11-19-2021

Early Math Interventions in Informal Learning Settings Coding Protocol

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Publication Information

Nelson, Gena; Carter, Hannah; and Boedeker, Peter. (2021). "Early Math Interventions in Informal Learning Settings Coding Protocol". *Early and Special Education Faculty Publications and Presentations*, 141.
https://doi.org/10.18122/sped141.boisestate

This material is based upon work supported by the National Science Foundation under Grant DUE- 2000292.

Early Math Interventions in Informal Learning Settings Coding Protocol

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Abstract

The purpose of document is to provide readers with the coding protocol that authors used to code experimental and quasi-experimental early mathematics intervention studies conducted in informal learning environments. The studies were conducted in homes and in museums with caregivers as intervention agents and included children between the ages of 3,0 and 8,11 years. The coding protocol includes more than 200 variables related to basic study information, participant sample size and demographics, methodological information, intervention information, mathematics content information, the control/comparison condition, outcome measures, and results and effect sizes. The coding protocol was developed for the purpose of conducting a meta-analysis; results of the meta-analysis is pending. The data set associated with this coding protocol will be available to the public at the conclusion of the grant (early 2024).

Keywords: early math, intervention, home learning environment, home mathematics environment, meta-analysis, coding protocol

Funding Statement: This material is based upon work supported by the National Science Foundation under Grant DUE- 2000292.

This coding protocol includes variables in the following categories:

Coding Protocol: Basic Study Information

Variable Name	Code Options	Code Descriptions
Study Identifier	Number	This number will be provided for all studies.
Authors	Names	All authors' last names, separated by commas
Year	Year	Year of publication
Journal	Journal name, Dissertation, or Other	Record the journal name. ● If the item is a dissertation, record "Dissertation." ● If the item is not a journal article or dissertation, record "Other."
Publication Type	Select **one**: 0 = unknown 1 = journal article 2 = dissertation, thesis 3 = book chapter 4 = conference presentation 5 = pre-print	Codes defined as: ● unknown = use this code if you are unable to determine what type of publication the article is ● peer reviewed journal = any study from a research journal; this will be the majority of articles ● dissertation, thesis = any study that is titled dissertation or thesis; will have a university noted that the student is from

	6 = report 7 = other	● book chapter = any study that is one part of a larger book of studies; there will be no issue number ● conference presentation = poster presentations or summaries of conference presentations or proceedings; a date and location will likely be included ● pre-print = we obtained a word document from an author of an article that has not yet been published; note: the list of study identifiers will alert you to a pre-print ● report = technical reports, reports from state departments or the U.S. Department of Education, research briefs, executive summaries ● other = use this for any other publication type that surfaces
Location Code	Select **one**: 0 = not reported 1 = US 2 = non-US	● Not reported = the authors did not report where the study took place ○ If no location is provided, refer to the location of publication (such as the institution affiliation of the authors). ▪ If it's US, note this in the anecdotal code, and continue to use US demographics. ▪ If it's foreign, note this in the anecdotal code, and we use non-US. ○ If multiple locations are represented and nothing is reported, refer to the location from which the IRB was granted. ● U.S. = The data for the study were collected in the U.S., including territories. ○ NOTE: If no explicit location (e.g., Boise, ID) is reported, but the following are mentioned, use “US” for this code and explain in the anecdotal code below. ▪ Head Start ▪ Southwest (or anything similar such as “midsize town in the northeast”) ● Non-U.S. = The data in the study were collected in a country other than the U.S.

Location	Name or NR	● Not reported = If the authors did report where the study took place (i.e., you put NR for the previous code), put NR here as well. ● Anecdotally report the location of the study **with the most description you can find** (e.g., U.S., Midwest section of the U.S., a southern state in the U.S., France, Europe, Chile, etc.) ○ If the study reports, "Boise, ID" as the location, include "Boise, ID" (not just Idaho).

Participant Sample Size and Demographics: Basic Information Provided at the Study Level

Variable Name	Code Options	Code Descriptions
Child Attrition Reported	Select **one**: 0 = no 1 = yes	● No = attrition (loss of participants from pretest to posttest or over the course of the duration of the study) information was not reported ● Yes = attrition (loss of participants) was reported either as a percentage (e.g., "attrition from pre to posttest was 15%") or as raw data (e.g., at pretest there were 100 participants and at posttest there were 89 participants") Note. This refers only to loss of participants, or participants who dropped out of the study. This does not refer to participants with "missing data."
Total Child Attrition	Anecdotal or NR	Include a note about the level of attrition (e.g., 15% of the total sample was missing at post-test), or NR for studies that do not report attrition or do not report total attrition. In addition, knowing if attrition is unclearly presented in the method or results will be helpful. ● Use this column if attrition is reported for a study in which there is only a treatment group.

Attrition According to Group	Anecdotal or NR	Include a note about the different levels of attrition per group (e.g., 12% of the control group and 15% of the treatment group). In addition, explain if attrition is unclearly presented in the method or results. ● Use NR if no attrition is reported ● Use NR if there is only a treatment group (see above)
Child Sample Size (pre-attrition)	Number or NR	Record the total number of children who participated in the study before attrition and missing data were considered (i.e., at the beginning of the study, how many children were included in the analyses?) This sample size includes all children in the treatment and control group(s). ● If no attrition is reported, use this column for the sample size. ● If only the post-attrition sample size is reported, use NR. ● If only one sample size is reported, and it is unclear if the sample size reported refers to a pre- or post-attrition number, then use this column to report sample size. ● If only one sample size is provided, but it's clearly (based on a sound inference from the text) the pre-attrition sample size, use this column. ● If multiple sample sizes are mentioned, provide the sample size that was the focus on analysis. For example, if 500 children participated, but the researchers chose to use on 250 for analysis, report 250 (not 500). In this case, 250 children did not leave the study; instead, the researchers just didn't focus on analyzing/reporting their data.
Child Sample Size (post-attrition)	Number or NR	Record the total number of children who participated in the study after attrition and missing data were considered (i.e., at the end of the study, how many children were included in the analyses?) This sample size includes all children in the treatment and control group(s). ● If no attrition is reported, use the "pre-attrition" column for the sample size. ● If only the pre-attrition sample size is reported, use NR.

		● If only one sample size is provided, but it's clearly (based on a sound inference from the text) the post-attrition sample size, use this column.
Child Age or Grade Reported	Select **one**: 0 = no 1 = yes	● No = no information about the age or grade of children in the study was reported ● Yes = at least some information (mean, range, grade ranges) was reported
Child Average Age	Number in years or NR	Report the average age as a numeral (e.g., 4.5 for 4.5 years); use NR for average age Not Reported. Use two decimal places. ● This refers to the full sample only; if average age is reported as separate values for different groups (report in next section), use NR.
Child Age Range Minimum	Number in years or NR	If the range in child years is given in months or years (convert to years), use this column to report the minimum value.
Child Age Range	Number in years or NR	If the range in child years is given in months or years (convert to years), use this column to report the minimum value.
Child Grade Reported	Select **one**: 0 = no 1 = yes	● No = the grade level of child participants was not reported ● Yes = grade of child participants was reported in some format
Child Grade Levels	Record **all that apply**: 0 = Not applicable 1 = First Grade 2 = Second Grade 3 = Third Grade 4 = Fourth Grade and Up	Record the grade levels represented by child participants in this study; use numerical order: ● Not applicable = Grade level was not reported; If some participants are not enrolled in school (i.e., a grade level isn't reported because they aren't in school), use "0" for not applicable. ● First Grade = This applies to any child listed as being in first grade

	5 = PreK/Preschool 6 = Kindergarten	● Second Grade = This applies to any child listed as being in second grade ● Third Grade = This applies to any child listed as being in third grade ● Fourth Grade and Up = This applies to any child in the study that was in fourth grade or any grade above fourth grade ● Preschool, PreK = this applies to Head Start, preschools, prekindergarten, and other preschool options reported as grades; Preschool here doesn't imply the place, it refers to the corresponding grade a child is in. ● Kindergarten = This applies to any child listed as being in kindergarten; this applies to foreign studies that may indicate a child was in their second year of preschool Note: If the study is longitudinal and the same students are followed for more than one grade level (e.g., 1st to 2nd grade) then you should highlight the grade cells in **blue** to alert us that this is longitudinal and not separate groups of students.
Child GenderReported	Select **one**: 0 = no 1 = yes	● No = no information related to child gender was reported ● Yes = at least some information (raw data or %) related to child gender was reported, either at the study (total) or group level (treatment, control)
Child Dual Language Learner (DLL) Status Reported	Select **one**: 0 = no 1 = yes	Note. This may be referred to as dual language learner (DLL), English Learner (EL), English Language Learner (ELL), Multilingual Learner (ML), English as a Second Language (ESL), non-native speaker, Limited English Proficiency (LEP) or other related terms (terms may be different for non-US studies). ● No = no information related to child DLL status was reported ● Yes = at least some information related to child DLL status was reported, either at the study (total) or group level (treatment,

		control); this includes qualitative or descriptive information (e.g., all children were native speakers of the local dialect) Note: DLL status typically refers to how another person or organization (e.g., school) identifies or describes the learning needs of a child.
Languages Spoken in the Home	Select **one**: 0 = no 1 = yes	Note. This is different than the code of DLL because we are interested in capturing information related to the languages spoken in the child's home; whereas DLL status is usually how someone outside of the home (e.g., teacher, researcher) perceives the child, not how the family perceives their home practices. *Please also note that ASL is a language that Deaf children or children with Deaf parents may use in the home.* ● No = no information related to languages spoken in the home was provided ● Yes = at least some information related to languages spoken in the home was provided Note: If the parents report language, include that here (not in DLL).
Child with or at-risk of a Disability Reported	Select **one**: 0 = not reported 1 = no children with disabilities or at-risk 2 = yes, children with **disabilities** are included 3 = yes, children with **risk** for disabilities are included 4 = yes, **both** children with and at-risk for disabilities are included	Note. This includes all IDEA categories for disability – however, IDEA is US legislation, and these terms may be slightly different for non-US studies (so, you should consider any term that refers to disability). ● This code refers to with a disability (including but not limited to): specific learning disability including a reading disability (dyslexia), math disability (dyscalculia) or a writing disability (dysgraphia), autism spectrum disorders (ASD), developmental delay, cognitive or intellectual disability, speech language impairment, emotional behavior disability or disorder, blindness or visual impairment, Deaf or hard of hearing, Deaf-blindness, ADHD, Other health impairment (OHI; may be used to refer to epilepsy, cerebral palsy), orthopedic impairment, multiple disabilities, traumatic brain injury (TBI).

		● In addition, please keep in mind that some children with disabilities may receive services under Section 504, not IDEA (so their disability may not be described as a federal category). ● Students with disabilities may also be identified as students "receiving special education services" or as having an IEP or 504 plan. ● **A 504 plan and an IEP would represent a disability, not risk.** ● Being at-risk for these disabilities, authors will report information such as "children were at-risk for learning disabilities" or "children were at risk" or "children were at risk for disability" as many of these disabilities do not have a true "risk" but rather scores on a screening measure may simply indicate "low achievement." Also note that "risk for low SES is not considered risk for disability." ● Also note that older studies may use terms that are outdated, and non-US studies may use other terms. For example, "mild mental handicap" or "mental retardation" may appear in the literature. This is a disability. ● Not reported = no information related to child disability or risk status was reported ● No = information about disability was reported but authors stated that no children with disabilities were included in the sample ● Yes = the authors provided at least some information about the **disability** of child participants (e.g., sample size of children with developmental delay, statement that "children with disabilities were included.") ● Yes = the authors provided at least some information about the **risk** status of child participants (e.g., statement that "children at-risk for disabilities were included.") ● Yes, the authors provided at least some information about the **disability and risk** status of child participants.

Child Disability or Risk Information	Copy/Paste or NA	Use NA for studies that received a code of "no, information related to child disability or risk status was reported." Copy and paste the specific information related to the type of disability or risk children in the study had as well as sample sizes; and copy and paste information related to a study reporting that children with disabilities were excluded from the study.
Child Race Reported	Select **one**: 0 = no 1 = yes	● No = no information related to child race/ethnicity was reported ● Yes = at least some information (raw data or %) related to child race/ethnicity was reported, either at the study (total) or group level (treatment, control) This specifically refers to if any information related to the **child's** race/ethnicity is reported.
Family SES Reported	Select **one**: 0 = no 1 = yes	Note. This may be referred to as poverty levels, socioeconomic (SES) information, free/reduced price lunch, etc. Non-US studies may also use a composite to calculate SES such as income and mother's level of education, etc. In the Excel file, the column is named "Child SES" which we will leave and just know we are referring to "Family SES" instead. ● No = no information related to family SES was reported ● Yes = at least some information related to family SES was reported, either at the study (total) or group level (treatment, control); this includes qualitative or descriptive information.
Caregiver Sample Size	Number or NR	Record the total number of caregivers/parents (primary caregivers; in some cultures, this may be the mother, father, aunt/uncle, or grandparent) **who participated in the study** after attrition and missing data were taken into account (i.e., at the end of the study, how many parents were included in the analyses?) ● If the total sample size for caregivers is not provided, use NR.

Parent/Primary Caregiver Age	Anecdotal or NR	Provide any information the study reports related to the age of the primary caregiver. This might be an average age or a range. It might be presented for the entire sample or different groups. Provide all information given (e.g., you might provide total sample and group sample information, or just total sample, depending on how authors report information). ● If information about the age for caregivers is not provided, use NR.
Information about the Highest Level of Education	Anecdotal or NR	Provide all relevant information the study reports related to the highest level of education for the primary caregiver(s). Oftentimes, this is presented for mothers only. It might be presented for the entire sample or different groups. This does not only include the highest level for the full sample, but the breakdown of education attained for the full sample (e.g., 50% had a bachelor's degree; 20 percent have high school). ● In the Excel file, the column is named "Highest Level of Education" which we will leave and just know we are referring to all relevant information. ● If information about the highest level of education for caregivers is not provided, use NR.

Child Demographics: Group Level

Variable Name	Code Options	Code Descriptions
Authors	Names	All authors' last names, separated by commas
Year	Year	Year of publication
Group	Name	Include the name of the group using the following format (each group gets its own row in Excel):

		● If there is (a) one treatment group only or (b) one treatment group and one control group, only use TRT and CTRL ● If there is more than one treatment group or control group, use a descriptive naming convention such as: ○ TRT Board Games; TRT Letter Game ○ CTRL BAU; CTRL Active Reading Group ● If a study only provides information for the full sample, use FULL SAMPLE ○ If the study has only a TRT group, use "TRT, FULL SAMPLE" ● If a study provides information at the group level (treatment, control) and at the full sample level, include only the group level numbers (do not include FULL SAMPLE) unless there is a data point provided for FULL SAMPLE that was not already provided in TRT/CTRL. In other words, don't provide duplicate information. ○ If you have a FULL SAMPLE row for unique data (not provided in TRT/CTRL), avoid duplicating info provided by the author by coding NC for not coded. This will avoid duplicating info but will also let us know the info was provided by authors, which is why we don't want to code NR. **NOTE:** If the study requires a row for more than one group (e.g., TRT, CTRL, and full sample), code TRT first, CTRL next, and FULL last (e.g., TRT in row 1, CTRL in row 2).
Child Average Age	Number in years or NR	Report the average age as a numeral (e.g., 4.5 for 4.5 years); use NR for average age Not Reported. Use two decimal places. ● If average age is reported as separate values for different groups use NR.
Child Age Range Minimum	Number in years or NR	If the range in child years is given in months or years (convert to years), use this column to report the minimum value.

		● If average age is reported as separate values for different groups use NR.
Child Age Range	Number in years or NR	If the range in child years is given in months or years (convert to years), use this column to report the minimum value. Report the range of ages included (4.0 – 6.5); use NR for average age Not Reported. ● If average age is reported as separate values for different groups use NR.
N of Females	Number or NR	● Provide the raw number of child female participants (use numerals) ● Use NR when this information is not reported; including if only the number of males is provided.
N of Males	Number or NR	● Provide the raw number of child male participants (use numerals) ● Use or NR when this information is not reported; including if only the number of females is provided. use numerals.
Female %	Percent or NR	● Provide the percent of child female participants; use ***decimals*** but do not use a % sign (e.g., 89% = 0.89; 42.3% = 0.423). Convert whole numbers to full decimals. ● Use NR when this information is not reported; including when only the percent of males is given.
Male %	Percent or NR	● Provide the percent of child male participants; use ***decimals*** but do not use a % sign (e.g., 89% = 0.89; 42.3% = 0.423). Convert whole numbers to full decimals. ● Use NR when this information is not reported; including when only the percent of females is given.
Languages Spoken in the Home	Anecdotal or NR	Provide any information for the total child sample regarding languages spoken in the home. This information should be copy/paste from the article, coders adding any detail where necessary. Examples include:

		● 100% of children were English speakers but 20% of children also spoke Spanish in the home. ● Languages spoken in the home included: English, Spanish, Mandarin, and Arabic. ● Languages spoken in the home included: English (60%), Spanish (20%), Mandarin (13%), and Arabic (7%). ● Use NR if this information is not reported.
Child *N* with or at-risk for Disability	Number or NR	● Provide the raw number of child participants who were identified as having or being at risk for a disability. ● Note: Risk may refer to at-risk for a disability or at-risk for academic failure. It may also be referred to as "low achievement" "struggling learner" or "learning difficulty." ● Use NR if this information is not reported.
Child % with or at-risk for Disability	Percent or NR	● Provide the percent of child participants who were identified as having or being at risk for a disability. ● Note: Risk may refer to at-risk for a disability or at-risk for academic failure. It may also be referred to as "low achievement" "struggling learner" or "learning difficulty."
Disability or Risk Type	Anecdotal or NR	Provide a qualitative and quantitative summary of the disability and risk, including category labels and raw samples sizes or percentages. Make a note when authors do not provide sample sizes. Examples include: ● Of the 100 children in the study, 10 had an identified disability (no information on disability type was provided). ● In total, 30 children had disabilities including: developmental delay (80%), autism (15%), speech language impairment (5%). ● Of the 100 children in the study, approximately 25% had or were at-risk for disabilities including: autism, intellectual disability, visual impairment, and other health impairment (sample sizes for each type were not provided).

		● Note: Risk may refer to at-risk for a disability or at-risk for academic failure. It may also be referred to as "low achievement" "struggling learner" or "learning difficulty." ● Use NR if this information is not reported.
U.S. Studies: Race and/or Ethnicity		
Child *N* Caucasian or White	Number, NR, or NUS	● Provide the raw number of children identified as White or Caucasian
Child *N* African American/Black	Number, NR, or NUS	● Provide the raw number of children identified as African American or Black
Child *N* Asian American, Native Hawaiian or Pacific Islander	Number, NR, or NUS	● Provide the raw number of children identified as Asian American, Native Hawaiian or Pacific Islander ● Note, if Asian American and PI, or Native Hawaiian, are provided as two different percentages, then this is a case where you would need to ADD those numbers to list them here. Make a note in the final column for race/ethnicity if you perform this calculation.
Child *N* Hispanic	Number, NR, or NUS	● Provide the raw number of children identified as Hispanic ● Note: It is okay if the numbers do not add up due to differences in how authors may present Hispanic/Latinx information.
Child *N* Native American/ American Indian	Number, NR, or NUS	● Provide the raw number of children identified as American or American Indian
Child *N* Multi-racial or more than two races	Number, NR, or NUS	● Provide the raw number of children identified as multi-racial or more than two races
Child *N* Other	Number, NR, or NUS	● Provide the raw number of children identified as Other

Child N Not Reported	Number, NR, or NUS	Note. This column is specifically for race/ethnicity in which the authors specify that it was Not Reported; this does not apply to information that may be missing from a study (such as you can't figure out where a remaining 5% of the sample fits in if the numbers do not add to 100%) ● Provide the raw number
% Caucasian or White	Percent, NR, or NUS	● Provide the percent of children identified as White or Caucasian; use ***decimals*** but do not use a % sign (e.g., 89% = 0.89; 42.3% = 0.423). Convert whole numbers to full decimals.
% African American/Black	Percent, NR, or NUS	● Provide the percent of children identified as African American or Black; use ***decimals*** but do not use a % sign (e.g., 89% = 0.89; 42.3% = 0.423). Convert whole numbers to full decimals.
% Asian American, Native Hawaiian or Pacific Islander	Percent, NR, or NUS	● Provide the percent of children identified as Asian American, Native Hawaiian or Pacific Islander; use ***decimals*** but do not use a % sign (e.g., 89% = 0.89; 42.3% = 0.423). Convert whole numbers to full decimals. ● Note, if Asian American and PI, or Native Hawaiian, are provided as two different percentages, then this is a case where you would need to ADD those numbers to list them here. Make a note in the final column for race/ethnicity if you perform this calculation.
% Hispanic	Percent, NR, or NUS	● Provide the percent of children identified as Hispanic; use ***decimals*** but do not use a % sign (e.g., 89% = 0.89; 42.3% = 0.423). Convert whole numbers to full decimals. ● Note: It is okay if the percent does not add up due to differences in how authors may present Hispanic/Latinx information.
% Native American/ American Indian	Percent, NR, or NUS	● Provide the percent of children identified as American or American Indian; use ***decimals*** but do not use a % sign (e.g., 89% = 0.89; 42.3% = 0.423). Convert whole numbers to full decimals.

% Multi-racial or more than two races	Percent, NR, or NUS	● Provide the percent of children identified as multi-racial or more than two races; use ***decimals*** but do not use a % sign (e.g., 89% = 0.89); 42.3% = 0.423). Convert whole numbers to full decimals.
% Other	Percent, NR, or NUS	● Provide the percent of children identified as Other; use ***decimals*** but do not use a % sign (e.g., 89% = 0.89; 42.3% = 0.423). Convert whole numbers to full decimals.
% Not Reported	Percent, NR, or NUS	Note. This column is specifically for race/ethnicity in which the authors specify that it was Not Reported; this does not apply to information that may be missing from a study (such as you can't figure out where a remaining 5% of the sample fits in if the numbers do not add to 100%) ● use ***decimals*** but do not use a % sign (e.g., 89% = 0.89; 42.3% = 0.423). Convert whole numbers to full decimals.
U.S. Studies Race Notes	Anecdotal, NR, or NUS	● Provide any information to race/ethnicity for US studies that did not fit in the categories above, or any other helpful notes. ● If information is presented about children being immigrants, please note that here, including undocumented parents or children. ● There is no need to put the information here if it is already represented in the other columns.
U.S. Studies: Socioeconomic Status		
N of FRL	Number, NR, or NUS	● Provide the raw number of child participants who qualified for FRL
N of CCS	Number, NR, or NUS	● Provide the raw number of child participants who qualified for CCS
N of Head Start	Number, NR, or NUS	● Provide the raw number of child participants who qualified for or participated in Head Start ● This refers to all students in Head Start, regardless of their poverty level

		● If the study states that "all participants" quality, provide the total sample size here
N of < Poverty Line	Number, NR, or NUS	● Provide the raw number of child participants who qualified as being below the poverty line ● Note that Head Start does not equal below the poverty line, include only information that specifies the exact number of families below the poverty line
% Of FRL	Percent, NR, or NUS	● Provide the percent of child participants who qualified for FRL
% Of CCS	Percent, NR, or NUS	● Provide the percent of child participants who qualified for CCS
% Of Head Start	Percent, NR, or NUS	● Provide the percent of child participants who qualified for or participated in Head Start ● This refers to all students in Head Start, regardless of their poverty level ● If the study states that "all participants" quality, put a "1" here to indicate 100%
% of < Poverty Line	Percent, NR, or NUS	● Provide the percent of child participants who qualified as being below the poverty line ● Note that Head Start does not equal below the poverty line, include only information that specifies the exact number of families below the poverty line
U.S. Studies SES Other	Anecdotal or NR	● If U.S. studies provide another format for describing the SES of participants, include that information and raw data or percentages here. ● If studies mention collecting this information or using it in an analysis, but do not report specific details about SES, make a note here.

		● Use NR if no other information about SES is provided.
U.S. Studies: Dual Language Learner Status ● For any non-U.S. study, use the code NUS and move to the next section.		
Child *N* DLL	Number, NR, or NUS	● Provide the raw number of child participants who were identified as a dual-language learner (includes all types of categorizations - e.g., DLL, EL, etc.)
Child % DLL	Percent, NR, or NUS	● Provide the percent of child participants who were identified as a dual-language learner (includes all types of categorizations)
Non-U.S. Studies:		
Race/Ethnicity International Studies	Notes and sample sizes, or NR, or US.	Please use this column to make anecdotal notes about race/ethnicity if the study was a non-U.S. study. Provide all details that you can synthesis from text or tables. For example: ● "All students (n = 39) in the study were Chinese." ● "Students in the study were all born in Germany." ● "Most of the students in the study (95%) were born in Canada and (5%) were refugees from Somalia."
Non-U.S. Studies SES Information	Anecdotal, or NR, or US.	For the Non-U.S. studies summarize the information that authors provide about SES in text or in the tables. Examples might include: ● "In our sample the highest prestige score in a household was on average M = 98.6 (SD = 34.4)." ● "All of the included children were from middle to high income families."
Non-U.S. studies dual language learners	Anecdotal, or NR, or US.	For the Non-U.S. studies summarize the information that authors provide about non-native speakers of the local or country official language, as it is provided in text or in the tables. This may also be referred to as a multilingual home in non-U.S. studies. Examples might include:

		● "In our sample, approximately 10% of children were non-native German speakers. ● 16 children were non-native Chinese speakers, other languages included English and French.

Coding Protocol: Methodological Information

Variable Name	Code Options	Code Descriptions
Study Identifier	Number	This number will be provided for all studies.
Authors	Names	All authors' last names, separated by commas
Year	Year	Year of publication
Study Design	Select **one**: 0 = Not reported 1 = Pre-test and post-test 2 = Pre/post-test and delayed post-test 3 = Post-test only 4 = Post-test only with a delayed post-test 5 = Delayed post-test only 6 = Cross-over design 7 = Other	NOTE: Remember that not all studies we are coding met our inclusion criteria (i.e., those studies we are coding for quality only). Thus, you may have studies with no pre/post, for which you should code as "7" here. Codes defined as: ● Not reported = The authors did not provide this information. ● Pre-test and post-test = Researchers gave both a pre- and post-test to measure the effect of the intervention. ● Pre-/post-test and delayed post-test(s) = Researchers gave a pre-, post-, and delayed post-test (sometimes referred to as a follow-up test or maintenance test) to measure the effect of the intervention. ● Post-test only = Researchers gave only a post-test to measure the effect of the treatment. ● Post-test only with a delayed post-test = Researchers gave only a post-test to measure the effect of the treatment, followed by a delayed post-test. ● Delayed post-test only = Researchers only provided information about a follow-up test. For example, the study may be a second study from the original intervention. ● Cross-over = Researchers used a cross-over design; usually this means there is a pre-test, followed by a mid-point assessment,

		and then at that time, the intervention groups switch, followed by a post-test. Sometimes this is referred to as T1, T2, and T3. ● Other = Authors used another design type not listed here as an option (e.g., observational studies)
Group Types	Select **one**: 0 = Not reported 1 = Treatment group only 2 = 1 treatment group and 1 control group 3 = 2 or more treatment groups and 1 or more control groups 4 = other 5 = unclear	Codes defined as: ● Not reported = the study did not report the number of treatment or control groups ● Treatment group only = the study included only one group, and all participants in the group received the treatment/intervention ● 1 treatment group and 1 control group = the study included only 1 group that received the treatment/intervention and only 1 group that did not receive the math intervention that was the focus of the study (non-intervention/control group) ● 2 or more treatment groups and 1 or more control groups = the study included multiple treatment groups (groups who received different treatments/interventions), and either one or more control groups (non-intervention/control group) ● Other = the study included one treatment group and multiple control groups or some other combination of groups ● Unclear = it was unclear from the description which groups were intervention groups or control groups and the number of associated conditions.
Group Types Information	Anecdotal	In this cell, copy/paste a sentence or phrase from the study that describes the number and type of treatment and control groups. This information may be presented most succinctly in the abstract. Be sure to check the method section if needed. Include all information about the group types provided by the author (i.e., even if they are school based). For example: ● 1 treatment group about board games, 1 treatment group about color games, and 1 control ● 1 group where all participants received the treatment

		Note: If you chose 4 (other) or 5 (unclear) for the previous code, ensure that your notes make it clear why these codes were chosen.
Assignment to condition or group	Select **<u>one</u>:** (assignment, level): 0 = Not reported 1 = Not applicable, treatment group only 2 = Random 3 = Nonrandom 4 = Matching 5 = Regression discontinuity 6 = Other	Select the code that represents how groups were assigned to treatment and control conditions. This should be explicitly stated by the author, not implied. ● Not reported = The authors did not provide this information ● Not applicable, treatment group only = Use this code when the study includes only a treatment/intervention group and no control group ● Random: Researchers used random assignment, sometimes referred to as RCT, randomized control trial. Random assignment would occur before anyone receives the intervention; a procedure for random assignment could be placing individuals into the treatment or control group based on the result of a coin flip. ● Nonrandom = Researchers stated they used nonrandom assignment. Nonrandom assignment can include if students, parents, teachers, or administrators selected students into a group. ● Matching = Researchers used matched participants (this is not the same as a parent-child dyad) ● Regression discontinuity = Researchers used regression discontinuity; this will be specified as such ● Other = authors used another assignment procedure not listed here as an option
Treatment Fidelity Method	Select **<u>all that apply</u>**: 0 = no 1 = adherence to intervention procedures	This code refers to if the intervention was monitored for implementation fidelity (i.e., did the interventionist implement the intervention as intended). When evaluating each study, this code looks at the method(s) used to measure fidelity, *not the fidelity results.* **Include all fidelity measures, whether related to the informal math intervention or not.** **NOTES:**

	2 = adherence to dosage recommendations 3 = quality	● Remember to differentiate between what recommendations were provided for implementing the intervention and then the data researchers collected to determine if the intervention was implemented as intended or not. The latter is treatment fidelity. ● Treatment fidelity data would not be collected before the intervention (i.e., parent training does not equal fidelity); it would be collected during/after the intervention. ● Collection of parent measures (e.g., surveys) does not automatically mean that treatment fidelity data was collected. Be sure to review the purpose of the survey, for example, to determine if it was to measure if the intervention was implemented as intended. ● There are a few ways that studies may report treatment fidelity, and researchers may report one, more than one, or none. ● Researchers may explicitly refer to treatment/implementation/intervention fidelity, or they may just describe the methods/methods used for monitoring fidelity. ● Even if results are not provided for the treatment fidelity methods/measures, still document the type of fidelity measured here. **CODE DESCRIPTIONS:** ● No = no mention of treatment fidelity methods to monitor implementation. ● Adherence to intervention procedures = information that demonstrates that the intervention procedures were followed; can be measured by yes/no - yes, they did XYS or no they did not (may be the parent marking items that document child participation) ○ e.g., a checklist of things a parent is supposed to do while reading a book to a child

		● Exposures/duration/dosage = information that demonstrates that the intervention was implemented for the specific length of time that was recommended ○ e.g., number of sessions, minutes per session, times per day/week, etc. were documented. ● Quality of delivery = information that captures the quality of the instruction provided by the interventionist (so this goes above and beyond procedures, but instead, was information captured that shows the quality of interactions between intervention agent and the children during the intervention) ○ e.g., observation of a parent using high quality discussion techniques/questions as they play the game with the child, parent reported child engagement, or observation of parent using children's response to an activity to identify appropriate next steps in the activity
Treatment Fidelity Method/Measure Notes	Anecdotal or NR	Provide a sentence or two regarding how treatment fidelity was monitored/measured. Include information about who was responsible for checking or reporting fidelity of implementation. Based on the type of fidelity documented in the previous code, be sure to report on the methods for each (if reported in the article). Also make it clear if the method is for school/teacher or caregiver/informal setting (e.g., teacher checklist, parent time logs, etc.) Report only the method/measure here, not the results, and separate the methods based on the type of fidelity (e.g., Procedures: XYZ; Dosage: XYZ; Quality: XYZ). Examples: ● Use NR when treatment fidelity information is not provided ● Dosage: Parents were asked to record the number of times per week they played a game and to turn in the logs at the end of the intervention.

		● Dosage: Children were asked to report to the researcher how many times they played the game at home. ● Procedure: A coach from the study did a home visit and monitored a play session between parents and children, checking for procedural fidelity with the intervention using a checklist.
Treatment Fidelity Results	Select **all that apply**: 0 = no 1 = adherence to intervention procedures 2 = adherence to dosage recommendations 3 = quality	For those studies that measure fidelity (as documented in the "Treatment Fidelity Method" code above), this code refers to if results were provided for the measures. Consider every measure listed above to determine if each has reported results or not. **CODE DESCRIPTIONS:** ● No = no mention of treatment fidelity **results**. ● Adherence to intervention procedures = **results** of the procedures measures are provided. ○ e.g., data from a checklist of things a parent is supposed to do while reading a book to a child ● Exposures/duration/dosage = **results** of the dosage measures are provided. ○ e.g., number of sessions, minutes per session, times per day/week, etc. are described/listed/explained. ● Quality of delivery = **results** of the quality measures are provided. ○ e.g., data from observations of a parent using high quality discussion techniques/questions as they play the game with the child is explained
Treatment Fidelity Results Notes	Anecdotal or NR	Provide a sentence or two regarding the level of treatment fidelity (i.e., the results). Based on the method for the type of fidelity documented in the previous codes, be sure to report on the results for each (if they are reported in the article). Also make it clear if the results are for school/teacher or caregiver/informal setting (e.g., teacher checklist, parent time logs, etc.)

		Examples: ● Parents reported that they implemented the intervention 89% of the time as suggested. ● A coach who visited the home noted that 75% of the procedures were implemented as prescribed. ● Use NR when treatment fidelity information is not provided.
Nature of Instruction in Treatment was Recorded	Select **one:** 0 = no 1 = yes, but not reported in study for an informal component 2 = yes, reported in study for an informal component 3=yes, reported in the study for a formal component	This code refers to whether the researchers collected audio or visual data to record the nature of instruction in the treatment/intervention group. If transcripts are mentioned, that indicates audio/video was recorded. This data can be collected anytime that parents provide instruction (i.e., during the intervention or after the intervention if the interventionist is required to provide instruction). ● No = the study did not report collecting any audio or visual data regarding the nature of the intervention ● Yes, not reported = the authors collected audio and/or visual data of the implementation of the intervention BUT the authors did not report any excerpts from these sources in the study ● Yes, reported = the authors collected audio and/or visual data of the implementation of the intervention AND the authors reported at least one excerpt from these sources in the study ● Yes, reported in the study for a formal component = the authors collected audio and/or visual data of the implementation of an intervention, but in a formal setting (e.g., school)
Data Collectors and Data Scorers Awareness of Conditions	Select **one**: 0 = not reported 1 = blinded 2 = unblinded	This code refers to whether data collectors (e.g., research assistants who administered the outcome measures) and/or scorers (e.g., research assistants who were responsible for scoring measures) were unaware of (blind to) either the purpose of the study, the group assignment of the participants, or both. ● Not reported = The authors did not report whether data collectors were unaware/blind to the study conditions

		● Blinded = The authors reported that data collectors were unaware/blind to the study conditions ○ Note: If independent coders are brought in, they are likely blinded. If the coder is unaware of the hypothesis, they are likely blinded. ● Unblinded = The authors reported that data collectors were aware and not blinded to the study conditions ○ Note: If a researcher is the data collector, we don't assume they were unblinded if it is not stated.
Data Collectors/Data Scorers Awareness Notes	NR or Anecdotal	Provide a sentence or two regarding any information you found about the data collectors/scores' awareness of the purpose or the group assignment of the participants. ● If your last code (awareness of conditions) was "0" (not reported), your code here should be NR for not reported. ● If your last code was "1" (blinded) or "2" (unblinded), your code here should be an anecdotal note explaining how you knew to choose blinded or unblinded.
Interrater Agreement	Select **one:** 0 = not reported 1 = no, was reported as not completed 2 = yes, reported for at least 1 child measure 3 = yes, reported for all child measures 4 = yes, reported for at least one measure (not child)	This code refers to whether authors reported double-scoring or requiring that two individual data collectors scored or inputted outcome data into a database to improve the reliability of the scoring or data input was reliable. This refers to the scoring and data entry procedures. This refers to any percentage of data that were double-scored or entered. This does not refer to the individual outcome measure reliability. ● Not reported = the study did not mention double scoring outcome data or double entering any percentage of the outcome data. ● No, not completed = the authors specifically state that outcome data were not double-scored or entered. ● Yes, reported for ***at least 1 outcome measure but not all measures*** = the authors reported that at least one of the outcome data sources (e.g., 30% of the math achievement data, but did not

		provide data regarding the double-scoring of the home numeracy environment scale) were double-scored or double entered. ○ To receive this code, the authors do not have to specify the percent of data from the outcome measure that were double scored. ○ An example would be a study that had transcripts and pre- and post-tests, and the transcripts were double-coding but the pre- and post-tests were not double-scored. ● Yes, ***reported for all measures*** = the authors specified that at least some percentage of all outcome measure data were double-scored or double-entered (e.g., 30% of all outcome data were double scored for reliability). ○ To receive this code, the authors do not have to specify the percent of data from the outcome measure that were double scored. ● Yes, reported for at least one measure **(not child) =** The authors reported that at least one measure they collected (not a child measure) was double-scored or double entered. ○ To receive this code, the authors do not have to specify the percent of data that were double scored.

Coding Protocol: Intervention Information

Informal Math Child Intervention		
Variable Name	**Code Options**	**Code Descriptions**
Study Identifier	Number	This number will be provided for all studies.
Authors	Names	All authors' last names, separated by commas
Year	Year	Year of publication
Informal Math TRT Group Name	Name	Each treatment (TRT) group receives its own line in Excel. Some codes may apply broadly to all TRT groups. This information simply needs to be copy/pasted to multiple lines for studies that have more than 1 treatment group. However, where TRT groups often differ include math intervention content, intervention activities, or dosage. This information should be carefully located for each TRT group.
Informal Math Child Intervention Agent	Select **one**: 0 = not reported 1 = parent or another adult caregiver 2 = researcher 3 = after school staff 4 = library or museum staff 5 = staff at another type of community space 6 = older sibling 7 = daycare provider 8 = mix of options 9 = other	The purpose of this code is to identify who provided the supplementary instruction to the ***child participants.*** ● *Note: Even if the assessment or intervention was computer administered, there is still someone overseeing the child as they take it; this person is considered the agent.* ● not reported = the study did not report information about who provided children with supplementary math instruction ● parent or other adult caregiver = the parent or other primary caregiver (e.g., grandparent) provided children with supplementary math instruction ● researcher = a researcher (including research assistants, graduate students) provided children with supplementary math instruction ● after school staff = staff or volunteers (including older children such as high school students) provided children with supplementary math instruction ● library or museum staff provided children with supplementary math instruction

		● staff at another type of community space = staff at another type of facility (e.g., outdoor play spaces, zoos, community centers, YMCA, boys, and girls' clubs) provided children with supplementary math instruction ● older sibling = older sibling of the child in the study provided children with supplementary math instruction ● daycare = daycare provider, such as a non-relative adult who cares for a child for a fee in their home provided children with supplementary math instruction ● mix of options = more than one type of intervention agent was identified who provided children with supplementary math instruction ● other = any other option regarding who provided children with supplementary math instruction that is not included here as an option
Informal Math Child Intervention Agent Mix or Other Information	Anecdotal or NA	If you selected the options above "mix of options" or "other" you should provide a phrase that describes who the intervention agent is.
Informal Math Child Intervention Location	Select **<u>one</u>**: 0 = Not reported 1 = Child's home only 2 = After-school program 3 = Summer school program 4 = Classroom intervention with an at-home component 5 = Home-based daycare setting	This code refers to ultimately ***where the child received the extra math*** support or intervention because of the caregiver intervention. Remember that where the outcomes/measures were collected may/may not be the same places as where the intervention was conducted. 0 = Not reported or unclear 1 = Child's home only: The intervention is only conducted at the child's home. 2 = After-school program: The intervention is conducted at a school, but not during school hours. 3 = Summer school program: The intervention is conducted at a school, but not during the regular school year.

	6 = Museum 7 = Library 8 = Zoo 9 = Community center 10 = Other public space 11 = Mix of one or more options above	4 = Classroom intervention with an at-home component: The intervention is conducted at a school, but the intervention also includes some type of at-home component. 5 = Home-based daycare setting: The intervention is conducted at a daycare that is ran out of someone's home 6 = Museum 7 = Library 8 = Zoo 9 = Community center 10 = Other public space: The intervention is conducted at some public place that is not mentioned above. 11 = Mix of one or more options above: The intervention is conducted at two or more of the locations listed above. Choose this option instead of selecting two from above. If this code is chosen, explain in the next code.
Informal Math Child Intervention Location Mix or Other Information	Anecdotal or NA	If you selected the options above "mix of options" or "other" you should provide a phrase that describes where the intervention took place. ● If you did not choose these two options, use "NA" here.
Caregiver Intervention Training and Follow-Up Support		
Caregiver Intervention Initial Training	Select **<u>one</u>**: 0 = no or not reported. 1 = yes	Training refers only to the training that the caregiver receives in order to provide children with the math intervention. This may be as minimal as the researchers providing suggestions or as extensive as the researchers leading an intensive training session. Codes defined as: ● No or not reported = the study did not report information about the training OR specifically states that the caregiver did not receive any training. ○ Mark Not Applicable for the remaining initial training codes if "no or not reported" is chosen here.

		● Yes = the study specifically states that the caregiver received training.
Initial Training Duration/Time for the Caregiver Intervention	Select one: NA = not applicable 0 = no 1 = yes	Is any information provided about the duration of the training? Time of training can refer to training length, training intensity, or training session minutes/hours. This may refer, for example, to the number of sessions a parent attended about math, or the length of a training session with a researcher (e.g., 30 minutes). ● Not applicable = The study did not include caregiver training. ● No = the study included information about training the caregivers, but the information did not include any information about the duration/time of the training. ● Yes = the study included information about training the caregivers, and the study included specifics about the time/length/amount of the training.
Initial Training Duration/Time Notes for Caregiver Intervention	Anecdotal or NA	Copy/paste a sentence or a phrase that provides all relevant detail about the training duration/time for caregivers. ● This time refers to training **but does <u>NOT</u> refer to follow-up support.** ○ This may include the number of minutes, sessions, or hours of training. ○ Examples: ▪ Parents were trained in one 30-minute session. ▪ Parents received two 45-minute sessions. ● Not applicable (report NA) = The study did not include caregiver training or information related to initial training duration/time.
Was the caregiver intervention or training (initial or follow up) inclusive of **how to facilitate** the activity?	Select **one**: NA = not applicable 0 = no 1 = yes	This code refers to whether the training provided the caregiver with information about the basic procedures of the intervention. In other words, the parents were provided *information/support on how to facilitate the activit*y (e.g., told how the intervention should be implemented, provided modeling or demonstration of the activities). **For this code, consider both the initial and the follow up support/training.**

		● For example, caregivers were provided with information about recommended steps for implementation, or general procedures for how to use or play the intervention activity. ○ Another example - parents were allowed to practice facilitating the activity with the researcher present. **Code descriptions:** ● Not applicable (report NA) = The study did not have caregiver initial or follow up training. ● No = The study had initial or follow up training, but how to facilitate the activity/procedures were not included. ● Yes = The study had initial or follow up training that included information about how to facilitate the activity/procedures.
Was the caregiver intervention or training (initial or follow up) focused on specific **Math Content** related to the Intervention?	Select **one**: NA = not applicable 0 = no 1 = yes	This code refers to whether the training provided the caregiver with specific mathematics content knowledge. Based on the math content of the intervention, related content support was provided for the caregiver. **For this code, consider both the initial and the follow up support/training.** ● For example, were caregivers provided with information about what cardinality means, or developmental information about specific math skills. ○ This does not refer to a training on a math activity or strategy alone where the actual math content is not part of the training. **Code descriptions:** ● Not applicable (report NA) = The study did not have caregiver initial or follow up training. ● No = The study had initial or follow up training, but math content was not included. ● Yes = The study had initial or follow up training that included information about math content.

Was the caregiver intervention or training (initial or follow up) focused on Basic/**general Information about Supporting Children's Math Developmen**t?	Select **one**: NA = not applicable 0 = no 1 = yes	This code refers to whether the training provided the caregiver with information about best practices or strategies for supporting children's mathematics development or acquisition of knowledge and skills; this may also refer to development in general such as cognitive development or age-appropriate activities. Aside from the intervention-specific training, was more general guidance provided for supporting children's math development? **For this code, consider both the initial and the follow up support/training.** ● This is more about supporting development than focusing on content. Oftentimes, supporting development and content go together. ● For example, were caregivers provided with information (e.g., a handout or tip sheet) about how to enhance children's understanding of counting during a specific activity. How to enhance understanding (mentioned here) would be different than the procedures for implementing the actual intervention (procedure code above). **Code descriptions:** ● Not applicable (report NA) = The study did not include caregiver initial or follow up training. ● No = The study had initial or follow up training but supporting math development was not included. ● Yes = The study had initial or follow up training that included supporting math development.
Caregiver Intervention Follow-Up Support	Select **<u>one</u>**: 0 = no or not reported 1 = yes	Follow-up support refers only to support **after initial caregiver intervention or training** that a caregiver receives (e.g., a coaching session with the child, home visit, additional refresher training, text message reminders). Consider any training or support provided after the first/initial meeting/training/support. Codes defined as:

		● No or not reported = the study did not report information about follow-up training or specifically states that the caregiver did not receive any follow-up support. ○ ***Mark Not Applicable for the remaining follow-up training codes.*** ● Yes = the study specifically states that the caregiver received follow-up support.
Caregiver Intervention Follow-Up Support Time and Location Notes	Anecdotal or NA	Include a sentence or a phrase (you can copy/paste) that provides all relevant detail about the ***duration/frequency and location*** of follow-up support for caregivers. This may include the number of minutes, sessions, or hours of training as well as the location. For example: ● Parents had one home visit, lasting between 30 and 45 minutes by a researcher. ● Parents received weekly text message reminders. ● Not applicable (report NA) = The study did not include caregiver follow-up training.
Caregiver Intervention Follow-Up Support Nature of Visit Notes	Anecdotal or NA	Include a sentence or a phrase that provides all relevant detail about the ***nature or purpose*** of the follow-up support. In other words, what was the purpose or function? Was it to simply provide coaching, reminders about procedures, check for fidelity of procedures, specific demonstration of a skill that was requested by the parent? **You can copy/paste or paraphrase, but include only what the authors state, not inferences.** ● Not applicable (report NA) = The study did not include caregiver follow-up training.
Recommended Child Intervention Duration		
Recommended Child Intervention Length	Anecdotal: Include numeral and unit or NR	Provide the recommended number of total days, weeks, or months of the full child intervention. ● For example, if the study reports, “Parents were instructed to implement the intervention 3 times per week over 4 weeks” you would only record “4 weeks” as that is the length of the full intervention with a normal and unit.

Recommended Child Intervention Intensity	Anecdotal: Include numeral and unit(s) or NR	Provide the recommended number of total sessions or sessions per week, month, or another unit of the child intervention. • For example, if the study reports, "Parents were instructed to implement the intervention 3 times per week over 4 weeks" you would record "3 times per week" as that is the total number of recommended sessions in a week/month. • For example, "Parents were asked to complete 15 sessions over 2 weeks" you would record: "15 sessions as that is the recommended number of total sessions. • For example, "1 session per 1-2 weeks"
Recommended Child Intervention Session Length	Anecdotal: Include numeral and unit or NR	Provide the recommended length of each session of the child intervention. ● For example, if the study reports, "Parents were asked to complete 15 sessions over 2 weeks, with each session lasting 10 minutes" you would only record "10 minutes" as that is the recommended length of each individual session.
Child Intervention Duration as Implemented/Reported		
Duration of Child Intervention as Implemented	Select **<u>one</u>**: 0 = no 1 = yes	Is any information provided about the duration of the implemented child intervention? Time can refer to training length, training intensity, or training session minutes/hours. Codes defined as: ● No = the study did not report the **<u>actual</u>** duration that the intervention was implemented (weeks, days, sessions, etc.). ● Yes = the study reported some information about the actual frequency with which the intervention was implemented.
Child Intervention Length as Reported	Anecdotal or NR	Provide the number of total days, weeks, or months in total that the intervention was **implemented** with children. Include a unit and provide all information that is included. ● For example: Average number of weeks was 4.2 weeks. ● Use NR if information about length is not reported in the study.

Child Intervention Intensity as Reported	Anecdotal or NR	Provide the number of total sessions or sessions per week or month that the intervention was **implemented** with children. Include a unit and provide all information that is included. ● For example: The average number of sessions per week was 4.1 ● Use NR if information about intensity is not reported in the study.
Child Intervention Session Length as Reported	Anecdotal or NR	Provide the **actual** length of each session in which the intervention was implemented with children. Include a unit and provide all information that is included. ● For example: The average session length was 20 minutes and ranged from 5 minutes to 32 minutes. ● Use NR if information about session length is not reported in the study.
Intervention Activities		
Quality of the Description of Activities	Select **one**: 0 = no 1 = yes	Did the study provide a description of the intervention activities in a manner that allowed you to clearly understand the activities that were included? In other words, did you know from reading the study (and not having to make any inferences or assumptions) what activities were included in the intervention? Would someone be able to easily implement this intervention again based on the provided description? ● **Note: If you choose no here, explain below and still fill out all codes below with either yes or no. Even if the author doesn't provide a quality description, we'll still want to know what content was included.** ● When considering quality, look to both the caregiver and the child interventions. If the activity is thoroughly described in either, the code should be "yes".
Quality of the Description of Activities Notes	Anecdotal or NA	If you chose "no" above, write a brief statement explaining why. Include a description of what is unclear and an example to illustrate. ● For example, "The counting portion of the intervention was clearly explained, but the other portions were just mentioned." ● If you chose "yes" above, put NA.

Children's Books	Select **one**: 0 = no 1 = yes	This refers to any intervention that recommends children's books or children's literature as part of the intervention. The books can either be published or researcher created. This does NOT include stories that are presented as e-books or on iPad devices.
Children's e-Books	Select **one**: 0 = no 1 = yes	This refers to any intervention that recommends children's e-books as part of the intervention.
Number Board Games	Select **one**: 0 = no 1 = yes	This refers to any intervention that recommends number board games (where counting is required to move along the board) as part of the intervention. For example, Chutes and Ladders, Candyland, The Number Race. These board games can also be researcher created.
Commercially Available Playing Cards	Select **one**: 0 = no 1 = yes	This refers to any intervention that recommends commercially available playing cards as part of the intervention. For example, UNO, standard playing cards, Go Fish, etc.
Research Developed Cards	Select **one**: 0 = no 1 = yes	Intervention that recommends cards that were specifically designed/developed by the research as part of the intervention.
Flash Cards	Select **one**: 0 = no 1 = yes	This refers to any intervention that recommends flash cards as part of the intervention. For example, flashcards for addition facts.
Other Games	Select **one**: 0 = no 1 = yes	This refers to any intervention that recommends other games as part of the intervention. For example, Connect Four, checkers, or dice games.
Other Games Information	Anecdotal or NA	If you selected "yes" for other games, you need to describe it here. If you selected "no" for other games, use NA.
Digital Technology	Select **one**: 0 = no 1 = yes	This refers to any intervention that recommends technology (iPads, specific apps) as part of the intervention. This does not include children's e-books; keep that code separate (above).
Digital Media	Select **one**: 0 = no 1 = yes	This refers to any intervention that recommends digital media (TV shows, movies, Podcasts, YouTube Videos) as part of the intervention.

Puzzles	Select **one**: 0 = no 1 = yes	This refers to any intervention that recommends puzzles as part of the intervention.
Blocks	Select **one**: 0 = no 1 = yes	This refers to any intervention that recommends building blocks as part of the intervention.
Patterning Materials	Select **one**: 0 = no 1 = yes	This refers to any intervention that recommends patterning materials as part of the intervention; this may include duplicating a pattern or extending a pattern. For example, using colored tiles, beads and string, blocks, etc. to create patterns (e.g., lining up red-blue-red-blue blocks).
Shape Sorters	Select **one**: 0 = no 1 = yes	This refers to any intervention that recommends shape sorters (or other shape related materials) as part of the intervention.
Food Routines	Select **one**: 0 = no 1 = yes	This refers to any intervention that recommends materials to focus on related to daily food routines. This may include family mealtime, setting the table, cooking, grocery shopping, or other food routines.
Home-School Communication Journals	Select **one**: 0 = no 1 = yes	This refers to any intervention that recommends materials to increase communication between the intervention agent (e.g., the home) and another organization, such as the school. This does not refer to parents simply tracking the intervention.
Conversation	Select **one**: 0 = no 1 = yes	This refers to any intervention that recommends materials or information to enhance the type of conversations they are having with children, including how to ask questions, embed math language throughout routines, how to increase inquiry-based discussions, etc.
Nature or Outdoor Learning	Select **one**: 0 = no 1 = yes	This refers to any intervention that recommends materials or information to enhance nature or outdoor learning opportunities for children, including gardening, jungle gyms, parks, etc.
Everyday Experiences	Select **one**: 0 = no 1 = yes	This code refers to everyday experiences that have the intention of focusing on math because of the math intervention or training (not including the activities implemented as part of food routines or

		nature/outdoor learning - we are capturing those separately). This may include, but is not limited to: ● Laundry (e.g., sorting clothes, matching) ● Bathroom routines (e.g., we need to wash out hands until we count to 20, brushing teeth) ● Exercising (e.g., counting jumping jacks, running for 2 minutes) ● Listening to music (if there is a focus on scales, patterns, etc.)
Everyday Experiences Anecdotal	Anecdotal or NA	Use this column to detail information about the everyday experience that had an explicit math focus. Use NA if you selected "no" for Everyday Experiences above.
Other Activities	Anecdotal or NA	If there is another activity that was used in this intervention study that is not represented in the list above, include a note in which you identify and describe the activity. ● For example, if links are provided but the content of the links is unclear, include that here because you won't know which activity above the links relate to. ● Use NA if there were no other activities.

Mathematics Intervention Content

Variable Name	Code Options	Code Descriptions
Quality of the Description of Math Content	Select **one**: 0 = no 1 = yes	Did the study provide a description of the intervention math content in a manner that allowed you to clearly understand the content that was included? In other words, you knew from reading the study (and not having to make any inferences or assumptions) what content was included. ● When considering quality, look to both the caregiver and the child interventions. If the content is thoroughly described in either, the code should be "yes".

		● An example of "no" would be that the study did not mention any specific math content that was included; or the authors may have simply stated "an at home math intervention" or a "math storybook intervention." If the description of the math is so general that the only terms used are "math" or "numeracy" this is an example of no. ● If you can pull out specific content (all of those listed below) this is an example of "yes."
Quality of Description of Math Content Notes	Anecdotal or NA	If you chose "no" above, write a brief statement explaining why. Include a description of what is unclear and an example to illustrate. ● For example, "The counting portion of the intervention was clearly explained, but the other portions were just mentioned." ● If you chose "yes" in the above code, use "NA" here.
Early Numeracy Skills (organized alphabetically)		
Benchmark or Landmark Numbers	Select **one**: 0 = no 1 = yes	Benchmark or landmark numbers are a reference, usually multiples of 10, for a child to reference. For example, in the problem 8 + 5, a child might be taught to "make 10" to solve this. 8 + 2 (to make 10) and 3 more is 13.
Cardinality	Select **one**: 0 = no 1 = yes	Students understand the principle of cardinality when they understand that the last number in a count sequence represents the total quantity. ● For example, if students are asked to count a set of four dots, and an examiner then asks, "How many dots?" Students who understand cardinality will likely immediately respond, "four" while students who do not understand cardinality will likely need to recount the dots before responding to the examiner. ● This also includes instances when an adult or another child says, "give me 2 apples" and the child needs to appropriately "give" the quantity requested. It is sometimes referred to as "give N task."
Comparison: Numerals	Select **one**: 0 = no 1 = yes	Numeral comparison refers to the ability to discern between the most (or "more") and least (or "less") value of two or more **numerals.**

		This skill may also be called: Numeral Comparison, Quantity Discrimination or Magnitude Comparison. This is about numerals (not comparing objects)
Comparison: Sets or Objects	Select **one**: 0 = no 1 = yes	Set comparison (like magnitude comparison) refers to the ability to discern between the most or fewest when considering two or more groups of objects. This skill may also be called: Quantity Discrimination, or Magnitude Comparison. This is about comparing objects, not numerals. This is not the same as visual numerical comparison (see Libertus study) that is typically used for evaluating ANS - approximate number system.
Composing or Decomposing	Select **one**: 0 = no 1 = yes	● Composition refers to the ability to put numbers together (joining) to make larger numbers or combine more than one set of objects to create a larger set of objects. ● Conversely, decomposition refers to the ability to take apart numbers (separating) to make smaller numbers or take apart a set of objects to create two or more smaller sets of objects. ● The processes of composition and decomposition happen without formal operational words (i.e., plus, minus) or symbols (i.e., +, –), but instead emphasize part-whole relationships. ● For example, students may be presented with a set of objects, and after an examiner alters the set, they may ask the student, “How many objects were added?” or “How many objects were taken away?”
Counting: Correspondence	Select **one**: 0 = no 1 = yes	Correspondence (aka one-to-one) refers to counting a set of objects and simultaneously matching each object with the associated number word. In other words, a child would count a set of objects without skipping objects, or double counting objects, and each object receives only one number-word label. This may include counting sets or groups of objects, such as blocks, toys, items of food on a plate.

Counting: Error Identification	Select **one**: 0 = no 1 = yes	This skill refers to the ability to identify errors in counting with and without objects. For example, students possess this skill if they can accurately identify double counting of objects or missed number words when reciting the number sequence (e.g., knowing that in "one, two, four, five, six" the "three" is missing).
Counting Principles	Select **one**: 0 = no 1 = yes	Instead of referring to specific counting skills, studies may refer to the five counting principles (Gelman & Gallistel, 1978): one to one correspondence, stable order, cardinality, order irrelevance, abstraction. Only mark this option if the study refers to the "Counting Principles" specifically.
Counting: Sequence or Verbal Counting	Select **one**: 0 = no 1 = yes	Verbal counting (aka rote counting) refers to stating the correct sequence of number words. This can be illustrated in different variations, such as counting forward from "one," counting forward from a number other than "one," counting backward, and counting on (e.g., there are 2 blocks on the table and I add 3 more, how many are there now, "3, 4, 5.")
Counting: Skip Counting	Select **one**: 0 = no 1 = yes	This type of counting refers to counting by a number other than 1s, for example by 2s (2, 4, 6, 8, …) or 5s (5, 10, 15, …).
Equivalence	Select **one**: 0 = no 1 = yes	Skills with equivalence refer to creating an equivalent set (from a numeral or set of objects) and breaking apart an initial set of objects (e.g., 6 apples) into two or more equivalent sets of objects (i.e., splitting the 6 apples equally among 2 people).
Matching Quantities	Select **one**: 0 = no 1 = yes	Match quantity refers to the action of matching equivalent numbers represented as either a set or quantity (e.g., dots), numeral, or number word. For example, a child may be shown a picture of two apples and asked to select from a set of numerals which numeral matches the picture (i.e., 2).
Missing Number	Select **one**: 0 = no 1 = yes	This skill refers to identifying the missing number that comes before or after a number, or between two numbers, when provided a segment of the number line.

Number Line Estimation	Select **one**: 0 = no 1 = yes	Number line estimation refers to estimating the placement of a number along a number line when considering the provided beginning and end points of the number line.
Number Line Sequencing	Select **one**: 0 = no 1 = yes	Number line sequencing refers to the ability to correctly sort numbers (such as numerals on cards) in a specified order. ● For example, a child might sort cards from least to greatest.
Numeral Identification	Select **one**: 0 = no 1 = yes	Correctly matching the number word or number name with the number symbol.
Number Relations	Select **one**: 0 = no 1 = yes	Some studies may group several early numeracy skills and use the term "number relations" or "number relationships"
Operations	Select **one**: 0 = no 1 = yes	Some studies may group several early numeracy skills and use the term "operations"
Ordinal Numbers	Select **one**: 0 = no 1 = yes	Skill with ordinal numbers refers to the ability to state an object's relative placement. ● For example, this skill can be used when describing a person's place in line as the "first" person in line, or the "second" person in line.
Place value	Select **one**: 0 = no 1 = yes	All numbers in our counting system, regardless of their value, are created using only 10 digits (0, 1, 2, 3, 4, 5, 6, 7, 8, 9). This system is often referred to as the base-ten counting system, because it uses ten unique digits that are grouped repeatedly by ten to make subsequent groups of numbers (NRC, 2009). We need only ten digits to represent all numbers in a counting sequence because of *place value*, which refers to understanding that the value of an individual digit in a multi-digit number depends on its position (i.e., place) within the respective number.
Properties of Addition and/or Subtraction	Select **one**: 0 = no 1 = yes	This refers to conceptual understanding of mathematical properties that are necessary to be proficient with addition and subtraction (e.g.,

		knowing that when you add one to a set the total quantity becomes greater).
Simple Addition and/or Subtraction with Objects	Select **one**: 0 = no 1 = yes	Basic arithmetic refers to the ability to add and subtract, typically within 20 (i.e., sums and differences are between 0 and 20). This may also include number combination skills generally referred to as "plus one/minus one," or "two more/two less" or "doubles." Students perform these actions with the use of objects (such as blocks) to help track addition and subtraction processes.
Simple Addition and/or Subtraction Without Objects (aka Basic Facts)	Select **one**: 0 = no 1 = yes	This skill is similar to simple addition and subtraction (may be referred to as basic facts or number combinations) described above, except that student perform these actions without the use of objects, and instead use numerals.
Subitizing	Select **one**: 0 = no 1 = yes	Subitizing refers to the ability to instantly recognize (i.e., subitize) quantities of up to three or four (e.g., instantly recognizing that there are 3 drinking glasses on the table, looking at a picture and stating that there are two dogs), without the use of counting (verbal and nonverbal).
Visual Numerical Discrimination (ANS)	Select **one**: 0 = no 1 = yes	This refers to instant visual numerical comparison or discrimination. Students are asked to visually discrimination very quickly the difference between two pictures. This will always be a computer-based skill. Most studies that use this will refer to it being a test of the approximate number system (ANS). This is different than Comparison: Sets of Objects because it's an instant process and is more of a combination of comparison and subitizing but should only be coded as Visual Numerical Discrimination.
Writing Numerals	Select **one**: 0 = no 1 = yes	Writing numerals refers to a child practicing writing number of symbols. This may be in relation to other skills, such as writing the numeral that matches a set of objects (then also select "matching quantities" if this is the case).
Skills Associated with Basic Facts (organized alphabetically)		

Computation	Select **one**: 0 = no 1 = yes	This goes beyond basic facts in that students must use an algorithm to solve more complex computation that requires an understanding of place value.
Multiplication and or/Division: Basic Facts	Select **one**: 0 = no 1 = yes	Applying skills of multiplication and division with numerals. Multiplication (whole number facts up to 100 and division facts within 100 with whole numbers). Basic multiplication and division refer to facts that are rote memorization.
Multiplication and/or Division: Principles of Understanding	Select **one**: 0 = no 1 = yes	Understanding that multiplication refers to repeated addition or "groups of" and division refers to "equal groups or sets." This does not actually refer to performing multiplication or division, but it refers to demonstrating the understanding of "groups" such as with pictures, discussion multiplication as repeated addition, and discussion division as creating equal groups.
Principles of Fractions	Select **one**: 0 = no 1 = yes	Students understand that a fraction is used to represent a part of a whole. This may be with a number line, diagram, area model, or set model. Students may identify fractions, match fraction representations, compare fractions, or find equivalent fractions.
Word Problem Solving	Select **one**: 0 = no 1 = yes	This refers to real world problems where children need to apply their understanding of numbers or operations. This may also be referred to as story problems.
Measurement & Geometry (organized alphabetically)		
Identifying and Using Measurable Attributes	Select **one**: 0 = no 1 = yes	This skill refers to identifying objects (shapes, lines, other items) as the same or different on the attributes that can be measured (e.g., length, height, weight) and possibly using the attributes for comparison or to order objects by an attribute (longest stick to shortest stick).
Measuring Objects	Select **one**: 0 = no 1 = yes	This skill refers to using standard and nonstandard measurements for measuring objects. For example, using a ruler, or a nonstandard unit of measure (e.g., using the paper clips) to determine the length of a block. For example, the book may be 11 inches long, or it may be 12 paper clips long. This refers to all units of measure.

Navigation	Select **one**: 0 = no 1 = yes	This skill refers to using relative position, spatial relations, and vocabulary to understand, discuss, and create navigational directions. ● For example: Take 10 steps forward, turn left, and walk 5 more steps.
Relative Position	Select **one**: 0 = no 1 = yes	This skill refers to describing relative positions or objects such as "above, below, next to, under."
Shapes: Building or Composing	Select **one**: 0 = no 1 = yes	This skill refers to drawing shapes or forming shapes with smaller shapes or filling in templates with given pieces to form a new shape. This includes 2D and 3D shapes.
Shapes: Describing Their Attributes	Select **one**: 0 = no 1 = yes	This skill refers to describing shapes and their attributes, such as by the number of sides or relative size. This includes 2D and 3D shapes.
Shapes: Identifying	Select **one**: 0 = no 1 = yes	This skill may refer to identifying shapes by their name or being given a shape name and identifying the matching shape, including finding shapes in their environment. This includes 2D and 3D shapes.
Data Analysis & Probability (organized alphabetically)		
Collecting Data	Select **one**: 0 = no 1 = yes	This skill refers to children collecting data (e.g., tallying snack choices) to identify trends, totals, etc. within the data. ● For example, which snack has the most tallies or how many more tallies do cookies have compared to apples.
Organizing or Sorting	Select **one**: 0 = no 1 = yes	This skill refers to early data analysis skills of sorting objects based on their attributes (e.g., number of sides, weight) or using sorting to solve problems, or organizing data into categories. Use this option when the skill is referred to as a data analysis or probability specific skill in the intervention study.
Representing data	Select **one**: 0 = no 1 = yes	This skill refers to representing data, such as by creating a chart, bar graph, line plot, picture, etc.
Algebra (organized alphabetically)		

Representing Problems with Equations	Select **one**: 0 = no 1 = yes	This skill refers to number and operations problems that children represent with equations (e.g., 5 x 5 = 25).
Sequencing and Patterns	Select **one**: 0 = no 1 = yes	This skill refers to recognizing, duplicating, or extending simple patterns (e.g., number patterns, color patterns, shape patterns).
Other Mathematics Skills (organized alphabetically)		
Logico-Mathematics	Select **one**: 0 = no 1 = yes	This term is typically used to describe skills like classification (classifying objects by a measurable attribute), seriation (arranging objects by size), and sorting (usually goes with classification). Select this option only when the study specifically refers to the skills as logico-mathematics.
Math Language	Select **one**: 0 = no 1 = yes	This refers to interventions that focus on teaching children about specific mathematics vocabulary (discipline specific terminology). This may be in written or oral form. This may be referred to as "math talk" or "number talk."
Money	Select **one**: 0 = no 1 = yes	This skill refers to identifying the value of coins and bills and using money to solve problems.
Problem Solving	Select **one**: 0 = no 1 = yes	Problem solving involves using logic or reasoning to solve a task or a set of related tasks for which there is no immediately apparent solution. This is not the same as word problem solving.
Scientific Inquiry or Reasoning	Select **one**: 0 = no 1 = yes	Inquiry typically refers to a set of skills that are a process: children engage in observing, questioning, predicting, evaluating, and concluding.
Tell and Write Time	Select **one**: 0 = no 1 = yes	"Tell and write time in hours and half-hours using analog and digital clocks" (CCSS).
Other Math Intervention Content	Anecdotal or NA	● Use NA if you have nothing to report. ● Use this cell to report any other math skills that the author described but do not fit into the above categories. ● Examples: Principles related to volume/capacity

		● NOTE: "Number sense" is a term that a lot of researchers use differently, and most often it means a set of early numeracy skills (most often a combination of subitizing, counting, comparison, and number recognition). Because it's a term that is not agreed upon by researchers and it refers to a set of skills, it's best if we put that here.

The Control/Comparison Condition: Study Level Information

Variable Name	Code Options	Code Descriptions
Study Identifier	Number	This number will be provided for all studies.
Authors	Names	All authors' last names, separated by commas
Year	Year	Year of publication
TRT Name	Name	This is where we need to link the TRT group(s) that refer to this control group. ● If there is more than one treatment group, list them here separated by a semicolon (e.g., TRT big; TRT small) and in alphabetical order. ● If the study has **only a TRT group**, you still need to put a line in the CTRL tab and respond to the item below.
Control Condition	Select **one**: 0 = no 1 = yes	This code refers to whether there was at least 1 control or comparison condition in the study. ● No = there was only a treatment group(s) in the study and no control. NOTE: If you select this option, use NA for all remaining codes. ● Yes = there was a control condition.
CTRL Name	Name or NA	Each CTRL group receives its own line in Excel. ● If the study has **only a TRT group**, you still need to put a line in the CTRL tab and respond to the item below.

Control Activities	Select **one**: 0 = NA 1 = no, BAU 2 = no, not described 3 = yes	Did the study provide any information on the type of activities that were included in the control condition (e.g., books, blocks, puzzles, reading activities, outdoor activities)? ● NA = select this option if there wasn't a control condition. ● No, BAU and not described = the study specified that the control condition was business as usual (BAU) and the study did not describe the conduction any further than BAU ○ Even if the term "BAU" is not explicitly stated, still use that code if the definition above applies. ● No, not described = the study did not refer to the control as business as usual and the control group received some sort of support, but it was not described in terms of the types of activities in the control condition. ● Yes, the study provided information on at least one type of activity in the control condition. This can include control conditions called BAU if the BAU activities are also described.
Types of Control Activities	Anecdotal, NA, or NR	Write 1-2 sentences describing the control condition activities. Use: ● NA when there was not a control condition ● NR when there was a control condition, but it is not described or simply referred to as business as usual (BAU) without further detail.
Control Content	Select **one**: 0 = NA 1 = no, BAU 2 = no, not described 3 = yes	Did the study provide any information on the type of content (math, reading, play) included in the control condition? ● NA = select this option if there wasn't a control condition. ● No, BAU and not described = the study specified that the control condition was business as usual and the study did not describe the BAU content. ● No, not described = the study did not describe the types of content in the control condition.

		● Yes, the study provided some information on the type of content in the control condition. This can include BAU conditions in which content is also described.
Types of Control Content	Anecdotal, NA, or NR	Write 1-2 sentences describing the control condition content. Use: ● NA when there was not a control condition ● NR when there was a control condition, but it was BAU or not described Examples include: "The control condition was an active control where parents were instructed to read storybooks not pertaining to math to children. Parents were provided with materials." "The control condition was described as "business as usual" and did not provide specific information about content or what instruction looked like."
Control Time	Select **one**: 0 = NA 1 = no, BAU 2 = no, not described 3 = yes	Did the study provide any information on the time/duration that the control condition received support? ● NA = select this option if there wasn't a control condition. ● No, BAU and not described = the study specified that the control condition was business as usual and did not receive any additional support. ● No, not described = the study did not describe time/duration of the additional support students received. ● Yes, the study provided some information on time of the control condition (e.g., "same amount as intervention" or "twice a week."). This may include BAU conditions in which the authors also provide details related to the time.
Control Time Described	Anecdotal, NA, or NR	Write 1-2 sentences describing the control condition time. Use: ● NA when there was not a control condition ● NR when there was a control condition, but it was BAU or not described

Nature of Instruction in the Control Condition was Documented or Reported	Select **one**: 0 = NA 1 = no 2 = yes	This code refers to whether there was any documentation of the nature of the instruction in the control condition (e.g., audio, or visual data collection, someone entered the home and observed instruction). ● NA = select this option if there wasn't a control condition. ● No = the study did not describe efforts to document the nature of the instruction in the control condition. ● Yes, the study provided information about how the nature of the instruction in the control condition was documented.
Nature of Control Described	Anecdotal, NA, or NR	Write 1-2 sentences describing how the nature of the control condition was documented. Use: ● NA when there was not a control condition ● NR when there was a control condition, but it was not described

Coding Protocol: Outcome Measures

Variable Name	Code Options	Code Descriptions
Study Identifier	Number	This number will be provided for all studies.
Authors	Names	All authors' last names, separated by commas
Year	Year	Year of publication
Meta or Quality	Select **one**: 1 = meta 2 = quality	Use the Phase 4 tab of the included studies spreadsheet (column B) to determine if the study that this measure is a part of will be included in the meta-analysis or will be used for the quality paper.
Measure Name	Anecdotal	Report the official measure name. This may be a title of a norm-referenced measure (e.g., Woodcock Johnson-III), or it may be an informal name for a researcher developed measure (e.g., number skills). ○ If the researcher uses both the whole name and an abbreviation, provide the whole name with the abbreviation in parentheses - e.g. Early Mathematics Measures (EMM). ● For math achievement measures, use the preassigned naming conventions for studies that are both in the meta-analysis and in the quality paper. ● Subtest names of math achievement measures will be listed in the linked document above. ○ Check this list regularly and add to it as needed (for any subtests, not just math achievement, that are not there) so that each coder pair codes for (and uses the same name for) each subtest. ● Be sure to include the name of the measure itself (not the concept that is being measured). ○ For example, Libertus measured the precision of children's ANS for visual arrays by administering a version of Panamath, a freely available non-symbolic numerical

		comparison task. For the measure name, list "version of Panamath". ○ Note also that sometimes the authors will only refer to the content as the name of the measure (e.g., letter identification).
Measure Citation	Anecdotal or NR	● Include the full APA citation of the measure, if provided. Be sure to check the reference list to ensure that the citation is for a specific measure and is not just citing another study that used the measure. ○ For example: ■ Ginsburg, H.P., & Baroody, A.J. (1990). Test of Early Mathematical Ability (2nd ed.). Austin, TX: Pro-Ed. ○ If you find a measure that has a citation, tag Hannah and Gena on the codebook. Give us the author/year of the study so we can double check the citation and add it to our list ● If the measure was adapted from an existing measure include [adapted from: CITATION]. ● If no citation was provided, code "NR" here.
Publication Type of the Measure	Select **one**: 0 = unclear 1 = norm-referenced 2 = researcher developed 3 = other	This code refers to the publication type of the measure. We do not provide a "not reported" option, because even though some measures will not be identified as "norm-referenced" they are common measures (e.g., WJ-III) and are known to be norm-referenced even if authors do not report it. ● Unclear = it is unclear from the description of the measure if the measure is norm-referenced or not (e.g., this may be especially true for non-U.S. studies if norm-referenced measures are not those typically used in US studies). ○ If you select this code for a measure, this will need to be checked by Gena to confirm.

		● Norm-referenced = refers to measures that are typically published by companies and were developed with rigorous and standardized procedures. ○ To determine if a measure is norm-referenced, first check to see if the author describes it as such. Next, review the list of norm-referenced measures below. ■ Common examples of norm-referenced measures include IQ tests (WJ-III; WISC; WIAT), and math and reading achievement measures (TEMA, KeyMath, SESAT, SAT-10, GORT). Typically, norm-referenced measures will have a citation along with the description. ● Researcher-developed = refers to measures that were developed by the authors of the study for the purpose of the study or were adapted from previous researcher-developed measures. These measures tend to be narrower in focus, such as asking a child to count or identify numerals. Many home numeracy or learning environment scales are researcher developed. Some researchers also do not use their own measures, but measures that were developed by other researchers. Sometimes, these have citations. ● Other = use this code if a measure is referred to as something other than norm-referenced or researcher-developed.
Page No.	Number	Note the page number where the measure is described in the study.
Measure Respondent	Select **one**: 0 = not reported 1 = child 2 = parent or caregiver 3 = researcher 4 = other	This code refers to who responded to the measure or was administered the measure by a researcher. ● Not reported = it is not reported who the focus of the measure administration was. ● Child = the child responded to items. ● Parent or caregiver = the parent or caregiver responded to items. ● Researcher = the researcher observed child or parent behavior (e.g., used a checklist to observe math talk) and recorded data.

		● Other = another adult or sibling responded to items or multiple respondents
Measure Content	Select **one**: 0 = unclear 1 = math achievement 2 = math talk 3 = reading or literacy 4 = home math survey 5 = home literacy survey 6 = home learning environment 7 = math attitude, beliefs, perceptions 8 = executive function 9 = IQ test or cognitive measure 10 =other	This code refers to the main content or domain of the measure. ● Unclear = Use this code if authors were unclear in the type of content or skill that the measure assessed. ● Math achievement = Use this code for all math knowledge and skills measures including, but not limited to, counting, early numeracy, number identification, computation, concepts and applications, problem solving, story problems, WJ-III Calculation, WJ-III Applied Problems, KeyMath, TEMA, TOMA, Aimsweb. This does not refer to IQ tests of ABILITY (WJ is an IQ test, but the achievement subtests are still achievement measures - calculation and applied problems) ● Math talk = use this code for all measures of "math talk" such as frequency of words or utterances spoken, or type of math words spoken. ● Reading or literacy = use this code for all measures that are related to reading achievement or other areas of literacy (e.g., phonological awareness, reading comprehension, letter identification, vocabulary). ● Home math environment = use this code if parents responded to a survey, interview, open ended questionnaire, etc. about the home numeracy environment or home math environment. If there is a separate home literacy/reading environment scale, that should go on its own line in Excel. ● Home literacy environment = use this code if parents responded to a survey, interview, open ended questionnaire, etc. about the home literacy environment or home reading environment. If there is a separate home math/numeracy environment scale, that should go on its own line in Excel.

		● Home learning environment = use this code if parents responded to a survey, interview, open ended questionnaire, etc. about the home learning environment generally; this may refer to one survey that captured both reading and math information. If separate measures are used, you should put both measures on their own lines in Excel. ● Math perceptions, beliefs, attitude = this refers to any measure that captures a child or parents' beliefs about math, attitude or enjoyment related to math, self-efficacy in performing math tasks, beliefs about the importance of academics, etc. ● Executive function = tests related to executive function skills including attention, inhibitory control, updating working memory, cognitive flexibility or shifting. There are several different names for EF measures, but they should be referred to as an EF measure. ● IQ tests of ability (WJ ability measure, WISC, WIAT, etc.) ● Other = this refers to any other measure not listed above ○ If there is an "ANS" measure, it should be coded as "other" here. ○ If there is a treatment fidelity measure (e.g., parent survey documenting intervention participation), code "other" here.
Other Content Area Note	Anecdotal or NA	● Use NA when you **did not** select "Other "for the Measure Content code above. ● If you **did** select "Other," report the content area, skill, or domain that the measure focused on.
Home Numeracy or Environment Scale Questions Reported	Select **one**: 0 = not applicable 1 = no, questions are not reported 2 = yes, questions reported	This item directly relates to the Measure Content code above, specifically home numeracy or home math environment scales and/or questionnaires. Were the ***specific questions*** related to the home environment ***provided*** in the study?

		● Not applicable = select this option if the study did not collect data related to the home numeracy or home math environment **(i.e. you did not pick 4, 5, or 6 for the "measure content" code above)** ● Not reported = The authors collected data related to the home math or numeracy environment, BUT the specific questions asked were not provided. ● Yes reported = The authors collected data related to the home math or numeracy environment, AND the specific questions asked were provided.
Math Achievement Measures Description (for meta-analysis studies only)	Anecdotal or NA	For **math achievement measures** only (and for meta-analysis only), provide a short list of skills included in the measure. Simply report the skills that are reported in the study. For example, for a measure called "counting" you might write "students asked to count as high as possible without making a mistake" or for larger tests you might report "subtest included items about counting, comparison, measurement, and calendar activities." ● If the measure was not **math achievement measures** and/or is not for the meta-analysis, code "NA" here. In other words, only include an anecdotal code here if you selected "1=meta" for the meta/quality code above and "1=math achievement" for the measure content code above.
Time Measure Was Administered	Select **one**: 0 = not reported 1 = pretest only 2 = posttest only 3 = pretest and posttest 4 = posttest and delayed posttest 5 = pretest, posttest, and delayed posttest	This code refers to when the measure was administered. ● Not reported = the authors do not state anything about when the measure was administered. ● Pretest only = the measure was collected/administered at only one point in time, which was right before the intervention began. ● Posttest only = the measure was collected/administered at only one point in time, which was after the intervention. ● Pretest and posttest = the measure was collected/administered both before and after the intervention.

	6 = Other	● Posttest and delayed posttest = the measure was collected/administered both after the intervention and at a later follow-up session. ● Pretest, posttest, and delayed posttest = the measure was collected/administered before, after, and at a later follow up session. ● Other = the measure was administered using a different schedule than listed. ○ If the measure was administered "well before" (e.g., several weeks) before the intervention began, code "other" here.
Administration Time Other Note	Anecdotal or NA	● If you selected codes 0-5 in the "Time Measure was Administered" code above, use NA here. ● If you selected a code of Other above, include a note about the administration time.
Posttest Administration Time	Select **one**: 0 = not applicable 1 = not reported 2 = administered within 2 weeks of intervention 3 = administered more than 2 weeks after intervention 4=administered "immediately" with no specifics provided	This code refers to whether the posttest (if administered) was given "immediately," or within 2 weeks of the intervention ending. It is appropriate to make inferences here. For example, if the intervention was only five minutes in a museum, if the author says the posttest was given immediately after the intervention, we can assume it was given within two weeks. ● Not applicable = the measure was not given at posttest. ● Not reported = the measure was given at posttest, but the authors did not state when posttest measures were administered. ● Administered within 2 weeks of intervention = the authors state that the measure was given no more than 2 weeks after the end of the intervention (for all students), or that the posttest sessions occurred *immediately* after intervention. ● Administered more than 2 weeks after intervention = the authors state that the posttest was given more than 2 weeks after the intervention; this includes statements such as "posttest was given

		right after the intervention ended and testing took approximately 3 weeks to complete for all children." ● Administered "immediately" with no specifics provided: The authors state that the post test was given "immediately after," "shortly after," etc. the invention. However, no specific information (e.g., number of days) was provided.
Posttest Administration Time Information	Anecdotal or NA or NR	● Include only the number and the unit (e.g., 1 week) ○ Record the number of days, weeks, or months after the end of the intervention that the post-test was administered. ○ Include the unit (days, weeks, months). ● Not applicable = the measure was not given at posttest. ● Not reported = the measure was given at posttest, but the authors did not state when posttest measures were administered.
Number of Items	Number or NR	● Report the number of items in the measure/assessment. ○ Do not include any practice items in your total. ● Use NR if the number of items cannot be determined. ● It is acceptable to figure out the number of items, if possible, when the author doesn't explicitly state how many items the measure has ○ For measures that are scales, surveys, or interviews, check the tables presented in the study to determine if the items are presented in the results (e.g., authors may put all items from the measure in a results table). Also, if the measure is included in the article, you can count the items. ■ Be sure to check the appendix or supplementary resources for the measures.
Reliability Type Reported	0 = not reported 1 = reported for each of the following reliability types:	This code refers to the type of reliability that is reported for each measure. For each type of reliability, you will code either "0" or "1" in your spreadsheet. For example, if the study has test retest and split half, you code "1" for both of those and "0" for everything else. To receive a

	● internal reliability, consistency; Cronbach's alpha ● test retest ● parallel form ● split half ● interrater ● other	code of 1, the reliability estimate (the numeral) must be given. For example, (.89 or >.90); authors that reported "internal reliability was *good/acceptable/moderate/etc.*" would not receive credit for this item. ● Not reported = the authors did not report any reliability estimates for the measure. ● Internal consistency; internal reliability; Cronbach's alpha = the authors reported reliability across items within the measure. ● Test retest = the correlation between one test administration and another test administration of the same measure is provided. ● Parallel form = reliability between multiple (two or more) versions of the same test (sometimes called Form A, B) is provided. This is sometimes called an alternate form. ● Split half = reliability of one half of the test compared to the other half of the test is provided. ● Interrater agreement = reliability of scores across different raters is provided for the specific measure (if it is provided as an aggregate across all measures do not select this; See Item XX). ● Other = any other type of reliability information provided.
Reliability: Other	Anecdotal or NA	Use NA if you did not select the code of "Other" above. If you selected a code of "other" for reliability, describe the type of reliability.
Reliability Source	Select **one**: 0 = NA 1 = sample 2 = publisher 3 = sample and publisher	This code refers to whether the information about reliability, collectively, was captured from the sample in the study or if it was reported from the test manual or publisher. If the reliability is reported for the sample, it will usually be for internal consistency; internal reliability; Cronbach's alpha. ● Not applicable = you selected a code of "not reported" above for all types of reliability and reliability was not reported for the measure ● Sample = the reliability for the measure was based on the current study's sample (the manuscript will report this by referring to the sample)

		● Publisher = the reliability for the measure is reported by the authors as referring to the publisher or test manual for that measure. Examples include "as reported by Jordan et al. (2009) the test-retest reliability is .89" or "as reported in the test manual internal consistency is .90." ● Sample and publisher = both sources of reliability are provided
Validity Reported	Select **one**: 0 = not reported 1= construct validity 2 = content validity 3 = expert validity 4 = criterion validity (concurrent or predictive validity) 5 = more than one type 6 = other	This code refers to whether information about the validity of the measure was reported. To this study, a few types of validity are likely to be reported (1. expert concurrent; 2. or concurrent or predictive). Validity refers to how well the measure measured the construct that was intended to be measured. ● Not reported = no information about validity was reported. ● Construct = does the test measure what it is intended to measure. To code a yes for this, the author can simply say that the measure had construct validity and not report a statistic. ● Content = does the test measure the full construct or is it representative of the whole construct. To code a yes for this, the author can simply say that the measure had construct validity and not report a statistic. ● Expert validity = did the authors report that validity of the measure was established by using experts to design the measure? ● Criterion validity = how well the test relates to another measure. This is sometimes referred to as Concurrent or predictive validity= did the authors report how the measure correlated (*r*) with student performance on ***another*** measure? NOTE: Concurrent and predictive validity may be reported as correlations in the Results, especially for researcher-developed measures, as opposed to in the Method. To receive a code of 1 for this, the authors can simply report that there is criterion, predictive, or concurrent validity without reporting a statistic.

		○ Concurrent = the measures were administered at about the same time. For example, if the measure you are coding is "rote counting" the authors may correlate the score of "rote counting" at the beginning of the intervention with the TEMA (the criterion measure to establish validity) score also at the beginning of the study. ○ Predictive = the measures were administered at different times to establish how well one measure predictors to performance on ***another*** measure later. For example, if the measure you are coding is "rote counting" the authors may correlate the score of "rote counting" at the beginning of the intervention with the TEMA (the criterion measure to establish validity) score 4 months later. Predictive usually equates to more than 1 month apart between measures. ● More than one type = If more than one type of validity from the list is reported. We don't need to know which validity type is reported, just if it's reported at all. ● Other = use this code if authors reported or refer to another type of validity for the measure.

Quality of Results at the Study Level

Variable Name	Code Options	Code Descriptions
Quality: Data Analysis Part 1	Select **one**: 0 = no 1 = yes	"Were the data analysis techniques appropriately linked to key research questions and hypotheses? (Gersten, 2005; p.152)" Was the data analysis plan or technique reported? In other words, did the authors provide a description of their analyses? **Record: Yes or No** *(If you record "no" also make a small note about the rationale)*

Quality: Data Analysis Part 2	Select **one**: 0 = no 1 = yes	"Were the data analysis techniques appropriately linked to key research questions and hypotheses? (Gersten, 2005; p.152)" **Record: Yes or No** *(If you record "no" also make a small note about the rationale)*
Quality of Data Analysis: Part 3	Select **one**: 0 = no 1 = yes	**Quality of Data Analysis: Part 3** "Were the data analysis techniques appropriately linked to the unit of analysis in the study? (Gersten, 2005; p.152)" **Record: Yes or No** *(If you record "no" also make a small note about the rationale)*
Quality of Reporting Results	Select **one**: 0 = no 1 = yes	"Were results presented in a clear, coherent fashion? (Gersten, 2005; p.152)"

Effect Size Level Information

Variable Name	Code Options	Code Descriptions
Number of achievement measures	Anecdotal	How many math achievement measures were administered in this study that allow for effect size calculation?
Specific Outcome	Title of assessment	What outcome measure is this effect size associated with? (Record the name of the measure as it appears in the study)
Quality of Effect Size Reporting	Select **one**: 0 = no 1 = yes	Did the study report the effect size calculations for this outcome measure in a manner that demonstrates the effectiveness of the intervention?
Design associated with the effect size	**Select one:**	Select the administration that represents the effect size.

	● Single Group (Pretest/Posttest) ● Independent Groups (Pretest/Posttest) ● Independent Groups (Posttest only)	
Group Name	Anecdotal	What group (if there is more than one treatment group or control group) is this effect size information associated with?
Pre-test sample size treatment	Number	Record the pre-test sample size for the treatment group
Pre-test sample size comparison	Number	Record the pre-test sample size for the comparison group
Post-test sample size treatment	Number	Record the post-test sample size for the treatment group
Post-test sample size comparison	Number	Record the post-test sample size for the comparison group
Pre-test Mean treatment	Number	Record the pre-test Mean on the math outcome for the treatment group
Pre-test SD treatment	Number	Record the pre-test SD on the math outcome for the treatment group
Pre-test Mean comparison	Number	Record the pre-test Mean on the math outcome for the comparison group

Pre-test SD comparison	Number	Record the pre-test SD on the math outcome for the comparison group
Post-test Mean treatment	Number	Record the post-test Mean on the math outcome for the treatment group
Post-test SD treatment	Number	Record the post-test SD on the math outcome for the treatment group
Post-test Mean comparison	Number	Record the post-test Mean on the math outcome for the comparison group
Post-test SD comparison	Number	Record the post-test SD on the math outcome for the comparison group
Adjusted post-test Mean treatment	Number	Record the adjusted post-test Mean on the math outcome for the treatment group
Adjusted post-test SD treatment	Number	Record the adjusted post-test SD on the math outcome for the treatment group
Adjusted post-test Mean comparison	Number	Record the adjusted post-test Mean on the math outcome for the comparison group
Adjusted post-test SD comparison	Number	Record the adjusted post-test SD on the math outcome for the comparison group
Pre to post correlation	Number	Record the correlation between pre-test scores and post-test scores on the outcome measure
Measure reliability	Number	Record reliability (Cronbach's alpha if given, or note other kind of reliability) of the measure

If Means and SD for pre and post-test scores on the math achievement test are not given, record the following:

Information to Record	Number
F-statistic	
Degrees of freedom for F-test	
p-value from F-test	
Independent *t*-statistic (independent samples, “between groups)	
Degrees of freedom for t-test	
p-value from t-test	
Dependent *t*-statistic (“within groups”)	
Degrees of freedom for t-test	
p-value from t-test	