

An Exploration of Black Girls' Science Motivation and Teacher- and School-Related Beliefs

Summary:

Black girls and women remain underrepresented in STEM fields, but little is known about factors influencing their motivation and plans in these fields. Using data from a large, nationwide sample of Black adolescent girls, this new study finds that:

- out-of-classroom opportunities to engage in science learning and activities are significant in shaping science motivation
- informal opportunities to learn and do science are important in fostering expectations for success in science and science-related identity beliefs
- perceptions of teachers as fair and supportive are important for science-related expectancies for success and valuing of science tasks
- perceptions of school safety and security, teacher race, and family income are important to Black girls' science motivation and pursuits.

Black girls and women have much to contribute to science, technology, engineering, and mathematics (STEM), yet they remain underrepresented in these fields. This new study sought to gather information about how Black girls and women view their science teachers and schools, and how key features of the science learning environment (e.g., out-of-classroom opportunities to learn and do science) relate to their science motivation and long-term STEM career plans and pursuits. The study focused on Black girls' perceptions of their science teachers because teachers serve as key role models and sources of social capital for students and have the ability to create affirming and supportive learning environments. In addition, the study investigated Black girls' perceptions of their science classrooms and the broader school context, as these are associated with experiences of exclusion, discrimination, and Black students' cultural assets.

Researchers used data from the High School Longitudinal Study of 2009 (HSL:09), which includes a nationally representative sample of students that were followed from Grade 9 through postsecondary education. Several notable findings emerged. First, out-of-classroom opportunities for Black girls to engage in science learning and activities are significant. Informal opportunities to learn and do science such as participating in a science club, competition, or study group are important in fostering Black girls' expectations for success in science and science-related identity beliefs. Second, the results highlighted the critical importance of Black girls' perceptions of their teachers as supportive and fair agents to their science-related expectancies for success and valuing of science tasks. These results underscore the importance of having supportive and encouraging teachers and the impact these student-teacher relationships have for students' motivation. Further, these results expand our understanding of how teacher treatment and the motivation beliefs and engagement of minoritized students are connected. Third, the study found unique effects of perceptions of

school safety and security, teacher race, and family income as important to Black girls' science motivation and pursuit, pointing to the embedded nature of science experiences of Black girls and women.

Research Recommendations

As this study was conducted with a secondary dataset from the National Center for Education Statistics (NCES), future researchers could use this work as a foundation to create novel measures that specifically focus on Black girls' STEM motivation experiences and perceptions. These new measurement tools should be asset-based and capture the wisdom, cultural wealth, and experiences of Black girls and women in STEM. In addition, future research should collect longitudinal data at the elementary and postsecondary levels to understand how STEM motivation changes throughout the Kindergarten through Grade 12 schooling experience among Black girls and women. Gathering longitudinal data will help identify important areas of intervention to promote STEM learning and growth early on in students' academic experiences.

Policy Recommendations

The results point to several avenues for programs and practice. There is a pressing need to develop affirming and celebratory STEM spaces for Black girls that emphasize the utility of science for creating social change and promoting communal goals (McGee & Bentley, 2017; Steinberg & Diekmann, 2017). Further, school leaders can work to more directly support Black girls through mandating that teachers and school staff engage in:

- (a) anti-gendered racist workshops and programs that identify and challenge discriminatory practices in STEM and
- (b) the implementation of asset-based programming that draws on Black girls' cultural capital and individual assets.

Policy initiatives could also focus on creating partnerships between educational institutions, community organizations, and industry stakeholders that leverage community expertise to support the interest development and motivation of Black girls in science.

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