Family Math Research Agenda

Developed by the Family Math Roadmap Implementation Project’s Research Work Group
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Center for Family Math
A center of NAFSCE—National Association for Family, School, and Community Engagement
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Introduction

The Center for Family Math (the Center) is an initiative of families, researchers, practitioners, advocates and funders intended to close opportunity gaps by promoting family math. The Center’s mission is to advance research, policies, practices, partnerships, and systems that inspire, harness, and amplify the power and love of math through family and community engagement. Family math refers to activities that happen outside the classroom and within the context of family relationships, the community, and everyday life, that support children, youth, and families by strengthening their math awareness, understanding and confidence. By building and growing a family math movement, supporting research and scholarship, providing resources, helping the field set priorities, and connecting stakeholders, the Center will work to ensure that all families and children – particularly those from low-income communities and communities of color – see themselves as math learners equipped with the attitudes, confidence, and experiences to grow math knowledge and skills.

History of the Project

In 2016, the Overdeck Family Foundation, Heising-Simons Foundation, Bill & Melinda Gates Foundation, Robert R. McCormick Foundation and Chicago Mercantile Exchange Group Foundation collaborated with a diverse group of researchers, parents, educators, and policymakers to create a Roadmap for Supporting a Family Math Movement. This work generated the Family Math Roadmap Implementation Project (the Project), a three-year effort to build the foundations of a national family math movement, including foci on research, practice, policy, advocacy, and philanthropy. The Project’s Research Work Group produced this Family Math Research Agenda to provide guidance for the field. The Research Agenda’s designated “priorities” are meant to generate research questions and approaches that will be useful for informing the family math movement in its efforts to increase equity, family leadership, asset-based approaches to problem-solving, and the development of community-based resources. They are presented to help researchers, funders, and policy-makers generate new family math knowledge and understanding that will propel the field toward social justice.

Through its 2021/22 strategic planning process, the Center identified three primary objectives for its work in research, guided by this agenda. The Center seeks to:

● Support, encourage, and/or stimulate research that informs timely and actionable ideas for policy, practice, and professional development.
● Curate, communicate, and disseminate research that differentiates the benefits of family math practices and programs for different groups under different circumstances.
● Identify and build partnerships that can strengthen and sustain the research base for family math.

Development of the Priorities
The Research Agenda features seven priorities. These priorities were derived from several different sources and with the involvement of many people. A literature review, commissioned by the Project and conducted by Eason, et al., (2020), was a guiding resource. A set of Measurement Guidelines created by Project members based on the identified Values of the Project were used as a lens, to build on the findings and recommendations of Eason and colleagues. The twin goals of elevating equity and parent voice while de-emphasizing the tendency to characterize traditionally marginalized groups using deficit-focused thinking and language were foremost in our thinking.

To facilitate input from diverse stakeholders, a series of meetings was held between two groups: the project’s Parent Advisory Council -- a consultative group of parent leaders--and its Research Working Group--a set of researchers and practitioners with vested interests in family math work. Results from these meetings were distilled and incorporated into the Agenda’s priorities. Text for each priority had an author and editor team, and feedback on the document was sought from members of the Project’s Coordinating Committee, seasoned research experts, and other family math stakeholders. The final draft reflects editing and input from the Center’s recently constituted Family Math Research Consortium.

Preceding the priorities, the Research Agenda offers a set of “non-negotiables”: standards that, for the Center, will not merely be recommendations, but will provide guidelines, specifying which types of research the Center itself will support, disseminate, and encourage.

Non-negotiables: Family Math Values in Research

The following non-negotiable requirements reflect two themes that surfaced over and over throughout the work of the research workgroup to develop this agenda. They cut across all of the priorities and represent foundational values. These requirements are set with the intention of addressing the existing power dynamic between community organizations, families, researchers, and funders. Because research can bring attention, support, and money to participant programs and families, there is a built-in bias for participants to be compliant research partners, with little input into intervention planning, study design, analysis of results, and efforts to disseminate findings. In all cases, researchers wield substantial power in shaping the questions asked and the inputs and activities used to answer them, and are beneficiaries of the information participants share with them. It is therefore their responsibility—whether acting as individual researchers or as part of a research organization— to have acute awareness of this power dynamic and to work intentionally to redistribute power as much as possible while maintaining rigor.

As is the case with the research agenda priorities, these non-negotiable requirements are intended to guide the work of the Center, while at the same time, informing the family math research field. In an effort to hold itself accountable, the Center will limit
the use of its resources to 1) proposals and studies that center families in the work, and 2) proposals and studies that build equity into their design. These ideas are expanded upon below.

**REQUIREMENT #1: Centering families**

Proposals and studies that center families in the work:

- Assume and acknowledge existing family strengths and funds of knowledge
- Include family input in key decision points, such as determining objectives and questions, and designing and choosing tools
- Compensate families for their role and plan research activities to prioritize family convenience
- Consult with families when interpreting and reflecting on findings, incorporating their input in dissemination efforts
- Ensure research findings are accessible beyond the research community, and specifically made accessible for families, addressing issues of language, outreach, and readability
- Design these family-centering efforts in ways that build leadership in underrepresented communities and reflect their cultural diversity
- Ensure meaningful collaboration and inclusivity by systematically forming and sustaining authentic partnerships that involve families

**REQUIREMENT #2: Building equity**

Proposals and studies that build equity into their design:

- Come from a conceptual framework that explicitly acknowledges the need to improve access to resources for historically marginalized communities
- Ensure that all involved researchers have a working knowledge of bias and systemic racism
- Incorporate mechanisms for self-examination in terms of race and other identity markers at both the individual and team levels
- Approach measurement in ways that are culturally affirming and responsive to children, families, and communities
- Actively seek diversity in participation and perspectives
- Conduct research that informs efforts to actively interrupt policies and practices currently shaping family math that have their own structural racial inequities, racial discrimination, and bias.
Recommended Priorities for Family Math Research

The following seven priorities are issue areas in which the Center will seek to increase research. Each priority emphasizes the need for a particular kind of work; that is, it recommends a topic of study that is underrepresented in the literature, or it endorses research processes that support family and community voice and leadership. For each priority, we offer rationales -- a few key reasons we believe more of this type of research is needed. This is followed by references that support those rationales, along with sample research questions and existing resources that might be helpful to those who want to address the priority.

PRIORITY #1-Families in Context

The Goal for the Field: Expand our definition of family math to include and value more existing family routines and patterns

The Specific Need: More open-ended, qualitative (e.g., ethnographic, case studies, mixed methods) studies that focus on families within a particular social context (SES, race, ethnicity, language, urban/suburban/rural) and document existing family routines and patterns that present math learning opportunities for children

Rationales

1. The “deficit-focused” literature base must be replaced with work that highlights strengths and opportunities for growth among families; for that, we need a fresh perspective on what constitutes “good” family math engagement.

All good research is guided by questions, but not all questions are good ones. Specifically, the research literature related to math achievement has a problematic history of asking questions that associate marginalized children and families with deficits. Questions such as “why do these children not achieve as much as their white counterparts?” and “what is it that white families are doing that families of color seem not to do?” have the damaging effect of problematizing people rather than systems. Further, a persons-with-deficits research focus has not proved successful in creating widespread and long-lasting change of the kind that is needed. To replace this orientation with different, more just, and helpful thinking, we need to approach family math as a discovery process that assumes all families have funds of knowledge that can be studied and described and that pointing out systemic inequities is a more powerful lever for positive change than trying to understand the behaviors they cause and reinforce. Better questions might include “how are children
succeeding?” “what do families need?” “what assets do families have?” and “how can programs leverage those assets and meet those needs?”

2. It’s clear that there are many important differences (by SES, culture, race, language, e.g.) in what family math looks like, how it can be affected/leveraged, and how it might in turn affect other things (attitudes about math, school engagement, math achievement among children), but we don’t have a good roadmap to these differences.

Existing research has demonstrated that the ways that families interact with schools, with learning, and with math differ somewhat systematically between demographic groups, but our understanding of these differences is limited by the quantitative, achievement-focused research that describes it. Open-ended, qualitative work that focuses on one social context at a time, documenting its particularities and analyzing its strengths might make a big difference in our efforts to help families enjoy math. If we can better understand how families interact with math now, we can improve our efforts to strengthen family math.

Sample research questions

- What are the implications of families’ cultures for what kinds of educational supports are most helpful?
- How do we best equip families to support math learning in their home language in ways that integrate well with math in school, whether taught in English or not?
- How does home language support math learning in school?
- What are families doing already that can serve as foundations for promoting early math?
- What kinds of ideas/attitudes/practices are available within underserved communities that can provide a platform to enhance family math engagement?
- What kinds of child behaviors elicit shared mathematical engagement within families?
- How does the family contribution to math development shift as children age and enter the school system? Are families more important before formal math education begins?
- How do race, language, and SES interact with the home-school relationship?
- How closely do caregiver beliefs about children’s math education parallel their beliefs about their overall education and their own math education, specifically?
- Are there missed opportunities for math learning at the grade school level because we fail to recognize how families in different cultures and contexts are already engaging in math?
- How does family engagement with math during everyday routines relate to the math homework support they can provide?
- Which settings/methods are most effective for reaching commonly underserved families, and does this vary for families from different cultures?

Resources for Studying Families in Context


References that Support the Rationales


Priority #2-Families as co-designers

The Goal for the Field: Broaden our understanding of effective strategies for co-designing family math programs and interventions and increase the role of families as collaborators in family math research.

The Specific Need: Studies that highlight the effects of involving families themselves in the design of interventions, program evaluations, and research studies.

Rationales

1. **We have reason to believe it will be beneficial to increase family input in study design related to family math—enhancing relevance, coherence, and effects/outcomes—but we need more thorough demonstration of this benefit.**

   We know from work in other fields that families have funds of knowledge, have expertise in their families and communities, and have assets to contribute to strengthen the relevance and effectiveness of programs, services, and research. There are a few studies that demonstrate this effect in work related to family math, but more are needed to influence the field as a whole to move in this direction. It is challenging to work in new ways and with additional partners. It requires more time, may require more funds, and certainly requires a more thoughtful and informed approach. We need to study work that clearly demonstrates the benefit of involving families and communities in designing family math programs and interventions specifically if we hope to see these practices become more common.

2. **Co-designing interventions with families around family math has the potential to increase both equity and effectiveness.**

   Involving families in the design of programming and evaluation addresses equity by empowering families and helping practitioners and researchers assess their own biases and negative assumptions. It further allows program design and evaluation to access family strengths and consider families’ wishes and desires, rather than jumping to solutions based only on existing theory. Co-design is a shift from doing “to” and “for” families to doing “with” families by actively
engaging them in the development and research process from beginning to end. Methods to achieve co-construction, such as human-centered design thinking, funds-of-knowledge approaches, and participatory design must be consciously incorporated into development processes to activate this resource for equity and effectiveness.

Sample Research Questions

- Are there benefits of co-design on families’ attitudes, knowledge, and practices around family math?
- How can co-design shift family math practitioners’ thinking about family math?
- How can co-design shift family math practitioners’ attitudes about the families they work with? Does co-design improve practitioners’ knowledge and understanding of families’ assets and funds of knowledge?
- How might co-design improve family math programs and services?
- Does co-design increase the cultural relevance of or reduce implicit bias in programs, interventions, and research?
- What strategies are effective in leveraging families’ funds of knowledge and expertise of their children and communities?

Resources for Studies that Involve Families as Co-Designers

The Family Leadership Design Collaborative (FLDC): https://familydesigncollab.org

Families & Communities in Curriculum Co-Design

References that Support the Rationales

[https://globalfrp.org/Articles/5-Benefits-of-Human-Centered-Design-Thinking-for-Family-Engagement](https://globalfrp.org/Articles/5-Benefits-of-Human-Centered-Design-Thinking-for-Family-Engagement)
[https://globalfrp.org/content/download/584/4750/file/GFRP_FamilyAgency&Voice.pdf](https://globalfrp.org/content/download/584/4750/file/GFRP_FamilyAgency&Voice.pdf)
PRIORITY #3-Co-created Measurement Tools

The Goal for the Field: Move toward greater equity in and shared responsibility for how we measure outcomes

The Specific Need: Work that involves families and communities in the design, development, and testing of assessment tools that measure shifts in math engagement, math attitudes, and math awareness

Rationales

1. **Since we must shift and rebuild our sense of what family math engagement may look like in different families and contexts, we must also shift the tools we use to measure it so that they are sensitive enough to detect it.**

   Part of the system that reifies the deficit-oriented literature about math achievement in marginalized families and communities is the use of tools that reflect a white-centered perspective. We need assessment tools that help us see family math engagement in new ways and in contexts that differ from those of many of the scientists who want to learn about and support them. Engaging families in co-design is one way to promote that.

2. **Tools may be more suited to their particular contexts if we involve families and communities in helping us to design them.**

   Research often strives to develop tools that will work in any context; for example, a good ruler should demonstrate that 12 inches is always the same length. But human beliefs, understandings, and behavior are far more divergent and complex than ideas like length and weight. Early childhood contexts in particular are diverse because they are deeply rooted in families, and families are divergent by culture, race, income, and a multitude of individual factors. By involving families and communities in our efforts to design useful tools, and becoming more comfortable with using different tools in different situations, we are more likely to detect and learn about a world of family math we will otherwise never study.

Sample Research Questions (see also sample questions for Priority 2 above)

- What are the challenges to co-creation of measurement tools? How can those be ameliorated?
- What are effective strategies for engaging families in the co-creation of measurement tools?
- How should we measure the quality of engagement in community-based programs?

Resources for the Co-Creation of Measurement Tools


References that Support the Rationales


**PRIORITÉ #4-Community-based Partnerships**

**The Goal for the Field**: Enhance communication and learning between researchers and practitioners and increase the amount of research that has direct implications for improving practice.

**The Specific Need**: More research-practice partnerships that co-design and evaluate family math resources, engaging in enduring two-way collaborations that mutually inform the science and practice of family math.

**Rationales**

1. **Research-practice partnerships are powerful tools for advancing science and practice as well as informing policy.**

   The critical importance of research-practice partnerships for advancing research, practice, and policy has been lifted up as a priority (and challenge) for educational, human service, and child development research. Defined by Coburn and colleagues (2013) as long-lasting, mutualistic collaborations that are organized to investigate problems of practice and solutions for improving outcomes, research-practice partnerships will help generate a cumulative family math knowledge base that is relevant to diverse family lives. Partnerships also hold the promise of helping dismantle systemic injustice by increasing the role of underrepresented and marginalized (but central) stakeholders in the development, design, and evaluation of family math practices. Moreover, partnerships are an avenue toward building on both (a) the cumulative research knowledge base and (b) existing strengths within communities by improving our knowledge of (and continuously improving) programs that are reaching families.

2. **Very little existing research directly evaluates community-based programs and even less does so from a research-practice partnership positionality.**

   To date, research on family math primarily consists of studies that are researcher-led with limited community-partner involvement. While the field has a growing number of observational and experimental studies in naturalistic family and community-based settings, this work has rarely involved research-practice collaborations co-designing and evaluating family math resources, approaches, or supports.

3. **Too little of the evidence base (and family math resources developed in the lab) from experimental and observational studies of family math has directly led to changes in intervention or the evaluation thereof.**
Research on family math practices that predict improved family engagement and improved child math outcomes is growing, with increasing evidence coming from naturalistic, experimental, ethnographic, and mixed method studies. And, at the same time, many community-based organizations are working to align their family math efforts with research evidence. Yet, it is rare for research-practice partnerships to carry lessons from the laboratory into the field or lessons from the field into the lab through research-practice collaborations. Such partnerships hold the potential to enhance both the speed and effectiveness of our efforts to translate knowledge into practice.

Sample Research Questions

- Are programs and family math resources in the field aligned with early math learning and family engagement research as well as with community strengths and priorities?
- To what extent and how are families engaged in community-based programs?
- How does implementation of community-based partnerships affect providers and researchers? Does practice benefit? Does research improve?
- How should we measure the quality of engagement in community-based programs?
- How do community-based partnerships affect the quality and/or quantity of family engagement in math learning, including family knowledge, efficacy, beliefs, attitudes, and behaviors?
- Which programs and/or program features best promote family and community engagement, and for whom (e.g., are families welcomed in from the margins or missing opportunities for engagement) are programs successful in promoting engagement?
- What are the outcomes of programs developed through community-research partnerships focused on family math?
- What are key differences between research-practice partnerships and community-research partnerships?
- Are there program impacts of community-based partnerships on children’s math learning, in the short term and the long term?
- From co-design to collaborative implementation to evaluation, what are the lessons learned (e.g., innovation principles) from family math research-practice partnerships?

Resources for Building and Studying Community-based Partnerships


References to Support the Rationales


Priority #5-Home/School connection

**The Goal for the Field:** Find methods to activate family math that enhance relationships with school in ways that provide greater access to educational equity for all children.

**The Specific Need:** Equity-oriented research is needed to clarify how schools affect home engagement, how home engagement affects school participation and achievement in math, and how schools and families can best partner to promote children's math skills and attitudes.

**Rationales**

1. **Out-dated beliefs around “family involvement in school”** (rather than strengths-based home-school partnership approaches) persist among educators despite theory and empirical work demonstrating the ways these beliefs create and reinforce inequity.

   Traditional beliefs about the roles of schools and families (and relationships between the two) place psychological, social, and physical boundaries between home and school, favor unidirectional communication from school to home over bidirectional collaboration, and restrict family engagement to school-dictated modes that are not equally accessible for all families (e.g., volunteering in the classroom, attending school events, or chaperoning a field trip). As a result, many families are marginalized by schools, and many schools are unable to tap into the considerable resources families can bring to educational partnerships. On the other hand, ethnographic, longitudinal, and experimental work demonstrates that strengths-based partnerships between home and school...
promote achievement and social-emotional development. Almost none of this work, however, has focused on home-school partnerships that center on math learning. Social-emotional and literacy foci are much more common.

2. **Prior research on the home-school connection shows that sociocultural factors, including race and immigration status, impact parents’ and teachers’ practices.**

Research demonstrates that math-focused communications are less frequent than other topics between educators and families of marginalized groups. Further, we know little about effective means of supporting home-school connections for educators working with children from diverse cultural backgrounds across all topics. In the United States, it is often the case that white, middle-class teachers are the ones working with children and families from the most racially marginalized groups. Our resources for preparing these teachers to learn about the students and families they are working with, reflect on their own biases, cultivate trusting relationships with students and families that are different from themselves, and leverage those relationships to support family math practice are extremely limited. There is also very limited knowledge on how diversity in family strengths can best be capitalized on to improve classroom practice, support family math, and build partnerships that are culturally meaningful.

3. **Understanding home-school connections can help us develop outcome measures that are meaningful to families, moving the field toward work that is immediately useful to those it is meant to serve.**

Often, grant funding is tied to mandated outcomes, such as standardized math assessments, which are generally not meaningful to families and have been identified as barriers to effective home-school partnerships. Research is necessary to redefine impacts and outcomes in ways that strengthen the home-school connection. Qualitative and nonexperimental research may offer the best means to capture the dynamic and complex nature of family math interventions.

**Sample research questions**

- How do family math communications (and barriers to communication) vary by sociocultural context?
- How does research influence practice? In particular, how has and how can critical theory (such as indigenous, feminist, post-colonial, critical race, post-structural, and others) research influence communications between home and school?
- What models of family math are available that build reciprocal and relational communications about math? What structures and strategies are effective and replicable in these models (e.g., home-based activities, cross-sector collaborations, culturally responsive pedagogies, the frequency and length of interventions, etc.)?
● How do families' cultural values and beliefs regarding math and education influence their participation in family math initiatives or their continuation of school practices at home?
● What are effective practices for partnerships between diverse families, teachers, and researchers in testing family math interventions in the field as well as scaling up research-tested programs?
● What alignments or misalignments exist in the ways schools and families define and assess ideal outcomes of family math interventions?
● Recognizing that outcomes are not limited to children's math achievement, what are effective ways to assess the mutual benefits—to both caregivers and children—of family math interventions?
● What are broader impacts of family math interventions on facets of the home-school connection, such as effect on family engagement at school, influence on teachers' cultural competence, or impact on relationships (child-peer, teacher-child, parent-teacher)?
● What strategies are most culturally appropriate and effective for teachers to use to support family math engagement in a way that builds on what children are learning in school?
● How do teachers’ perceptions of caregivers’ interest and capacity to engage in math activities with their children affect their practices and communication with parents?

Resources for Studying the Home-School Connection

Tran, Y. (2014). Addressing reciprocity between families and schools: Why these bridges are instrumental for students’ academic success. Improving Schools, 17(1), 18-29.

References that Support the Rationales

Van Voorhis, F. L., Maier, M. F., Epstein, J. L., & Lloyd, C. M. (2013). The impact of family involvement on the education of children ages 3 to 8: A focus on literacy and math achievement outcomes and social-emotional skills. MDRC.

PRIORITY #6-Family Math Attitudes

The Goal for the Field: Directly address problematic attitudes about mathematics, helping us leverage families to alleviate this barrier to learning

The Specific Need: Studies that help us understand how family engagement relates to family and child math attitudes/anxiety and math achievement
Rationales

1. **Attitudes about mathematics and math anxiety are crucial and persistent issues in math education, and family math should prioritize efforts to build positive math experiences and interrupt anxiety.**

   Research is clear that anxiety about mathematics is common, and links directly to poor math achievement. We also know that math anxiety appears as early as first grade, so we can’t wait for elementary school to intervene—we have to target the early years as well. Given that math anxiety and attitudes about math are strongly culturally influenced, it may never be adequate to address them in school settings only. By targeting home and community environments, it is possible we may be able to shift attitudes about math in more comprehensive and enduring ways than great teaching alone can ever address.

2. **We have evidence that parental math anxiety can lead to poorer math understanding and performance and sometimes greater levels of math anxiety in children.**

   Studies show that parental math anxiety is “catching,” that is, children whose parents are math anxious are less likely to achieve well in math and are often more likely to be anxious about math themselves. Practitioners assume that home-based interventions that emphasize the “fun” nature of math may be able to promote positive attitudes and help prevent negative effects on children, but we need more evidence to demonstrate whether or not this is the case. At this point, we do not know whether it is possible to shift parent attitudes in a meaningful way, nor do we know whether this will affect children’s learning and anxiety. Without a better understanding of how these families’ beliefs and experiences interact with children’s achievement and beliefs, we don’t know what specific advice to give parents to help children develop positive math identities.

Sample research questions

- Can we better understand how math anxiety develops and is influenced by the home environment? Are there different types of math anxiety?
- How do family culture and context interact with math anxiety in families and children?
- What are the most effective ways to reduce math anxiety within families and promote better child understanding and positive math attitudes?
- Will shifts in parent behavior (e.g., not saying, “I’m not a math person,” making a point of playing math-related games) help children succeed with math academically? Will they lessen the development of math anxiety in children?
• What are the best ways for family-facing organizations to influence families’ attitudes toward mathematics?

Resources for Studying Child Math Attitudes


References to Support the Rationales


PRIORITY #7-Non-Number Topics

The Goal for the Field: Broaden our scope for mathematics research to include topics other than numbers, such as mathematical practices, geometric concepts, and algebraic reasoning

The Specific Need: Studies that focus on the development of non-number topics and the possibility that family support of this math learning can impact other learning domains

Rationales:

1. Most existing studies of family math focus on number-related math topics, but the field is clear that spatial and geometric types of math-related thinking and learning have important correlations to educational outcomes.
Math is much more than numbers; by limiting ourselves to a definition of math that is almost exclusively numerical, we miss important opportunities to enhance not only mathematical enjoyment and achievement, but also to understand how math broadly supports development. Consider, for example, space, shape, and geometry. Given that we know these predict important learning outcomes for young children across a range of topics and skills, we need to know more about how to support families in recognizing opportunities for learning about these topics. It is important to explore how family interactions can improve children’s learning in these areas and what interventions can foster such interactions.

2. **There are mathematical practices and ways to approach problems that connect to all domains of learning; if we study these and understand them better, we may be able to leverage family math to address development more broadly.**

We know that early math skills predict math achievement into adolescence, but some research suggests that early math skills also predict later reading achievement, although the exact mechanism remains unclear. Further, research indicates a strong connection between mathematical thinking and executive functioning skills. Mathematical practices – such as perseverance, abstract reasoning, sense-making, and strategy – all relate to executive functioning, which in turn relates to learning across all academic topics. Algebraic reasoning skills, such as representation, understanding parts of a whole, and categorizing may relate to social-emotional learning, communication, and analytical thinking across domains, but more research on this is needed. Because these competencies are connected to everyday learning for young children, focusing on them may help families and educators approach mathematical thinking with more ease and less anxiety. Research that examines how families see and make these connections between mathematical thinking and other kinds of learning can uncover what may already be happening naturally and expand opportunities for more intentional support.

**Sample research questions**

- What cultural and linguistic approaches to non-number topics are naturally occurring/used with families?
- How do mathematical practices in family settings around non-number topics and dispositions impact school readiness and success in mathematics?
- How do everyday activities promote mathematical thinking beyond numbers?
- Are there cues children provide that indicate non-number mathematical thinking and how can families follow these cues to promote early math learning?
- How can interventions be designed to promote mathematical thinking/non-number topics (incorporate families)?
- How do non-number math topics support social-emotional learning and executive function?
- What are the relationships between various non-number math topics and other learning domains, such as literacy, and executive functioning?
What are the effects of infusing family math into other types of programming (health-oriented, nutrition-oriented, literacy-oriented)?
What are the ways families naturally build mathematical thinking in everyday experiences?
What prompts or tools can help families build intention and meaning to expand interactions in their everyday experiences?
What values do families hold for their child’s development across domains?
In what ways do families already recognize the development of their child’s mathematical thinking?
How does the development of executive function impact mathematical thinking, and the development of mathematical thinking impact executive function?
How does the development of social emotional skills impact mathematical thinking, and the development of mathematical thinking impact social emotional skills?

Resources for Studying Non-Number Topics


References that Support the Rationales

Curriculum Focal Points for Prekindergarten (2010), NCTM, Reston, VA.
Implementing Standards for Mathematical Practices, Institute for Advanced Study/ Park City Mathematics Institute/Created by Learning Services, Modified by Melisa Hancock 2013. 10
Common Core progression documents, http://ime.math.arizona.edu/progressions/.
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