Beyond the child: Building science capital and parent science habitus through family STEM programs

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Background
The lack of students who choose to major in science, technology, engineering, or mathematics (STEM) fields is a growing concern in the United States and across the world. Because an individual's attitudes and understandings of STEM are likely shaped by "an individual's direct, personal experiences, needs, expectations, and aspirations," it is important to address the issue from a systems perspective.

Family Influence: Family culture plays a vital role in developing STEM interests. Parents have been shown to be important in encouraging the STEM interests of youth. Parents who discuss the value and importance of STEM tend to have children with a higher self-efficacy and STEM outcome expectations. Youth's interest in STEM careers is related to their families' science capital and science habits. However, most programs aimed at increasing youth interest and career aspirations focus on the youth and little is known about programs that seek to approach the problem from a systems perspective. Of particular importance is increasing the tools parents have to support the STEM interests and career aspirations of their children.

Research Question
How does participation in a museum-based, family STEM program aimed at increasing the science capital and family capital of youth influence their
• Cultural capital and science habits of the adult participants?

Theoretical Framework

Community Cultural Wealth Theory: the types of knowledge, connections, and capabilities communities possess

Science Family Habitus: beliefs, dispositions, and behaviors families hold related to what is appropriate, acceptable, and possible for them related to science

Methods
This quasi-experimental family STEM program, included the NextGen Scientist Survey, and 11 intensive family case studies. FAME: Families and Museums Exploring

Findings

Cultural Capital
Scientific Capital: Parents had greater knowledge of science, its influence on their families, and the role it plays in every day life. Parents also had more knowledge about STEM careers and related field. "This is a great opportunity for my child to grow in the knowledge and awareness of the many possible careers. It helped me to have more information to share with my child. I have an interest in animal science as she wants to be a veterinarian." (Sila, Hispanic mother)

On the NextGen Scientist Survey, the adults were asked questions about their access to science capital as a child.

Nearly half (46.5%) of the parents reported that they did not know anyone who had a STEM career as a child. Yet more than half (57.1%) of them wanted a STEM career when they grew up. However, only about a third (36.7%) of the parents reported that they currently work in a STEM, STEM-Related, or Technical STEM career.

What did you want to be when you were young?

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What is your current job?

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Family Science Habitus

Parents reported significant changes to their child's interests, hobbies, and family routines. They noted changes to their science habits and the ways they engage with their child. "This program helps me to talk more about science and the opportunity to do things together as a family." (Scott, African American father)

Aspirational Capital: The parents' aspirations changed not only for their children but also for themselves. Parents decided to go back to school to pursue a STEM career and many parents related how STEM has impacted their children's STEM career aspirations. "My family is more interested to know about science since they have seen their parents pursuing STEM careers and have a strong interest to do things together as a family." (Mary, African American mother)

Educational Capital: Parents felt they had a better understanding of what activities were available and better able to find opportunities for their child to engage in STEM. "It has made me explore other opportunities to increase science in my children's routines." (Brittany, African American mother)

Linguistic Capital: The family spent more time talking about science at home. They changed how they spoke about science. One mother said her daughter was being given more STEM-related language by the family. "It has made my daughter more aware of the STEM topics and made learning fun as a family." (Elizabeth, White mother)

Implications
Family support plays a critical role in students' identities and career aspirations. The results of this study suggest that family STEM programs can positively influence the cultural capital, including science, social, familial, individual, aspirational capital, and family science habits of the parent participants.

Future programs should:
• Help parents understand the wide variety of careers that are possible in STEM;
• Introduce families to community members who engage in STEM careers and hobbies who are representative of the participants;
• Help parents understand the wide variety of home activities that are considered STEM;
• Explicitly teach parents how to engage in effective questioning during science activities;
• Build parent's navigational capital such as applying for college or other STEM programs;
• Specifically address linguistic capital and the language of STEM, which may be a barrier to participation in STEM.

By building the cultural capital and family science habits of the parents, they will have more tools to effectively support the science interests and career aspirations of their children.

Sustained, engaging, family-based programs out-of-school, and potentially in schools, is one way to approach the need for more youth, particularly women and those from underrepresented groups, to pursue STEM careers.

Limitations
This study has a limited sample size and results should not be generalized beyond this sample. Additionally, the participants in this study were volunteers and their science interests may not be representative of the larger populations.

References

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