Introduction
Prior academic skills are significant predictors of later academic achievement (e.g., Duncan et al., 2007). Especially during the preschool years, however, there is limited literature examining whether the prior academic skills predict the growth rate of subsequent academic learning.

Much research on learning trajectory, which is available for school-aged students’ literacy/reading development, suggests two alternative views:
1. Stanovich’s (1986) classic article proposed a hypothesis, called the “Matthew effect” in reading, which suggests “rich-get-richer and poor-get-poorer patterns (p. 360)” in development.
2. More recent studies on elementary school students support an alternative perspective called the “compensatory trajectory of development” (e.g., Aunola, Leskinen, Onatsu-Arviommi, & Nurmi, 2002). This perspective suggests that children who initially start with lower literacy skills may accelerate in their learning over time, and eventually catch up with peers who begin with higher initial literacy skills.

Further research is needed to investigate if
1. Trajectory patterns of literacy learning from preschool to kindergarten differ from those found during the elementary school years.
2. School-aged students’ literacy growth trajectories are applicable to trajectories of low-income children’s academic growth trajectories in other academic areas.

Research Question
Do Head Start (HS) children’s academic skills at Head Start (HS) entry level predict their subsequent growth trajectories in math, reading, and vocabulary skills over HS entry to Kindergarten?

Methods
- This study comprised secondary analyses using nationally representative longitudinal data from the Head Start Family and Child Experiences Survey 2006 Cohort (N_{class} = 3,005; N_{class} = 402).
- To handle missing data, multiple imputation was employed.
- Due to the nested structure of the data (time-child-classroom), 3-level growth curve modeling was employed.
- A series of child/family characteristics were included as control variables (e.g., child ethnicity, gender, mother education, home language, and income-to-poverty ratio).

Results
1. growth patterns
   - Positive association was found between initial math skills and growth (Matthew effect),
   - Negative association was found between initial vocabulary skills and growth (compensatory trajectory of development), and
   - No association was found between initial reading skills and growth over time

   ![Figure 1. Academic growth trajectories from Head Start (HS) entry to Kindergarten](image)

   Notes. Math skills were measured by a combined version of (1) the Applied Problems subscale of the Woodcock-Johnson Tests of Achievement—3rd Edition (W-J III, Woodcock, McGrew, & Mather, 1991) and (2) selected items from the Early Childhood Longitudinal Study math assessment (Stout et al., 2007; U.S. Department of Education, 2002).

   Psychometric skills were measured by the Peabody Picture Vocabulary Test—Fourth Edition (PPVT-4; Dunn, Dunn, & Sinden, 2008); and Reading skills were measured by Letter-Word Identification subscale of Woodcock-Johnson Tests of Achievement—Third Edition (W-J III, Woodcock et al., 2001).

   ![Figure 1. Correlations between HS entry-level skills and linear growth from HS entry to Kindergarten](image)

   Results vary across academic areas:
   - Positive association was found between initial math skills and growth (Matthew effect),
   - Negative association was found between initial vocabulary skills and growth (compensatory trajectory of development), and
   - No association was found between initial reading skills and growth over time.

Discussion
Understanding the association between initial academic skills and subsequent academic growth is important because this understanding could guide effective teaching and curriculum (Leppänen et al., 2004). Specifically, the current findings suggest that compensatory curricula are needed for children who start HS programs with poor math skills, while advanced/additional academic supports are needed for those who start HS programs with higher vocabulary skills.

References


Policy Implications
- Compensatory curricula are needed for children who start HS programs with poor math skills.
- Advanced/additional academic supports are needed for those who start HS programs with higher vocabulary skills.
Promoting positive early social-emotional (S-E) behaviors has been highlighted by researchers and teachers as a way to facilitate children’s learning in the early childhood classroom (Lin et al., 2003; National Scientific Council on the Developing Child, 2004). Findings from recent longitudinal studies, however, suggest that early S-E behaviors may not be unique predictors of subsequent academic achievement (Duncan et al., 2007; see Thompson & Rakes, 2007). For example, Duncan et al.’s meta-analysis of six longitudinal datasets showed that most S-E behaviors at school entry were not significantly related to academic skills in later years, controlling for early cognitive/academic-related skills.

It remains unanswered, however, whether those results are generalizable to children living in poverty, who tend to display lower S-E competence than more affluent peers (Brophy-Herb et al., 2007).

Additionally, available studies using longitudinal datasets mainly examined S-E behaviors measured only at one time point, overlooking potential changes in early S-E behaviors over time. Given the research evidence suggesting systematic changes in early S-E behaviors over time (Bub, McCartney, & Willett, 2007; Peisner-Feinberg et al., 2001), S-E behaviors measured only at one time point may insufficiently explain subsequent academic trajectories. Accordingly, the link between S-E behaviors and academic competence may be more precisely described, if both capacities are considered as time-varying variables.

The purpose of this study is to examine lagged association between prior S-E behaviors (i.e., behavioral problems and social skills) and subsequent academic achievement (i.e., math, vocabulary, reading, and pre-writing) from Head Start (HS) entry to Kindergarten.

Methods
• This study comprised secondary analyses using nationally representative data from the Head Start Family and Child Experiences Survey 2006 Cohort (FACES; N\text{Child} = 3,005; N\text{Class} = 402).
• Multiple imputation was used to handle missing data. Three-level growth curve modeling (GCM) was employed due to the nested structure of the dataset (time-child-classroom).
• A series of child/family characteristics were included as control variables (e.g., child ethnicity, child gender, mother education, home language, and income-to-poverty ratio).

Results showed
(1) negative lagged association between behavioral problems and academic achievement and
(2) positive lagged association between social skills and academic achievement.

The findings suggest potential benefits of possessing positive S-E behaviors for subsequent learning, when longitudinal changes in both S-E behaviors and academic skills are considered in analyses.