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Money Talks! The Role of Parents' Discussion of Money for Preschoolers' Math Knowledge

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Supplementary Materials: Materials [see Index of Supplementary Materials]

Abstract

Children's participation in cultural, everyday practices and social interactions involving math and money can contribute to the development of their knowledge and skills in these domains. Further work is needed to uncover what features of these activities, such as aspects of the conversations that may occur (e.g., number and money talk), facilitate and/or are shaped by children's understanding of money concepts and skills. The present study examined the extent to which parents engaged in conversations about numbers and money with their four-year-old children during pretend grocery play and the relations to children's math skills. We found that talk about price labeling and exchanging currency or goods occurred most frequently and that money and number talk were not significantly related to children's broader math skills. However, parents' money talk was positively associated with children's money-related math skills, and this association was driven by the co-occurrence of talk about money and numbers. Our results suggest that parent-child conversations in familiar contexts such as grocery shopping provide rich opportunities to discuss culturally relevant practices surrounding money and practice math skills in the context of monetary exchanges. Thus, it is critical to consider how existing family practices and everyday contexts support children's early math learning.

Keywords

early math skills, home numeracy, money, number talk, parent-child interactions, pretend grocery shopping

Highlights

- While pretending to shop, parents and children discussed prices and exchanging money or goods.
- Parents' money talk was positively associated with children's money-related math skills.
- This positive relation was driven by the co-occurrence of talk about money and numbers.
- Parents' money and number talk were not significantly related to children's broader math skills.

Children's exposure to math experiences start early, when learning is guided or shaped by more knowledgeable others and often embedded in meaningful activities and sociocultural contexts. Interactions between caregivers and their children, specifically linguistic exchanges surrounding number and math (i.e., number or math talk), during formal and informal learning activities play a key role in children's developing math skills (Bachman et al., 2020; Eason et al., 2021;

Eason & Ramani, 2020; Elliott et al., 2017; Hanner et al., 2019; Leyva, 2019; Susperreguy & Davis-Kean, 2016; Thippana et al., 2020). Before children enter formal schooling, many of these math-related conversations occur in natural, everyday settings, such as meal times, cooking, and play times in the home (Son & Hur, 2020; Susperreguy & Davis-Kean, 2016; Vandermaas-Peeler et al., 2018) and community spaces such as grocery stores (Hanner et al., 2019). For instance, while grocery shopping, caregivers and their children have opportunities to discuss the number of specific products in their cart, weigh produce, or compare the prices of items, which can cover a range of skills including identifying numerals, counting, labeling sets, measuring, comparing, and making calculations (Hanner et al., 2019). Thus, even in contexts in which math learning is not the principal goal, children can gain valuable exposure to math concepts and practice number-specific skills.

The idea that children's math experiences are shaped by sociocultural practices in children's everyday lives is further supported by two complementary research findings. First, evidence from low- and middle-income countries shows that children with limited or no formal schooling can acquire basic math skills and apply these skills in their daily lives, likely because they are exposed to math concepts informally in their environment, such as when completing work activities and commercial transactions in countries like Brazil (e.g., Guberman, 1996; Saxe, 1988a). Second, children tend to perform better on math assessments or problems that are set in familiar contexts and linked with cultural knowledge (Guberman, 2004; Nasir et al., 2008), suggesting that the contexts in which children are exposed to math concepts matter for their learning. For instance, children who use math for everyday activities that involve money (e.g., selling candy) perform better in math-related assessments that require knowledge of money, such as arithmetic with bills and unit price comparisons than children who do not (e.g., non-sellers) (Saxe, 1988a).

These aforementioned "money skills" fall under broader knowledge known as economic and financial literacy. Interestingly, education curricula and standards for mathematics in the United States do not mention money-related skills until the 2nd or 3rd grade, a few years into children's formal schooling (e.g., National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010), and recommendations for teaching about money focus primarily on developing knowledge of financial literacy, issues, risks, and practices (e.g., Birbili & Kontopoulo, 2015; Federal Deposit Insurance Corporation [F.D.I.C.], 2022). However, money knowledge and skills, and economic and financial literacy more broadly, are highly (1) valued by caregivers and educational and government institutions (F.D.I.C., 2022; Hagedorn & Schug, 2021; Northwestern Mutual Marketing Research, 2003; Schug & Hagedorn, 2005), (2) recommended by those institutions to be taught as early as pre-kindergarten (F.D.I.C, 2022), and (3) regarded by parents as skills that they are primarily responsible for teaching (Guberman, 2004).

Taken together, these works suggest that math learning occurs when children participate in sociocultural activities, and caregivers engage their children in meaningful math learning opportunities by embedding learning in familiar contexts. Moreover, these context-dependent interactions may facilitate the development of other important and highly valued skills, such as money knowledge. The current study builds on these findings by examining how parents discuss money concepts, which can include number talk, during a pretend grocery shopping activity with their preschool-aged children. Additionally, it considers how money talk relates to children's number and money knowledge. Findings from this study have the potential to inform strengths-based early childhood math education interventions as these may guide parents and educators to include informal instruction in math in everyday activities.

Math Learning in the Grocery Context

One common context of parent-child interactions that lends itself to discussions of number concepts is interactions with food, including real and pretend grocery shopping or mealtimes. Prior research shows that caregiver-child interactions in these contexts provide opportunities for diverse and high-quality number talk (Bachman et al., 2020; Braham et al., 2018; Hanner et al., 2019; Leyva, 2019; Leyva et al., 2019; Vandermaas-Peeler et al., 2009). In many cases, the frequency of caregivers' number talk in a grocery shopping context relates to children's concurrent (e.g., Bachman et al., 2020) and later (Leyva, 2019) math abilities. For instance, Leyva (2019) observed low-income Chilean parents' math support during a grocery game with their preschool-aged children in which they were instructed to create a grocery list and pretend to shop at a farmers' market. Parents' math support referred to counting or simple arithmetic operations (i.e., addition and subtraction) during the list making and reading stages of the game. Parents varied considerably in their provision of math support during the grocery game. Further, those who provided more math support had children with greater gains in math skills about one year later. This relation held even after accounting for children's age, children's initial literacy skills, parents' education, and home literacy practices. Thus, caregivers can effectively support children's math development by engaging in math-related conversations during everyday activities (Leyva, 2019).

These findings are aligned with sociocultural theories of cognitive development, which emphasize the role of culture and social processes in supporting and guiding learning (Gauvain et al., 2011; Rogoff, 2003; Vygotskij & Cole, 1981). Specifically, grocery shopping is a regular cultural routine that families across socioeconomic and ethnic backgrounds engage in, offering repeated opportunities for learning (Gauvain et al., 2011; Leyva, 2019; Leyva et al., 2019). Through social interactions that incorporate cultural artifacts and tools, such as language and numeracy, caregivers can initiate and facilitate children's mathematical thinking and development (Gauvain et al., 2011; Vygotskij & Cole, 1981), particularly in an activity that involves numerical information or skills such as itemization. In addition to interactions about numbers and math in a general sense (e.g., discussing the number of grocery items), the grocery context provides families with opportunities to engage in culturally relevant practices and behaviors surrounding money, such as identifying bills and coins, making transactions and receiving change, and having conversations about general financial topics (e.g., the ability to afford a product, taking advantage of sales, making price comparisons, etc.). Thus, this context is suitable for conversations where talk about money and math can co-occur. In this study, we argue that children can practice a variety of numerical skills in the context of money such as identifying numerals, magnitude comparisons, and arithmetic calculations. The grocery shopping context provides an ecologically valid opportunity for caregivers to discuss math and money concepts with their children in a way that may support children's math skills more generally. To our knowledge, there is no published research that investigates the relation between parent-child discussions of money in the grocery context and young children's math abilities. We expand on previous work by examining whether dyadic interactions surrounding money in this context are associated with children's ability to solve problems involving money specifically and math skills more broadly.

The Role of Money Practices in Children's Money Knowledge and Math Skills

Beyond the grocery context, children's experiences with money, including selling or making purchases on their own (Saxe, 1988a; Taylor, 2009) and those mediated by caregivers (Abramovitch et al., 1991; Guberman, 1996, 2004; Jong, 1997; Otto, 2013), are linked with a range of their money skills such as knowledge of pricing (Abramovitch et al., 1991) and calculations involving money (Guberman, 2004). For instance, Guberman (2004) found that parental reports of Latin American and Korean children's engagement in everyday activities involving arithmetic and money were associated with their ability to solve math problems focused on money. Activities were considered academic if parents' intention was to teach their child about money (e.g., identifying and counting money) and instrumental if the goal of the activity was non-instructional but achieved a goal involving money (e.g., playing store, adding and handing bills to a cashier). Both of these activities could occur in a variety of informal or community spaces, such as a grocery store. Children with greater involvement in instrumental but not academic activities with money generally scored higher on a coin-based arithmetic test (Guberman, 2004). These findings complement the research reviewed in the previous section on the grocery shopping context for math learning and, again, highlight the importance of considering how cultural practices support children's understanding of numerical and money concepts. However, the question of how parents and children interact with money, and what features of these everyday interactions are likely driving children's skill acquisition, still remains unknown. Given that these activities are likely dominated by conversations, especially those involving financial transactions which tend to follow a verbal script (Otto, 2013), one possibility is that conversations about money (i.e., money talk) effectively scaffold children's money and math knowledge.

Considering the skills that might be fostered in these interactions about money, children may develop both domain-general math skills (e.g., identifying numerals, counting, etc.) as well as specific content knowledge about money (e.g., the values of bills and coins); however, these constructs may not be fully distinct. Some research demonstrates that children's money knowledge and their general math skills are linked (Jong, 1997; Saxe, 1988a), while others find that children may not need broad math knowledge to successfully engage in money practices (Saxe, 1988b; Taylor, 2009). Specifically, Jong (1997) found that 5-year-old children's ability to identify, order, and compare Arabic numerals was related to their ability to match and compare monetary values. This association was mediated by coin knowledge, suggesting that children's number skills benefit their mastery of money concepts (Jong, 1997). In contrast, Taylor (2009) found that among a sample of 20 children in early elementary school, most children could correctly produce and identify the monetary amount needed to purchase an item while playing shopping. However, some children were able to produce the correct amount needed (e.g., a quarter) but were unable to identify its monetary value (e.g., 25 cents). Thus, children's everyday use and knowledge of currency may not extend to or support their general math skills (Taylor, 2009). Here, we aim to clarify whether money talk, one aspect of children's everyday experiences with money, relates to their math skills more broadly as well as math problem solving with money.

The Present Study

The current study draws on research highlighting the impact of children's participation in cultural practices and social interactions on their learning and development to examine variability in parents' talk about money during a pretend grocery shopping activity with their preschool-aged children and the relation to children's money and math knowledge. While past work has shown that the extent to which caregivers and children engage in number talk within a grocery context is associated with children's math skills (e.g., Leyva, 2019), to our knowledge, no studies have examined whether money talk relates to children's money knowledge or math skills more broadly. Additionally, though considerable research shows that children's engagement in everyday, caregiver-mediated activities involving money shapes their ability to solve problems involving currency (e.g., Guberman, 2004) and possibly their general math abilities (e.g., Jong, 1997), it is unclear what specific features of these money-related activities, including aspects of the conversations that occur during these activities, facilitate or are shaped by children's understanding of money concepts and skills. Thus, the present study merges these streams of past literature and investigates the following questions:

> RQ1: What is the frequency which with parents engage in money talk with their children in the context of playing with pretend grocery store toys?
>
> RQ2: Is parental money talk linked to children's money-related math skills, above and beyond number talk?
>
> RQ3: Is parental money talk that co-occurs with number talk associated with children's money-related math skills?
>
> RQ4: Does parental money talk predict children's math skills more generally?

First, given that caregivers' money-related practices and number talk with their children varies widely (e.g., Guberman, 2004 and Leyva, 2019), it is hypothesized that parents will show considerable individual variability in money talk in the grocery context. Second, given that parent-child engagement in everyday activities involving money is related to children's money knowledge (e.g., Abramovitch et al., 1991), it is expected that parents' overall money talk will relate to children's ability to solve problems involving money. Third, given that applied problem solving requires some numeracy skills, it is hypothesized that the aforementioned association between money talk and children's ability to solve problems involving money is driven by money talk that co-occurs with number talk. Lastly, given that the literature on the links between money knowledge and general math skills is mixed, the last research question is exploratory. It is possible that children's broad math skills are enhanced by their acquisition of money concepts and thus, money talk would relate to children's math abilities more generally. Other possibilities are that children may not be able to transfer the math skills they use when manipulating money to other problems that do not involve money, or that money talk facilitates children's understanding of cultural norms related to purchasing and selling and not their knowledge of money and ability to arithmetically manipulate money. In these cases, parental money talk would not predict math skills more broadly. In general, we have no hypotheses about the directions of these associations. This work aims to uncover how existing parenting practices, specifically conversations about money in everyday contexts may contribute to or be influenced by the development of children's cognitive skills, which has the potential to inform parent-focused, early childhood math interventions.

Method

Participants

Data were derived from a longitudinal study of preschool-aged children and their caregivers from a large, mid-Atlantic metropolitan area in the United States that examines how the home learning environment relates to socioeconomic variability in children's early academic skills. Families were recruited through an institutional research participant database, community flyer distributions, and in-person contact between members of the study team and potential participants at childcare and pre-kindergarten centers. The original sample consisted of 128 dyads, but one dyad was excluded due to insufficient video data (i.e., the video camera shut off after 30 seconds) and another dyad was excluded due to examiner error. The final sample for the current study included 126 parent-child dyads. All children (51% girls) were four years old when they enrolled in the study (*M* child age = 4 years and 4.80 months, *SD* = 3.61 months). Parents reported on their child's general, physical, and mental health, and few indicated that their child had a developmental delay (*n* = 4 or 3%) or was diagnosed with a language delay (*n* = 12 or 10%). Most children participated with their mothers (94%), but a few fathers (6%) were included in this sample as well. Parents were primarily White and non-Hispanic (80%), followed by Black (10%), Asian (4%), Hispanic/Latino (2%), or another race or ethnicity (4%). On average, parents were highly educated, with most reporting that they had at least a Bachelor's degree (74%). Also, parents reported a range of household incomes; 24% of families were low-income (earning below 200% of the federal poverty line), 34% were middle-income (earning between 200% and 400%), and 42% were high-income (earning over 400%). Annual income in dollars ranged from $5,000 to $350,000 with a median income of $95,000 (*M* = $105,548, *SD* = $68,740). Last, a majority of parents reported English as the primary language spoken in the home (*n* = 99 or 79%); three families reported other primary home languages (i.e., Czech, Kazakh, and Spanish) and English as the secondary home language. Twenty-four parents did not provide any information about the primary language spoken in the home.

Procedure

The study consisted of two waves of data collection with the parent and child in their home. The first wave occurred when the child was 4 years old and the second wave of data collection occurred roughly one year later (*M* = 12.57 months later, *SD* = 0.77 months, Range = 11.04-14.98 months). During the initial wave, the dyads were visited in-person in their homes by researchers. However, the 5-year-old follow-up data collection was conducted virtually via Zoom due to the COVID-19 pandemic.

During the 4-year-old home visit, parent-child dyads engaged in three different activities, shared book viewing, a puzzle task, and pretend grocery shopping. Only data from the grocery shopping activity were analyzed as money talk did not occur in the other tasks. During the grocery shopping activity, dyads played together with a developmentally appropriate grocery store toy set that included shopping baskets, pretend food, a cash register, a credit card, and play money (bills depicting ones, fives, tens, as well as coins resembling pennies, nickels, and dimes) for about 8 minutes. Given the unstructured nature of the grocery shopping activity relative to the book and puzzle tasks (in which dyads were given 5 minutes each to complete), the 8-minute interaction duration was chosen to give families who may have been less familiar or experienced with these toys time to acclimate. However, in an effort to keep the entire home visit duration reasonable, we stopped dyads after 8 minutes to move on to other activities. Four dyads chose to stop the grocery activity before 8 minutes passed and their interaction times ranged from 5.17 to 7.20 minutes. The pretend grocery shopping interactions were video-recorded and transcribed verbatim at the utterance level, a complete thought or sentence separated by the speaker's natural cadence (Pan et al., 2004). After the play session, children completed math assessments designed to measure their general number knowledge and parents were asked to complete an online questionnaire regarding demographic and household information. At the 5-year-old time point, children were given two math assessments designed to test their problem-solving skills.

Age 4 Measures

Parental Number Talk

Grocery shopping transcriptions were coded for parental number talk by searching for key terms in parent utterances that included number words and elicitations (e.g., "count," "how much," or "seven"). Codes and searched terms were adapted from Casey et al. (2018) and Ramani et al. (2015). Utterances including these terms were then verified by a coder to ensure that words contained within search terms (e.g., "pretend" containing "ten" within it) or non-numeric uses of search terms (e.g., "one" being used as "thing") were not included. An utterance containing multiple numeric search terms would be coded as a single instance of number talk based on the dominant or more advanced category to maintain the unit of analysis at the utterance level and increase coding reliability. Ordered from most to least prioritized, these category codes included arithmetic, comparing magnitudes, ordinal relations, counting, number symbols, labeling set sizes, and other number talk. For instance, utterances containing arithmetic often contained other categories of talk by necessity, e.g., labeling set sizes, and in these cases, they were coded as arithmetic utterances. Descriptions, examples, and summary statistics of each categorical code are shown in Table 1.

Table 1

Descriptions, Summary Statistics, and Examples of Number Talk Codes (Unimputed Data, N = 123)

Variable	Description	Example	*M* (*SD*)
Arithmetic	Referencing or requiring the use of operations, such as adding or subtracting.	"Let's add them up."	0.80 (1.63)
Counting	Reciting or referencing the count list, such as counting by fives, tens, etc., asking the other person to count, or asking questions about counting.	"One, two, three pizza slices."	2.15 (3.32)
Labeling set sizes	Referencing cardinal values, including sets of objects that were present as well as sets of minutes, dollars, etc.	"How many fruits are there?" "There are two minutes left."	14.67 (9.73)
Number symbols	Using Arabic numerals or number words, including labeling numerals, identifying or looking for numerals, writing numbers, discussing the spelling or sounds in number words, or talking about number symbols more generally.	"That's a nine."	2.45 (4.71)
Other	Other mathematical talk that did not fall into the above categories, such as referring to currency using a number word, patterns, ordinal relations, comparing magnitudes, or referencing times or ages.	"There are a bunch of tens in the cash register." "Which one has more?"	1.14 (1.63)
Total			19.90 (14.30)

Number talk coders included graduate students, postdoctoral researchers, full-time research staff, and undergraduate research assistants. To develop and refine the coding scheme, the coders practiced coding transcriptions based on a preliminary coding manual; the coding team then met to discuss discrepancies in coding and update the manual to include additional clarifications and examples as needed. Once the final manual was complete, all coders completed a set of six practice transcriptions that were checked by the coding team lead, who provided utterance level feedback on each transcript. For all coding used in this analytic sample (i.e., not practice transcriptions), 20% of the transcripts were double-coded and Kappa statistics were used to determine reliability for the overall occurrence of number talk (κ = .94) as well as categories of number talk. Two categories of number talk, comparing magnitudes and ordinal relations, occurred infrequently (.20% and .06% of number utterances, respectively) so they were recoded as other number utterances. Coders were highly reliable in identifying instances of talk about number symbols (κ = .83), counting (κ =

.92), labeling set sizes (κ = .91), arithmetic (κ = .74), and other number utterances (κ = .79). The frequencies of these categories of number utterances were summed to create the total parental number talk variable.

Parental Money Talk

Grocery shopping transcriptions were coded for instances of parental money talk by searching utterances for key terms related to money or purchasing. These terms included number words (e.g., “seven”), money words (e.g., “bill”, “dollar”, “dime”, “card”), purchasing words (e.g., “pay”, “total”, “change”, “receipt”), finance words (e.g., “afford”, “decline”, “sale”, “expensive”), and elicitations (e.g., “how much”). These utterances were verified by a coder to ensure that words that contained search terms or non-numeric uses of search terms were not included, consistent with the Parent Number Talk coding protocol. Additionally, number words were only considered money talk when they referred to money or purchasing (e.g., “That costs six dollars”) and elicitations were only coded when they referred to the cost of items or the value of money (e.g., “How much does that cost?” or “How many bills are there?”). Additionally, coders did not include money-related search terms that were used with an alternative meaning (e.g., “I need you to change spots with me”) nor any number-related search terms unrelated to money (e.g., “I’ll have two pizzas”). All verified utterances were then coded categorically based on the mathematical category of the talk used or purchasing interactions being represented. To reduce overlap, only one code would be used for each individual utterance and categorical codes were ranked hierarchically based on complexity and rarity of the math or purchasing topic. Descriptions, examples, and summary statistics of each categorical code are shown in Table 2.

Four coders, including three full-time research staff and the first author of this manuscript, were involved in the coding scheme development, training, and annotating of the grocery shopping transcriptions for money talk. First, the money talk categories were developed by adapting the number talk codes for money-specific situations, watching several videos, and reading their transcriptions to extract additional themes. Next, the coders independently annotated three videos for instances of money talk based on an initial set of categories and the identified codes were compared across coders per video. Coding discrepancies were discussed as a group and the coding protocol was updated and refined with deletions, clarifications, and additional examples. Then, all coders completed two additional transcriptions which were checked by the coding lead, who provided utterance-level feedback. Then, beyond the practice transcripts, 27% of the transcripts (n = 34) were double-coded and Kappa statistics were used to determine coder reliability in identifying categories of money talk, including arithmetic (κ = .82), numeral identification (κ = .72), counting (κ = .90), price labeling (κ = .89), finance (κ = .80), value labeling (κ = .82), naming bills and coins (κ = .82), exchanges (κ = .77), and other money utterances (κ = .75). The frequencies of these categories of money talk were summed to create the total parental money talk variable. Some of these money talk utterances overlapped with the number utterances, i.e., they were considered both money and number talk.

Additionally, “other” money talk utterances often included references to a credit, debit, or some other type of card, which can be considered sociocultural-based substitutes for money (and not money per se). On average, this category of money talk occurred relatively more frequently (M = 5.11 utterances, SD = 3.56) than many other types such as naming bills and coins (M = 1.04, SD = 2.01), which aligns with United States’ consumers’ increasing tendency to make payments with credit and debit cards instead of cash (Cubides & O’Brien, 2023). Since our grocery activity materials included a card (and we did not specify what kind), dyads had the option to discuss and use this cash substitute. If the use of a card for purchases is part of families’ typical “money practices,” we wanted to capture it. To ensure that our findings were not impacted by talk involving cards, we ran post-hoc analyses after removing number and/or money talk utterances that referenced a card, and our pattern of findings did not change (see Supplementary Materials).

Independent Parental Number and Money Talks

Given the high intercorrelation between parents’ money talk and number talk and the frequent co-occurrence of these in parental utterances, we derived the counts of utterances that contained number talk only (e.g., “I’ll have two pizzas”), money talk only (e.g., “Here’s your change”), and both money and number talk (e.g., “That’s two five-dollar bills”). In other words, we generated three, independent counts of parents’ money and number talk such that utterances only fell into one of these three categories.

Table 2

Descriptions, Summary Statistics, and Examples of Money Talk Codes (Unimputed Data, N = 123)

Variable	Description	Example	*M* (*SD*)
Arithmetic	Referencing or requiring the use of operations facilitated by money or in relation to a price or amount of money.	"If we have one dollar and one dollar, what is that all together?"	0.62 (1.69)
Numeral identification	Using Arabic numerals in the context of money or purchasing (e.g., labeling numerals on bills or other money items, identifying or looking for numerals on or in reference to an amount of money).	"See the five on this bill?"	1.29 (2.51)
Counting	Referencing the count list, such as counting by fives, tens, etc., asking the other person to count, or asking questions about counting when discussing bills or coins.	"One, two, three dollars."	1.21 (2.49)
Price labeling	Labeling the price of objects.	"Your total is seventeen dollars!"	7.29 (7.01)
Finance	Discussions or negotiation of price, price comparisons, or exclamations of the value versus price.	"Oh, are these on sale?"	1.67 (2.34)
Value labeling	Using cardinal values to identify the value of money. This could include giving a value to a set of bills or change not in relation to the price of an object or objects.	"I have thirty-five dollars here." "Hand me five dollars. "	2.85 (3.79)
Naming bills and coins	Using numbers (e.g., "fives") or names (e.g., "dimes") to refer to bills and coins.	"Those green bills are ones."	1.04 (2.01)
Exchange	Transactions without any math or number use, including exchange of goods for money, giving change, or explaining how the exchange should be performed.	"Do I get any change?"	5.10 (3.97)
Other	Other talk where money was clearly referenced but did not fit into any of the categories above	"That's a credit card."	5.11 (3.56)
Total			20.66 (13.92)

Children's Number Skills

Children completed assessments of their cardinal number knowledge and counting skills. A modified version of the Give-N task was used to measure cardinality at age 4 (Wynn, 1992). During Give-N, children were presented with a set of plastic counters (fish) and were asked to help a bear puppet, manipulated by the experimenter, count by giving the bear the right number of fish to eat. Children were asked to produce a set of one to six fish, presented in a pseudorandom order (e.g., "Can you give the bear three fish?"). After each trial, the experimenter confirmed that the child gave the correct number (e.g., "Is that three?"), regardless of children's accuracy. Children completed two sets of the six trials (i.e., one to six) each with different bear puppets. Unlike in previous versions of Give-N which calculate a child's knower-level, children in this study were scored on overall accuracy, calculated as the percentage of correct responses provided out of all 12 trials. In the case of trial-level missing data, if children did not complete at least 80% of trials but did complete the first set of one through six, accuracy on these first six trials alone was calculated. This version of the Give-N task has been found to be highly reliable in past work (weighted κ = .87; Marchand & Barner, 2020).

To measure children's counting skills, they were asked to count out loud independently. If a child stopped without making a mistake, they were prompted to continue (e.g., "What comes next?"). If the child noticed a mistake they made while counting, they were allowed to start over or correct their mistake. The child would be stopped by the experimenter if they reached 100 without mistake. Count list knowledge was scored as the highest number that the child could count to without making any mistakes.

Socioeconomic Status

Parents completed a questionnaire detailing their family's economic information. Parents' SES was calculated from their reported yearly household income in U.S. dollars and highest level of education. Parents' educational attainment was converted to a variable representing years of completed education, where "less than a high school diploma or general equivalency diploma" = 11 years, "some college but no degree" = 13 years, "associate's degree" = 14 years, "bachelor's degree" = 16 years, "graduate degree" = 18 years. An SES composite was derived from averaging the *z*-scored education and income variables.

Age 5 Measures

Money-Specific Math Skills

An assessment measuring children's applied math problem solving skill in the context of money was developed specifically for this study. The task was developed based on items and concepts that preschool-aged children would encounter in the Applied Problems subtest of the Woodcock-Johnson Tests of Achievement (Schrank et al., 2014). Specifically, we created items that required magnitude comparison or arithmetic in word problems relating to money. The first version of the assessment contained 11 items and after piloting, five items that showed ceiling or floor effects were removed. One of these items, "How many quarters do you need to make a dollar?" showed ceiling effects. Four out of the five items showed floor effects; they included questions in which children were presented with sets of coins (e.g., two pennies and one nickel) and asked "How much money is this?". After removing items that showed ceiling or floor effects and considering the total assessment duration and potential participant fatigue, we had children complete only six items (instead of adding more items) while ensuring that the items were representative of a range of math concepts (e.g., including all four operations of math). The first two items involved addition and subtraction of coins or bills (e.g., "If you had six quarters and you spent three of them, how many quarters would you have left?" with 6 quarters shown on the screen). Additional items required children to compare values (i.e., determining which of three items with price tags they could purchase with 5 dollars), calculate change (i.e., "If you bought this candy bar that cost 50 cents with one dollar, how much money would you have left?"), do simple division (i.e., "this backpack usually costs 10 dollars, but today it is half off. How much would it cost today?"), and do simple multiplication (i.e., "How much money would you need to buy two of these games if they each cost 7 dollars?"). For all items, images were shown on the screen to reduce working memory load (e.g., two board games with $7 price tags for the addition item). Accuracy on these six items was scored as 1 (correct) or 0 (incorrect), and scores were averaged to form a money math skills composite. While the psychometric criteria of the Applied Problems subtest do not apply to our task, the split-half internal consistency of this measure is $r_{SB} = 0.84$.

Domain-General Math Skills

Children completed the Applied Problems subtest of the Woodcock-Johnson Tests of Achievement IV (Schrank et al., 2014), which is designed to measure their ability to analyze and solve math problems in everyday contexts. Items become progressively more difficult as the test goes on. Initial items require the application of basic number concepts, like counting, and advance to items requiring arithmetic and knowledge of different unit measurements. The assessment was adapted for online administration; stimuli were scanned and displayed individually on PowerPoint slides and children provided verbal responses. For items that required children to point, different colored arrows were placed under the stimuli and children were asked to identify which arrow was pointing to the correct response. Starting and stopping rules were followed as if the stimulus binder was used (e.g., children finished a full page in order to obtain a ceiling) despite the modifications for online administration. Standardized scores were calculated based on children's ages at the time of assessment. Past work has demonstrated high test-retest reliability for this scale in the norming sample (α = 0.92) and concurrent validity with other math assessments included in the Woodcock-Johnson as well as other standardized math assessments (McGrew et al., 2014).

Analysis Plan

To address our first research question regarding the frequency with which parents engage in money talk with their preschool-aged children, subcodes of money talk were totaled for all dyads, and descriptive statistics for all codes were calculated. After collapsing the subcodes, patterns of missing data were examined; missing data ranged from 0% (e.g., age, gender, and cardinality at age 4) to 16-18% (i.e., age 5 math outcomes) across analytic variables. All data were imputed using the 'mi impute chained' command in Stata 15 to create 40 imputed datasets. All regression models were estimated on imputed data, with estimates of standardized coefficients and R2 statistics calculated using the 'mibeta' package to estimate averages across imputations.

To address our second research question on the associations between parental money talk and children's applied problem solving with money, we estimated three separate models of children's performance on the novel money task at age 5 using the count of parental utterances including money talk, then the count of parental utterances using number talk, and then both variables. To address our third research question on the relations between co-occurring money and number talk and children's applied problem solving with money, we estimated one model of children's performance on the money task at age 5 using the counts of utterances containing number talk only, money talk only, and co-occurring money and number talk. All of these models also included covariates, including parents' overall number of utterances to control for more general differences in parental linguistic input, children's number skills (i.e., Give-N and counting scores from age four) to account for individual differences in math skills at the time of the parent-child interaction, and SES to adjust for broader contextual differences between families.

Finally, to address our fourth research question about whether these associations were specific to children's math problem solving in the context of money or extended to applied problem solving in other contexts, we estimated the same series of regression models with Applied Problems scores as the dependent variable. Again, three separate models of children's math scores were estimated using money talk, then number talk, and then both variables. Last, we estimated one model of children's math scores with the counts of utterances containing number talk only, money talk only, and co-occurring money and number talk, while controlling for overall parental utterances, foundational number skills, and SES.

Results

RQ1: What Is the Frequency With Which Parents Discuss Money Concepts With Their Children in the Context of a Grocery Store Task?

To answer our first research question, we examined the frequencies of each number and money talk code category used by parents within the grocery shopping activity. Average counts across parents are shown for each code in Table 2. Talk about price labeling was the most commonly occurring type of money talk, followed by discussion of exchanges and other, uncategorized money talk. Given the low frequencies of many of these codes, a money talk composite was calculated as the sum of all codes, excluding the exchange category based on preliminary analyses suggesting that this category did not align with other money talk codes (see Supplementary Materials). Descriptive statistics for and correlations between the money talk and all other study variables are shown in Table 3.

Table 3

Correlations and Descriptive Statistics for All Study Variables (Unimputed Data)

Variable	1	2	3	4	5	6	7	8	9	10	11
1. All Number Utterances	1.00										
2. All Money Utterances	0.75***	1.00									
3. Only Number Utterances	0.57***	-0.05	1.00								
4. Only Money Utterances	0.21*	0.61***	-0.12	1.00							
5. Money & Number Utterances	0.81***	0.95***	-0.01	0.34**	1.00						
6. Overall Utterances	0.29**	0.15	0.33***	0.16	0.12	1.00					
7. Money-related math skills	0.13	0.21*	-0.08	0.08	0.22*	-0.15	1.00				
8. Applied Problems	-0.01	-0.03	-0.01	-0.09	-0.00	-0.05	0.54***	1.00			
9. Cardinality	-0.03	0.01	-0.03	0.01	-0.01	-0.12	0.33***	0.62***	1.00		
10. Counting	0.02	0.01	-0.01	-0.07	0.03	-0.13	0.47***	0.45***	0.37***	1.00	
11. SES	-0.01	-0.01	-0.09	-0.09	0.03	-0.19*	0.19*	0.35***	0.51***	0.15	1.00
M	19.90	20.66	6.92	7.68	12.98	156.34	0.59	104.19	0.81	22.66	0.08
SD	14.30	13.92	8.32	4.50	11.73	47.87	0.49	17.68	0.25	20.11	0.77
Obs.	123	123	123	123	123	123	107	105	126	120	124

*$p < .05$. **$p < .01$. ***$p < .001$.

RQ2: Is Money Talk, Separate From Talk About Numbers More Generally, Linked to Children's Money-Related Math Skills?

Money talk was used to predict children's ability to solve math problems in the context of money while controlling for the total number of parents' utterances during the interaction task, children's foundational number skills, and family SES. This model was significant overall, $F(5, 108.9) = 7.88$, $p < .001$, and on average, explained 28% of the variance in children's scores on the money task across imputations. As shown in Model 1 of Table 4, parents' use of more money talk when playing with their children at age 4 was associated with higher scores on the money task at age 5, such that a one standard deviation increase in money talk was associated with a 0.22 standard deviation increase in children's scores. A similar pattern of findings was observed with parents' number talk, $F(5, 108.8) = 7.29$, $p < .001$, R2 = .26 (shown in Model 2 of Table 4), where the count of parental utterances that involved number talk was significantly related to children's money knowledge ($\beta = .19$). In order to tease apart these associations, we included both money and number talk counts in a single model (Model 3 of Table 4); this model was also significant overall, $F(6, 108.9) = 6.67$, $p < .001$, and explained 27% of the observed variance in money knowledge. When controlling for overall talk, children's prior number skills, and SES, neither money talk or number talk was uniquely predictive of children's skills.

Table 4

Regression Models Predicting Money-Related Math Skills at Age Five From Overall Money and Number Talk Observed During Parent-Child Interactions at Age 4 (Imputed N = 126)

	Model 1		Model 2		Model 3	
Predictor	***B***	***SE***	***B***	***SE***	***B***	***SE***
Money Utterances	0.008*	0.003	–	–	0.001	0.005
Number Utterances	–	–	0.007*	0.003	0.007	0.004
Overall Utterances	-0.001	0.001	-0.001	0.001	-0.001	0.001
Cardinality	0.294	0.206	0.302	0.209	0.296	0.207
Counting	0.009***	0.002	0.009***	0.002	0.009***	0.002
Family SES	0.048	0.068	0.044	0.068	0.047	0.068
Constant	0.137	0.229	0.201	0.229	0.141	0.231

*$p < .05$. **$p < .01$. ***$p < .001$.

RQ3: Is Parental Money Talk That Co-Occurs With Number Talk Associated With Children's Money-Related Math Skills?

To examine the independent contributions of money and number talk, as well as their co-occurrence, the three talk variables (only money talk, only number talk, and co-occurring money and number talk) were included as predictors of money knowledge, $F(7, 112.8) = 5.84$, $p < .001$ (Model 4 in Table 5). Controlling for the overall count of utterances said by the parent, prior math skills, and SES, the count of co-occurring money and number utterances was the only factor related to children's ability to solve math problems in the context of money ($\beta = .21$). As such, the associations between money talk and math skills in the context of money shown in Table 4 seem to be driven by money talk that involved numbers, while money talk without numbers and number talk that was not in the context of money were not related to children's performance on the money task.

Table 5

Regression Model Predicting Money-Related Math Skills at Age Five From Utterance-Level Money and Number Talk Counts Observed During Parent-Child Interactions at Age 4 (Imputed N = 126)

	Model 4	
Predictor	***B***	***SE***
Money and Number Utterances	0.009*	0.004
Only Number Utterances	0.000	0.005
Only Money Utterances	0.003	0.010
Overall Utterances	-0.001	0.001
Cardinality	0.301	0.208
Counting	0.009***	0.002
Family SES	0.035	0.066
Constant	0.151	0.224

*$p < .05$. **$p < .01$. ***$p < .001$.

RQ4: Does Parental Money Talk Predict Children's Math Skills More Generally?

This same set of models was then estimated with children's scores on the Applied Problems subtest of the Woodcock Johnson as the dependent variable. As shown in Table 6, neither money talk nor number talk was significantly related to children's more general math problem solving skills when added to regression models individually, $F(5, 106.9) = 13.53$, $p < .001$, and $F(5, 106.7) = 13.43$, $p < .001$, respectively (Models 1 and 2) or together, $F(6, 107.3) = 11.57$, $p < .001$ (Model 3). Likewise, when examining the co-occurrence of money and number talk, utterances with only money talk, and utterances with only number talk, $F(7, 111.3) = 10.46$, $p < .001$ (Table 7), none of the three talk variables was significantly related to children's Applied Problems scores.

Table 6

Regression Models Predicting General Math Skills at Age Five From Overall Money and Number Talk Observed During Parent-Child Interactions at Age 4 (Imputed N = 126)

	Model 1		Model 2		Model 3	
Predictor	***B***	***SE***	***B***	***SE***	***B***	***SE***
Money Utterances	-0.033	0.103	–	–	-0.114	0.146
Number Utterances	–	–	0.023	0.106	0.109	0.149
Overall Utterances	0.017	0.037	0.013	0.039	0.011	0.039
Cardinality	32.583***	6.433	32.686***	6.435	32.786***	6.442
Counting	0.230**	0.069	0.227**	0.069	0.227**	0.069
Family SES	2.899	2.121	2.864	2.122	2.815	2.123
Constant	70.111***	7.582	69.536***	7.609	70.486***	7.616

*$p < .05$. **$p < .01$. ***$p < .001$.

Table 7

Regression Model Predicting General Math Skills at Age Five From Utterance-Level Money and Number Talk Count Observed During Parent-Child Interactions at Age 4 (Imputed N = 126)

	Model 4	
Predictor	***B***	***SE***
Money and Number Utterances	0.079	0.129
Only Number Utterances	-0.008	0.173
Only Money Utterances	-0.490	0.362
Overall Utterances	0.016	0.040
Cardinality	33.246***	6.393
Counting	0.232**	0.069
Family SES	1.966	2.047
Constant	71.636***	7.408

*$p < .05$. **$p < .01$. ***$p < .001$.

Discussion

The current study examined variability in parental money and number talk during a pretend grocery shopping activity with their young children and explored associations with children's math skills specifically in the context of money and broader math knowledge. Consistent with past work demonstrating a link between children's money experiences and their skills using money (e.g., Guberman, 2004), we found that the frequency of parents' money talk—one facet of children's everyday experiences with money—was associated with children's ability to solve math problems involving money. Further, this relation appeared to be driven by money talk involving numbers, yet increased talk about numbers in other contexts did not predict children's money skills. In other words, children's money skills may be more strongly supported by interactions in which conversations about money and number co-occur (e.g., arithmetic with bills) than discussions of non-numerical, instrumental money activities (e.g., asking for change in general, "Do I get any change?") or non-money related number talk (e.g., counting sets, "Look at these three apples"). This pattern of findings did not extend to children's broader math skills, consistent with past literature finding no significant association between parents' number talk and children's math skills (e.g., Leyva et al., 2019).

Importantly, all of our analyses controlled for children's earlier counting skills suggesting that parents' conversations about money are predictive of children's math skills in the context of money even when basic numeracy skills are accounted for. Overall, the results of the present study suggest that parent-child interactions about money in culturally embedded math contexts, such as a grocery shopping activity, may foster children's acquisition of specific content knowledge about money above and beyond earlier counting skills. Parental money talk is particularly important for children's math skills in the specific domain of money use, rather than their broader math skills.

Our findings extend the existing literature on parental math support by investigating parent-child discussions about math in the context of money and uncovering the specific type of money talk, i.e., with numbers, that relates to children's skills. These results align with existing theories suggesting that early math development is language-based and domain-specific. In the extant literature, parents' overall talk is related to children's language skills (see Anderson et al., 2021 for a meta-analysis), number talk is related to number skills (see Silver et al., in preparation for a meta-analysis) and spatial talk is related to spatial skills (see Wu et al., 2022 for a review).

However, inconsistent with most of the literature on parent-child number talk (e.g., Silver et al., in preparation; Son & Hur, 2020; Susperreguy & Davis-Kean, 2016), we found that the frequency of parent number utterances did not significantly relate to children's overall math skills. Some studies have reported null associations between parent number input and children's math skills (e.g., Duong et al., 2021; Elliott et al., 2017; King, 2022; Leyva et al., 2019), and recent evidence in the broader study of the home math environment suggests that these mixed findings may be due to measurement differences. The relation between number or math talk and children's math skills may be driven by particular types of talk, which are not consistently captured across studies, such as conversations about "advanced" concepts (e.g., arithmetic or talk about larger numbers for preschool-aged children) (e.g., Elliott et al., 2017; Mutaf-Yıldız et al., 2020). Thus, it is possible that the null association between parents' number talk and children's math skills in our study is due to a lack of specificity in the type of talk that may relate to children's concurrent math skills. Future studies should explore different types of number talk, their co-occurrence with types of money talk, and the relation to children's money-specific and general math skills.

Our findings are of particular interest for the development of strengths-based early childhood math interventions. Talking about math in the context of money may be easily integrated into family routines and pretend play, providing preschool-aged children with developmentally-appropriate opportunities to strengthen their understanding of money-related math concepts. This sentiment aligns with past work by Guberman (2004) illustrating that parents and children engage in math- and money-related activities in the home and that this may support their ability to apply their math skills in problem-solving contexts involving money. Specifically, researchers compared Latin American and Korean American children's involvement in "out-of-school" math activities with and without money and found that children's performance on arithmetic assessments tended to correspond to their out-of-school practices. Latin American caregivers often reported their child's engagement in routine activities involving money (e.g., inserting coins into the washing machine or making transactions at the grocery store) with greater "arithmetical complexity" than was reported by Korean American parents, possibly due to the expectation of Latin American children to regularly contribute to the household and family. In contrast, Korean American caregivers reported that their children's experiences with money were generally limited, e.g., to receiving money during special occasions and instead engaged in academic activities such as completing math workbooks outside of school, which involved math in a more abstract sense. As such, Latin American children seemed to have relatively more experiences with math in the context of money, and in turn, Latin American children correctly solved more arithmetic problems involving currency, whereas Korean American children correctly solved more problems with chips representing numerical values (and not currency). Thus, instead of talking about math in an abstract way, mathematical conversations in the context of money may provide children with a clear, hands-on use of math skills that is important for everyday life. Given that children's money and math-related experiences in everyday contexts can mirror their ability to solve different types of math problems, future studies should explore whether different types of money talk, e.g., those occurring with or without numbers or math, may relate to different types of money skills such as knowledge of the values of bills and coins versus the ability to arithmetically manipulate money.

We acknowledge several limitations of the current study and provide suggestions for future work to address these limitations. First, we developed a novel assessment of children's money-specific math skills and while this measure had good internal consistency, the psychometric criteria of the standard WJ AP do not apply to our task. Future work should comprehensively examine the reliability and validity of this assessment. Evaluating the psychometric properties of this task can include addressing the consistency of the task over time (test-retest reliability), whether the task reflects most or all aspects of money-related math skills (content validity), and whether this measure agrees or correlates with variables that are of theoretical relevance and are measured concurrently or in the future (criterion validity). For instance, researchers can examine the correlations between scores on our new task, the money knowledge and skills measures used in the literature reviewed in this paper (Guberman, 2004; Saxe, 1988a), and standardized assessments of money skills that children are exposed to in formal schooling. Also, it would be useful to determine whether this task can capture changes in children's performance over time and test the invariance of this measure across cultures.

Moreover, due to the COVID-19 pandemic, we adapted the age 5 math assessments (i.e., WJ AP and money-specific problem solving) for online administration. Like the in-person administration of these tasks, some questions required children to respond verbally, and for items that required them to point, we placed different colored arrows under the stimuli and children were asked to identify which arrow (i.e., by color) was pointing to the correct response. This request to identify the color associated with their response may have introduced additional cognitive demands for some children and affected their performance. Thus, our findings may be partially driven by children's ability to remain focused and engaged, as well as map their choices to the arrows in order to respond. However, recently published research using the same sample (Carver et al., 2022) found that children's WJ AP scores at age 4 and 5 were highly positively correlated ($r = .74$, $p < .001$). Also, research with even younger children (2- to 3-year-olds) showed that there were no significant differences in performance on a cardinal number knowledge task between children tested in-person and remotely (Silver et al., 2021). Nonetheless, we acknowledge the possibility that the virtual context may have affected some children's performance and hence our results.

Another limitation of this study is that our semi-structured observations may have captured how caregivers and children interacted under ideal or potentially unrealistic situations, e.g., with little to no distractions or access to the task materials and time, and only considered one caregiver, primarily mothers. Past research suggests that fathers' and mothers' interaction styles differ and may influence children's early learning in unique ways (Leech et al., 2013). Thus, future research should consider conversations in more naturalistic settings, by recording interactions at families' local grocery stores or with existing grocery toys in the home, while accounting for different family structures, to increase the ecological validity of these findings.

Also, we can only speculate on the direction of the positive association between the quantity of parents' money talk involving numbers and children's money-related math skills. It is possible that parents' money talk facilitates children's acquisition of money concepts, and these concepts are reinforced through repeated practice of math skills involving money, e.g., arithmetic with coins and bills. Alternatively, parents may employ greater money talk if they believe that their child is equipped with the knowledge and abilities to appropriately respond to and engage in certain discussions about money, such as exchanging currency or comparing prices. It is likely that both of these mechanisms are at play and future research may seek to experimentally manipulate parents' money-related linguistic input in everyday, cultural contexts, such as grocery shopping (e.g., Hanner et al., 2019; Braham, Libertus, & McCrink, 2018; Shivaram et al., 2021), and observe how children's money and broad math abilities change over time. Given that parental language input supports the development of children's language and math skills (e.g., Anderson et al., 2021; Casey et al., 2018) and that early financial literacy interventions can promote changes in children's attitudes about and knowledge of money and financial practices (Hagedorn & Schug, 2021), it is possible that parents' linguistic input about money during everyday routines would causally relate to children's money skills.

Additionally, our findings suggest that money skills and domain-general math abilities may be distinct constructs and future work should examine different kinds of money skills and explore what types of money talk predict different skills. Past research suggests that children's money knowledge is a multi-dimensional construct (Guberman, 2004), and while our novel money task assessed a variety of math skills involving money, including magnitude comparison and arithmetic, we could not differentiate these constructs in the present study. Also, future research should investigate the factors that potentially shape and drive parent-child money talk, such as parent education and math skills, and more broadly, families' economic experiences and practices. Our study found that family SES, a composite of family yearly income and educational attainment, was not significantly correlated with parent money talk at the zero-order level. However, past studies have found that the quantity and quality of parental language input that young children hear vary between and within SES groups (e.g., Schwab & Lew-Williams, 2016) and that children's attitudes, knowledge, and skills surrounding money and finances is partially shaped by their own economic experiences, including the everyday money-specific behaviors of their parents (LeBaron & Kelley, 2021). Thus, it is possible that SES (or parental income and education separately) relates to certain types of parent-child discussions of money, whether these conversations involve math concepts, and the contexts in which they occur.

Lastly, the generalizability of our results may be limited to families that match the demographics of the majority of our sample and future research should examine cultural and socioeconomic variability in parent-child interactions surrounding money in a variety of contexts such as the home (e.g., cooking and mealtimes) and community spaces (e.g., museums, parks). Although we believe that our sample is relatively more racially and socioeconomically diverse than some lab-based studies, our sample still primarily consisted of White families with an average income above $100,000 (even though a wide range of yearly incomes were reported), our results may not generalize across cultures or SES. Past research suggests that parents are primarily responsible for shaping their children's attitudes, beliefs, and behaviors related to finance and money and that this transmission of values often occurs through parent-child conversations throughout the lifespan (LeBaron et al., 2020; LeBaron & Kelley, 2021). Relatedly, parenting practices, including teaching children about money, and general financial practices (e.g., saving) are linked with family culture and SES (Magnuson & Duncan, 2002; Otto, 2013). Thus, it is likely that parent-child discussions about money during everyday activities vary based on families' lived experiences with money. These are important differences to uncover if we are interested in leveraging extant parent-child conversational practices to inform interventions that support children's developing math and money skills.

Conclusion

The extent to which parents engage in money talk with their children in a grocery shopping context has the potential to support children's developing money and math knowledge. Although parents' money and number talk were not significantly related to children's broader math skills, we found that parents' money talk during pretend grocery shopping was positively associated with children's ability to solve applied problems involving money and this was driven by the co-occurrence of talk about money and numbers. Our results provide nuanced insight into the contribution of parent-child conversations during familiar, everyday contexts such as grocery shopping, which provide rich opportunities for families to engage in discussions of culturally relevant practices and behaviors surrounding money, as well as practice early math skills in the context of money. Along with past work on children's math development in culturally embedded math contexts (e.g., Leyva, 2019; Vandermaas-Peeler et al., 2018), we hope our findings motivate future work to consider how existing family practices and everyday contexts support children's early math.

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Data Availability: The data analyzed in this project are from an ongoing longitudinal study and will not be publicly available until its completion per our data sharing plan with our primary funder, the National Institute of Child Health and Human Development. However, the analysis code is available from the authors upon request.

Supplementary Materials

The Supplementary Materials contain information about the reliability of the money talk codes and the results of post-hoc analyses in which talk referencing the use of a card for purchases was removed to ensure that our pattern of findings was not impacted or driven by these discussions (for access, see Duong et al., 2024).

Index of Supplementary Materials

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