

Examining Correlations Between Imposter Syndrome and Gender in Harvard First-Years

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Imposter Syndrome at Harvard:

After observing many of our first year classmates exhibit signs of imposterism or doubt their abilities and successes since coming to Harvard, we wanted to see how prevalent the imposter phenomenon (IP) is among first year students, as well as observe the potential role gender plays in explaining variation in IP. Imposter syndrome is a psychological phenomenon in which individuals feel inadequate or intellectually incapable despite their previous success, which contributes to a feeling of “academic fraudulence” (Corkindale). This pattern can greatly undermine the performance of students in various ways, including dissuading them from studying a particular major, inhibiting their ability to perform in high pressure situations, and making them students feel intimidated to participate in class. Our research is particularly concerned with Harvard first-years because individuals are more susceptible to experiencing imposter’s syndrome when entering a new academic environment and may question whether they belong in the community.

Research Question:

Is imposter syndrome for first-year students at Harvard correlated with gender? Additionally, does the intersection of gender with factors such as race or concentration correlate to higher reported imposter syndrome?

Hypothesis:

We hypothesize that women may be more affected by imposter syndrome because of external pressures of gender roles that may lead them to internalize feelings of incompetence. In addition, a lack of representation of women in certain fields may lead women to doubt their competence and feel like a fraud. For instance, Harvard has an overwhelmingly male faculty, especially in scientific and engineering domains; the Harvard Open Data Project recorded extremely low percentages of female faculty: 6% in environmental science and engineering, 10% in biomedical engineering, and 15% in economics (Ling). In addition, over the past five years women have made up less than 7% of the students enrolled in Math 55, a first year math course notorious for its difficulty (Natanson). Another study found that “female computer science concentrators with eight years of programming experience report being as confident in their skills as their male peers with zero to one year of programming experience” (Khadka). This data reveals the lack of gender diversity in academia, fueling a positive feedback loop in which false feelings of inferiority inhibit women from feeling comfortable in certain classes, and therefore reinforces a gender imbalance that further dissuades women from entering these fields.

Additionally, research indicates that women may experience imposter syndrome more frequently, especially for racial minorities, due to the implicit racism and sexism embedded within higher education (Walton). In a paper from 2018 entitled “Are all imposters created equal? Exploring gender differences in the imposter phenomenon-performance link,” Rebecca Badawy notes that socialization has reinforced the idea that women tend to express more warm, nurturing behavior, while men tend to express more self-interested, assertive behavior. After

reading this study, we became interested in learning about how imposter syndrome is distributed among male and female first-year students at Harvard. Along with the idea that women may be more affected by imposter syndrome, we hypothesized that various social factors lead women to discount their abilities, and that they may report lower academic self-esteem or confidence. Our findings illuminated the association of gender and imposter syndrome within the Harvard first-year student population, and will hopefully contribute to future efforts to minimize its negative impacts on students. This paper details our research process and considers how our results fit into the social and academic landscape of Harvard.

Building a survey:

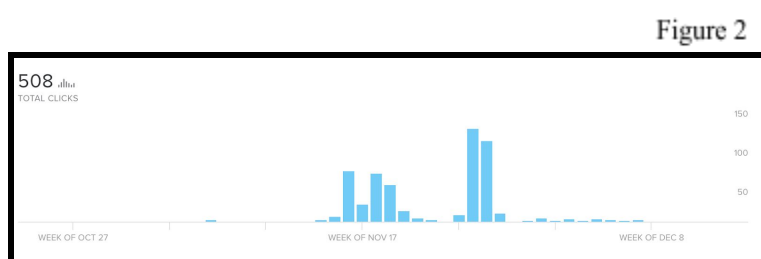
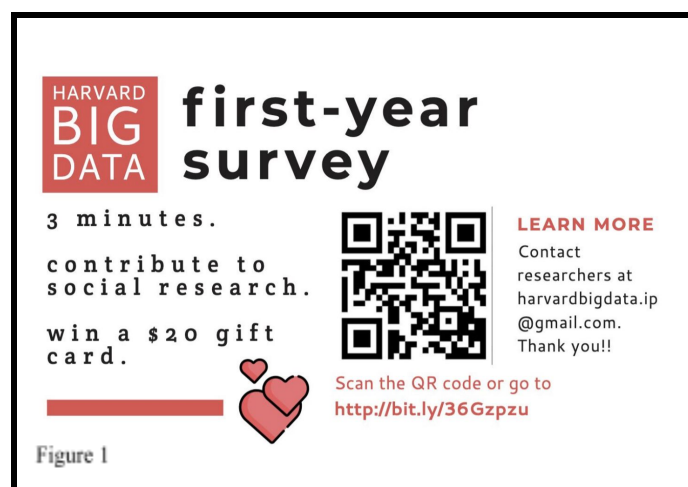
Our research was based upon a survey that queried first-year students about their internal states, including feelings of inferiority, inauthenticity of success, and other indicators of imposter syndrome, without explicitly using the term “imposter syndrome” to avoid social desirability bias. In addition, our survey collected demographic information about race, family income, and gender, which we used to assess the correlation between gender and imposter syndrome, as well as other factors when they overlap with gender, such as women who identify as racial minorities.

Our survey questions were based off of an IP scale developed by Dr. Pauline Rose Clance of Georgia State University (Clance IP Scale). The IP scale uses a scale from 1 (not at all true) to 5 (very true) in which participants rated their response to several statements; scores are added up and analyzed at the end of the survey. Our survey questions were tailored towards Harvard students, but contained the same type of language and phrasing found in Dr. Clance’s IP scale. Our survey includes questions about students’ concentration plans, comparisons to others, repeating success, acceptance into Harvard, and levels of self-confidence and self-assurance. The complete survey can be reached here:

<http://bit.ly/2RBcj8x>.

Additionally, our survey collected demographic information in order to situate our results within the context of race, gender, concentration, and income, among other factors. We also asked respondents to indicate their entryway for the purposes of reaching similar representation from each first-year dorm.

Reaching students: Our target population was Harvard first-years. As first-years ourselves, we had access to email lists of all first-year dormitory buildings, as well as the Class of 2023 Facebook group and GroupMe group chat. Our first wave of surveying was conducted via email beginning Nov. 15. A week later, we supplemented this email-based recruiting with



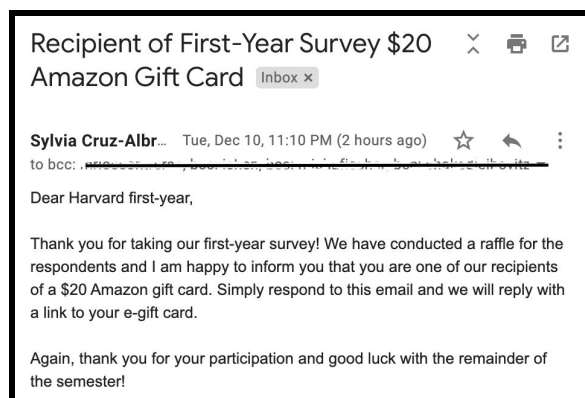
group chat and Facebook posts, flyer distribution (see Figure 1), and in-person recruiting in Annenberg dining hall. 84% of respondents accessed our survey via email or flyers while another 14% came from Facebook. These patterns are reflected in the click data collected from the form link (see Figure 2).

Combined, these recruiting methods allowed us to easily access a large, diverse population of students. Our frame population was the same as our target population, because we did not limit our research to any subset of Harvard, such as solely an athletic team, club, or dormitory. In order to capture the diverse nuances of the first-year class across these various subsets, we kept the frame population the same as our target. In addition, we chose to sample from this same population by reaching out to all first-year students on campus. Thus, our sample was a probability sample, and the only limiting factor was the response rate. The number of people who responded to our recruiting attempts determined the size of our responded pool. In the end, we received 305 responses. After cleaning the data to eliminate participants who had taken the survey more than once or were ineligible, our sample size was 277 participants. However, this sampling method was technically feasible in the short amount of time given to carry out our survey and made it easier for us to reach potential participants. Additionally, the significant rate of non-response is indicative of light recruiting methods in order to limit the disruption of our survey on first-year student life. Because of our large sample size, we did not need to use aggressive recruiting tactics; rather, those individuals who were inclined to participate could choose to do so. Additionally, we added an incentive to our survey in order to reward those who did participate. Respondents were given the option of providing their email address to be drawn in a raffle for one of five \$20 Amazon gift cards (see Figure 3).

Figure 3

There were disadvantages to this method, however. Notably, our response level contains significant non-response error, given the first-year class size of 1,650. Because our data was dependent on who decided to respond to our survey, it is possible that our data is not completely reflective of the entire class. If those who responded were more enthusiastic, extroverted, or had more free time, our measurements of imposter syndrome could have been skewed. For instance, response error may lead to unequal demographic representation.

The largest limitation of our study design was the absence of a benchmark test to make a comparison. For example, if our survey indicated that males exhibit IP at lower rates than females, this could have been measurement error. In this case, it is a possibility that male



students misreported on surveys due to socialization and a greater need to appear competent (Badawy). Without our benchmark, it is unclear if our results are truly representative of the greater first-year class, or if they are skewed by unreliable self-reporting. However, even given these limitations, the results provide a starting point for developing an understanding for the imposterism experiences of Harvard first-years, as well as a benchmark for future research.

Ethical considerations:

There were also ethical considerations to make. Several of our survey questions centered around feelings of inferiority or insecurity. Participants who chose to take part in our survey were exposed to these questions, and there was a chance that the questions could be emotionally triggering in some way. We felt as though the potential of our survey to trigger extreme negative emotions was fairly low, but was still a possibility for some participants. These considerations shaped our survey development in order to minimize negative words or associations while still measuring these feelings in participants. We also had to consider the confidentiality of our survey. Our survey was completely anonymous, although we did ask demographic questions. The survey also asked for participants to select the first-year house that they live in. This question served to help us figure out how many responses we were receiving from each dormitory so we could be aware of how representative our population of respondents was in comparison to the greater class of Harvard first-years. Because we asked for dormitory information, in addition to gender, race, and other identifying information, there was the potential that a respondent's identity could be retraced. In order to address this privacy concern, we disassociated dorm names from survey data so that it could not be used to identify individuals. Rather, data about first-year entryways was only used during the data collection process to ensure we generated similar response rates from each dorm.

Analysis:

After cleaning our data, we chose to use Microsoft Excel and Tableau to analyze our data. This strategy allowed us to compare and visualize different variables such as gender, general concentration, and race. In our dataset of respondents, females were overrepresented compared to males by 59.

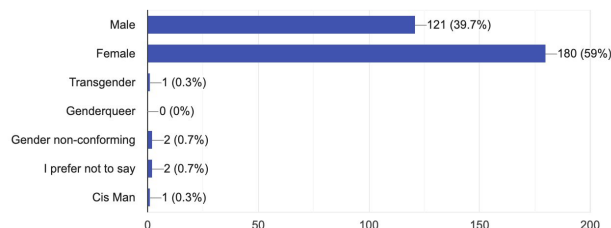
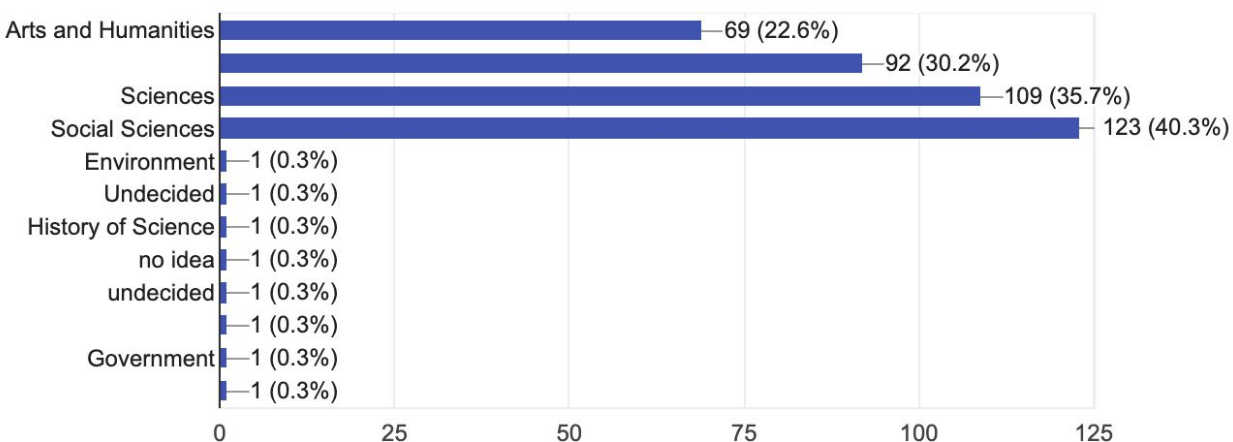


Figure 4

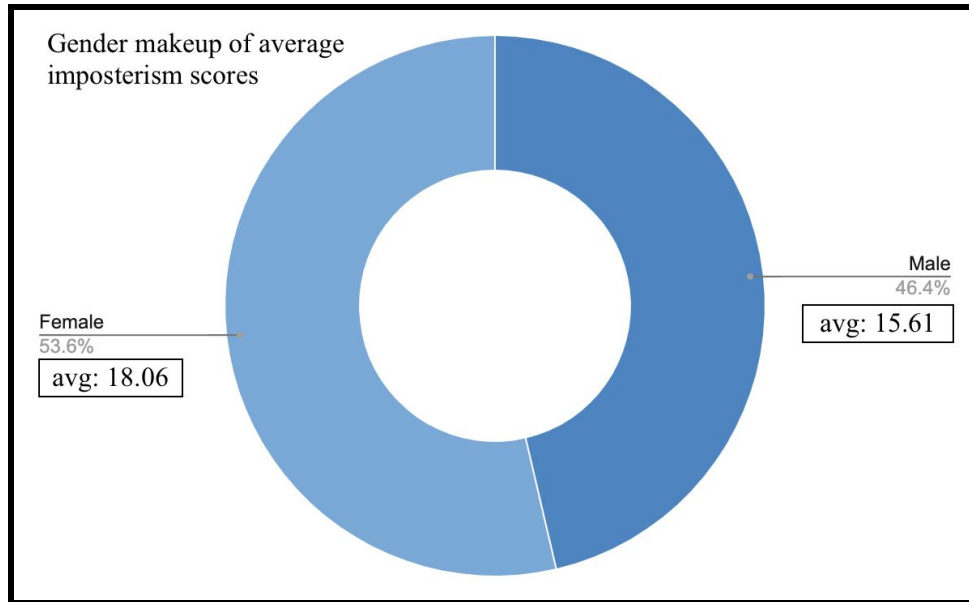
We received a generally representative sample of respondents across major.



The average impostorism score indicates the average sum score of our five impostorism questions (rated on a scale of 1 to 5) of every respondent. Using this scale, the lowest possible impostorism score is 5 while the maximum is 25. Overall, we found high reported levels of impostorism with a total average impostorism score of 17.05 and an average response of 3.40 for each category. Additionally, 205 out of 277 respondents received scores above 15, suggesting that at least 70% of participants experience a moderate-to-high degree of impostorism across the board.

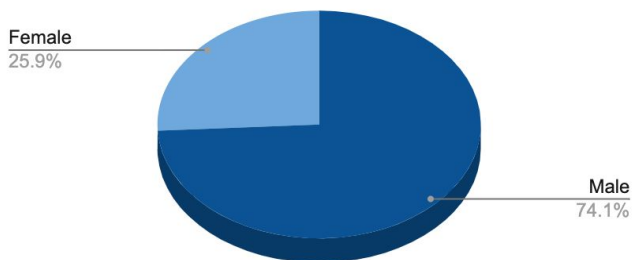
Figure 5

When we split these averages by gender, we found that the female average impostorism score was 18.06 compared to 15.61 for males. This 2.45 point difference indicates that on average female harvard first-years experience greater feelings of impostorism.



The extremities of the results are also illuminating. Out of imposterism scores exceeding 22 (a total of 18 results), all 18 were female. Conversely, of sum imposterism scores lower than 12 (a total of 21 results), 16 were male. This display of the upper and lower bounds of sum imposterism scores and the way in which they correlate to gender suggests that the development of very high and very low imposterism are highly correlated with gender. These findings are consistent with our hypothesis that women may report higher feelings of imposterism.

Gender Makeup of IP Scores Below 12



Gender Makeup of IP Scores Above 22

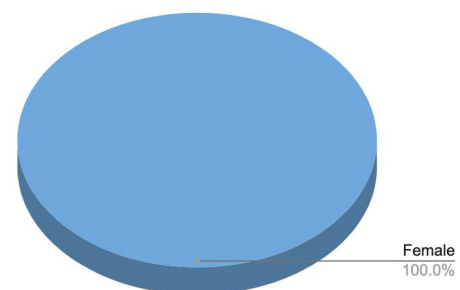


Figure 7

Our study also analyzed the breakdown of reporting for each of our five questions pertaining to imposter syndrome. Notably for all individuals, the highest ratings were given to the statement “I often compare my abilities to others and think they may be smarter than me.” On a 1 to 5 scale of agreement, the average response was a 3.8. However, for women this trend was even more distinct, with an average reporting of 4.04 versus vs. the average reporting of 3.35 for males.

For reference, we have included a histogram (Figure 8) comparing each individual question’s average scoring response for males compared to females. The y-axis represents the average reporting score on a scale of 1 to 5. The x-axis represents each of the five questions, listed below. The orange histogram represents first-year males, and the blue histogram represents first-year females. Overall, there is a higher or similar reporting average for females compared to males.

Compare: “I often compare my ability to those around me and think they may be more intelligent than I am.”

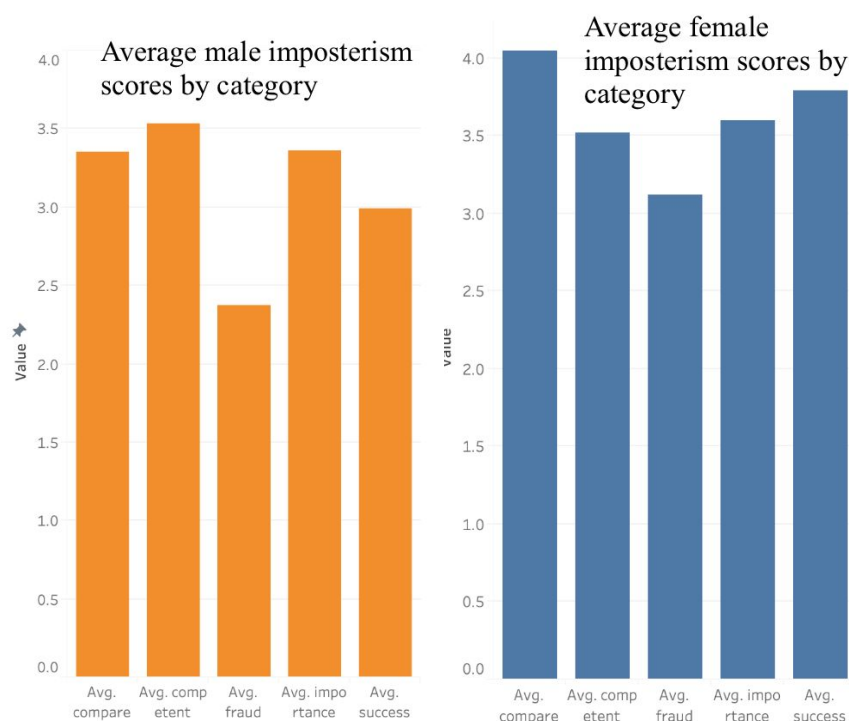
Competent: “I can give the impression that I’m more competent than I really am.”

Fraud: “Sometimes I feel or believe that my getting into Harvard has been the result of some kind of error.”

Importance: “If I receive a great deal of praise and recognition for something I’ve accomplished, I tend to discount the importance of what I’ve done.”

Success: “When I’ve succeeded at something and received recognition for my accomplishments, I have doubts that I can keep repeating that success.”

Figure 8



Across different racial groups, the intensity of reported imposterism varies greatly Figure

9 shows that groups with the highest average reportings of imposter syndrome by score were American Indian or Alaska Native at 4.0 and Black or African American at 3.12. More specifically still, Black or African American women had a higher average of 3.67 compared to the average of Black males at 3.15. Similar patterns emerge within all racial and ethnic groups--females of a particular group display higher average scores of imposter syndrome when compared to their male counterparts of the same ethnicity. For East Asian or South Asian females compared to Asian males, this score is 3.59 versus 3.27. For Hispanic, Latinx, or Spanish, females score an average of 3.57 compared to males, who score an average of 2.92. White female individuals had an average score of 3.57 where white male individuals displayed an average of 2.97. For those of Middle Eastern or North African descent, average female scores were reported at 3.28, while average male scores were reported at 2.7.

Figure 9

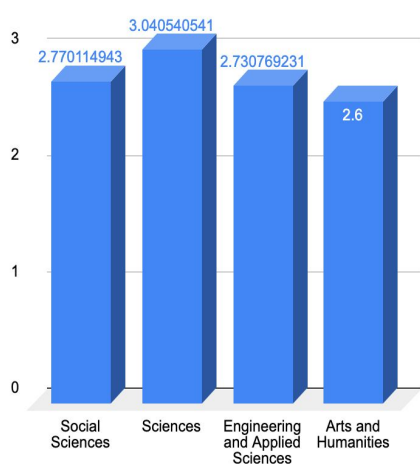
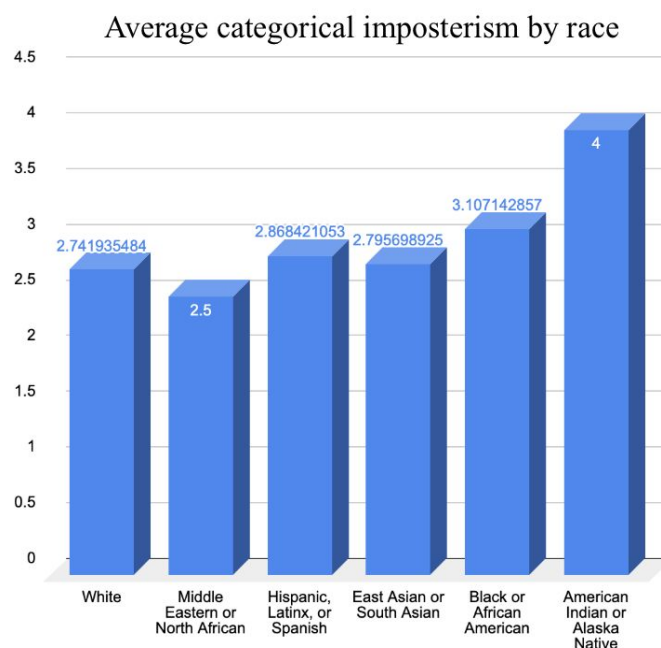


Figure 10

Imposter syndrome also presented a gender disparity across various concentrations. Generally, the sciences displayed the highest average levels of reported imposter syndrome at 3.04. Social Sciences and Engineering and Applied Sciences followed with scores of 2.77 and 2.73, respectively. Arts and Humanities reported the lowest average score of 2.6 (Figure 10).

Across the board, respondents who plan to concentrate in the sciences reported the highest levels of imposterism while arts and humanities showed lower levels. While these differences were not as significant as the gender disparities within each concentration, it is important to note that concentration does appear to correlate with imposterism to an extent. The difference between arts and humanities and sciences is a 0.44 difference, or a 14% difference.

When divided by gender categories, these differences become even more apparent. In all broad concentration categories, men display lower average imposter syndrome values. Within the Sciences, men average 2.82, while women average 3.18. In Engineering, men average 2.28 where women average 3.10. In Arts and Humanities, men average 2.20, and women average 3.00. Most noticeably, in Social Sciences, men average 2.13, nearly one entire point less than the women's average of 3.12. Within a five point scale, this near one point difference is significant. In all concentrations, particularly social sciences, engineering, and arts and humanities, women consistently report higher feelings of imposterism.

Average imposterism scores for males and females across concentrations

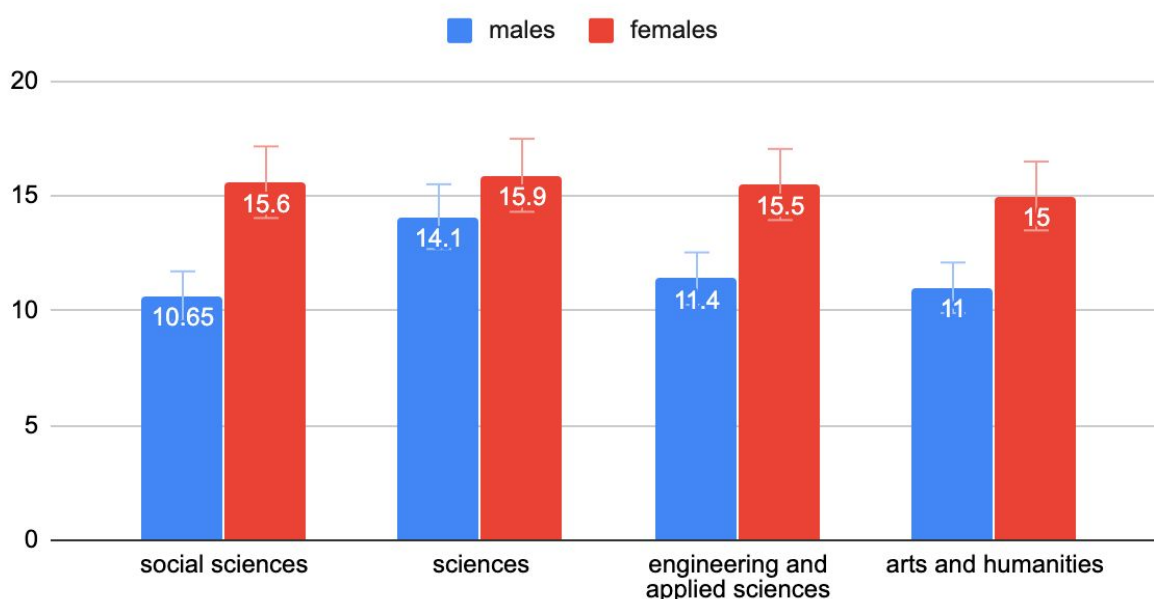


Figure 11

Such findings quantify the disparity between imposterism across race and gender boundaries, although they do not provide an explanation for them. However, by applying these results to other research and the academic context in which they occur, we can hypothesize potential mechanisms for the results. In the case of women and particularly women of racial minority backgrounds, higher reported feelings of imposterism may be linked to the lower representation of faculty with similar identities and backgrounds. Coupled with the implicit and explicit discrimination of women and racial minorities in academia, this may lead to lower self-confidence in a high-pressure, academic environment at Harvard. Additionally, the variation of imposterism for individuals across concentration also may be indicative of varying academic

environments within various academic settings and/or differences in individuals who plan to study in these different fields.

Conclusion:

In this survey, we set out to discover how imposter syndrome was correlated with gender for first-year students at Harvard College. We hypothesized that women would exhibit more frequent signs of imposter syndrome due to external pressure and societal expectations of gender roles that might lead to a doubting of competence. While this research does not explain why women report and display stronger signs of imposter syndrome, it did confirm our hypothesis about the relationship between imposter syndrome and gender in the Harvard first-year student body.

By determining imposterism scores for individuals as modeled by Clance and Imes, we were able to quantify this disparity among Harvard first-years. On average, women consistently report higher experiences of imposterism. When factors such as concentration and race are considered, these correlations become even more clear. These results are also consistent with the research conducted by Clance and Imes, the researchers who developed the impostorism scale that we implemented in our survey (Clance). Their pioneering study of highly successful female professionals in 1978 found that women are more likely than men to exhibit imposterism.

A more recent study by Sandhyarani Hawbam and Sonam Singh about imposter syndrome and gender differences in a representative sample of college students and working adults in India found a similar pattern of “significantly higher level of IP among females than male” (Hawbam). This study explored the role of gender stereotyping as a mechanism for such patterns and concluded that the external factors that pressure men to succeed rather than women may lead women to feel that success is “incongruent with the traditional female role” and downplay their achievements as products of luck or unusually hard work. Meanwhile, stereotypes of men as dominant, successful, and in positions of leadership may bolster confidence in high-pressure environments. These “psychosocial” factors of socialization drove our hypothesis of in our study and the results of other researchers on a larger-scale align with many of our results.

It is important to note that despite the consistent pattern of higher imposterism among women, our survey results demonstrate that imposterism affects a majority of first-year students regardless of gender. Therefore, it is useful to look not only at the average imposterism score as set forth by Clance and Imes but also discern the makeup of these scores in order to better understand the different ways men and women experience imposterism. Our research suggests that male Harvard first-years are more likely to experience imposterism in situations involving competence and performance while females are more likely to feel inferior to peers and doubt their ability to achieve future success. When the five categories are analyzed independently, we find that the most prominent areas of gender disparity have to do with comparison with others and feeling like a fraud -- categories in which women had average IP scores 0.69 and 0.75 higher

than men, respectively. Meanwhile, in the category of “I often give off the impression that I am more competent than I really am,” the difference between scores by men and women was not statistically significant -- that is, on average, both men and women experience this form of imposterism to the same degree. This is the only category in which the average imposterism scores of female respondents did not exceed those of males.

This finding is consistent with prior research that suggests that for men, imposterism is most often exhibited in situations involving competence or performance due to social structures that tend to expect more of men. In particular, in a 10,000-person study, “Are all impostors created equal? Exploring gender differences in the impostor phenomenon-performance link,” conducted in 2018 by Badawy and colleagues, participants were given a two-part performance separated by either falsely positive or negative feedback in between. It was found that males who were given negative feedback performed worse on the second part of the exam, while females improved after receiving negative feedback. This study appears to confirm the higher presence of performance-driven imposterism in males, which may be a result of higher social expectations for men as opposed to women. Additionally, our study found that 74% of respondents reported a moderate to high degree of imposterism (defined as an average reporting of 3 or higher on each question), which aligns quite similarly to the findings in Gravois, cited in Badawy’s study, that 70% of individuals of both genders experience imposterism.

Future research might build on the results of our study by focusing on the mechanisms by which imposterism may arise as well as the consequences of imposterism on student wellbeing and performance. Additionally, given our preliminary correlations regarding intersectionality, the scientific community might broaden the existing research on imposter syndrome by considering factors such as academic or professional fields as well as race and income in individuals. While our study contains non-response error and should not be considered fully representative of the Harvard first-year class, nor extended outward as representative of other groups of individuals, they are illuminating for better understanding the varying experiences of men and women in relation to the common phenomenon of imposter syndrome.

Works Cited

Badawy, Rebecca et al. "Are all impostors created equal? Exploring gender differences in the impostor phenomenon-performance link." *ScienceDirect*,
<https://www.sciencedirect.com/science/article/abs/pii/S0191886918302435>.

Clance IP Scale: <https://paulineroseclance.com/pdf/IPTestandscore.pdf>

Clance, Pauline Rose, and Imes, Suzanne Ament. "The Imposter Phenomenon in High Achieving Women: Dynamics and Therapeutic Intervention." *American Psychological Association*, American Psychological Association, <https://psycnet.apa.org/record/1979-26502-001>.

Corkindale, Gill. "Overcoming Imposter Syndrome." *Harvard Business Review*, 23 July 2014, <https://hbr.org/2008/05/overcoming-imposter-syndrome>.

Harvard Graduate Student Mental Health Survey:
<https://mentalhealthsurvey.fas.harvard.edu/home/downloadExcel/1>

Hawbam, Sandhyarani and Singh, Sonam. "Impostor Phenomenon: Gender Differences and Role of Family Environment." *Research Journal of Social Science & Management*, The International Journal Research Publication. 04 August 2018.
<https://pdfs.semanticscholar.org/d3d2/cbc7fd15ccbc1635689dbb8b5fb6672ed3.pdf>

Khadka, Ahilya. "Data Reveals Gender Gap in Computer Science at Harvard: News: The Harvard Crimson." Data Reveals Gender Gap in Computer Science at Harvard | News, <https://www.thecrimson.com/article/2016/4/25/computer-science-gender-gap/>.

Ling, Emma. "Gender Disparity in Harvard Faculty." *Medium*, Harvard College Open Data Project, 6 Mar. 2018,
<https://medium.com/harvard-open-data-project/gender-disparity-in-harvard-faculty-b253ae949a56>.

Natanson, Hannah. "'A Sort of Everyday Struggle': News: The Harvard Crimson." 'A Sort of Everyday Struggle' | News | *The Harvard Crimson*,
<https://www.thecrimson.com/article/2017/10/20/everyday-struggle-women-math/>.

“Pew Research Center.” *Pew Research Center*, Pew Research Center, 30 Oct. 2019, www.pewresearch.org/.

Walton, Gregory M. et al. “A Question of Belonging: Race, Social Fit, and Achievement.” American Psychological Association, American Psychological Association, <https://psycnet.apa.org/doiLanding?doi=10.1037/0022-3514.92.1.82>.