

Article

Preschool Classroom Libraries in Turkey: Are They Used to Support Early Mathematics Skills?

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Abstract: The two studies in this paper considered the use of the classroom library as a means of socializing mathematics development in Turkish preschoolers. Study 1 ($n = 80$) documented whether classes had a library, its contents, and whether/how teachers encouraged children to use the library. Study 2 ($n = 47$) investigated the teachers' confidence in teaching mathematics and the means that they used. Both studies used online surveys that were distributed via social media sites. There were four noteworthy findings. One, the Turkish preschool teachers reported viewing mathematics instruction as important to the development of children and were confident in their abilities to teach their students mathematics. However, they relied upon their general knowledge of children and their general pedagogical knowledge, rather than on their knowledge of mathematics, to do so. Two, the preschool teachers in Turkey had classroom libraries that they encouraged their students to use by having a set library time each day and by modeling how to sit and read in the library. They also encouraged family involvement in reading. However, these classroom libraries had fewer mathematics books than other types of texts. Three, while libraries were consistently present in Turkish preschool classrooms, they were not seen as venues for children's mathematics development. Four, preschool mathematics instruction in Turkey appears typically to use whole groups and explicit instruction, and particularly during circle time/the morning meeting.

Keywords: mathematics; preschool; classroom library; early childhood; prekindergarten

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The culture and economy of Turkey are rapidly changing and are becoming more aligned with Western ideals [1]. As a part of the changing culture, early childhood education has become a priority for Turkish society (Organization for Economic Co-operation and Development (OECD), n.d.) [2]. In 2013, Turkey implemented wide-spread changes to how preschool was delivered. The biggest change was a shift from teacher-directed to more child-centered and hands-on forms of instruction [3]. Note that some of these changes had begun to be introduced as early as 2006, but they became much more widespread in 2013. As a result of these changes, the need for early education, and more specifically for preschool, has increased in importance in Turkey [1,4]. Relatedly, the Ministry of National Education in Turkey has redesigned preschool education programs to be more developmentally appropriate. As such, modern Turkish preschools now include play, language development, reading, writing, mathematics, science, art, and music over the course of a school day (European Commission. Education, Audiovisual and Culture Executive Agency [5], with the goal of supporting the physical, cognitive, and emotional development of children, and preparing them for primary education [6]. Despite the transition to a more child-centered focus, little is known about the mathematical learning opportunities that are provided in Turkish preschools.

This paper extends the work of Stites et al. [7,8] on mathematical learning opportunities by using preschool classroom libraries, and, more generally, it considers how Turkish

preschool teachers view mathematics teaching. Given the common use of these “book centers” and their hands-on child-directed nature, it is important to examine whether or not the preschool classroom library may be an underutilized resource in Turkish preschools.

The theoretical framework that underlies this study relies heavily upon Bronfenbrenner’s (1979) [9] ecological framework. He conceptualizes children’s development as occurring in unique and interacting contexts. Of particular importance for this study are the microsystem and the macrosystem. Children are influenced by several microsystems, such as their homes and schools. We focus here on the role that school plays. The macrosystem is societal influences. That is, these children are growing up in a society that has recently become more industrialized, and that is in the process of revising its school system in keeping more with Western views [1]. Vygotsky’s sociocultural theory is also relevant [10]. He talks about the importance of a teacher who is sensitive to a child’s needs and capabilities, and who carefully scaffolds instruction. The theory also talks about the influence of cultural mores and customs.

1. Early Mathematics Development

Children’s learning of mathematics skills begins during the preschool years, or even earlier [11–15]. The importance of developing a strong mathematical foundation is widely accepted; however, studies show that preschool children are often not provided with adequate mathematical learning opportunities [7,14]. While the importance of experiencing preschool mathematics learning opportunities is known, the actual access to mathematics is often limited [16]. One study indicates that preschool children are often limited to 24 min a day, on average, for mathematics instruction in school, with the remainder of the instructional time being spent primarily on literacy [14]. Although formal mathematics learning opportunities are limited, less formal experiences are also rare. In one study with U.S. preschools, Early et al. (2010) [17] concluded that as little as six percent of free-choice time is spent on mathematics engagement. This is particularly concerning given that difficulty with mathematics is often evident as early as preschool [18].

The goal of preschool mathematics instruction is to expand mathematical conceptual understanding [19]. Prior research has indicated that preschool children are more likely to grasp mathematical concepts when they are presented in an authentic, hands-on manner [19–21].

Exposing young children to mathematical opportunities is more than simply putting numbers in front of a child or engaging in teacher-led instruction. Children need to be provided with experiences that draw upon their interests and prior knowledge [22]. When a child’s interests are peaked, they are more likely to engage in activities that will help them develop mathematics skills [23]. One such activity is reading mathematical storybooks. Children find these engaging [16,24]. In-depth mathematical conversations are also critical. These conversations build children’s knowledge of mathematical language and often occur during play and shared book reading with adults and peers [25,26]. However, most, if not all of the studies just cited, were conducted mainly in the United States. We turn next to how mathematics is facilitated in Turkey.

2. Preschool Mathematics Learning in Turkey

Despite what we know about the importance of early mathematics, preschool mathematics has not been a focus in Turkey [6]. While a modest increase in research on preschool mathematics education in Turkey has occurred during the past few years [27], it is not a heavily researched topic. Çiltaş [28] and colleagues examined 359 studies on mathematics education in Turkish schools from 1987–2009, and they found few studies that were related to preschool mathematics.

Students from Turkey have consistently performed behind their peers from other countries [29]. Mathematics scores from 2019 on the Trends in International Mathematics and Science Study (TIMSS), which examined the mathematics knowledge of fourth- and eighth-grade students in 64 countries, indicate that Turkish fourth-graders ranked 23rd

among 58 countries assessed with the TIMSS, while eighth-graders ranked 20th out of 39. These scores indicate a need for additional mathematics support for Turkish children. Moreover, as we know, early mathematics skills predict later ones, at least with U.S. and Canadian children [30].

3. The Preschool Classroom Library

One often overlooked means of instruction is the use of mathematics storybooks. Mathematics storybooks are a way of introducing mathematical ideas to preschoolers by using shared book reading, and they have been shown to be effective in demonstrating mathematical concepts. In addition to increasing exposure to mathematical concepts, storybooks also allow for an increase in mathematical language, which is significantly related to growth in children's math skills [31].

Classroom libraries have the potential to leverage the effectiveness of mathematical storybooks in a child-centered play-based format [8]. However, previous research indicates that the classroom library is often not seen as a venue for mathematics learning. Stites et al. (2021a) [7] found that preschool teachers in the United States did not view the classroom library as a place for mathematics learning. In fact, the number of mathematics storybooks available in the classroom library was significantly lower than more traditional storybooks (e.g., fairytales). The U.S. preschool teachers who participated in the study indicated that mathematics opportunities typically were only provided during whole-group instruction and during small-group center time. In another study, Stites et al. (2021b) [8] compared the use of the classroom library for mathematics in China, Japan, and the United States. Teachers in China, Japan, and the United States viewed the classroom library as a venue for literacy-based learning and exploration (e.g., word identification, reading comprehension), and not for mathematics instruction. Not surprisingly perhaps, once again, the number of mathematical storybooks was significantly less than more traditional storybooks. Differences were noted across the countries in terms of how mathematics instruction occurred, with Chinese and U.S. preschool teachers relying on whole groups and direct instruction, and Japanese teachers indicating more use of naturally occurring mathematical opportunities, such as outdoor exploration.

4. The Present Study

Encouraging young children to engage with books in a classroom library improves literacy development [32,33]. Mathematics storybooks can be used to improve conceptual understanding [7,34–36]. While the effectiveness of both the classroom library and mathematics storybooks is widely accepted, we are aware of only two studies [7,8] that have investigated preschool teachers' use of the classroom library for mathematics. Even less is known about preschool mathematics in Turkey. We do know, however, that Turkey has recently reformed their preschool education programs to be more child-centered and hands-on.

To better understand if Turkish preschool teachers utilize the classroom library for mathematics, we engaged in two related studies. By using adapted versions of the questionnaires from Stites et al. (2021a) [7] and Stites et al. (2021b) [8], the current study used two online surveys to assess Turkish preschool teachers' beliefs about how mathematics is taught, the use of classroom libraries, and whether/how they encouraged children to make use of these libraries. In Study 1, we used an online survey to investigate if and how Turkish preschool teachers report using the classroom library for mathematics. We paid particular attention to the types of books and materials included in the classroom library in Study 1. After an initial analysis of the Study-1 results (detailed below), we concluded that the responding Turkish preschool teachers did not view the classroom library as a venue for mathematics learning. Given that the classroom library was not seen as a place for mathematical growth, we sought to learn more about how Turkish preschool teachers teach mathematics. Therefore, we collected data from a second group of Turkish teachers by using a second survey that focused on the teachers' beliefs about the importance of teaching mathematics in preschool, their confidence in teaching mathematics, and how

mathematics was taught in their classrooms. We also asked teachers if and how they embedded mathematical opportunities into informal (e.g., transitions, snack, etc.) parts of the school day. This paper addresses the following research questions:

1. Do Turkish preschool teachers use the classroom library for mathematics development, and if so, how?
2. How do Turkish preschool teachers report teaching mathematics?

Findings from studies such as these are important because they provide evidence for the actions that teachers report taking to foster young children's mathematics skills. The results of this study may serve as a catalyst for better understanding the experiences that are currently available for mathematics learning in present-day Turkish preschools.

5. Study 1

The purpose of Study 1 was to examine the use of the classroom library for the development of Turkish preschoolers' mathematics development. This study focused on the types of books available in the library, as well as if/how Turkish preschool teachers encouraged the use of the library during the school day. A mixed-method approach was used to analyze the survey responses.

5.1. Method

5.1.1. Participants

After obtaining IRB approval from the Aksaray University Human Research Ethics Committee, teachers were recruited through social media sites catering to preschool teachers in Turkey (e.g., Facebook, Whatsapp chat groups, etc.). These sites were moderated by practicing preschool teachers. The total sample consisted of 80 participants who were currently teaching ($n = 73$, 92%) 3-to-5-year-olds, or who used to teach ($n = 7$, 7%) 3-to-5-year-old preschool classrooms. The majority of participants were females ($n = 74$, 93%); the mean age of participants was 29.64 years ($SD = 5.47$). Their years of teaching experience ranged from 1 to 29 years ($M = 6.39$, $SD = 5.46$). Participants had at least a bachelor's (91%) or master's (8%) degree with an emphasis on preschool teaching.

5.1.2. Procedure

This study was a replication of Stites et al. (2021a) [7]. Participants were screened before partaking in the study to ensure that they were or had been preschool teachers in Turkey. After screening participants, the survey was distributed via Google Forms. The first page of the survey was used as informed consent; that is, it informed participants about the nature of the study. Participants gave their consent by proceeding through the remainder of the survey.

5.1.3. Measure

The online survey included 37 multiple-choice and open-ended questions (see Table 1), including a section on participants' demographic information and questions regarding the use and the content of their classroom libraries. As previously noted, the survey was developed by researchers in the United States [7]. It was translated from English to Turkish and was back translated by two native Turkish speakers. After translations were completed, questions were piloted with 8 preschool teachers in Turkey to ensure that the questions were culturally appropriate.

Participating teachers reported on whether they had a classroom library, how frequently students used this library throughout the school day, and the types of materials (e.g., informational, mathematics, or story books) available to students in the classroom library. The online survey also included teachers' responses to open-ended questions on if and how they encouraged their students to use the classroom library. Sample items included, "Do you do anything to encourage children to use the classroom library? If so, how?"

Table 1. Sample Survey Questions: Study 1.

Sample Question	Response Type
On a typical day, approximately how many children are in your classroom?	Open-ended
Do you have a library in your classroom that is accessible to children?	Yes/No
What type of books are available in your classroom library?	Check all that apply
(a) Informational texts	
(b) Fantasy books	
(c) Story/picture books about people	
(d) Story/picture books about people	
(e) Math story books (e.g., books focused on math topics like counting etc.)	
(f) Other	
Of the books available in your classroom library, approximately how many of these are informational texts?	Open-ended
Of the books available in your classroom library, approximately how many of these are story/picture books?	Open-ended
Of the books available in your classroom library, approximately how many of these are math storybooks?	Open-ended
Do you allow children to take books/games from the classroom library home?	Yes/No
Are there materials you want/need for your classroom library, but are unable to get some reason?	Open-ended

5.1.4. Coding and Scoring Approach

Responses to the survey questions were downloaded directly from Qualtrics and were translated into English. Once translation was complete, responses were uploaded into SPSS to analyze quantitative questions. Qualitative responses were reviewed by all of the authors, with the assistance of an undergraduate assistant. Once the authors established their initial codes, they met to compare codes and resolved any differences. Overall, coders demonstrated 99% interrater reliability. Any discrepancies in coding were resolved by discussion.

5.2. Results

5.2.1. How the Classroom Library Is Used

Eighty-nine percent of teachers from Turkey reported having a library in their classroom. Those teachers noted that children spent an average of 24 min every day (ranging from 0 to 60 min, $SD = 11.09$) in the reading center. Most teachers (86%) reported encouraging their students to use the classroom library throughout the school day. They utilized different strategies to motivate their students to do so. For instance, 72% of teachers noted that they encouraged children by setting regular reading times every day; 54% said they provided reading activities or games that might interest their students. Most teachers (65%) reported that they acted as role models to encourage students to use the classroom library; 71% of teachers indicated that they kept the book center open and often directed their students to encourage their use of the library classroom. Other strategies that were used to encourage the classroom library were noted as choosing the child who reads the most in a month (77%), promoting family involvement in reading activities (75%), and emphasizing the importance of reading books (79%). A breakdown of the responses is included in Table 2.

5.2.2. Content of Preschool Classroom Libraries

The numbers of books in the classroom libraries ranged from 0 to 200 books ($M = 41.16$, $SD = 43.62$). There were significantly fewer mathematics books ($M = 5.86$, $SD = 7.19$) in the classroom libraries than storybooks ($M = 34.11$, $SD = 39.47$) or informational books ($M = 11.22$, $SD = 11.07$) ($F(2,102) = 26.87$, $p < 0.001$, $\eta^2 = 0.342$). Although there were significantly fewer mathematics texts in the classroom libraries, the teachers used several mathematics-related materials (e.g., games, activities) to support the children's mathematics learning in the classroom space ($M = 5.86$, $SD = 7.19$).

Table 2. Strategies used to encourage children’s usage of classroom library.

Responses	<i>n</i>	Percent (%)
Emphasizing the importance of reading	65	79.0
Explaining the benefits of books	63	78.8
Choosing the “reading star” in a month	62	77.5
Involving families in reading activities	60	75.0
Setting up regular reading times in the daily schedule	57	71.3
Acting as role models	52	65.0
Directing students to classroom library throughout the day	48	60.0
Facilitating reading activities or games that might interest students	43	53.8

5.3. Discussion

The Turkish preschool teachers who participated in this study indicated using diverse strategies to encourage children to use the classroom library. While the participating teachers did encourage the use of the classroom library, they appeared to see it only as a venue for literacy development, and not mathematics.

6. Study 2

Study 1 reveals that the participating Turkish preschool teachers did not view the classroom library as a venue for mathematics learning. Therefore, we engaged in a second study to better understand how mathematics is taught in Turkish preschool classrooms, with particular attention to the instructional format (e.g., whole group, small group, center-based, etc.) and the use of the classroom library for mathematics. We also examined if mathematics was a part of free choice for children by examining what kinds of mathematics activities teachers reported as being available for children to engage in. As in Study 1, we used a mixed-method design.

6.1. Method

6.1.1. Participants

IRB approval from the Turkish institution was obtained prior to distributing the survey. A total of 47 Turkish preschool teachers responded to the survey. Participants were not required to have participated in Study 1 to respond to the questionnaire. All of the individuals who responded to the survey indicated that they identified as female and as lead preschool teachers (e.g., not assistant teachers/paraprofessionals). The average number of years teaching preschool was just under nine ($M = 8.68$, $SD = 5.71$, range 1–21 years). A total of 86% of the teachers held bachelor’s degrees, while 11% had master’s degrees in education. All of the teachers reported having Turkish teaching certification.

6.1.2. Procedure

As in Study 1, Survey Two was distributed by using different social media sites for preschool teachers in Turkey (e.g., Facebook, Whatsapp chat groups, etc.). These sites were moderated by practicing preschool teachers. Participants were screened before partaking in the study to ensure their eligibility. After screening participants, the survey was distributed via Google Forms.

6.1.3. Measure

The survey was developed from the interview questions that were used in the seminal study by Stites et al. (2021a) [7] and translated into Turkish. The adapted online survey included 40 multiple-choice and open-ended questions, with a focus on how mathematics is taught in their preschool classrooms. Native Turkish speakers translated/back translated the survey, and one of the authors put the survey into Google Forms. Teachers were asked about whether mathematics occurred in large- or small-group settings, and if they had a mathematics center in their classroom. We also queried teachers about the materials available during free play, and if mathematics materials were available during that time. Specific

survey questions addressed the use of the classroom library as a venue for mathematics learning. Teachers were asked to respond to questions about the presence of mathematics storybooks, as well as other mathematics materials (e.g., manipulatives, games, etc.) in their classroom libraries.

Finally, teachers were asked to report their level of confidence in teaching mathematics to preschool children. More specifically, we asked teachers, “How confident are you when it comes to supporting your students in their math education?”. We followed up by asking about the importance of teaching preschool children mathematics by using the question, “How important do you think it is to teach math to preschool children?”. A sample of Survey Two questions are included in Table 3.

Table 3. Sample Survey Questions: Study 2.

Sample Question	Response Type
Can you provide examples of how math is incorporated throughout the day?	Open-ended
Do you set aside explicit instructional time for math?	Yes/No
Do you have a math center(s)?	Yes/No
Do you do anything to encourage children to use math center?	Open-ended
What types of math materials are available during free playtime? (For example, blocks)	Open-ended
Do you do anything to encourage children to use math materials during free play?	Open-ended
Does your classroom library have math storybooks?	Yes/No
Does the library include any math games?	Yes/No
Do you use math activities in any other ways during the day that we have not talked about?	Open-ended
How important do you think it is to teach math to preschool children?	Likert scale 1–5
How confident are you in your ability to support your students’ math learning?	Likert scale 1–5

6.1.4. Coding and Scoring Approach

As with Study 1, responses to the survey questions were downloaded directly from Qualtrics and translated into English. Once translation was complete, responses were uploaded into SPSS to analyze quantitative questions. Qualitative responses were reviewed by all of the authors, with the assistance of an undergraduate assistant. Once the authors established their initial codes, they met to compare codes and resolved any differences. Overall, coders demonstrated 97% interrater reliability. The few discrepancies in coding were resolved by discussion.

6.2. Results

6.2.1. Teachers’ Views of the Importance of Teaching Mathematics to Preschoolers

The Turkish teachers who responded to the survey indicated that they felt that teaching mathematics was important or very important ($M = 4.51$, $SD = 0.63$). The most commonly reported reason for why these teachers viewed preschool mathematics as important was for everyday life skills ($n = 21$). For example, one teacher noted that teaching mathematics in preschool is important “because mathematics is a universal language. It’s crucial.” The teachers in the study also indicated that teaching mathematics in preschool is important because it is a crucial part of a child’s cognitive development ($n = 17$): “I think it is very important to support their development and to create more schemes in their minds while the mind is very open at this age. They can learn math easily and grasp it very well now.”

Similar to their views on the importance of teaching mathematics in preschool, the Turkish preschool teachers also reported feeling confident or very confident about teaching mathematics in preschool ($M = 4.02$, $SD = 0.621$). When asked about what made them feel confident about teaching mathematics (or not), the teachers gave a variety of responses. Few teachers ($n = 4$) reported not having adequate preparation as the reason for not feeling confident. Interestingly, of the 33 teachers who reported feeling confident or very confident, only 6 reported that their confidence was the result of preparation. The two most common reasons given for high levels of confidence were knowing the needs of the children ($n = 9$),

and confidence in their overall pedagogical skills ($n = 9$): *“I can present activities in a way adapted to the needs of children, I teach math through play and using concrete materials.”*

6.2.2. Use of the Classroom Library to Teach Mathematics

Eighty-six percent of the responding teachers indicated that they had classroom libraries that were available during free play, reading time, and quiet time (e.g., nap). Of the Turkish preschool teachers who responded, 47% indicated that their classroom libraries contained mathematics-themed books, such as counting and patterning books. Of the 47% of teachers who indicated that they had mathematics-themed books in their libraries, only six indicated that they encouraged the children to seek out mathematics items from the library. These six teachers reported that they encouraged the children by showing the items ($n = 3$), and by reading the mathematics books from the library ($n = 3$).

While the Turkish preschool teachers did not report encouraging the use of the mathematics storybooks in the library, the majority of them (95%) reported incorporating mathematics themes and concepts into classroom storybook reading. For example, a preschool teacher shared that she has the children *“count the fruits, animals, etc.”* when reading books. Another teacher shared that she *“chooses a story suitable for the number of the week”*.

6.2.3. How Mathematics Is Taught

Similar to previous studies that examine the use of the classroom library for mathematics [7,8], the majority of Turkish preschool teachers did not report using the classroom library for mathematics instruction. However, these teachers did report other ways that mathematics was incorporated into daily instruction. Ninety-one percent of responding teachers indicated that specific times of the school day were set aside for explicit mathematics instruction.

The Turkish preschool teachers also noted that explicit mathematics instruction often occurred during the circle/morning meeting time (93%) and/or in a small-group math center (40%). The teachers who reported using whole-group mathematics instruction noted that it frequently occurred during circle and calendar time. The Turkish teachers (90% of the 77% who reported using the morning meeting for mathematics) indicated that the circle time/morning meeting frequently focused on number-sense activities (e.g., counting with one-to-correspondence, counting on from a number, number identification). For example, one teacher mentioned that her morning meeting included *“counting the current people by saying who came to our class today, talking about the air temperature”*. Another stated that her class *“counts the people in the class. We place chairs on the tables according to the number of people.”* While activities that focus on number sense were the most frequently reported, individual preschool teachers noted shape identification during morning meetings, while another noted working with patterns.

Less than half (40% of the 91% who reported explicit instruction) of the Turkish preschool teachers indicated having math centers in their classrooms. The teachers who indicated having math centers shared that they included activities such as number cards, puzzles, blocks, shapes, and matching games; however, the teachers provided few discrete examples of how their math centers were executed.

While math centers were reported less frequently than in studies with non-Turkish samples [8], 88% of the Turkish preschool teachers did report incorporating mathematics into their daily routines by incorporating mathematics into everyday activities (32%; e.g., counting the fruit at snack time), using mathematics games (29%), and incorporating mathematics themes into art activities (25%).

6.3. Discussion

As with Study 1, the teachers in Study 2 reported not viewing the classroom library as a place for mathematics learning. In fact, only 47% of teachers indicated having mathematics storybooks in their libraries, and even fewer encouraged their use. While mathematics storybooks were not a consistent part of the libraries, the Turkish preschool teachers in the

study did indicate incorporating mathematical themes into their general storybook reading (e.g., counting teddy bears, etc.). Most often, these embedded mathematics opportunities focused on counting and number identification. While the teachers in the study indicated high confidence levels in their mathematics teaching, and recognized the importance of mathematical learning, the majority of the mathematics instruction appeared to be explicit instruction that occurred in large groups.

7. General Discussion

As Turkey adopts, in general, a more Western style of education, the nature of its early childhood programs has also changed (Review of National Policies for Education, 2007). As a part of this educational shift, the Ministry of National Education in Turkey has made significant changes to preschool education programs. For example, many Turkish preschools have transitioned from teacher-directed to more child-centered learning [3]. These child-centered changes include increased emphasis on things such as play and art, in addition to more academic subjects, such as reading, writing, and mathematics [5]. Within this transformation, the new goal of Turkish preschools is the physical, cognitive, and emotional development of their students, as well as preparing them for formal schooling [6].

This paper investigated Turkish preschool teachers' use of the classroom library for mathematics learning. In Study 1, we examined the use of preschool libraries for mathematics learning with a particular focus on the types of books and materials available in the library. Study 2 focused on how participating Turkish preschool teachers viewed the nature and type of mathematics instruction that they used in their classes.

There are four particularly interesting and important findings. One, Turkish preschool teachers report viewing mathematics instruction as important to the development of children. This is consistent with the general findings of Stites et al. (2021b) [8], where teachers in China, Japan, and the U.S. viewed it as important in preschool. The Turkish preschool teachers were confident about their abilities to teach mathematics to young children in their classes. What makes this particularly interesting is from where this confidence came. That is, these teachers seemed to rely upon their general knowledge of children and their general pedagogical knowledge, but not on their knowledge of mathematics or their specific knowledge of how to teach mathematics.

Two, the preschool teachers in Turkey overwhelmingly indicated having classroom libraries, which they encouraged their students to use. This is consistent with research from the United States [6], as well as from China and Japan [8]. It is interesting that, across four very different cultures with different philosophies (China, Japan, the United States, Turkey) about how children learn, the structures of their classrooms are similar in that all have active classroom libraries. The teachers in this study reported encouraging library usage by having a set library time each day, and by modeling how to sit and read in the library. They also encouraged family involvement in reading.

Three, while libraries were consistently present in Turkish preschool classrooms, they were not seen as venues for children's mathematics development. Although mathematics storybooks can be used for skill development, [7,34–36] the teachers in Studies 1 and 2 indicated having significantly fewer mathematics storybooks than traditional storybooks or informational texts. Some Turkish preschool teachers did report having mathematical items (e.g., games, manipulatives, etc.) in their libraries. Moreover, when mathematics storybooks and/or materials were present in the libraries, very few Turkish teachers reported encouraging the children to seek them out. This is consistent with previous research in China, Japan, and the United States [7,8].

Four, preschool mathematics instruction in Turkey appears to typically use whole groups and explicit instruction, and particularly during circle time/morning meetings. Although the teachers did report making use of some informal mathematical opportunities, by far the highest percentage of mathematics instruction was explicit and was focused on counting and number identification. This is different than what reportedly occurs in China and the United States, where teachers report a mixture of both explicit and informal

mathematics instruction, and in Japan, where mathematics instruction is embedded into the daily routine via natural opportunities [8]. This is a particularly interesting finding given that China, Japan, and the United States consistently outperform Turkey on assessment measures [37].

Turkey has redesigned preschool programs to be more child-centered and in alignment with Western pedagogy [3]; however, the teachers in this study indicated that explicit whole-group instruction is still the primary way that mathematics is taught. Turkish preschool leaders may need to continue assessing their preschool programs to include more informal and small-group mathematics opportunities, including the use of the classroom library. Given that Turkish preschool teachers understand the importance of mathematics and are confident in teaching it, and given the frequency of preschool classroom libraries, the classroom library may provide a logical place to engage in these informal mathematical experiences.

8. Limitations and Future Directions

Although we think that these results add to our understanding of how mathematics skills are socialized in preschool classrooms, and particularly outside of the United States, there are some limitations that need to be kept in mind. One, the samples in the two studies were small. Two, the samples were nonrepresentative. They were convenience samples, collected from people who read social media sites. This limits the generalizability of the findings. Three, the data are all self-reports; we were not able to actually observe in the classroom. Although our data are consistent with those of others who have conducted similar studies [7,8], some responses may reflect social desirability. Four, we do not have outcome data that show how children's mathematical development is affected by their preschool experiences. Five, this questionnaire was developed initially for use with a U.S. sample. Although the questionnaire was piloted with a Turkish sample, it is possible that it still was not sufficiently sensitive to Turkish cultural norms, mores, and practices. Despite these limitations, we think that these results are an important first step that show how mathematics skills are socialized in Turkish preschools, and at a time when the school system is increasingly turning to Western forms of instruction. Future research should address these limitations.

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