Too Little Math for Preschool Kids

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Abstract

Young children's mathematic skills are important predictors of later school success. Yet, we know little about the mathematics exposure children receive in early childhood classrooms. Most early childhood education settings use a published general curriculum, and instruction is likely driven in part by these curricular materials. Therefore, we examine the mathematics activities in 15 comprehensive preschool curricula. We describe the prevalence of mathematics as well as the mathematical content, intentionality, and multi-step (extended) characteristics of these activities. We find that mathematics comprises about 14% of the total activities in the curricula, ranging from 5% to 90%. We find wide variation in the content, intentionality, and depth of the activities. Some curricula cover a more diverse range of content; others focus on only one or two mathematics domains. Most of the mathematics activities across the curricula do not involve more than 1-2 steps, and about 20% do not provide mathematical guidance for the teacher and students. To enhance mathematical learning, more attention is needed to the mathematics included in early childhood curricula.

Key Words: Preschool Mathematics, Curricula, Early Childhood Education

Too Little Math for Little Kids

Young children's mathematics skills are important predictors of their subsequent school success (Claessens and Engel, 2013; Claessens et al., 2009; Duncan et al., 2007). Math skills measured at kindergarten entry predict not only later math achievement but also reading achievement. Young children are capable of learning complex and advanced mathematics (Clements and Sarama, 2011); yet, mathematics receives scant attention in early childhood classrooms (Bachman et al., 2018; Farran et al., 2017)

Nearly two-thirds of 4-year-olds in the U.S. receive some form of formal early childhood education (ECE), prior to kindergarten entry (NCES, 2018). Yet, little is known about what mathematics is taught in most preschool classrooms. The curriculum used is likely a key factor in determining the content and pedagogy in an ECE classroom (Klein and Knitzer, 2006). Most state preschool programs and all Head Start programs are required to use a published curriculum. However, general preschool curricula—those that are not focused on one curriculum area such as literacy, math, or social-emotional development—vary widely in terms of their focus and content (Weiland, 2016). In 2015 the National Center on Quality Teaching and Learning (NCQTL) issued an extensive review of available preschool curricula. The report focused on curricula and grouped mathematics, science and social studies, and logic and reasoning into one rating, while literacy received a separate rating.

School systems, state preschool and Head Start programs, and private preschools are more likely to choose one of the comprehensive curricula and to derive their mathematics emphases from the curricular guidance. For example, in recent research on Head Start classrooms, 86% reported using a general, comprehensive curriculum—75% used *Creative Curriculum* and almost 11% used *High Scope* (Moiduddin et al., 2017). Given the widespread

use of comprehensive preschool curricula and the importance of mathematics in early childhood, the aim of this study is to examine the mathematics content and assess the mathematical guidance provided for activities within the most widely used comprehensive preschool curricula. The findings can be used to inform curriculum developers about the quality of the mathematics opportunities provided in extant curricula and also to aid early childhood administrators who are in the position of selecting a preschool curriculum.

Background

Mathematics in ECE has received growing attention from both researchers and practitioners. Young children are equipped to learn and practice a range of mathematics skills in ECE (Clements and Sarama, 2011). Yet, research has found that teachers of young children report spending little time on mathematics (Engel et al., 2013; La Paro et al., 2009) and feel unsure or ill-equipped to teach mathematics (Ginsburg et al., 2008). Typically, teachers of preschool children have had little course work or training in teaching in mathematics (Ginsburg et al., 2014). While this evidence suggests that preschool teachers are likely not spending much time on math, it is also important to note that the time teachers spend on various types of academic content and topics may be influenced by their prescribed curriculum. Preschool programs and preschool teachers rely on curricula to help inform and guide their instruction. Thus, understanding the curricula teachers use remains an important first step in understanding the potential effect of preschool on children's development.

Research studies that have examined those curricula that are focused on specific academic content areas often find significant gains in skills in the targeted academic area (Jenkins et al., 2018). Yet most preschool classrooms rely on more general, comprehensive curricula, rather than curricula targeted on specific academic content (Weiland, 2016). The

professional literature on mathematics points to the importance of high quality activities for promoting children's learning, and the value in addressing a diverse array of mathematical concepts (NCTM, nd). Thus, we examine and evaluate the mathematics activities in widely used comprehensive preschool curricula to provide a descriptive picture of the mathematics children likely receive in preschool classrooms using these curricula.

Our curricular focus is important because math learning opportunities for children are happening very infrequently in early childhood classrooms. For example, Bachman and colleagues conducted observations in 73 community-based preschool classrooms three times across a school year, specifically focused on math activities. They observed, on average, two minutes per day of mathematics activities and nearly seven times as much time on literacy. Moreover, 50% of the children were never observed interacting with any math materials (Bachman et al., 2018). These limited math opportunities had consequences; children who had at least some math exposure learned more mathematics across the year. The relatively low exposure to math is corroborated in studies of prekindergarten classrooms where the percentage in math may be somewhat higher (7 minutes) but still considerably lower than a focus on literacy (e.g., Farran et al., 2017).

Increasing the children's opportunities for math learning is important for their math skill acquisition. Both learning and developmental theories suggest that children acquire skills through interactions with their environments (Bronfenbrenner and Morris, 1998; Vygotsky, 1978). Children exposed to high quality mathematics opportunities in turn had higher levels of early mathematics skill gains (Clements and Sarama, 2011). Both theory and research suggest that ECE contexts are important for children's development, and the content that teacher's

emphasize has been shown to relate to student learning gains (Engel et al., 2013). Thus, we expect that the mathematics in preschool curricula likely influences preschool classrooms.

We examine general, widely-used, comprehensive curricula comparing their relative emphases on math activities. Beyond merely including math activities in the curriculum, the domains of math covered, the intentionality and extended nature of the activities being offered are also critical (Clements et al., 2017; National Research Council, 2009; Stipek, 2013). "High-quality, explicit, and sequential teaching including mathematics talk should be the core of children's mathematical experiences." (Clements et al., 2017, p. 155). The National Research Council (2009) report emphasized that, while important for other reasons, play-based child-initiated activities have almost never been shown to increase children's learning; instead children need intentional and sequenced instruction.

Intentional means that the curriculum highlights for the teacher the math concepts to focus on, while extended mathematics means that the curriculum purposefully outlines the steps of taking children through learning the concepts in the activity. The practice guide for teaching mathematics to young children published by the What Works Clearinghouse (WWC) recommends targeted, purposeful, and meaningful math instruction. In addition, the WWC guide emphasizes the variety of math domains that should be covered in an early childhood class, including number and operations, geometry, patterns, measurement and data analysis (Frye et al., 2013). Consequently, we examine the different areas of mathematics covered by the curricular activities; we evaluate the expressed intentionality of the activities, and we note how extended the activities are, in other words, the number of steps outlined for the learning sequence in each activity.

Research Questions

Preschool curricula can shape how and what mathematics content young children are taught; yet, we know surprisingly little about the mathematics activities in existing comprehensive preschool curricula. We plan to address this gap by asking the following questions:

1. How prevalent is mathematics in widely used comprehensive preschool curricula?
2. What is the mathematical content of the activities in these curricula?
3. Are the mathematical activities intentional and multi-step?

To address these questions, we examine the mathematics activities in 15 widely used comprehensive preschool curricula recommended by the National Head Start Association.

Data

The mathematics activities reviewed in this study come from 15 curricula recommended in the 2015 NCQTL report supported by the National Head Start Association. We do not include any curricula that target specific skills or domains.[1] The 2015 NCQTL report provides ratings and recommendations for the curricula examined here, but the report does not examine mathematics as a separate domain. We used the most recently published version available in the 2019. In addition, in cases in which a curriculum had versions for different age ranges, we focused on the version for 4-year-old children. We accessed many of these curricula through our university libraries. However, in two cases we purchased copies; and in one case we received a complimentary copy for the purpose of this research. Twelve of the 15 curricula are listed in Table 1; two curricula contained no mathematics activities—*Core Knowledge* and *Innovations*. *Innovations* has a list of mathematics manipulatives that a teacher could ask a director to provide

[1] One exception is *High Scope Numbers Plus* which is part of the widely used comprehensive curriculum *High Scope* curriculum, although it is a standalone supplement. *High Scope Numbers Plus* much be purchased separately.

for the classroom, but does not have mathematics activities for the teacher to do with these manipulatives, and *Core Knowledge* provides a list of mathematics-related goals and mathematics vocabulary. Another curriculum, *High Reach Learning*, was out of print at the time of our coding. Thus, our analyses focused on 12 of the 15 recommended curricula.

Measures

Prevalence of mathematics activities

We relied on each curriculum to identify mathematics activities, but it became evident that some activities labeled as math in a curriculum did not have mathematics as their primary content. In many instances, these activities actually focused on science content but were grouped with mathematics, such as talking about mixing colors or the translucency of different objects. In other instances, the mathematical content was a minimal aspect of the activity with no actual math learning goals, such as a craft activity categorized as mathematics but with a primary objective of learning how to use scissors. In these cases, the activity was excluded from our analyses, given that our investigation examines activities in which the primary focus was mathematics. Appendix A reports the number of excluded activities for each curriculum.

Mathematics content

We coded every mathematics activity for its primary content based on the kindergarten Common Core State Standard (CCSS) mathematics domains (CCSS, 2019), which are similar to the National Council of Teachers of Mathematics (NCTM) recommended strands (NCTM, nd). Three of our content codes—Geometry; Operations and Algebra; and Measurement and Data—are the same as the CCSS domains. Because the domain of Counting and Cardinality comprises a wide range of concepts that are a significant focus in preschool math, we parse Counting and

Cardinality to distinguish between Rote Counting and Numerals; Counting (Objects), Cardinality, and Comparing. Our mathematics content codes are also similar to the recommendations in the What Works Clearinghouse practice guide for the type of math content to include in early childhood classrooms (Frye et al., 2013. The distinction we made among math strands also aligns with that of other systems for coding early math content (e.g., COEMET, Sarama and Clements, 2007), as well as with empirical evidence that counting objects is more predictive of cardinal knowledge than rote counting (e.g., Gunderson and Levine, 2011) and symbolic number knowledge and nonsymbolic number knowledge are distinct domains (e.g., Matejko and Ansari, 2016; Rittle-Johnson et al., 2017). The kindergarten CCSS domain of Number and Operations in Base Ten involves only beginning to work with the numbers 11-19 in kindergarten, and therefore, we did not have a code specific to Base Ten concepts for preschool activities.

The codes were mutually exclusive; in cases where multiple content codes were applicable, we selected the one that was the clearer emphasis of the activity, based on the activity objective. In instances where two content areas were equally emphasized, we coded the more complex content area as the primary activity. For example, if an activity utilized counting and identified this as an objective, but the counting was used in the application of a data analysis activity, the primary content area would be coded as Measurement and Data.

Rote Counting and Numerals includes numerical recognition, writing numerals, and rote counting.

Counting, Cardinality, and Comparing includes counting sets of objects, comparing sizes of sets, ordering, or other activities focused on cardinality or one-to-one correspondence.

Geometry includes identifying and describing shapes, constructing shapes, and spatial concepts such as describing relative positions.

Operations and Algebra includes addition and subtraction and patterns.

Measurement and Data include describing and comparing quantitative attributes (e.g., number or size), classifying objects and comparing quantities, collecting data and making/interpreting graphs, and using both standard measurement tools (rulers, scales) and objects as units for measurement (e.g., shoes, paperclips).

Intentionality

Coding the intentionality of the activity involved whether or not the activity had prompts for the teacher to help draw the students' attention to the mathematics in the activity. We examined each activity for whether or not it had a clear and explicit mathematics objective to indicate to the teacher what math concepts the children should be learning from the activity. We also coded whether or not the activity included a script or steps for the teacher to draw students' attention explicitly to the mathematical concepts of the activity.

The Intentionality code distinguished activities where the teacher was provided with guidance to ensure mathematics instruction occurred during those activities from those activities that provided no guidance for teachers to draw students' attention to mathematics concepts. For example, some patterning activities did not actually include directions to teachers to ensure that children were either engaged in creating or identifying the core units of patterns, which could result in children arranging objects without any attention to pattern. On the other hand, in some activities these were specific suggested statements or questions emphasizing mathematical concepts, such as "Explain to students how all the shapes are triangles because they have three

sides," or "Ask students, *'Are there still the same number of blocks if we rearrange them?"*' In other cases, the activity itself required attending to mathematical concepts, such as instructing students to match items based on quantity.

Extended activity

To know if the activities had the potential to engage children in mathematics in more depth, we also coded whether or not an activity had at least three math-related steps (i.e., the sequential aspect recommended by many). We called three step activities extended ones. This code was included to distinguish between activities that briefly engaged children in mathematical talk or thinking and activities that immersed children in math for a longer period of time or in multiple ways. For example, an activity with three steps might first pose a problem or question for children to discuss ways to solve, then have the teacher introduce and model a new practice, and finally offer children an opportunity to engage in the new practice themselves. To be more specific, the following definitions were used:

One step Something that requires children's attending (whether observing teacher or actually doing something themselves); when activity shifts, count as a second step

Examples: Teacher sets up materials (**does not count as step**), teacher demonstrates how to make a pattern (**1**), children create their own patterns (**2**), teacher asks children to talk about their patterns (**3**) = 3 steps

Teacher creates a rhythm through a series of claps, children "echo" (**1**) = 1 step

Children observe teacher sorting a set of objects (**1**), children guess what the sorting rule was (**2**) = 2 steps

Do not include as a step:

- transitions to other activities/set-up/clean-up
-steps that simply say "Continue activity" without any new elements
-"take-home" activities

-steps that are not at all math related (e.g., singing a song with no math elements; explaining that carrots grow underground)

Analysis

First, we identified every activity in each curriculum that was labeled as mathematics by the curriculum designer. We then coded each activity for primary mathematics content, intentionality, and whether or not it was extended. A team of coders worked to categorize the activities and maintain high reliability. We double coded at least 20% of the mathematics activities within each curriculum, and we had high agreement overall with some variation across curricula. Appendix B shows the reliability for individual curricula. On average, the percent agreement for the primary math content was 88%, and the percent agreement for the intentionality and length (extended) codes ranged from 83% to 95%.

Results

Table 1 displays the 12 of the 15 preschool curricula with mathematics activities that we could examine. In Table 1, we show the total number of all activities in each curriculum, the total number of mathematics activities, and the proportion of each curriculum dedicated to mathematics. First we examined the total number of activities across all domains in the 12 curricula. Results presented in Table 1 show a wide range of total activities in these curricula, from 46 activities in *Tools of the Mind* to 2816 activities in *Big Day for PreK*. Because of this very large range across the curricula we show both the mean number of activities and the median. The median number of all activities within these 12 curricula was 1324. Focusing specifically on the mathematics activities, there was a total of 1947 summed across the curricula, 12% of the total activities. However, the total number of mathematics activities also varied across curricula. *Tools of the Mind* had 17 mathematics activities while *Big Day for PreK* had

420. Because the number of activities ranged so widely across these curricula, we focus on proportions for the remainder of this analysis to provide a more common metric for comparing across curricula.

The proportion of each curriculum dedicated to math relative to other domain areas was typically low. Five curricula have fewer than 10% of their total activities focused on mathematics—*Frog Street, HELP, InvestiGator Club, Let's Begin with the Letter People,* and *Preschool First*. Four curricula had between 11 and 20% mathematics activities— *Big Day for PreK, Curiosity Corner, DLM,* and *OWL*. *Creative Curriculum* and *Tools of the Mind* had 26.5% and 37% mathematics activities, respectively. The *median* proportion of mathematics activities is nearly 14%, showing that most general preschool curricula have a fairly small proportion of their total activities dedicated to mathematics.

As mentioned previously the general *High Scope* curriculum is comprehensive, but it includes mathematics as a separate manual, *High Scope Numbers Plus*. This manual has to be purchased separately and we have no way to know how many preschools actually make the separate purchase; nevertheless we coded the math component of *High Scope Numbers Plus*. It contains 90% mathematics activities. If we had not coded the supplement, the percentage of the activities in the entire *High Scope* curriculum would have been much lower.

Mathematical Content

Table 1 also displays the primary mathematical content for each of the activities across the curricula. These are shown as a proportion of the total mathematics activities in a given curriculum. As shown in the table, overall, activities focused on Rote Counting and Numerals are, on average, about 12% of the total activities. However, this ranges from none in *Let's Begin with the Letter People* to 27% in *Investigator Club*. In contrast, 36% of the mathematics

activities overall focus on Measurement and Data. This focus ranges from about 5% in *DLM* to 56% of all mathematics activities in *Let's Begin with the Letter People*. About one fifth of the math activities across all the curricula focus on Geometry and another fifth on Operations and Algebra.

As with the other content areas, individual curricula emphasize these areas in different ways, for example, *Preschool First* has only 1% of the activities focused on Geometry, but 30% on Operations and Algebra. In contrast, 20% of *High Scope Numbers Plus* activities emphasize Geometry and about 15% Operations and Algebra. Interestingly, Counting, Cardinality, and Comparing activities are similarly emphasized across curricula. Overall, on average, these activities comprise 26% of the mathematics activities.

Overall, the mathematics content covered in a given curriculum varies substantially across the curricula examined. For example, 42% of *Creative Curriculum* math activities are Measurement and Data and 7% Rote Counting and Numerals. Similarly, *High Scope Numbers Plus* focuses primarily and Measurement and Data, and little on Rote Counting and Numerals. In contrast, *OWL* primarily emphasizes Operations and Algebra (32%), followed by Geometry (25%) and Counting, Cardinality, and Comparing (23%).

Intentionality of the Mathematics and Activity Length (Extension)

Table 2 displays the number and proportion of mathematics activities that are not intentional, intentional but not extended in length, and both intentional and extended. When an activity was classified as "Not Intentional," that meant there was not enough information provided in the curriculum to evaluate intentionality and the sequential/extended nature of the activity. For example, the activities in *Curiosity Corner* could not be coded reliably using our intentionality and extended criteria described above. The format of the curriculum's activities

made it difficult to identify whether there were explicit math objectives as well as to determine the beginning and end of individual activity steps (required to identify extended activities). Consequently, activities from it were excluded from this part of our analyses.

As we have indicated mathematical content covered in each of the curricula varied; the curricula also varied in the depth and length with which various content areas were covered. Figure 1 displays the percent of the total mathematics activities in each curriculum that are brief and not intentional mathematics activities; the proportion that are intentional, but are not extended activities; and the proportion that are both intentional and extended. As shown in both Table 2 and Figure 1, the intentionality and length of activities varied across curricula. The median proportion of activities that were intentional but not extended was 38% but ranged from 0 in *DLM* to 80% in *Let's Begin with the Letter People*. The median proportion that are both intentional and extended was 28%, but this ranged from about 10% in *Hawaii Early Learning Profile* to 81% in *DLM*.

Next, we display in Figure 2 the percent of all the mathematics activities by their primary mathematics content areas, distinguishing between brief activities with no mathematical intentionality, brief intentional activities, and activities that are both intentional and extended. Figure 2 displays the proportion of these mathematics activities by their primary mathematics content across 11 curricula (excluding *Curiosity Corner*). As shown in Figure 2, the mathematics activities in general preschool curricula were fairly evenly distributed across mathematical content areas with the exception of Rote Counting and Numerals. Few of the activities overall focus on Rote Counting and Numerals, and not surprisingly most activities that focused on this content were not extended. Activities focused on Counting, Cardinality, and Comparing were

most frequently included in the 11 curricula, with the other three mathematical content domains evenly distributed and close behind.

Figure 2 summarizes across the curricula; it is important to note, however, that these 11 curricula varied in the content covered as well as the intentionality and length in which each content was covered. Figures 3a through 3k show the content of the mathematics activities separately for each of the 11 curricula by mathematical intentionality and length. These proportions are out of the total number of mathematics activities in each curriculum. While both *DLM* and *HighScope Numbers Plus* had the highest proportion of intentional and extended mathematics activities, as shown in Figures 3a and 3b, most of *DLM*'s intentional and extended activities were distributed across Counting, Cardinality, and Comparing and Geometry, while *Numbers Plus* intentional and extended activities were primarily related to Measurement and Data. *Frog Street*'s intentional and extended mathematics activities were primarily dedicated to Counting, Cardinality, and Comparing (Figure 3c) while *Big Day for PreK*'s intentional and extended activities were primarily Operations and Algebra; and Measurement and Data (Figure 3d). *The Investigator Club* has a smaller proportion of intentional and extended activities than the curricula described above; and while the *Investigator Club* activities were primarily dedicated to Counting, Cardinality, and Comparing, overall most of the mathematics activities in this content area were intentional but not extended (Figure 3e).

Similarly, most of the mathematics activities in *OWL* were not intentional or extended (Figure 3f). As shown in Figure 3G, *Preschool First* had few Geometry activities, more Rote Counting and Numerals activities, and most of its other activities were not intentional and extended. *Creative Curriculum* primarily emphasized Measurement and Data (Figure 3h), but had few intentional and extended mathematics activities. Both *HELP* and *Let's Begin with the*

Letter People had few intentional and extended activities and emphasized Counting or Measurement, respectively (Figures 3i -3j). Finally, *Tools of the Mind*'s intentional and extended activities were only in Counting, Cardinality, and Comparing (Figure 3k).

As a whole, these figures show the heterogeneity in mathematical focus, length of activities, and mathematics content areas across these curricula. These results suggest that the mathematical guidance, length, and content children potentially receive in preschool depends heavily on the curriculum used.

Discussion

As preschool programs expand, concerns have been raised about their quality and the short- and long-term effects of the experiences young children have in the classrooms (e.g., Farran and Lipsey, 2017; Lipsey et al., 2018; Phillips et al., 2017). The influence of preschool programs on math skills is of particular concern given that children's school-entry mathematics skills are important predictors of their later reading and mathematics achievement (Claessens and Engel, 2013; Duncan et al., 2007). Questions about how preschool programs can promote children's mathematics skills remain (Bachman et al., 2018). A large experimental evaluation of a statewide preschool program found that by third grade the math scores of children who attended pre-k were significantly lower than children who had not attended a preschool program (Lipsey et al., 2018). However, non-experimental evidence from another preschool program suggested some lasting effects, particularly in mathematics achievement through seventh grade (Gormley et al., 2017). Several prominent recent reports have asserted that quality will be better assured if preschool programs adopt "evidence-based" curricula (Friedman-Krauss et al., 2018;

Sharpe et al., 2017). However, the majority of the widely used general preschool curricula have no evidence suggesting that the curricula will lead to mathematics learning gains.

Observational studies in preschool programs find that math skills receive scant attention from teachers (see Bachman et al., 2018; Farran et al., 2017), but children in classrooms where math is relatively more emphasized make gains not only in math but also in a number of areas including self-regulation (Fuhs et al., 2014; Le et al., 2019). Early childhood curricula represent an important avenue for increasing the attention math receives in classrooms for young children. Yet, as our study demonstrates, most comprehensive early childhood curricula have little math and also vary widely in the mathematics content they do include.

Our findings provide information about the math foci of 15 of the most often used and recommended curricula in the early childhood field (one of which is out of print, two have no math content at all, and another has no activities detailed enough to be coded beyond their presence in the curriculum). These curricula are rated by NCQTL and endorsed by the National Head Start Association; this endorsement has not been updated since 2015. As more states follow the strong suggestions from national organizations to choose an evidence-based curriculum for their pre-k programs, these will be candidates of choice—despite the fact that most of these curricula are not supported by evidence. For example, until 2017, all of the curricula examined here were listed on the extensive list of appropriate curricula districts could choose for their classrooms within the Tennessee Voluntary Pre-K program. Four of the ones reviewed in this paper comprised the short list of acceptable curricula provided by the New Jersey Department of Early Childhood and Family Engagement. As we noted, two of these curricula are used in a majority of Head Start classrooms currently.

As our evidence shows, however, the mathematics instruction children will receive varies enormously among these curricula. Three curricula, in fact, had no math activities that could be coded. Some curricula had very few activities that met our fairly lenient criteria for mathematical focus and guidance and length. Most of the curricula we reviewed varied in what mathematical content was emphasized and the extent to which guidance was provided to draw students' attention to the mathematics, and they varied in the length of individual mathematics activities. There is clearly no consensus among curriculum developers regarding what math skills children should be developing at this age. *Big Day for PreK* covered all 5 mathematics areas fairly equally and had a mix of brief intentional activities and more extended activities in each content area. Others, like *Creative Curriculum,* focused almost all its mathematical activities on measurement, and the activities were very brief, although they offered teachers some mathematical guidance and focus. Children in one program utilizing one curriculum may be exposed to very different content from children in classrooms using another curriculum, contributing to children arriving to kindergarten with vast disparities in their math knowledge.

Most early childhood curriculum developers do not appear to be attending to mathematics content nor to the quality of their activities—including the mathematical guidance, and sequenced steps for implementation. Based upon our review, we conclude that high quality mathematics is lacking from most of the comprehensive preschool curricula.

Curriculum developers tend to be pushed by demands from the field, and most of the early childhood field has been and continues to be focused on literacy. It is likely that the amount and quality of the mathematics activities do not figure into evaluations of curriculum for adoption by a district or program. That needs to change; administrators who make decisions regarding the curriculum to adopt need to pay careful attention to the amount, content, and

quality of mathematics in the curriculum. Increasingly research is demonstrating not only that mathematical skills in young children matter for long-term development but also that particular skills are more important to develop early than others (see Rittle-Johnson et al., 2017). As early childhood programs expand and increasingly rely on the curriculum adopted to determine the content young children are exposed to, it is important for mathematics to play a bigger role and for the curricula to reflect the knowledge now present in the field.

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