Evaluating the Introduce a Girl to Engineering Day Program

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INTRODUCTION

- Females are underrepresented in STEM fields and engineering in particular. Whereas women make up 48% of the United States labor force, they only make up 14% of the engineering labor force
- The purpose of this research was to examine the influence of a one-day outreach program, Introduce a Girl to Engineering Day (IGED), among young girls aged 8-12.
- We examined changes in children's beliefs about their understanding, interest, and skill in STEM as they related to participation in the IGED program.
- We also examined correlations between children's and parents reports about the child's understanding, interest, and skill in STEM.
- We expected children's ratings of their own understanding of and aspirations for engineering careers to increase from pre-program to immediate post-program.
- We explored whether immediate post-program ratings were maintained at 6-months post-program.

METHOD

PARTICIPANTS

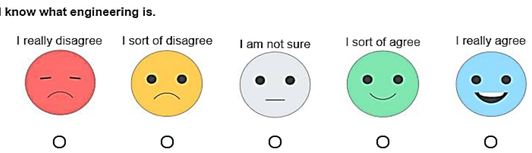
- Pre N=94, Post N=97, 6 month post N=65, Parent N=95
- Girls from the ages of 79.68 - 151.07 months, M = 114.27

PROCEDURE

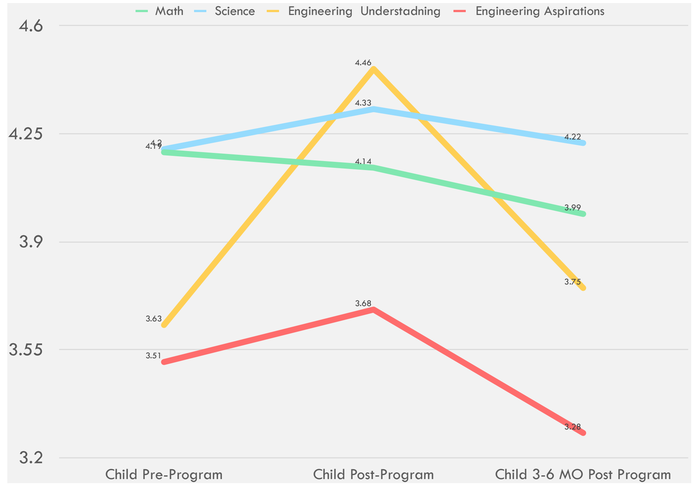
- The study was a short-term sequential design using multi-informants. The sample was assessed at 3 time points (pre-program, immediate post-program, 6 months post-program).
- During the IGED program participants learned about what engineering is, how engineering helps society, and gender stereotypes in STEM. Children also participated in hands-on engineering workshops.

MEASURES

- The parent and child surveys were completed in Qualtrics
  - Means of Math, Science, and Engineering Understanding were determined by parent and child reported ability and interest in these areas.
  - Children's mean of Engineering Aspirations was determined by their self-reported interest in pursuing several engineering jobs in the future. Parent reported aspirations included ratings of their desire for their child to study and pursue a career in engineering someday.



RESULTS AND DISCUSSION



* The 3-6 month post program survey means are sub analysis of a sample size of 65

Child Report	Parent Report: Engineering Understanding	Engineering Aspirations	Math	Science
Pre-Program				
Math	.23*	-.07	.54**	.09
Science	.36**	.07	.04	.14
Engineering Understanding	.15	.02	.10	.15
Engineering Aspirations	.38**	.23*	.24*	.06
Immediate Post-Program				
Math	.10	-.07	.36**	-.03
Science	.39**	.15	.16	.32**
Engineering Understanding	.26*	.14	.14	.03
Engineering Aspirations	.38**	.16	.11	.01
6-Month Post-Program				
Math	.30*	.22	.19	-.12
Science	.27*	.12	.04	-.03
Engineering Understanding	.335**	.23	.07	-.08
Engineering Aspirations	.48**	.37**	.33**	.05

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Correlations between Parent and Child Reports

- There was a high degree of correspondence between parent and child reports.
- The average intra-class correlation among all measures was .83 with a 95% confidence interval between .76 to . 89, F (58, 170) = 5.85, $p < .001$.

Child Reports, Full Sample: Pre-, Immediate Post-Program

- There was a multivariate within subjects effect, $F(4, 88) = 20.03$, $p < .001$, $\eta^2 = .48$ with univariate effects for engineering understanding, $F(1, 91) = 74.18$, $p < .001$, $\eta^2 = .45$ and engineering aspirations, $F(1, 91) = 4.10$, $p = .046$, $\eta = .04$. The effect for science approached significance, $F(1, 91) = 2.913$, $p = .09$, $\eta^2 = .03$

Child Reports, Sub Sample: Pre-, Immediate Post-, and 6-Month Post-Program

- There was a multivariate within subjects effect, $F(4,56) = 8.30$, $p < .001$, $\eta^2 = .56$ with a univariate effect for engineering knowledge, $F(2,13.3) = 20.99$, $p < .001$, $\eta^2 = .26$.

CONCLUSIONS

- The program had a positive effect on engineering understanding and aspirations immediate post-program ratings.
- However, the 6-months post-program, children's ratings returned to nearly pre-program levels.
- Future research should examine ways to prolong the positive impact of outreach programs like IGED.

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