5-12-2022

Coding Protocol: A Meta-Analysis of Early Numeracy Curriculum-Based Measurement

Gena Nelson
Boise State University

Coding Protocol: A Meta-Analysis of Early Numeracy Curriculum-based Measurement

Gena Nelson
Assistant Professor
Boise State University
genanelson@boisestate.edu

Abstract

The purpose of this document is to provide readers with the coding protocol that authors used to code 21 studies that met inclusion criteria for a meta-analysis. The focus of the meta-analysis was to determine the average correlations between four common early numeracy curriculum-based measure measurement (CBM) tools (i.e., oral counting, quantity discrimination, missing number, and numeral identification) and mathematics achievement criterion measures. We also identified moderating factors of the relationship between CBM and the criterion measures. Studies were included if they focused on at least one of the four common early numeracy CBM, and included correlations for students in preschool, kindergarten, or first grade. We coded 21 studies published between 2004 and 2021, including 19 peer-reviewed journal articles and two doctoral dissertations. Across studies, we coded variables such as basic study information, participant demographics, general CBM information (e.g., administration time of year, publisher), criterion measure information (e.g., state test, norm-referenced achievement measure, time of year), administration lag time between the CBM and criterion measure, and the correlation.

Keywords: meta-analysis, curriculum-based measurement, math, early numeracy

Early Numeracy CBM Meta-Analysis Code Book

Variable Name	Code Options	Code Descriptions
Authors	Names	All authors' last names
Year	Year	Year of publication
Group Descriptor	Anecdotal or NA	Provide information about the specific group this is related to if the authors split the presentation of correlations in ways other than grade level. For example, by district or school, or by students (e.g., students with disabilities compared to students without disabilities; meets expectations, fails to meet expectations). Use NA if this does not apply.
Correlation Descriptor	Anecdotal	Add a brief (3-4 word) description of the correlation that is unique compared to other correlations in this study. Use terms such as the CBM name, criterion name, and time of year for the CBM.
Study Sample Size	Number	Record the total study sample size.
Sample Size for Correlation	Number	Record the sample size associated with the correlation.
CBM Measure Type	Select one: 0 = numeral identification 1 = quantity discrimination 2 = oral counting 3 = missing number	• Numeral identification = when students are prompted to verbally name the number they see on a page. This may also be called number identification, naming numbers, or number naming. • Quantity Discrimination = when students are prompted to verbally (or by pointing) to the larger or small numeral (this is not the same as comparing sets of dots, it has to be a numeral). This may also be called: quantity comparison, magnitude comparison, or numeral comparison. • Oral Counting = when students are prompted to start counting from 1 and continue counting as high as they can. This may also be called counting, oral counting fluency, counting aloud, or verbal counting. This is not the same as counting with correspondence. • Missing number = when students are prompted to identify (either verbally or in writing) the missing number in a sequence. This is usually in a sequence of 3 numbers with either the first, middle, or last number missing from the pattern.

Measure Features	Anecdotal	Provide details related to the features of the measure. This should include (when applicable) range of numbers included (e.g., 0 to 9, 0 to 100). This could also include if the oral counting measure stopped at a certain number (no higher than 100 for example).
CBM Grade Administration	Number	Report the specific grade level of the CBM administration that you are providing correlations or slope for.
CBM Administration Time of Year	Anecdotal	Report the specific time of administration (e.g., fall, winter, December, May) that you are reporting a correlation for. This is the CBM administration time. If more than one descriptor is given (e.g., winter January, then give both). If the study specifies that the measure was given at the beginning of the year, use Fall and if the study specifies that the measure was given at the end of the year, use Spring. It's really important if we have the time of year as a month that we record this to approximate the number of weeks between CBM and Criterion measure administration.
Criterion Measure	Name	Record the criterion measure that this correlation is associated with.
Criterion Measure Type	Select one: 0 = not reported 1 = state test 2 = other CBM 3 = norm-referenced math achievement measure 4 = researcher developed measure 5 = unclear 6 = other	Select the type of criterion measure that was used: ● Not reported = the authors stated that a criterion measure was used but did not provide any information about the measure to determine what type it was. ● State test = any state end of year test ● Other CBM = the authors used another CBM ● Norm-referenced math achievement measure = any known norm-referenced math achievement measure such as the SAT-10, TEMA, TOMA, WJ-Applied Problems, WJ Calculation, etc. ● Researcher developed measure = any measure that is researcher developed and not norm-referenced ● Unclear = this code is reserved for studies that use a measure that may be unclear because it's not a well-known norm-referenced measure (e.g., foreign studies) or you can't find any information about the measure ● Other
Criterion Measure Time of Year	Anecdotal	Report the specific time of administration time of the criterion measure (include benchmark window such as fall, winter, spring, and/or specific months).

Criterion Measure Grade	Number	Report the specific grade level of the criterion measure administration that you are providing correlations or slope for.
Does the study specifically report the number of weeks of months between the CBM and criterion measure?	Select one: 0 = no 1 = yes	Some studies will report the exact/approximate number of weeks or months between the administration of a CBM and Criterion measure for the correlation that is reported.
Weeks, Months between CBM and Criterion used for the Correlation	Number and Unit	Specify the number (14) and unit (weeks).
Correlation	Decimal	Record the given correlation between the CBM and criterion measure. Include as many decimal places as given in the manuscript.