

Increasing the Likelihood Young Women Will Consider Science Careers

Approaches to increase the likelihood that young women will consider, and subsequently pursue, careers in science must address the following barriers: lack of self-confidence and self-efficacy, the rigid adherence to societal, sex role and occupational stereotypes, and the lack of appropriate role models. Academic, technological, and interpersonal skill development must also be addressed (Noland, Leukefeld, & Reid, 2001).

Although there are few follow-up evaluations of programs specifically for females in science and math, those that exist indicate that these interventions show promise (Campbell, 1991a, 1991b). Young females appear to respond well to program designs that emphasize a relaxed, cooperative work environment in which learning is fun. Follow-up data indicate these programs increase the number of math and science courses young women subsequently select. For example, three years of follow-up data from a study of an annual, four week summer program on science, math, and sports for groups of “average” minority junior-high females found that these young women increased their science and math course-taking plans on average of 40 percent, and that they followed through on plans to actually take the courses. (Campbell 1991a). Two and a half years of follow-up data from a two week residential science program for minority and white high school junior females, who were already interested in science, suggests that the program decreased the participants stereotypes about people who were good in science, reduced feelings of isolation, and strengthened commitment to careers in science and math (Campbell, 1991b). Females have the inherent ability to succeed at high levels in math and science, and special intervention programs can provide opportunities for young women to internalize the belief that they can pursue and successfully achieve a career in science.

Furthermore, research indicates that parent and family involvement improves not only student success but also school effectiveness (Epstein, 1986). It is recognized that parents play a key role in encouraging or discouraging their daughters in STEM careers. Therefore, parents were targeted in the *Girls in Science* program. For example, according to research conducted by Henderson and Berla (1994), children have better chances of success when parents are enabled to play key roles in their children's learning. In addition, research conducted by Fantuzzo, Davis, and Ginsburg (1995) revealed that intervention programs that included parental involvement were more effective than programs without parental involvement.

Finally, teachers also have a key role in encouraging girls to pursue careers in STEM careers. A 1992 report by the American Association of University Women (AAUW) revealed that teachers could contribute to girls' lack of interest and confidence in science and math by giving girls less attention or a lower quality of attention during class. The report adds that teachers must be careful not to limit girls' potential in math and science by using gender-biased practices. Techniques such as calling on girls for answers to questions and giving praise when they answer are helpful strategies (AAUW, 1992). Rural Appalachian teachers, like other teachers, are often not as fully qualified to teach science and math. For example, in

1998, 18 percent of all mathematics teachers and 12 percent of all science teachers in grades 7 through 12 reported that they were teaching out-of-their field (U.S. Department of Education, 1999). In rural and low-income areas, like rural Appalachian Kentucky, the situation worsens where 31 percent of mathematics teachers and 17 percent of science teachers did not have either an undergraduate or graduate major or minor in their teaching assignment field. Research also indicates that the educational opportunities of all students improve when teachers are not only competent and skillful, but are also highly committed to their profession (Darling-Hammond, 1998).