A Comparison of Women in Nontraditional and Traditional Science Majors: Implications for Career Counsellors

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Abstract

This study examines differences in the career self-efficacy, self-esteem, attitudes toward feminism, and developmental environments of 135 women in traditional (Nursing, Occupational Therapy) and nontraditional (Engineering, Computer Science) science majors. The results indicated that women in traditional and nontraditional science majors did not differ on the variables of career self-efficacy or attitudes toward feminism and self-esteem, although Nursing students reported significantly higher self-esteem than the other groups. Qualitative differences were found in types of career barriers with traditional science majors indicating self- and other-imposed barriers, while nontraditional science majors tended to cite more external barriers.

Résumé

Cette étude examine les différences observées chez 135 femmes inscrites dans des cours universitaires scientifiques traditionnels (profession infirmière, ergothérapie) et non traditionnels (génie, informatique), au point de vue de leur auto-efficacité en matière de leur carrière, de leur estime de soi, de leurs attitudes envers le féminisme et de l'environnement où elles ont grandi. Les résultats indiquent qu'aucune différence n'avait pu être constatée entre les femmes ayant choisi des cours scientifiques traditionnels ou non traditionnels, en ce qui concerne les variables d'auto-efficacité en matière de leur carrière ou leurs attitudes envers le féminisme ou leur estime de soi. Il est cependant à noter que les étudiantes-infirmières présentaient une estime de soi beaucoup plus élevée que les autres groupes. Chez les étudiantes de cours scientifiques traditionnels, des différences qualitatives ont pu être observées dans certaines catégories d'obstacles à leur carrière, indiquant des obstacles imposées par elles-mêmes ou les autres, tandis que chez les étudiantes de cours scientifiques non traditionnels, des obstacles extérieurs étaient plus souvent indiqués.

In the last decade there has been a growing awareness that a small number of young women are selecting mathematics and science as majors in university. Despite the changes in society that have allowed women more access to a wider realm of careers, women still aspire to traditional careers more often than to nontraditional careers (Betz & Fitzgerald, 1987). In order for counsellors and educators to understand what changes need to be made to increase the number of women choosing scientific careers, it is important to understand what factors influence women in making their career decisions. The current research exam-

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ines factors that may be related to women choosing either traditional or nontraditional science majors. "Traditional" science majors are those majors deemed "appropriate" for women by society in which and women make up the majority of students (e.g., Nursing), whereas in nontraditional science majors (e.g., Engineering), women are in the minority.

Of the small number of theorists who have proposed models of career development for women (e.g., Astin, 1984; Farmer, 1985; Gottfredson 1981), the model of Betz and Fitzgerald (1987) was chosen as the basis of the current study. Compared to other theories, it is a more inclusive, multivariate model that better captures the complexity of factors impinging on women's career decisions. Betz and Fitzgerald (1987) hypothesize four sets of factors which facilitate women's career development: (a) individual variables (high ability, liberated sex-role attitudes, instrumentality, androgynous personality, high self-esteem, strong academic self-concept); (b) background variables (working mother, supportive father, highly educated parents, female role models, work experience as an adolescent, androgynous upbringing); (c) educational variables (high education, continuation in mathematics, women's schools); and (d) adult lifestyle variables (late marriage, few children).

For the purposes of the current research, the first two factors of the Betz and Fitzgerald (1987) model were chosen for study. Of the individual variables, self-esteem, career self-efficacy (academic self-concept), and gender-role values were included in the study because the research literature provides greater support for the influence of these three variables in career development than for the variables of instrumentality and androgyny. Ability level was not as appropriate for the population participating in this study because university students are generally at a high ability level. One of the strengths of this model is that in addition to intrapsychic variables, it also includes sociocultural variables. Thus, Betz and Fitzgerald's (1987) first four background variables were also included in the study: working status of mother, support of father, educational level of parents and extrafamilial female role models. Educational variables and adult lifestyle variables were not included because they were not as applicable to the women in this study, all of whom had high education, continuation in mathematics, and were not yet at the life stage of marriage and children.

Fitzgerald and Betz (1987) define career self-efficacy expectations as a belief in one's ability to perform career-related behaviours successfully. They believe that career self-efficacy is a useful construct for understanding women's under-representation in traditionally male careers. Lucas (1997) suggests that women tend to possess a higher degree of self-efficacy with regard to traditional careers, given the fact that their social environments may be providing less access the information necessary to develop feelings of efficacy with respect to career-

related, nontraditional behaviours. However, other studies (Nevil & Schleker, 1988; Schaefers, Epperson, & Nauta, 1997; Ritchie et al., 1997) have found that women who choose and persist at nontraditional careers possess a high degree of career self-efficacy. Further research is needed to clarify the role of self-efficacy in nontraditional career choices.

Closely related to the concept of self-efficacy, and equally important in women's career development, is the concept of self-esteem. A number of authors define self-esteem as one's evaluation of self and degree of acceptance of self (Lobel, Agami-Rozenblat, & Bempechat, 1993; Long, 1993). Betz and Fitzgerald (1987) include self-esteem in their model because they believe that low self-esteem can be a barrier to women's career decision making because of low confidence in themselves. However, recent research has had mixed results with some research indicating that women in nontraditional areas possess higher self-esteem than their traditional counterparts (Kleinplatz, McCarrey, & Kateb, 1992), and other research finding the opposite to be true (Long, 1993). Thus, further research with this variable is warranted.

The third individual variable in Betz and Fitzgerald's (1987) model is gender-role attitudes. This variable is included in their model because research has shown that liberal attitudes towards women's roles is a strong predictor of women's career involvement. In addition, more liberal gender-role attitudes and a feminist orientation have been found to predict career choices that are nontraditional for women (Fassinger, 1990, 1994; O'Brien & Fassinger, 1993). This finding suggests that women who grow up in an environment that allows them to develop feminist gender-role attitudes are more likely to consider a wider variety of potential career options.

Besides these three intrapsychic variables, the Betz and Fitzgerald (1987) model also includes sociocultural variables such as family factors and extrafamilial role models as being important to women's career choices. Betz and Fitzgerald (1987) believe that female role models and family environments which help to foster self-esteem, career self-efficacy and strong feminist attitudes can facilitate women to consider nontraditional careers. Previous research supports this belief by reporting that women in nontraditional careers and majors are more likely to come from homes in which there is: (a) a high rate of maternal employment (Erez, 1987; Jagacinski, 1987); (b) fathers are supportive; and (c) parents are highly educated and employed in professional positions (Betz, 1994; Jagacinski, 1987; Mau, Dominick, & Ellsworth, 1995). Research has also shown that teachers and university professors can play an important, but somewhat lesser, role in influencing women's decisions to pursue nontraditional occupations (Betz, 1994; Betz & Fitzgerald, 1987; Mau, Dominick, & Ellsworth, 1995; Ritchie et al., 1997; Scheye & Gilroy, 1994). However, it is not known whether role models differ for

women who choose nontraditional versus traditional science majors.

Finally, the research highlighted thus far suggests that women may potentially experience a number of intrapsychic and environmental barriers to choosing a nontraditional career. For example, Swanson and Tokar (1991) found women's perceptions of barriers to career development (e.g., conflict between personal relationship and career roles, discrimination, pregnancy) were responsible for a discrepancy between women's abilities and their achievements.

The goal of the current study is to understand better the factors that hinder women in choosing traditional or nontraditional science majors within a Canadian context. All previous research on the Betz and Fitzgerald model and related variables has occurred in the United States. On the basis of the research review above, this study will examine two hypotheses and two research questions: (a) women in nontraditional science majors are more likely to have higher levels of career self-efficacy, self-esteem, and stronger feminist orientations than women in traditional science majors; (b) compared to women in traditional science majors, women enrolled in nontraditional science majors will more often come from homes with one or two professional parents, a high degree of maternal employment outside of the home, and strong paternal support; (c) is there a difference in role models chosen by women in traditional and nontraditional science majors? and (d) what barriers do women in nontraditional and traditional science majors encounter or foresee encountering?

METHOD

Participants

Participants were 135 female undergraduates from two traditional female faculties (37 fourth-year Nursing and 46 first- or second-year Occupational Therapy students) and two nontraditional female faculties (8 Computer Science and 44 Engineering students from all four years of their programs) at the University of Western Ontario. Participants ranged in age from 17 to 44 years with an average age of 23.8 years.

Measures

Self-Efficacy. This variable was measured using the short form of the Career Decision- Making Self-Efficacy Scale (CDMSE) (Taylor & Betz, 1983), which was developed in 1996 (Betz, Klein & Taylor, 1996). The CDMSE- short form (SF) consists of 25 items rated on a five-point scale designed to measure self-efficacy expectations related to tasks or behaviours considered to be associated with career decision making.

High scores indicate greater feelings of career self-efficacy. Tests of reliability for the CDMSE-SF indicate high internal consistency with coefficient alphas ranging from .73 to .83 (Betz, Klein, & Taylor, 1996). Internal consistency for the present sample was .92.

Self-Esteem. The Rosenberg Self-Esteem Scale (RSE) (Rosenberg, 1970, 1989) is a global measure of self-esteem. Respondents rate 10 self-report items, on a four-point Guttman scale, and the resultant overall score is indicative of their level of self-esteem (Gray-Little, Williams, & Hancock, 1997). A high score indicates low self-esteem. The RSE has been found to have high internal consistency, with scores ranging from a low of α = .88 (Gray-Little, Williams, & Hancock, 1997) to a high Guttman scale coefficient of .93 (Rosenberg, 1970, 1989). Coefficient alpha for the present sample was .82.

Attitudes Toward Feminism. Attitudes toward feminism were measured by the Attitudes Toward Feminism and the Women's Movement Scale (FWM) (Fassinger, 1994). The FWM is a 10-item, 5-point rating scale measuring affective reactions to feminism and the women's movement (Fassinger, 1994). A high score indicates more feminist attitudes. Internal consistency scores have shown this scale to be reliable with reports of full scale reliability coefficients for women as high as .86 (Fassinger, 1994). The internal consistency of the present sample on this instrument was .84.

Personal Questionnaire. Developed by the author, this instrument included seven questions to assess the sociocultural variables. The first three questions were rated on a 5-point scale: (1, 2) To what extent does your mother (father) support your career decision? (3) To what extent have you encountered barriers in the process of making your career-related decisions? (4) Name one person and their relationship to you who influenced your career decision making and indicate whether the influence was positive or negative; (5) List any barriers or restrictions that you have encountered or expect to encounter with regards to your choice of career; (6, 7) mother's (father's) occupation.

Responses to Question five were assessed using qualitative analysis methods. Themes were derived by the first author from the responses using the qualitative methodology developed by Straus and Corbin (1990). Conceptual labels, deemed to best describe the data, were assigned to the responses. Next, conceptual labels that were related were grouped together to form categories. The first and second author then independently placed each response in a category. Interrater agreement between the two coders on 128 individual barriers was 92%. Disagreement on category placement was resolved through consensus discussion.

Procedure

Participants were from classes in the faculties of Nursing, Occupational Therapy, Computer Science, and Engineering. Each faculty determined which classes were available for the research. The first author spent five minutes in each class in 1997 to explain the study and distribute packets containing the four questionnaires to interested students. The instruments were completed by students during their own time, without compensation, and returned to the first author. Of 234 distributed packets, 142 were returned for a response rate of 58%.

RESULTS

The first hypothesis predicted that women in nontraditional academic majors were more likely to report higher career self-efficacy, self-esteem, and stronger feminist attitudes than women in traditional academic majors. To address this hypothesis, a MANOVA was performed with choice of major as the between-subjects factor and scores on career self-efficacy, self-esteem, and attitudes toward feminism as the dependent variables. The MANOVA was not significant (Wilks' Lambda = .989, p = .70) and none of the univariate F's for the dependent variables were significant. Means and standard deviations for these variables are presented in Table 1.

An examination of the means for all four groups indicated a potential difference on self-esteem within the traditional science group. To compare Nursing, Occupational Therapy, and the nontraditional majors, a follow-up ANOVA was performed with the three majors as the between-subjects factor resulting in a significant F (2,132) = 3.85, p = .024. An examination of the means for each major revealed that women in Nursing reported significantly higher self-esteem (16.24) than did women in Occupational Therapy (18.67) and in nontraditional programs (18.27). On this measure, a lower score indicates higher self-esteem.

The second hypothesis stated that compared to women in traditional majors, women in nontraditional academic majors would report more often coming from families where parents were employed in professional occupations and mothers were employed outside of the home. Two 2 x 2 chi-square tests were performed with two levels of major and two levels of professional status (professional versus nonprofessional) for both mother (X (1) = .02, p =.88) and father (X (1) = 2.09, p =.15). A third chi-square test was performed with two levels of maternal employment (inside or outside of home) (X (1) = .53, p =.47). All three chi-squares were not significant. Traditionality of major was not related to professional status of parents or maternal employment. Table 2 presents the frequencies for these variables.

TABLE 1.

Table of Means and Standard Deviations by Traditionality of Academic Major

Measurement	Traditional $n = 83$ X	Traditional $n = 83$ SD	Nontraditional $n = 52$ X	Nontraditional $n = 52$ SD
CDMSE-SF	100.40	11.32	97.90	16.36
RSE[a]	17.59	4.13	18.27	4.53
FWM	35.04	11.40	36.08	14.47
Mother's Support of Career Decisions	4.76	0.71	4.67	1.17
Father's Support of Career Decisions	4.83	1.09	4.71	1.16
Number of Career-Related Barriers	1.27	1.06	1.13	1.01

Note. CDMSE-SF = *Career Decision-Making Self-Efficacy Scale-Short Form* (Betz, Klein, & Taylor, 1996); RSE = *Rosenberg Self-Esteem Scale* (Rosenberg, 1989); and FWM = *The Attitudes Toward Feminism and the Women's Movement Scale* (Fassinger, 1994).

[a]Higher score indicates lower level of self-esteem.

It was also hypothesized that women in nontraditional science majors would report higher levels of parental support of career decisions than women in nontraditional science majors. The relation between women's choice of nontraditional major and paternal support of career decisions was tested by Pearson correlations. The correlations were not significant (r=- .52, p= .55 for fathers and r=- .05, p= .60 for mothers) with the majority of participants indicating that both their fathers (88.9%) and mothers (91.9%) were highly supportive of their career decisions, regardless of the traditionality of their choices: M = 4.79 (fathers), and M = 4.73 (mothers), out of 5.

The fourth research question addressed types of role models women in traditional and nontraditional science majors reported as influential in their career development and decision-making. The majority of the participants (82.2%) indicated that someone had influenced them in their career decision-making, with 77.8% of the sample reporting that

TABLE 2.

Table of Frequencies for Professional Status of Parents and Maternal Employment by Traditionality of Academic Major (N = 124)

Category	Traditional			Nontraditional		
	n	*Frequency*	%	*n*	*Frequency*	%
Father	77			47		
Professional		26	34		22	47
Nonprofessional		51	66		25	53
Mother	80			44		
Professional		32	40		17	39
Nonprofessional		48	60		27	61
Employed Outside Home		65	81		38	86
Homemaker		15	19		6	14

the influence was positive. For traditional academic majors, mothers (33%) and persons outside of the family (33.3%) were the most frequent role models. Of the 39 nontraditional science majors who responded, the most frequent role model categories were also persons outside of the family (41.0%) and mothers (23.1%).

From the qualitative analyses, five categories of barriers were found for women in traditional academic majors: (a) Admission Requirements for Current Program/ Past Program (21%); (b) Jobs and Job Search Process (25; e.g., "difficulty of finding a job after graduation"); (c) Membership in a Devalued or Unknown Profession (16 %; e.g., "When I chose nursing, people made me feel I was choosing second best to medicine"); (d) Lack of Support or Family Obligations (18%; e.g., "I was told by my high school counsellor that I was not smart enough to be a nurse"); and (e) Self-image/Self-confidence (10%; "fear of failure once in the program").

For women in the nontraditional majors, there were three categories of barriers: (a) Acceptance into Desired Program and Difficult Nature of Work (31%); (b) Work Setting Discrimination, Rigid Stereotypes and Prejudices (56%; e.g., "being in engineering, I am sure there will be a lot of barriers because women have problems getting credit for a job

well done and the same amount of money as a man"); and Language Barriers (7%; e.g., "difficulties in communication (I'm an ESL student").

Only one of these categories (Acceptance into Desired Program) was present for both types of science majors. What was qualitatively different between the two groups was that women in nontraditional science majors tended to cite more other-imposed or external barriers, while women in traditional science majors more often expressed a combination of self and other-imposed barriers. In addition, women in nontraditional science majors mainly listed barriers that affected only themselves, while some women in traditional science majors included barriers related to family.

DISCUSSION

The primary purpose of this research was to investigate whether there were differences in women's attitudes and background environment that related to their career choice of traditional versus nontraditional science. In contrast to previous research (Fassinger, 1990; Nevil & Schleker, 1988; Scheye & Gilroy, 1994), women in traditional and nontraditional academic majors were not significantly different when compared on their assessed career self-efficacy, self-esteem, and attitudes toward feminism. It may be that these three variables are not moderating variables for women choosing a nontraditional major in Canada in the late 1990's.

Previous research on self-esteem and traditionality of career choice was mixed with one study (Kleinplayz et al., 1992) finding higher self-esteem for women in nontraditional science majors and another study (Long, 1993) finding higher self-esteem for women in traditional science majors. The current study adds to these mixed results by finding that all of the women had high self-esteem which may be due to all four programs requiring a high level of achievement for acceptance and continuation in the programs. The significantly higher self-esteem in Nursing students may be a result of them being in the fourth year of their program (and thus feeling accomplishment and success), compared to OT students being in the first 1 to $1^1/_2$ years of their program, and the nontraditional science majors being spread throughout four years of their programs.

When family variables are considered, contrary to previous research (e.g., Betz & Fitzgerald, 1987; Fassinger, 1990), the nontraditional science majors did not appear to have grown up in significantly different households from the traditional science majors. Women in both streams had supportive parents from both professional and skilled occupations. It may be that today's parents are more aware of the importance of supporting whatever careers their daughters choose.

In addition, with 81-86% of the mothers in the current study employed outside of the home, maternal employment may no longer be a discriminating variable in daughters' career choices. Enough time may have passed since earlier studies (e.g., Erez, 1987; Jagacinski, 1987) reported more participants with mothers working in the home. As Betz and Fitzgerald (1987) note, it is no longer whether to do both roles, but rather how to do both. It is likely that these mothers provided role models of how to manage multiple roles. Having mothers who worked outside of the home may also explain why these daughters chose their mothers as being influential in their career decisions (tied for first for traditional majors; second for nontraditional majors).

Finding these kinds of disconfirmatory results can be viewed as positive, especially if they are replicated in other samples, because they may indicate that some of the previously identified internal and external barriers affecting women choosing nontraditional science majors may be lessening at the end of the twentieth century. The difference in results may also be a related to the highly competitive nature of admission to the traditional science programs of Nursing and Occupational Therapy in Ontario which have high rejection rates because of limited spots and thus, likely result in students whose self-esteem and self-efficacy are as high as nontraditional science majors. Finally, the sample was a slightly older group of students because of Grade 13 in Ontario ($M = 24$ years), compared to American studies, resulting in these women having more opportunities for life experiences that would contribute to higher self-esteem and self-efficacy. For example, the mean ages in the self-efficacy studies of Lucus (1997), O'Brien and Fassinger (1993), and Scheye and Gilroy (1994) were 20.3, 17.3, and 21.3 years respectively.

When asked directly about barriers, however, these women did list different barriers to their career aspirations. Women in nontraditional majors anticipated encountering unfair work practices and experiencing prejudice and isolation in the workplace. They had already encountered, or expected that they would encounter, situations where their abilities and knowledge as a professional would be questioned. On the other hand, women in traditional majors experienced barriers of feeling belittled by their status in a profession that is female-dominated and generally devalued within a predominately male-centred medical system. Further devaluing was experienced by some of the Nursing students as provincial governments cut funding to hospitals and they felt unsure about finding jobs after graduation.

Before considering the implications of the study, some limitations must be addressed: (a) fewer Computer Science majors than expected were included as participants as a result of low enrolment, restricted classroom access, and English being a second language for a large number of students; (b) faculty members in the four faculties selected which

classes would be available to the researcher for data collection for this study; (c) participants who volunteered to complete the questionnaires may have been qualitatively different from other women in their programs; and (d) the self-report nature of the research design may have resulted in participants presenting an ideal self to the researcher.

Implications of This Study

Even though there are a number of limitations to this study, it may still be possible to draw a number of tentative conclusions for Canadian career counsellors and educators. The results of this study may suggest a positive shift in the factors related to women's nontraditional career choices in the late 1990's compared to factors reported in earlier research. It may be that the women in this study were influenced by the change in the social fabric of society over the last two decades as a result of the women's movement. For example, the idea of science being strictly a "man's domain" may be changing. Currently, at the large university of this study, there are only five, out of a possible 26, science programmes that are still male-dominated (i.e., fewer than 33.3% female students; University of Western Ontario, 1997). It is important that career counsellors be aware of this change and counter any stereotypic expectations that their female clients may have about science careers.

In addition, there are likely to be barriers for these women as they pursue science majors. Women planning to enter traditional science faculties might benefit from counselling which addressed possible barriers around high admission requirements, concerns about finding a job at the end of the program, and being in a devalued profession. Women in nontraditional science majors might benefit from counselling which helped them deal with the difficult work of the program, possible work setting discrimination, and stereotyping that can occur in the classroom. Providing encouragement and support at the individual level, as well as advocating for change at the systemic level of program design, may help to increase the number of women entering, and staying in, nontraditional science majors.

In conclusion, this sample of women in nontraditional and traditional science majors did not differ significantly in self-esteem, career self-efficacy, attitudes towards feminism, and selected family variables. It may be that previous differences in psychological and family variables for women in traditional and nontraditional science majors are not as relevant among Canadian women as they were among American women. There do appear to be some aspects of the Canadian context that are different from the American context (e.g., older age of students in science majors, more limited space in science programs) that may help to explain the results of this study. However, because there is only one

other Canadian study on one of these variables (self-esteem: Kleinplatz et al., 1992), there are likely other unknown artifacts or moderating variables within the Canadian context that account for these science majors having similar self-esteem, self-efficacy, and attitudes toward feminism. Only future research will be able to clarify the causes of these findings and to examine other related variables and potential barriers to women's career decision making.

References

Astin, H. S. (1984). The meaning of work in women's lives: A sociopsychological model of career choice and work behavior. *The Counseling Psychologist, 12*, 117-126.

Betz, N. (1994). Basic issues and concepts in career counselling for women. In W. B. Walsh and S. H. Osipow (Eds.), *Career Counselling for Women* (pp. 1-42). Hillsdale, NJ: Erlbaum.

Betz, N. E., & Fitzgerald, L. F. (1987). *The career psychology of women.* Orlando, FL: Academic Press.

Betz, N. E., Klein, K. L., & Taylor, K. M. (1996). Evaluation of a short form of the career decision-making self-efficacy scale. *Journal of Career Assessment, 4*, 47-57.

Erez, M. (1987). Women's choice of innovative-technical fields of studies. *Applied Psychology: An International Review, 37*(2), 183-200.

Farmer, H. S. (1985). Model of career and achievement motivation for women and men. *Journal of Counseling Psychology, 32*, 363-390.

Fassinger, R. E. (1990). Causal models of career choice in two samples of college women. *Journal of Vocational Behavior, 36*, 225-248.

Fassinger, R. E. (1994). Development and testing of the attitudes toward feminism and the women's movement (FWM) scale. *Psychology of Women Quarterly, 18*, 389-402.

Gottfredson, L. S. (1981). Circumscription and compromise: A developmental theory of occupational aspirations [Monograph]. *Journal of Counseling Psychology, 28*, 545-579.

Gray-Little, B., Williams, V. S., & Hancock, D. (1997). An item response theory analysis of the Rosenberg self-esteem scale. *Personality and Social Psychology Bulletin, 5*, 443-451.

Jagacinski, C. M. (1987). Engineering careers: Women in a male-dominated field. *Psychology of Women Quarterly, 11*, 97-110.

Kleinplatz, P., McCarrey, M., & Kateb, C. (1992). The impact of gender-role identity on women's self-esteem, lifestyle satisfaction and conflict. *Canadian Journal of Behavioural Science, 24*(3), 333-347.

Lobel, T. E., Agami-Rozenblat, O., & Bempechat, J. (1993). Personality correlates of career choice in the kibbutz. *Sex Roles, 29*, 359-370.

Long, V. O. (1993). Masculinity, femininity and women scientists' self-esteem and self-acceptance. *The Journal of Psychology, 125*(3), 263-270.

Lucas, M. (1997). Identity development, career development, and psychological separation from parents: Similarities and differences between men and women. *Journal of Counseling Psychology, 44*, 123-132.

Mau, W., Dominick, M., & Ellsworth, R. A. (1995). Characteristics of female students who aspire to science and engineering or homemaking occupations. *The Career Development Quarterly, 43*, 323-337.

Nevil, D. D., & Schleker, D. I. (1988). The relationship of self-efficacy and assertiveness to willingness to engage in traditional/nontraditional career activities. *Psychology of Women Quarterly, 12*, 91-98.

O'Brien, K., & Fassinger, R. E. (1993). A causal model of the career orientation and career choice of adolescent women. *Journal of Counselling Psychology, 40*(4), 456-469.

Ritchie, B. S., Fassinger, R. E., Linn, S. G., Johnson, J., Prosser, J., & Robinson, S. (1997). Persistence, connection, and passion: A qualitative study of highly achieving African American-Black and White women. *Journal of Counseling Psychology, 44*(2), 133-148.

Rosenberg, M. (1970). *Conceiving the self.* New York: Basic Books.

Rosenberg, M. (1989). *Society and the adolescent self-image.* (Rev. ed.). Middletown, CT: Wesleyan University Press.

Schaefers, K. G., Epperson, D. L., & Nauta, M. N. (1997). Women's career development: Can theoretically derived variables predict persistence in engineering majors? *Journal of Counseling Psychology, 44*, 173-183.

Scheye, P. A., & Gilroy, F. D. (1994). College women's career self-efficacy and educational environments. *The Career Development Quarterly, 42*, 244-251.

Straus, A., & Corbin, J. (1990). *Basics of qualitative research.* Newbury Park, CA: Sage.

Swanson, J. L., & Tokar, D. M. (1991). College students' perceptions of barriers to career development. *Journal of Vocational Behaviour, 38*, 92-106.

Taylor, K. M., & Betz, N. E. (1983). Applications of self-efficacy theory to the understanding and treatment of career indecision. *Journal of Vocational Behaviour, 22*, 63-81.

University of Western Ontario, Office of Institutional Planning and Budgeting. *1996-97 Full-time science students by program and gender.* London, ON: Author.

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