### Kindergarten Kickstart: Developing a promising short-term, high-impact, and research-based summer pre-kindergarten program

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#### Background

It is well established that early childhood is a crucial time to support cognitive and socioemotional development, prepare children for success in school, and prevent or ameliorate health and educational risks that can become difficult and costly to resolve later in life.\(^1\)\(^-\)\(^4\)

Differences in educational opportunities during this period contribute to achievement gaps in later grades that only grow with time. In recent decades, researchers across disciplines, in conjunction with practitioners and policymakers, have moved forward the notion that high-quality early childhood education (ECE) experiences can begin to ameliorate these gaps.

In spite of these efforts, only about 60% of four-year-olds nationwide attend state-funded preschool.\(^5\) There are wide disparities in preschool access across socioeconomic status, where children from low-income families are about 20% less likely to attend than their high-income peers. Additionally, middle-income families are generally the most underserved by preschool programming, as they are ineligible for government subsidies but often cannot afford the rising costs of ECE programs.\(^6\)

Even children who do attend preschool often do not have access to high-quality experiences that adequately prepare them for success in school and beyond\(^5\): Best practices research often does not make it to many early childhood classroom, and communities are underprepared to serve children. For example, both child-directed play\(^7\) and content-specific curriculum implementation\(^8\) are critically important to high-quality preschool experiences, yet not all programs emphasize these elements equally. As ideas about the importance of ECE grows, so does access to preschool opportunities. However, there is a paucity of highly qualified, well-prepared teachers who are able to provide ECE services. To ensure high-quality experiences, it is critical that new approaches be taken to ensure ECE programs implement research-based approaches to classroom practices and teacher training alike.

The Kindergarten Kickstart program is a translational research model that aims to measurably develop children’s skills in critical domains (including literacy, numeracy, social-emotional regulation, and executive functioning) via a short-term, high-impact, research-based intervention in the summer before kindergarten. The program emphasizes domains that have shown through a rigorous evidence base to be highly predictive of later academic achievement and demonstrably responsive to short-term intervention, while simultaneously emphasizing the developmentally appropriate principles of play-based learning. Furthermore, Kindergarten Kickstart provides dual teacher and researcher training to develop a cohort of early childhood professionals who are able to foster high-quality classroom environments through rich interactions with the children in their care.

#### Program Design
Kindergarten Kickstart is a full-day pre-K program in Middletown, CT. Kickstart operates for five weeks each summer in the kindergarten classrooms that enrolled children will attend in the subsequent school year. Each classroom has an approximate 4:1 teacher-student ratio, with three undergraduate student teachers and one lead certified teacher serving 12-18 children per classroom. The program also includes important components of any ECE program: an emphasis on play-based pedagogy, multiple outdoor play periods, weekly field trips, and weekly family engagement workshops.

The program is designed to maximize the benefits of a brief pre-K intervention by utilizing research from contemporary developmental science. Prior to the beginning of the program each summer, teachers participate in a two-week intensive training process, where they attend daily workshops, are trained in small-scale content-based interventions, and collaboratively develop lesson plans for their classrooms. Throughout the program, undergraduate student teachers receive daily coaching from their certified lead teacher, and all teachers receive regular mentorship from program leadership.

**Research Design and Method**

To date, Kindergarten Kickstart has served 106 children in nine classrooms from 2012-2016. 24 undergraduate student teachers and seven certified public school teachers have received training from the program. Children were recruited through community and school engagement, and all participants either had no prior pre-kindergarten experiences, or were identified as needing additional support prior to kindergarten.

Using a pre-post design, children were administered a battery of assessments at the beginning and end of the program to examine gains in children’s skills and the overall efficacy of the intervention. These assessments included a widely used screening assessment for school readiness (Speed-DIAL-4), a numeracy task (Which Has X⁹), and an executive function task (Head, Toes, Knees, Shoulders¹⁰). The school readiness assessment was conducted in each of the five cohorts, while the numeracy and executive function tasks were conducted in the most recent two cohorts.

Additionally, during summer 2016 each classroom received a full-length CLASS¹¹ observation. This measure of the quality of teacher-child interactions is widely used in ECE settings around the country as a measure of process quality.

**Results**

In aggregate data over five years (n=72), we observed a statistically significant increase in total scores on the DIAL-4 from pretest M(SD)=96.5(15.6) to posttest M(SD)=100.7(15.9), t(71)=4.15, p<.001, Cohen’s d=.5. Gains were observed on five subtests, including key indicators for literacy (Rapid Object Naming, Letters and Sounds), conceptual knowledge (Meaningful Counting, Actions), and gross motor development. Growth was particularly apparent for children with low initial scores. Statistically significant gains were also observed on both the numeracy and executive function tasks (see Table 1).
Finally, CLASS scores indicated that classroom process quality was high across domains, with average scores of 6.42 out of 7 on emotional support, 5.89 on classroom organization, and 3.61 on instructional support. Kindergarten Kickstart’s scores were above the 2015 national Head Start average\textsuperscript{12} on all three domains of the tool (see Figure 1), with Kickstart classrooms near the top 10% of Head Start grantees on emotional support and instructional support.

Discussion

Preliminary findings suggest that Kindergarten Kickstart is an effective short-term ECE program that produces measurable gains on literacy, numeracy, executive functioning, and gross motor skills after only five weeks. These results are encouraging, but must be interpreted cautiously, as a randomized experiment has not yet been conducted. Additionally, CLASS scores indicate that Kindergarten Kickstart classrooms are of high quality on the whole, suggesting that Kickstart may be an efficient way to rapidly train early childhood educators in high-quality educational practices. Future work will utilize randomized designs, further explore teacher development, and will follow Kickstart graduates through elementary school in order better understand the long-term promise of this program.
Tables and Figures

Table 1. Kindergarten Kickstart student gains from 2012-2015 cohorts.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Pre-test Mean (SD)</th>
<th>Post-test Mean (SD)</th>
<th>Mean Difference (Effect Size)</th>
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<tbody>
<tr>
<td><strong>School Readiness Assessment</strong></td>
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<tr>
<td>(Speed-DIAL-4)</td>
<td>72</td>
<td>96.5 (15.6)</td>
<td>100.7 (15.9)</td>
<td>+4.2*** (.27)</td>
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<tr>
<td><strong>Numeracy Task</strong> (Which Has X)</td>
<td>20</td>
<td>81.0 (13.6)</td>
<td>87.2 (11.4)</td>
<td>+6.2** (.50)</td>
</tr>
<tr>
<td><strong>Executive Function Task</strong> (Head, Toes, Knees, Shoulders)</td>
<td>20</td>
<td>9.50 (9.09)</td>
<td>17.0 (12.1)</td>
<td>+7.5* (.71)</td>
</tr>
</tbody>
</table>

Note: *p<.10, **p<.05, ***p<.001

Figure 1. Mid-program CLASS scores as compared to 2015 national Head Start averages (Office of Head Start, 2015).
References


