



Excerpts from “Generation STEM”

Introduction

Over the past 50 years, women in the United States have made great strides in education and entry into the work force in this country. However, despite these advances, women continue to be underrepresented in the fields of science, technology, engineering, and math, collectively referred to as “STEM.” Women’s representation is low at all levels of the STEM career “pipeline,” from interest and intent to majoring in a STEM field in college to having a career in a STEM field in adulthood. Studies show that girls lose interest in math and science during middle school, and STEM interest for girls is low, compared to boys.

The aim of this report is to explore how girls can better become engaged in STEM through examination of what girls themselves say are their interests and perceptions about these important fields. We found that:

- Seventy-four percent of high school girls across the country are interested in the fields and subjects of STEM.
- Girls are interested in the process of learning, asking questions, and problem solving.
- Girls want to help people and make a difference in the world.
- Girls who are interested in STEM are high achievers who have supportive adult networks and are exposed to STEM fields.
- Girls who are interested in STEM fields are actually interested in many subjects and career opportunities—STEM is just one area of interest among many.
- Perceived gender barriers are still high for girls and may help explain why STEM fields aren’t their top career choices.
- African American and Hispanic girls have high interest in STEM, high confidence, and a strong

work ethic, but have fewer supports, less exposure, and lower academic achievement than Caucasian girls.

What We Know: The Context

WOMEN AND GIRLS IN STEM

Women are faring better, academically, than ever before. Today, the majority of college graduates (57%) and master’s level graduates (60%) are women, and nearly half (48%) of this country’s work force is comprised of women.

However, there are some fields in which female representation has remained low. Within STEM fields women are better represented in life sciences, chemistry, and mathematics; women are not well represented in engineering, computing, and physics.

- Women account for about only 20% of the bachelor’s degrees in engineering, computer science, and physics.
- Regardless of specific area of STEM, only about 25% of these positions are held by women.

ACHIEVEMENT IN MATH AND SCIENCE

Although there is an age-old belief that girls are not high achievers in math and science but, rather, are stronger in English/language arts and social studies, performance measures paint a different picture. According to the American Association of University Women, high school girls and boys perform equally well in math and science. Specifically, high school girls earn more math and science credits than do boys; and girls’ GPAs, aggregated across math and science classes, are higher than boys’. Boys, however, tend to do better on standardized tests, such as the SAT or ACT.

However, a number of factors are known to reduce

performance, and likely have influenced perceptions of girls' ability to achieve in math and science:

- *Outdated stereotypes and feelings of insufficiency can hold girls back.* Social psychological research shows that the stereotype that girls are not as good as boys in math can have negative consequences. When girls know or are made aware of this stereotype, they perform much more poorly than boys; however, when they are told that boys and girls perform equally well on a test, there is no gender difference. It is possible that girls are internalizing this stereotype and talking themselves out of achieving in math and science when, in reality, they are doing just as well or better than boys. This stereotype threat has also been found for African American and Hispanic students in test achievement.
- *The subtleties of society and culture reflect the stereotype that girls are not good at or suited for math and science and unconsciously discourage girls.* For example, experts in STEM education have observed how mothers interact with their children in science museum settings, finding that mothers encourage their sons more than their daughters to engage in hands-on activities in museums.
- *Compared to boys, girls with the same abilities are more likely to give up when the material is difficult and to talk themselves out of pursuing the field.* Research has also shown that having confidence in one's ability and believing that hard work and effort can increase intelligence are associated with higher achievement in math and science among girls. This and other research suggest that perception of one's ability or capability is more important for a girl than her actual ability or knowledge, and changing this perception can lead to more entry into STEM domains.

INTEREST IN MATH AND SCIENCE

Research shows that girls start losing interest in math and science during middle school. Girls are typically more interested in careers where they can help others (e.g., teaching, child care, working with animals) and make the world a better place. Recent

surveys have shown that girls and young women are much less interested than boys and young men in math and science. A national report on college freshmen major/career interests shows that, on average, 20% of young women intend to major in a STEM field, compared to 50% of young men ... This lack of interest may be a product of older stereotypes about girls doing poorly in math, or of low confidence in their abilities, or alternatively may reflect a general well-roundedness in girls that leads many to turn to their high verbal skills during career planning.

Findings [Note: Findings 1-4 are available in the full report.]

FINDING 5: THE STORY DIFFERS FOR AFRICAN AMERICAN AND HISPANIC GIRLS

We found some significant racial/ethnic group differences in our data. Specifically, we found that African American and Hispanic girls say they have just as much interest in STEM as Caucasian girls, but they have had less exposure to STEM, less adult support for pursuing STEM fields, lower academic achievement, and greater awareness of gender barriers in STEM professions. However, their confidence and ability to overcome obstacles are high, pointing to the strong role of individual characteristics in STEM interest and perceived ability in these subjects.

HIGH INTEREST

Although interest in STEM is high for all ethnic groups (73% of Caucasian girls, 76% of African American girls, 74% of Hispanic girls), interest in some aspects of STEM is higher for African American and Hispanic girls. African American and Hispanic girls are more interested in:

- How things work (African American—82%, Hispanic—83%, Caucasian—73%)
- Building things/putting things together (African American—58%, Hispanic—67%, Caucasian—56%)
- Creating an iPhone app or designing a computer or video game (African American—67%, Hispanic—68%, Caucasian—55%)

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ACHIEVEMENT, EXPOSURE, SUPPORT

However, compared to Caucasian girls, African American and Hispanic girls score lower in some areas, including academic achievement, exposure to STEM careers, and adult support of STEM careers. African American and Hispanic girls both have lower self-reported grades in school than Caucasian girls (African American GPA—3.3; Hispanic GPA—3.4; Caucasian GPA—3.6).

In addition to academic achievement, STEM exposure is also lower for African American and Hispanic girls:

- Caucasian girls (61%) are more likely to know someone in a STEM career, compared to African American (48%) and Hispanic (52%) girls.
- Caucasian girls (70%) are more likely to go to their parent(s) for information on career choices, compared to African American (54%) and Hispanic (54%) girls.

We found that adult support/encouragement appears to be lower for African American and Hispanic girls as well:

- African American girls (62%) say that teachers are less supportive of their career interests, compared to Caucasian girls (73%).
- African American girls (38%) say that their parents are less likely to approve of a STEM career compared to Caucasian girls (54%).

FINANCIAL MOTIVATIONS

Additionally, some new findings emerged. African American and Hispanic girls appear to value financial motivations in determining their career paths. For example:

- African American (41%) and Hispanic girls (31%) are more likely to be motivated to choose a career that pays a lot of money compared to Caucasian girls (21%).
- More Hispanic girls (67%) are likely to say that their mothers want them to choose a career that pays a lot of money compared to Caucasian girls (55%).

- African American (21%) and Hispanic girls (21%) are less interested in being stay-at-home moms compared to Caucasian girls (38%).

BARRIERS AND OBSTACLES

African American and Hispanic girls are more cognizant of gender barriers in STEM fields.

- Compared to Caucasian girls (19%), more African American (30%) and Hispanic girls (28%) worry about sexual harassment in the STEM workplace.
- More African American (35%) girls feel that employers in the fields of STEM don't usually want to hire women, compared to Caucasian girls (25%).
- Half (50%) of African American girls (compared to 38% of Caucasian girls) agree with the statement: "Because I am female, I would NOT be treated equally by the men I studied/worked with if I pursued a career in STEM."

Excerpts from *Generation Stem: What Girls Say About Science, Technology, Engineering and Math*. © 2012 by Girl Scouts of the USA/Girl Scout Research Institute. Printed with permission. For the complete report, visit [Girl Scouts of America](http://GirlScouts.org).