

Building the Cultural Wealth of Parents to Support Science Career Aspirations of Youth



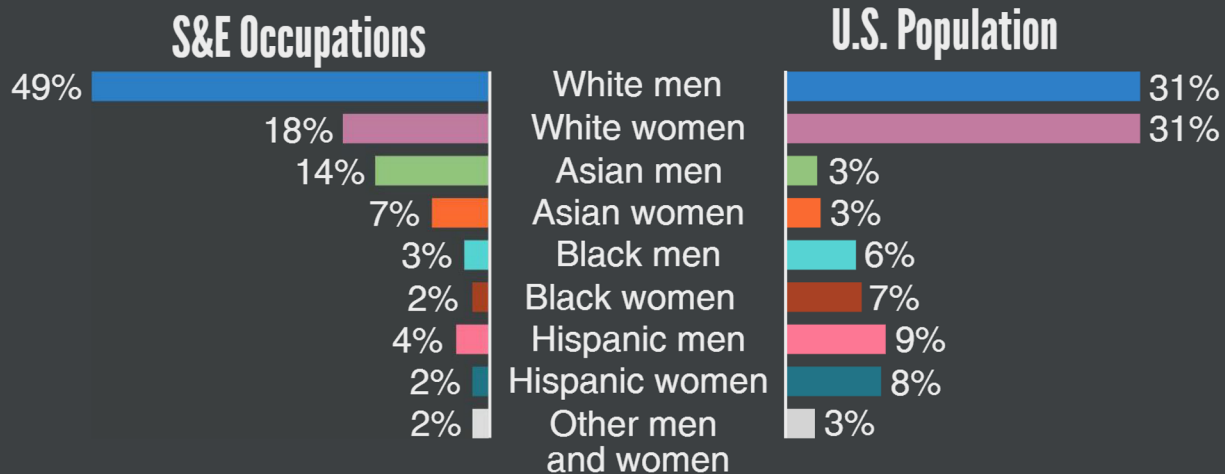
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The Call for Scientists

Workers in science and engineering occupations

In 2015, women and some minority groups were represented less in science and engineering (S&E) occupations than they were in the U.S. general population.



Source: National Center for Science and Engineering Statistics, National Science Foundation
Women, Minorities, and Persons with Disabilities in Science and Engineering: 2017
<https://nsf.gov/statistics/wmpd/>

Science Capital



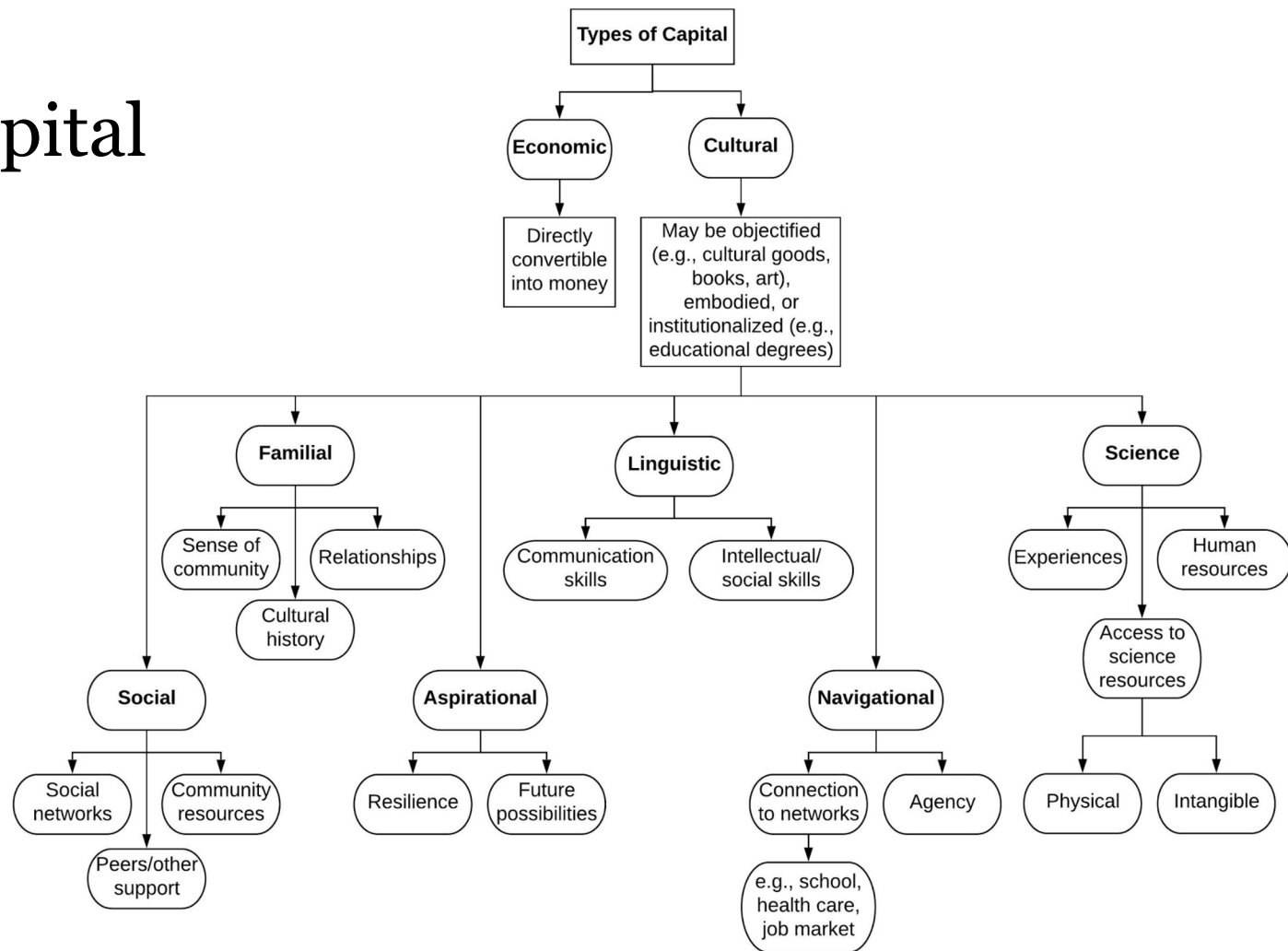
Archer, L., Dawson, E., DeWitt, J., Seakins, A., & Wong, B. (2015). "Science capital": A conceptual, methodological, and empirical argument for extending bourdieusian notions of capital beyond the arts. *Journal of Research in Science Teaching*, 52(7), 922–948.

Science Habitus



Archer, L., DeWitt, J., Osborne, J., Dillon, J., Willis, B., & Wong, B. (2012). Science aspirations, capital, and family habitus: How families shape children's engagement and identification with science. *American Educational Research Journal*, 49(5), 881-908.

Cultural Capital



Forms of capital examined in this study. Adapted from Yosso, T. J. (2005). Whose culture has capital? A critical race theory discussion of community cultural wealth. *Race Ethnicity and Education*, 8(1), 69-91.

Systems Approach to Programming



FAME: Families and Museums Exploring

Embodied Experiences

- Family STEM investigations
- Career information
- Community-based mentors
- Museum educators
- Take home activities
- Follow up experiences



Environment

- Engaging museum program
- Communal meals
- Transportation
- Convenient time
- Flexible scheduling and attendance



Mediating Processes

- Successful family experiences
- Shared knowledge of STEM careers
- Interactions with mentors
- Peer community
- Access to STEM tools and resources

Program Outcomes

- Enhanced interest and knowledge about STEM
- Enhanced interest and knowledge about STEM careers



- Enhanced sense of community in STEM
- Enhanced **science capital**
- Enhanced **family science habitus**

Example Program Events



Bird banding with Dr. John Gerwin,
Research Curator of Ornithology, NCMNS



Find your “Spirit Ant” with Dr. Magdga Songer,
Evolutionary Biology Lab, NCMNS

Research Question

How does participation in a museum-based, family STEM program aimed at increasing the science capital and family habitus of youth influence the:

- Cultural capital and science habitus of the adult participants?



Data Collection

- *NextGen Scientist Survey*
 - First and last events
 - 3 open ended questions
- 11 intensive family case studies
 - 3 Adult interviews
 - Coded using Community Cultural Wealth Theory

	Strongly Disagree	Disagree	In-Between	Agree	Strongly Agree
People like me have jobs in science					
I am interested in science					
I think I am good at science					
I can talk with others about science					

Jones, M. G., Ennes, M., Weedfall, D., Chesnutt, K., & Cayton, E. (2020). The Development and Validation of a Measure of Science Capital, Habitus, and Future Science Interests. *Research in Science Education*, 1-17. Doi: 10.1007/s11165-020-09916-y

Parent Participants (N = 44)



	Frequency	Percent
Gender		
Female	41	93.2
Male	3	6.8
Race		
African American	24	54.5
Hispanic	7	15.9
White	9	20.5
Other	4	9.1
Language		
English	36	83.7
Spanish	5	11.6
Other	2	4.7
Education		
Some high school	3	6.8
Graduated high school	4	9.1
Some college	10	22.7
2 years of college	6	13.6
4 or more years of college	21	47.7

Science Capital- Quantitative Data

When you were a child	n	Yes	No
Did you have access to science toys and tools	43	76.7	23.3
Did you know anyone who worked in STEM	41	53.5	46.5

	n	STEM	NonSTEM
What did you want to be when you grew up?	42	57.1	42.9
What is your current job?	42	35.7	64.3



Science Capital- Quantitative Data

	Pre-Test			Post Test			z	p
	n	Yes	No	n	Yes	No		
Do you know anyone now who works in STEM	44	77.3	22.7	44	93.2	6.8	-2.65	.008*
Do you know anyone now with STEM hobbies?	44	68.2	31.8	43	76.7	23.3	-1.00	.315
Does anyone in your family work in STEM?	42	76.2	23.8	43	86.0	14.0	-1.41	.157



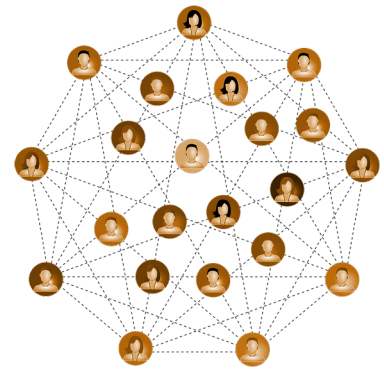
Science Capital- Qualitative Data

Reported increase in science capital:

- Science knowledge and its influence on family
- More awareness of role of science in everyday life

“This was a great opportunity for my child to grow in the knowledge of science and the many possibilities available. It helped me to have more information to guide my daughter in her interest in animal science as she wants to be a veterinarian.” (Sofia, Hispanic mother)

Social Capital



Reported increase in social capital:

- Built a community of parents and youth who also liked science
- Sharing information within personal social circles

This program was “an opportunity [for my son] to see that other friends his age are interested in science as he is.”
(Kelly, White mother)

Familial Capital

Reported increase in familial capital:

- Spent more time together
- Learned together
- Referred to educators as “Vanilla Aunties”



The program “helped us bond and learn new things together. I’ve learned my child is very knowledgeable on things I never knew. It exposed us to new things and made learning fun as a family.” (Heather, African American mother)

Aspirational Capital

Reported increase in aspirational capital:

- For their children
- For themselves



“My family has a deeper appreciation for science related experiences and understand the impact these experiences will have on our son's future. We are increasing dialogue about science related careers and I feel strongly that he will pursue a career in STEM.” (Olivia, African American mother)

Linguistic Capital

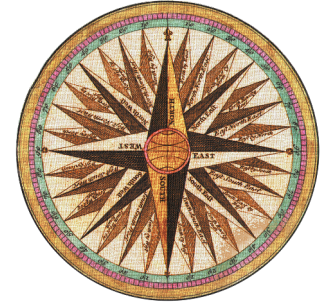


Reported increase in linguistic capital:

- Families spent more time talking about science
- Families changed how they talked about science
- Youth used more scientific vocabulary

“I hear my daughter talk to her friends that she goes with to explain what she is doing and how things work. She also explains things to her family upon return after activities. She uses more science vocabulary too.” (Elizabeth, White mother)

Navigational Capital



Reported increase in navigational capital:

- Increased ability to find new experiences and opportunities for children
- Increased awareness of the types of opportunities available

The program “has made me explore other opportunities to integrate science into my children's routines.” (Brittany, African American mother)

Family Science Habitus- Quantitative

Of the 13 items related to science activities on survey:

- Increased often they **talked with others** about science
($t(42) = 3.51, p = .001$)
- Increased how often they went to a zoo, aquarium, museum, or planetarium ($t(43) = 3.32, p = .002$)

Family Science Habitus- Qualitative

Reported increase in family science habitus:

- Spend more time talking about science
- Changed how they prioritize their children's activities

“I have increased the priority to involve my son in STEM activities as much as we can. He is such an athlete but we have shifted our priorities to have a balance between STEM and sports because he loves both.” (Olivia, African American mother)

Future Research



Thank You!



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Resources

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