PROFILES OF SCHOOL READINESS AMONG RURAL APPALACHIAN CHILDREN FROM LOW-INCOME HOMES

Kiren Khan, Ph.D., Laura Justice, Ph.D., and Hui Jiang, Ph.D.

Executive Summary

There is growing evidence that children who enter kindergarten ready for its academic, socio-emotional, and physical demands are more likely to achieve future academic success (Duncan et al., 2007; Hair et al., 2006). In contrast, children who enter kindergarten behind their peers in these areas are at risk for academic underachievement (Cabell, Justice, Logan, & Konold, 2013), and future unemployment (Rouse, Brooks-Gunn, & McLanahan, 2005). Consequently, there have been federal initiatives, such as Race to the Top-Early Learning Challenge, aimed at gathering information regarding children's kindergarten entry skills, raising the quality of early learning and development programs, and improving access to quality early child care programs for at-risk children.



The Schoenbaum Family Center (SFC) and Crane Center for Early Childhood Research and Policy (CCEC) Partnerina to improve children's well-beina through research, practice, and policy.

EDUCATION AND HUMAN ECOLOGY

This White Paper presents the results of a study examining profiles of school readiness among 383 entering kindergarteners residing in rural, Appalachian communities. School readiness was indexed across a variety of dimensions, including pre-academic skills (math, language and literacy), social-emotional skills, and learning-related behaviors. Results revealed that children had four distinct school-readiness profiles: **global risk** (12 percent of children), **academic risk** (35 percent), **socio-behavioral risk** (13 percent), and **ready** (36 percent). Children in the three risk profiles were more likely to have attended lower-quality preschool programs in the year before kindergarten.

Recommendations

For Policymakers

- Establish home-based intervention programs for children identified with global, academic and/or socio-behavioral risk that help parents support their children's academic and social skills.
- Invest in professional development of preschool teachers to improve children's readiness
- Promote the quality of preschool programs, given their association with future school readiness among rural children.

For Practitioners

- Develop curricula to address the needs of children who exhibit any of the three risks profiles, to help them arrive to kindergarten ready to learn.
- Assess school readiness across a variety of dimensions, including socio-emotional and cognitive readiness in conjunction with language and literacy screeners.

For Researchers

- Partner with policymakers and practitioners to develop school-readiness assessments that test children's knowledge and skills across a variety of domains, are psychometrically valid, and easy to use.
- Develop and test school-readiness interventions that align to children's specific profiles.

School Readiness in Rural and Low-Income Children

A growing body of research shows that children growing up in rural areas, including the Appalachian region, tend to lag behind their non-rural peers in their educational achievement (Lee & Burkam, 2002; Miller & Votruba-Drzal, 2013). Recently, data from the Early Childhood Longitudinal Study showed that kindergarteners in rural settings perform more poorly than suburban and urban kindergarteners on measures of both math and reading (Miller & Votruba-Drzal, 2013). This gap in educational achievement may be attributed, in part, to characteristics of the homes, schools, and community environments of rural children compared to their urban and suburban peers. Research examining the impact of socio-economic status on children's literacy development shows that children growing up in low-income households are less likely to experience language- and literacy-rich environments (Heath, 1983; Hoff-Ginsberg, 1991; Roberts, Jurgens, & Burchinal, 2005) compared to children growing up in relative socio-economic advantage.

Being reared in a rural environment may pose a challenge for children with respect to arriving to school "ready to learn," often referred to as school readiness. A considerable volume of research has shown that children who arrive to kindergarten with well-developed academic and socio-emotional competence fare better than their non-ready peers (e.g., Duncan et al., 2007). Children in rural settings are at-risk for arriving to kindergarten not ready for several reasons. First, access to high-quality center-based preschools can be limited in rural areas. Second, rural parents may place less value on educational achievement than suburban and urban parents, and may believe that they have less influence on their children's educational outcomes (Miller & Votruba-Drzal, 2013). Such circumstances can be detrimental to ensuring that all children arrive to kindergarten ready to learn.



Aims of the Study

In this paper, we report findings from an examination of school readiness for children in rural, Appalachian communities residing in low-income households. Appalachia is a large geographic region of the United States (extending across 13 states) with a distinct cultural heritage and longstanding history of poverty. The combination of poverty and rurality in this region presents a unique set of challenges for ensuring adequate preparation of children for formal education. We aim to:

- Determine the extent to which there are distinct profiles of kindergarten readiness among rural, Appalachian kindergarteners, and;
- Examine the association between preschool classroom quality and kindergarten readiness profile membership.



Methods

Procedures

The data used in this project were collected as part of a large cluster randomized control trial (RCT) designed to examine the impacts of an early literacy curriculum implemented in 104 preschool classrooms in rural, Appalachian communities. Five children were randomly selected for participation from each classroom enrolled in the larger RCT, for an initial sample of 506 children. In the RCT, children participated for an 18-month period that extended across their preschool year and the fall of kindergarten; 76 percent of the initial sample was retained to kindergarten (n = 383), and these children were the subjects of the current study.

Participants

The 383 kindergarteners were primarily white (94 percent) and female (54 percent). The average age of children in the fall of the kindergarten year was 67 months, with a range of 58 to 77 months. All of the children resided in low-income households and had qualified in the year prior for participation in targeted-enrollment preschool programs (e.g., Head Start). Two indices of socio-economic status were collected on this sample: maternal education and household income. For maternal education, the majority of mothers in the sample (70 percent) had a high school diploma as their highest degree earned, and 8 percent had not completed high school; only 11 percent had a university degree. In terms of household income, 71 percent of families in the sample had an annual total family income of less than \$35,000, 17 percent had a total family income of \$35,001 to \$65,000, and 12 percent had a family income of \$65,001 to \$85,001 or higher.

Measures

Measures of relevance to this study included measures of school readiness, collected when children were in kindergarten, and measures of classroom quality, collected when children were enrolled in center-based care in the year preceding kindergarten.

School readiness skills. Children's language, literacy, math, socio-emotional skills and learning-related behaviors were examined in the fall of the kindergarten year using 11 different measures (see Table 1).

Classroom quality (preschool). Classroom quality was determined by direct observations conducted in children's classrooms in the preschool year using the *Classroom Assessment Scoring System* (CLASS; Pianta, La Paro, & Hamre, 2008). The CLASS is designed to assess three main dimensions of classroom quality: emotional support, classroom organization and instructional support. Field assessors videotaped two-hour long classroom observations in the fall, winter and spring of the preschool year. Three 20-minute cycles were randomly chosen from each of these observations (six hours of video) and coded by trained and reliable CLASS coders.

Aim 1

The first aim was to examine whether there were profiles representing patterns of readiness in entering-kindergarteners across the five readiness domains. Table 1 displays the mean (average) scores, standard deviations (spread of scores), and range of scores observed on each of the 11 measures used to assess children's skills in the fall of kindergarten. Total possible scores (or max scores) are also provided to allow for better interpretation of children's skill levels on individual measures, as these varied in number of test items and total possible scores.

There was a substantial amount of variability across each of the five domain indices, as indicated by the considerable range of scores exhibited by children across the 11 measures. This spread indicates that some children may demonstrate adequate to high levels of skill, whereas others may exhibit relatively low levels of skill. Thus, simply looking at the average scores on measures does not provide a complete picture of individual children's skills or whether there are sub-groups of children within the sample that are performing more poorly or more strongly consistently across the measures compared to their peers.

Table 1

DOMAIN	MEASURE	М	SD	RANGE	MAX SCORE
Language	CELF Sentence Structure	17.60	2.95	1-22	22
	CELF Word Structure	17.88	3.80	2-24	24
	CELF Expressive Vocabulary	26.65	6.53	6-40	40
Literacy	WJ Letter-Word Identification	15.54	5.08	3- 42	76
	WJ Word Attack	3.37	2.32	0-22	32
	PALS Spelling	9.85	5.78	0-20	20
Math	ARS Math (average)	3.25	0.99	1-5	5
Social-Emotional	SSRS Social Skills (average)	1.40	0.33	0.37- 2	2
Learning-Related Behavior	LBS (average)	1.61	0.31	0.66-2	2
	TCRS Task Orientation (average)	3.63	1.06	1-5	5
	TCRS Behavior Control (average)	3.76	0.75	1.5- 5	5

Descriptive data for 11 readiness indices from fall of kindergarten.

Note. CELF = Clinical Evaluation of Language Fundamentals (Wiig et al., 2004); WJ = Woodcock-Johnson III Tests of Achievement (Woodcock et al., 2002); PALS = Phonological Awareness Literacy Screening-Kindergarten (Invernizzi, 2010); ARS = Academic Rating Scale (NCES, 1994); SSRS = Social Skills Rating System (Gresham & Elliott, 1990); LBS = Learning Behavior Scale (McDermott et al., 2000); TCRS = Teacher-Child Rating Scale (Hightower et al., 1986). Means, standard deviations, ranges and the maximum possible score on each assessment are provided. A multilevel latent profile analysis (MLPA) was conducted to determine whether children clustered into distinct profiles representing specific patterns of readiness. Results from this MLPA indicated that there were four distinct profiles of school readiness, as shown in Figure 1.

Figure 1.

Profiles of school readiness at kindergarten entry.



On Figure 1, children's standardized factor scores (or z-scores) are depicted on the y-axis. The conversion of scores on each of the 11 measures to standardized factor scores allows for comparison across the measures, with 0 representing the mean score on each measure.

Sixteen percent of children belonged to Profile 1, what we term "global risk." Children in this profile exhibited particularly poor social-emotional skills and learning-related behaviors (about 1.5 standard deviations below the mean) and low language, literacy and math skills (about 1 standard deviation below the mean). To provide a reference for this group's performance, when compared to an age-matched nationally representative normative population, these children rank in the 24th to 31st percentile on language and in the 16th percentile on social skills.



To illustrate how children in this profile compare to their peers in this sample, let's consider the social-emotional and math skills of children in this profile. Social-emotional skills were assessed by teachers who rated children on the frequency with which they demonstrated certain behaviors or skills (such as following directions) on a 3-point rating scale (0 = never, 1 = sometimes, 2 = very often). Children in this profile mostly scored 0 on this rating scale compared to the average child's rating of 1.4 points. Math skills were measured by a survey administered to teachers who rated each child's mathematical thinking and understanding of mathematical problems on a 0 to 5 scale (with 0 indicating very poor math skills and 5 indicating very high levels of skill for this age range). Children in this profile scored about 1.0 point on the math skills measure compared to an average score of 3.25 points.

Thirty-five percent of children belonged to Profile 2, "academic risk." On average, children performed about a half of a standard deviation below the mean on academic skills, including language, literacy, and math, and were average in terms of their social-emotional skills and learning-related behaviors compared to the rest of the sample. Thus, children in this profile had a slight disadvantage in academic skills relative to other skills. For instance, when testing children's ability to name objects or actions (Expressive Vocabulary measure in Table 1.) children in this profile scored about 23 points out of a total possible 40 points. This is in contrast with an average score of 27 points for all children in the sample.

Thirteen percent belonged to Profile 3, "socio-behavioral risk," with these children exhibiting slightly greater than average academic skills (language, literacy, math), but below average social-emotional skills and learning-related behaviors (such as attending to the teacher and cooperating in class activities).

Twenty-six percent of children belonged to Profile 4, "ready," performing about 0.65 to 0.8 standard deviations above the mean across all five domains of readiness. When compared to a national sample, these children perform around the 60th percentile on language and 70th percentile on socio-emotional skills, indicating that despite the effects of socio-economic disadvantage, children in this profile are still on track to begin formal literacy instruction with literacy, math, and social skills comparable to their more advantaged peers.



Aim 2

A second aim was to examine the association between classroom quality during preschool and children's kindergarten readiness. A regression analysis was used to predict children's profile membership based on preschool classroom quality. After controlling for a variety of child background factors (e.g., household income, race), results showed that children in "ready" versus "risk" profiles (i.e., Profiles 1-3) experienced significant differences in preschool classroom quality (p = 0.004, *large effect size* = 0.68). Figure 2 shows how classroom quality varied across each of the four readiness profiles. As can be seen in this graph, negative scores on classroom quality are associated with membership in the at-risk, academic risk and socio-behavioral risk profiles. In contrast, positive scores on classroom quality are associated with ready profile membership.

Figure 2.

Mean of prekindergarten classroom quality factor score (standardized) for four school readiness profiles.



On Figure 2, classroom quality is depicted on the y-axis in standard units (zero representing the mean score on the CLASS measure). The height of each bar represents the average child's classroom quality score in a particular readiness profile relative to the overall sample.



Conclusions

The results reported in this paper are important in several key ways:

First, this work is one of the only studies of school readiness in children residing in rural, Appalachian communities. Results show that entering kindergartners are variable in their academic and socio-behavioral skills: some children have high levels of skill whereas others have lower skill levels. Profile analysis was useful for identifying groups of children who appear to have globally poor readiness (16 percent) and mixed readiness profiles (48 percent), showing risk in either academic or socio-behavioral skills. Interventions targeted to children with specific profiles during preschool or around kindergarten entry may serve to heighten their readiness and overall preparedness for schooling.

Second, this work helps to identify preschool programs as a potential protective factor that helps predict positive school readiness; this is specific, however, to high-quality preschool programs. Efforts to improve access to high quality early education programs may be a fruitful avenue for preparing children in these communities for the rigors of formal schooling. Also, teacher training targeted at improving the instructional climate of classrooms may be a useful investment for supporting children's readiness and ongoing development in this community.



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