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Evaluating the Impact of Mothers' Self-esteem on Early Childhood Home Environment: Evidence from the NLSY

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Abstract:
We test whether mother's self-esteem is an important driver of children's home environment quality. Utilizing matched mother-child data from the National Longitudinal Surveys, our analysis employs instrumental variables regressions to estimate the relationship of interest. Validity of our empirical approach is assessed by conducting statistical tests for overidentifying restrictions and additional robustness checks. Key findings indicate that rise in mothers' self-esteem improves children's home environment and supports children's cognitive and emotional development. Further, the magnitude of these effects appear to be larger than the degree of association between other cognitive and non-cognitive attributes of mothers and children' home environment.

Key Words: Childhood development; Home environment; Mothers' self-esteem; Instrumental variables; Orthogonalization.

JEL classification: C26, J13, J24

Compliance with ethical standards:
We hereby declare that this analysis was not funded by any public or private entity. We also declare that this study does not involve any conflict of interest.

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1. INTRODUCTION

In 1966, James Coleman and his colleagues emphasized the importance of family's role in childhood development. Over half a century later, it is well established that a healthy home environment, determined by parental inputs, is a necessary prerequisite for a child's physical and mental growth (Payne *et al*., 1994; Benasich & Brooks-Gunn, 1996; Baharudin & Luster, 1998; Strauss & Knight, 1999; Evans, 2004; Melhuish *et al.*, 2008; Bernal & Keane, 2011; De Haan, 2011; Bharadwaj *et al.*, 2018; Tracey & Polachek, 2018). However, there is limited research on identifying effective mechanisms to improve children's home environment, especially during early childhood years. As such, our study contributes to the early childhood development literature by evaluating the importance of mothers' self-esteem in shaping children's home environment during initial childhood years. Our results indicate that mothers with high self-esteem invest in family-level inputs that are effective in improving children's home environment quality (for ages 0-5 years) and fostering cognitive and emotional development.

A supportive home environment during early childhood has beneficial effects on children's future wellbeing and human capital outcomes.[1] For instance, a study by Lehmann *et al*. (2016) indicates that variation in quality of child-family interactions that stimulates cognition during early childhood years does affect children's cognitive outcomes. Yet, plight of many American families has been deteriorating over the years. Heckman and Masterov (2007) observe that the proportion of American children born into or living in non-traditional families has increased since 1970. More recent statistical trends on American families suggest that about 39 percent

[1] See Barnett (1995), Vellutino *et al.* (1996), Heckman (2000), Phillips and Shonkoff (2000), Anderson *et al.* (2003), Cunha *et al.* (2006), Heckman and Masterov (2007), Cunha and Heckman (2007, 2010), Burger (2010), and Heckman *et al.* (2012) for details.

of all children reside in single-parent or no-parent families, and about one-fifth of all children live in poverty.[2] These proportions are even higher among demographic minorities.[3]

Our research investigates whether improving mothers' self-esteem can be an effective way to positively influence children's home environment, and thereby support early childhood development. Self-esteem (alternatively 'self-worth' or 'self-perception') is an important non-cognitive attribute. Individuals with higher self-esteem tend to experience positive mental wellbeing outcomes such as emotional satisfaction, psychological stability, success, and happiness (Fox, 2000; Neiss *et al.*, 2002; Baumeister *et al.*, 2003; Cheng & Furnham 2003a, 2003b). Conversely, individuals with lower levels of self-esteem suffer from numerous emotional and behavioral problems including anxiety, depression, aggression, delinquency, and antisocial behavior (Leary *et al.*, 1995; Baumeister *et al.*, 2000; Donnellan *et al.*, 2005; Trzesniewski *et al.*, 2006). Further, Borghans *et al.* (2008) discuss that personality traits (including self-esteem) are important predictors of socio-economic outcomes (including income, cognitive skills, and overall well-being).

Given the existing literature-based evidence on the advantage of having a high level self-esteem, it is reasonable to believe that self-esteem can be an important driver of parents' child-rearing activities. In support of this conjecture, self-competent parents are found to engage in constructive childcare activities[4] and demonstrate authoritative parenting styles.[5] Characterized by high levels of supervision, acceptance, and allowance of psychological autonomy,

[2] Estimates obtained from Livingston (2014) and the National Center for Children in Poverty (NCCP). See http://www.nccp.org/publications/pub_1170.html; Retrieved on February 26, 2017.

[3] As of 2015, the National Center for Children in Poverty reports that the proportion of children living in low-income/poor families exceed 60 percent for African-Americans, Hispanics, and American Indians. See http://www.nccp.org/publications/pub_1170.html; Retrieved on February 26, 2017.

[4] See Menaghan and Parcel (1991), Aunola *et al.* (1999), Herz and Gullone (1999), and Cheng and Furnham (2004) for details.

[5] See Aunola *et al.* (1999) and Herz and Gullone (1999) for details.

authoritative parenting is positively associated with children's academic progress, life satisfaction, happiness, and congenial behavior.[6] In addition to this direct effect, women with higher self-esteem also tend to stay in stable marriages or relationships with their partners, thereby increasing their children's likelihood of growing up in a traditional household structure.[7] As such, effective measures to improve women's self-esteem can be perceived as a viable policy option intended to foster early childhood development.

Early childhood interventions (e.g., family-level interventions *etc*.) are believed to be effective policy tools to reduce children's ability gaps between different socio-economic groups.[8] However, adoption of such interventions is often complex. Apart from the large costs of implementation and identification of appropriate target population, designing early childhood policies requires policymakers to be cautious of possibilities that family-level interventions may often interfere with the sanctity of a family (Heckman, 2011). In this context, public programs aimed at improving mothers' self-esteem can be considered as a feasible approach, as such interventions are less likely to provoke social scrutiny. Moreover, in the past, social measures to improve women's self-esteem (commonly measured by the Rosenberg self-esteem scale) have been used as an effective strategy to address discrimination against women in labor markets as well as in family relationships (Hackett & Betz, 1981; Cruikshank, 1993; Campbell *et al.*, 1995; Baumeister *et al.*, 2003; Johnson & Ferraro, 2000; Groves, 2005).[9] Given the historical evidence on socio-economic viability of self-esteem-promoting programs (Gagnon

[6] See Steinberg *et al.* (1989, 1992), Suldo and Huebner (2004), and Milevsky *et al.* (2007) for details.

[7] Research shows that women with higher self-esteem tend to share a healthy and stable relationship with their spouses or partners (Furnham & Cheng, 2000; Baumeister *et al.*, 2003).

[8] For example, the projected benefit of a dollar invested in Perry Pre-school Project participants is estimated to be 5.7 dollars (in estimated benefits) through the age of 27 and 8.7 dollars for the remainder of the participants' lives (Heckman, 2000). A recent study by Walters (2015) has also shown that early childhood interventions (Head Start program) are important for long-term human capital development.

[9] An example of a large-scale self-esteem promoting program is the California Task Force to Promote Self-esteem and Personal and Social Responsibility Records (1986-1990). See details in http://pdf.oac.cdlib.org/pdf/csa/selfesteem.pdf; Retrieved on August 9, 2017.

et al., 1997; Sweet & Applebaum, 2004; Howard & Brooks-Gunn, 2009), our study analyzes whether adoption of measures to improve mothers' self-esteem can be considered as an effective strategy to promote children's home environment conditions during early childhood. Efficacy of such interventions, however, relies on mothers' self-esteem having a positive and causal influence on children's home environment. However, in practice, identification of this causal link faces several empirical challenges.

A major threat to identification of the causal impact of mothers' self-esteem using single equation regression models such as ordinary least squares (OLS) regressions arises from the possible omission of relevant variables that are correlated with mothers' self-esteem (e.g., intrinsic traits like motivation). The second major empirical challenge arises from the risk of reverse causality, as unfavorable home conditions and disputed relationships can adversely affect mothers' self-esteem (Elliott, 1996; Nosek *et al.*, 2003). Therefore, past studies that have evaluated the relationship between mothers' self-esteem and child outcomes using OLS-based models are not immune to the aforementioned endogeneity concerns. Even though existing studies in this space find that mothers' self-esteem is positively associated with children's home environment[10] and their psychological well-being, it is possible that the estimates from these studies are biased and inconsistent.

An empirical solution to the above identification problem is the use of instrumental variables (IV) - a strategy we employ in our analysis. We match mothers' information from the original cohort in the National Longitudinal Surveys of Youth 1979 (NLSY79) with their biological children's data from the National Longitudinal Survey of Child and Young Adult (NLS-CYA). Based on survey design (discussed later in further detail), we use self-esteem scores reported in the 1987 survey to construct measures of mothers' self-esteem (*SE87*).

[10] See Menaghan and Parcel (1991), Garrett *et al.* (1994), and Surkan *et al*. (2008) for details.

To motivate the causal interpretation of our regression estimates, we estimate an overidentified model using two instrumental variables such that the joint validity of our IV's can be assessed via standard (overidentified restrictions) tests. Both our instruments are based on mothers' past information documented during the initial survey years of NLSY79.

Our first IV is derived from self-esteem scores reported in the 1980 survey of NLSY79 (*SE80*), which is seven years prior to the period when our key regressor (*SE87*) was reported. The empirical approach of utilizing *SE80* as an IV for future reported self-esteem measures has already been adopted by a few existing studies in the self-esteem literature (Kammeyer-Mueller *et al.*, 2008; Drago, 2011; Tang & Baker, 2016).[11] With respect to the relevance criteria of *SE80* as an IV for *SE87*, it is worth noting that self-esteem is a rank order-preserving trait. Therefore, past measures of self-esteem is likely to be positively correlated with future scores. However, the excludability criteria of using the distant lagged measure of self-esteem as an IV depends largely on the expectation that unobserved shocks that affect individuals' home environment in the relevant survey years of NLS-CYA (commences in 1986) are uncorrelated with *SE80*. Conceivably, based on the implicit expectation that both conditions are met, the above-mentioned studies have used 1980's self-esteem score as an IV for self-esteem scores reported in future survey years (1987 and 2006 surveys) in the NLSY79. However, estimation of exactly identified models restricts the scope of providing empirical evidence to justify validity of an IV. Moreover, as noted earlier, self-esteem can potentially be endogenously determined by individual-specific unobserved characteristics (such as motivation or attitude) that can also affect home environment (Ryan *et al.*, 1994; Bansal *et al.*, 2006; Muola, 2010). Serial correlation across these unobserved influences over time shall refute the excludability

[11] Instrumental variables estimation in Drago's (2011) study is motivated from the possibility that self-esteem scores in NLSY79 are likely to suffer from attenuation bias. Tang and Baker (2016) use IV regressions (using 1980's self-esteem scores as an instrument) to perform empirical tests for endogeneity in 2006 self-esteem measures. Tang and Baker (2016) further find that controlling for relevant individual-specific information can reduce endogeneity bias in self-esteem scores.

assumption of *SE80* as an IV for future self-esteem scores (such as *SE87*). As such, a second instrument would allow us to statistically test the joint validity of our instrumental variables by conducting Sargan-Hansen overidentification test. To be specific, the (Sargan-Hansen) test statistic follows a chi-square distribution and allows testing the null hypothesis of whether all the instruments are uncorrelated with the error term in the main regression. The test statistic is computed by regressing the estimated error term in the main (IV) regression on the instruments.

For our second IV, we consider percentage of female students and professional staff corresponding to each adult mother when they were in high school. Recorded in the first survey year of the NLSY79, the information on gender composition of high school students and professional staff was documented in a separate mail survey that was sent to schools attended by the original NLSY respondents. We use this particular survey information as an indicator of female student percentage at mothers' high school.

Considering female student percentage at high school as an IV for adult mothers' self-esteem is motivated from the evidence that gender composition at school, especially during adolescence, can influence students' self-esteem (Schneeweis & Zweimüller, 2012, pp. 483-484). This relationship is substantiated by a large body of empirical literature in the education space that indicates female students tend to have higher levels of self-confidence and better educational outcomes (including higher likelihood of choosing traditionally male-dominated streams) when they are assigned to academic environments where the student gender composition is in their favor (e.g., Booth *et al.*, 2014, 2018; Schøne *et al.*, 2019). We elaborate on these evidences in further detail in Section 3. However importantly, the validity of using student's sex composition at high school as an IV for future self-esteem can be compromised if individuals' school choices are correlated with students' gender composition at school. This particular concern is likely to be even more pronounced if individuals choose to attend single-sex schools or schools where students' gender ratio is disproportionately skewed in favor of a

particular sex. Hence, to address this concern, we restrict our analysis to mothers who went to co-educational high schools where female students' percentage varied between 40 and 60 percent. However, to check consistency in our key findings, we perform multiple robustness checks where we allow the female student ratio to vary within wider ranges and control for additional school-specific indicators.

Nonetheless, considering the possibility of the already highlighted empirical concerns regarding the two instruments, overidentification restriction test would allow us to statistically verify the validity of our IV's. More specifically, rejection of the null hypothesis of the test would indicate that at least one of our instruments is correlated with unobserved error terms in the main regression.

In our empirical analysis, we estimate both OLS and two-stage least squares (2-SLS) regressions. The NLS-CYA documents measures of children's home environment quality by constructing a composite Home Observation Measurement of the Environment-Short Form score (HOME). The HOME score is estimated based on survey responses on child-family interactions and can be further classified into sub-components - cognitive stimulation and emotional support scores. Our 2-SLS results suggest that mothers with higher self-esteem scores provide a significantly better home environment to their children. In particular, a one-standard deviation increase in mothers' self-esteem score is related to 0.2-standard deviation increase in HOME standard score for children aged five or below. We find similar effects when looking at sub-components of HOME - cognitive stimulation and emotional support scores. Further, estimation of standardized regressions indicates that effects of mothers' self-esteem are larger than the degree of association between other measures of their cognitive and non-cognitive traits (such as locus of control, schooling, and aptitude) and children's home environment. The statistically insignificant Sargan-Hansen statistic values across all our 2-SLS regressions provide empirical support to the presence of a causal link between mothers' self-

esteem and children's home environment conditions. Furthermore, our regression estimates are robust to the inclusion of multiple sensitivity checks (explained in the paper).

The remainder of the paper is organized as follows: Section 2 provides an overview of the data used in our analysis; Section 3 describes our identification strategy including discussions on the potential validity of our instruments; Section 4 explains the key findings; while Section 6 presents concluding remarks.

2. DATA AND DESCRIPTIVE INFORMATION

2.1 The National Longitudinal Surveys

The dataset used in this analysis is prepared by linking mothers from the original cohort of the NLSY79 with their biological children from the NLS-CYA. Commencing in the year 1979, the NLSY79 reports a wide range of human capital and labor market information based on a nationally representative sample of 12,686 individuals who were born between 1957 and 1964. The NLS-CYA documents child-level information of biological children born to mothers from the original NLSY79 cohort. The survey incorporates a large number of information on children's health, education, family interactions, and demographic characteristics. The surveys in NLS-CYA are conducted biennially since the year 1986.

An important survey-specific aspect with regard to our key regressor is that the self-esteem scores are recorded for only three NLSY79 survey years (1980, 1987 and 2006). Moreover, since our study focuses on early childhood environment, we restrict our analysis to children aged 0-5. Based on survey design and conditional on the availability of sufficient child information for our child age groups of interest, we consider the 1987 reported scores of self-esteem as our key regressor, and the one-year adjacent (preceding and succeeding) biennial NLS-CYA surveys of 1986 and 1988 as our study period for all other child and mother

information. Our strategy is based on the assumption that reported self-esteem scores in the NLSY79's survey year of 1987 can be used as a proxy for the mothers' self-esteem level for both the years 1986 and 1988. This is to ensure a sufficiently large sample size for our analysis to increase the power of our regression models. However, restricting our analysis to NLS-CYA survey year 1988 does not affect our findings when we replicate our empirical analysis using the main dependent variables (see Appendix A.7). In other words, we try to check the rationality of our approach in a supplemental analysis by analyzing the effect of mothers' self-esteem (1987 NLSY79) on only future information on child outcomes of interest (1988 NLS-CYA).

We utilize three NLS-CYA measures of children's home environment quality as dependent variables in our analysis – HOME, cognitive stimulation and emotional support score. The HOME raw score is a composite measure of children's home environment, which is constructed (by NLS-CYA) from a wide range of survey variables including information on child-family interactions, parents' childcare investments, and household characteristics (Bradley & Caldwell, 1984). In general, the HOME score can be viewed as a broad indicator of maternal and family-level inputs that determine children's home environment. It is important to note, that the survey items used to estimate the HOME raw scores vary by children's age groups studied in our analysis (see Appendix Table A.1 and Table A.2).[12] As the primary focus of our study is on early childhood years, we consider two separate child samples - 'infants' (0-2 years) and 'preschoolers' (3-5 years). Additionally, depending on particular functionality of each component included in construction of HOME scores, NLS-CYA further classifies the HOME raw score into cognitive stimulation and emotional support scores (also indicated in Appendix Table A.1 and A.2). While the cognitive stimulation score incorporates survey items

[12] The NLS-CYA reports separate HOME-SF raw scores for children belonging to age groups: 0-2 years, 3-5 years, 6-9 years, 10 years and above. The age-specific information used to construct the HOME-SF raw score restrict the scores' comparability across different child age groups.

that usually contribute to child's cognitive development, the emotional support score is measured using items that are specific to family investments that aid children emotionally.

Finally, we repeat our empirical analysis using the standard score version of HOME, cognitive stimulation and emotional support measures for all children aged between 0 and 5. Since, unlike raw scores, the standard scores are comparable across children of different age groups, using the latter allows us to maximize our child sample size to ensure higher precision of our regression estimates.

With respect to our key regressor, individuals' self-esteem scores recorded in the NLSY79 are calculated based on individuals' responses to a 10-item questionnaire designed by Rosenberg (1965). We provide details on NLSY79 coding of each item in Appendix Table A.3. We utilize the Item Response Theory (IRT) scores of mothers' self-esteem (MSE) as our main explanatory variable.[13] The IRT scores allow comparison in self-esteem scores across different survey years as these scores are not sensitive to changes introduced in the survey items used to measure individuals' self-esteem.

Further, to minimize omitted variable biases, we include a number of relevant child-, mother-, and family-specific characteristics. Child characteristics include binary indicators for sex, age, race, and ethnicity. Mothers' cognitive (aptitude and academic qualification) and non-cognitive (locus of control) abilities are captured by Armed Forces Qualification Test scores (AFQT), schooling, and Rotter scale. In addition, we control for mothers' age, and dichotomous maternal indicators for being in a married relationship and being employed. For family-level characteristics, we control for household size (number of household members) and family's poverty status (binary indicator for being below the Federal poverty threshold).

[13] See details on IRT scores in https://www.nlsinfo.org/sites/nlsinfo.org/files/attachments/141120/Rosenberg%20Documentation%20with%20IRT.pdf; Retrieved on July 22, 2016.

2.2 Descriptive statistics

Table 1 presents descriptive information of all the variables used in our analysis. We further classify the information by the respective analysis samples of infants and preschoolers. The descriptive statistics presented in Table 1 are based on the largest regression sample used in our study for each child age group.

Focusing on overall measure of infants' home environment quality, the sample average of HOME raw scores (assessed on a maximum scale of 200) is 135.6, which is approximately equivalent to the sum of sample averages of the sub-classification cognitive stimulation (64.1) and emotional support (72.2). For preschoolers, the sample average of HOME (assessed on a maximum scale of 300), cognitive stimulation, and emotional support raw scores are 189.1, 109.8, and 79.6, respectively. Compared to raw score versions of home environment measures, the sample mean of standard scores (assessed on a maximum scale of 1400) are comparable across both the child age group categories. For instance, the HOME standard scores for infants and preschoolers are 991.0 and 977.4, respectively.

Further, to explore an in-depth understanding of our main findings, we select a few components of the HOME scores that specifically capture the quality of mother-child interaction. The selected variables are coded as binary indicators by the NLS-CYA and are based on either mothers' response or interviewers' observation on several aspects of mother-child interactions.[14] More specifically, these information (including verbal communication, display of affection, reading books, grocery visits with child, *etc*.) can be used as proxy measures of mother-child relationship quality. Table 1 further reports the sample proportion of each of the dichotomous indicators included in our empirical analysis.

[14] Indicated in Appendix Tables A.1 and A.2. See notes.

With respect to mothers' self-esteem, in Table 1, we present the sample means of IRT scores for the NLSY79 survey years 1987 (key regressor) and 1980 (lagged value). Based on the descriptive information of our key regressor, infants' mothers appear to have higher self-esteem levels than mothers of preschoolers (493.9 versus 484.0). This difference holds with respect to past self-esteem scores as well (472.1 versus 465.1). Furthermore, the correlation coefficient for the self-esteem scores reported in the two survey years is equivalent to 0.45.

Additionally, we also report the descriptive information of female student percentage at mothers' high school. When the student gender composition variable is restricted to vary within the range 40-60 percent (used as our IV), we find that the average female percentage in our sample is 50.5 percent. In absence of any (interval-based) restriction, the sample average of female student percentage marginally increases to 51.7 percent.

3. IDENTIFICATION STRATEGY

Our goal in this study is to understand the relationship between mothers' self-esteem and children's home environment quality. As such, the ordinary least squares regression equation is:

$$\mathrm{Y_{ij}} = \beta_0 + \beta_1 \mathrm{MSE_j} + \mathrm{X'_{ij}}\beta_2 + \varepsilon_{\mathrm{ij}} \quad (1)$$

where Y_{ij} is measure of home environment quality of child i born to mother j. MSE_j is the measure of mother's self-esteem. The coefficient β_1 is the parameter of interest that quantifies relationship between mother's self-esteem and child's home environment. X'_{ij} represents vector of child-, mother-, and family-specific characteristics, respectively. Finally, ε_{ij} indicates the error term that incorporates overall effect of omitted variables as well as unpredictable shocks and measurement errors.

As previously noted, identification of true impact of mothers' self-esteem on children's environment from equation (1) faces several empirical challenges. First, exclusion of unobserved determinants of home environments that are correlated with mothers' self-esteem may generate biased and inconsistent OLS estimates. Secondly, mothers' non-cognitive traits can potentially be influenced by prevailing home environment conditions characterized by family relationships and socio-economic wellbeing. This reverse causality may also lead to biased and inconsistent estimates of the true relationship of interest. Finally, the self-esteem scores recorded in NLSY79 may suffer from individual-specific reporting bias and measurement errors (Drago, 2011). Therefore, the self-esteem scores may not accurately portray mothers' true self-esteem level. Given these empirical concerns, OLS estimates from equation (1) shall not be representative of the causal influence of mothers' self-esteem on child home environment.

3.1 Endogeneity concerns and instrumental variables

To motivate the causal interpretation of the estimated effects of mothers' self-esteem, we adopt IV regressions strategy. We further examine the validity of our empirical approach by estimating an overidentified model by instrumenting our key repressor (mother's self-esteem scores reported in 1987) by its distant lagged value (scores reported in 1980 survey) and past value of female student percentage at mothers' academic institutions when they were in high school.

With respect to utilizing lagged information of our key regressor as an instrument, it is worth noting that individuals' self-esteem scores of 1980 are measured seven years prior to the time when our explanatory variable was reported (i.e., NLSY79 survey year 1987). As such, in case the main empirical concern in identifying the relationship of interest is reverse causality between mothers' self-esteem and children's home environment, the validity of using past

value of endogenous regressor as IV relies on the notion that future life events do not affect predetermined characteristics. By this conjecture, 1980's self-esteem scores can be considered as a potential IV for self-esteem scores reported in 1987, assuming that individuals' self-esteem at different points in life are positively correlated. However, in case the unobserved heterogeneities that influence individual characteristics (like cognitive and non-cognitive traits) and their behavior (such as parental efforts) are serially correlated across time, past values of endogenously determined variables may suffer from omitted variable biases. Furthermore, while the relevance criteria of predetermined value of an endogenous variable can be empirically verified, the validity of excludability assumption cannot be directly tested. As a way to alleviate this empirical concern, Wooldridge (2009) recommends using distant lags of endogenous variable rather than using values from the immediate past. The empirical validity of this strategy depends on the condition that persistence in the error terms declines over time. In addition, Reed (2015) suggests that instrumenting an endogenous regressor with its lagged measure can be an effective strategy in addressing simultaneity biases, provided the lagged variables are not a part of the main estimating equation. Finally, when investigating the effects of self-esteem on individuals' financial behavior using the NLSY79 data, Tang and Baker (2016) use 1980's self-esteem scores as an IV for self-esteem scores reported in NLSY79 survey of 2006 to test for endogeneity in measures of self-esteem (using Wald and Wu-Hausman tests). While the authors find empirical evidence indicating that controlling for relevant covariates in regression models lowers the risk of endogeneity in the self-esteem measures, they also acknowledge the lurking empirical concern of omitted variable bias arising from unaccounted heterogeneities, which cannot be explicitly tested.

Our analysis adds to the statistical evidence of Tang and Baker's (2016) study on the endogeneity concern related to self-esteem measure by incorporating an additional instrument

to test the validity of our empirical approach and statistically verify the causal interpretation of our regression estimates.

Employing female student percentage at high school as an additional IV for adult women's future self-esteem is based on the conjecture that academic environments with higher percentage of female peers is positively related to female students' self-confidence. In this context, the empirical literature in the related space documents several empirical evidences with respect to academic as well as behavioral outcomes that support our conjecture. For instance, Drudy and Chatháin's (2002) study (on Irish schools) indicates that students of a particular sex tend to have higher interactions with their teachers in classrooms where their own sex are in the majority. The authors further believe that in specific co-educational environments where the pupil-gender ratio is disproportionately in favor of a particular sex, students are less likely to be equally confident in communicating with their instructors (also see Schneeweis & Zweimüller, 2012). Additionally, based on survey of students from 68 schools in Belgium, Brutsaert and Van Houtte (2002) find that on average, girls in single-sex schools feel more 'connected to the social context of the school' ('*Sense of Belonging'*) compared to girls in co-educational setting.

Focussing on academic outcomes, Lavy and Schlosser (2011) show that increase in the grade-specific proportion of female students in schools (ranging from elementary to high schools) leads to better cognitive outcomes for both boys and girls. To understand the underlying mechanisms behind the observed relationship, the study indicates that a higher percentage of female peers results in lower levels of classroom disruption and improved inter-student as well as student-teacher relationships. In a similar study, using Norwegian administrative data, Black *et al.* (2013) extend the literature on the influence of cohort-specific gender composition at schools on children's educational outcomes. The authors observe that a higher proportion of girls in a cohort is more likely to improve girls' academic outcomes compared to boys. Black

et al. (2013) also find that a higher fraction of female students improves girls' future labor market participation, indicating that the effects of student's gender composition is not restricted to short-term academic benefits, but has long-term human capital implications as well (also see Billger, 2007; 2009). Few years later, Booth *et al.* (2018) extend the empirical evidence on students' academic outcomes by studying the effects of gender composition in classrooms at the university-level. In particular, based on random assignment of students to co-educational and single-sex classrooms, Booth *et al.* (2018) observe that female college students assigned to single-sex classes are less likely to drop out of university and more likely to earn their degree with a high score. The highlighted evidence on the academic outcomes related to students' gender mix, based on comparison between single-sex and coeducational schools, is additionally supported by a more recent study by Dustmann *et al.* (2018), who exploit random assignment of Korean high school students to different gender composition-specific environments.

Having higher number of female peers has not only been found to improve female students' cognitive performance, but may also counter gender stereotypes. In this regard, few studies report that girls assigned to single-sex environment are more likely to choose traditionally male-dominated academic streams (e.g., streams related to natural science such as computer science and Physics) compared to female students from co-educational background (Crombie & Armstrong, 1999; Kessels *et al.*, 2008; Schøne *et al.,* 2019). Finally, to conclude our discussion of the related literature, gender composition appears to also bear attitudinal and behavioral implications on women. For example, based on randomized experiments, Booth and her co-authors (Booth & Nolen, 2012; Booth *et al.*, 2014) find that girls in single-sex environments are more likely to engage in risk-taking and competitive behaviors compared to their female peers from a co-educational setting. Overall, the literature evidence discussed above provides credible signal towards a positive link between share of female peers and staff members in academic institutions and female students' self-confidence level.

To estimate the causal influence of student gender mix on human capital outcomes, several studies in the aforementioned literature have exploited random assignment of students to environments with varying gender composition (e.g., single-sex versus mixed gender classrooms; e.g., see Booth *et al.*, 2014, 2018). However, our analysis does not allow us to exploit such random assignments. As such, using female student percentage at mother's high school as an IV for future self-esteem may suffer from omitted variable biases if mothers, during their adolescence, made their school choices conditional on student gender composition along with other school-specific characteristics. These choices are likely to be even more apparent in case of single-sex high schools (where female student percentage is close to 100) or schools where the gender composition among students and staff members is disproportionately apportioned in favor of a particular sex. Therefore, as a measure to address this empirical issue and ensure comparability among the mothers in our analysis, we restrict our sample to include mothers who attended co-educational high schools only. Additionally, to motivate a plausibly exogenous variation in the female student percentage in high schools, we further focus our analysis to high schools where the female percentage varied between the range of 40 and 60 percent. In particular, conditional on the knowledge that a high school is co-educational, we expect that the precise percentage of the female students and professional staff in an academic institution is independent of individuals' school choices within our selected bandwidth.[15] We graphically present the distribution of our instrument in Appendix Figure A.1.

[15] Although, our selected female student percentage range (40-60 percent) does not guarantee exogeneity of our instrument, it is reasonable to believe that during our study period (1986-1988), people had relatively limited means to access information (e.g., easy access to the internet). As a result, such limitations could potentially restrict students' ability to observe very specific school-related information such as precise estimates of gender composition of students and staff member at their potential high school. Further, if we assume that choosing to attend publicly administered high schools (which accounts for 95 percent of the mothers' sample) limits students' ability to make choices (due to the location-specific requirements of attending schools within individuals' school districts) conditional on other school-specific characteristics including gender composition, our analysis based on mothers who attended public high schools only generate results that are largely similar to our key findings in the

However, while the above empirical assumption does not guarantee the absence of confounding influences of the unobserved heterogeneities that influence individuals' school choices, performing overidentification test can help us verify whether our IV is likely to suffer from omitted variable biases. We also estimate additional specifications using alternative (wider) ranges of female student percentages as well as by controlling for supplemental school-specific characteristics to examine the validity of our IV approach once school-specific heterogeneities that can influence individuals' decisions are accounted for. These results are discussed in detail in the next section.

The first stage of the 2-SLS regressions are represented by:

$$\mathrm{MSE_{ij}} = \gamma_0 + \gamma_1 \mathrm{LagMSE}_j + \gamma_2 \mathrm{Femratio}_j + \mathrm{X'_{ij}}\gamma_3 + \upsilon_{ij} \qquad (2)$$

, where LagMSE_j is mother's self-esteem score reported in the NLSY79 survey year 1980 and Femratio represents the female student percentage reported in the supplemental school survey of 1979. The standard errors in all our regressions are clustered on the mothers.

4. RESULTS

4.1 Mother's self-esteem and early childhood home environment

Prior to our regression analysis, in Figure 1 we plot children's home environment raw scores against mothers' self-esteem scores (classified according to percentile) to gain a preliminary understanding of the nature of the relationship of our interest. For both infants and preschoolers, Figure 1 indicates a positive relationship between mothers' self-esteem and children's home environment quality measured in terms of overall HOME score, cognitive stimulation, and emotional support.

main analysis. We also estimate additional specifications controlling for relevant school-specific quality indicators (see Appendix Table A.6).

In Table 2, we report OLS and IV regression estimates of the relationship between mothers' self-esteem and children's home environment raw scores for infants and preschoolers.

< Insert Table 2 here >

Overall in Table 2, both OLS and IV estimates suggest that increase in mothers' self-esteem is positively related to infants' home environment quality. With respect to OLS estimation, on average, a one-unit increase in the IRT score of self-esteem is associated with an increase in HOME, cognitive stimulation, and emotional support raw scores by 0.033, 0.019, and 0.014 units respectively, *ceteris paribus* (see columns 1-3). All three OLS regression coefficients are statistically significant at the 1 percent level. With respect to the 2-SLS regressions (columns 4-6), for the overall raw score of infants' home environment condition, on average, a one-unit rise in *MSE* is related to 0.034-unit increase in HOME and a 0.22-unit increase cognitive stimulation scores respectively, *ceteris paribus*. The second stage IV estimates are statistically significant at the 10 percent level for HOME and cognitive stimulation scores.

Regression estimates with respect to preschoolers' home environment measures are reported in columns 7-12 of Table 2. Focusing on the OLS estimates (columns 7-9), a unit rise in the IRT measures of mothers' self-esteem is associated with 0.053, 0.037, and 0.014-unit increases in corresponding HOME, cognitive stimulation, and emotional support scores, *ceteris paribus*. However, upon accounting for potential endogeneity in measures of mothers' self-esteem, we find comparatively larger effects for each home environment raw score. In particular, our 2-SLS estimates indicate that a one-unit increase in IRT score prompts a 0.106-, 0.058-, and 0.036-unit increase in HOME, cognitive stimulation, and emotional support scores, respectively. Further, all the 2-SLS regression estimates in Table 4 are statistically significant at the conventional levels.

Focusing on our first stage results, we find that in the infants' and preschoolers' samples used for analyzing HOME raw scores, a one-unit increase in IRT score of mothers' self-esteem in 1980 is associated with approximately 0.37-unit (column 4) and 0.39-unit (column 7) increase in the IRT scores reported in 1987 survey of NLSY79, respectively. These effects are statistically significant at the 1 percent level. We find approximately similar coefficients of the past measure of mothers' self-esteem in both the child age group (infants and preschoolers) samples used to analyze cognitive stimulation and emotional support scores. With respect to our second IV, in the HOME raw score samples for infants and preschoolers, a one-percentage point increase in the female student percentage in high school within the selected bandwidth of 40-60 percent positively changes mothers' future self-esteem scores by 1.8 units (statistically significant at the 1 percent level) and 1.3 units (statistically significant at 10 percent level), respectively. Additionally, when testing for weak instruments, we observe that the partial F-statistic values in all our 2-SLS regressions are substantially larger than the recommended value of 10 (Stock *et al.*, 2002). For partial F-statistic values, we report both Cragg-Donald Wald and Kleibergen-Paap F-values (see Stock & Yogo, 2005; Kleibergen & Paap, 2006). These findings indicate that the instruments explain a substantial portion of the variance in our key regressor around its mean.

Next, to test whether at least one of our instruments is correlated with unobserved error term in the main estimating regression, we refer to the Sargan-Hansen test statistic values obtained from our 2-SLS models. In all our models, the Sargan-Hansen χ^2 values (presented at the bottom of Table 2) are statistically indistinguishable from zero at the conventional significance levels (indicated by the corresponding probability values). In other words, based on the overidentification test, we are unable to reject the null hypothesis that our excluded instruments are uncorrelated with error terms in the analysis sample. This provides additional statistical

evidence in support of the validity of our IV's and causal interpretation of the second-stage IV estimates of the impact of mothers' self-esteem on children's home environment quality.

Further, in Table 3, we replicate our OLS and 2-SLS specifications using standard home environment scores. Similar to Table 2 findings, Table 3 estimates indicate that mothers' self-esteem has a positive and statistically significant impact on children's HOME standard score and its sub-components. Further, the 2-SLS estimates (columns 4-6) of the effect of mothers' self-esteem on children's HOME standard scores appear to be larger than the corresponding OLS estimates (columns 1-3). In columns 4-6, our 2SLS estimates suggest that a unit increase in mothers' self-esteem score results in approximately 0.40-unit increase in HOME standard scores and 0.32-unit increase in each of cognitive and emotional components of HOME scores. All the 2-SLS regression coefficients of interest are statistically significant at the one percent level. In addition, the first stage results observed in Table 2 hold across all three standard scores. Once again, we find the Sargan-Hansen test statistic is statistically insignificant, which allows us to not reject the null hypothesis of absence of correlation between our instruments and unobserved error terms in the main regression.

The results above indicate that mothers' self-esteem has a positive impact on children's home environment. However, the magnitude of the estimates presented in Table 2 and Table 3 does not bear economic interpretation, as the outcome variables as well as the measure of mothers' self-esteem (being indices) do not have any natural metrics of measurement. As such, to gain a more intuitive understanding of the regression estimates of interest reported in Tables 2 and 3, we perform standardized IV regressions. The advantage of this exercise is that it allows us to compare effects of mothers' self-esteem with potential effects of other important cognitive and non-cognitive maternal traits on children's home environment.

Figure 2 provides a graphical representation of the estimated beta-coefficients from our standardized regressions. For infants, we find that a one-standard deviation increase in mothers' self-esteem score leads to approximately 0.1-standard deviation increase in HOME (0.11) raw scores as well as cognitive stimulation (0.08) and emotional support raw scores (0.13). In comparison, for preschoolers, a one-standard deviation increase in mothers' self-esteem leads to around 0.2-standard deviation increase in all three raw scores of home environment quality (0.24, 0.20, and 0.15 for HOME, cognitive stimulation and emotional score respectively). Finally, using standard scores, one-standard deviation rise in mothers' self-esteem score results in approximately 0.2-standard deviation unit hike in each of the three measures. It is worth noting that since the standardized regressions are performed by replicating the 2-SLS specifications reported in Table 2 and Table 3, the statistical significance of the standardized regression estimates do not differ from that of the coefficients presented in Tables 2 and 3.

Importantly, regardless of the samples and home environment measures employed in our standardized regression analysis, mothers' self-esteem appears to have the largest impact on children's home environment compared to alternative measures of mothers' cognitive and non-cognitive characteristics including measures of mothers' locus of control (Rotter scale), schooling, and aptitude (AFQT). However, the estimated beta coefficients on the additional cognitive and non-cognitive measures presented in Figure 2 do not represent causality, as we have not accounted for possible endogeneity in those measures.

< Insert Figure 2 here >

We further verify the consistency in our main findings by using previously adopted single IV approach of instrumenting reported self-esteem measure by its past value (as done by Drago, 2011; Tang & Baker, 2016). In Appendix Table A.4, we find that the 2-SLS estimates of the

effects of mothers' self-esteem on children's home environment are largely similar to the corresponding coefficients reported in Table 2 and Table 3. Finally, to check if the 2-SLS estimates of interest in Table 2 and Table 3 hold across alternative estimation techniques, we perform Two-step Generalized Method of Moments (GMM) and Limited Information Maximum Likelihood (LIML) regressions using children's HOME standard scores. We present our Two-step GMM and LIML estimates in Appendix Table A.5. The key regression estimates under both the empirical specifications are similar to the estimated coefficients obtained from the 2-SLS regressions (reported in Table 3).

4.2 Exploring mechanisms and additional robustness checks

4.2.1 *Analysis on mothers' parental practices*

The findings discussed in the previous section indicate that mothers' self-esteem has a positive influence on children's home-environment conditions but our key analysis prompts a follow-up question. What is it that the mothers with higher self-esteem do that improves the home environment? To answer this question, we select a few survey-specific indicators of mother-child interaction from the NLS-CYA, which are used to construct the HOME scales. In particular, based on mothers' self-reported assessments and interviewers' observations (during the time of interview), these measures evaluate the nature of mother-child relationship. Consistent with the NLS-CYA's classification, we consider binary indicators of the measures that incorporate information on whether the mother reads stories to her child; takes her child to groceries; engage in verbal communication with her child; and displays affection (hugs/kisses/caress) towards her child. The detailed information on the survey measures considered in the analysis are specified in Appendix Table A.1 (infants) and A.2 (preschoolers).

Using the binary outcomes, we estimate linear probability models (LPM) and 2-SLS regressions for our analysis. Table 4 presents our regression results. Panel A reports regression

estimates based on self-reported assessments by the mothers. With respect to the LPM estimates (columns 1-4), we find that mothers with higher self-esteem scores are more likely to report that they frequently read stories as well as interact with their infants while performing household chores. The estimates are statistically different from zero at the 5 percent level. Additionally, the LPM estimate with respect to 'reading' to preschoolers is statistically significant at the 10 percent level. In comparison, while the IV regression estimates across all dependent variables in Panel A are positive, we find statistically significant (at the 1 percent level) impact of mothers' self-esteem only for the indicator on whether mothers read to their preschool aged children (column 8). In particular, the IV regression estimates suggest that a unit increase in a mother's self-esteem score leads to a 0.3 percent increase in the probability that mothers frequently read to their preschool aged children.

Panel B (infants) and Panel C (preschoolers) in Table 4 present regression results obtained using binary indicators of information recorded from interviewers' observation. In Panel B, we find that the self-esteem of infants' mothers is positively and significantly (at the 10 percent level) related to their likelihood of providing useful toys to children (column 8). For preschoolers (Panel C), we find positive but statistically insignificant relationship between mothers' self-esteem and all the selected indicators of mother-child relationship. Overall, although we do not find much statistical significance in relation with the impact of mothers' self-esteem on the majority of their behavioral indicators, the positive 2-SLS coefficients across all the binary outcomes of mother-child interaction corroborate the observed positive impact observed with respect to the composite measures of children's home conditions in Table 2 and Table 3.

Finally, it is worth noting that the first stage coefficients of both our IV's are statistically significant at the conventional levels across all specifications estimated in Table 4 (estimates are available upon request). Further, the Sargan Hansen test statistic values indicate that the

assumption of no correlation between our instruments and unobserved error term in main regression cannot be negated.

< Insert Table 4 here >

4.2.2 *Alternative intervals of high school female student percentage*

Following our discussion on the potential empirical concerns regarding the validity of the female student percentage at high school as an IV for mothers' future self-esteem level, we test our empirical approach using alternative intervals where the highlighted issues are likely to be more pronounced relative to our selected bandwidth of 40-60 percent. However, the chosen range might prompt selectivity concerns. In this regard, it is worth noting that only 5 percent of our sample mothers lie outside the female-student percentage interval of 40 and 60 percent. In Table 5, we present results from two specifications using standard scores of children home environment - one where the female student percentage is allowed to vary in the range 20-80 percent (columns 1-3) and the other where the same is bounded in the interval of 30-70 percent (columns 4-6). First of all, under both the circumstances, the second stage coefficients of interest appear to be closely comparable to the 2-SLS estimates in Table 3. Secondly, female student percentage in all our regression models continues to be a statistically significant predictor of mothers' future self-esteem along with its own lagged value. Last but not least, the Sargan Hansen test statistic under wider intervals of female student percentage in high school remain statistically insignificant. This further supports the validity of our empirical approach adopted in the main analysis.

< Insert Table 5 here >

Finally, accounting for the possibility that gender composition in high school is likely to be correlated with various school-specific characteristics and quality indicators that can influence

potential students in making their choices, in Appendix Table A.6, using standard scores of children's home environment conditions, we re-estimate our 2-SLS specifications by additionally controlling for school-level characteristics including a binary indicator of whether a school is a public institution and percentages of white faculty and professional staff; female faculty; full-time teacher; and teachers with graduate qualification (Master's or PhD). Incorporating these additional school-level controls does not affect our key findings with respect to our second stage coefficients of interest as well as first stage empirical evidence regarding the validity of our instrumental variables.

5. CONCLUSION

To the best of our knowledge, this is the first empirical study to explore the presence of a causal link between mothers' self-esteem and children's home environment during early childhood. Our findings provide compelling empirical support to the expectation that a mother who values herself assigns substantial importance to the quality of parental and family resources invested in child-rearing activities. The causal interpretation of the estimated positive link between mothers' self-esteem and children's home conditions is further statistically supported by additional robustness measures along with tests for overidentified restriction. However, despite the multiple empirical verification exercises performed to assess the validity of our strategy, we acknowledge that the potentially non-randomized assignment of treatments used as instrumental variables does not unequivocally guarantee absence of possible endogeneity concerns associated with measures of individuals' self-esteem. However, the highly consistent findings across multiple empirical specifications open up substantial opportunity for future research to exploit more conclusive evidence (e.g. randomized experiments) on the causal impact of parental self-esteem on child wellbeing and related mechanisms underlying the observed relationships.

Overall, the results obtained from our study have important policy implications. Usually early childhood interventions have focused on young children as the primary target group. The current analysis attempts to propose an alternative policy pathway that can augment the effectiveness of early childhood development programs by accounting for welfare of primary caregivers as well. Our study suggests that social programs (such as confidence-building exercises) designed to promote mothers' self-esteem can have significant impact on childcare investments and parental abilities. To summarize, this study adds to the early childhood development research by demonstrating the importance of parental non-cognitive skills in child-rearing activities.

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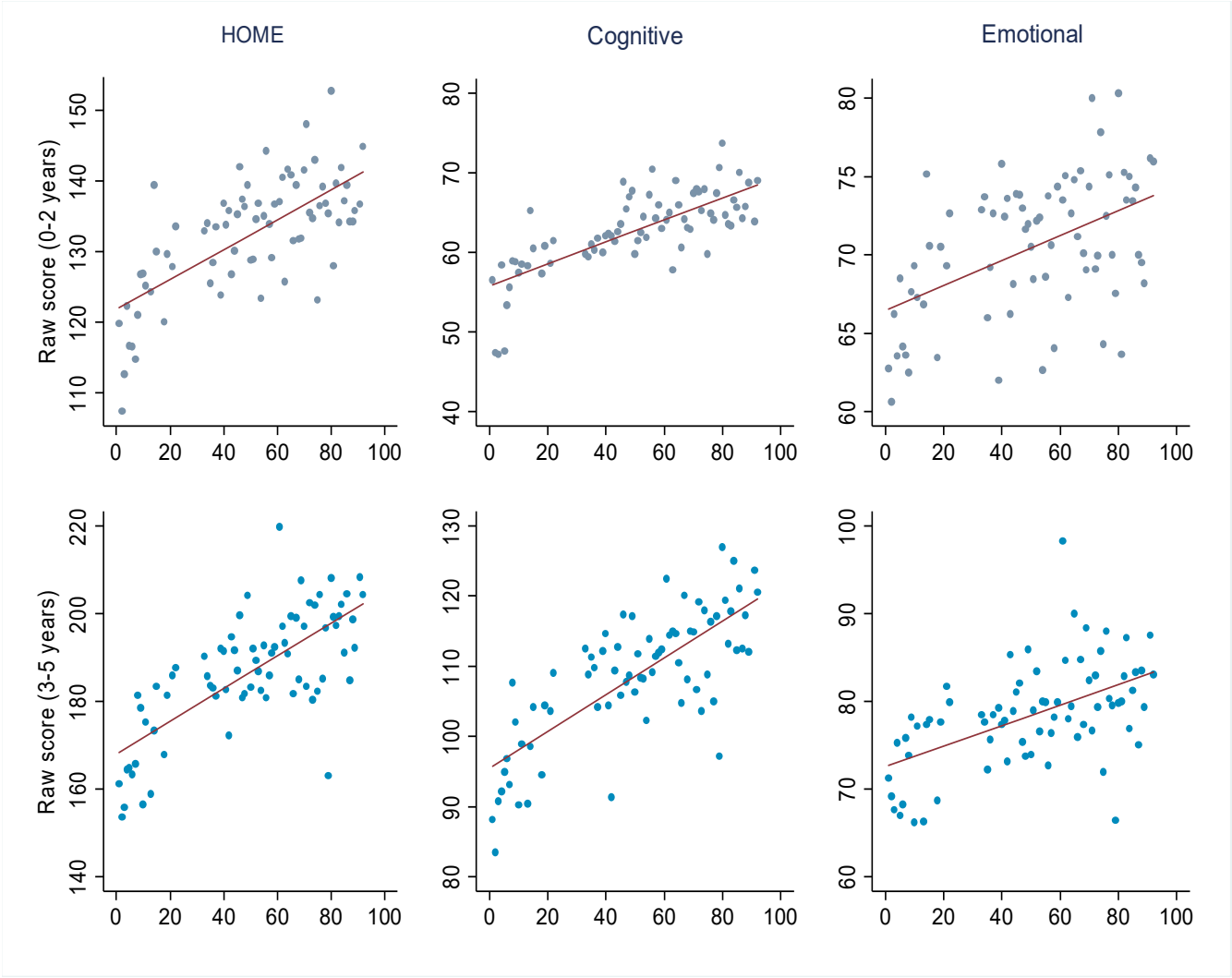
Table 1
Summary statistics of variables

Child sample	0-2 years (Infants)		3-5 years (Preschoolers)	
	Mean	SD	Mean	SD
Dependent variables				
HOME raw score	135.572	23.817	189.077	36.299
Cognitive stimulation raw score	64.058	15.868	109.792	23.783
Emotional support raw score	72.192	13.936	79.587	19.146
HOME standard score	991.033	148.937	977.361	151.718
Cognitive stimulation standard score	985.550	151.650	976.901	153.951
Emotional support standard score	1000.109	147.577	983.630	148.901
Reading✓✓ (Mothers' report)	0.431	0.495	0.496	0.500
Grocery✓✓ (Mothers' report)	0.326	0.469	-	-
Talking✓✓ (Mothers' report)	0.849	0.358	-	-
Spoke/ conversed with child✓✓	0.894	0.308	0.865	0.342
Responded verbally✓✓	0.701	0.458	-	-
Hugged or kissed✓✓	0.812	0.391	0.443	0.497
Provided useful toys✓✓	0.565	0.496	-	-
Answered child's questions✓✓	-	-	0.814	0.389
Expressed positive feelings✓✓	-	-	0.878	0.327
Mother characteristics				
Self-esteem 1987 score (key regressor)	493.851	80.801	484.041	83.021
Self-esteem 1980 score	472.130	83.698	465.058	84.580
Female % in high school	51.708	8.756	51.748	8.706
Female % in high school (restricted to 40-60)	50.520	3.376	50.686	3.596
Rotter	8.840	2.406	8.972	2.464
AFQT	41.261	27.720	35.882	26.589
Schooling	12.568	1.950	12.066	1.799
Age	26.547	2.333	26.706	2.268
Married✓✓	0.730	0.444	0.613	0.487
Employed✓✓	0.716	0.451	0.703	0.457
Family and school characteristics				
Family size✓✓	3.903	1.321	4.068	1.442
Poverty status✓✓	0.263	0.440	0.318	0.466
Child characteristics				
African-American✓✓	0.224	0.417	0.270	0.444
Hispanic✓✓	0.149	0.356	0.162	0.368
Female✓✓	0.481	0.499	0.482	0.500
Age	1.579	0.929	4.463	0.951
Sample size	1,697		1,609	

Notes: The descriptive information (mean and standard deviations (SD)) of the dependent variables are estimated for each child age group based sample size. Further, information on mother-child interactions (ranging from grocery visits to expression of positive feelings about child) are recoded to binary indicators based on NLS-CYA's methods (See details in https://www.nlsinfo.org/content/cohorts/nlsy79-children/other-documentation/codebook-supplement/appendix-HOME-scales/page/0/1; Retrieved on November 2, 2015). ✓✓: Represents that the variable is a binary indicator.

Figure 1

Children home environment scores and percentile of mothers' self-esteem measures



Notes: The above graphs plot children's average raw scores of HOME, cognitive stimulation and emotional support for children aged 0-2 and 3-5 against percentile score of mother's self-esteem reported in the survey year 1987 (measured in the horizontal axis of each graph).

Table 2

Estimating the effects of mother's self-esteem on child home environment- Raw scores

	Age 0-2 years (Infants)						Age 3-5 years (Preschoolers)					
	OLS			2-SLS			OLS			2-SLS		
	HOME	Cognitive	Emotional	HOME	Cognitive	Emotional	HOME	Cognitive	Emotional	HOME	Cognitive	Emotional
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Self-esteem	0.033***	0.019***	0.014***	0.034*	0.017	0.022*	0.053***	0.037***	0.014**	0.106***	0.058***	0.036**
	(0.007)	(0.005)	(0.004)	(0.020)	(0.015)	(0.012)	(0.010)	(0.007)	(0.006)	(0.029)	(0.020)	(0.017)
Rotter	-0.118	-0.287*	0.141	-0.114	-0.296*	0.169	-0.379	0.016	-0.440**	-0.215	0.083	-0.373*
	(0.225)	(0.152)	(0.137)	(0.256)	(0.174)	(0.154)	(0.319)	(0.226)	(0.181)	(0.380)	(0.265)	(0.208)
AFQT	0.031	0.009	0.022	0.030	0.010	0.017	0.290***	0.165***	0.125***	0.246***	0.148***	0.107***
	(0.030)	(0.021)	(0.018)	(0.033)	(0.023)	(0.020)	(0.042)	(0.029)	(0.025)	(0.056)	(0.037)	(0.031)
Schooling	0.494	0.366	0.108	0.488	0.378	0.068	2.368***	1.702***	0.518*	2.233***	1.650***	0.472
	(0.364)	(0.254)	(0.227)	(0.393)	(0.272)	(0.247)	(0.514)	(0.359)	(0.308)	(0.573)	(0.407)	(0.346)
Mothers' age	0.829***	0.436**	0.414***	0.828***	0.438**	0.408**	0.367	0.052	0.323	0.411	0.072	0.350
	(0.245)	(0.173)	(0.156)	(0.258)	(0.183)	(0.161)	(0.375)	(0.264)	(0.217)	(0.412)	(0.292)	(0.233)
Marital status	8.788***	2.670**	6.227***	8.788***	2.674**	6.235***	4.506**	-1.988	6.033***	4.246*	-2.084	5.924***
	(1.620)	(1.159)	(1.036)	(1.746)	(1.240)	(1.069)	(2.065)	(1.432)	(1.209)	(2.329)	(1.628)	(1.348)
Employed	1.356	1.523*	0.068	1.339	1.557*	-0.036	3.612**	1.810	1.230	3.085	1.610	1.038
	(1.212)	(0.884)	(0.760)	(1.274)	(0.942)	(0.791)	(1.840)	(1.258)	(1.047)	(2.167)	(1.439)	(1.181)
Household size	-1.479***	-1.196***	-0.204	-1.477***	-1.202***	-0.187	-2.656***	-1.057**	-1.468***	-2.525***	-0.998**	-1.399***
	(0.408)	(0.309)	(0.244)	(0.451)	(0.346)	(0.253)	(0.587)	(0.450)	(0.348)	(0.654)	(0.508)	(0.397)
Poverty status	-2.174	-0.256	-1.989*	-2.149	-0.308	-1.822*	-13.163***	-12.073***	-2.236*	-12.427***	-11.770***	-1.898
	(1.599)	(1.133)	(1.040)	(1.779)	(1.244)	(1.095)	(2.222)	(1.586)	(1.246)	(2.554)	(1.836)	(1.409)
African American	-10.222***	-6.254***	-3.417***	-10.255***	-6.178***	-3.621***	-13.274***	-7.951***	-5.170***	-15.047***	-8.649***	-5.927***
	(1.604)	(1.109)	(1.050)	(1.773)	(1.241)	(1.118)	(2.340)	(1.643)	(1.338)	(2.922)	(2.021)	(1.641)
Hispanic	-1.074	-2.385**	1.085	-1.069	-2.393**	1.124	0.667	-3.128*	3.395**	0.719	-3.151*	3.398**
	(1.623)	(1.126)	(1.039)	(1.714)	(1.161)	(1.112)	(2.329)	(1.651)	(1.388)	(2.633)	(1.914)	(1.511)
Female child	2.720***	1.115	1.718***	2.724***	1.106	1.742***	3.076**	0.279	3.148***	3.104**	0.278	3.150***
	(1.049)	(0.728)	(0.662)	(1.052)	(0.749)	(0.664)	(1.511)	(1.052)	(0.896)	(1.546)	(1.059)	(0.911)
First-stage results – *(Dependent variable: Reported self-esteem score in 1987)*												
Reported self-esteem 1980	-	-	-	0.370***	0.367***	0.363***	-	-	-	0.392***	0.381***	0.387***
	-	-	-	(0.029)	(0.030)	(0.030)	-	-	-	(0.033)	(0.033)	(0.034)
Female student percentage	-	-	-	1.750***	1.378**	1.773***	-	-	-	1.257*	1.196*	1.217*
	-	-	-	(0.665)	(0.670)	(0.680)	-	-	-	(0.661)	(0.671)	(0.678)

Observations	1,697	1,617	1,613	1,697	1,617	1,613	1,609	1,527	1,528	1,609	1,527	1,528
R-squared	0.178	0.109	0.134	0.178	0.109	0.132	0.351	0.298	0.218	0.339	0.293	0.211
Second stage F	-	-	-	26.262	13.595	15.867	-	-	-	52.162	37.446	25.983
CD Wald F-stat	-	-	-	147.340	139.597	133.127	-	-	-	144.213	131.683	134.288
KP F-stat	-	-	-	86.192	81.207	79.415	-	-	-	77.745	71.133	72.235
Hansen J	-	-	-	0.447	0.926	0.153	-	-	-	0.022	0.050	0.305
P-value	-	-	-	0.504	0.336	0.696	-	-	-	0.883	0.823	0.581

Notes: C-D- Cragg-Donald Wald; K-P- Kleibergen-Paap Wald.
With respect to infants (0-2 years), columns 1-3 report estimated coefficients from OLS regressions and columns 4-6 report estimated coefficients from 2-SLS regressions. For preschoolers (3-5 years), the OLS and 2-SLS coefficients are reported in columns 7-9 and columns 10-12 respectively. Robust standard errors are clustered on mother's identity and are reported in parentheses. All regression models control for mother-, family-, and child-specific characteristics. *** p<0.01, ** p<0.05, * p<0.1

Table 3

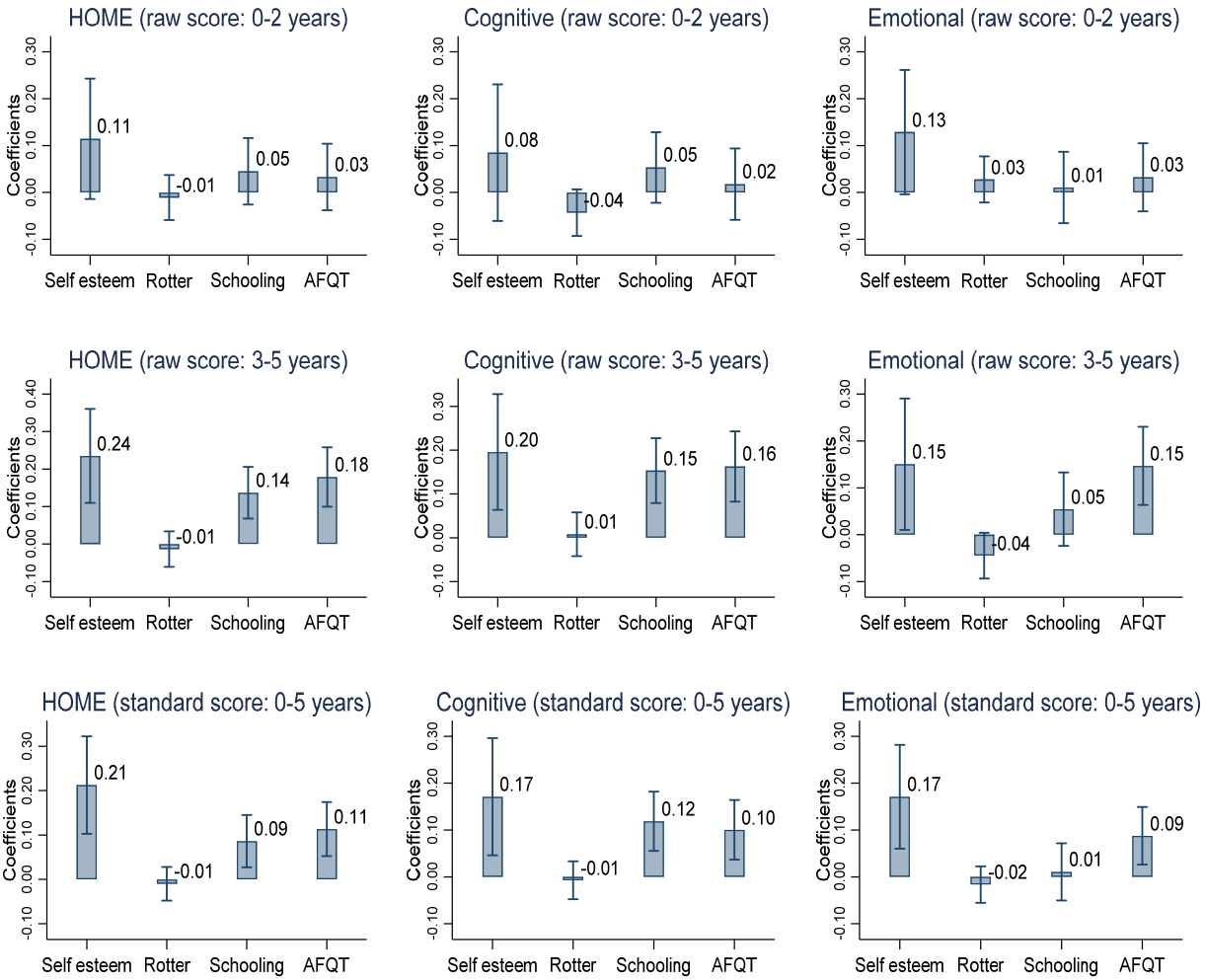
Estimating the effects of mother's self-esteem on child home environment- Standard scores

	Age 0-5 years					
	OLS			2-SLS		
	HOME	Cognitive	Emotional	HOME	Cognitive	Emotional
	(1)	(2)	(3)	(4)	(5)	(6)
Self-esteem	0.228***	0.237***	0.137***	0.396***	0.320***	0.318***
	(0.032)	(0.035)	(0.034)	(0.105)	(0.119)	(0.105)
Rotter	-1.183	-0.745	-1.642	-0.651	-0.473	-1.065
	(1.056)	(1.128)	(1.095)	(1.263)	(1.353)	(1.293)
AFQT	0.755***	0.630***	0.617***	0.648***	0.576***	0.500***
	(0.139)	(0.147)	(0.148)	(0.177)	(0.186)	(0.179)
Schooling	6.533***	8.404***	1.449	5.832***	8.080***	0.724
	(1.722)	(1.869)	(1.788)	(2.034)	(2.194)	(2.109)
Mothers' age	-1.030	-1.423	-0.114	-0.998	-1.402	-0.043
	(1.176)	(1.274)	(1.245)	(1.335)	(1.419)	(1.382)
Marital status	31.739***	-0.146	52.295***	31.097***	-0.500	51.680***
	(7.188)	(7.799)	(7.498)	(8.346)	(9.028)	(8.449)
Employed	7.658	13.675**	0.954	5.661	12.709*	-1.086
	(5.807)	(6.281)	(6.157)	(6.815)	(7.297)	(6.925)
Household size	-9.514***	-8.988***	-6.506***	-9.198***	-8.793***	-6.071***
	(1.909)	(2.221)	(2.000)	(2.315)	(2.793)	(2.305)
Poverty status	-40.170***	-48.866***	-20.070***	-37.623***	-47.625***	-17.139*
	(7.486)	(8.198)	(7.680)	(9.030)	(9.849)	(8.779)
African American	-65.901***	-64.197***	-40.270***	-70.458***	-66.529***	-45.284***
	(7.833)	(8.377)	(8.292)	(9.766)	(10.280)	(9.946)
Hispanic	-2.678	-21.762***	17.753**	-2.208	-21.665**	18.278*
	(7.655)	(8.270)	(8.120)	(8.990)	(9.604)	(9.431)
Female child	16.111***	7.203	22.565***	16.438***	7.357	22.890***
	(4.991)	(5.348)	(5.292)	(5.122)	(5.450)	(5.369)
First-stage results – *(Dependent variable: Reported self-esteem score in 1987)*						
Reported self-esteem 1980	-	-	-	0.372***	0.366***	0.367***
	-	-	-	(0.028)	(0.028)	(0.028)
Female student percentage	-	-	-	1.533***	1.298**	1.507**
	-	-	-	(0.592)	(0.591)	(0.602)
Observations	3,062	2,916	2,912	3,062	2,916	2,912
R-squared	0.253	0.206	0.149	0.246	0.204	0.141
Second stage F	-	-	-	53.459	35.207	27.355
CD Wald F-stat	-	-	-	260.840	244.448	240.843
KP F-stat	-	-	-	96.321	89.772	90.217
Hansen J	-	-	-	0.058	0.108	0.001
P-value	-	-	-	0.810	0.743	0.973

Notes: C-D- Cragg-Donald Wald; K-P- Kleibergen-Paap Wald.
Columns 1-3 report estimated coefficients from OLS regressions. Columns 4-6 report estimated coefficients from 2-SLS regressions. Robust standard errors are clustered on mother's identity and are reported in parentheses. All regression models control for mother-, family-, and child-specific characteristics. *** p<0.01, ** p<0.05, * p<0.1

Figure 2

Graphical representation of standardized regression estimates using raw and standard scores of children's home environment



Notes: The above graphs plot coefficients of measures of mothers' cognitive and non-cognitive ability (labelled on the horizontal axis in each graph) derived from standardized regressions using raw as well as standardized scores of HOME, cognitive stimulation, and emotional support as dependent variables. The regressions are estimated for each child age group (i.e., for children aged 0-2, 3-5, and 0-5).

Table 4
Effects of mothers' self-esteem on selected maternal inputs used in construction of HOME scores

	Linear probability model				Instrumental variables estimation			
Panel A: *As reported by mother*								
Variables	Reading (0-2 years) (1)	Grocery (0-2 years) (2)	Talking (0-2 years) (3)	Reading (3-5 years) (4)	Reading (0-2 years) (5)	Grocery (0-2 years) (6)	Talking (0-2 years) (7)	Reading (3-5 years) (8)
Mother's self-esteem	0.0004**	0.0001	0.0002**	0.0003*	0.0004	0.0003	0.0002	0.0013***
	(0.0002)	(0.0002)	(0.0001)	(0.0002)	(0.0004)	(0.0004)	(0.0003)	(0.0004)
Observations	1,762	1,759	1,770	1,665	1,744	1,742	1,752	1,647
R-squared	0.1035	0.0264	0.0591	0.1147	0.1047	0.0251	0.0581	0.0916
F-value	17.540	3.028	6.417	18.094	16.831	3.036	5.751	17.794
Hansen J statistic					1.222	1.094	0.015	0.000
P-value (Hansen J)					0.269	0.296	0.904	0.983
Panel B: *Interviewer's observation (0-2 years)*								
Variables	Spoke to child (1)	Responded verbally (2)	Hugged or kissed (3)	Provided useful toys (4)	Spoke to child (5)	Responded verbally (6)	Hugged or kissed (7)	Provided useful toys (8)
Mother's self-esteem	0.0001	0.0001	0.0002*	0.0004**	0.0002	0.0005	0.0004	0.0007*
	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0004)	(0.0003)	(0.0004)
Observations	1,708	1,636	1,714	1,697	1,690	1,619	1,696	1,679
R-squared	0.0079	0.0307	0.0339	0.0987	0.0077	0.0269	0.0333	0.0961
F-value	1.238	4.510	4.462	18.601	1.087	4.364	4.339	17.884
Hansen J statistic					0.613	0.204	0.402	0.552
P-value (Hansen J)					0.434	0.652	0.526	0.458
Panel C: *Interviewer's observation (3-5 years)*								
Variables	Conversed with child (1)	Answered child's questions (2)	Hugged or kissed (3)	Expressed positive feelings (4)	Conversed with child (5)	Answered child (6)	Hugged or kissed (7)	Expressed positive feelings (8)
Mother's self-esteem	0.0000	0.0002	0.0004**	0.0002	0.0004	0.0004	0.0007	0.0003
	(0.0001)	(0.0001)	(0.0002)	(0.0001)	(0.0003)	(0.0003)	(0.0004)	(0.0003)
Observations	1,646	1,624	1,642	1,653	1,628	1,606	1,624	1,634
R-squared	0.0397	0.0515	0.0609	0.0391	0.0326	0.0496	0.0591	0.0379
F-value	4.349	5.185	8.813	3.444	4.337	5.231	8.282	3.574
Hansen J statistic					0.680	0.433	0.124	2.360
P-value (Hansen J)					0.410	0.511	0.725	0.125

Notes: Columns 1, 2, 3, and 4 report estimated coefficients from LPM regressions using measures of mother-specific inputs (variables were selected from mother's report and interviewer's observation on items in HOME scale). Columns 5, 6, 7, and 8 report estimated coefficients from instrumental variables regressions. Robust standard errors are clustered on mother's identity and are reported in parentheses. The first stage regression results are similar to the results reported in Table 5. *** p<0.01, ** p<0.05, * p<0.1

Table 5

2-SLS estimates for standard home environment scores by adjusting the range of female percentage in high school

	Age 0-5 years					
	Female % in high school: 20-80%			*Female % in high school: 30-70%*		
	HOME	Cognitive	Emotional	HOME	Cognitive	Emotional
	(1)	(2)	(3)	(4)	(5)	(6)
Self-esteem	0.413***	0.337***	0.348***	0.409***	0.339***	0.338***
	(0.104)	(0.118)	(0.105)	(0.104)	(0.119)	(0.105)
First-stage results – *(Dependent variable: Reported self-esteem score in 1987)*						
Reported self-esteem 1980	0.370***	0.365***	0.365***	0.367***	0.363***	0.363***
	(0.027)	(0.027)	(0.028)	(0.027)	(0.028)	(0.028)
Female student percentage	0.837**	0.697*	0.793*	1.136**	0.985**	1.109**
	(0.402)	(0.407)	(0.409)	(0.451)	(0.451)	(0.464)
Observations	3,177	3,021	3,016	3,163	3,009	3,002
R-squared	0.242	0.202	0.136	0.241	0.201	0.137
Second stage F	53.834	36.537	27.778	53.379	36.219	27.700
CD Wald F-stat	260.935	246.072	240.022	261.474	246.185	240.417
KP F-stat	97.415	91.622	90.653	97.540	91.773	90.611
Hansen J	0.004	0.047	0.319	0.175	0.314	0.265
P-value	0.948	0.829	0.572	0.676	0.575	0.607

Notes: C-D- Cragg-Donald Wald; K-P- Kleibergen-Paap Wald.
Columns 1-3 report estimated coefficients from OLS regressions. Columns 4-6 report estimated coefficients from 2-SLS regressions. Robust standard errors are clustered on mother's identity and are reported in parentheses. All regression models control for mother-, family-, and child-specific characteristics. *** p<0.01, ** p<0.05, * p<0.1

Appendix

Table A.1

Survey items used in the construction of the HOME scales, cognitive stimulation scores, and emotional support scores (0-2 years)

Survey question	Respondent	Scale
-How often does child have a chance to get out of the house?	Mother	Cognitive
-About how many children's books does child have?	Mother	Cognitive
-How often do you get a chance to read to child?✓ (*Reading*)	Mother	Cognitive
-How often do you take child to the grocery store?✓ (*Grocery*)	Mother	Cognitive
-About how many, if any, cuddly, soft, or role-playing toys does child have?	Mother	Cognitive
-About how many, if any, push or pull toys does child have?	Mother	Cognitive
-Some parents spend time teaching their children new skill while other parents believe children learn best on their own. Which most closely describes your attitude?	Mother	Cognitive
-How often does child eat a meal with both you and his/her father/step/father-figure?	Mother	Emotional
-How often do you talk to child while you are working?✓ (*Talking*)	Mother	Emotional
-About how many times, if any, have you had to spank child in the past week?	Mother	Emotional
-Mother spontaneously spoke to child twice or more (excluding scolding)?✓ (*Spoke to child*)	Interviewer	Emotional
-Mother responded verbally to child's speech?✓ (*Responded verbally*)	Interviewer	Emotional
-Mother caressed, kissed, or hugged child at least once?✓ (*Hugged or kissed*)	Interviewer	Emotional
-Mother slapped or spanked child at least once?	Interviewer	Emotional
-Mother interfered w/ child's actions or restricted child from exploring >= 3 t-times?	Interviewer	Emotional
-Mother provided toys or interesting activities for child?✓ (*Provided useful toys*)	Interviewer	Cognitive
-Mother kept child in view/ could see child/ looked at him/her often?	Interviewer	Emotional
-Child's play environment is safe?	Interviewer	Cognitive

Notes: Responses to questions related to emotional scale and cognitive scale are used to construct cognitive stimulation and emotional support scores respectively. Retrieved from https://www.nlsinfo.org/ on November 22, 2015. For more information, see https://www.nlsinfo.org/content/cohorts/nlsy79-children/other-documentation/codebook-supplement/appendix-HOME-scales/page/0/1. ✓: Represents the information selected in analyzing the effects of mothers' self-esteem on mother-specific inputs in Table 5.

Table A.2

Survey items used in the construction of the HOME scales, cognitive stimulation scores, and emotional support scores (3-5 years)

Survey question	Respondent	Scale
-How often do you read stories to child? ✓ (*Reading*)	Mother	Cognitive
-About how many children's books does child have?	Mother	Cognitive
-How often do you take child to the grocery store?	Mother	Cognitive
-About how many magazines does your family get regularly?	Mother	Cognitive
-Does child have the use of a CD player, tape deck, or tape recorder, or record player at home and at least 5 children's records or tapes?	Mother	Cognitive
-Do you or have you helped [child] with numbers?	Mother	Cognitive
-Do you (or someone else) help [child] with the alphabet?	Mother	Cognitive
-Do you (or someone else) help [child] with colors?	Mother	Cognitive
-Do you (or someone else) help [child] with shapes and sizes?	Mother	Cognitive
-How much choice is child allowed in deciding foods s/he eats at breakfast & lunch?	Mother	Emotional
-About how many hours is the TV on in your home each day?	Mother	Emotional
-If child got so angry that s/he hit you, what would you do? Hit him/her back/	Mother	Emotional
Send child to room / Spank child / Talk to child/ Ignore it/ Give child a chore/ --Take away allowance/ Hold hands until calm/ Other/ Short time-out	Mother	Emotional
-How often does a family member get a chance to take child on any kind of outing?	Mother	Cognitive
-How often has a family member taken or arranged to take child to any type of museum?	Mother	Cognitive
-How often does child eat a meal with you and his/her father/stepfather/father-figure?	Mother	Emotional
-About how many times, if any, have you had to spank child in the past week?	Mother	Emotional
-Mother conversed w/ child >=2 times (no scolding or suspicious comments)? ✓	Interviewer	Emotional
-Mother answered child's questions or requests verbally? ✓ (*Answered child's questions*)	Interviewer	Emotional
-Mother caressed, kissed, or hugged child at least once? ✓ (*Hugged or kissed*)	Interviewer	Emotional
-Mother introduced interviewer to child by name?	Interviewer	Emotional
-Mother physically restricted or (shook/grabbed) child?	Interviewer	Emotional
-Mother slapped or spanked child at least once?	Interviewer	Emotional
-Mother's voice conveyed positive feeling about child? ✓ (*Expressed positive feelings*)	Interviewer	Emotional
-Child's play environment is safe?	Interviewer	Cognitive
-Interior of the home is dark or perceptually monotonous?	Interviewer	Cognitive
-All visible rooms of house/apartment are reasonably clean?	Interviewer	Cognitive
-All visible rooms of house/apartment are minimally cluttered?	Interviewer	Cognitive

Notes: Responses to questions related to emotional scale and cognitive scale are used to construct cognitive stimulation and emotional support scores respectively. Retrieved from https://www.nlsinfo.org/ on November 22, 2015. For more information, see https://www.nlsinfo.org/content/cohorts/nlsy79-children/other-documentation/codebook-supplement/appendix-HOME-scales/page/0/1. ✓: Represents the information selected in analyzing the effects of mothers' self-esteem on mother-specific inputs in Table 5.

Table A.3
Survey items used in the construction of the Rosenberg self-esteem scale
(Reporting years: 1980, 1987, and 2006)

Survey question	Categories employed
I am a person of worth	Strongly agree=3, agree=2, disagree =1, strongly disagree=0.
I have a number of good qualities	Strongly agree=3, agree=2, disagree =1, strongly disagree=0.
I am inclined to feel that I am a failure	Strongly agree=0, agree=1, disagree =2, strongly disagree=3.
I am able to do things as well as most other people	Strongly agree=3, agree=2, disagree =1, strongly disagree=0.
I felt I do not have much to be proud of	Strongly agree=0, agree=1, disagree =2, strongly disagree=3.
I take a positive attitude toward myself	Strongly agree=3, agree=2, disagree =1, strongly disagree=0.
I am satisfied with myself	Strongly agree=3, agree=2, disagree =1, strongly disagree=0.
I wish I could have more respect for myself	Strongly agree=0, agree=1, disagree =2, strongly disagree=3.
I certainly feel useless at times	Strongly agree=0, agree=1, disagree =2, strongly disagree=3.
At times I think I am no good at all	Strongly agree=0, agree=1, disagree =2, strongly disagree=3.

Notes: Total score ranges from 0 to 30. Retrieved from https://www.nlsinfo.org/ on November 22, 2015. For more details, see https://www.nlsinfo.org/content/cohorts/nlsy79/other-documentation/codebook-supplement/nlsy79-appendix-21-attitudinal-scales#rosenberg. The IRT scores are constructed based on the aggregate scores recorded from the above information.

Figure A.1

Distribution of female sex percentage in mothers' high school

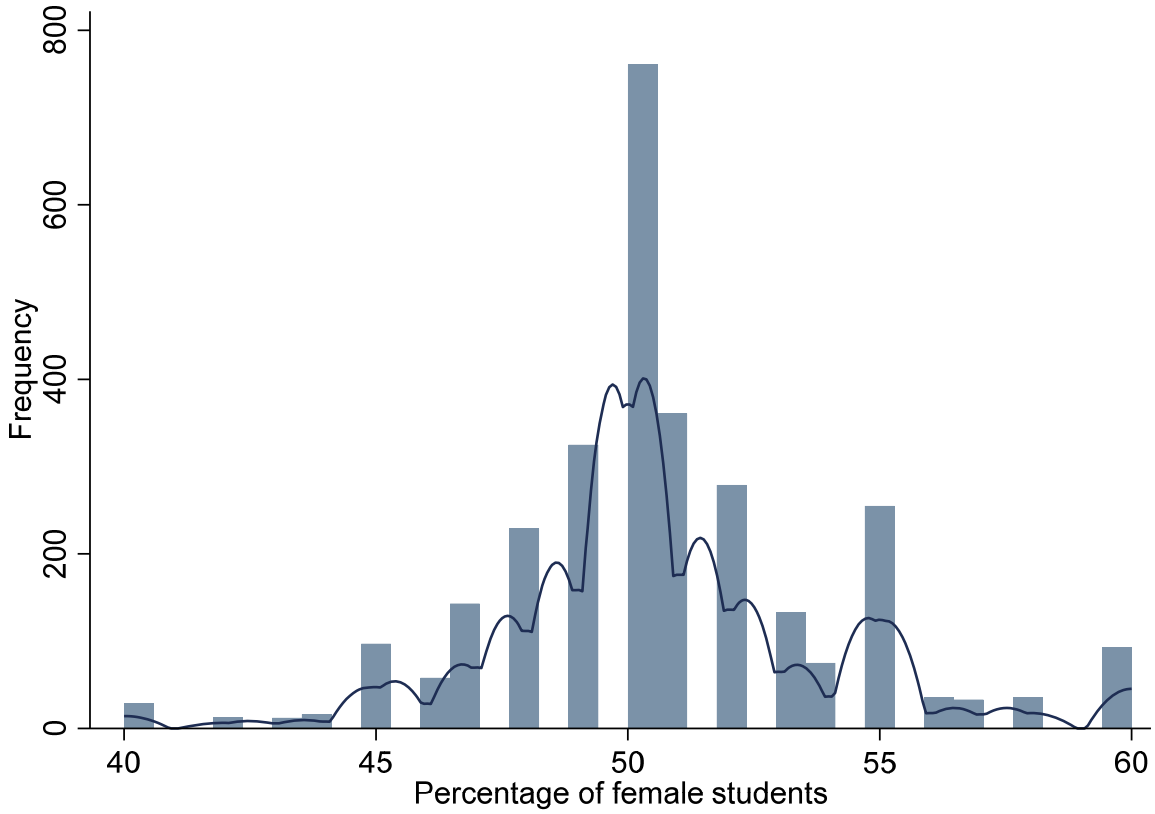


Table A.4

Results using a single instrumental variable in two-stage least squares analysis (reported self-esteem score of 1980 survey)

	Raw scores (0-2 years)			Raw scores (3-5 years)			Standard scores (0-5 years)		
	HOME	Cognitive stimulation	Emotional support	HOME	Cognitive stimulation	Emotional support	HOME	Cognitive stimulation	Emotional support
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Second-stage regression									
Mother's self-esteem	0.039**	0.010	0.029**	0.137***	0.076***	0.059***	0.432***	0.363***	0.348***
	(0.018)	(0.013)	(0.011)	(0.032)	(0.021)	(0.018)	(0.089)	(0.097)	(0.091)
First-stage results – *(Dependent variable: Reported self-esteem score in 1987)*									
Self-esteem 1980	0.369***	0.366***	0.366***	0.356***	0.354***	0.353***	0.368***	0.366***	0.365***
	(0.025)	(0.026)	(0.026)	(0.028)	(0.029)	(0.029)	(0.022)	(0.022)	(0.022)
Observations	1,752	1,678	1,685	1,750	1,653	1,644	4,731	4,474	4,466
R-squared	0.270	0.203	0.153	0.308	0.287	0.172	0.254	0.218	0.145
C-D F-statistic	212.326	204.497	198.759	158.856	150.444	147.303	278.967	269.547	265.356
K-P F-statistic	289.085	278.195	271.009	249.593	236.764	229.869	762.556	733.570	709.063

Notes: C-D- Cragg-Donald Wald; K-P- Kleibergen-Paap Wald.
Columns 1-3 report IV regression results for raw scores of HOME and its components for children aged 0-2 and columns 4-6 report the same for children aged 3-5. Columns 7-9 present results for standard score of HOME and its components for all children aged 0-5. Robust standard errors are clustered on mother's identity and are reported in parentheses. All the models include similar controls used in regressions represented by the Tables 3 and 4 estimates. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A.5

Relationship between mothers' self-esteem and children's home environment standard scores using alternative estimation methods (0-5 years)

	Two-step GMM			LIML		
	HOME	Cognitive stimulation	Emotional support	HOME	Cognitive stimulation	Emotional support
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Mother's self-esteem	0.395***	0.318***	0.318***	0.396***	0.320***	0.318***
	(0.104)	(0.119)	(0.105)	(0.105)	(0.119)	(0.105)
Observations	3,062	2,916	2,912	3,062	2,916	2,912
R-squared	0.246	0.205	0.141	0.246	0.204	0.141
CD Wald F-stat	260.840	244.448	240.843	260.840	244.448	240.843
KP F-stat	96.321	89.772	90.217	96.321	89.772	90.217
Hansen J statistic	0.058	0.108	0.001	0.058	0.108	0.001
P-value (Hansen J)	0.810	0.743	0.973	0.810	0.743	0.973

Notes: Estimated coefficients from Two-step GMM and LIML models are reported above. Robust standard errors are clustered by mother's identity and are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A.6

Controlling for additional school-specific characteristics

	Standard scores (0-5 years)		
	HOME	Cognitive stimulation	Emotional support
Variables	(1)	(2)	(3)
Mother's self-esteem	0.394***	0.333***	0.305***
	(0.110)	(0.123)	(0.110)
First-stage results – *(Dependent variable: Reported self-esteem score in 1987)*			
Self-esteem 1980	0.369***	0.364***	0.365***
	(0.029)	(0.029)	(0.030)
Female student %	1.487**	1.302**	1.460**
	(0.632)	(0.630)	(0.643)
Observations	2,836	2,711	2,700
R-squared	0.243	0.202	0.142
CD Wald F-stat	235.170	222.448	218.067
KP F-stat	84.952	79.995	79.979
Hansen J statistic	0.005	0.024	0.092
P-value (Hansen J)	0.946	0.877	0.762

Notes: Estimated coefficients from 2-SLS models are reported above. Robust standard errors are clustered by mother's identity and are presented in parentheses. Additional school characteristics include percentages of- white faculty and professional staff, female faculty, full-time teacher, and teachers with graduate qualification, and indicator of whether the school is a public institution. *** p<0.01, ** p<0.05, * p<0.1

Table A.7
Analysis using NLS-CYA survey 1988 only

	Standard scores (0-5 years)		
	HOME	Cognitive stimulation	Emotional support
Variables	(1)	(2)	(3)
Mother's self-esteem	0.469***	0.281**	0.417***
	(0.125)	(0.133)	(0.131)
First-stage results – *(Dependent variable: Reported self-esteem score in 1987)*			
Self-esteem 1980	0.381***	0.378***	0.385***
	(0.029)	(0.030)	(0.030)
Female student %	1.445**	1.264**	1.264*
	(0.663)	(0.666)	(0.674)
Observations	1,608	1,548	1,531
R-squared	0.277	0.220	0.166
CD Wald F-stat	143.574	137.255	137.684
KP F-stat	86.501	83.221	83.873
Hansen J statistic	0.808	0.153	1.605
P-value (Hansen J)	0.369	0.696	0.205

Notes: Columns 1-3 report estimated coefficients from 2-SLS regressions. Robust standard errors are clustered on mother's identity and are reported in parentheses. All regression models control for mother-, family-, and child-specific characteristics. *** p<0.01, ** p<0.05, * p<0.1