

Learning Early Math Skills Through Theatre: An Examination of the Impact of a Live Performance of *Peg + Cat: The Big Dog Problem*

Laura Bofferding, Ph.D., Associate Professor, Mathematics Education

Signe Kastberg, Ph.D., Professor, Mathematics Education

Amanda Mayes, Ph.D., Manager of Education, Purdue Convocations

Project Abstract

Schools continue to narrow their focus to subjects included on standardized tests. Justifying subjects and activities not covered on those assessments is increasingly difficult. As a result, subjects like theatre are overlooked in favor of math, science, and literacy initiatives. Although research suggests involvement in the arts has positive academic impacts, few studies with experimental designs are exploring the impact of live performances on the understanding of basic mathematical concepts. To the best of our knowledge, no research has been conducted aimed at understanding what role a live performance might have in building the early math skills of young children. This study will assess the impact of a live performance of the PBS children's show, *Peg + Cat: The Big Dog Problem*, on the math skills of some of our youngest theatre patrons.

Project Description

The primary goal of this study is to understand the impact a live performance has on a young child's understanding of early math concepts including measurement, shapes, patterns, and problem solving. In order to meet this goal, schools will be recruited to have their students attend a live performance of *Peg + Cat: The Big Dog Problem* by the Fred Rogers Company and Casa Mañana. This show is based upon the PBS Kids TV series and book of the same title by Jennifer Oxley and Billy Aronson. This book is a level two reader. Students in preschool through first grade will be targeted to attend the performance. All students who participate in the study will be provided with a copy of the book. All students will have the book read to them as part of the research at varying times.

Schools will be randomly assigned to one of several treatment groups (read in advance, read after performance) or control group. Schools will be provided with detailed instructions explaining when they should read the text and complete the assessment in relation to their performance date. The evaluation tool will assess knowledge of measurement, shapes, patterns, and problem solving.

This study will start to construct the body of knowledge on the impact of the performing arts on early mathematical skills. Participating arts organizations will be recognized in all publications resulting from this research.

Cost for Presenting Organizations

- Each copy of the book= \$2 (likely less, but awaiting final word from the publisher)
- Purdue will provide funding for all data analysis and assessment materials

Program Plan

1. Review of current literature- spring 2018/fall 2019
2. Full development of study design including research questions, methodology, program assessments- spring 2018
3. Select schools who are willing to participate- fall 2018
4. Send list of participating schools with approximate number of involved students to Dr. Mayes- fall 2018
5. Obtain Institutional Review Board (IRB) approval for a study working with human subjects, approval application must include a list of all presenting arts organizations and schools participating in the study- fall 2018
6. Dr. Mayes will either randomly assign schools to the treatment or control groups or assign schools in matched pairs to the treatment or control group- late fall 2018/early spring 2019
7. Study officially underway- spring 2019/continuing to fall 2019
8. Data analysis begins- late fall 2019
9. Preliminary results complete-spring 2020
10. Study ready for publication- late spring 2020

Further Questions

Please contact Dr. Amanda Mayes at Purdue University with further questions via email at asmayes@purdue.edu or via phone at (765) 494-2695.