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 motivations” (Carnoy, 2000), 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 expectancies. Youth’s interest in STEM careers is related to their families’ science capital and science habitus. 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.

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

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

Social Capital: The program helped the parents build a social network to support their children. One mother highlighted the importance of her son’s work.“His opportunity for his son to see that other friends his age are interested in science as he is.” (Kelly, White mother)

Familial Capital: Parents were able to learn together and bond as a family. It also gave parents opportunities to engage together on weekends. One mother said the program made her and her husband appreciate the things they’ve learned over the years and made learning fun as a family.” (Weather, African American mother)

Linguistic Capital: The families spent more time talking about science at home. They changed how they spoke about science. One mother said her daughter was even using more scientific language. “Heard my daughter talk to her friends that she goes with to explain what she’s doing and how things work. Other also explains things to her family upon return after activities.” (Sadia, Hispanic mother)

Research Question
How does participation in a museum-based, family STEM program aimed at increasing the science capital and family habitus of the adult participants?

Population (N = 44)
- 12% spoke Spanish at home
- 35% Hispanic
- 37% Black
- 7% Asian

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

Results
Cultural Capital

Science Capital: Parents had greater knowledge of science, its influence on their family, and the role it plays in every day life. “Parents also had more knowledge about science careers and hobbies and people who engage in STEM careers.” This led to a greater opportunity for their children to grow in the knowledge and appreciation of science and the many possibilities available. It helped the family to have more meaningful dialogue about science-related interests in animal science as she wants to be a veterinarian.” (Sadia, Hispanic mother)

Cultural Capital

Astrational 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 participated in their children’s STEM career aspirations. “My family’s aspirations and cultural capital has increased the impact these experiences will have on our kids’s future. We are able to talk about science at home, to explain how careers and careers I developed that self to pursue a career in STEM.” (Olivia, African American mother)

Nonspecifc Capital: Parents felt they had a better understanding of what activities were available and better able to find opportunities for their children to engage in STEM. “It has made me explore other opportunities to extend science into children’s routines.” (Britanny, African American mother)

Family Science Habitus

Parents reported significant changes in their family’s cultural participation in science. “My children now can call what we do science is all about a different types of science! They are more interested in becoming [a scientist]! They want to explore the world, they look for rocks, plants, animals and find ways to find more about it.” We go to explore at museum parks next beach etc. They ask to buy toys used to test that are science related like beakers, bug catching etc.

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, identity, aspirational capital, and family science habitus of the parent participants.

Future programs should:
- Help parents understand the wide variety of careers that are considered STEM
- Introduce families to community members who engage in STEM careers and hobbies who are representative of the participating families
- 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 and communication which may be a barrier to participation in STEM.

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

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

References


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