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## **Women Who Continue to Pursue Science: Motivated not only Despite but also by Concerns about the Future**

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*Like other struggles or problems, concerns can be seen as a catalyst for change, or a source of motivation that moves us forward.*

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### **ABSTRACT**

The purpose of this paper is to explore how women pursuing science fields are able to do so despite their concerns about the future (e.g., difficulty combining family and career, undesirable work environment). Do these women change their values, ignore the stereotypes, or manage in some other way? Thirty college women pursuing science and engineering participated in a semester-long program where they discussed their concerns with several peers and female professionals. Quantitative data showed students' concerns and values remained strong over time. Qualitative data revealed students became aware that peers and professionals shared their concerns, and this helped them to feel part of the field. Surprisingly, they were now motivated not only despite but also by the concerns that once discouraged them. These results suggest that career programs can help women to recognize shared concerns, become motivated to change the field in the ways that concern them, and to reimagine their futures.

### **INTRODUCTION**

Many college women have concerns about their future lives and work, particularly in terms of combining their personal life and career (Eccles, 1987; Holland & Eisenhart, 1990; McCracken & Weitzman, 1997; Stage & Maple, 1996). This seems to be particularly the case for women pursuing natural sciences and engineering careers (Seymour & Hewitt, 1997; Ware & Lee, 1988). Women may question the likelihood of having family or making a contribution to society when pursuing a science-related career (Eccles, 1987; Holland & Eisenhart, 1990; Seymour & Hewitt, 1997) and they may expect to work in an isolating,

uninviting workplace (Stage & Maple, 1996). This is predictable because science has, over time, been defined as a "nerdy, male and White" occupation (Eisenhart, Finkel, & Marion, 1996) and women are still underrepresented in the physical sciences and engineering fields (Vetter, 1996). Even though they may look to female professionals for ideas of how to successfully meld professional and personal lives (Gilbert & Rossman, 1992), college women report a lack of role models and mentors who discount negative stereotypes (Astin & Sax, 1996; Mutha, Takayama, & O'Neil, 1997; Osborn, Ernster, & Martin, 1992; Sonnert & Holton, 1996).

Many women who consider science careers become discouraged by negative stereotypes and the lack of women professionals makes it difficult to produce much counter-evidence. One way of conceptualizing this process is to see negative stereotypes as representing "possible selves" that students are motivated to become or avoid (Markus & Nurius, 1986). Using this perspective, if women have negative images of science professionals, they may be less motivated to pursue science careers because they want to avoid becoming these negative images. However, women who pursue science are also likely to have positive, desirable images that lead them to pursue the career. This creates a tension among positive and negative future images, a tension that may lead some women to doubt whether they can be the kind of person they would like to be and still become a scientist. Part of what contributes to the concerns college women have, then, is their uncertainty that positive possibilities or possible selves exist, or that they will personally be able to achieve them.

This study aims to examine how these concerns about the future, and related negative stereotypes, influence women who do continue to pursue science-related fields. Surely these pursuers of science too have (had) similar concerns about their future lives as scientists. How do these women stay in their fields despite their concerns about the future? Do they change their values (i.e. decide to give up their personal life)? Ignore the stereotypes? Find a way to "have it all"? Eventually leave? In order to study this, I invited college women who were in the midst of grappling with these issues and who were discouraged from continuing to pursue their desired science or engineering field to attend a one-semester program. In a workshop series/discussion group format, the college women could discuss their concerns about the future with peers, graduate students, and professionals. This allowed me the opportunity to examine the college women's concerns about the future over time, and how, if at all, their concerns affected their actions or career decisions.

## **METHOD**

### **Participants**

Thirty college women attending a large midwestern university participated in the project (see [Appendix A](#) for a list of pseudonyms and information). They ranged in age from 19 to 22; 4 were Sophomores, 13 were Juniors, 13 were Seniors. Eleven students declared majors in biological-sciences, 5 students in physical-sciences, 6 students in health- or medical-sciences, and 8 students in engineering. They reported a mean GPA of 3.22 (on a 4.0. scale). The group was diverse; 9 (30%) students were ethnic minorities and 11 students (36.7%) were first generation college students.

### **Procedure**

College student selection. Students majoring in natural science or engineering received an electronic posting for a "future career concerns" program for women that would meet every other week over the fall semester. I posed these questions: "Are you trying to decide if a science or engineering career is really for you?" and "Do you have concerns about your future career path? (For example, having a personal life or family in the

future, diversity in the workplace, wondering if your work will make a contribution?).” Over 400 women expressed interest in participating, which illustrated the salience of the issue under study. (A shortened program was offered to accommodate some additional students during the second semester.)

The pool was narrowed down based on students’ abilities to attend all sessions, intensity and specificity of concerns, and Sophomore class status or higher. Kayla’s application was typical of the group who participated.

I am interested in the career workshop for women. My name is Kayla and I am a senior majoring in Physiology. I will graduate in May and plan to work in biological research, and then attend medical school. Many of the issues you addressed in your e-mail are concerns of mine. I plan to get married and have a family but I am concerned about how everything will be juggled. My desire for a family conflicts with my desire to be a physician, and many of the people I have talked to say that I must choose or one or the other will suffer. I would like to believe that this is not so, and I hope your workshops would offer some insight.

To make the sessions smaller, two sessions of the program were offered (a Tuesday session or Wednesday session); 15 women attended each session throughout the semester. Because the sessions were identical and the two groups were similar, the results of the two groups are considered collectively.

Graduate students/professionals recruitment. The graduate students were recruited via a women-in-science electronic listserv and through peer recommendations. The female graduate students represented a range of science- and engineering- fields and lifestyle choices; most attended the same university while others attended another nearby large university. Similarly, the women professionals were recruited by recommendations of colleagues at the university and letters sent to nearby workplaces. The professionals lived within an hour’s drive of the university and represented a range of fields, degrees, and lifestyle choices; working in academics, hospitals, or industry, working part-time or from home, with children and without. There were between six and eight guests per session.

Role model web site. In addition, I created a role model web site showcasing a variety of science graduates, including men and women from various fields and of multiple ethnic backgrounds (contact author for more information). In the web site, 17 role models are showcased with pictures and share their reflections on their career choices, about their lives, and their struggles; all were available over e-mail.

Workshop series/Discussion groups. Students met six times over 12 weeks: 1) The first session consisted of peer discussion and exploring a role model web site; 2) discussion groups with graduate women; 3) career exploration among peers; 4) discussion groups with professional women; 5) future planning among peers; and 6) social event. In the second and fourth session, students were in small groups with two graduate/professional women for approximately 30 minutes, then in another group with two different graduate/professional women for another 30 minutes, and then engaged in an open-mixer for the remaining 30 minutes. This arrangement sought to maximize students’ exposure to different viewpoints and airtime to discuss their issues.

## **Data Sources and Analysis**

Students completed a pre-post survey using a 6-point Likert-type scale to assess their agreement with having future career concerns (1=strongly disagree to 6 =strongly agree). The items included combining career and personal life, combining career and having children, working alone, working long hours, competitive work environment, not feeling similar to others, and lack of role models. Students also added open-ended comments elaborating their concerns. Follow-up interviews with 10 students focusing on their experiences

of concerns were transcribed. I also requested an update via e-mail from students 16 weeks after the program was over.

First, I quantitatively compared students' pre- and post-surveys to look for changes in the magnitude of their concerns. Reports that their concerns increased or stayed the same would suggest they had not changed their values and continued to be concerned. Reports that their concerns decreased would suggest they were ignoring stereotypes or had changed their values. Regardless of the quantitative results, a closer look at open-ended comments would be warranted. I conducted a content analysis regarding the nature of their concerns from the qualitative data sources. That is, I read and re-read their open-ended survey answers within students from pre-post and looked carefully for patterns across students (e.g., reduction/increase of concerns, discouraged by/ignored stereotypes) and analyzed the content of student interviews in a similar fashion.

## **RESULTS**

In order to discuss how the college women were able to continue to pursue science careers despite concerns about the future, I will first provide further context by offering a glimpse of the students' concerns. Then, I will report that the magnitude of the college women's concerns remained high throughout the 12-week program suggesting retention of values and concerns. Next, I will shift my focus to the qualitative data that will illustrate that the college women recognized shared concerns with peers, graduates, and professionals and as a result, they began to feel part of the field. Collectively and individually, they could choose to stay, stake a claim, and help to reshape the field. Finally, I will show that concerns that were once discouraging to their pursuit were now serving as a source of motivation.

### **A Glimpse of their Concerns**

In the first meeting, students sat around a large table and shared their concerns with everyone in the group. As we went around the table to share, it was clear that the concerns that brought them to the program were intense in magnitude. It was also clear that students had concerns in common with one another, as evidenced by Lori and Rose's exchange.

Lori: My main struggle right now is I don't know if I really want to be a doctor anymore or what aspect of the medical field I want to be in. It is sort of like having a mid-life crisis. The unfortunate thing is because I have no direction. I don't even want to go to class anymore (tears up). I feel like it is totally useless.

Rose: I kinda have the same concerns as you (looking at Lori). I am not sure I want to go into medicine because I am not sure how much time I'm going to have for the rest of my life afterwards.

This exchange illustrates that Rose is speaking not only to the group, but also directly to Lori, by saying that she has similar concerns. Students continued to share their concerns as they went around the table; similar concerns affected natural science and engineering students.

Genoveva: I don't know if any of you have heard, but engineers are dull people with stressful lives and no family life, and I just can't believe that's true.

Georgia: I have a whole bunch of struggles (laugh) but I want to go to grad school, I want to go into forensics also. One of my big concerns is that I have a boyfriend. He lives in another state and I want to be with him but I want to go to graduate school. I am torn. Where do I go? Do I



put this on hold? Or do I put him on hold?

Genoveva had an image of what her life might be like as an engineer and Georgia had a more pending decision to make regarding her graduate training and boyfriend. Across students, there was an “either/or” quality to their concerns. Students perceived that they had to resolve the future career concerns by making a choice between 1) leaving the field so they could become who they wanted to become personally, or 2) by staying and becoming the negative stereotypical images. The open-ended comments on their pre-surveys were completed just before this discussion around the table, and for the most part, echoed the types of concerns and the “either/or” quality in their thinking about how to move forward in the face of these concerns about the future. Although they were interested in pursuing a science career, they were trying to decide if pursuing the career would be worth the sacrifices evident in others' lives.

### **Women's Concerns Remain Strong**

Students' initial responses on the future career concerns survey provided a quantitative assessment of their future career concerns. Their chief future career concerns (see [Table 1](#)) were having a family and science career in the future, having a personal life and science career in the future, and working in a competitive environment.

In their post-surveys, students still reported high means on the same items, including combining family and career, personal life and career, and working in a competitive environment. These high means indicated remaining concerns in those areas (see [Table 1](#)). Paired t-tests were conducted to examine pre-post changes within participants. The only significant change was that they became increasingly concerned with working long hours, from pre-intervention ( $m=3.96$ ,  $SD=1.07$ ) to post-intervention ( $m=4.65$ ;  $SD=1.09$ ),  $t(26)=-3.14$ ,  $p=.01$ . These results suggest that students held onto their values for family and personal life, and a desirable work environment. I turn to the open-ended comments pre-post to illustrate how their perspectives on their concerns changed over time.

### **Moving Forward Despite Concerns: Finding Possible Selves**

The students' post-survey comments added insight into how they changed their perspective of their concerns. For example, Estrella was representative of the students' experiences. As a first generation college student, she was experiencing a great deal of self-doubt and did not have a great deal of support from her Hispanic-American family. She wrote:

Another concern I have is, “will I make it?” because although I'm just starting my science courses, I feel that either I'll be pushed down or “drop” myself. Also, I'll be the first in my family to pursue a Bachelors Degree, and go for my Ph.D. My family is not really supportive. (pre-survey)

These feelings of self-doubt and concern about pursuing science and medicine were even more apparent in our first meeting when she almost broke down in tears describing her concerns. By the end of the program, her concerns remained strong, but she now planned to stay.

My concerns have somewhat stayed the same since the beginning of the semester. One thing that has changed is that I know I want to stay in science. Remember I was having second thoughts. As hard as it seems right now to pursue this degree, I feel that switching my major to business or education, which are other majors that interest me, may be a “way out” and I don't want that. (post-survey, emphasis hers)

In other words, students like Estrella began to see options for themselves within the sciences, rather than

having to leave because of their concerns. She said in her interview, “The graduate students and the doctors that came in were helpful. I could see what I’m up against and what’s expected, what to look forward to.”

It was clear that their interactions with several individuals who were part of the science field helped the college women to change their perspective on their concerns. Corie, a computer science student, was concerned about a range of issues stemming from being a woman in a male-dominated field.

Females in computer science are rare. I am worried about competition and being seen as an equal. I am also worried about balancing family life in my future, and if I will be able to succeed if I start a family. (Some companies will not hire if they feel you won’t be dedicated, and feel if you want a family, then you won’t be dedicated.) (pre-survey)

At the end of the program she reported, “I have been able to think about what I want to do with my career, and allowed me to voice my concerns and have my questions answered [through the discussions with professionals].” In her interview she elaborated, “There was a couple of computer science people and they...told me to be prepared about things that you’re going to encounter.” These words of wisdom came from examples of real-life people who were doing all of the things they wanted, and gave them confidence it was a real possibility for them.

Kate, a talented chemistry student with a 3.9 GPA, further supported this inclination to move forward despite concerns because of the good examples set by the professionals they met. She was frustrated with the lack of role models around her and it made it difficult for her to imagine a future for herself. Kate contemplated leaving her field and even school. In the beginning of the semester she wrote:

My biggest concerns are the lack of female role models in the academic environment. I’ve never had a female professor here. I am concerned about the sacrifice of family/personal time a science career seems to require. (pre-survey)

By the end of the semester, it was clear that the discussions with professionals helped her to see possibilities for herself.

This program helped me by allowing me to talk with different women in different areas of science. I was able to see that it is possible to have a science career and a personal life at the same time. You always hear that this is possible, but it always seems like there are so few examples out there. I have decided that some type of graduate school is in my future; probably dental. (post-survey)

Kate's outlook on life changed a lot since she started the program. Being a dentist or a chemist became a more realistic possibility for her after she met women in science who were combining family and career.

Discussions with peers and professionals helped them to identify strategies and to anticipate and prepare for what they were going to face. It was through their connection and shared concerns with peers, graduate students, and professionals that they began to challenge stereotypical images in the field and began to feel a part of the field.

### **Shared Concerns, Values, and Selves: Becoming Part of the Field**

The college students recognized that they shared concerns and values with the women in the field whom they had met (peers, graduates, and professionals). By virtue of these other people having membership in the science field at large, they too, could have a place. Josie wrote in her post-survey, "I feel the need to mention the impression of my field has taken a new shape since the beginning of the semester." The field was now seen as a large entity containing pockets of diversity, rather than one homogenous, unchangeable

being. Students had described their images of the science field as they once saw it. Words such as “genius”, “cut-throat”, “competitive”, “old white men”, and “bookworm” were used to describe the predominant images in their environments. There were other stereotypes too; students in the physical sciences saw most as lab-confined researchers, most pre-med students saw others as competitive, and computer science and engineering students perceived less gender and ethnic diversity and personality.

After meeting several people who were part of the science field, the college students now saw spaces within the science field where women with their values and images could exist. Zarah found that engineering was broader than she thought and that she doesn't “have to go into automotive or steel industries.” Robyn reported that she challenged the images in the field. She said, “Science majors are bookworms with no social life...I don't feel like I fit in but I don't want to. You can have fun and get good grades too.” Kellie, a student in engineering, added to what Robyn had to say by highlighting that the students' differences can be a source of growth for the field. She said, “In my field there are men with bad communication skills where I could be helpful to them.” Having a social life and good communication skills could be values of the field in the future.

Their connection to peers helped them to imagine entering the field with a cohort of similar values and images. Abha shared, “My impressions of my field are vast and confusing at times...I do fit in well with people in my classes and they'll probably be the same kind of people I end up working with.” Annie similarly reported, “Medicine is very out-for-themselves but it's nice to have a group of girls who want to help you succeed.” This showed that Annie's views of the field had changed to include the peers in the program. As Jill concluded, “My field is what I've wanted to be part of for as long as I can remember. Sounds nice to call it ‘my field’ since I've just decided that is really where I should be.” These quotes help to illustrate that these changing views of the field helped them to see a place for themselves. After they began to see their peers as future colleagues, the diversity represented by the professionals they met, and imagined their own contributions, students were more motivated to move forward. But by seeing themselves as part of a collective within the field, they also revealed a new perspective: they were now motivated not only despite their concerns about the future but also by their concerns. They wanted to create new possibilities and images for women in the field.

### **Motivated By Their Concerns: Moving Forward as a Collective**

At the end of the semester, the college students were interviewed about whether their concerns had increased, decreased, or stayed the same. In addition, as a follow-up probe, they were asked about whether they saw a relationship or no relationship between their concerns and their motivation. Recall that initially, students' concerns (e.g., lack of female role models, combining personal life and career) brought them to the program and were cited as a primary factor for discouraging their pursuit of science careers. Surprisingly, they reported that the concerns that once discouraged them now served to motivate them in positive ways. Estrella explained this different way of looking at concerns, “When I think of this concern I think negative, but I guess it could be positive. I think some concerns can be positive.” Kayla said, “It can go both ways but it's a lot how you think, are you positive or more pessimistic; it's your personality.” Missy elaborated this point by saying, “I'm always the kind of person who worries a lot, but I think it motivates me because if I wasn't concerned about my future I wouldn't be as motivated in school.”

Their concerns guided them toward seeking strategies and help from others. Kate described in her interview, “I think there are two ways you can handle concerns about the future, you can either get motivated and seek out help or you can switch your major.” Rather than seeing their experience of concerns as discouraging, they began to see the concerns as a guide toward gaining support. It gave purpose to their interactions with science professionals and drew them deeper into field and could make them more knowledgeable. Carol described this in her interview:

I definitely think that the more motivated you are, the more you will be able to seek out answers for your concerns and it will diminish your concerns. I'm worried about this so I'm going to go research it and look into it and that sort of thing. Being concerned about something tends to motivate me because I don't like being not "in the know."

These college women began to see themselves as people who were reshaping the field in new ways, reminding them of women's important place in the field. They could address the need for more women role models, women who could offer the positive future images that they sought. Robyn explained this perspective of viewing these concerns as a source of fuel to challenge the field and move in new directions.

It depends on what kind of spin you put on it. Because if you're concerned "I'm never going to make it", you probably will not work as hard. But if you are concerned because this person thinks they're better than me but they're not, then that would make me work harder...I told you this story once before [about my sorority sister]. This doctor said, "Do you want to go to med school?" and she said, "No, I think I want to go to [Physician Assistant] school" and he said, "Oh, well that makes sense, there aren't very many pretty girls who go to med school." She was gung-ho about PA school and now she's going to go to med school. That person pissed her off so much that she's going to prove him wrong. It's funny how one person can set you off and you prove them wrong.

Annie elaborated this point:

I got really, really concerned my sophomore year after I talked to my advisor [and he discouraged me]. I want to go back to him after I become a famous forensic pathologist and say "He told me I couldn't do it, now look at me." I think women in the sciences are different than just women. There are not a lot of women forensic pathologists-- there's none-- that motivates me, too.

Both Robyn and Annie describe recognition of the few women in their fields and reported that many people, even students' own advisors, went so far as to discourage them. Discouragement sways many away from pursuing science fields, but not so anymore for these students. Armed with their own talent and interest in the fields, they turned around their own self-doubt in the face of others' doubts and discouragement. It was not so much a reaction to others as it was confirmation—that if they themselves did not move forward, things would never change and there would still be a dearth of female role models for women in the future.

They did imagine that the situation for women in science was going to continue to improve. Mostly it would continue to do so if more women entered these fields. Kayla said:

I think things are going to change a lot for women, I don't think it's always going to be this way, always having to quit our jobs... I think it's changing, more options like breast-feeding and stuff like that. I think they will be more accommodating than places are now in understanding that. Women are obviously a contribution to society and they have to start making exceptions, so I think it's going to work alright, I'm not that worried about it anymore.

Whether based in reality or in lofty optimism, these perspectives allowed women who were genuinely interested in pursuing science careers the strength to move forward despite their concerns. And surprisingly, the concerns themselves served as motivation and reason to reshape the fields, individually and collectively.

### **A Postscript: 16 weeks later**

Of the 30 students, 21 provided me with an update of their progress. Four students (Estrella, Jane, Keshia, and Lori) who were particularly concerned reported that they continued to take courses in their majors and



gained new career-related experiences such as volunteering with the Red Cross or finding cultural support groups and career mentors on campus. Ten students (Annie, Carol, Genoveva, Josie, Kate, LaTisha, Michaela, Robyn, Rose, and Ryan) shared that they continued the progress they had made throughout the semester. For example, they stayed in touch with graduates and professionals they met during the program, saw their advisors and sought connections with new professionals, and continued to identify professionals who represented realistic and desirable life options. Seven students (Abha, Brianna, Ebony, Jill, Kayla, Tiffany and Zarah) reported that they had taken their first major career-related internships and or first jobs in the field after graduation. Their actions provided evidence that their perspectives on managing concerns and commitment to the field persisted over the school year.

## **DISCUSSION**

Future career concerns were salient in the lives of college women when they entered the 12-week program and remained strong in magnitude at the end. However, they began to see these concerns in a new light; rather than seeing the presence of concerns as a reason to leave the field, they now saw their concerns as manageable and as a motivation to reshape the field in new ways. They could personally contribute to changing the stereotypical images of scientists. Discussions with graduate students and professional across various fields helped them to see their values and concerns were shared with others who considered themselves to be in the sciences. They began to see their concerns as on-going tensions managed by professionals across fields that were, for the most part, happy with their decisions to stay in the field. As Eisenhart (1995) conceptualized, students were able to pave new paths by hearing the “stories of self” shared by more established members of the field. Meeting others in their field, and learning about their values and concerns, helped students to see a place for themselves in their desired fields. There was evidence that their perspectives on managing concerns and commitment to the field persisted over the school year. It is hard to know whether their perspectives will last when they enter the field without on-going support, but these longitudinal results are encouraging.

This study suggests that not all concerns should be or can be resolved by women students. Future career concerns may be viewed as on-going tensions that need to be managed by exploring one's career options and identifying mentoring and other types of support in one's environment. Like other struggles or problems, concerns can be seen as a catalyst for change, or a source of motivation that moves us forward. Gilligan (1982) discussed the idea that when women experience crisis or struggle, they also experience growth and development of character. This may especially be the case in science fields where women must progress without easily identifiable or accessible role models and take on a “pioneering” spirit. Rather than being pushed out of the field, women want to stake a claim in the field and take more control in their career decision-making. Women’s decisions to face those who discourage them, and to prove them wrong, represents a healthy form of psychological reactance (Brehm, 1966; Buboltz, Woller, & Pepper, 1999), that can energize women to keep toward their goals. The current study suggests that we may learn more about resilience from examining the experiences of women who pursue nontraditional fields. To conceptualize future career concerns as a motivational fuel complements the efforts to understand ways that “outsiders-within” seek to reshape their fields (Collins, 1986) and how women manage multiple commitments in creative ways to compose their lives (Bateson, 1990).

At a practical level, career and mentoring programs can help students to deal with ambiguity and on-going tensions in the future and to see their concerns as reasons for action. Whether on career panels, in focus groups, or through informal advising, professionals can be encouraged to share their past and current career concerns, struggles, and paths, making them explicitly transparent and accessible. While researchers have extensively documented the benefits of modeling and vicarious learning (Schunk, 1987), programs can try to target the personal life dimensions that students are most interested in. Supporting other researchers (e.g.,

Bird & Didion, 1992), this study suggests it is critical for students to interact with multiple role models and mentors who can challenge the stereotypes. This will also help students to develop an understanding of the trials of career journeys and promote more realistic multiple role planning (McCracken & Weitzman, 1997). In addition, programs can help students to reimagine their futures and see themselves as entering a field that is currently changing.

There were some limitations of this study. There was not an alternative program that could act as a control to see how the context itself influenced the students' concerns. Future research could help to tease apart the relative importance of the mentoring they received from peers and professionals and the ability to vent their concerns. For example, programs could offer discussions with peers only; discussions with live presence of the professionals; or interactions with only the role model web site. Although the program included students from different backgrounds, but there was not enough information to gauge the impact of gender, ethnicity, and class on the magnitude or management of students' concerns. Future research can explore the generality and relative intensity of future career concerns across a range of nontraditional careers, across a larger population of female students.

Even though the women decided to continue to pursue their desired fields, this is clearly not an easy life struggle to manage. With continued efforts, students who are talented and willing to work hard will be able to envision and become what they desire, regardless of their desired lifestyle choices. With more women entering a range of nontraditional fields, we may see more and more diverse images, or possible selves, across individuals and institutions, and find ways to provide support for these women and their lives. While we tend to encourage students to be realistic, there is an important role for imagining and reimagining the future. Thinking about what life could be like for women in science can help more women to move forward because of their concerns, rather than despite their concerns. With more emphasis on these perspectives, they can strive to create new images in the field for themselves and women who follow.

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### Appendix A. Participants

Name	Year	Major
Corie	Sophomore	Computer Science
Estrella	Sophomore	Pre-med

Genoveva	Sophomore	Civil Engineering
Jane	Sohpomore	Pre-med
Annie	Junior	Human Biology
Brianna	Junior	Zoology/Museum Sciences
Julie	Junior	Chemistry
Kate	Junior	Chemistry
Keshia	Junior	Medical Technology
LaTisha	Junior	Medical Technology
Lori	Junior	Human Biology
Michaela	Junior	Microbiology
Missy	Junior	Medical Technolgy
Robyn	Junior	Human Biology
Ryan	Junior	Bldg. Construction Mgmt.
Sunita	Junior	Human Biology
Tiffany	Junior	Microbiology
Abha	Senior	Computer Science/English
April	Senior	Computer Science
Carol	Senior	Chemisty
Ebony	Senior	Manufacturing Engeineering
Georgia	Senior	Forensic Chemistry
Jeri	Senior	Physiology
Jill	Senior	Zoology
Josie	Senior	Microbiology/Botany
Kayla	Senior	Physiology
Kellie	Senior	Material Science Engineering
Lizzie	Senior	Medical Technology
Rose	Senior	Biochemistry
Zarah	Senior	Material Science Engineering

**Table 1.** Response to quantitative items assessing future career concerns

Statement	Pre-test		Post-test	
	Mean	SD	Mean	SD
I am concerned about having a personal life and my science career.	4.67	1.60	4.90	1.60
I am concerned about having children/family during my career.	4.93	1.36	4.83	1.23
I am concerned about working alone or in isolation.	3.57	1.22	3.67	1.67



I am concerned about working long hours.	3.87	1.07	4.60	1.04
I am concerned about competitive, cut-throat behavior in the workplace.	4.37	0.96	4.70	1.02
I am concerned that my work may not directly impact or help others.	3.13	1.46	3.43	1.65
I am concerned that I do not feel similar to others in my field in terms of personality or lifestyle.	3.77	1.36	3.90	1.35
I am concerned that I do not feel similar to others in terms of gender or race.	2.93	1.26	2.93	1.17
I am concerned that I do not see people in my field who are role models--or how I want to be in the future.	3.60	1.33	3.70	1.21

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