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EDUCATIONAL ASSESSMENT & EVALUATION | RESEARCH ARTICLE

Jumpstart program efficacy: The impact of early childhood education advancement initiatives on low-income preschool children's literacy, agency, and social relations

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Abstract: The Jumpstart program is a national early childhood education program focusing on supporting children's language skills, literacy, and social-emotional development. The present study examined the impact of Jumpstart programming on the school readiness of low-income preschool children. One hundred and twenty-one preschool children (69 boys, 52 girls) between three and five years old participated in the study. Assessments of student language skills, literacy, and social-emotional development were conducted using the Jumpstart School Success Checklist. Analysis of pre- and post-program student outcomes found that children in Jumpstart improved significantly in their language skills, literacy, initiative, and social development, $t(117) = 37.63, p < 0.001$. Results support the efficacy of Jumpstart in promoting student academic and socioemotional growth, highlighting the importance of such early childhood initiatives and pointing towards the potential of similar educational programs—particularly in supporting children from underserved communities. Limitations and future directions for this study were discussed.



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PUBLIC INTEREST STATEMENT

The frequently studied "achievement gap" between privileged and marginalized students can be better explained by conceptualizing an "education debt", where the systemic deficit of schooling resources provided to low-income and minority students accumulates over time to become an inter-generationally magnified effect. Low-income students must work harder than their more privileged peers to combat the effects of this deficit in educational opportunity to obtain the same results because their families have not had access to the same opportunities historically. We examined the impact of one intervention, the Jumpstart program, on low-income preschoolers' school readiness; the results showed the program facilitated substantial improvement in their school readiness. Effective early childhood education interventions are critical to reversing the effects of education debt and the opportunity gap. More importantly, they speak to the American dream of equity by giving every child—regardless of background—the opportunity to reach their fullest potential.

Subjects: Education Studies; Bilingualism / ESL; Early Childhood

Keywords: jumpstart; school readiness; low-income; achievement gap; education debt; intervention; service-learning; underserved communities

1. Introduction

Access to education is a critical determinant of children's future academic success, social skills, and well-being, predicting better long-term outcomes in numerous health, financial, and professional contexts (Sulaiman & Mohezar, 2006; Lonigan, Burgess, & Anthony, 2000; Reynolds, Temple, Ou, Arteaga, & White, 2011; Reynolds, Temple, Roberston, & Mann, 2001; Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002; Garcia & Weiss, 2017; Winkleby, Jatulis, Frank, & Fortmann, 1992; Ross & Wu, 1995). Better performance on measures of educational attainment are frequently associated with higher income, better health outcomes, and greater subjective well-being (Brock, 2010; Campbell et al., 2014; Duncan, Morris, & Rodrigues, 2011; Reynolds et al., 2011; Snyder & Dillow, 2012; Snyder, Dillow, & Hoffman, 2009);

However, socioeconomic status sharply influences a child's access to educational opportunities and can limit the ability of children from marginalized backgrounds to reach their full potential. Research has found that these disparities in opportunity and school readiness begin "at the school gate" and are already present in kindergarteners. Early childhood education programs, like the national Head Start program, have emerged as a promising point of intervention (Garcia, 2015; Reynolds et al., 2001). Although Head Start has demonstrated positive effects on student outcomes, it impacts children from different backgrounds differentially and has at times struggled with high teacher-to-student ratios and underfunding (Barton, Spiker, & Williamson, 2012; Bloom & Weiland, 2015; McCoy, Connors, Morris, Yoshikawa, & Friedman-Krauss, 2015; Miller, Farkas, & Duncan, 2016; Miller, Farkas, Vandell, & Duncan, 2014). Jumpstart is a unique supplemental early childhood education program run by non-profit Jumpstart National that trains volunteer instructors in theoretically grounded, developmentally appropriate practices to assist Head Start classrooms in deliver an empirically-informed curriculum to assist low-income children's language and literacy, initiative, and social relations skills. The present study seeks to examine the impact of this community-based model on children's learning outcomes.

2. Background

The "achievement gap" between marginalized and privileged students in graduation rates and standardized test performance has been documented and discussed extensively in the education literature (Ladson-Billings, 2006; Reardon, 2011, 2016; Stephens, Hamedani, & Destin, 2014; Kober, 2001). National studies consistently find that students from low-income families score lower on tests of math and reading skills than high-income students (Ladson-Billings, 2006; Loeb, 2007; National Assessment of Educational Progress [NAEP], 2018; Reardon, 2011; Stephens et al., 2014). These disparities continue to persist today—a recent study reviewing over 200 million test scores from schools across the nation found that school districts with more low-income students had an average academic performance significantly below the national grade-level average (Reardon, 2011, 2016).

Historically, studies have considered the role of parenting in producing these outcomes, with Hart & Risley's "30 Million Word Gap" study being of particular note (Hart & Risley, 1995, 2003). In their 1995 study, they reported that children from low-income families heard 30 million fewer words from their parents than their more affluent peers and consequently performed more poorly in school due to this "language deficit" (Hart & Risley, 1995). However, recent work has not only challenged Hart & Risley's claims but has also suggested that low-income children are exposed to a diversity of language when accounting for multilingual speech, bystander talk, and multiple caregivers (Sperry, Sperry, & Miller, 2018; Thomas, 2014). In addition to sparking an important conversation on how education and socioeconomic associations are explored, researchers also challenged the premise of viewing parental practices as singlehandedly responsible for academic disparities between privileged and marginalized communities (Avineri et al., 2015; Miller & Sperry, 2012; Sperry et al., 2018; Thomas, 2014).

Closer investigation into the causes of this gap across socioeconomic has pointed towards the role of systemic educational inequalities in the American schooling system that have been exacerbated over time (Gamoran, 2001; Ingersoll, 2002; Kim & Taylor, 2008; Ladson-Billings, 2006). Students from lower-income households may not have the financial and scholastic resources that give students from higher-income households an advantage, including test preparation services, tutoring, and tuition for preschool. In addition, economically disadvantaged and under-served communities often suffer from overcrowding, underfunding, and inadequate support of educational programming which can contribute to worse academic performance (Ladson-Billings, 2006; Kim & Taylor, 2008; Heckman, 2011). Furthermore, low-income and minority students face stereotype threat and discrimination within schooling systems and certain pedagogical practices (Cochran-Smith, 2004; Ladson-Billings, 2006; Steele, 1999; Zeichner, 2002). Ladson-Billings (2006) proposes that modern understanding of the achievement gap can be better explained by conceptualizing it as an “education debt”, where the systemic deficit of schooling resources provided to low-income and minority students accumulates over time to become an inter-generationally magnified effect. Whereas more economically privileged households can pass on academic knowledge, resources, and advice for test preparation and college admissions, first-generation, low-income, and minority students must work harder than their more privileged peers to combat the effects of this deficit in educational opportunity to obtain the same results because their families have not had access to the same opportunities historically (Kim & Taylor, 2008; Ladson-Billings, 2006).

The segregating effects of these systemic differences begin while children are young and persist through their growth and development; the educational gap between children from low-income and high-income neighborhoods is statistically significant by the time they enter kindergarten (Garcia, 2015; Duncan et al., 2011; Jumpstart, 2018; Isaacs & Patton 2012; Lee & Burkam, 2002; Leseman, 2002). Less than half of low-income children score “adequate” on school readiness by age 5, in contrast to 75% of children from middle and high-income families (Garcia, 2015; Jumpstart, 2018). Recent work has suggested that this disparity manifests even before kindergarten, with low-income 4-year-olds demonstrating delayed language and social-emotional skill development in comparison to their more affluent counterparts (Grant & Shannon, 2015).

Throughout the last few decades, researchers have found that participation in early education in preschools and other pre-kindergarten programs has been linked to positive outcomes in early learning, cognitive development, and language development (Barnett, 1995; Brooks-Gunn & Duncan, 1997; Burchinal, Campbell, Brayant, Wasik, & Ramey, 1997; Feagans, Fendt, & Farn, 1995; Klebanov, Brooks-Gunn, McCarton, & McCormick, 1998; Lamb, 1998; Ramey & Ramey, 1998; Sylva, Melhuish, Sammons, Sirai-Blatchford, & Taggart, 2004). In their review of early childhood education programs, Elango, Garcia, Heckman, & Hojman found a universal positive effect of interventions on early measures of IQ and academic achievement (2015). In addition, early childhood education leads to improved school readiness and better academic performance throughout later school years (Barnett, 2002; Magnuson, Meyers, Ruhm, & Waldfogel, 2004). These positive effects were most pronounced for children from disadvantaged households, highlighting the potential for early childhood interventions to narrow disparities between children from different socioeconomic backgrounds.

Although the duration of these positive effects varies, several critical studies have found evidence for persistence into adulthood. The Abecedarian Project, a longitudinal study that randomly assigned students to a “preschool treatment” condition or a “no preschool” control condition and followed them throughout college (Campbell et al., 2008). Children who attended preschool demonstrated improved reading and math skills that persisted into adulthood. In addition, they attained more education, were more likely to attend a 4-year college, and earned significantly higher schools on intellectual and academic measures such as standardized test scores (Campbell et al., 2008).

Enrollment in early education intervention programs also produced positive social, life, and health outcomes. Reviews of randomized studies that placed matched-pairs of children into “treatment” (educational intervention) and “control” conditions (no intervention) found significant

positive effects on measures of scholastic success (Barnett, 1995; Currie, 2001). A 15-year longitudinal study found that children enrolled in early childhood education programs such as preschool were significantly more likely to graduate from high school and attained more higher education than children who were not enrolled in preschool (Reynolds et al., 2001). Rates of juvenile arrest, violent arrest, grade retention, and school dropout were also significantly lower (Reynolds et al., 2001). A 20-year follow-up on the Abecedarian project revealed that early education resulted in positive changes for adult health behaviors (Campbell et al., 2014). Even when adjusting for multiple covariates, the early childhood education intervention resulted in better education and social outcomes over 15 years later.

While early childhood education interventions have been found to have positive effects on children's school readiness and life outcomes, the cost of full-time preschool or private center-based care is often prohibitively expensive for low-income families (Blank, Shulman, & Ewen, 1999; Magnuson et al., 2004). In order to address this problem, national initiatives like Head Start have implemented early childhood intervention programs to close the gap between high- and low-income children before they enter kindergarten by improving children's school readiness. A federal initiative funded by the U.S. Department of Health and Human Services, Head Start provides free early childhood education, health resources, and nutritional support for children from families with household incomes at or below the poverty line. Children in foster care, homeless children, and children from families receiving public assistance are also eligible (Office of Head Start, 2018). Today, nearly 90% of preschool-aged children from low-income households are enrolled in public, nationally sponsored programs such as Head Start (Head Start, 2018).

Using a "whole child" model that supports students' development by providing health and nutritional services in addition to education, Head Start has been able to increase children's pre-academic skills (ES = 0.19 to 0.22), reduce behavior problems (ES = -0.08 to -0.14), and improve overall health (ES = 0.11 to 0.33) (Garces, Thomas, & Currie, 2002; Shager et al, 2013; Miller et al., 2016; Bitler, Hoynes, & Domina, 2014).

Recent research has focused on taking a closer look at the differential effects of Head Start on children from different backgrounds, particular those who are high-risk in behavioral problems, pre-academic skill deficits, health, and are facing economic difficulties at home (Barton et al., 2012; Bloom & Weiland, 2015; McCoy et al., 2015; Miller et al., 2016, 2014). Although dual language learning Head Start participants demonstrated greater improvement after enrollment in the program, their school readiness as not equivalent to their monolingual-English speaking peers. In addition, Miller et al. (2016) reports although Head Start works to best support low-income children, the program helps lower-risk children more than it helps higher-risk children. Review of Head Start impacts has also revealed that the types of risk factors that program targets are more closely related to behavior than to test scores (Klebanov & Brooks-Gunn, 2006; US DHHS Final Report, 2010; Miller et al., 2016).

Building on research that examines how Head Start impacts different children differently, other organizations such as the non-profit Jumpstart have begun to work towards improving the quality of early childhood education interventions by providing opportunities for additional training in child development to volunteers known as "Jumpstart Corps" members. Working in partnership with Head Start classrooms and other state preschools, Jumpstart Corps members work with Head Start instructors to provide additional assistance and deliver high-quality childcare after completing a year-long service-learning course on empirically-informed strategies for supporting children's early learning.

Jumpstart is a unique supplemental early childhood education program that trains college students and community members on a volunteer basis to deliver an empirically-informed curriculum to assist low-income children's language and literacy, initiative, and social relations skills. The program is based on the HighScope principles of active learning and supporting children's learning through interaction with adults and peers, building on Vygotsky's model of adults

scaffolding children's learning (HighScope, 2018). In addition to gaining a foundation in educational theory and child development, Corps members support preschoolers by working collaboratively in teams of 5–6 and forming close, personal relationships with children.

To maximize the effects of early childhood education interventions, children should receive additional assistance like one-on-one interaction to build a solid foundation for early learning. However, with the typical preschool ratio of one instructor to ten children, students are less likely to receive proper instruction and additional support for school readiness. Initiatives like Jumpstart bring highly educated college students into classrooms to better individualize children's learning process and create more opportunities for student-driven learning (Abel, Nerren, & Wilson, 2015). In addition to broader measures of school readiness, Jumpstart children demonstrated greater improvement in their language and literacy skills and social development than their non-Jumpstart counterparts (Harris & Berk, 2011). In fact, Harris and Berk (2011) found that Jumpstart children from disadvantaged backgrounds and underserved communities were entering kindergarten at—and slightly above—the average performance of all American kindergarteners, effectively eliminating the achievement gap before they entered school.

The present study examines the impact of Jumpstart initiative on the language and literacy, initiative, and social relations of children from low-income communities. We hypothesized that Jumpstart children would show significant improvement in their school readiness skills after the program intervention.

3. Methods

3.1. Service-learning providers

Forty-one undergraduate students (18–34 years of age) enrolled in a public university participated in a service-learning course for one academic year where they took one introductory course and one advanced practicum course, where they were trained to serve as Jumpstart Corps members to work in the classrooms with children.

Before entering the classroom, each Corps member completed the service-learning course component where they attended weekly classes on child development theories, developmentally appropriate practices, and cultivating young children's school readiness and social skills. All Corps members were trained in how to administer the Jumpstart curriculum, which consists of the following units: Welcome, Reading, Circle Time, Center Time, Let's Find Out About It, and Sharing and Goodbye. Please see Table 1.

Corps members worked in teams of 5–6 people to coordinate with the preschool's head teachers and assign 4–5 children to each Corps members. Each Corps member committed to serving between 200–300 hours over the school year and implemented Jumpstart sessions twice a week at the preschools. The instructor conducted field observations of each Corps member's work in the classroom.

3.2. Service-learning recipients

Participants in this study were 133 preschool children between three and five years of age, who were enrolled in seven Head Start programs in Orange County, California. 12 children were excluded due to missing data or failure to complete the Jumpstart program due to absences. The final data included 121 children.

57% of participants were male and 43% were female. The average age, in months, of Jumpstart children, was 50.74 months, with ages ranging from 24.70 months to 57.83 months. 88% of participants identified as Hispanic/Latino and 12% of participants were White. The majority of children came from a household where the most spoken language was Spanish (78%), with 21% reported that English was most spoken at home and 1% reporting other languages (i.e., Vietnamese, Persian) were spoken most at home. Children in this sample are referred to as low-income because of their participation in the Head Start program, which primarily serves

Table 1. Jumpstart curriculum activities and targeted skills

Activity	Activities Conducted	Target Skill Area	Specific Skills
Welcome	Children transition to Jumpstart from previous activity, explore name cards and letters	Language and Literacy	Building alphabet knowledge, develop understanding of meaning and use of written content
Reading	Children and Corps members read interactively together in small groups or one-on-one	Language and Literacy	Build vocabulary, encourage interaction with text, support development of children's comprehension skills
Circle Time	Children sing songs, play games, and read poems as a large group	Language and Literacy, Social Relations	Develop familiarity with letters and words, foster positive relationships and social skills with peers and adults
Center Time	Children explore activity centers focusing on storybooks and unit themes	Language and Literacy, Initiative	Support book comprehension, build vocabulary, encourage creative problem-solving and interaction
Let's Find Out About It	Children explore new ideas and objects in a small group guided by a Corps member	Language and Literacy, Initiative	Build concept knowledge and vocabulary, learn about objects and use, engage in exploration and problem-solving
Sharing and Goodbye	Children talk and listen to each other's favorite session activities in group setting	Social Relations	Engaging with peers and adults in conversation, building vocabulary

The participating Head Start schools and parents gave National Jumpstart consent using the Jumpstart School Success Checklist (JSSC) to conduct pre- and post-assessment on their participating children's growth. The authors received permission from National Jumpstart to use project assessment data in the present study.

3.3. Measures

Head Start teachers collected data on the students' language and literacy, initiative, and social skills. The Jumpstart School Success Checklist (JSSC) was administered in the fall at the beginning of the program and again in the spring, at the conclusion of the Jumpstart sessions. Pre-program and post-program scores were compared to assess student progress and program efficacy.

The JSSC consisted of 15 items scored on a 5-point Likert scale, organized into three subcategories of language and literacy skills, initiative and agency, and social development. The JSSC is derived from the HighScope Educational Research Foundation's Preschool Child Observation Record (COR), 2nd Edition (Jumpstart, 2018), selecting fifteen items that are related to Jumpstart's program goals. External studies of the internal consistency and external validity of the JSSC indicated that its internal consistency is high (Cronbach's Alpha of .95 and higher) (Immekus, 2011) and that it is moderately to strongly correlated with other prominent measures of language and literacy such as the Test of Early Reading Ability (Pearson Coefficients ranged from .47-.63 for subtest) (Meyers et al., 2011, as cited in Grant & Shannon, 2015), and the Get Ready to Read (Pearson Coefficient of .63) (Meyers et al., 2011, as cited in Grant & Shannon, 2015).

A child's language and literacy skills are assessed by examining their proficiency with listening to and understanding speech (in English), using vocabulary, using complex patterns of speech, showing awareness of sounds in words, demonstrating knowledge about books, using letter names and sounds, and reading and writing. Children with stronger language and literacy skills were observed

to clearly sustain ongoing dialogues, read aloud phrases and sentences, and use clauses or compound subjects in speech as opposed to only responding to questions in conversation, using the same word to name more than one object, or speaking in simple sentences. Their initiative and agency skills are assessed by observing how often and how fluidly the child solves problems and makes choices and plans. Students with stronger initiative skills were observed to make plans with multiple details and choices (“I’m going to paint my mom a picture of our new truck.”) and work to solve problems over multiple attempts, instead of becoming frustrated and leaving the task. Children’s socioemotional skills are assessed by examining how they initiate play with others, resolve interpersonal conflict, understand and express their feelings, relates to adults, and relates to other children. Those with stronger socioemotional skills were seen playing games with rules, negotiating conflicts with other children, identifying and expressing reasons for emotions, and bonding with adults and peers.

4. Results

4.1. Does the jumpstart intervention improve children’s skill development?

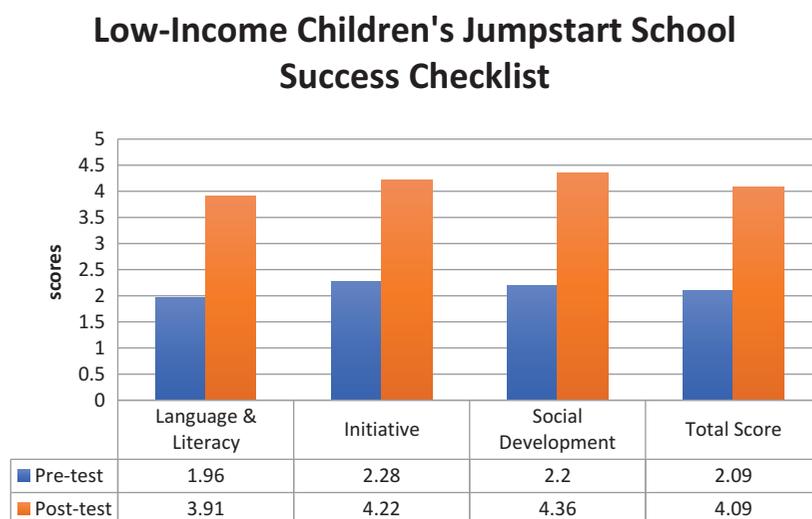
To examine participant’s language and literacy, initiative, and socioemotional skills before and after completion of the one year Jumpstart program, we conducted a paired-samples t-test. Results showed that children’s mean score on the JSSC improved significantly from the fall ($M = 2.08, SE = 0.06$) to the spring ($M = 4.09, SE = 0.07$), $t(117) = 37.63, p < 0.001$ (Figure 1 Low-Income Children’s Jumpstart School Success, p. 10). Participation in the Jumpstart program led to significant improvements in children’s skills both overall and within each subcategory. On average, JSSC scores for Jumpstart children increased from pre-test to post-test by 2.01 points, with a significant and substantive effect size (*Cohen’s d*) of 3.46.

Within the subcategory of language and literacy skills, a paired-samples t-test showed that children’s mean score improved significantly and substantively from the fall ($M = 1.96, SE = 0.06$) to the spring ($M = 3.91, SE = 0.07$), $t(117) = 36.49, p < 0.001$. On average, language and literacy scores increased from pre-test to post-test by 1.95 points, with a significant and substantive effect size (*Cohen’s d*) of 3.36.

Within the subcategory of initiative, a paired-samples t-test showed that children’s mean score improved significantly and substantively from the fall ($M = 2.26, SE = 0.07$) to the spring ($M = 4.22, SE = 0.07$), $t(117) = 32.35, p < 0.001$. On average, language and literacy scores increased from pre-test to post-test by 1.95 points, with a significant and substantive effect size (*Cohen’s d*) of 2.95.

Within the subcategory of socioemotional skills, a paired-samples t-test showed that children’s mean score improved significantly and substantively from the fall ($M = 2.19, SE = 0.07$) to the spring ($M = 4.36, SE = 0.07$), $t(117) = 31.25, p < 0.001$. On average, language and literacy scores

Figure 1. Low-income children’s jumpstart school success checklist.



increased from pre-test to post-test by 2.16 points, with a significant and substantive effect size (*Cohen's d*) of 2.88. See Table 2 for descriptive statistics of JSSC scores at each quarter and see Table 3 for descriptive statistics of pre- and post-test JSSC.

In sum, students that participated in the Jumpstart program demonstrated consistently significant and substantial improvement within and across categories. See Figure 1.

4.2. Does the jumpstart intervention affect children from different backgrounds differentially?

To determine whether the Jumpstart program was more beneficial to children from different demographic backgrounds of age, gender, language, and ethnicity, we first wanted to see if there were differences in children's skills at the pre-test in the fall.

Table 2. Jumpstart school success checklist sample items

Skill Assessed	Skill type	Scoring
Language and literacy	Listening to and understanding speech	<ol style="list-style-type: none"> 1. Child responds with actions or words to a suggestion, request, or question 2. When listening to a story, rhyme, or narrative, child anticipates and fills in a word or phrase 3. When listening to a story, rhyme, or narrative, child comments on or asks a question about it 4. Child contributes to an ongoing conversation 5. Child sustains a dialogue by taking three or more conversational turns
Language and literacy	Using vocabulary	<ol style="list-style-type: none"> 1. Child talks about people or objects close at hand 2. Child talks about absent people or objects 3. Child uses vocabulary related to a particular subject 4. Child uses two or more words to describe something, e.g. "That's a big, furry dog" 5. Child asks about the meaning of a word
Agency	Making choices and plans	<ol style="list-style-type: none"> 1. Child indicates a choice by pointing or some other action 2. Child expresses a choice in one or two words 3. Child expresses a choice with a short sentence, e.g. "I'm gonna play with the truck" 4. Child makes a plan with one or two details, e.g. "I'm going to work in the block area with the fire truck" 5. Child makes a plan with three or more details, e.g. "I'm going to paint my mom a picture of our new truck and I'm gonna use two brushes and the green paint."
Agency	Solving problems with materials	<ol style="list-style-type: none"> 1. Child expresses frustration when encountering a problem with materials 2. Child identifies a problem with materials and asks for help 3. Child tries one way to solve a problem with materials 4. Child tries two ways to solve a problem with materials 5. Child tries three or more ways to solve a problem with materials
Socioemotional	Understanding and expressing feelings	<ol style="list-style-type: none"> 1. Child expresses and emotion 2. Child comforts another child, e.g. patting, hugging, giving something to an upset child 3. Child talks about an emotion, e.g. "I'm mad—don't take my truck!" 4. Child represents an emotion through pretend play or art. 5. Child identifies an emotion and gives a reason for it, e.g. "Sari is sad because she misses her mommy."
Socioemotional	Resolving interpersonal conflict	<ol style="list-style-type: none"> 1. In a conflict with another child, child responds with yelling or physical action 2. Child requests adult help in resolving a conflict with another child 3. Child identifies the problem in a conflict with another child 4. With adult help, child offers a solution to a conflict 5. Child negotiates the resolution of a conflict with another child

Table 3. Descriptive statistics of JSSC scores

Variables	M (Fall)	SD (Fall)	M (Winter)	SD (Winter)	M (Spring)	SD (Spring)
JSSC Literacy and Language	1.93	0.71	3.00	0.89	3.90	0.77
JSSC Initiative	2.24	0.76	3.33	0.87	4.22	0.75
JSSC Social Relations	2.17	0.74	3.33	0.95	4.37	0.81
Total JSSC Score	2.06	0.70	3.16	0.87	4.09	0.74

Table 4. Results from paired-samples t-test before and after jumpstart program completion

	t	d
JSSC Language and Literacy	36.49***	3.36
JSSC Initiative	32.35***	2.95
JSSC Social Relations	31.25***	2.88
Total JSSC Score	37.63***	3.46

Note. ***Significant at the $p < 0.000$ level. *d* represents Cohen's *d* effect size.

4.3. Age

We first conducted a linear regression to examine whether older children had more developed skills at the pre-test. Results showed that age marginally predicted total JSSC score at the pre-test, $b = 0.15$, $t(124) = 1.72$, $p = 0.08$ such that older students had slightly higher pre-test scores than younger students. Age also explained a marginal proportion of variance in total JSSC score at the pretest, $R^2 = 0.02$, $F(1, 122) = 2.96$, $p = 0.08$.

Within the subcategories, age significantly predicted for initiative skills (i.e., ability to make choices and complex plans), $b = 0.17$, $t(124) = 1.97$, $p = 0.05$ such that older students had stronger initiative skills than younger students at the pre-test. Age explained a significant proportion of the variance in pre-test initiative scores, $R^2 = 0.02$, $F(1, 122) = 3.86$, $p = 0.05$. In addition, age marginally predicted for children's socioemotional skills at the pre-test, $b = 0.16$, $t(124) = 1.79$, $p = 0.07$ such that older children had marginally stronger social reasoning skills than their younger peers at the pre-test. Age explained a marginally significant proportion of the variance in the pre-test socioemotional skill scores, $R^2 = 0.03$, $F(1, 122) = 3.19$, $p = 0.07$. However, age did not significantly predict for language and literacy skills, $b = 0.13$, $t(124) = 1.46$, $p = 0.15$ and did not explain a significant portion of the variance in pre-test language skills, $R^2 = 0.02$, $F(1, 122) = 2.12$, $p = 0.15$.

At the post-test in spring, age no longer predicted for total JSSC scores, $b = 0.09$, $t(124) = 0.99$, $p = 0.32$ and did not explain significant proportions of the variance in total post-test JSSC scores, $R^2 = 0.01$, $F(1, 122) = 0.99$, $p = 0.32$. In addition, age did not predict the post-test scores of language and literacy skills $b = 0.08$, $t(124) = 0.88$, $p = 0.38$; initiative skills $b = 0.08$, $t(124) = 0.91$, $p = 0.37$; or socioemotional skills $b = 0.10$, $t(124) = 1.11$, $p = 0.27$.

Overall, age did not predict for the pre/post-test change in JSSC score, $b = -0.04$, $t(124) = -0.43$, $p = 0.67$ and did not explain a significant portion of the variance, $R^2 = -0.01$, $F(1, 122) = 0.18$, $p = 0.67$.

In sum, participants' age influenced their initiative skills at the pre-test but did not significantly influence their post-test JSSC scores upon leaving the program. In addition, age did not significantly influence the pre/post-test change in outcomes.

4.4. Gender, language, and ethnicity

We conducted several analyses of variance to test whether gender, language, or ethnicity influenced JSSC scores at the pre-test, post-test, or the pre/post-test change.

The ANOVA on gender found no significant effect on JSSC scores ($F(1, 124) = 0.14, p = 0.70$; $F(1, 124) = 0.54, p = 0.45$; $F(1, 124) = 0.37, p = 0.54$). Language was operationalized in two ways, assessing children's most spoken language [1 = English, 2 = Spanish, 3 = Other] and the language they were most comfortable with [1 = English, 2 = Spanish, 3 = Other]. There was no main effect of language on JSSC scores at the pre-test, post-test, or the pre/post-test change ($F(1, 124) = 1.74, p = 0.18$; $F(1, 124) = 1.96, p = 0.14$; $F(1, 124) = 1.20, p = 0.31$; $F(1, 124) = 0.91, p = 0.34$; $F(1, 124) = 0.50, p = 0.61$; $F(1, 124) = 0.03, p = 0.87$). Ethnicity was coded such that [1 = White/European American, 2 = Asian/Asian American, 3 = Hispanic/Latinx, 4 = African/African American, 5 = Multiracial/Other] and entered into an analysis of variance. Results showed no significant main effect of ethnicity on total JSSC scores ($F(1, 124) = 1.06, p = 0.38$; $F(1, 124) = 1.46, p = 0.22$; $F(1, 124) = 0.50, p = 0.74$).

5. Discussion

The purpose of the present study was to examine the impact of Jumpstart on improving young children's language and literacy, initiative, and socioemotional skills. Consistent with our hypothesis, Jumpstart children showed substantial improvement in multiple skill areas and overall. The magnitude of the effect size (Cohen's $d = 3.36$) of overall improvement within a year of participation demonstrated the power for early childhood interventions to significantly improve children's cognitive and socioemotional outcomes and enhance their school readiness. Previous research on the Head Start program and other similar pre-kindergarten educational interventions has consistently highlighted improved student outcomes on behavioral and school readiness measures (Barnett, 1995; Brooks-Gunn & Duncan, 1997; Burchinal et al., 1997; Feagans et al., 1995; Klebanov et al., 1998; Lamb, 1998; Magnuson et al., 2004; Ramey & Ramey, 1998). Although the direction of the effect has always been positive, the strength of the effect varies greatly—recent meta-analyses of Head Start place aggregated effect sizes of the intervention at 0.27 SD (Garces et al., 2002; Shager et al., 2013; Miller et al., 2016; Shager et al., 2013).

The particularly strong effect size of the present study captures the potential for further improvement of these early childhood interventions via supplemental initiatives such as Jumpstart. Relative to previously recorded interventions, the present study found substantially stronger effects in children's improvement over time with no differences in gains among students from different language or demographic backgrounds. Our results demonstrate that Jumpstart is an effective intervention program for children from low-income backgrounds, leading to strong gains in children's language and literacy, initiative, and socioemotional skill development without differentially benefitting students from more privileged backgrounds.

Language and literacy skills are critical in increasing children's school readiness, as proficiency and fluency in English are necessary for children to succeed in early school settings. Jumpstart Corps members consistently read books with children, helped them practice their writing, and engaged in enriching play and conversations with their partner children. Our results found that the Jumpstart program substantially improved children's language and literacy skills. Research on the pre-kindergarten achievement gap has highlighted how children from language backgrounds where their most comfortable is not English struggle more in their early educational years. Our post-intervention results found that there was no gap in the language and literacy skills between children who were most comfortable in English and those who were most comfortable in another language (i.e., Spanish, Vietnamese), meaning that Jumpstart children were entering kindergarten with no differential language ability. Jumpstart children from underserved communities were able to start school on a more level, lingual playing field. These results highlight the power for early childhood educational programs to equalize school readiness outcomes and reverse the deficit of systemically accumulated, inter-generational educational debt.

In addition, the Jumpstart intervention significantly and substantially improved children's initiative skills. Research on children's sense of agency has found that feeling empowered to make choices, influence events, and have an impact on their world is closely linked to children's sense of being, belonging, and developing their identity (Bandura, 2001; Carpendale & Lewis, 2006; Corsaro, 2005; DeVries & Zan, 1994). Developing a greater sense of initiative and agency also facilitates development of children's critical thinking and problem-solving skills. Jumpstart Corps members worked closely with children to think about complex plans, multiple ways to try solving a problem with available materials, and reasoning about their goals, in addition to supporting their confidence and self-esteem. Although these practices have been found to lead to positive development outcomes for children of all backgrounds, developing a strong early sense of agency in children from disadvantaged and low-income backgrounds can be particularly beneficial in empowering them countering feelings of helplessness that can manifest after facing a systemic lack of opportunity.

The Jumpstart program also prioritized the scaffolding and development of children's socioemotional skills, resulting in significant and substantial change upon completion of the program. Stronger socioemotional skills are correlated with better behavioral and classroom engagement outcomes in younger children, in addition to positive relational outcomes such as more job satisfaction, happier relationships, and higher subjective well-being in later adulthood (Garces et al., 2002; Shager et al., 2013; Miller et al., 2016; Bitler et al., 2014). Although some educational initiatives prioritize academic outcome such as school readiness, Jumpstart supplements Head Start's mission of caring for "the whole child" by also focusing on developing children's emotional, interpersonal, and social reasoning skills such as conflict resolution, expressing feelings, and relating to others. To foster these valuable skills, Corps members scaffolded conversations about identifying, expressing, and understanding feelings as well as creating strong bonds with their students while modeling emotional intelligence.

Overall, the Jumpstart program demonstrates that not only do early childhood educational programs work, they can produce powerful effects when pre-service teachers are provided with sufficient training, resources, and financial and organizational support. Though Head Start programs have consistently reported small positive outcomes from their interventions, they are often under-resourced in comparison to their center-based or private preschool counterparts. While the data clearly shows that Head Start programs are working in supporting children from marginalized communities, supplemental programs and initiatives like Jumpstart can strengthen the magnitude of their impact. Jumpstart Corps members are extensively trained in early childhood development, educational theory, and best practices in education, allowing them to deliver theoretically-informed and developmentally-appropriate curricula to their students (Yen, Herbst, Jaffry, Mena, & Perez, 2016).

In addition to highlighting the value of additional training and experience in best equipping early childhood educators to support their students' learning, the findings of the present study also highlight the need for better funding for early childhood interventions overall. Investing in early childhood education benefits society as a whole, with both financial and social returns. Children with better early learning outcomes are more likely to graduate high school, achieve academic success in higher education, and report higher levels of lifetime workforce productivity (Garces et al., 2002; Shager et al., 2013; Miller et al., 2016; Bitler, 2014). Building on these academic and career-oriented benefits, investing in early childhood education also results in positive societal outcomes such as lower rates of crime, teen pregnancy, and public assistance dependency. Given the consistently positive effects of Jumpstart interventions, national, state, and local institutions can maximize the impact of education programs by increasing teacher compensation, offering more opportunities for professional development and training and supporting community and college-oriented service work with marginalized communities.

Although there is a strong financial argument for supporting early childhood education interventions, it is also critical to contextualize these findings by thinking about the developmental trajectories of children from marginalized communities. For many low-income children, educational inequality is a pervasive, systemic force that prevents them from having the opportunities

for success that their more affluent peers are given. Many must also overcome an educational debt that is accumulated over generations, as others in their family have not received the same information, resources, or opportunities that more affluent families are given. Education is both perpetuator and adversary of inequality: for many children from low-income backgrounds, education has the ability to shape the trajectories of their futures. While systemic differences in educational opportunities contribute to widening gaps in academic outcomes, education can also change a child's life for the better and enable them to achieve their full potential.

6. Limitations

Because our study was a pre/post-test evaluation and not a controlled experimental study, there were several limitations. One limitation of the study was the lack of comparison groups of children who did not participate in any early childhood education intervention and children who participated in a non-Jumpstart supplemented Head Start program. Although the substantially larger effect size of the Jumpstart intervention relative to standard Head Start programming on children's skill development suggests that Jumpstart is more effective, future studies should explore the differences in outcomes across groups in order to better understand the mechanisms by which different early childhood education initiatives impact school readiness.

Another limitation that may limit the generalizability of this study is the small sample size of participants in our study and the selection of preschoolers from an urban low-income community. The limited capacity of educators in the community program also meant that multiple raters could not evaluate the same children. Given the diversity of experiences within the low-income community, additional studies are needed to study the role of interventions like Jumpstart in more schools, districts, and cities in order to better understand how factors like region, urbanity, and student language backgrounds interact with program efficacy.

In addition, while Jumpstart appears to have a strong positive effect in children's development of skills, we cannot know how robust those changes are as children enter kindergarten and grade school. Longitudinal, follow-up data on children's behavioral outcomes are needed to better understand whether the gains observed upon completion of the Jumpstart program will predict long-term positive outcomes in school achievement.

7. Conclusion and future directions

The results from this study show that the Jumpstart program facilitated significant and substantial improvement in low-income preschool children's language and literacy, initiative, and social development skills. Considered in the context of existing research on early childhood education, our study findings highlight (1) the capacity for early interventions to improve behavioral and academic outcomes for children from disadvantaged or marginalized backgrounds and (2) the ability to strengthen program impact given sufficient funding, training, and organizational support as demonstrated by the Jumpstart supplement. Future studies should continue to investigate the longitudinal impact of different early childhood education programs to determine which practices result in optimal outcomes for children. Although the results from our study suggest that Jumpstart's curricula, teaching practices, and professional development contribute to the particularly strong effect of the intervention, additional research on which specific practices and activities can best facilitate children's development. In addition, future studies should examine the impact of community-based learning interventions such as Jumpstart on inter-generational effects of educational debt and the self-efficacy of children from underserved communities. Finally, because Jumpstart's model of engaging local college students and volunteers in supporting children from their communities represents an ecological approach to education, future research should also investigate the impact of participating in service-learning on students' outcomes.

Today, there are hundreds of thousands of children from marginalized communities who are not being given the chance to succeed. This opportunity gap begins "at the school gate," as soon as children enter kindergarten and widens from there. Early childhood education programs like Jumpstart intervene at

a critical point in a child's development by giving them the high-quality, attentive education all children deserve and equipping them with the academic and behavioral skills to point them towards success. As a society, these initiatives are critical in reversing the effects of education debt and opportunity gaps. More importantly, they speak to the American dream of equality by giving every child—regardless of background—the opportunity to reach their fullest potential.

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