

# Number Sense Sentence Starters for Bilingual Families

Reynaurora Resendez

Pasadena ISD

Carrie S. Cutler

University of Houston

Number sense represents a “big idea” in math that includes estimation, place value, fluency with basic facts, relative size of numbers, counting strategies, and number composition/ decomposition (Dehaene, 2011). Teachers build number sense by utilizing routines like number talks, counting collections, choral counting, and other strategies (e.g., Jordan & Dyson, 2014; Humphreys & Parker, 2015; Shumway, 2011). But outside the classroom, number sense takes a more organic and conversational tone (Chval, et al. 2021; Wang & Walkington, 2023). Informal math experiences play a vital role in promoting number sense development by helping children make connections between in- and out of school learning opportunities (Simpson, & Kastberg, 2022). For bilingual families, informal math experiences scaffold development in both languages as children engage in conversations, problem solving, and mathematical reasoning with their caregivers and other children (Razfar, 2012). Additionally, informal math activities promote cultural connections as families support number sense by drawing on their unique cultural backgrounds. Despite these benefits, language barriers, cultural differences, or limited access to mathematics resources in their native language may hamper everyday mathematical interactions and discussions (Jourdain & Sharma, 2016). Further, bilingual parents may lack confidence in their own mathematical abilities, leaving them to struggle with spontaneous number sense-building interactions while cooking, shopping, playing games, handling money, and playing at parks or children’s museums (Ramani et al., 2015).

## Method

In this investigation, we provided a brief intervention to encourage informal math experiences with bilingual families and explored their self-reports via an interview to understand how sentence starters might be used to support number sense conversations.

We worked with three sets of Spanish- and English-speaking parents interested in integrating number sense conversations with their children. We first related to parents the positive effects of informal math conversations on children’s number sense (Huang et al., 2023). We pointed out how mathematics is found everywhere and that number sense develops from the earliest explorations of counting (such as counting the steps to the top of the slide), comparisons (such as saying which of two collections of sea shells has more), and estimation (such as wondering aloud how many children are at library story time). We encouraged parents to scaffold their children’s number sense with a set of conversation starters interspersed throughout natural conversations (see Table 1).

**Table 1***Sentence Starters Provided to Parents*

Sentence Starters	
English	Spanish
What do you notice? What do you wonder? I wonder _____. I notice _____.	¿Qué notaste? ¿Qué te preguntas? Me pregunto _____. Me doy cuenta _____.
How many _____ are there? How do you know? I know that there are ____ because _____.	¿Cuántos hay? ¿Cómo lo sabes? Yo sé que hay ____ porque _____.
When you count things, what does the last number counted tell you? The last number tells me that _____.	Cuando contamos cosas, ¿Qué te dice el último número contado? El último número me dice que _____.
How many items do you think are there? Why? I think there are ____ because _____.	¿Cuántos objetos crees que hay? ¿Por qué? Creo que hay ____ porque _____.
Which has more?	¿Cuál tiene más?
Do you see a pattern? Can you describe it?	¿Ves un patrón? ¿Puedes describirlo?

**Data Collection**

Each family provided us with photos and videos of their informal math experience. We used the photos and videos to initiate a conversational interview with the family about their implementation of the sentence starters and overall experience with informal number sense conversations. During the interviews, we asked each family the same set of questions:

1. How did you feel about your family’s math experience?
2. Which sentence starters did you use?
3. How did your child(ren) respond to the prompts?
4. What have you taken away from this experience?

Family One, comprised of two bilingual parents and a child aged 18 months, experienced informal mathematics at a public park where they counted flowers and made magnitude comparisons of hits during a ball game, with Dad explaining how having “more” showed who won. They incorporated sentence starters we provided, including, “I notice that you have 2 points more than me. That means that you are winning.” Family Two, consisting of two bilingual parents and children ages 8 and 12 years, experienced informal mathematics at a children’s museum. The mother invited the children to do a “math walk” (Wang & Walkington, 2023) to discover the mathematics in different exhibits. She reported using the sentence starter, “Can you estimate how many \_\_\_\_\_?” multiple times throughout the day when the children first estimated then counted visitors in different spaces. They identified number concepts embedded in exhibits such as sound decibels and heart beats per minute, prompted by the sentence starter, “How many \_\_\_\_\_ do you think there are?” They compared the

number of materials in two STEM exhibits to see which contained more, using the sentence starter, “Which has more, the Lego® area or the paper airplane area?” They culminated the museum math walk by pointing out prices in the museum store. Family Three included two bilingual parents and a 7-year-old child who discussed number sense while cooking together. They used the sentence starter, “How many do you think \_\_\_\_” multiple times as they measured ingredients and estimated how many cupcakes the batter would make. They reported that using fractions in the recipe “made sense” because it was part of the cooking process, not just a math exercise.

## **Findings**

Several themes emerged as we analyzed the interview data. First, parents reported “feeling better” about talking to their children about math after learning how to use the sentence starters. Second, families reported increased appreciation for mathematics in everyday life. They related that incorporating number sense was more straightforward than anticipated. They were able to remember most of the sentence starters and found it simple to integrate the three areas of number sense we highlighted in the intervention—counting, comparing, and estimating. While parents initially took the lead pointing out things to count, compare, or estimate, children also used variations of the sentence starters to draw attention to mathematics in the environment. Even though each family’s informal setting was unique, all of them agreed that learning a few simple sentence starters prompted them to take a more active role in building number sense.

## **Implications for Parents**

Parents often serve as important math mentors, guiding their children’s mathematical learning through informal interactions. By teaching parents to scaffold their children’s learning, they practiced a simple yet powerful way to build number sense. When parents understand that mathematics occurs in everyday experiences and possess language scaffolds such as our sentence starters, they can organically support children’s understanding of number sense, laying the foundation for formal learning and promoting number sense as a real-world skill (Simpson & Kastberg, 2022). By incorporating mathematics into familiar daily activities, parents can promote math-positive identities and instill confidence in their children’s mathematical abilities. Moreover, bilingual families’ informal math experiences enrich language development and cross-cultural understanding with children’s overall learning. By supporting parents as math mentors who integrate number sense into everyday life, we can ensure that bilingual children receive the support they need to thrive mathematically and academically.

## **Implications for Teachers**

Teachers play a vital role in offering parents practical strategies around everyday interactions that promote math during stress-free moments. Encouraging families to engage in family math walks and informal number sense conversations empowers bilingual families to incorporate traditions, events, and problem-solving practices that can enrich lessons inside the classroom. When teachers connect home life with the classroom, they create a welcoming and equitable environment where students and their families feel recognized and validated. By providing sentence starters in the home language as well as English, teachers convey how bilingual families can use their whole language repertoire when engaging in informal math activities. This may later transfer to the classroom and support overall mathematical understanding and cross-linguistic connections such as cognates. Finally, partnering with families fosters a collaborative sense of teamwork as parents and teachers work side by side to support children’s number sense development.

Informal math experiences can positively impact students’ number sense development while enjoying activities with their families. We hope you will consider using sentence starters to empower bilingual families in this worthwhile pursuit.

## References

- Chval, K. B., Smith, E., Trigos Carrillo, L. M., & Pinnow, R. J. (2021). *Teaching math to multilingual students: Positioning English learners for success in grades K-8*. Corwin.
- Dehaene, S. (2011). *The number sense: How the mind creates mathematics* (Rev. and updated ed.). Oxford University Press.
- Huang, Q., Sun, J., Lau, E. Y. H., & Zhou, Y. (2023). Parental scaffolding and children's math ability: The type of activities matters. *British Journal of Developmental Psychology*, *41*(3), 246–258. <https://doi.org/10.1111/bjdp.12444>
- Humphreys, C., & Parker, R. E. (2015). *Making number talks matter: Developing mathematical practices and deepening understanding, grades 4-10*. Stenhouse Publishers.
- Jordan, N. C., & Dyson, N. (2014). *Number sense interventions* (1st ed.). Paul H. Brookes Publishing Co.
- Jourdain, L., & Sharma, S. (2016). Language challenges in mathematics education: A literature review. *Waikato Journal of Education*, *21*(2), 43–56.
- Ramani, G. B., Rowe, M. L., Eason, S. H., & Leech, K. A. (2015). Math talk during informal learning activities in Head Start families. *Cognitive Development*, *35*, 15–33. <https://doi.org/10.1016/j.cogdev.2014.11.002>
- Razfar, A. (2012). Vamos a jugar counters! Learning mathematics through funds of knowledge, play, and the third space. *Bilingual Research Journal*, *35*(1), 53–75. <https://doi.org/10.1080/15235882.2012.668868>
- Shumway, J. F. (2011). *Number sense routines : building numerical literacy every day in grades K-3*. Stenhouse Publishers.
- Simpson, A. & Kastberg, S. (2022). Makers do math! Legitimizing informal mathematical practices within making contexts. *Journal of Humanistic Mathematics*, *12*(1), 40–75. <https://doi.org/10.5642/jhummath.202201.05>
- Wang, M. & Walkington, C. (2023). Investigating problem-posing during math walks in informal learning spaces. *Frontiers in Psychology*, *14*, 1106676–1106676. <https://doi.org/10.3389/fpsyg.2023.1106676>