



Do academic preschools yield stronger benefits? Cognitive emphasis, dosage, and early learning



Bruce Fuller*, Edward Bein, Margaret Bridges, Yoonjeon Kim, Sophia Rabe-Hesketh

Institute of Human Development, University of California, Berkeley and Food and Drug Administration, Washington D.C., United States

A B S T R A C T

Earlier research details how quality preschool offers sustained benefits for children from poor families. But the nation's typical program yields tepid effects for the average middle-class child. We ask whether pre-k impacts range higher when teachers spend more time on activities emphasizing language, preliteracy, and math concepts. Stronger effects are observed for children attending academic classrooms: up to about 0.27 *SD* in pre-literacy and math concepts, compared with peers in home-based care at 52 months of age ($n = 6,150$). Black children enjoy strong benefits from academic pre-k, up to 0.39 *SD* for math concepts. Estimated benefits equal 0.43 *SD* for the average child attending academic pre-k after about eight months. Gains persist through kindergarten. Results stem from a national sample of children, employing a quasi-experimental method to account for confounders related to family practices and children's earlier proficiencies. Future work might focus on the interplay of academic activities with social dimensions of instructional support.

We know after a half-century of research that high quality preschool yields sustained benefits for many poor children (Duncan & Magnuson, 2013; Pungello et al., 2010; Reynolds, Temple, Ou, Arteaga, & White, 2011; Yoshikawa et al., 2013). But the developmental benefits from attending a typical preschool for the average American child remain small to modest, often fading in elementary school (Loeb, Bridges, Bassok, Fuller, & Rumberger, 2007; Magnuson, Ruhm, & Waldfogel, 2007; NICHD, 2005).

This paper asks whether preschool results in more robust child development when teachers focus time on classroom activities that foster oral language, preliteracy and math skills, what we label *academic-oriented preschool*. We test whether longer exposure to such classrooms raises the magnitude of effects, benefits that may span cognitive and social domains, and whether children from particular ethnic groups enjoy stronger gains. Our core expectations stem from earlier results showing that many pre-k classrooms offer warm settings for children, while lacking coherent and engaging learning activities (for review, Hamre, 2014). When preschool teachers spend more time on academic-oriented activities, as one specific facet of classroom quality, we expect to observe stronger developmental effects, drawing on a national sample of children and their classrooms.

Theorized within a developmental-risk framework, we know that young children in homes and nonparental settings are variably exposed to rich oral language and cognitively challenging tasks, along with exposure to print material and math concepts (e.g., Livas-Dlott et al.,

2010; Gopnik, 2016; Pianta & Stuhlman, 2004). To the extent that such activities offer cognitive facilitation or impart preliteracy competencies inside pre-k classrooms, we expect to observe stronger effects. We draw on a national sample of children ($n = 6150$, the Early Childhood Longitudinal Study, Birth Cohort [ECLS-B]), who were tracked between 24 and 72 months of age. The analysis extends a quasi-experimental method to rigorously take into account prior factors (confounders) that may influence family selection into pre-k and lift child development as well. The ECLS-B data allow for wide external validity of findings, while being constrained by the range and texture of classroom quality measures.

We do not presume that pre-k teachers currently focus exclusively on academic competencies or structured play activities; many blend the two elements of instructional organization. Yet pre-k classrooms in the American context have come to focus more on children's preliteracy and academic competencies, while de-emphasizing social development (Bassok, Latham, & Rorem, 2016). What's not understood is whether this academic orientation inside the classroom results in stronger cognitive growth, or whether effects on social development, be they positive or negative, can be detected. Certain subgroups of children may benefit more from academic-oriented preschool, whether gauged in the cognitive or social domain.

Three literatures inform our research questions. First, we review how *instructional organization* – including but not limited to time spent on oral language, preliteracy and math activities – generally elevates

* Corresponding author at: Institute of Human Development, Tolman Hall 3659, University of California, Berkeley 94720, United States.
E-mail address: b_fuller@berkeley.edu (B. Fuller).

children's cognitive growth. Second, we review prior work on how pre-k effects are conditioned by the length of children's attendance (*dosage*). Third, we ask whether certain *groups*, namely Black or Latino children, may benefit from academic-oriented preschool, given home conditions and disproportionate selection into pre-k centers, including Head Start, that may display this academic emphasis.

1. Classroom activities and preschool benefits

Taking high-quality preschool to scale and sustaining developmental gains has been a challenging task. Oklahoma's universal preschool effort has shown encouraging results for poor children in Tulsa, along with gains for the one-third that came from non-poor families (Gormley, Gayer, Philips, & Dawson, 2005). Similar benefits have been observed in Boston and Chicago, where programs largely serve children from low-income families (Reynolds et al., 2011; Weiland & Yoshikawa, 2013).

But early studies drawing on national samples reveal small effect sizes for the average American child attending a typical preschool (Loeb et al., 2007; Magnuson et al., 2007). Few studies are designed to disaggregate pre-k effects for children from poor versus middle-class family backgrounds – even as the nation's middle-income households grow more diverse. The overall effect of pre-k attendance was estimated at 0.13 *SD* by the Loeb team, ranging up to 0.23 *SD* for preliteracy skills of Latino children, compared with peers who did not attend preschool and based on quasi-experimental techniques. Magnuson's team, also drawing on a national sample, estimated similarly tepid mean effects from pre-k, compared with home-based care. Even when cognitive gains do appear, they often fade-out by the fifth grade (NICHD, 2005).

Still, research that takes quality measures into account (most often relying on local samples) does find stronger pre-k effects, even for less-poor or middle-class children, especially when classroom practices emphasize preliteracy skills or carefully structured tasks focusing on math concepts, ranging between 0.13 and 0.37 *SD* depending on child subgroups and outcome measures (Landry, Anthony, Swank, & Monsegue-Bailey, 2009; Mashburn et al., 2008; Pianta & Stuhlman, 2004; Weiland & Yoshikawa, 2013). Cognitive gains can be absent when teachers exhibit steady emotional support, but spend less time on activities that nurture preliteracy skills (Pianta et al., 2005).

Idle time inside classrooms or over-reliance on unguided play appears to reduce the beneficial effects of preschool on cognitive growth (Early et al., 2010). On the other hand, more time spent on tightly organized activities with rich academic content helps contribute to cognitive gains (Chien et al., 2010; Landry et al., 2009). One observational study from 671 pre-k classrooms found that organized time spent on oral language and preliteracy activities, along with supportive interactions, yielded significant effects on 4 year-olds' expressive language, pre-reading skills, and knowledge of math concepts, with effect sizes ranging up to 0.32 *SD* (Burchinal, Vandergrift, Pianta, & Mashburn, 2010). Academic content is variably animated by teachers in the feedback they provide to children, offering cognitive facilitation and motivating encouragement, the construct of instructional support (e.g., Pianta et al., 2014). We focus on the first part of this theorized model: how time spent on academic activities may lift growth, recognizing that classroom tasks are embedded in differing forms of social interaction with adults and peers.

1.1. Academic orientation and social development

Fear of didactic practices or “direct instruction” animates much of the worry over increased time spent on preliteracy and math activities in pre-k classrooms (Gopnik, 2016). Nurturing the child's capacity to explore or to construct their own understandings of language or mathematical concepts is what's developmentally appropriate, many practitioners and psychologists argue (e.g., Copple & Bredekamp,

2009). Earlier work has detailed the prevalence of direct instruction in many preschools, where teachers emphasize memorization of facts or academic knowledge, even in classrooms serving 3 or 4 year-olds (Hamre, 2014; Stipek, Feiler, Daniels, & Milburn, 1995).

At the same time, we know that children's feelings of competence or efficacy, often experienced when engaged in stimulating learning tasks, help to predict steeper cognitive gains (Blankston et al., 2013; Denham et al., 2003; Lemerise & Arcenio, 2000). The child's emotional confidence and eagerness to engage in classroom activities similarly contribute to gains in knowledge of math concepts (Galindo & Fuller, 2010), including when facilitated through “guided play,” defined as “a discovery-learning approach intermediate between didactic instruction and free play” (Fisher, Hirsh-Pasek, Newcombe, & Golinkoff, 2013:1872). Similarly, McCartney et al. (2010) found that time spent in cooperative peer activities, including cognitively rich tasks, helped to buoy young children's social development (also, NICHD, 2005).

Indeed, a less dichotomous model of play versus academic content has emerged over the past generation, one that includes cognitive facilitation, emotional support, and socialization, at times including guided-play activities. Unstructured play or over reliance on child-selected activities may fail to advance cognitive outcomes, even those linked to creativity or cooperative problem-solving (Lillard et al., 2013). Still, work by Bridget Hamre and colleagues shows that consistent instructional support by teachers – manifest in well-structured tasks, enrichment of oral language, and supportive feedback to children – spills over to advance children's self-regulation and cooperative skills as well (Hamre, Hatfield, Pianta, & Jamil, 2014). We know less about whether academically intensive classrooms – spending more time on oral language, preliteracy, or math activities – shape children's social development, beyond gains in the cognitive domain, and whether such effects are discernible with national samples of children and classrooms.

We contribute to this work on instructional organization by estimating whether teachers' emphasis on oral language, preliteracy, and math activities – their *academic orientation* – may affect growth in children's cognitive and social competencies, drawing on nationwide data and moving beyond local samples. The present paper does not speak to the wider debate over learning-through-play or the direct instruction of young children. We do directly test whether greater classroom time spent on academic-oriented activities yield gains in both developmental domains.

The effects from activity structures in classrooms are likely moderated by other dimensions of quality, especially the character of teacher-child interactions (e.g., Downer, Sabol, & Hamre, 2010). But first, we assess whether academic-oriented preschools yield stronger effects than previously observed in national studies, which failed to distinguish variation in classroom activities, or gauge benefits for differing groups of children.

1.2. Dosage and academic orientation

The magnitude of preschool effects, including the possible benefits of academic-oriented programs, may be sensitive to the timing or length of pre-k attendance. Such dosage effects may stem from the age at which a child enters preschool, as well as the hours of exposure each week. Karoly, Kilburn, and Cannon's (2005) review found that more time spent in preschool, entering at age 3 or attending more hours per week, was associated with stronger developmental gains. This earlier literature did not benefit, however, from national samples of children, take into account which children select into differing dosage conditions, or distinguish between cognitive and social outcomes.

A review by Zaslow et al. (2010) finds that more hours attending preschool each day are associated with stronger social development and knowledge of math concepts, at least for poor children. The NICHD (2005) longitudinal study offered the advantage of looking at continuous monthly exposure to home- or center-based care over time,

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