Effective Methods that Parents and Caregivers Use to Improve Math Achievement in Informal Learning Environments: A Meta-Analysis

PURPOSE

The purpose of this poster is to gather feedback from researchers with expertise in the areas of informal learning environments, early mathematics, and parents/caregivers. This poster presents a draft of planned procedures for an exhaustive and systematic review of the literature on interventions to improve mathematics achievement in informal learning environments. We present relevant definitions, literature search terms and inclusion and exclusion criteria. The meta-analysis that we will conduct as a result of this literature search is supported by grant from the National Science Foundation (#2000292).

INTRODUCTION

Prior to school entry, children spend more time in informal learning environments than in formal school settings. Parents and childcare providers play a critical role in children's math development in the early years of learning. Recently, there has been an upward trend in empirical research investigating the effectiveness of math interventions in informal learning environments. A comprehensive analysis of the literature provides a clear picture of what is currently known about the effects of math interventions in informal learning environments, reveals the overall average effect of math interventions, and identifies key features of interventions that influence treatment effects. Given the amount of time children spend in informal learning environments, identifying effective early math interventions to implement in these environments is necessary. Thus, the purpose of this study is to conduct a meta-analysis.

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RESEARCH QUESTIONS

1) What is the average treatment effect, and how variable are the effects, of math interventions implemented by parents and childcare in informal learning environments?

2) What variables predict the effectiveness of math interventions implemented in informal learning environments (e.g., type of activity, childcare provider characteristics and training, age of participants, materials, length of activity) for the total sample of studies?

IMPORTANT TERMS

It is important to keep in mind that this meta-analysis focuses on informal learning *environments*; not informal mathematics *instruction*. We are considering formal and informal instruction in informal environments.

- **Informal learning environments** may include experiences (e.g., walking in the park), designed environments (e.g., libraries, zoos, gardens), programs (e.g., after school robotics program run by a children's museum), and the home.
- **An intervention** is a change (quantitative or qualitative) to the typical routine or instruction.
- **Parents or caregivers** (including staff at a library, a grandparent, neighbor, etc.) are those implementing the intervention not a researcher.

LITERATURE SEARCH TERMS

- Intervention, activity, training, instruction, tutoring, program
- Math*, "early math*", numeracy, "number sense"
- Preschool*, prekindergarten, "early childhood", kindergarten, "first grade", "second grade", "third grade", elementary
- Parent*, childcare, caregiver, daycare, "after school", community, "home tutoring", home-based, "home learning environment", "home math* environment", "home numeracy", "math* play", "informal learning"

OTHER SEARCH METHODS

In addition to conducting an electronic search (1980 to present) of published and unpublished (i.e., grey) works, we also plan to:

- Contact published authors
- Search relevant journal table of contents
- Explore reference lists of included studies
- Conduct forward citation searches of included studies
- Use email listservs to contact researchers

INCLUSION CRITERIA

Studies included in this meta-analysis must meet the following criteria:

1. Investigates the effects of a math intervention implemented in an informal learning environment
2. Administers at least one math outcome measure to determine effectiveness
3. Involves a math program implementer that is a parent or childcare provider
4. Includes participants that are children 3 years, 0 months (average start age) to the end of third grade (approximately 9 years old)
5. Has an experimental or quasi-experimental group design
6. Provides appropriate information to calculate effect sizes (e.g., means, *SD*s, F statistics, *t*-tests)
7. Reports results in English

WE NEED YOUR HELP!

We will start the literature search in a few weeks, and we need your help with the following:

1. Are we missing any critical search terms?
2. In which journals should we conduct a table of contents review?
3. What listserv (and contact person if possible) do you suggest (especially with an international focus)?
4. Do you have any unpublished work that may meet criteria?
5. Do you know of specific authors who we should reach out to for unpublished works?

For more information about this project, or to provide additional feedback, please contact Gena Nelson (genanelson@boisestate.edu).
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