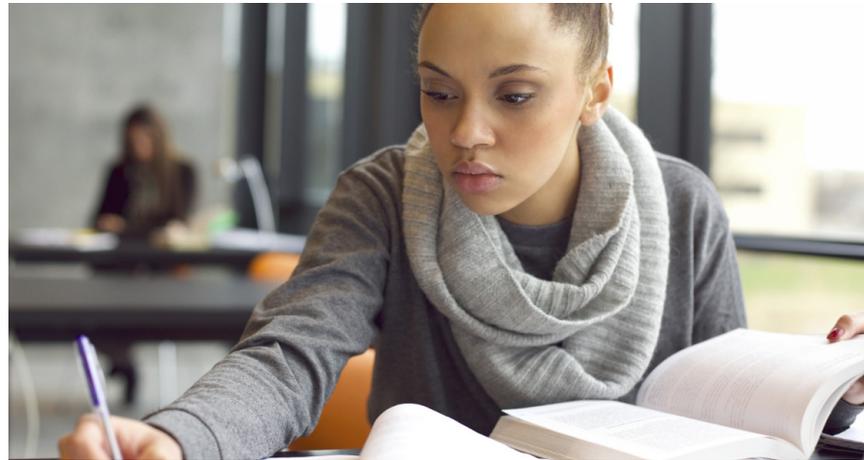**Child TRENDS**

NEW EVIDENCE ON THE RELATIONSHIP BETWEEN ACADEMIC ABILITY AND NONMARITAL TEEN CHILDBEARING

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OVERVIEW

Teenage childbearing is associated with negative outcomes for mothers, their children, and society as a whole. We used data from a nationally representative survey that follows young women over time to explore the relationship between three different measures of academic ability and the likelihood of subsequently experiencing a teen birth outside of marriage. Previous studies have found that girls who perform well in school are less likely to become teen mothers. We show that this is true for some girls, but not for others. We also show that not all measures of academic ability are related to the risk of nonmarital teen childbearing.

KEY FINDINGS AND IMPLICATIONS

- Improvements in academic performance are associated with a lower risk of teen childbearing for girls with few behavioral problems, but not for girls with more pronounced behavioral problems.
- For girls with few behavioral problems, higher scores on *math and reading-comprehension* tests are associated with a lower risk of teen childbearing. Scores on *word recognition* tests, on the other hand, are not related to teen childbearing for either group.
- For girls with few behavioral problems, policies that improve analytical thinking skills (i.e., skills that are measured by the math and reading-comprehension tests) may help to reduce the risk of early childbearing.
- For girls with more substantial behavioral problems, school-based interventions may need to be supplemented with strategies that address other important correlates of risky behavior.

BACKGROUND

Teenage childbearing is related to numerous adverse outcomes for young mothers, their children, and society more generally. For example, children of teen mothers are more likely to be low birth weight than children whose mothers give birth a few years later (Manlove et al., 2008). Among young women, early childbearing is

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linked to diminished educational attainment (Kane et al., 2013) and an increased risk of living in poverty (Grogger and Bronars, 1993). Teen births have also been estimated to cost taxpayers nearly $10 billion annually (National Campaign to Prevent Teen and Unplanned Pregnancy, 2014). Studies often find that the implications of teen childbearing are more limited, but are still negative, once they account for the fact that many young mothers were already disadvantaged before they gave birth (Ashcraft et al., 2012; Hoffman, 2008; Levine and Painter, 2003).

Rates of teen childbearing tend to be lower in areas with greater income mobility (Chetty et al., 2014) and higher employment rates (Colen et al., 2006). Teen births are also less common among girls who have higher educational expectations (Driscoll et al., 2005) and who live in places with lower levels of income inequality (Kearney and Levine, 2014). This evidence suggests that teens who have "more to lose" may be less likely to place themselves at risk of early childbearing. Consistent with this theory, some studies have found that there is a negative relationship between various markers of girls' academic success and their chances of subsequently experiencing a teen birth (Heckman et al., 2006; Shearer et al., 2002; Manlove, 1998). In a paper recently published in *Perspectives on Sexual and Reproductive Health*, we offer new evidence on the relationship between academic ability and teen childbearing (Lou and Thomas, 2015). This brief expands on our study's findings by reporting previously unpublished estimates of the strength of that relationship.

DATA

We analyzed data on 701 female participants in the Panel Study of Income Dynamics (PSID), which is a longitudinal survey that follows sample members over time. Because single parenthood is associated with a number of negative maternal and child outcomes, we focused in particular on nonmarital teen childbearing, which we defined as a first birth to an unmarried girl between the ages of 16 and 19. We did not use data on childbearing among those younger than 16 in order to avoid overlap between the time periods during which test scores and births are measured. The girls in our sample turned 16 between 2000 and 2007.

We measured academic ability using survey respondents' scores on Woodcock Johnson-Revised assessments of letter-word identification, passage comprehension, and applied problem-solving skills. The early portion of the letter-word test assesses the ability to recognize letters and simple words; as the test progresses, subjects are asked to identify increasingly complex words. The passage-comprehension test assesses reading-comprehension skills, and the applied problem-solving test measures the ability to solve practical problems mathematically.

We recognized the possibility that academic ability might reduce the risk of teen childbearing to a greater degree among "low-risk" students (i.e., students who are less likely to engage in risky behavior) than among "high-risk" students, or vice versa. As a result, we separately studied girls in the top and the bottom halves of our sample in terms of their Behavior Problems Index (BPI) scores. The PSID's BPI scale is created using responses provided by the respondent's primary care giver to questions about the respondent's behavioral traits including secretiveness, depression, disobedience, and impulsiveness.

We used an analytical approach that allowed us to measure the relationship between academic ability and teen childbearing while accounting for girls' family backgrounds and the characteristics of the states in which they live. The appendix at the end of this brief provides additional information on the way in which we incorporated these control variables into our analysis.
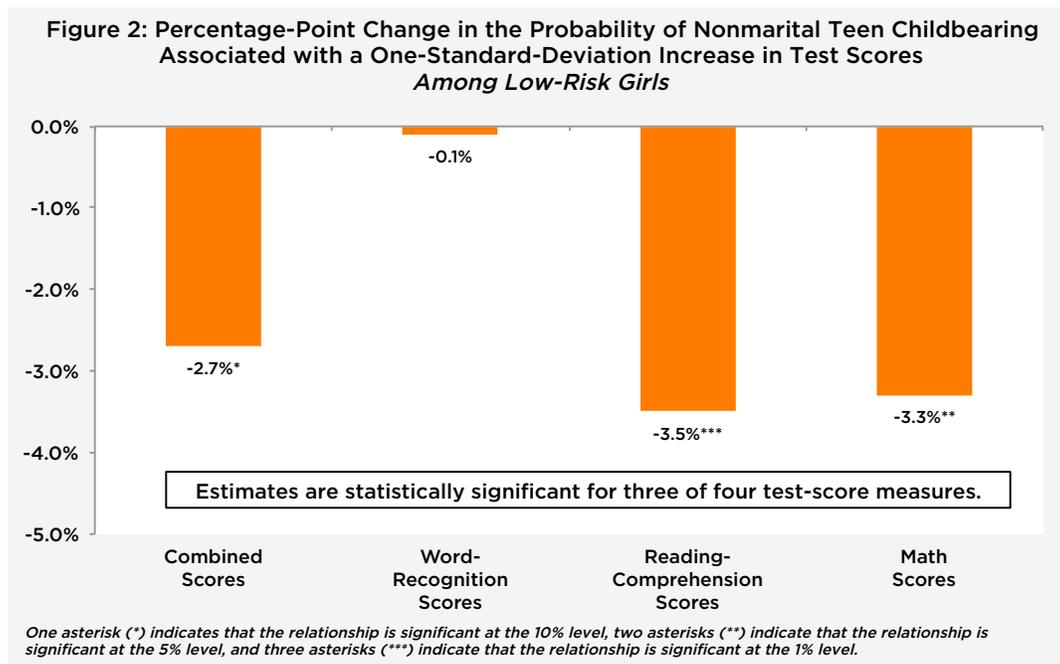
RESULTS

Figures 1 and 2 show our estimates of the change in the predicted probability of experiencing a nonmarital teen birth that is associated with an increase of one standard deviation in test scores. For each of our test score variables, one standard deviation is equal to about 15% of the mean. Thus, an improvement of one standard deviation is equivalent to an increase that is a little less than a fifth as large as the average score. Figure 1 displays estimates for the high-risk half of our sample, and Figure 2 displays estimates for the low-risk half of our sample. We report results for average scores across the three combined tests and for each individual test. Figure 1 shows that, among high-risk girls, there is a small positive association between test scores and the probability of experiencing a teen birth, suggesting that an improvement in scholastic achievement is related to a somewhat higher probability of teen childbearing. However, none of these estimates are statistically significant. In other words, for this group, there is not enough statistical evidence to allow us to conclude that there is any meaningful relationship between our academic ability measures and the risk of teen childbearing.

On the other hand, Figure 2 shows that, for the low-risk half of our sample, there is a statistically significant negative relationship between teen childbearing and scores on the combined tests and on two of the three individual assessments. Our results suggest that, on average, a one-standard-deviation increase in combined test scores within this group is associated with a reduction of nearly three percentage points in the probability of experiencing a nonmarital teen birth. Turning to our estimates for the individual assessments, we find that a one-standard-deviation increase in scores on either the reading comprehension test or the math test is associated with a statistically significant reduction of more than three percentage points in the probability of having a nonmarital teen birth. Given that about six percent of low-risk respondents experienced an unwed teen birth, these results imply that there is quite a strong relationship between test scores and nonmarital teen childbearing among girls with relatively few behavioral problems. More specifically, we estimate that, within this group, a one-standard-deviation increase in scores on either assessment is associated with a reduction of more than fifty percent in the risk of teen childbearing. As is the case for the high-risk subgroup, the relationship between word-recognition scores and teenage childbearing for the low-risk group is very small in magnitude and statistically insignificant.

Figure 1: Percentage-Point Change in the Probability of Nonmarital Teen Childbearing Associated with a One-Standard-Deviation Increase in Test Scores
Among High-Risk Girls
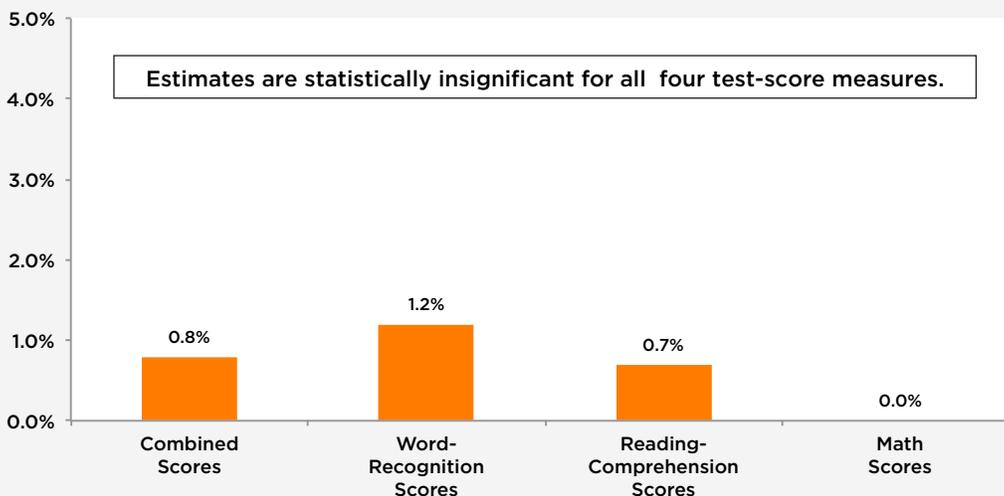
One asterisk (*) indicates that the relationship is significant at the 10% level, two asterisks (**) indicate that the relationship is significant at the 5% level, and three asterisks (***) indicate that the relationship is significant at the 1% level.

Figure 2: Percentage-Point Change in the Probability of Nonmarital Teen Childbearing Associated with a One-Standard-Deviation Increase in Test Scores *Among Low-Risk Girls*

One asterisk (*) indicates that the relationship is significant at the 10% level, two asterisks (**) indicate that the relationship is significant at the 5% level, and three asterisks (***) indicate that the relationship is significant at the 1% level.

DISCUSSION

Our results show that reading-comprehension and math test scores are strongly related to the risk of nonmarital childbearing among girls with comparatively few behavioral problems. We find that, within this group, a one-standard-deviation increase in scores on either assessment is associated with a reduction of more than one half in the probability of experiencing an unwed teen birth. Notably, however, we find no evidence of a similar relationship among girls with more pronounced behavioral problems. Also striking is the fact that word-recognition test scores are not related to teen childbearing for either group. The word-recognition test is described as an assessment of basic academic skills, whereas the reading-comprehension and math tests are described as assessments of the ability to apply these basic skills to the challenge of solving academic problems (Riverside Publishing, 2014). Our results thus imply that analytical thinking skills have a particularly strong relationship with the risk of teen childbearing, but that this relationship may exist only for students with relatively few behavioral problems.

Overall, our findings are consistent with a growing literature showing that teen births are most common among girls with limited educational and economic prospects. We contribute to this literature by documenting the fact that some dimensions of academic ability are much more predictive than others of teen childbearing, and by showing that the strength of this relationship depends importantly on the degree of other behavioral problems. These results highlight potentially important questions for future research. Most importantly, given the sobering finding that our measures of academic ability are not associated with a reduction in teen births among young women with pronounced behavior problems, future work should delve more deeply into the linkage between test scores and behavioral characteristics as they relate to the risk of early childbearing.

Our research also has the potential to inform future policy debates. For example, it is possible that early childhood education programs or other policies that enhance school readiness could help to lower the teen birth rate. At the same time, our results suggest that, for adolescents

with substantial preexisting behavioral problems, school-based approaches might not be enough. Previous work has shown that behavioral problems are themselves important correlates of early childbearing (Coyne and D'Onofrio, 2012). Thus, if we are to make progress among girls who are at greatest risk of teen pregnancy, educational interventions may need to be supplemented with strategies that address the thicket of underlying social and economic problems that can lead to risky behavior.

It is important to note that we were largely unable to account for peer influences, neighborhood characteristics, or school quality in our analysis. As a result, our estimates may overstate the true effects of academic ability. On the other hand, our estimates could understate these effects to the extent that our sample underrepresents girls with lower-than-average test scores and higher-than-average probabilities of out-of-wedlock childbearing. This is a realistic possibility, as we did not have enough information to include some members of the original PSID sample in our analysis. The girls excluded for this reason were, on average, more disadvantaged than girls who were retained in our final sample. On balance, then, our results suggest the possibility that public policies designed to improve academic performance during the pre-teen and early teenage years might also help to reduce the number of nonmarital teenage births.

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APPENDIX ON RESEARCH METHODS

Our analysis controlled for several different socioeconomic and demographic characteristics of respondents and their families and for a number of state-level policy and economic factors. Our estimates thus reflect the change in the likelihood of becoming an unmarried teen parent that accompanies an increase in test scores without any corresponding changes in these other characteristics. This approach improved our ability to measure the direct relationship between teen childbearing and test scores. As an example, compared to members of our sample who are from high-income families, sample members with low family incomes tend to perform less well academically and are more likely to experience a nonmarital teen birth. One might therefore wonder whether the observed relationship between test scores and teen childbearing simply reflects the confounding influence of income in our data. By incorporating family income into the analysis as a control variable, we eliminated this source of potential bias in our estimates.

The table below lists all of the control variables included in our analysis. In other work, we included controls to account for neighborhood characteristics in addition to the variables listed below. We did not include these control variables in our final analysis because we lacked information on neighborhood characteristics for a large number of survey respondents. However, we would note that our key conclusions remained the same when we accounted for these additional controls.

Appendix Table: Control Variables Included in Analysis of the Relationship Between Academic Ability and Teen Childbearing

Individual-Level Controls

Respondent's Race/Ethnicity[§]

Respondent's Year of Birth

Respondent's Age at Assessment

Was the Respondent Low Birth Weight?

Frequency with which the Respondent Attends Religious services[§§]

Family-Level Controls

Household Income

Primary Care Giver's Raw Woodcock Johnson-Revised Passage-Comprehension Score

Primary Care Giver's Years of Education

Was the Respondent's Mother Unmarried when the Respondent was Born?

Was the Respondent's Mother a Teenager when the Respondent was Born?

State-Level Controls

Respondent's State of Residence[§§§]

Annual Unemployment Rate in the Respondent's State of Residence

Mean Monthly TANF Benefit for a Family of 3 with no Income in the Respondent's State of Residence

Does the Respondent's State of Residence have a TANF Family Cap?

Does the Respondent's State of Residence have a Duration-Based Medicaid Family Planning Waiver?

Does the Respondent's State of Residence have an Income-Based Medicaid Family Planning Waiver?

Does the Respondent's State of Residence have a Medicaid-Funding Abortion Restriction?

Does the Respondent's State of Residence have a Parental-Involvement Abortion Restriction?

Does the Respondent's State of Residence have a Mandatory-Delay Abortion Restriction?

[§]White non-Hispanic, Black non-Hispanic, Hispanic, Other race or ethnicity
[§§]Never, Less than once per month, Once per month, A few times each month, Once per week, Several times each week
[§§§]All analyses include a set of state fixed-effects dummy variables that record the respondent's state of residence during their early teenage years. We are able to control for both state fixed effects and the time-varying state-level controls listed above because the state of residence was not measured in the same year for all sample members.