REL SOUTHWEST Regional Educational Laboratory Southwest

REL Southwest Ask A REL Response

Early Childhood

August 2018

Question:

What does the research say about K-2 indicators that are predictive of later performance?

Response:

Thank you for the question you submitted to our REL Reference Desk. We have prepared the following memo with research references to help answer your question. For each reference, we provide an abstract, excerpt, or summary written by the study's author or publisher. Following an established Regional Educational Laboratory (REL) Southwest research protocol, we conducted a search for research reports as well as descriptive study articles on K–2 indicators that are predictive of later grade performance.

We have not evaluated the quality of references and the resources provided in this response. We offer them only for your reference. Also, we searched the references in the response from the most commonly used resources of research, but they are not comprehensive, and other relevant references and resources may exist. References provided are listed in alphabetical order, not necessarily in order of relevance. We do not include sources that are not freely available to the requestor.

Research References

Brown, R. S., & Coughlin, E. (2007). *The predictive validity of selected benchmark assessments used in the Mid-Atlantic region* (Issues & Answers Report, REL 2007-No. 017). Washington, DC: U.S. Department of Education, Institute of Education Sciences, Regional Educational Laboratory Mid-Atlantic. https://eric.ed.gov/?id=ED499099

> *From the ERIC abstract*: "This report examines the availability and quality of predictive validity data for a selection of benchmark assessments identified by state and district personnel as in use within Mid-Atlantic Region jurisdictions. Based on a review of practices within the school districts in the region, this report details the benchmark assessments being used, in which states and grade levels, and the technical evidence available to support the use of these assessments for predictive purposes. The report also summarizes the findings of conversations with test publishing company personnel and of technical reports, administrative manuals, and similar materials. The study investigates

the evidence provided to establish a relationship between district and state test scores, and between performance on district-administered benchmark assessments and proficiency levels on state assessments. When particular district benchmark assessments cover only a subset of state test content, the study sought evidence of whether district tests correlate not only with overall performance on the state test, but also with relevant subsections of the state test. While the commonly used benchmark assessments in the Mid-Atlantic Region jurisdictions may possess strong internal psychometric characteristics, the report finds that evidence is generally lacking of their predictive validity with respect to the required state or summative assessments. To provide the jurisdictions with additional information on the predictive validity of the benchmark assessments currently used, further research is needed linking these assessments and the state tests currently in use. Additional research could help to develop the type of predictive validity evidence school districts need to make informed decisions about which benchmark assessments correspond to state assessment outcomes, increasing potential success of instructional decisions meant to improve student learning as measured by state tests. The following are appended: (1) Methodology; (2) Glossary; and (3) Detailed Findings of Benchmark Assessment Analysis."

Burchinal, M. (2018). Measuring early care and education quality. *Child Development Perspectives 12*(1), 3–9. https://onlinelibrary.wiley.com/doi/epdf/10.1111/cdep.12260

From the abstract: "High-quality early care and education (ECE) programs are thought to increase opportunities for all children to succeed in school, but recent findings call into question whether these programs affect children as anticipated. In this article, I examine research relating the quality of ECE to children's outcomes, finding somewhat inconsistent and modest associations with widely used measures of process and structural quality, and more consistent and stronger associations with other dimensions of ECE such as curricula and type of ECE program. I discuss why the associations between ECE quality and outcomes are so modest, including limited children's outcomes, psychometric issues with quality measures, and a need to revise and expand measures of ECE quality. The evidence indicates that we need to focus on the content of instruction and teaching practices, as well as the extent to which teachers actively scaffold learning opportunities. We also need to continue to focus on the quality of interactions between teachers and children, and on children's access to age-appropriate activities."

Duncan, G. J., Dowsett, C. J., Claessens, A., Magnuson, K., Huston, A. C., Klebanov, P., et al. (2007). School readiness and later achievement. *Developmental Psychology, 43*(6), 1428–1446. https://pdfs.semanticscholar.org/8041/de7a7646a08d06eef94e2fa75ccaecb650a0.pdf?_ga=2.28345077.898802666.1530834445-1776330897.1530834445

From the abstract: "Using 6 longitudinal data sets, the authors estimate links between three key elements of school readiness—school-entry academic, attention, and socioemotional skills—and later school reading and math achievement. In an effort to isolate the effects of these school-entry skills, the authors ensured that most of their regression models control for cognitive, attention, and socioemotional skills measured prior to school entry, as well as a host of family background measures. Across all 6

studies, the strongest predictors of later achievement are school-entry math, reading, and attention skills. A meta-analysis of the results shows that early math skills have the greatest predictive power, followed by reading and then attention skills. By contrast, measures of socioemotional behaviors, including internalizing and externalizing problems and social skills, were generally insignificant predictors of later academic performance, even among children with relatively high levels of problem behavior. Patterns of association were similar for boys and girls and for children from high and low socioeconomic backgrounds."

Halle, T., Vick Whittaker, J. E., & Anderson, R. (2010). *Quality in early childhood care and education settings: A compendium of measures*, *second edition.* Washington, DC: Child Trends. https://www.acf.hhs.gov/sites/default/files/opre/complete_compendium_full.pdf

From the introduction: "Quality measures were originally developed for research aimed at describing the settings in which children spend time and identifying the characteristics of these environments that contribute to children's development. They were also developed to guide improvements in practice. Increasingly, however, measures of quality are being used for further purposes. In particular, they are being used to guide components of state policies. For example, many states are developing Quality Initiatives and employing measures originally created for research or for guiding improvement in practice for the new purpose of assigning quality ratings to early care and education settings. States are also using these measures to monitor change in quality over time.

The *Quality in Early Childhood Care and Education Settings: A Compendium of Measures, Second Edition* was compiled by Child Trends for the Office of Planning, Research and Evaluation of the Administration for Children and Families, U.S. Department of Health and Human Services, to provide a consistent framework with which to review the existing measures of the quality of early care and education settings."

Jordan, N. C., Glutting, J., Ramineni, C., & Watkins, M. W. (2010). Validating a number sense screening tool for use in kindergarten and first grade: Prediction of mathematics proficiency in third grade. *School Psychology Review, 39*(2), 181–195. Retrieved from https://www.academia.edu/15608137/Validating_a_number_sense_screening_tool_for_use_in_kindergarten_and_first_grade_Prediction_of_mathematics_proficiency_in_third_grade

From the abstract: "Using a longitudinal design, children were given a brief number sense screener (NSB) screener (N = 204) over six time points, from the beginning of kindergarten to the middle of first grade. The NSB is based on research showing the importance of number competence (number, number relations, and number operations) for success in mathematics. Children's mathematics achievement on a validated high-stakes state test was measured 3 years later, at the end of third grade. Test-retest reliability estimates were obtained for the NSB. Two criterion groups were then formed on the basis of the third-grade achievement test (children who met and who did not meet mathematics standards). Diagnostic validity analyses for the NSB were completed using repeated measures analyses of variance and receiver operator curve analyses. Results from all analyses revealed that scores on the NSB in kindergarten and first grade

predicted mathematics proficiency in third grade. Areas under the receiver operator curve indicated that the NSB has high diagnostic accuracy (areas under the receiver operator curve = 0.78-0.88). Findings suggest that kindergarten and first-grade performance on the NSB is meaningful for predicting which children experience later mathematics difficulties."

McFarland, J., Hussar, B., de Brey, C., Snyder, T., Wang, X., Wilkinson-Flicker, S., et al. (2017). *The condition of education 2017* (NCES 2017-144). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. https://eric.ed.gov/?id=ED574257

From the ERIC abstract: "'The Condition of Education 2017' is a congressionally mandated annual report summarizing the latest data on education in the United States. This report is designed to help policymakers and the public monitor educational progress. This year's report includes 50 indicators on topics ranging from prekindergarten through postsecondary education, as well as labor force outcomes and international comparisons. 'The Condition' includes an 'At a Glance' section, which allows readers to quickly make comparisons within and across indicators, and a 'Highlights' section, which captures a key finding or set of findings from each indicator. The report contains a 'Reader's Guide,' a 'Glossary,' and a 'Guide to Data Sources' that provide additional information to help place the indicators in context. In addition, each indicator references the data tables that were used to produce the indicator, most of which are in the 'Digest of Education Statistics.' In addition to the regularly updated annual indicators, this year's report highlights innovative data collections and analyses from across the Center: (1) The first spotlight indicator examines the relationship between student risk factors at kindergarten entry (poverty and low parent educational attainment) and academic achievement in early elementary school; (2) The second spotlight indicator draws on administrative data from the Center's EDFacts data collection and finds that 2.5 percent of students in U.S. public elementary and secondary schools were reported as homeless in 2014-15; (3) The third spotlight indicator draws on longitudinal data from the Beginning Postsecondary Students Study to examine the rates at which first-time college students persist toward completion of a degree or certificate; and (4) The fourth spotlight indicator examines how disability rates for U.S. adults vary by educational attainment, finding that 16 percent of 25- to 64-year-olds who had not completed high school had one or more disabilities in 2015, compared to 4 percent of those who had completed a bachelor's degree and 3 percent of those who had completed a master's or higher degree. In addition, two indicators provide insights from the Center's recent work on technology in education. The first previews key findings from the Center's upcoming report, 'Student Access to Digital Learning Resources Outside of the Classroom.' The second presents findings from the National Assessment of Educational Progress's 8th-grade Technology and Engineering Literacy (TEL) assessment."

Wolf, P. J., & Lasserre-Cortez, S. (2018). *An exploratory analysis of features of New Orleans charter schools associated with student achievement growth* (REL 2018-287). Washington, DC: U.S. Department of Education, Institute of Education Sciences, Regional Educational Laboratory Southwest. https://eric.ed.gov/?id=ED579168

From the ERIC abstract: "In the wake of Hurricane Katrina, the number of charter schools in New Orleans has rapidly expanded. During the 2012/13 school year—the period covered by this study—of the 85 public schools in New Orleans, 75 were chartered, enrolling more than 84 percent of all public school students in the city in 92 different school campuses. This study explored organizational, operational, and instructional features of New Orleans charter schools serving grades 3-8 that are potential indicators of student achievement growth in English language arts (ELA), math, and science. The organizational characteristic of kindergarten provided as an entry grade was associated with higher levels of [value-added measures] VAM on the ELA test. The operational characteristic of an extended school year also was associated with higher levels of ELA VAM. The instructional characteristics of a lower percentage of teachers with graduate degrees, more experienced teachers, and a lower student/teacher ratio were associated with higher levels of ELA VAM. The analysis revealed fewer potential key indicators of charter school effectiveness regarding VAM in math and science. The inclusion of kindergarten as an entry grade was the only school feature that was statistically significant in its association with math VAM; schools with kindergarten were correlated with higher math VAM scores. Having a lower student/teacher ratio and fewer staff in student support roles were the only school features that were statistically significant in their association with higher science VAM scores. None of these associations between potential key indicators and math and science VAM scores remained statistically significant when estimated using 2013/14 outcome data, indicating that the results are not robust to such an additional analysis. Offering kindergarten as an entry grade and having a lower teacher/student ratio were the only potential key indicators with statistically significant associations with more than one VAM outcome. Having kindergarten as an entry grade was positively associated with ELA and math VAM. Having a lower teacher/student ratio was associated with higher ELA and science VAM. Contains appendices."

Additional Organization to Consult

Vanderbilt Peabody College, Peabody Research Institute, The Meta-Analysis Center – https://my.vanderbilt.edu/macpri/

From the website: "Our mission at the Meta-Analysis Center at the Peabody Research Institute (MAC@PRI) is to conduct research syntheses and meta-analyses on research relevant to improving the well-being of children, youth, and families. Faculty and research staff at our center conduct systematic reviews and meta-analyses of intervention research and predictive research on risk and protective factors, with expertise in advanced methodological techniques, as well as contributing to the development, testing, and application of meta-analysis methods."

Meta-Analysis Center research summary presentation: *School readiness and later achievement: Results from a meta-analysis of longitudinal studies*. https://my.vanderbilt.edu/predictors/files/2013/07/Wilson-SREE-2014-FINAL.pdf

Selected summary conclusions:

- Early academic skills are strongest predictors of later performance on both standardized tests and grades.
- Early mathematics skills were more strongly predictive of later math achievement than early reading skills, but also of total achievement and grades.
- Social skills and problem behaviors were not strongly predictive of later academic achievement.

Methods

Keywords and Search Strings

The following keywords and search strings were used to search the reference databases and other sources:

- Kindergarten indicators
- Kindergarten indicators AND later performance
- Kindergarten AND predictive validity
- Grade 1 indicators
- Grade 1 AND later performance
- Grade 1 AND predictive ability
- Grade 2 indicators
- Grade 2 AND later performance
- Grade 2 AND predictive validity

Databases and Resources

We searched ERIC for relevant, peer-reviewed research references. ERIC is a free online library of more than 1.6 million citations of education research sponsored by the Institute of Education Sciences (IES). Additionally, we searched Google Scholar and PsychInfo.

Reference Search and Selection Criteria

When we were searching and reviewing resources, we considered the following criteria:

- *Date of the publication:* References and resources published from 2003 to present, were included in the search and review.
- *Search priorities of reference sources:* Search priority is given to study reports, briefs, and other documents that are published and/or reviewed by IES and other federal or federally funded organizations, academic databases, including ERIC, EBSCO databases, JSTOR database, PsychInfo, PsychArticle, and Google Scholar.

- *Methodology:* The following methodological priorities/considerations were given in the review and selection of the references: (a) study types—randomized control trials, quasi-experiments, correlational studies, descriptive data analyses, literature reviews, mixed methods analyses, and so forth; (b) target population, samples (representativeness of the target population, sample size, volunteered or randomly selected, and so forth), study duration, and so forth; and (c) limitations, generalizability of the findings and conclusions, and so forth.

This memorandum is one in a series of quick-turnaround responses to specific questions posed by stakeholders in the Southwest Region (Arkansas, Louisiana, New Mexico, Oklahoma, and Texas), which is served by the Regional Educational Laboratory (REL) Southwest at AIR. This memorandum was prepared by REL Southwest under a contract with the U.S. Department of Education's Institute of Education Sciences (IES), Contract ED-IES-91990018C0002, administered by AIR. Its content does not necessarily reflect the views or policies of IES or the U.S. Department of Education nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.