Abstract Title Page

Title: Do Head Start impacts vary by neighborhood context?

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Abstract Body

Background / Context:

The goal of Head Start is to improve the school readiness skills of low-income children in the United States. As a result of the 1998 reauthorization of Head Start, the Department of Health and Human Services conducted a national evaluation of the Head Start program. The resulting Head Start Impact Study (HSIS) was designed to provide an estimate of the *average* impact of Head Start, with relatively less attention to heterogeneity of impact, particularly across sites. Indeed, the study of variation in impact in the HSIS and other preschool studies has typically addressed moderation by child and family risk (rather than by neighborhoods). Yet, information on variation by neighborhood context is especially critical for large-scale programs such as Head Start, which serve families from a large and diverse range of communities. While little prior research has focused on neighborhood level moderators of the impact of early education programs, the large number of sites in the HSIS and the spread of those sites across the country make it possible to address questions about the way in which neighborhood characteristics are a key source of variation in Head Start impacts.

Child care policy and market characteristics are critical potential moderators of the impact of assignment to Head Start. In the HSIS, control-condition choices among types of care are likely influenced by both state-level policies and local availability. As such, the expectation is that the impact of Head Start may be *more positive* in areas in which there are few other early care and education options, and *neutral* (or even negative) in areas in which there are many other high-quality options for early care and education. In addition, though somewhat more distant from children's direct early care and education experiences, regional and community characteristics such as neighborhood crime and socioeconomic disadvantage might also moderate impacts of assignment to the Head Start program (Aber et al, 1998; Bronfenbrenner & Morris, 2006). Constructs from the burgeoning literature on neighborhood effects such as community violence are theorized to impede children's development in ways that may make it difficult for them to benefit from early child care and education programs (Sampson, Morenoff, & Gannon-Rowley, 2002). Consistent with this expectation, Aber et al. (1998) find that benefits of a classroom-level intervention were dampened in the highest risk environments.

Purpose / Objective / Research Question / Focus of Study:

In this paper, we capitalize on the addition of geocodes for Head Start centers in which children were randomly assigned to address questions about the role of neighborhood characteristics in moderating impacts of assignment to the Head Start program. Specifically, we explore the extent to which impacts of assignment to Head Start on outcomes for children vary by the availability of alternative child care options as well as the presence of community crime and neighborhood socioeconomic disadvantage.

Setting:

The Head Start Impact Study sample was designed to be nationally representative of 3- and 4-year-olds attending Head Start programs in the United States and included children in 22 states.

Population / Participants / Subjects:

This research uses data from the Head Start Impact Study and includes 4,440 3- and 4-year-old children who were randomly assigned off a waitlist in 351 Head Start programs across 81 Head Start grantees to either receive an invitation to participate in Head Start services or to the control group (no offer of Head Start). Randomization was conducted based on 202 center groups: a total of 2,644 children were randomized to receive Head Start services and 1,796 were randomized to the control group. Ultimately children enrolled in 1,632 classrooms across 930 Head Start and non-Head Start centers.

Intervention / Program / Practice:

Children were randomly assigned to receive Head Start services or to a control group. The control group could enroll in other early childhood programs but did not have access to Head Start in the center to which they were randomly assigned (although there was some crossover to other Head Start centers). As Head Start is based on a "whole child" model, children randomly assigned to the Head Start group had access to a set of comprehensive services including preschool education, medical, dental, and mental health care, nutrition services, and parental involvement activities.

Research Design:

Random assignment occurred prior to the beginning of the 2002-03 school year. Children were randomly assigned to Head Start within centers (or *groups* of several centers in cases where the small sample size in the center required them to do so). Data collection began during the fall of 2002, after random assignment. Preschool-year outcomes for children were collected during the spring of 2003.

Data Collection and Analysis:

The current research utilizes data collected during the first year of the longitudinal Head Start Impact Study. Measures of children's cognitive skills include early receptive language (Peabody Picture Vocabulary Test), math skills (Woodcock Johnson III Applied Problems), and early literacy (Woodcock Johnson III Letter-Word Identification).

To date, we have matched center geocodes to data from the US Department of Education (DOE), the American Community Survey, and Economic Census data to assess availability of alternative child care and preschool options. For the construct of child care/early education program availability, we pair these publicly-available geocoded data with reports from the directors of Head Start centers on the level of competition that they face in their neighborhoods. In combining across these data sources, we z-score all relevant variables and create a summary average measure. We have also matched center geocodes to data on crime from FBI records. Finally, we match center geocodes with census records to assess neighborhood socioeconomic

disadvantage (i.e., poverty), urbanicity, and minority concentration as key neighborhood level variables that may confound the relations we are most interested in assessing.

Our analytic approach utilizes multi-level models with random slopes in which children's spring cognitive outcome scores are modeled as a function of their fall scores, a set of center group fixed effects (in which random assignment took place), a set of child-level covariates, the random assignment dummy representing the impact of assignment to Head Start, and the neighborhood dimensions of interest (child care availability, crime). Residual variances are estimated separately for treatment and control groups to account for the impact of treatment on the distribution, as well as the mean, of child outcomes.

More specifically, our most basic two-level model is as follows:

Level 1:

$$Y_{ij} = \alpha_j + \beta_{1j} T_{ij} + \sum_{k=1}^{K} \beta_{2k} X_{kij} + T_{ij} e_{1ij} + (1 - T_{ij}) e_{2ij}$$

Level 2:

$$_j = \ _j$$

$$_{1j} = \ _{10} + \ _{11} NB_j + r_j$$

Where Y_{ij} is our outcome of interest, $_j$ is a fixed intercept for site j, X_{kij} are a series of pre-test and child and family covariates intended to increase precision in our estimates of random assignment to the Head Start program. As discussed above, e_{ij} denotes the random error term with separate variance estimates for the treatment and control groups. Neighborhood characteristics are modeled at level 2 (NB_j), allowing us to estimate the effects of neighborhood characteristics on the treatment *impact* ($_{1j}$). In addition to these basic analyses, we also examine the effects of neighborhood characteristics on treatment impacts in the context of interactions between treatment and child and family covariates at level 1, and in the context of additional neighborhood characteristics at level 2. These additional covariates allow us to assess the extent to which any observed effects of neighborhood characteristics may be due to the characteristic of interest, as compared to differences among children and families in those neighborhoods or to other, correlated, neighborhood characteristics.

Findings / Results:

Initial results demonstrate a significant effect of child care availability on the treatment impact on children's PPVT scores, (b=-2.20, SE=.91, p<.05), where children who were randomized in center groups in which there were *lower* levels of non-Head Start child care availability in the community showed significantly *larger* Head Start impacts on gains in PPVT scores relative to children randomized in center groups where there were richer child care and early education options. These results are graphed in figure 1 (please insert figure 1 here). The inclusion of key child and family characteristics in interaction with treatment assignment at level 1 (child age, mothers' employment, and the presence of both parents in the home) had little effect on the magnitude and significance of the estimate. Moreover, these results were robust to the inclusion

of potentially correlated neighborhood characteristics such as urbanicity and poverty in the model.

Although child care availability appears to matter for impacts on children's PPVT scores, effects are somewhat different for other cognitive outcomes, perhaps because of the sensitivity of the outcome measures to assess the skills that children are developing in care and early education environments. Specifically, no statistically significant effects of neighborhood characteristics on Head Start impacts were found for children's Woodcock Johnson Letter Word Identification. For the Woodcock Johnson Applied Problems test, while the *overall* availability of child care and early education was not associated with variation in impact of assignment to Head Start, marginally statistically significant effects were observed for the number of DOE-funded preschools (b=-1.55, SE=.83, p<.10) in the community. That is, in sites near a large number of DOE-funded preschools, Head Start impacts on gains in children's Applied Problems scores are smaller than in places where there are a small number of DOE-funded preschools (please insert figure 2 here).

Preliminary results of neighborhood crime analyses reveal evidence for treatment moderation of Head Start's impact on children's PPVT scores, (b=-0.15, SE=0.07, p<.05), where randomization in high crime neighborhoods was associated with *smaller* impacts on gains in PPVT scores relative to low crime neighborhoods, when accounting for variation in impacts accounted for by neighborhood poverty, urbanicity, and racial composition (please insert figure 3 here). There were no significant differences in the treatment impact on Woodcock Johnson Applied Problems or Letter Word Identification by level of neighborhood crime.

Conclusions:

Given wide variation across children and programs nationally, understanding heterogeneity of impact in the HSIS is critical. This study provides key information about how neighborhood characteristics may moderate the impacts of this highly-watched program.

Appendices

Appendix A. References

Aber, J. L., Jones, S. M., Brown, J. L., Chaudry, N., & Samples, F. (1998). Resolving conflict creatively: Evaluating the developmental effects of a school-based violence prevention program in neighborhood and classroom context. *Development and Psychopathology*, *10* (2), 187-213.

Bronfenbrenner, U., & Morris, P. (2006). The Bioecological Model of Human Development. In R. M. Lerner & W. Damon (Eds.), *Theoretical Models of Human Development*. Vol. 1 of the *Handbook of Child Psychology (5th ed.)* (pp. 793-828). New York: Wiley.

Sampson, R. J., J. D. Morenoff, and T. Gannon-Rowley (2002). Assessing neighborhood effects: Social processes and new directions in research. *Annual Review of Sociology*, *28*, 443–78.

Appendix B. Tables and Figures

Figure 1. *Treatment Impact on PPVT Scores by Composite Child Care Availability*

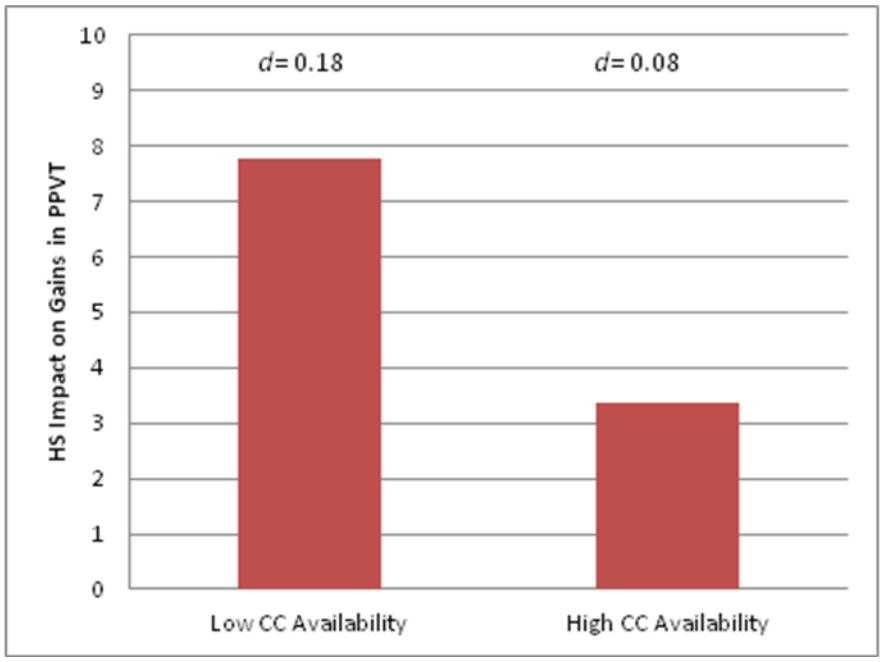


Figure 2. *Treatment Impact on WJ Applied Problems Scores by DOE Preschools per 100 Children Ages 0-5*

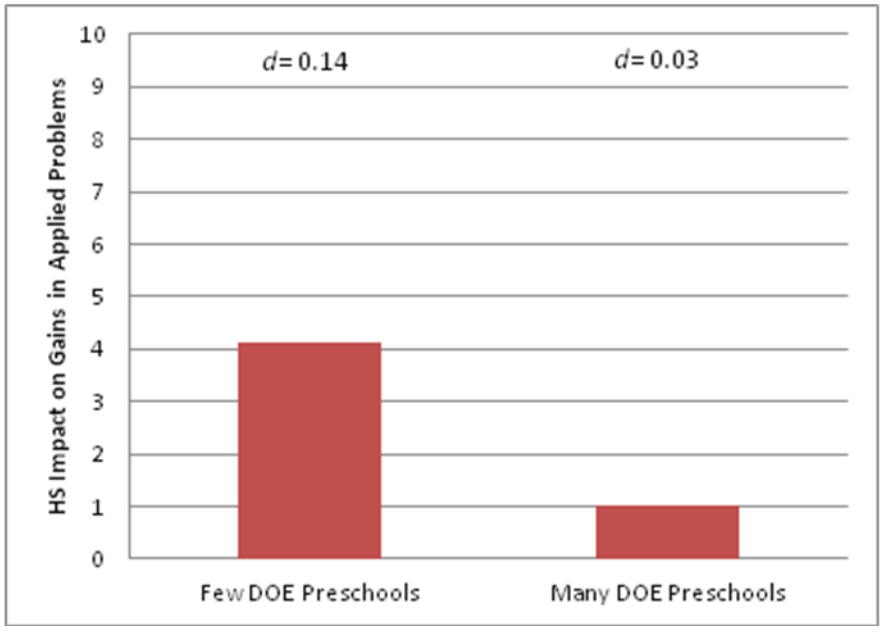
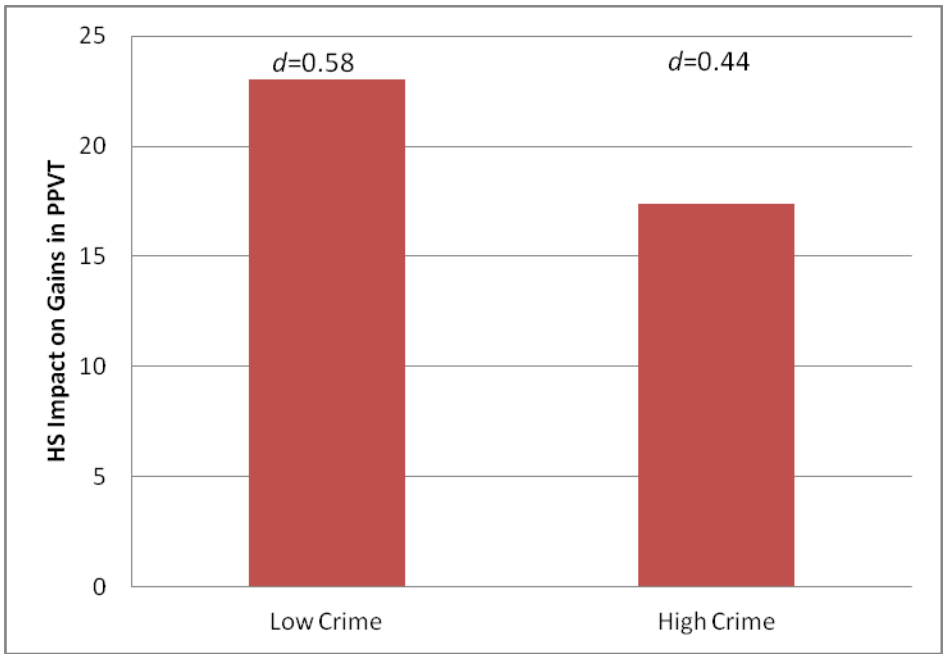


Figure 3. *Treatment Impact on PPVT Scores by Neighborhood Crime*


25
20
15
10
5
0
HS Impact on Gains in PPVT
d=0.58
d=0.44
Low Crime
High Crime