

University of Northern Iowa
UNI ScholarWorks

Honors Program Theses

University Honors Program

2014

Comparison of life experiences of men and women in the sciences

Tori Nicole Quist
University of Northern Iowa

Copyright © 2014 Tori Nicole Quist

Follow this and additional works at: <https://scholarworks.uni.edu/hpt>

 Part of the [Chemistry Commons](#), [Earth Sciences Commons](#), [Feminist, Gender, and Sexuality Studies Commons](#), and the [Physics Commons](#)

Let us know how access to this document benefits you

Recommended Citation

Quist, Tori Nicole, "Comparison of life experiences of men and women in the sciences" (2014). *Honors Program Theses*. 103.
<https://scholarworks.uni.edu/hpt/103>

This Open Access Honors Program Thesis is brought to you for free and open access by the University Honors Program at UNI ScholarWorks. It has been accepted for inclusion in Honors Program Theses by an authorized administrator of UNI ScholarWorks. For more information, please contact scholarworks@uni.edu.

COMPARISON OF LIFE EXPERIENCES OF MEN AND WOMEN IN THE SCIENCES

A Thesis Submitted
in Partial Fulfillment
of the Requirements for the Designation
University Honors

Tori Nicole Quist
University of Northern Iowa
December 2014

Introduction

A lack of sense of belonging and stereotype threat have been shown to contribute to women leaving the sciences (Seymour, 1997; Beasley & Fischer, 2012; Deemer et al., 2013). Contributing to this is the fact that most women find affirmation externally (through friends, family and professors) for their life decisions (Seymour, 1997; Zeldin, 2000). A set of comparative studies in 2000 and 2008 were done examining factors affecting women's and men's choices of majors and careers (Zeldin, 2000 and Zeldin, 2008). These studies concluded that men relied on achievements in science as the source of their career decisions to enter science, while women rely on social influences to enter and stay in science fields (Zeldin, 2008). However, the participants in Zeldin's studies were well established in their science careers. In order to get a wider perspective of the decision-making process that scientists go through, scientists from a range of career decision making points need to be studied. Additionally, Zeldin's study did not address scientists in academia. This qualitative study attempts to find common and dissimilar traits between men and women in the academic sciences in hopes of determining why they chose and persevered in a science related career.

This study focused on the life experiences of men and women in science fields. Participants ranged in age from undergraduates pursuing a science related undergraduate degree to people who have retired from an academic career in the sciences. Participants completed personal statements and in-depth interviews which explored past choices as well as current perceptions of the results of those choices. Results and conclusions from both male and female participants will be discussed.

Literature Review

Women have historically been underrepresented in the science fields, but are gaining in population in certain sciences (Table 1).

Degree	BS		MA		PhD	
	2001	2010	2001	2010	2001	2010
Biology	59.7	59.0	57.9	58.0	44.1	52.9
Chemistry	48.6	49.9	41.1	48.5	33.7	38.8
Physics	21.9	20.3	20.8	22.7	14.3	19.4
Engineering	20.1	18.4	21.2	22.3	16.6	23.2

Table 1- Percentage of Women holding each degree in 2001 and 2010. (NSF, 2013).

While life science degrees, such as biology, seem to have vastly improved the ratio of women to men obtaining degrees, the physical sciences still lack women, especially when comparing the number of higher degrees obtained.

There is a large body of research dedicated to determining what leads women away from the sciences. Several factors believed to contribute to the low numbers of women in science include a hostile atmosphere and lack of sense of belonging (Seymour 1997) and a stereotype threat against women considering entering science (Beasley & Fischer, 2012; Deemer et al., 2013). Seymour's study found that females often failed to relate to others already in the sciences. Women found a sense of belonging in places other than the sciences, and were therefore discouraged from entering science careers. Seymour also found women encountered a hostile atmosphere in the sciences that left many women uninterested in pursuing any science interests they may have had (Seymour, 1997). There is also research addressing the stereotype that women cannot do science. It was found that many women do not pursue a career in the sciences

simply because of the stereotype that women do not do science. It is an unfortunate and difficult cycle to break (Beasley & Fischer, 2012; Deemer et al., 2013).

However, little research was done on why women stay in the sciences. One way to determine how and why women overcome these obstacles to pursue a career in the sciences is to attempt to find similar traits or characteristics of women established in their science careers. This can help understand these women's career decision-making processes. In 2000 and 2008, a set of comparative studies were done comparing the career decision-making processes of men and women in the sciences. These studies concluded that men relied on ongoing achievements and success in science as the source of career decisions. However, women rely on social persuasions to gain the confidence necessary to succeed in male-dominated domains (Zeldin, 2008). In order to further develop the ideas presented in Zeldin's research, this study explored similar concepts, but included a sample population that spanned several points in the career making decision process. In order to gain a more accurate picture of how career decisions develop over time, participants ranged from undergraduate students in science careers to retired science faculty.

Research question. How do the experiences of men in science compare to those of women with regard to how those experiences shaped their career decisions?

Theoretical framework. The theoretical framework that best suited this research was phenomenology. Using this framework as a guide, the methods and data analysis were chosen to best compare human experiences. To summarize, "phenomenology is a framework that seeks to understand the meaning of human experience. This is accomplished by describing the subjective experiences of participants (and the researcher) with a chosen phenomenon. These descriptions are then analyzed to find the essential themes that shape that experience. From these themes, a single universal essence emerges that describes the meaning of the experience." (Casey, 2007)

Research Methods

Participants. Undergraduate volunteers were solicited from a list of students and faculty whose majors and department affiliations listed in the University of Northern Iowa's online directory were in chemistry, physics, and earth science. These men and women were contacted via email (also available in the directory) by the faculty PI if they were faculty, and by the student PI if they were students. Participants were asked to write a one to two page personal statement about their experiences in science thus far and participate in a semi-structured interview.

A table of the number of male and female participants and the number of how many participants were in each science field is presented in Table 2, separated into students and faculty or staff. Several students were majoring in more than one science field, as represented by the greater number of participants in the field column than the number column.

Designation	Number	Fields
Female Students	13	9 Chemistry 3 Physics 3 Earth Science
Male Students	6	4 Chemistry 2 Physics 1 Earth Science
Female Faculty or Staff	9	7 Chemistry 1 Physics 1 Earth Science
Male Faculty or Staff	4	1 Chemistry 1 Physics 2 Earth Science

Table 2-Participant List-32 Total Participants

Personal statements. The personal statement (Appendix A) was a one to two page typed statement that asked participants to describe their background and interests in science and tell their story about how they got to where they are in their science careers. Participants were asked

to complete and electronically submit the personal statement one to two days before their scheduled interview.

Interviews. The semi-structured interviews (Appendix B) were approximately 60-90 minutes. Interviews further explored participants' background in science. Participants were asked about what influenced them to pursue a science career, their academic background, the support they received while pursuing their science career, their confidence in their abilities, their accomplishments, and what they wished to accomplish in the future. Additional questions were based on participants' responses to the personal statement. These questions were participant specific and were for clarification and expansion purposes from their personal statements.

The identities of the students and faculty who chose to participate are only known by the researchers, pseudonyms were assigned for any presentation of data. This ensured confidentiality throughout the research process. Researchers involved in this project only collected data from their peers in order to minimize potential undue influence, coercion, or the appearance of coercion. For example, the student researcher interviewed undergraduate students. The faculty researcher interviewed faculty. Consequently, undue influence was minimized. All methods were approved by the UNI Institutional Review Board for research with human participants.

Analysis. The data analysis was broken up into two phases. Phase 1 involved female participants and was completed prior to Phase 2, which involved male participants. The interviews from Phase 1 were transcribed verbatim and the personal statements collected electronically. All of the data was uploaded into a qualitative data analysis program, NVivo. Phase 1 data was analyzed using Grounded Theory approach (Strauss & Corbin, 1990). The texts were read and re-read and categories emerged from the data. The themes from Phase 1 data analysis were *Accomplishments and goals, Motivation, Confidence, Challenges, Support, Interest*

in Science, and Black Sheep. Then, sections of the text were selected and categorized for comparison across categories.

Phase 2 data analysis also began with transcribing interviews verbatim and collecting personal statements electronically. However, Phase 2 data was analyzed using the Constant Comparative Method (Maykut & Morehouse, 1994) where the broad categories from Phase 1 were used to analyze and code the data from Phase 2. This allowed for a more direct comparison of themes between the male and female data. Sections of the text were then selected and categorized for comparison across categories. After the data from phases was coded, results were compared between each category and across the phases.

Results

Accomplishments and goals. The Accomplishments and Goals category includes text from participants that delves into what the participants believed they have accomplished thus far in their science careers and their future goals in the sciences and life in general. Both male and female participants indicated they were content with where they were in life and their goals were relatively short-term. Participants, in general, did not have an all-encompassing plan for forty years in the future, rather, they focused on small goals five to ten years in the future. Gigi describes her general goals for the next few years:

“I want to finish my master’s and I want to go get a Ph.D., but if not, I know that the master’s will get me a great job.” (Gigi, student)

Gigi has general plans for her near future, but is also content with where she is now. While she has a possible goal of getting a Ph.D., she is also content with her current status, and would be satisfied to continue her career pursuits with a Master’s degree. When asked what her goals for the future were, one female faculty member responded shortly, “Uh, me, but with tenure.” (Sally,

faculty), showing her contentedness with her current position and presenting her goal for the near future.

Another major theme present in the Accomplishments and Goals category was the participants' willingness to keep their options open for the future. Participants described their desire to pursue their passions, which fueled their decisions to keep as many options open as possible for future careers. One science education student describes his plans for being able to teach any science course he would like:

“I'm going for my degree in earth science, but I'll also have my degree, endorsement to teach physical science, and then I only have to take a few other courses to get my biology endorsement. There's definitely stuff I can do to make sure that I can teach whatever I want.” (Dean, student)

Dean's testimonial provides insight into his decision to take extra science courses. He wants the option to teach in any field in which he finds his passion.

Another student, Abby, sums up her ideas about keeping her options open in one short sentence:

“I'm not going to shut the door for the opportunity, I'm just going to keep my options open, especially if it's in a field that I'm really passionate about.” (Abby, student)

Again, this emphasized the importance the participants placed on following a path towards their passions by not setting future goals in stone.

Motivation. The Motivation category described participants' reasons for following their various science careers. The internal drive that a majority of both male and female participants exhibited was somewhat unbeknownst to the individual participants. They did not necessarily know where the motivation to pursue their goals came from, but it was a drive that all

of them possessed internally. For example, a faculty member, Adeline, describes her desire to pursue a Ph.D. When asked where the idea of wanting a Ph.D. came from, Adeline replies, “I don’t know, it’s just, it’s the end, it’s the highest degree” (Adeline, faculty). Adeline relies simply on her internal drive to achieve a high level degree with no evidence to suggest external reasons to pursue the degree. Similarly, Sally, another faculty member, was asked about her motivation to pursue a science career and she replied briskly, “Eh, I just did what I wanted to do” (Sally, faculty), summarizing her apparent lack of external motivators. Sally simply pursued a career and excelled in her studies because of her internal drive to follow her passions.

Male participants also described very internally driven motivations to succeed in science related goals. A student, Trent, explains how he solely feels responsible for his education:

“I definitely feel like I have that support behind me of all the other individuals who have helped me get in this position, but I definitely feel like if I was just to completely give up, and toss everything on their shoulders, nothing would ever progress forward.” (Trent, student)

His statement proves his internal drive to accomplish his goals, while he has been supported by others, he knows the drive to succeed must come from internal means.

While female participants displayed this intrinsic motivation and drive to succeed in all aspects of their academic career, males displayed a lack of motivation for what they deemed boring or unimportant classes. One student, Alex, described his experiences in classes he found unimportant:

“I felt like I was either hearing the same information I heard before...or what I was being taught was just really irrelevant to my future career...it was a little bit difficult for me, at

times, to stay interested, and to actually put effort into things because they were just not helpful for me.” (Alex, student)

This suggests a lack of motivation for classes Alex considered irrelevant led to a lack of effort in those same classes.

Confidence. The Confidence category included sections of text related to how sure participants were in their scientific abilities and compared to their peers. Both Phase 1 and Phase 2 participants displayed similarly varying degrees of confidence. Many of our participants, both men and women, considered themselves very confident people:

“I’d say I’m more confident than a lot of people.” (Gerri, student)

Gerri’s statement explains that when compared to her peers, she feels more confident than most of them. Jake also displayed a high level of confidence:

“When I go into a class, nine times out of ten, I expect to be top.” (Jake, student)

This statement shows how Jake expects to be top of his classes. He is confident in his abilities compared to his peers.

However, a spectrum of confidence levels was displayed, and a portion of both male and female participants also struggled with low confidence. For example, Evan states, “There are days that I wonder how it is I got where I am, or whether I really should be there or not” (Evan, faculty). Similarly, Adeline felt that “At a certain point you feel like somebody’s going to find out you’re a fraud, and you really don’t know” (Adeline, faculty). These statements from Evan and Adeline are an example of imposter syndrome. Imposter syndrome is an internal experience of inadequacy. People who exhibit imposter syndrome feel like intellectual frauds (Clance, 1978). At times, the level of confidence a person experiences may be extremely low if that person feels like an imposter. There is an example of participants with low confidence in some

aspects of their science career. Both male and female groups contained participants with high levels of confidence and low levels of confidence. The data suggests that neither men nor women had predominately high or low levels of confidence. Instead, it was determined that between our male and female participants, each group had similar, varied levels of confidence.

Challenges. In the Challenges category, participants described the experiences which they struggled the most to overcome. The main challenges for both the men and women were financial and academic difficulties. Dean demonstrates many of the students' main challenge, academic difficulties:

“A lot of it [poor grades] is just kind of making sure I'm studying right. Some of the classes that I've been taking, I've just had bad study habits.” (Dean, student)

Dean, along with many of the other student participants listed academics as one of their main challenges. Another main challenge was financial difficulties, particularly during college and just out of college years. Carol, a faculty member talked about struggling with a low income and high student debts just out of college:

“I remember Christmas, a few days before Christmas, going to the grocery store with a dollar nineteen, I could get one thing, and I looked at everyone loading up their carts and I thought ‘I used to take that for granted, and I'm never going to do that again’.” (Carol, faculty)

Carol explains one of the main challenges presented for both men and women, financial difficulties. There was one challenge described by female participants, but not mentioned by male participants was the idea of balancing family, work, school, and a social life. Nicole explains the challenge of balancing her work/life balance:

“Deciding how much to give into the family versus what I really wanted to do, those types of decisions, those types of things have probably stopped me in my track...And how much to balance some of that.” (Nicole, faculty)

Nicole struggled with balancing how much her family’s opinions should matter while developing her career path and life plans. While this balancing act was a common challenge mentioned by the female participants, male participants did not list family/work balance as a challenge.

Though many challenges were listed, all participants found various means to push through their struggles in order to accomplish their goals. Russell described his greatest challenge and the methods he used to overcome that challenge.

“The largest challenge that I’ve faced is actually my lack of timely comprehension of material... I’ve overcome that by studying with friends, and taking extra time to meet with professors.” (Russell, student)

Both men and women had various challenges, but one of the common methods for overcoming challenges was to work with others to support one another.

Support. The Support category contained participants’ statements about the support they received in pursuing their science careers. Both male and female participants described their family members as supportive and encouraging, but not towards science specifically. Generally, participants’ parents encouraged them to pursue whichever career they chose, and would have encouraged them along the way, no matter what they chose to pursue. For example, Steven remembered his parents encouragement in whatever he was interested in:

“They [Steven’s parents] encouraged me in, you know, whatever I wanted to do, I think they would’ve encouraged me.” (Steven, faculty)

Carol’s parents demonstrated their lack of preference for their child’s future:

“I think they [Carol’s parents] were pretty neutral, you know. Whatever we chose to be interested in was fine.” (Carol, faculty)

Cassandra felt supported by her parents in her various interests:

“They’ve [Cassandra’s parents] always been, basically, whatever I wanted to do, they’re going to support me.” (Cassandra, student)

Steven, Carol and Cassandra’s words echo the sentiments of the other participants by stating how their parents would support them in whatever they chose to do. They were not specifically encouraged or told to enter science, but chose science and were supported by their parents in that decision.

Another interesting aspect of the Support category was the percentage of participants who had close family working in a science field. Fifty percent of the men in this study had family members (grandparent, parents, siblings, uncles, etc..) in scientific careers, while only 18% of women had close family members working in the sciences.

Interest in science. The interest in science category describes when participants’ interest in science first appeared. Two sub-categories emerged from the data: both male and female participants were either always interested in science or their interest was sparked at some point in their school years. The percent of men and women either always interested in science or had their interest sparked at a later time was about the same. The overall numbers of participants who were either always interested in science was about the same as the number of participants who had their interest in science sparked in school. Participants such as Evan and Lynn talked about being always interested in the sciences.

“I was always one of the kids who wanted to be the astronaut growing up.” (Evan, faculty)

“I don’t have any defining moment I can remember in which I decided that science was my ideal career choice; for as long as I can remember science has been my favorite subject.” (Lynn, student)

Evan and Lynn have an inherent interest in science. For as long as they can remember they have been interested in science. Other participants, such as Jake and Adeline, had their interest in science sparked in school.

“I think it started in high school, where I really started to like it, when I took my first earth science and biology classes. I found that I really excelled in science and math area.” (Jake, student)

“The bit in junior high is the first awareness of science and liking science.” (Adeline, faculty)

Jake and Adeline’s interest in science did not develop until later in their lives. There was no recognizable correlation to gender between the participants interested in science from a very early age and the participants who had their interest in science sparked later, in school.

Black Sheep. The Black Sheep category emerged when this trend in the female category developed. The female participants reported feeling different from family members or the general population of females, even since childhood, and through most of their lives had difficulty relating to other women. Thirteen out of the 22 female participants mentioned that from a very early age they felt a bit different than other girls and women around them. While only 3 out of the 10 men interviewed mentioned anything about feeling different, and even then to a lesser degree than the women. Carol, a faculty member, describes her experiences as a child being interested in science:

Interviewer: “pretty much since you were ten, you knew you wanted to be a scientist.”

Carol: “M-hm, I just always found that interesting...I loved science and math in school and that was so much more interesting than everything else. So I decided I was going to be a scientist, I had a little science kit, so I turned my room into a lab. I put white sheets over everything and laid out the little scalpels and other things. My mother didn’t say a word because she just figured the trend would pass after a while... I was an oddity in my family, that’s for sure.” (Carol, retired faculty)

Carol specifically states she was an oddity in her family. She later goes on to talk about her college life and difficulty relating to many of the women on campus,

“Some of them were real sorority girls, like, over 60% of the school was in sororities. I have to say, I never really felt like I fit in with them.” (Carol, retired faculty)

Carol says she never fit in with the majority of the female population in her school. Kate talks about her attitude toward people finding her interests unusual,

“I’ve just always been like, if people think it’s weird or that I can’t do it, then I’m like ‘oh, fine, I’m doing it, get over it’” (Kate, student)

This statement shows that Kate has encountered people who found her interests unusual, and yet Kate pursues those interests anyway. Gerri sums up her differences from her family in one short sentence, “I’m definitely the black sheep of my family.” (Gerri, student)

Samantha describes herself as a solitary person, but accepts that as her personality:

“I’m a lone wolf. There’s nothing wrong with that.” (Samantha, faculty)

Liz talks about how from a very early age she has felt set apart from other women:

“As a kid I was always a tomboy. It’s always been my personality to be more in that direction than feminine.” (Liz, staff)

A majority of women made unprompted statements about how they had difficulty relating to family members and female peers throughout their lives, but only 3 out of the 10 male participants mentioned similar feelings. Brad briefly mentioned enjoying doing things differently than other people.

“I guess one thing that I always liked: doing different things than other people. I mean, if everybody is going to buy vanilla ice cream, I will buy chocolate ice cream, just to be a little different. I don’t know, there’s no reason for everybody to do the exact same thing. Otherwise, it’d be very boring.” (Brad, Student)

Unlike many of our female participants, however, Brad did not mention that his interest in setting himself apart from other people produced difficulty in relating to other people. Another student, Jake, talked about having trouble talking to new acquaintances because he is pursuing a “smart” degree.

“I would talk to people and tell them about what I wanted to do, and once I told them what I did, they always looked at me, I feel like people looked at me a little bit differently sometimes. I’d be like “Oh, I’m doing chemistry” and their eyes would get big and they would, just be like “Oh, ok” and “You’re so smart” and they wouldn’t really want to talk to me anymore because they just thought I was too smart.” (Jake, Student)

Compared to the female participants, however, Jake may have had difficulty at this point in his life making small talk with strangers, but he did not mention any of the enduring feelings of “otherness” from the general population that women described feeling throughout their lives. The only male participant who seemed to have the same degree of feeling different and unable to relate to other people was Nick, a faculty member, though a majority of his difficulty relating to other people he attributed to having Asperger’s.

“I have had Asperger's my entire life, though at the time did not know that this was my diagnosis. As such, I do not make friends easily.” (Nick, Faculty)

By far, the female participants displayed a higher percentage of this Black Sheep Phenomenon and to a greater degree than the male participants.

Conclusions

Both men and women felt accomplished thus far in their careers and believed that their inherent interest in science and internal motivation them to continue toward relatively short term goals. However, men were more likely than women to struggle to stay motivated in “traditional” schooling in order to achieve those goals which is in line with previous research findings (e.g. Epstein, 1998).

Both men and women overcame similar issues in confidence and challenges to get where they are in their careers. However, similar to previous research, women are much more concerned about maintaining work-life balance than men (e.g. Van Anders, 2004).

Familial role models in science are more prevalent for the men in our population than the women which is inconsistent with previous research (Zeldin, 2008). Additionally, both groups claim their interest in science was either “always” there or was sparked by some experience in school indicating that familial support (not exclusive to science) and enthusiastic teachers are valuable for inspiring both populations to pursue science. Although the participants developed their interest in science at varying ages, all participants developed a love of the sciences in their youth. This emulates previous research findings that early interest in science is key for developing a career in the sciences and can lead to increased science self-concept and achievement (Liebham, et. al, 2013)..

Many of the female participants described feeling different from “typical” female family and peers. This separation and independence from mainstream society was coined the Black Sheep phenomenon. The Black Sheep phenomenon was present in 13 out of the 22 women, but only 3 out of 10 men. An explanation of this phenomenon may be found in the sociological Distance from Privilege model (Noble, et. al, 1999). This model explains how women who grow up farther from the mainstream are more likely to succeed in STEM careers (Noble, et. al, 1999). The Black Sheep code that emerged from this study’s data is a perfect example of the Distance from Privilege idea. Women from this study repeatedly described themselves as independent or different from their families or peers. These women grew up outside the stereotypical female childhood and often found it difficult to relate to the general population of women around them. The Distance from Privilege concept would attribute their success in a male-dominated career field to continuously avoiding the mainstream and pursuing their interests with little care of what others might think. This black sheep phenomenon may have helped our female participants avoid many of the factors previously determined that lead women away from the sciences.

Stereotype threat is a common cause listed for women dropping out of science. Many women do not enter science or leave science because of the perceived stereotype that women can’t do science (Beasley & Fischer, 2012; Deemer, et. al., 2013). Attributing themselves as different from “typical” women may have allowed the female participants in this study to avoid stereotype threat.

A hostile atmosphere and lack of a sense of belonging in the sciences has also been found to lead women away from the sciences (Seymour, 1997). Seymour’s study concluded that across institution types, women in science struggle with feeling like they belong in the sciences. The current study’s female participants had very different experiences than those presented in

Seymour's study. Instead of not finding a sense of belonging in the sciences, the women in this study felt a lack of belonging with the general, non-science population. These women found their sense of belonging in the sciences

In 2011, a study by Rhoton found that female STEM academics intentionally distanced themselves from "feminine" qualities to be successful in their careers. Rhoton listed "feminine" qualities as "taking things personally" and "being irrational." However, the female participants in this study claimed they "always" felt different from "typical" women and were already distant from those stereotypical feminine qualities. Instead of intentionally removing such qualities, participants in this study perceive that they either do not have these qualities or have them to lesser extent.

The males in this study also did not exhibit any of the challenges of stereotype threat (as there is no stereotype that men are unable to do science) or a lack of sense of belonging, though there is no research suggesting males would encounter this in a male-dominated field. This is supported by the fact that only 3 of the 10 male participants in this study mentioned anything that would be categorized as black sheep. Of those 3 men, the black sheep sensation was to a lesser degree than the females' sense of not fitting in with the general population. It seems that without the need to overcome obstacles such as stereotype threat and a lack of sense of belonging, males did not need to feel different than the general population (the black sheep sensation) to succeed in a science field.

The conclusions from this study raise an interesting question: Are programs that are designed to promote more women in the sciences, such as female scientist camps and workshops, working? Are they even necessary or could they be a hindrance to those already interested in the sciences? The Black Sheep phenomenon that so many female participants exhibited may provide

some insight to these questions. These women grew up set apart from mainstream society's definition of the "typical" female. Unlike research studies in the past that indicate women leave the sciences because they felt unwelcome and were unable to find a "home" in the sciences, female participants in this study clearly found their home in the sciences. The promotion of women in science needs to be done in such a way as to not deter the women (or men) who have found their sense of belonging in the sciences. The main support system for both the female and male participants were their parents. The participants were not influenced to become interested in science through being told to enter science. Instead, they expressed interest in the sciences, and were supported by their parents in that interest. The interest in science stemmed from an internal drive and inherent interest in science that was supported and nurtured throughout their lives by supportive parents. Instead of actively trying to push more women into the sciences, this study's results suggest supporting women who express an interest in science and ensure that interest is never discouraged. It is important to note that the males' support system for entering the sciences was similar to the females'. Encouragement applies to get anyone who is interested to pursue a scientific career path.

Limitations

Unfortunately, due to the general population of the participating undergraduate institution, there was very little racial and ethnic diversity across participants. Additionally, participants were only associated with academic science, and there was no representation of people's experiences in industrial science careers. The institution in which the data was collected was a PUI, which leaves out the perspectives of scientists in large research institutions or small private colleges. The data was mostly "snapshot and hindsight" based, meaning participants provided a snapshot of their lives in the current moment and had to remember past experiences to

answer interview questions. This was necessary because of the short timeline and interview techniques used in this qualitative study. A more longitudinal study would be necessary to gain a more accurate picture of developing scientists' career decision-making processes.

Literature Cited

- Beasley, M., & Fischer, M. (2012). Why they leave: the impact of stereotype threat on the attrition of women and minorities from science, math and engineering majors. *Social Psychology of Education, 15*(4), 427-448.
- Clance, P. R., & Imes, S. (1978). The Imposter Phenomenon in High Achieving Women: Dynamics and Therapeutic Intervention. *Psychotherapy: Theory, Research & Practice 15*(3), 241-47.
- Deemer, E. D., Thoman, D. B., Chase, J. P., & Smith, J. L. (2013). Feeling the Threat: Stereotype Threat as a Contextual Barrier to Women's Science Career Choice Intentions. *Journal of Career Development. 41*(2), 141-158.
- National Science Foundation, National Center for Science and Engineering Statistics. 2013. Women, Minorities, and Persons with Disabilities in Science and Engineering: 2013. *Special Report NSF 13-304*. Arlington, VA. Retrieved July 16, 2013 from: <http://www.nsf.gov/statistics/wmpd/>.
- Noble, K. D., Subotnik, R. F., & Arnold, K. D. (1999). To Thine Own Self Be True: A New Model of Female Talent Development. *Gifted Child Quarterly, 43*(3), 140-149.
- Rhoton, L. A. (2011). Distancing as a Gendered Barrier: Understanding Women Scientists' Gender Practices. *Gender & Society, 25*(6), 696-716.
- Seymour, E., & Hewitt, N. M. (1997). *Talking about leaving: Why undergraduates leave the sciences*. Westview Press Boulder, CO.
- Strauss, Anselm L., and Juliet M. Corbin. *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*. Newbury Park, CA: Sage Publications, 1990. Print.

Zeldin, A. L., Britner, S. L., & Pajares, F. (2008). A comparative study of the self-efficacy beliefs of successful men and women in mathematics, science, and technology careers.

Journal of Research in Science Teaching, 45(9), 1036-1058.

Zeldin, A. L., & Pajares, F. (2000). Against the Odds: Self-Efficacy Beliefs of Women in Mathematical, Scientific, and Technological Careers. *American Educational Research Journal*, 37(1), 215-246.

Appendix A

Personal Statement Instructions

Please write a 1-2 page statement describing how you got to where you are in your science career. Consider questions such as:

1. How did you decide on your major/career?
2. What experiences led you to this point in your life?
3. Who influenced you and how?
4. How have you felt supported (or not) in your decisions?
5. What challenges have you faced and how did you overcome them?

There are no “right” answers and feel free to address other issues not listed here.

Please e-mail your completed statement to quistt@uni.edu or dawn.delcarlo@uni.edu 48 hours before your scheduled interview time

Appendix B
Interview Questions

1. When did you decide to pursue a career in science and why?
2. What influenced you the most to pursue a career in science?
3. What other career paths did you consider?
4. Describe your academic background in science.
 - a. How well do you feel your academic performance in science matches your knowledge or abilities?
 - b. How confident do you feel in your abilities compared to your peers?
5. What kind of support did you have in pursuing a career in science? (Friends, family, professors)
6. What challenges have you overcome while pursuing your science career?
7. At this stage of your career, what do you feel you have accomplished and what do you feel you could have accomplished?
8. What do you still wish to accomplish in the future?

This Study by: Tori Quist

Entitled: Comparison of life experiences of men and women in the sciences

has been approved as meeting the thesis or project requirement for the Designation
University Honors

12/17/14
Date

Dr. Dawn Del Carlo, Honors Thesis Advisor

12/17/14
Date

Dr. Jessica Moon, Director, University Honors Program