

Research Brief:
**Child & Family Characteristics
Associated with Kindergarten
Readiness**

Early Childhood Policy Research Group (ECPRG)

Phillip Sherlock, PhD; Robert Chapman; Herman T. Knopf, PhD; Maya Schreiber, MA



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Introduction

This study identifies contexts in which children are more or less likely to be ready for kindergarten. The Early Childhood Policy Research Group (ECPRG) leveraged a sequential machine learning pipeline to identify child and family characteristics associated with differential kindergarten readiness rates. This machine learning approach (1) identified subgroups of children, as described by child and household characteristics as well as household service-use, and (2) the kindergarten readiness rate associated with each subgroup, as measured by the Florida Kindergarten Readiness Screener (FLKRS). This initial, exploratory work was undertaken with the intention of empirically identifying salient subgroups of children and households in need of future, narrower investigations.

Data & Methodology

To be included in the analysis, children must have been born in Florida and had a Florida Kindergarten Readiness Screener (FLKRS) score at kindergarten entry. Child-level data from the Early Childhood Integrated Data System were used which includes data from the following agencies to describe child characteristics and household service use:

- Florida Department of Education
- Florida Department of Children and Families
- Florida Agency for Health Care Administration
- Florida Department of Health (including birth certificate records)
- U.S. Department of Housing and Urban Development

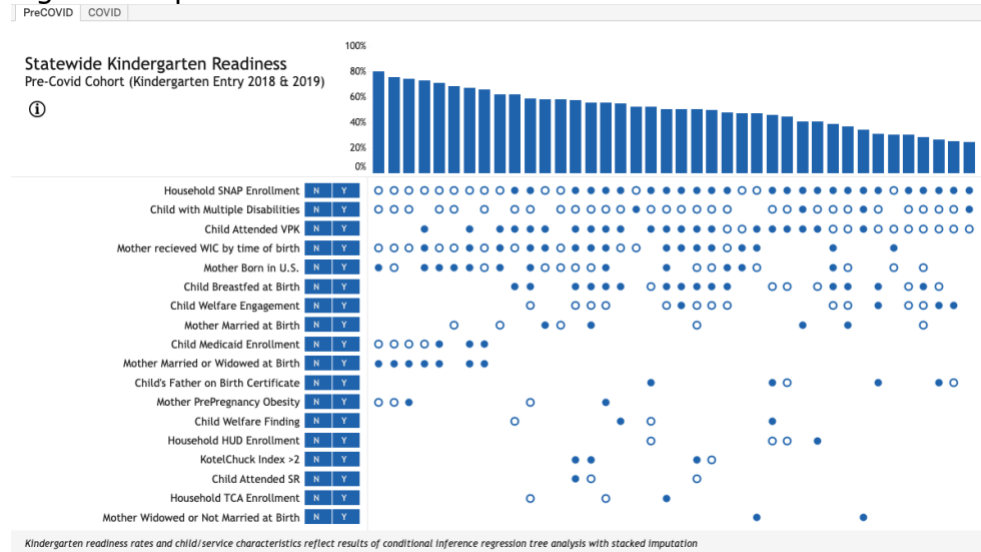
The research team conducted the sequential machine learning pipeline twice, once with a pre-COVID-19 Cohort (kindergarten entry 2018-2019), and once with a COVID-19 cohort (kindergarten entry 2020-2021). For each cohort, the pipeline identified subgroups for whom different constellations of variables determined differential rates of children's kindergarten readiness. These variables vary by subgroup. For example, VPK enrollment could be determined as relevant for one group of children but not for another. The algorithm also reported the associated proportion of children within each subgroup who were ready for kindergarten (i.e., FLKRS score of 500 or greater).

Results

Results are visualized in an [interactive UpSet plot](#) where users can view all subgroups of children and the characteristics relevant to their kindergarten readiness. The vertical bars describe the kindergarten readiness (KR) rate of the identified subgroup. The rows and dots describe the characteristics of the identified subgroup. Bars are pre-sorted in descending order for users' convenience, to allow users to quickly locate which subgroups have the highest KR rate. Users can select the bar to see the child characteristics associated with this subgroup's KR rate.

Each row corresponds to one of the child characteristics or service-use indicators that were identified as relevant to kindergarten readiness. A dark blue circle indicates that the children in that subgroup had the identified characteristics. An unfilled circle indicates that the children in that subgroup did not have the identified characteristic. When there is no circle present, this indicates that the identified characteristic is not relevant to the subgroup's KR rate. Users can select specific variables to highlight all subgroups with the variable of interest.

Figure 1. UpSet Plot



Per the nature of the analyses, meaningful characteristics and potential intervention opportunities are specific to each subgroup.

Results can be used in two ways. First, results created subgroups of children as defined by variables relevant to their kindergarten readiness. This information helps us to identify important subgroups which warrant further analysis, allowing us to identify potential interventions for these groups of children.

Second, looking across subgroups, we can identify key variables that acted as resilience factors (i.e., improved kindergarten readiness) for vulnerable children. These results can begin to be used to better support children and families. For example, we found that Supplemental Nutrition Assistance Program (SNAP) participants who enrolled in VPK had higher rates of kindergarten readiness than those who did not enroll in VPK. This suggests that further collaboration between SNAP and VPK administrators to enroll SNAP children in VPK may result in higher kindergarten readiness for children.

We can also identify children who are consistently at a higher risk for low FLKRS scores and may need additional support. Across subgroups, children consistently identified as needing additional support in preparing for kindergarten include children who participated in SNAP, have multiple disabilities, were born to mothers

who immigrated to the United States or were born to mothers who were not married.

The following more specifically summarizes trends we see across subgroups:

Services & Interventions

- In the pre-COVID-19 Cohort, among SNAP recipients, VPK enrollment predicts higher rates of kindergarten readiness. Students who received SNAP and who participated in VPK had a KR rate range of 41%-62%, compared to their non-VPK-participating peers who had a KR rate range of 24%-48%. We observed a similar finding among students who used SNAP and had multiple disabilities, wherein students who attended VPK had a KR rate 12% higher than their peers who did not attend VPK.
- In the COVID-19 Cohort, participation in SNAP is associated with lower KR rates across all subgroups. VPK was not identified as a factor that contributed to further differentiation in KR rates among these children.

Characteristics of the Students & Families

- Across both cohorts, children with multiple disabilities tended to have lower rates of KR compared to students without multiple disabilities.
- Across both cohorts, children who were born to married mothers had higher KR rates compared to their peers who were born to non-married mothers across a wide range of other factors. This can be seen in the UpSet plot by comparing the KR rates of similar subgroups where maternal marital status was a defining feature.
- Across both cohorts, students with mothers born in the U.S. tended to have higher KR rates.

Future Direction

The ECPRG will use results of this recently completed study to conduct future analyses focused on specific subgroups of children to better describe child and family contexts which relate to their kindergarten readiness. These results can be used by stakeholders to improve the early care and education mixed delivery system in preparing vulnerable children for kindergarten. Additionally, the ECPRG is working with program administrators and stakeholders to use existing results to better target specific interventions and support to the subgroups of children identified in these analyses.