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Conference Section Choice 1: Early Childhood Education
Conference Section Choice 2: Research Methods

Moderation of the Cognitive Impacts of Head Start by Children's Absenteeism

Background

The Head Start Impact Study (HSIS[1]), one of the only large-scale randomized trials of a public preschool program, found that four-year-olds who enrolled in Head Start programs gained significantly more than the comparison group in 13 out of 22 measures of language, literacy, and math, with an average gain of 0.18 SD (ranging from 0.09 to 0.31 SD[2]. Many early childhood education (ECE) researchers have expressed concern that evaluations of large public preschool programs like HSIS frequently demonstrate weaker effects on children's academic impacts than better-implemented model programs like the Abecedarian Project and Perry Preschool[3,4,5,6,7]. The most commonly examined culprit of this phenomenon is related to the treatment contrast, or the fact that research is unable to examine the myriad counterfactual settings to preschool. However, absenteeism in ECE programs is also an overlooked component of dosage.

In situations where ECE programs may not meet parents' or their children's needs, we often see lower levels of daily attendance, providing a window into how low-SES parents make daily accommodations in their decision to send their children to school. This ongoing decision-making is a daily reality for many low-SES families, and is potentially an under-researched component of gaps in children's early achievement and of inconsistent estimates of ECE effectiveness. However, models that seek to understand absenteeism in relation to children's outcomes are subject to endogeneity bias, meaning that any correlation between absenteeism and cognitive outcomes may be the result of unmeasured characteristics of the children or their parents. The opportunity to examine the role of absenteeism in the context of a randomized controlled trial, along with many potential predictors of absenteeism, may provide a solution to the problem of endogeneity in attendance research[8].

Research Question

In this study, I will examine the extent to which original reports of the impacts of Head Start may be downwardly biased as a result of not accounting for rates of absenteeism by asking: *How does absenteeism from ECE settings moderate the cognitive impacts of Head Start?* This proposed study represents the first attempt to adjust estimates of the effects of Head Start by student absenteeism.

Sample and Procedures

The HSIS was comprised of 4,440 3- and 4-year-old children from 351 oversubscribed Head Start centers across 81 Head Start grantees in 22 states. Children from these centers were randomly assigned to attend Head Start (n = 2,644), or were assigned to a control group (n = 1,796) in which they were not permitted to enroll in the Head Start center from which they were

randomized. Data utilized for this study will be limited to the 2,781 children who have available attendance data during the spring of 2003 (the first year of HSIS).

Data collection included parent/primary caregiver interviews, child direct assessments, ECE provider and program staff interviews (during the preschool years), and direct observations of quality of care settings. For the full sample of children, 32% were White, 30% were Black, and 38% were Hispanic; 38% of children had a mother who did not have a high school diploma, and 55% of the children had a single mother; English was spoken in the home for 70% of the children, and children came from families with an average income to needs ratio of 0.87[9] (based on the poverty level in 2002).

Measures

Children's cognitive outcomes will be focused on 4 constructs: receptive vocabulary, as measured by the Peabody Picture Vocabulary Test-III (PPVT[10]), early vocabulary, as measured by the Woodcock-Johnson Letter-Word Identification[11] subscale, oral comprehension, as measured by the Woodcock-Johnson Oral Comprehension subscale, and early numeracy, as measured by the Woodcock-Johnson Applied Problems subscale. These four measures were selected from the total eight reported by the HSIS due their widespread use in early childhood research and their predictive validity of later academic outcomes[4]. These assessments were collected at baseline (fall 2002) and again in spring 2003.

Parents reported how frequently their child was absent from their primary care setting over the past month. Responses were coded on a scale from 1-4, with 1 = "Never," 2 = "1-5 days," 3 = "6-10 days," and 4 = "More than 10 days."

Predictors of absenteeism will be grouped into theoretical categories that align with the literature on early absenteeism. These categories will include family needs, family resources, cultural norms and parental preferences, child characteristics, and contextual opportunities and constraints[12, 13, 14]. In addition to controlling for treatment status, these analyses will also control for length of the school day, ECE setting type, and measures of classroom quality.

Data Analysis Plan

Moderation by absenteeism cannot be estimated by an interaction term approach because absenteeism is a post-random assignment behavior. Instead, I will use a regression-based subgroup approach that will identify subgroups of children based on their likelihood of being absent[15, 16 17]. Using the baseline demographic predictors, I will create a likelihood of absenteeism index that can provide unbiased estimates of the Head Start-control group differences in cognitive outcomes at each level of the absenteeism index.

Prior to running my subgroup models, I will examine the extent to which the Head Start group and the control group are matched across background characteristics and absenteeism rates to ensure similarity. In the first model, I will conduct multiple regression analyses predicting absenteeism rates for the control group only.

In the second model, I will use the parameters estimated from the control group to create the likelihood of absenteeism index for the Head Start group children. In the final model, I will estimate the cognitive impact of Head Start on children with different likelihoods of absenteeism.

$$Outcome = \beta_0 + \beta_1(treat) + \beta_2(pretest) + \beta_3(absenteeism\ likelihood\ index) + \beta_4(absenteeism\ likelihood\ index * treat) + \beta_5(covariates) + \varepsilon$$

In this model, β_1 is the estimated impact of Head Start on students with the lowest likelihood of absenteeism, β_3 represents the estimated relationship between likelihood of absenteeism and cognitive outcomes, and β_4 represents the coefficients that correspond with different levels of absenteeism likelihood, estimating cognitive outcomes of the Head Start group at each level in comparison to the group with the lowest likelihood of absenteeism.

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