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Minding the Gap: Gender Disparities in Neuroscience

In January, 2005, Harvard University president Lawrence Summers sparked a nationwide controversy after a speech made to the National Bureau of Economics. In his address, Summers suggested that inherent differences might exist in women, making them less capable of high achievements in math and science. Although he later apologized and insisted his remarks were misconstrued, the comments have opened up a long standing debate in the academic world about the place of women in science. Nationally, women have made tremendous strides towards advancements in science. The numbers however, are still far from equal. While overall the numbers are nearing gender equality, there are still lags locally. At Brigham Young University (BYU), both male faculty members and students in science departments outnumber females. This is especially seen in the neuroscience department at BYU. Still in its infancy, the neuroscience program highlights gender differences in science at the university while providing insight into why these disparities may exist and what can be done to remedy the issue.

Established a mere seven years ago, the neuroscience program at BYU has become the largest in the nation. It is however, undoubtedly a male dominated field at BYU. BYU’s neuroscience homepage states that out of the current three hundred and eighty students in the neuroscience major, an overwhelming seventy-eight percent are male. Less than a quarter of undergraduate neuroscience students are represented by females. Moreover, the faculty is even more indicative of this gender gap. There are eighteen faculty members in the neuroscience department, but only one of them is a woman. Such numbers warrant exploration into the program at BYU, as they are part of both a national trend in which women are less likely to enter scientific fields as well as a signal of deeper and more local cultural values that lie behind the statistics.

Within the field of neuroscience, there are many types of discrepancies that occur. At all levels, women appear to be underrepresented. The three to one ratio of men to women in neuroscience at BYU shows that this
starts at the undergraduate level. This only continues as women progress in neuroscience. The *Journal of the History of Neuroscience* notes that of the neuroscientists hired for faculty positions between 1985 and 1990, only twelve percent were female (Haak 90). Dr. Ramona Hopkins, the only female neuroscience professor at BYU, mentions that the numbers are even more striking as women move up the ladder in academia. At the level of assistant professor, the numbers are nearer to equal; the gap, however, widens as women move up to associate professors, full time professors, and administrative positions. According to *To Recruit and Advance*, female doctorates working in an academic science career are less likely to be tenured or promoted to senior ranks than their male counterparts (87). Dr. Hopkins, who at one time was director of the neuroscience program at BYU, notes that women in her position are uncommon. Closely tied to this lack of representation in high positions are discrepancies in publication. In *Nature Neuroscience*, a prominent neuroscience journal, only one-fifth of articles have been penned by women (853). *To Recruit and Advance* has noted that women “may receive less institutional support and resources than male faculty” (90). Without this support, it is difficult for women faculty to be as successful in the research they need to become published. Moreover, since women in science work more frequently at lower level positions and are less likely to be tenured, they tend to lack the networks that higher status professors have. The potential lack of support, resources, and networks provides obstacles for women to advance and become published, revealing the discrepancies in all levels of the neuroscience world.

Because the issue of gender inequality in the neuroscience program is not unique to BYU, the question as to why differences exist has been raised by many people. All over the country, women have a tendency to be underrepresented in science fields. In *To Recruit and Advance: Women Students and Faculty in Science and Engineering*, the National Research Council of the National Academies explores this issue. The book notes that there have been “serious concerns about the ability of U.S. universities to recruit and retain women faculty and students in science” (5). Although the cause of this is impossible to isolate, suggestions have been made for this phenomenon. Much of this problem stems from early education. *Lost Talent*, a book by Sandra L. Hanson exploring the lack of female representation in science, states that at age nine, proficiency and achievement scores in science tend to be higher for boys (Hanson 2). In their senior year, boys are three times as likely as
girls to enter a career in science (Hanson 2). While these may relate to innate differences in the way that men and women think and process information, stereotypes can aggravate the problem. Women in Science reports that studies have suggested that attitudes about science may be closely related to achievement scores (28). If biases exist, girls’ attitudes about science may affect their achievement. Moreover, while girls may be given more slack in science and math, boys tend to be pushed more in these areas (Hunsaker). Without adequate preparation and drive, girls are less inclined to enter scientific fields or studies. Despite advances, the science world continues to be plagued by gender discrepancies on a national level.

While these inequalities do exist nationally, the numbers suggest that the differences between the numbers of men and women in neuroscience are more extreme at BYU. According to the journal Synapse, between 1985 and 1990, the Society of Neuroscience had a student membership comprised of forty-three percent women (Smith 332). Although this is not quite equal to men, it is far closer than BYU’s undergraduate enrollment in neuroscience. Even the female faculty representation lags behind the national average of twelve percent from twenty years ago, at less than six percent. While the numbers are indicative of this, women within the neuroscience program have also noticed discrepancies. Kim Hales, a neuroscience graduate student at BYU worked in Connecticut after receiving her bachelor’s degree from BYU and was surprised to find an all female graduate class. Naomi Hunsaker, a neuroscience PhD candidate at BYU notes that her choice of study often elicits “shock” from both men and women alike on campus. She also believes that “off BYU’s campus, people tend to be more scholarly and open to women in the field of neuroscience”. Dr. Hopkins, a professor at BYU, has even found that faculty at BYU have discouraged women from pursuing careers in neuroscience. The exaggerated differences among genders in neuroscience at BYU suggest that local and cultural influences may also be at play.

Although there are national components to the issue at BYU, local influences seem to be at work to keep the number of women in the neuroscience program lower than equal to that of men. Much of this appears to be rooted in the cultural values that pervade the campus of BYU. As a university owned and operated by the Church of Jesus Christ of Latter Day Saints (LDS church), BYU is inextricably tied to the values fostered by the church. In the LDS church, women are counseled that their foremost calling as women is motherhood. “The
Family Proclamation”, issued by the church, states that “Mothers are primarily responsible for the nurture of their children”. Because of this, LDS women tend to have an increased sense of responsibility towards becoming mothers and fulfilling their roles in such a calling. While education is still valued, church leaders counsel that marriage and motherhood should not be postponed. Women may shy away more from majors that produce time consuming careers, such as neuroscience. At the same time, men are told in “The Family Proclamation” that they are “responsible to provide the necessities of life”, spurring them towards majors that will lead to careers lucrative enough to provide for a family. Jennifer Burnett, a neuroscience graduate student at BYU has noted that many women at BYU get an education for its intellectual value, not necessarily for the intention to use it for a career. She feels this discourages women from picking a rigorous major geared towards specific careers, such as neuroscience. Such cultural values undoubtedly affect the rate at which women enter the neuroscience major at BYU. The neuroscience program at BYU does also seem to make it hard for women to uphold traditional and LDS values of womanhood. The undergraduate course work is heavy, with an estimated sixty seven credits needed to fulfill major requirements. Research and internships are also thrown into the equation, leaving students in the major heavily involved in academics. This makes the major especially challenging for young wives or mothers. Naomi Hunsaker feels that “It is unfathomable to be a wife, mother, and student in neuroscience since the academic and research focus is so rigorous. One aspect of your life would definitely suffer time and attention”. With the LDS emphasis on marriage and motherhood for women at BYU, women may be less represented in the field of study than in other academic settings.

Moreover, the emphasis of BYU’s neuroscience program also plays a part in its degree of attraction towards women. BYU stresses their neuroscience program as a stepping stone towards further education and advanced degrees. In fact, according to the neuroscience website, eighty percent of neuroscience students use their degree as preparation for professional school in medicine, law, or business. Another fifteen percent continue on to graduate school, while only five percent pursue no further education. Both Kim Hales and Naomi Hunsaker have observed this strong emphasis on advanced education. They both feel it is in large part a program geared towards preparing students for professional school, whether it is dental, medical, or law school. This emphasis can be a deterrent to those not wishing to advance beyond undergraduate studies. Women
Looking towards marriage and families may be disinclined to enter a program so heavily focused on professional school preparation. Hales and Hunsaker both mentioned the fact that women at BYU are less interested in medical or dental school than men, which makes it difficult to attract them to the program. The emphasis of BYU’s neuroscience program, along with the cultural values that are ever-present on campus, provides insight into the low percentage of females in the major.

With the inequalities in numbers in the neuroscience program at BYU established, the question of how equality can occur inevitably arises. One of the major aspects of the neuroscience department is the preparation it provides students intending to move on to advanced education. However, Naomi Hunsaker notes that if BYU wants to attract more female undergraduate students, the focus needs to shift. She feels that “other avenues” need to be publicized to prospective students, and that the program at BYU should do more to attract women not interested in post graduate professional programs. If more opportunities were shown to prospective female students, more interest could potentially be generated. It would be helpful for women to know that a bachelor’s degree in neuroscience can lead to flexible careers in pharmaceuticals, lab work, or science teaching. All three female neuroscience graduate students at BYU felt that a discussion of options and expansion of the scope of the program could help in both recruitment and retention of women in the program. They also all independently expressed the need for greater information to be made public about the neuroscience program. As a relatively new and unknown major, some potential female students may not hear much about it unless they are specifically looking for a pre-professional major. Although monthly seminars held by the neuroscience department bring prestigious neuroscience professors to BYU, they are mainly geared towards students already in the major. An emphasis on awareness and attracting female undergraduates could help improve the female to male ratio. Women in Science, a report on females in the field, also recommends workshops and seminars specifically geared towards women in science (79). Hunsaker suggests that “if the neuroscience program is interested in equality of genders, then it will be done. It is all about how it is marketed”. Presentation of the neuroscience program at BYU is key to adapting to the cultural values that seem to inhibit female enrollment.

Improving attitudes towards women in neuroscience can also be a means towards improvement. Women in Science suggests that one of the greatest tools for movement towards equality is bringing more female
science professors to universities (79). One of the most effective and easily accomplished ways to encourage women to enter and stay in the field of science is to provide positive role models for them. Dr. Hopkins feels that this is a necessary step towards equality in neuroscience. Positive female role models can not only help mentor younger females, but can also help show women that they can be part of the neuroscience community. Hopkins says that if people see successful women in the field of neuroscience and the contributions that they can make from a female perspective, they may begin to realize that “two sets of eyes are better than one” in the world of science. More women faculty members can help achieve this, but it can also begin earlier as well. Hopkins suggests that girls already in the program should educate other women both in college and high school, providing a catalyst for interest in the field. This can also be an effective means to change negative attitudes, as women can show others how to balance the demands of their gender and their field. If changes are to be made in the direction of equality, female role models and mentors will be crucial.

BYU has yet to actively work towards equality in numbers between genders in the neuroscience program. There are however, promising steps in the right direction. Recently, the department has formed a Neuroscience Club, which will help to educate others about the program while providing a support system for those already in it. Dr. Hopkins hopes that this will be an effective means of recruiting and retaining women as well. She believes that with the right leadership and direction, the club can make substantial strides in encouraging women to join the major. Moreover, she says that BYU’s neuroscience program participates in the annual Brain Awareness Week, in which students and faculty attempt to educate children about the field of neuroscience. By sparking interest in the field early, Dr. Hopkins believes that this too can help promote the field of neuroscience to girls, before biases are instilled in them. If BYU can continue with these steps, equality can become a closer reality. Dr. Hopkins and Naomi Hunsaker both believe that the disparities that exist in neuroscience will dissipate. Although the numbers may never be perfect, they have the potential to equalize. It will be slow and long-term, but change is possible.

The field of science has come a long way since the days when women were essentially excluded from the elite world. Discrepancies however, still exist. The neuroscience program at BYU highlights the gender gap that occurs on both a local and national level. Throughout all levels of academia, females are underrepresented.
On a broad scale, these differences highlight the perpetuation of early differences between boys and girls in attitudes and achievements in science. Looking through a more narrow scope however, the discrepancies also show the impact of BYU and LDS culture on female involvement in neuroscience. The past, however, shows us that change can occur. The fact that women are pursuing careers in neuroscience at BYU is promising, and with the proper measures, more women will follow. Through shifting its focus, spreading information, and employing female role models, the program has potential to become progressive not only for its size, but also for its gender equality.
Works Cited

Burnett, Jennifer. Personal interview. 9 Nov. 2006.

Eisenhart, Margaret A., et al. Women's Science: Learning and Succeeding from the Margins.


Haak, Laurel L. "Women in Neuroscience (WIN): The First Twenty Years." Journal of the


Hales, Kim. Personal interview. 9 Nov. 2006.


Hopkins, Ramona. Personal interview. 16 Nov. 2006.

Hunsaker, Naomi. “Research Paper.” E-mail to Melissa Davis. 9 Nov. 2006.


