

Evaluation of an Intervention to Increase Realistic Self-Efficacy and Interests in College Women

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High self-efficacy expectations in Realistic activities have been related to the pursuit of careers in engineering, science, and technology, where women have been historically underrepresented. Fifty-four college women were studied to determine if interventions based on self-efficacy theory would increase their confidence and interests in “Realistic” (from Holland’s theory) activities (e.g., using tools, assembling, building, operating machinery). Interest and confidence levels were measured pre- and posttreatments. Participants were prescreened to identify those with at least moderate interest in Realistic activities, but who were also low in Realistic confidence. At posttreatment, the 24 participants in the treatment group showed a statistically significant increase in Realistic confidence relative to the control group of 30 that received a neutral intervention. Ways to increase women’s Realistic confidence, and the relationships of confidence to interests and career pursuits, are discussed. © 2000 Academic Press

A persistent problem in career development and counseling is women’s continued underrepresentation in traditionally male-dominated careers, especially those in the sciences and engineering. According to the National Science Foundation (1990), women, who comprise a majority of college undergraduates, earn less than 20% of bachelor’s degrees in fields such as engineering and physics. This gender discrepancy is even more pronounced at the graduate level, with fewer than 10% of graduate degrees in engineering earned by women (Kuh, 1998).

Efforts to understand this lack of participation have focused on many variables, including external barriers such as a “chilly classroom climate” (Hall & Sandler, 1982) and internal barriers such as the belief that math and science are male domains (Betz, 1994). One potentially important factor which has received some attention is women’s lower levels of measured interest and self-efficacy or confidence in the Realistic theme of Holland’s (1997) theory. The Realistic

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theme includes activities involving technical, outdoor, "hands-on" activities, the kinds of skills often taught in high school "shop," electronics, and trades courses or under the tutelage of a parent comfortable with home and automobile repair.

The Realistic theme is one central component for pursuit of careers in engineering and technology; when Realistic interests and confidence accompany Holland's Investigative (scientific) theme, a large array of engineering and technical specialties becomes viable for career exploration. For example, all of the engineering occupations listed in the Occupations Finder for Holland's (1994, 1996) *Self-Directed Search* have either RI or IR as the first two letters of their Holland code. The *Strong Interest Inventory* (Harmon, Hansen, Borgen, & Hammer, 1994) includes the occupational scales of Engineer (RI) and Systems Analyst (IR). Women have reported consistently lower levels of Realistic interests (Gottfredson, Holland, & Gottfredson, 1975; Lunneborg, 1979) and Realistic confidence or self-efficacy (Betz, Borgen, & Harmon, 1996). Thus, interventions directed at increasing Realistic interests, Realistic confidence, or both in women could be useful in broadening women's career options.

A theoretical framework useful in guiding career interventions of this type is Bandura's (1977, 1986; see also Hackett, 1995) self-efficacy theory. Self-efficacy expectations refer to a person's belief concerning his or her ability to successfully perform a given task or behavior. These expectations are postulated by Bandura to be major mediators of behavior and behavior change. Low self-efficacy expectations regarding a behavior or behavioral domain lead to avoidance of those behaviors, while high efficacy expectations lead to "approach" of those behaviors. Bandura (1977) specified four sources of information through which self-efficacy expectations are learned and by which they can be modified: (1) performance accomplishments, that is, experiences of successfully performing the behaviors in question; (2) vicarious learning or modeling; (3) verbal persuasion such as encouragement and support from others, and (4) lower levels of emotional arousal, such as anxiety, in connection with the behavior.

Interventions to increase individuals' confidence in their scientific, mathematical, and technical abilities, including positive "applications" of the four sources of efficacy information, are just beginning to be designed and tested. For example, Luzzo, Hasper, Albert, Bibby, and Martinelli (1998) studied the effectiveness of a math/science self-efficacy intervention on math self-efficacy, math and science interests, and choice of majors and careers in a sample of undecided college students. Luzzo et al. reported that participants receiving an intervention focused on performance accomplishments reported higher math/science course self-efficacy following treatment; higher math/science course self-efficacy, self-efficacy for math/science related occupational requirements, and greater interest in math/science related careers were found at a four-week follow-up. Speight, Rosenthal, Jones, and Gastenveld (1995) showed the effectiveness of an intervention designed to increase self-efficacy with respect to medical careers in a sample of 45 9th graders, including 35 girls and 13 African Americans. Dawes, Horan, and Hackett (1997) evaluated the effects of a commercially published

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