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Tracing Young Women's Career Aspirations

From Junior High School into College

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We have heard the claim that the United States needs more scientists, mathematicians, and engineers to compete in world markets (National Commission on Excellence in Education, 1983; National Science Board (NSB), 1993, 1998, 2004; National Science Foundation (NSF), 1994, 2001; Task Force on Education for Economic Growth, 1983). The intensity of such claims increased with the realization that the majority of the workforce would be women and minorities, who traditionally have not pursued such careers (Bae & Smith, 1996; Johnson & Packer, 1987; NSB, 1998; Oakes, 1990; Stumpf & Stanley, 1996). The NSB (1998) predicted a 44% increase in science and engineering (S&E) occupations from 1996 to 2006. However, women constituted 22% of the S&E work force in 1995 and 25% in 1999 (NSB, 1998, 2004). The largest percentages of women were in the biological sciences (40%) and mathematics/computer science (33%), with much lower percentages in physical science (22% to 23%) and engineering (9% to 10%) (NSB, 1998, 2004).

Females' preferences for the biological sciences and males' for the physical sciences (Dawson, 2000; Rayman & Jackson, 1996) are reported as early as fourth grade (Kahle, 1996; Kahle & Rennie, 1993). Young women's high school achievements in mathematics and science do not necessarily lead to positive attitudes towards these subjects or related careers (Catsambis, 1995; Greenfield, 1996). In light of projected job trends in science, technology, engineering, and mathematics (STEM) fields, we must foster the mathematics and science interests and achievements of all students to increase their prospects of entering high demand STEM occupations.

The purpose of this study was to trace changes in the degree level and career aspirations of a group of young women over three time periods, from middle school, where they indicated interest in STEM fields, to high school, and into college. One objective was to determine whether young women's degree expectations and

STEM career interests were sustained or decreased over time. The characteristics of STEM careers that young women reported as most and least desirable were reviewed to understand the aspects of such work that were attractive or turned young women away from these fields. I compared the desirable and undesirable characteristics reported by young women who maintained STEM career goals versus those who did not to determine whether distinct perceptions or beliefs existed within a group. This analysis might suggest appropriate intervention strategies or types of knowledge and experiences needed to develop a more balanced view of STEM occupations.

Review of the Literature

Obstacles that lead to the loss of talented women from mathematics and science-based fields are complex factors that may interact and reflect the opportunities available in our society (Catsambis, 1995; Hanson, 1996; National Center for Education Statistics (NCES), 1997; Trauth, 2002). Public policy, local norms, school experiences, and family values influence the gender identity and work of women and men in different ways (Trauth, 2002). Varied research approaches have been used to identify the factors that contribute to young women's under-representation in STEM fields (Casserly, 1980; Catsambis, 1995; Clewell, Anderson, & Thorpe, 1992; Hanson, 1996). This work has examined young women's (a) beliefs and attitudes toward mathematics and science, (b) access to mathematics and science courses and extracurricular experiences, and (c) knowledge of and exposure to the STEM professions.

Beliefs and Attitudes toward Mathematics and Science

Some research suggests that girls' beliefs and attitudes are primary influences on their interests and science experiences (Catsambis, 1995; Hanson, 1996). Compared to girls, boys have more positive attitudes toward mathematics (Hyde, Fennema, Ryan, Frost, & Hopp, 1990) and science (Weinburgh, 1995). Compared to boys, girls' beliefs about their competence more often affect their mathematics and science achievement and participation. Girls may feel less adequate and have lower expectations for success in mathematics and science (Guzetti & Williams, 1996; Kahle, 1996; Lappan, Shaughnessy, & Boggs, 1996), although they achieve at the same or higher levels than males (Greenfield, 1997; Sax, 1995; Seymour, 1995). There is a decrease in mathematics and science self-concept from junior to senior high school, but it arrives earlier and is more prominent for females (Byrne & Shavelson, 1987; Greenfield, 1997), so they are more vulnerable (Smith, 2000).

Girls' attitudes toward math and science may also stem from their beliefs about the usefulness of these fields or male-dominance in these fields (Eisenhart, Finkel, & Marion, 1996; Hill, Pettus, & Hedin, 1990; Taber, 1992; Weinburgh, 1995). Parents, teachers, and school counselors foster sex-role stereotypes (Vetter, 1996) when they encourage the mathematics achievement of boys more than girls (Kahle & Meece, 1994), or have different educational and career expectations for boys versus girls (Greenfield, 1997; Kahle, 1996; Kahle & Meece, 1994; Shakeshaft, 1995; Shephardson & Pizzini, 1992). If mathematics and science are viewed as masculine, young women experience conflict between their interest in these subjects and their personal life and popularity (Clewell, et al., 1992; Stage & Maple, 1996).

Women may turn away from STEM fields because their math and/or science teachers emphasized competition rather than collaboration and cooperative approaches, or characterized STEM work as lonely and very demanding (Astin & Sax, 1996), requiring "super woman" qualities (Miller & Silver, 1992). Some research has noted women's perceptions of a role conflict between STEM careers and family responsibilities (Betz, 1994; McCracken & Weitzman, 1997; Nauta, Epperson, & Kahn, 1998; Packard, 2002; Seymour & Hewitt, 1997; Smith, 2000) because a STEM career is very demanding (Nauta, et al., 1998). Women more than men experience pressure when managing career and family responsibilities (Lips, 1992; Seymour & Hewitt, 1997), and women in STEM professions more often report that family duties interfere with their work (Burlew & Johnson, 1992).

Access to Mathematics and Science Extracurricular Activities

Females are as likely as males to complete advanced mathematics and science courses, except physics (NCES, 1997). While males and females take similar courses, their extracurricular mathematics and science experiences are very different (Catsambis, 1995, Greenfield, 1996, 1997; Hanson, 1996; NCES, 1997). Compared to girls, middle school boys are more likely to have visited science museums, participated in science fairs or math competitions, used a microscope, and met a scientist (Hanson, 1996; Jones, 1991). These extracurricular experiences may arise from students' interests, but they also increase the perceived intrinsic and utility value of math and science and positively affect students' attitudes so there is less decline throughout junior and senior high school (Hofstein, 1990). Applications of mathematics and science in authentic real world contexts reinforce concepts and processes learned in school and affect students' career expectations (Smith, 2000; Vetter, 1996).

Exposure to Role Models and Career Information

Females and minority students may have little STEM career information or limited exposure to STEM role models (Hill, et al., 1990; Schuck, 1998). Hence, they may not understand that math and science education are essential to enter STEM fields. Local occupational norms also influence adolescents' career aspirations (Ianni, 1989). For example, girls use limited female representation in STEM fields to conclude they are white male domains (Eisenhart, et al., 1996; Taber, 1992). However, meeting female scientists improves adolescents' attitudes toward both science and women in science (Smith & Erb, 1986; Terry & Baird, 1997). Female role models encourage girls to take risks (Smith, 2000) and counter stereotypes about appropriate work for men and women. Interacting with a scientist of one's own race and gender is a powerful influence on a student's science-related career choices (Hill, et al., 1990).

Research Methods

Research Focus

In this paper, I report data collected at three points over six to eight years, from 26 of 34 young women who had attended a week-long summer institute designed to support middle school girls' interests in mathematics and science-based careers. The purpose of this study was to trace the stability or changes in the degree level expectations and career aspirations of a group of young women over three time periods, from middle school, to high school, and into college. Were young women's degree level expectations sustained, or did they increase or decrease over time? Degree expectations and attainment could expand or limit young women's career options. Did young women maintain a "very strong" level of interest in STEM professions, or did their interest fade from junior to senior high school and into college? Did participants' STEM career choices reflect past trends with the largest percentage preferring the biological sciences versus mathematics, the physical sciences, or engineering in decreasing order? The characteristics of STEM careers that young women reported as most and least desirable were reviewed to understand the aspects of such work that were attractive or unattractive to young women. Were different desirable and undesirable characteristics reported by young women who maintained STEM career goals versus those who did not indicate different and distinct perceptions or beliefs within a group? Would this analysis suggest appropriate intervention strategies or types of knowledge and experiences needed to develop a more balanced view of STEM occupations?

Participants

The young women in this study represented varied school districts in Southeastern Pennsylvania, and, through a survey, expressed a desire to explore STEM careers at the 1994 to 1996 summer institutes. Three to five years later, in 1997 to 1999, 34 institute participants completed parallel forms of the initial survey as

described in previous work (VanLeuvan, 2005). A second follow-up survey was completed by 26 of the 34 young women in 2002 to 2003; contact was not possible by mail or phone with eight of the young women. At the time of the third survey, most of the 26 respondents were enrolled in college: one freshman, two sophomores, nine juniors, and eleven seniors or graduates. Fifteen girls (58%) stated their ethnicity as White American, while eleven (42%) were minority students, eight African Americans (31%), and two Asian Americans.

One problem encountered in this study was the difficulty in maintaining contact and obtaining responses from students six to eight years after their initial participation. The 26 respondents represent a subgroup that may be more intrinsically interested in mathematics and science and/or more conscientious than those who did not return the college survey. The findings might change significantly if the pool of respondents was increased. Nearly all of the participants had indicated an interest in exploring mathematics and science-based careers as junior high school students, but many (62%) indicated very different career aspirations several years later. The results reported here are not limited to participants who maintained STEM career preferences into college.

Research Procedures

A survey was developed using guidelines established by Davis and Humphreys (1985) and in consultation with Campbell Kibler Associates, experts in the evaluation of mathematics/science intervention programs for young women. Copies of the initial and follow-up surveys are available in a previous article (VanLeuvan, 2004). Students' responses were entered as ordinal ranks or nominal codes when categories of like responses occurred. A test of intra-rater agreement of coded responses over the survey yielded 85.3% agreement. Test-retest reliability measures resulted in $r = 0.86$ for the entire survey, with comparable results for particular sections: $r = 0.83$ for degree expectations, $r = 0.74$ for level of interest in math and science-based fields, $r = 0.88$ for career preferences and influences on career choice.

Junior high school students completed the initial survey prior to the summer institute and the follow-up surveys when they were close to graduation from high school and later enrolled in college. This study focuses on responses to three sections of the survey. The first set of analyses centered on participants' degree expectations. The second relevant section addressed the participants' levels of interest in STEM careers and actual career preferences. In the third section, participants' reported aspects of STEM careers that they liked most and least.

Analysis of degree expectations.

Prior research has noted that young women set lower educational goals over time (Holland & Eisenhardt, 1990; Miller & Silver, 1992; VanLeuvan, 2004), especially after they marry or become parents (Haggstrom, Kanause, & Morrison, 1986; Hanson, 1996; Marini, 1984). The level of education completed affects students' career options. Perhaps young women view the educational requirements for STEM careers as out of reach, unattainable, or undesirable aspects of these fields. To determine differences, students' degree goals were assigned ranks of 0 (*no degree*), 1 (*associate*), 2 (*bachelor*), 3 (*masters*), or 4 (*doctoral degree*). Two c2 tests were completed to ascertain significant differences from junior to senior high school and into college in participants' degree expectations; first across all levels from no degree to doctoral degree goals, then for participants with graduate degree goals versus those without graduate degree goals. I also performed a McNemar Test for Significance of Change, a c2 test for dependent samples involving nominal data, to compare degree expectations from junior to senior high school for two groups of students (a) those who set higher goals from an undergraduate to a graduate degree versus (b) students with lower goals from a graduate to undergraduate degree.

Interest in STEM careers.

A primary question of this longitudinal study focused on the strength and stability of young women's STEM career aspirations. For this purpose, students' who expressed levels of interest in STEM careers were assigned rankings of 3 (*high*), 2 (*moderate*), 1 (*low*), or 0 (*no interest*). I performed the McNemar Test for Significance of Change in the proportion of students who (a) increased to a *very strong* level of interest versus (b) those who decreased from very strong to a lower level of interest in a STEM career from junior to senior high school and into college.

The study also compared the career preferences of these young women to typical female representation in STEM fields. Did the STEM career preferences of these young women mirror past trends with the largest percentage choosing the biological sciences versus mathematics, the physical sciences, or engineering? From the girls' listed specific career preferences, types of responses were grouped to form categories, (a) the Health Professions including medicine, physical therapy, dietician, or nursing, (b) veterinarian, (c) biological science, (d) physical science, (e) engineering, (f) computer science/technology, (g) mathematics, and (h) non-STEM career options.

Desirable and undesirable characteristics of STEM careers.

A final study objective was examination of characteristics of STEM work that were attractive versus unattractive to young women. Would students who expressed STEM versus non-STEM career preferences identify the same features of this work as desirable or undesirable? Similar descriptors were grouped to determine common desirable versus undesirable features of STEM work. The categories described in the study results section were developed over three data sets: the current study, and studies of a 1991-1992 cohort (VanLeuvan, 2001), and parallel 1995-1996 cohort of young women (VanLeuvan, 2004).

Study Results

Degree Expectations

Participants reported the highest level of education they hoped to attain on the initial and two follow-up surveys in senior high school and college (see Table 1). Four junior high school respondents had no plans for higher education and two hoped to complete an associate degree. The other 20 girls consistently set very ambitious goals.

In high school, 50% of the respondents reported master degree goals, exceeding the proportions of college-bound seniors in 1998 and 1999 with master degree goals both nationally (31%) and in Pennsylvania (27% and 26%) (Educational Testing Service (ETS), 1999, 2000). Another 31% of high school respondents expected to earn a doctoral degree (Ph.D. or M.D.), also exceeding proportions of college-bound seniors nationally (23% and 22%) and in Pennsylvania (17% and 16%) in 1998 and 1999 (ETS, 1999, 2000).

Graduate degree expectations were reported by 16 young women (62%) in junior high school, 21 (81%) in senior high school, and 19 (73%) in college. There were not statistically significant differences in the proportions of students who identified particular degree level goals from junior high school to college, $c2(6, N = 26) = 9.59 < 12.59, p = .05$, or the proportion of students who reported up to a bachelor degree versus those with graduate degree expectations from junior high school to college, $c2(2, N = 26) = 2.41 < 5.99, p = .05$.

I then examined individual changes to higher versus lower degree goals from junior high to senior high school and into college. While the degree goals of some students were stable and did not change, more respondents decreased versus increased their degree expectations over time. From junior to senior high school, twice as many students reported lower degree goals (12) compared to six students who set higher degree goals. The McNemar Tests of Significance of Change indicated no statistically significant difference,

$c2(1, N = 26) = 2.00 < 3.84, p = 0.05$. However, the differences were more pronounced from senior high school to college where 4students set higher degree goals and 11 reported lower degree goals and approached statistical significance, $c2(1, N = 26) = 3.27 < 3.84, \ p = .05$.

Interest in a STEM Career

The number of young women who reported a strong interest in at least one of the STEM career areas dropped markedly from 24 students (92%) in junior high school to 17 (65%) in senior high school, and down to 10 (38%) in college. The McNemar Test for Significance of Change was calculated and indicated statistically significant differences (a) from junior high school to college, where one young woman reported increasing to a strong level of interest in a STEM career versus 15 respondents had decreased levels of interest, $c2(1, N = 26) = 12.25$, $p = .05$, and (b) from high school to college, where one student reported an increase, while eight indicated decreased levels of interest, $c2(1, N = 26) = 5.44$, $p = .05$.

Specific Career Preferences

On each survey, students reported up to three specific career preferences. Hence, the percentage of students who indicated particular career preferences as listed in Table 2 may exceed 100% if they are summed, as students reported interest in more than one area. Young women's declining interests in STEM fields are reflected in the lower percentages who indicate specific STEM career preferences from junior to senior high school and into college. However, across all three surveys the health professions were the most popular category of STEM occupations followed by the sciences and engineering, with little reported interest in mathematics or computer/information system sciences. Lawyer was the most popular non-STEM occupation followed by some form of business management or accounting and teaching.

If the health professions are seen as part of the biological sciences, the STEM career goals of these young women were similar to past occupational trends indicating the largest percentage of women in the biological sciences and lower percentages in mathematics/computer science, physical science, and engineering (NSB, 1998, 2004). A previous study by Benbow and Minor (1986) found that girls preferred biology more often than boys, who ranked chemistry and physics highest. In related work, Eccles, Barber, and Jozefowicz (1998) reported that girls' preferences for the biological sciences contribute to their higher levels of confidence and expectations for success in the health professions, but lower expectations for success in physical science and engineering when compared to boys.

Characterizations of STEM Work

Desirable features of STEM work.

On each survey, young women described what they thought they would like most and like least about a STEM career. Three categories of desirable characteristics appeared most often on both the high school and college surveys (see Table 3). Five high school students and eight college women, including those with and without STEM career preferences, indicated they would most like the exploration, discovery, or learning that they associated with STEM work. Four high school students with non-STEM career goals reported that the most desirable aspect of a STEM career would be helping others or giving back to society through their work. On the final survey, five college majors in STEM fields agreed, indicating increased awareness of the potential for societal contributions in STEM fields. Comments by four high school students and five college women reflected their enjoyment of and interest in science or mathematics as the most appealing feature of STEM work.

On the high school survey, the type of thinking or mental challenge of STEM work was the most frequent category of positive descriptors as reported by six students. Only two college women majoring in STEM

fields mentioned mental challenges. The majority of college women with non-STEM career preferences did not respond or report desirable features of STEM professions.

In the current study, college women with STEM career preferences more often found the most appealing aspects of STEM work to be the generative, exploratory qualities, mental challenge, and the capacity to contribute to society, when compared to college women with non-STEM goals. The categories of desirable characteristics of STEM fields identified here are consistent with those found in previous work with other groups of young women. Discovery and learning formed the largest category of positive descriptors for high school girls in two longitudinal studies (VanLeuvan, 2001, 2004). A smaller percentage of high school girls in these research cohorts mentioned opportunities to contribute to society as most desirable; 8% (VanLeuvan, 2001) and 6% (VanLeuvan, 2004) versus 19% of high school and 31% of college respondents here.

Undesirable features of STEM work.

The constellation of undesirable characteristics or negative descriptors of STEM careers was more varied (see Table 4). The most frequent category of response was a dislike for or difficulties in doing the mathematics required in STEM fields, as stated by six high school students (23%) and four college women (15%), most with non-STEM career goals. In previous work, the use of mathematics in STEM work also formed the largest category of negative descriptors for one cohort of high school girls (18%) (VanLeuvan, 2004), but a smaller percentage of another cohort (4%) (VanLeuvan, 2001).

Three additional categories of undesirable characteristics appeared on both the high school and college survey. The years of study required for STEM work did not appeal to two high school students and three college women. One high school student and three college women mentioned the competitive nature of STEM work and difficulty entering STEM professions. On the other hand, four high school students thought that STEM work could become boring or repetitive, while one college women offered a similar comment. These categories of negative descriptors were also identified by a comparable percentage of high school girls in two previous studies (VanLeuvan, 2001, 2004).

Two high school students (8%) disliked the challenge or hard work required for a STEM career, but no college women did so. In previous work, 9% of high school girls likewise reported the challenge or rigor required for STEM work as undesirable (VanLeuvan, 2001, 2004). Two new categories of negative descriptors emerged on the college survey. Three college women mentioned the lack of social contact or isolation they associated with STEM work. In a previous study, 6% of high school girls mentioned the isolation and limited social interaction they associated with STEM work (VanLeuvan, 2004). Among the college women who expressed STEM career preferences, four stated that they would not like the "long hours of work" or time devoted to a career versus family seen as necessary within STEM occupations. Only one high school student in a previous study shared this concern (VanLeuvan, 2004).

Summary Discussion and Conclusions

The young women in this study had set extraordinary degree goals as high school students, with 73% expecting to complete a graduate degree. These aspirations seem very optimistic given past indicators that women earned 55% of master's degrees and 39% of doctorates awarded in 1995, while in science and engineering women earned 38% of the master's and 31% of the doctoral degrees (National Science Board [NSB], 1998). However, 19 of the respondents still expressed graduate degree expectations as college students. Other studies (Holland & Eisenhart, 1990; Miller & Silver, 1992) and research with another group of young women (VanLeuvan, 2004) indicate a decline in the educational aspirations of young women over time. Longitudinal tracking over several years will enable us to see whether the ambitious educational goals of these young women come to fruition.

Young Women's Interest in and Characterizations of STEM Fields

While nearly all of the participants had indicated an interest in exploring mathematics and science-based careers as junior high school students, it is clear that the majority had developed very different career goals several years later. The number of young women with STEM career preferences decreased from 92% in junior high school to 38% in the college years. These college women most often reported a very strong preference for the health professions (23%), with only one reported preference each for biology, chemistry, engineering, and computer/information sciences. These expectations match work force trends, with the largest percentage of women employed in the biological sciences (40%), followed by mathematics, physical science, and engineering (NSB, 2004). The biological and health professions are certainly more gender-balanced. Other researchers have noted that girls' preferences for the biological sciences increase their levels of confidence and expectations for success in the health professions versus the physical sciences or engineering when compared to boys' preferences (Eccles, et al., 1998).

Prior research suggests that women are more likely to enter a STEM field when they believe their work will solve societal problems (Davis & Rosser, 1996; Hynes, 1995; Rosser, 1993; Sax, 1994) or help people (Astin & Astin, 1993; Vetter, 1996). Five (19%) of the college women in this study shared these views about the importance of helping others or giving back to the community through their STEM occupation. Young women may choose the health professions because they believe they will provide opportunities to address societal concerns as well as the flexibility to balance career and family responsibilities (Miller & Silver, 1992). One implication of these findings is that young women might sustain and increase their interest in STEM fields beyond the health professions if they were more aware and appreciated the societal contributions of chemists, physicists, or engineers, how their work improves our lives or the environment, or support medical research.

College women with STEM goals also described as desirable (a) the exploration and discovery (19%) and (b) the mental challenge or stimulation they viewed as integral to STEM work (8%). These results are consistent with previous research with other groups of high school girls (VanLeuvan, 2001, 2004). Career exploration programs or guest speakers in junior and senior high school could feature female STEM role models who highlight the societal contributions as well as the opportunities to learn and explore new ideas and techniques in their job. Female professionals could also share their views regarding the most rewarding aspects of STEM work, potentially offering students new perspectives. Meeting and interacting with female engineers or research chemists would broaden students' perceptions of what is appropriate, valuable, and satisfying work for women.

Students with non-STEM career goals reported the largest category of negative characterizations of STEM careers as their dislike for or lack of success in math and/or science (19%). Using mathematics formed the largest category of negative descriptors (18%) in previous research with one group of high school girls (VanLeuvan, 2004), but a smaller percentage (4%) of a second group (VanLeuvan, 2001). Students may have transferred negative feelings about their mathematics and science experiences to careers that rely on these competencies. They also may have erroneous views of the ways that mathematics is used in various STEM fields. Career exploration programs, guest speakers, or shadowing experiences in junior and senior high school would provide a more accurate picture of mathematical applications to STEM work and the role that computers play in removing the burden of tedious calculations.

Other college women characterized the STEM professions as isolating, providing limited social interaction, or requiring long hours of work (8%), exacting a costly personal toll. Six percent of high school girls in a previous study voiced similar concerns about the long work hours in STEM professions (VanLeuvan, 2004). However, the college women who disliked the long hours of work in STEM fields still indicated STEM career preferences in spite of reported concerns about these demands. Young women view STEM occupations as especially burdensome when they anticipate or have family responsibilities (Seymour &

Hewitt, 1997; Ware & Lee, 1988). STEM career goals may be rejected when young women do not see ways to combine their career and family roles (Arnold, 1993; Betz, 1994; Burlew & Johnson, 1992; Lips, 1992: Livingston & Burley, 1991; Nauta, et al., 1998). Career exploration programs and shadowing experiences would provide exposure to female STEM role models, who balance a career, family, and social life and counter such negative perceptions. Young women might then develop more realistic or normalized views of the types and amount of work required for specific STEM careers. They might also understand how women can fulfill their professional and family responsibilities and enjoy the satisfaction of attaining both their personal and professional goals.

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A version of this paper was presented at the annual meeting of the American Educational Research Association, San Diego, CA, April 16, 2004. A previous article traced changes in the career aspirations of

these young women from junior to senior high school (VanLeuvan, 2005).

Table 1

Young Women's Higher Education Degree-Level Goals

	Time of the survey					
	Junior high school		High school		College years	
Degree Goal	No.	%	No.	%	No.	%
No response	--	--	1	4	--	--
High school	4	15	--	--	1	4
Associate	2	8	--	--	--	--
Bachelor's	4	15	4	15	6	23
Master's	7	27	13	50	13	50
Doctoral	9	35	8	31	6	23

Note. Dashes indicate no responses for that degree level and time of the survey.

Table 2

Young Women's STEM Career Goals

	Time of the survey					
STEM	Junior high school		High school		College years	
Occupations	No.	%	No.	%	No.	%
Health professions	20	77	9	35	6	23
Medicine	16	62	3	12	3	12
Sciences	7	27	7	27	2	8
Biological	2	8	4	15	1	4
Earth	3	12	3	12	--	--
Chemical	1	4	1	4	1	4
Physical	1	4	--	--	--	--

Engineering	6	23	3	12	1	4
Mathematics	--	--	1	4	--	--
Computer/Info						
Sciences	1	4	2	8	1	4

Note. Dashes indicate no responses for that occupational category and time of the survey.

Table 2 continued

Young Women's Non-STEM Career Goals

	Time of the survey					
Non-STEM	Junior high school		High school		College years	
Occupations	No.	%	No.	%	No.	%
Lawyer	8	31	5	19	5	19
Business &						
Accounting	2	8	3	12	2	8
Teacher	2	8	3	12	2	8
Other	6	23	4	15	7	27

Table 3

What Young Women Liked Most About STEM Careers

	Time of the survey											
	High School Years						College Years					
	Career Aspirations						Career Aspirations					
Desirable Total	STEM		Non-STEM		Total		STEM			Non-STEM		
Characteristics	No.	%	No.	%	No.	%	No.	%		No.	%	
To discover & learn	2	8	3	12	5	19	5	19	3	12	8	31
Mental challenge	3	12	3	12	6	23	2	8			2	8

Helping people			4	15	4	15	5	19			5	19
Enjoyment interest												
In mathematics	2	8			2	8			1	4	1	4
In science	1	4	1	4	2	8	1	4	3	12	4	15
Other responses	2	8	2	8	4	15			2	8	2	8
Liked nothing			2	8	2	8						
No response given	1	4	1	4	2	8			10	38	10	38

Table 4

What Young Women Liked Least About STEM Careers

	Time of the survey											
	High School Years						College Years					
	Career Aspirations						Career Aspirations					
Undesirable Total	STEM		Non-STEM		Total		STEM				Non-STEM	
Characteristics	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Mathematics used			6	23	6	23	1	4	3	12	4	15
Math & science used									1	4	1	4
Hard work/challenge	1	4	1	4	2	8						
Years of study needed	1	4	1	4	2	8			3	12	3	12
Long work hours							4	15			4	15
It’s boring/repetitious	2	8	2	8	4	15	1	4			1	4
Competitive/difficult												
To enter field			1	4	1	4	3	12			3	12
Isolation on the job							2	8	1	4	3	12
Dislike nothing	1	4	2	8	3	12	2	8	1	4	3	12
Other responses	1	4	1	4	2	8			4	15	4	15

No response given	4	15	3	12	7	27	1	4	3	15	4	15