Since the 1970s many more women in the United States have been pursuing careers outside the home and increasing gender diversity in the work force. Nevertheless, there are still significant gender imbalances in many occupations. For example, the National Center for Education Statistics (2002) found that only 22% of physical scientists and nine percent of engineers were female in the 1990’s. Despite this small representation, the labor force in the United States was comprised of 46% women at the same time. Similarly, Gabriel and Schmitz (2007) found that 78% of clerical and administrative positions were held by women whereas 54% of managerial positions were held by men in 2001. Because female-dominated fields, such as nursing and education, earn a smaller salary than male-dominated fields (Mendez & Crawford, 2002) it is important to find factors that influence women to pursue male-dominated fields. This will help parents and educational institutions provide environments that encourage women to explore more career opportunities. If women are encouraged to enter male-dominated fields, they will have access to more economic resources, have greater occupational opportunities, and will be able to pursue a larger variety of interests and talents. Therefore, it is imperative to research the factors related to women’s choices about pursuing male-dominated careers.

Past research has shown that there are two broad categories which contribute to women’s nontraditional gender career aspirations: internal factors or self-perceptions (e.g., academic abilities and gender role attitudes) and external factors such as the influence of others in their lives (Frome, Alfeld, Eccles & Barber, 2006; Kerr & Robinson Kurpius, 2004; Mau, 2003; O’Brien & Fassinger, 1993; Quimby & DeSantis, 2006; Sax & Bryant, 2006; Schmader, Johns & Barquis- sau, 2004; Singer, Cassin & Dobson, 2005; Umbach, Kinzie, Kuh, Palmer & Thomas, 2007). One internal factor that influences women’s career choices is their perception about the importance of having a future career with a flexible work schedule for family. This factor was found to differ on 10 factors: interest and confidence in math and science, overall academic confidence, traditional gender role attitudes, importance of having a job with a flexible work schedule for family, influence of a mentor, parental modeling of traditional gender roles, and attachment to parents. A survey exploring these factors was distributed to 141 college women. Results indicated that women who were pursuing careers in a male-dominated field had significantly higher confidence and interest in math and science and also had parents who modeled less-traditional gender roles than women who were aspiring to enter traditional gender careers. However, because there were many factors which did not yield significant differences among the two career groups, future research should explore other influences, such as the learning environment, on women’s career choices.

Exploring Factors Contributing to Women’s Nontraditional Career Aspirations

This study sought to determine if women aspiring to enter traditional, or female-dominated, careers (e.g., nursing, social work, etc.) versus male-dominated careers (e.g., science, technology, mathematics, and engineering, etc.) would differ on 10 factors: interest and confidence in math and science, overall academic confidence, traditional gender role attitudes, importance of having a job with a flexible work schedule for family, influence of a mentor, parental modeling of traditional gender roles, and attachment to parents. A survey exploring these factors was distributed to 141 college women. Results indicated that women who were pursuing careers in a male-dominated field had significantly higher confidence and interest in math and science and also had parents who modeled less-traditional gender roles than women who were aspiring to enter traditional gender careers. However, because there were many factors which did not yield significant differences among the two career groups, future research should explore other influences, such as the learning environment, on women’s career choices.
in mathematics, science, and general academics (e.g., Frome et al., 2006; Mau, 2003; O’Brien & Fassinger, 1993; Sax & Bryant, 2006). Gender role attitudes and stereotypes further play a role in nontraditional gender career choices (O’Brien & Fassinger, 1993). Schmader et al., Johns, and Barquissau. (2004) found that even college women who majored in math and had traditional gender role attitudes were less likely to aspire to enter a career related to math than women without traditional gender role attitudes. They also found that women who believed men had greater academic abilities in mathematics than women tended to perform worse on a mathematics exam than women who did not hold these beliefs.

With regard to external factors, past research has found that parents influence women’s nontraditional gender career decisions. O’Brien and Fassinger (1993) looked at daughters’ attachment with mothers and found that having a moderate level of attachment while maintaining some independence impacts career development. Women with this attachment to their mothers were more likely to pursue math- and science-related careers. In addition, Betz and Fitzgerald (1987) found that women with parents who displayed traditional gender roles, such as the mother staying home with her children, were less likely to have nontraditional gender role attitudes.

A role model or mentor is another external factor that influences women’s career choices. Quimby and Desantis (2006) discovered that for women who had confidence to excel in a male-dominated field, those who had any person they regarded as a role model were more influenced to pursue a male-dominated field than those without role models. In addition, group mentoring programs for adolescent girls have also been shown to help improve girls’ confidence in their ability to do well in school (Kerr & Robinson Kurpious, 2004). Because previous research has shown that confidence in academic abilities increases the chance that women will enter nontraditional gender careers (Mau, 2003), it is important for women to have opportunities to gain access to mentors who will help guide their career decisions.

All of the aforementioned studies have explored various factors related to women’s nontraditional gender career aspirations. The results show that internal and external factors are two broad categories that influence women’s career choices. With regard to internal factors, if women are more self-confident in math, science, and their overall academic capabilities, have more liberal gender role attitudes, and have less desire to have a family-flexible job, they are more likely to pursue a nontraditional gender career (Frome et al., 2006; Mau, 2003; O’Brien & Fassinger, 1993; Sax & Bryant, 2006; Schmader et al., 2004; Singer et al., 2005). With regard to external factors, women are more likely to make a decision to pursue a male-dominated career when they have a moderate attachment to their parents while also maintaining some independence (O’Brien & Fassinger, 1993). In addition, influential mentors in nontraditional careers can guide women towards such careers (Kerr & Robinson Kurpious, 2004; Quimby & DeSantis, 2006).

Although previous studies have examined factors related to women’s nontraditional gender career decisions, almost none of the studies have explored both internal and external factors at the same time. Most studies focused on one particular factor in relation to women’s career choices. While important, exploring only one internal or external factor alone does not provide a general understanding of how different factors influence women’s career decisions. Thus, this study sought to expand previous research by examining the influence of several of the internal and external factors on one group of college women in order to gain a broader understanding of how they relate to women’s nontraditional gender career aspirations.

Based on previous research, we hypothesized that the women who were currently pursuing male-dominated jobs would demonstrate self-perceptions of:

- Having more confidence in math and science.
- Demonstrating better academic abilities overall.
- Having more liberal gender attitudes.
- Putting less emphasis on the importance of raising a family and having a family-flexible job than women pursuing a female-dominated career.

With regard to external factors, we hypothesized that women who were pursuing a nontraditional gender career would:

- Have more people in their lives they consider influential role models.
- Have a current moderate level of attachment with their parents while still maintaining much independence.
- Have parents who model less-traditional gender role attitudes than do the parents of women pursuing a female-dominated career.

**Method**

**Participants**

Participants were 141 female students, ranging in age from 18 to 41 years with the majority (95%) between 18 and 25 years. Participants were enrolled in a small, private, midwestern, all-women’s college. Seventy-eight students were aspiring to work in a female-dominated field, 52 students were interested in working in a male-
dominated occupation, and 11 students were studying for a gender-neutral field. Lastly, the students’ grade point average ranged from 2.8 to 4.0 on a 4.0 scale ($M = 3.40, SD = 0.42$).

**Materials**

A 50-question survey (see Appendix) examining 10 factors was composed of questions influenced by the work from five studies (Frome et al., 2006; Mau, 2003; O’Brien & Fassinger, 1993; Quimby & DeSantis, 2006; Schmader et al., 2004). The first three questions asked about demographic data (age, current year in college, and marital status). There were three open-ended questions which asked the students’ area of study, the occupation they were currently pursuing, and their cumulative GPA in college. The rest of the survey consisted of statements pertaining to the internal and external factors that might influence women’s career aspirations. These were to be rated on a 5-point scale, 1 (strongly disagree) to 5 (strongly agree).

**Internal factors.** The first internal factor examined participants’ confidence in their ability to do well in mathematics courses and careers (e.g., “I feel confident that I can earn an A or a B grade in math courses”). The second internal factor asked participants to rate their interest in math and math-related careers (e.g., “Math is interesting”), and the third internal factor addressed the participants’ confidence in being able to do well in science courses and careers (e.g., “I would be good at a job that requires much knowledge and skill in science”). The fourth internal factor had three questions assessing the participants’ interest in science, their desire to pursue more information about science, and their interest in having a career related to science (e.g., “I am interested in a career that uses science much of the time”). In addition, the fifth internal factor examined the participants’ overall confidence in earning high grades in school (e.g., “Overall it is easy for me to earn high grades in school”). Internal Factor Six assessed the participants’ desire to be the primary caregiver to their children if they planned to have children, and their desire to have a job with a flexible time schedule in order to accommodate their families’ needs (e.g., “It is important to have a job that does not require me to be away from my family”). Internal Factor Seven addressed the participants’ agreement with traditional gender role attitudes regarding mathematics, science, English, art, raising children, and the availability of career opportunities for men versus women (e.g., “In general, men are better than women at science,” and “There are more career opportunities in science for men than for women”).

**External factors.** The survey examined three external factors. The first external factor was whether participants had a mentor and how influential their mentor was in their career decisions (e.g., “My mentor has been very influential to the career choices I have made”). The second external factor asked participants to rate how well their parent(s)/guardian(s) supported and influenced their career choices, how often they sought advice from their parents about career choices and personal issues, and how frequently they relied on their parent(s)/guardian(s) for financial support (e.g., “I often seek advice from my mother/father/guardian about my career choices”). The questions that pertained to the parent/guardian attachment did not ask participants to indicate whether they relied on their mothers, fathers or guardians specifically. Finally, the third external factor examined the extent to which the participants’ parent(s)/guardian(s) divided the share of work equally when caring for their families and enacting traditional gender roles for the participants’ particular cultures (e.g., “My mother/father/guardians enact what would be considered traditional gender roles in my culture”).

**Procedure**

Participants were selected from a list of academic departments by choosing every third department. The researchers chose classes from each selected department to survey based on their schedule availability. We then gave the participants consent information which indicated that their responses would be kept confidential and only group data would be reported. Before the surveys were handed out, we asked participants to answer the questions to the best of their abilities.

**Results**

Once data were collected, the scores for the items for each factor were averaged together to calculate a single overall score for each factor. Thus, each participant had an average score for each set of the internal and external factors. The scores of each participant were then sorted into three groups based on whether the occupation the participant was pursuing was male-dominated, female-dominated, or gender neutral.

The United States Bureau of Labor Statistics (2006) was used as a guide to determine which fields were male-dominated, female-dominated, or gender neutral in this study. If the occupation consisted of 60% or more male workers, we coded the occupation as male-dominated. If the occupation consisted of 60% or more female workers, we coded it as female-dominated. If the occupation consisted of nearly 50% males and 50% females (41-59% one gender or the other), we coded it as gender neutral. Because only a small sample of 11 students was pursuing gender-neutral occupations, this group of participants was removed from the data set.
The participants’ scores were then averaged within each occupation group. After sorting, independent t-test analyses compared the differences in means for the 10 factors of the female-dominated and male-dominated career groups.

The results of analyses on the self-perception factors, math confidence, math interest, science confidence, science interest, academic confidence, the importance of a family flexible job, and gender role attitudes, are shown in Figure 1. There was a significant difference between the groups in interest towards math; the female-dominated occupation group ($M = 2.73$, $SD = 0.91$) had a lower interest in the subject, $t(129) = -2.81$, $p < .01$ than the male-dominated occupation group ($M = 3.18$, $SD = 0.90$). A significant difference was also found between occupation groups in their interest in science, $t(129) = -4.26$, $p < .01$. Those in the female-dominated occupation group ($M = 3.69$, $SD = 0.83$) had a significantly lower interest in science than the male-dominated occupation group ($M = 4.32$, $SD = 0.82$).

Furthermore, confidence in one’s science abilities approached a significant difference between the two occupational career groups, $t(129) = -2.53$, $p = .012$. The male-dominated occupation group ($M = 4.32$, $SD = 0.82$) was somewhat more interested in science than the female-dominated occupation group ($M = 3.69$, $SD = 0.83$). Nevertheless, there were no significant differences between occupation groups in academic confidence, the importance of having a family-flexible job, or gender role attitudes.

The independent t-test results for the external factors influence of a mentor, attachment to guardians, and parental gender models are shown in Figure 2. There were no significant differences between occupation groups in whether members had an influential mentor in their lives, or in the level of attachment to guardians. There was, however, a significant difference in whether parents exhibited traditional gender roles, $t(129) = 4.10$, $p < .01$. Specifically, the female-dominated occupation group reported a significantly higher ($M = 3.73$, $SD = 0.79$) adherence to traditional gender roles by their parents than did those in the male-dominated occupation group ($M = 3.10$, $SD = 0.79$).

**Discussion**

There were significant differences in interest in math and science, thus supporting the hypotheses that women pursuing male-dominated career fields were more likely to have higher interests in these subjects than women entering female-dominated fields. These findings lend support to previous research conclusions that women who pursue male-dominated careers, specifically math- and science-related ones, typically have higher levels of confidence and interest in these areas than do women who pursue female-dominated careers (Mau, 2003; O’Brien & Fassinger, 1993; Sax & Bryant, 2006).

**FIGURE 1**

Mean scores for the female-dominated occupation ($n = 78$) and the male-dominated occupation ($n = 52$) groups in self-perception factors.

Note: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree.

**FIGURE 2**

Mean scores for the female-dominated occupation ($n = 78$) and the male-dominated occupation groups ($n = 52$) for external factors.

Note: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree.
The hypothesis that participants who were planning to enter a female-dominated career were more likely to have parents who model traditional gender roles for their culture was also supported. Schmader et al. (2004) found that “parents’ endorsement of gender stereotypes is predictive of their children’s self-perceptions” (p. 837). Schmader et al. (2004) concluded from this that behaviors modeled by parents may influence the self-perceptions their children have about educational skills, such as math, and these self-perceptions influence career choices.

Despite the differences between both occupational groups, there were many results that did not support the hypotheses. Differences in overall academic confidence and traditional gender role attitudes among the two occupational groups were not significant. The all-women’s college environment may have played a key role in the reasons why there were no differences between the two groups for these factors. The college these women attended is part of the Women’s College Coalition, which focuses on raising gender equality through women’s education (http://www.womenscolleges.org). Umbach et al. (2007) also found that all-women’s colleges strive to create an environment that encourages students to spend large amounts of time studying. The participants in this study had a mean grade point average of 3.40 on a 4.0 scale, indicating that they put a strong emphasis on earning quality grades and thus have higher confidence in their overall academic abilities. Also, students pursuing a male-dominated or female-dominated career who have strong confidence in their academic abilities as well as less-traditional gender role attitudes may be more likely to attend colleges with this type of environment. Therefore, students pursuing male-dominated or female-dominated careers may have more confidence in their academic abilities and less traditional gender role attitudes based on their college environment rather than their occupational aspirations.

The manner in which attachment to parents and the influence of a mentor were defined in the survey may have also influenced why there were no significant differences between the two occupational groups in these factors. Many of the questions pertained to how influential the mentor was in a student’s career decisions. A student may feel that her mentor is influential in other aspects of her life and not necessarily her career aspirations. The same event may have occurred with the level of attachment to one’s parent(s)/guardian(s). A student may have felt, for example, that she relies on her parents for financial support but does not often seek advice from her parents on career choices or personal issues. Thus, both factors may have been interpreted differently for each student no matter her occupational group. This may explain why these nonsignificant differences contradicted previous research findings (O’Brien & Fassinger, 1993).

Furthermore, the hypothesis that women aspiring to work in male-dominated fields would rate the importance of having a career that is family flexible as less important was not supported, contradicting previous research (Frome et al., 2006). Again, a reason for the disparity of the study’s findings with previous research may be due to the environment of the college, or the type of students choosing to attend the college. A majority of the women sampled ranged in age from 18 to 24 and may have not been planning to begin a family any time soon. The women in this sample may have felt that no matter what career they choose when they did wish to have a family they would be able to balance their family time and work time appropriately.

An additional reason why the college environment served as a limitation in this study is that according to Umbach et al. (2007), women who attend an all-women’s college are more likely to pursue a nontraditional career than their counterparts. Undoubtedly, the college institution was an influential dynamic and the hypotheses were based on the general female population (i.e., women who attend coeducational schools, high-school girls, etc.). Because the sample of participants in this study were different from the sample of participants in previous research, that might explain why the results from this study are different.

Additionally, the way in which the factors were operationalized raises some challenges. For example, there were only two survey items addressing whether both parents model traditional gender roles. This creates difficulty in making conclusions about parents’ behaviors and how they relate to women’s career choices. Also, the questions pertaining to women’s gender role attitudes did not specifically relate to gender role attitudes about the workplace, which may have influenced the participants’ responses to these items.

Despite limitations, there were some potentially useful findings about factors that influence women’s career aspirations. If further research shows that interest and confidence in math and science play a significant role in a woman’s career choices, educational institutions could be encouraged to foster interest and confidence in these subjects. Moreover, parents could work to model egalitarian gender role behaviors in order to instill more varied occupational interests in their daughters.

Further examination of these influences could compare the responses from women attending coeducational institutions to the responses of the women in this study. Such a comparison would help determeme the degree to which the college environment has an
impact on these factors in relation to women’s career aspirations. Future surveys should also measure each internal and external factor using the same number and kinds of questions. Despite the fact that this study found factors which contribute to women’s nontraditional career aspirations, there is much more work that needs to be done to determine how these factors influence a woman’s occupational journey in life.

References
APPENDIX

To what extent do you agree or disagree with the following statements?

Note: Response options; 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree.

7. Overall, I am better at math than other people in my major.
8. I feel confident that I can earn an A or a B grade in math courses.
9. Math is interesting.
10. I want to pursue more information about math.
11. I am interested in a career that uses math much of the time.
12. I would be good at a job that required extensive math skills.
13. Overall, I am better at understanding science than other people in my major.
14. I feel confident that I can earn an A or a B grade in science courses.
15. Science is interesting.
16. I want to pursue more information about science.
17. I am interested in a career that uses science much of the time.
18. I would be good at a job that requires much knowledge and skill in science.
19. Overall, I earn high grades in school.
20. Overall, it is easy for me to earn high grades in school.
21. Overall, I earn higher grades in school than most people in my major.
22. If I have children, I plan to be the primary caregiver to my children.
23. I think it is important to have a job with a flexible work schedule that I can adjust to meet the needs of my family.
24. It is important to have a job that does not require me to be away from my family.
25. It is important to have a job that would allow me to be home when my children are out of school (like teaching).
26. It is important to have a job that makes it easy to take time off for family responsibilities.
27. I currently have a mentor in my life. If not, skip to question #33.
28. My mentor and I have a close relationship.
29. I often rely on my mentor for advice when pursuing a career.
30. My mentor has been very influential to the career choices I have made.
31. My mentor has influenced my interest in a career that requires good math skills.
32. My mentor has influenced my interest in a career that uses science much of the time.
33. I have at least one living mother/father/guardian. If not skip to question #42.
34. My mother/father/guardian provides a lot of support for the career I choose to pursue.
35. My mother/father/guardian's wishes have influenced the career I wish to pursue.
36. My mother/father/guardian's wishes have influenced my choice of majors at school.
37. I often seek advice from my mother/father/guardian about my career choices.
38. I often seek advice from my mother/father/guardian about my personal issues.
39. I rely on my mother/father/guardian to help support me financially.
40. My mother/father/guardians spend equal amounts of time caring for my family (if you only have one guardian, skip to the next question).
41. In general, my mother/father/guardians enact what would be considered traditional gender roles in my culture.
42. In general, men are better than women at math.
43. In general, men are better than women at science.
44. It is unusual if a woman is interested in math.
45. It is unusual if a woman is interested in science.
46. It is unusual if a man is interested in English.
47. It is unusual if a man is interested in art.
48. There are more career opportunities in science for men than for women.
49. There are more career opportunities related to math abilities for men than for women.
50. Overall, women are better at raising children than men.