# Hiring Patterns in the C-Suite:

# Female vs. Male CEOs

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Abstract

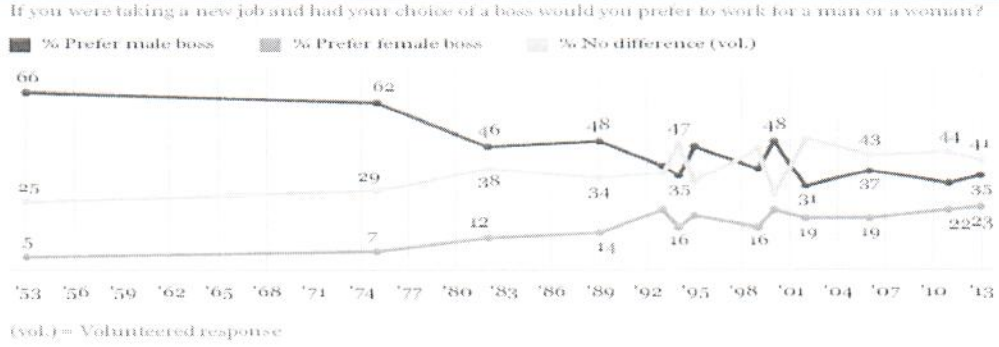
For the past century, men have predominantly been elected, hired, and nominated to hold all leadership positions for a company. Since the 1970s, the gender gap in leadership has begun to close. Although our society isn't navigated equally by both men and women, there has been progress with more women becoming CEOs of major companies. With the increase of women in leadership positions, the question is: Do women hire other women more than men hire women? I will review twenty companies from the Fortune 1000 list over a five year period beginning with the 2014 annual report and working backwards. While reviewing the annual report I collected the female vs. male ratio annually of their c-suite, also known as their executive team. Ten of the companies currently have a female CEO with a minimum of two years in the position. Those ten companies will then be matched with a comparable company in the same industry that currently has a male CEO with a minimum of two years in the position. After analyzing the data I began to draw conclusions of the hiring patterns and identify any statistically significant different in the sex of the CEO. With past studies of psychological preferences I'm able to identify whether females sabotage or support other females when hiring for the c-suite.

For my null hypothesis, I'm stating that the CEO of a company will always promote the most qualified applicant to their executive team, regardless of sex. With this as my null hypothesis, I'm predicting that a pattern of hiring a specific sex by a current female or male CEOs doesn't exist. Therefore, without a hiring pattern present, CEOs truly hire the best applicant, no matter the sex, for their executive team. This implies that there should be no difference between the hiring patterns of female vs. male CEO's.

## Current Stereotype

Gallup, an organization that conducts analytic research for companies, polled the opinion of which gender Americans would prefer as a boss. Since 1953, Gallup has been collecting this data that shows the progression of female vs. male preference as a boss. In 1953, 66% of Americans polled heavily favored males as their choice of a boss compared to 25% that stated no difference and 5% that stated preference for a female boss. Since then, the percent preference for a female boss has stayed consistently lower than a preference for a male boss or no preference at all. The graph below shows that the significance in the data is seen when the trend between preferences of male boss versus the no preference option compete with each other for the top choice. Starting in 2002, the percentage of Americans choosing the "no preference" option surpassed the male boss preference. In 2013, those polled stated that 41% of them had no preference in the sex of a boss while 35% preferred males and 23% preferred females (Newport, 2013).

**Graph 1.**
**American's Preference for Gender of Boss, 1953-2013***




**graph provided by Gallup (2013)*

In 2011, Forbes asked many of the world's most powerful women what their least favorite stereotype is about powerful women. From the list they narrowed it down to the ten most common stereotypes that are seen in society. The stereotypes include: a cheerleader, a token female, an angry boss, emotionally unstable, conniving, masculine, weak, tough, and number one being ice queen. Halley Bock, CEO of the leadership and development training company Fierce, states that, "A woman who shows no emotion and keeps it hyper-professional is icy and unfeminine. For many women, it can be a no-win situation" (Goudreau, 2011).

## Current Statistics

Gender equality, especially in the workplace, has been a topic in our expanding business world for the past couple of decades. Not only are women making up more of the workforce, but they are also being promoted to higher positions. Judith Warner (2014) evaluates reports from American Progress that states in 2013 women made up 52% of all professional-level jobs. During that same year only 14.6% of Fortune 500 executive officer positions were held by women. The percentage is even lower, at 4.6%, among Fortune 500 companies that have a woman as CEO. Some blame these low percentages on women not promoting other women, both genders preferring to work with men, or women choosing to stay at home with children for

periods of time longer than a year. Throughout the past five years, research has been conducted to see which of these reasons holds true.

## Literature Review

Michelle Duiguid, a professor from Washington University in St. Louis, decodes the idea of "the token female." Duiguid (2012) suggests that the token female can impose a threat to other women in the company along with prohibiting other women to be promoted. In 2011, upon completion of her study, she realized there are two different types of threats that women perceive: competitive threat and collective threat. Competitive threat is seen when a highly qualified female is hired to the c-suite and overshadows the current female on the team. The new female is seen as a threat to the current female rather than as a team member. Collective threat is present when a new female joins the c-suite, but isn't as qualified as the current female. Her low performance is seen as validating the negative stereotypes about females. Both of these threats only hinder the promotion of women and sustain the glass ceiling effect (Duiguid, 2012). Another study by Caroline Turner (2012), author of *Difference Works: Improving Retention, Productivity and Profitability through Inclusion,* also concluded that the token female, known as the "queen bee," makes a subconscious or, at times, conscious decision to become a supporter or saboteur of women. During Turner's workshops, which were given about this same topic, women shared personal stories of hindering others' aspirations. On the other hand, women also shared their openness and availability to help other women as mentors (Turner, 2012).

To further investigate the positive side of the token female in a company, Catalyst, a leading nonprofit research organization, conducted a study that analyzed which gender was more likely to pay it forward at a company. Paying it forward is characterized as high potential employees that sponsor and become role models for others. As a gender, females are seen as

more nurturing, but is that our nature or is it influenced by others? Within the same study, Dinolfo, Silva, and Carter (2012) found that women were more likely to mentor others if they themselves received the same mentoring. It was concluded that women were 65% more likely to pay it forward, while men were only 56% more likely. Through this study, the theory of the queen bee or token female is diminished.

Sheryl Sandberg (2010), COO of Facebook, shares her observations of women in leadership and how women are inflicting the inequality upon themselves. She suggests that: "Although different situations and other people may get in your way, they shouldn't affect your opportunity for promotion." In Sandberg's TEDTalk video, she highlights three reasons why women don't hold more leadership roles. They don't: sit at the table; make their partner a real partner, and they leave before they are ready to leave.

First, sitting at the table refers to taking opportunities to sit with executives and being engaged in conversation instead of sitting off to the side. Second, making your partner a real partner means sharing household duties. Although both spouses work during the day they should share family duties, whether it's chores around the house or chauffeuring kids to activities. Third, don't leave a company or a promotion before you're ready to leave. The idea of wanting to have kids doesn't mean you can't strive for a certain promotion or project. Women are planning too far in advance, and they are completely removing themselves from opportunities way before it is time (Sandberg, 2010).

One aspect that I'll be analyzing as part of my research is the perception vs. reality of women in the c-suite. Suddath (2014) a writer for *Bloomberg Businessweek,* reflects on the research by Sreedhari Desai, a professor from the University of North Carolina. Desai found that married men who were the sole breadwinners for their families viewed women in the workplace

unfavorably. These types of men were also less likely to take jobs at companies where women were executive team members, and they would even pass women over for promotions at work (Suddath, 2014).

Rich Morin (2013), with the PewResearch Center, conducted a survey that measured the preference between working with women or men. The majority of participants said it doesn't matter if their co-workers were men or women, though there was a percentage of participants that did prefer working with men rather than women. As expected, 77% of those surveyed said gender doesn't matter. The remaining 22% expressed they were twice as likely to prefer having other men as co-workers.

Within the past five years, studies have shown that the general society would prefer to work with men over women. What does that say for the future? However, Eggers and Lublin (2012), from the Wall Street Journal, published *More Women Are Primed to Land CEO Roles,* which highlights the increase of women CEOs in the next five years. With more women present in the workforce, there is a higher qualified pool of women for companies to groom for the corner office. Out of the Fortune 1000 companies, 35 of them currently have women CEOs. Although 3.5% is a small figure, there are women currently in the workforce that have been groomed for the position and are now playing the waiting game. This has the potential to double the number of major-company women CEOs by 2017 (Eggers & Lublin, 2012). With more women becoming CEOs, society will likely change its perception of working with or for women.

Leadership styles differ among individuals, especially by gender, but that alone shouldn't keep those individuals from promotions. Lead researcher Dr. Samantha Paustian-Underdahl (2014), of Florida International University, conducted a study about the effectiveness of female vs. male leadership styles. Her research derived from the role congruity theory, which suggests

that a greater prejudice toward women as leaders exists in our society. Women are stereotyped as not possessing certain leadership qualities that are necessary to lead a group of people, let alone a multi-billion dollar company. Men are seen as possessing those "certain" leadership qualities that are needed to lead a group of people which include: assertiveness and independence (Paustian-Underdahl, 2014).

Whether it is the perception of women in business, women mentoring others, or men being seen as better leaders, a glass ceiling is still in place. Writers for the *Harvard Business Review*, Eagly and Carli (2007), transform the term glass ceiling, instead describing it as a labyrinth, a maze with various obstacles and high walls. This term is more relevant to our generation rather than a glass ceiling because promotions are attainable for women if they're willing to face all the obstacles.

Our society is constantly changing and expanding, but will we ever change the perception of women in leadership? With my research I hope to find that women are currently making an impact in the c-suite, and they're not hindering each other from promotions.

## Importance of Topic

The discussion of female vs. male and gender equality has been around for decades. As a woman entering the business world after college, it's important to understand the limitations I might face. These limitations aren't here to scare me, but rather to motivate me. Society has placed the cause of these limits on the male population, which may very well be true, though the restrictions we face as a gender actually come from other women.

Business professionals that have held the position of CEO or are on the executive team, known as the c-suite, haven't always been accustomed to women holding the same positions. Historically, women have held the "lesser" jobs that allow them to be more available for their

families. These jobs were more likely part time or in positions related to secretarial work. This perception remaind until the 1970s when Katharine Graham became the first female CEO. Epstein and Smith (2001) reflect on Graham's accomplishment during her tenure as the CEO for *The Washington Post*. They acknowledge Graham's hard work and dedication to the company. Thanks to Graham and other women that stepped into leadership roles, they began to forge a path.

Mentioned previously, Warner (2014) outlines the percentage of women in the workforce. Women currently hold 52% of all professional-level jobs nationwide. From there, the report breaks it down even further into different industries. In information technology, only 14% of senior management positions at Silicon Valley startups are women. The financial services industry has a labor force of 54.2% women with only 18.3% serving as board directors and none as CEOs. Within the health care industry, women comprise 78.4% of the labor force, but only 14.6% hold executive officer positions with none as CEOs. Overall, in the United States, women hold 14.6% of executive positions, 8.1% of the top earners, and 4.6% of Fortune 500 CEOs (Warner, 2014).

When a woman does reach the c-suite—and more importantly, is appointed CEO—all eyes are on her. Questions start murmuring throughout the company and also in the business world about her capabilities as a woman to lead the company. Will she clean house of all the men or women? Will the company be filled with more women? Do you think a man would've done a better job? All these questions derive from speculations due to her gender and not from the experience she brings to the company. Subconsciously, as a society, it can be perceived that we have been accustomed to view certain positions as female and certain positions as male.

My research is important to those currently in the business world because they need to be aware of the gender hiring trend. If women are hiring more men vs. women to their executive team, or vice versa, they need to be aware that they might not be hiring the best candidate, but rather the gender they prefer to work with. It's important to ensure that the company is maximizing shareholder wealth, which is achieved by hiring the best leaders to the c-suite.

My generation, born between 1980 and 2000, known as Generation Y or the Millennials, also needs to be aware of the hiring trends. With years of experience and professional growth, we too can prepare to hold executive positions. Hopefully, one day, we won't be analyzed due to our gender, but rather for our work experience.

Since Kindergarten, our teachers, parents, siblings, and grandparents have been teaching us that we can do whatever we want after graduation, and no matter what gets in our way we shouldn't be stopped. The issue with that is the roadblocks aren't necessarily visible. In my literature review, many sources came to the conclusion that women play a role in keeping other women from advancing professionally. As a generation, we need to break through those barriers and ensure that we're not subconsciously repeating the cycle. We've been told that a glass ceiling has been put in place that hinders women from being promoted. This glass ceiling is usually described as being placed by men, though it can easily be placed by women as well. That's why it's important to educate my generation of women as we enter the workforce to help break through the glass.

To keep retention rates high, companies invest in their employees to help them grow as professionals. The Human Resource Department, also known as the Talent Acquisition Department, needs to review the hiring patterns of their executives. If women are more likely to hire men as part of their executive team, they should be aware of this trend. This then hinders the

advancement of women internally or externally to be promoted to the c-suite. Even if it's reversed, that women are more likely to hire men, this too becomes a "bottleneck" for the advancement of males. If either trend becomes true, the Human Resource Department might review the hiring process of a CEO differently. For example, if a company needs to diversify its gender that would meet those goals?

Whether you're involved in a local or national organization, people love to be connected with like-minded individuals. The last group that would benefit from my research is the numerous women associations across the globe. Diversity Best Practices (2011) posted a list highlighting the 20 Women's Organizations You Need to Know. These organizations ranged from the National Association of Female Executives (NAPW) to the Girls Scouts of America. Some of the organizations set themselves apart by representing a specific industry. Whether your profession is in medicine, finance or sports, there is a women's organization for you.

These organizations can use my research information to educate their members and act as a channel of communication for the generations I spoke of previously. No matter the age of the business professional, it's important to realize that our subconscious or conscious actions are hindering the female population. Education is the key to overcoming this potential hurdle. Even if it's not found at the CEO to executive team level, it may be relevant elsewhere in the company. The intent of these organizations is to bring all women together that share a common interest. That interest, whether it's in technology or communications, is what drew these women together as they continued to "fight" for equality in that field. Many of the organizations encourage young women to take control of their future and to pick a career they love. From impacting women across the globe to volunteering, the end goal is all the same: supporting other women.

With all the support across the globe, wouldn't you think that women in the workforce would be supportive and not defensive of each other? It's so easy to support one another, but when it comes down to it, do women follow through? No one suggests that all women should only hire other women, but rather the most qualified applicant. At times the most qualified applicant is the woman, but the perception or reality that women prefer to work with men gets in the way.

## Data Pool of Companies

In order to analyze the hiring rate of females vs. males on executive teams, I gathered data from 20 different publicly traded companies. I began reviewing a list of companies that currently have a woman as their CEO. My list came from Catalyst (2014), a leading nonprofit organization, which documented all women CEOs in Fortune 1000 companies up to August 2014. Next I decided on a competitor company that currently has a male CEO in the same industry. The list of companies comes from an array of industries so as to not lean towards a more female or male dominated industry. Below is the list of the 20 companies I analyzed for my thesis:

**Table 1.**
**Companies Included in Study**

| Female CEO | Female Company | Male CEO | Male Company |
|---|---|---|---|
| Meg Whitman | Hewlett-Packard | Steve Ballmer | Microsoft |
| Indra Nooyi | PepsiCo | Muhtar Kent | Coca-Cola Company |
| Virginia Rometty | IBM | Tim Cook | Apple |
| Denise Morrison | Campbell Soup | Ken Powell | General Mills |
| Ursula Burns | Xerox | Pierre Nanterme | Accenture |
| Carol Meyrowitz | TJX Companies, Inc | Kevin Mansell | Kohl's Inc. |
| Ellen Kullman | DuPont | Charles Bunch | PPG Industries |
| Debra Reed | Sempra Energy | Anthony Early | PG&E Corporation |
| Sheri McCoy | AVON Products | Scott Beattie | Elizabeth Arden |
| Marissa Mayer | Yahoo! | Tim Armstrong | AOL |

All the CEOs have been in their position for at least two years, which allows them time to make changes in their executive team, if needed. Data was gathered from the annual report of the company over a time span of no more than five years with a base year to calculate percent change. My data will be collected in a panel study on the terms of gender as I review the cross-sectional comparison of females vs. males that are hired to the executive team.

The data was analyzed as a whole to provide a larger sample size. With a larger sample size I was able to see if there was a statistical difference. In the case that a statistical difference wasn't found, my next step would be to analyze the incremental changes between the proportions of females vs. males being hired. The data comparison would then be calculated by the rate of change.

Whether women CEOs have a higher ratio of females vs. males in their c-suite, or vice versa, more questions arise from the statistical conclusions. The questions I asked included,: Do female CEOs hire more females vs. males? Do male CEOs hire more females vs. males? Is there a trend or do either genders hire the best applicant?

My literature reviews provided me with the perception society has with women holding high level leadership positions. This perception then can be compared to the reality that I derived from my data collection.

## Analysis Process

Before I was able to analyze any data I needed to procure the gender of every leader on the executive team of the predetermined pool of 20 publicly traded Fortune 1000 companies. Data was collected for each company for up to five years, or up until the CEOs hire date, whichever came first. I also collected the genders for the year that happened before the fifth year

or before the current CEO was hired. This year is used in my analysis as a base year to be capable of capturing percent increases for the first year the data is collected.

To test my hypothesis, I used the 2-Sample T-Test, which allowed me to compare whether or not the average difference between two groups was really significant, or if it's due to random chance. In order to put the 2-Sample T-Test to work, I needed to extract specific information from the genders collected.

Each company was assigned a number, 1-20, and data was collected each year for a specific company. For each year a designated number represented by the number after the decimal point (.1, .2, .3, etc.) was also assigned. For example, Hewlett Packard whose gender data was collected over four years is labeled as 1.1, 1.2, 1.3, and 1.4.

Once the genders of the executive team members were collected for each company per year, I began counting the number of female and males. To calculate the ratio of females serving on the executive board, I took the total number of females for a given year and divided it by the total number of people on the executive team. Having the percentage of females represented on the executive team for each year allowed me to track the "trend." This trend highlighted various companies that saw an increase, decrease, or no change in the female ratio from one year to the next. Although my data was collected for up to five years, it was important to have the previous year to help create a foundation or base when tracking data from year to year. Before statistically analyzing the data it would appear that there were three different outcomes for female percent change from year to year that each company would be labeled under: female percent increase, female percent decrease and female percent no change.

*Example of Increase*: While reviewing the female vs. male ratios for each company, the best female ratio increase and "equal" representation goes to AOL, depicted on the table below. By

viewing the very bottom row of Table 5, we're able calculate the female ratio of each year, represented by F%. Over the past three years, Tim Armstrong, AOL CEO, was able to keep the female ratio of the board at an average of 46%. Even for two years, the female ratio of the executive board stayed at a constant high of 50%. Though AOL has a smaller executive team, with about four to six executive officers, the female representation has made big strides. With only 25% of the team being female in 2011, which at the time equaled one person, Mr. Armstrong had the opportunity to add two more executive officers to the team and chose to hire female applicants.

**Table 2.**
**Example of Increase – AOL, CEO Timothy Armstrong**

| ***2009-base yr*** | | **2010** | | **2011** | | **2012** | | **2013** | | **2014** | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Male* | *3* | Male | 2 | Male | 3 | Male | 3 | Male | 3 | Male | 3 |
| *Female* | *1* | Female | 1 | Female | 1 | Female | 3 | Female | 3 | Female | 2 |
| *Total* | *4* | Total | 3 | Total | 4 | Total | 6 | Total | 6 | Total | 5 |
| *F %* | *25%* | F % | 33% | F % | 25% | F % | 50% | F % | 50% | F % | 40% |

*Example of Decline*: Every company had at least one year where the female ratio percentage over the next year saw a decrease of females. The companies with the most female ratio percentage decreases include Campbell Soup and Xerox. It also just so happens that both Campbell Soup and Xerox are both run by female CEOs. The table below shows the three years of decline for Campbell Soup from 2010 – 2013. Something that's interesting with the Campbell Soup company is the continuous trend decline for the number of females on the executive team. During the exact same time frame that the females are seeing a decline, the number of males on the executive team increases. Within five years, the female ratio dropped 50 percent. A decrease of female representation in the c-suite can be due to the sabotage effect. We can't fully draw a conclusion that Mrs. Morrison purposefully added more males to the c-suite over, females but it does add some speculation as to why the decrease. Other variables that would need to considered

is the availability of applicants for those positions but it's hard to judge, unlike in industries that fall under STEM professions that I address later in the paper, that variable.

**Table 3.**
**Example of Decline – Campbell Soup, CEO Denise Morrison**

| *2010-base yr* | | 2011 | | 2012 | | 2013 | | 2014 | |
|---|---|---|---|---|---|---|---|---|---|
| *Male* | *6* | Male | 7 | Male | 7 | Male | 8 | Male | 8 |
| *Female* | *4* | Female | 3 | Female | 2 | Female | 2 | Female | 2 |
| *Total* | *10* | Total | 10 | Total | 9 | Total | 10 | Total | 10 |
| *F %* | *40%* | F % | 30% | F % | 22% | F % | 20% | F % | 20% |
| ***F% +/-*** | | **-25%** | | **-25.93%** | | **-10%** | | **0%** | |

*Example of No Change*: When you calculate the percentage increase or decrease between years, there is always the opportunity for the answer to come back with a zero change. Depending on the circumstances, a zero change can be either good or bad. The positive side to a zero change when looking at the female ratio is that no females were removed from the executive team, or the CEO didn't add more males to the team. The negative side to a zero change conclusion is seen in the table below, where over the past five years DuPont has zero female representation on the executive team. The executive team numbers have stayed pretty constant between five or six and though Ellen Kullman, DuPont CEO, had the opportunity to add a female to the team in 2011 a male was hired instead. With DuPont being in an industry that is heavily dominated by the male population, the reasoning behind Mrs. Kullman not adding a female simply comes down to a low, or maybe even zero, pool of female candidates. Later in the report I discuss the low percentage of females working in jobs related to DuPont's industry. With women only making up 24% percent of the application pool that is available for Mrs. Kullman to hire executives from, it's easier to hire from the remaining pool of the 76% male group (Beede, 2011).

**Table 4.**
**Example of No Change – DuPont, CEO Ellen Kullman**

| *2009-base yr* | | 2010 | | 2011 | | 2012 | | 2013 | | 2014 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Male* | *7* | Male | 5 | Male | 6 | Male | 6 | Male | 6 | Male | 5 |
| *Female* | *0* | Female | 0 | Female | 0 | Female | 0 | Female | 0 | Female | 0 |
| *Total* | *7* | Total | 5 | Total | 6 | Total | 6 | Total | 6 | Total | 5 |
| *F %* | *0%* | F % | 0% | F % | 0% | F % | 0% | F % | 0% | F % | 0% |

Overall, the male CEO companies saw less occurrences of decreasing female ratios per company. Only one company saw three years of decline, two companies had two years of decline, five companies had only one year of decline, and two companies had zero years of decline due to zero females being present on the executive team.

Whereas the males saw the majority of their companies with only one year of decline, the female CEOs were split between one or three years. Four companies had three years of decline, one company had two years of decline, four companies had one year of decline, and one company had zero years of decline due to no female representation on the executive team.

After analyzing the 20 companies, one can draw several conclusions. After calculating the percentage increase or decrease of female representation on the executive team, there tends to be a trend for each sex. For the ten male CEO companies, the data shows that their executive teams saw more increase, over the past five years, in female ratio on the board. On the other hand, the female CEO companies showcased more of a decrease in female vs. male ratio on the executive team. A change in the female ratio occured when a CEO added more members to the board by "stacking" it with more males during the hiring process or by losing females from the executive team.

Within the past century, feminist movements have been huge, so one would believe that female CEOs would hire more females to join their executive board. From the pool of data that I

collected, there seems to be a trend that goes against that belief. The decreased ratio of females on the executive boards of female CEO companies could be attributed to the "token female" or "queen bee" effect. Michelle Duguid, assistant professor from Washington University in St. Louis, studied the behavior of women in the workplace, which led her to coin the term: "token female." This term refers to the two different threats that the token female, my pool of female CEOs, sense when hiring an applicant for an open position. The two different threats that Duguid concluded are: "competitive threat" and "collective threat" (Duiguid, 2012).

Companies where women were a minority saw a decrease of upper-level women in management. This decrease was due to the level of competitive threat in the workplace. When one female was promoted to a higher position the likeliness of her hiring or promoting another female to the group was low. Duguid states, "They (the token females) feel like they have a lot at stake from status, pay, and position." Collective threat derives from having negative stereotypes about women being validated by simply hiring or promoting another woman that ends up being less qualified for the position (Duiguid, 2012).

**Outcome of Data Analysis**

After initially drawing conclusions from the data by reviewing the change in female ratios to total executives in the c-suite from year to year the next step was to calculate, if any, statistically significant evidence within the data. Two, 2-Sample T-Tests were analyzed to test the significance of the differences in the data to see whether there is a statistical difference between female and male CEO's in their hiring the c-suite. The two tests are as follows: the change in year to year hiring (called Delta in the paper); and overall female to total c-suite proportion. Both tests were compared for statistical significance by using the standard thresholds alpha = .05 and alpha = .10.

$$\text{2-Sample T-Test: } t = \frac{\overline{\times_1} - \overline{\times_2} - \Delta}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

Wherein for the test for change in year to year hiring:

$\overline{\times_1}$ - mean of year to year change in female proportion of C-suite for male CEO companies
$\overline{\times_2}$ - mean of year to year change in female proportion of C-suite for female CEO companies
$\Delta$ - hypothesized difference = 0
$\mathbf{s_1^2}$ - variance of $\overline{\times_1}$
$\mathbf{s_2^2}$ - variance of $\overline{\times_2}$
$\mathbf{n_1}$ - number of observations for male CEO companies
$\mathbf{n_2}$ - number of observations for female CEO companies

**Table 5.**
**Test #1 - Year to Year Change in Female Proportion**

| Male CEO | | Female CEO | | Test Results | |
|---|---|---|---|---|---|
| Delta | 0.2066 | Delta | 0.0794 | 2-Sample T | 1.257739 |
| S | 0.5529 | s | 0.3955 | n1+n2-2 | 87 |
| s2 | 0.3057 | s2 | 0.1564 | alpha = .05 | 1.9876 |
| N | 47 | n | 42 | alpha = 1.0 | 1.6626 |

Conclusions from the first 2-Sample T-Test, from Table 5, are that there is no statistically significant difference between female and male CEO's hiring patterns based on sex. For a statistically significant difference, the 2-Sample T result would need to be greater than alpha t. The variance, which is the distribution of females across n, is calculated as s2. The Male CEO companies have a variance almost double the Female CEO companies. This shows that in the Male CEO companies, females aren't distributed as even across all companies, but rather clustered in a few companies. Too much variance also leads to no statically proven significance in c-suite hiring patterns. While not significant, it is interesting that the change for average male CEOs hiring patterns (0.2066) indicates a higher annual increase in female proportions compared to female CEOs (0.0794).

Wherein for the test for differences in overall female to total c-suite composition:

$\overline{\times_1}$ - mean of overall female to total c-suite composition for male CEO companies
$\overline{\times_2}$ - mean of overall female to total c-suite composition for female CEO companies
$\Delta$ - hypothesized difference = 0
$\mathbf{s_1^2}$ - variance of $\overline{\times_1}$
$\mathbf{s_2^2}$ - variance of $\overline{\times_2}$
$\mathbf{n_1}$ - number of observations for male CEO companies
$\mathbf{n_2}$ - number of observations for female CEO companies

**Table 6.**
**Test #2 - Overall Female to Total C-Suite Composition**

| Male CEO | | Female CEO | | Test Results | |
|---|---|---|---|---|---|
| F/T | 0.1735 | F/T | 0.2142 | 2-Sample T | \|-1.59688\| |
| S | 0.1235 | S | 0.1172 | n1+n2-2 | 87 |
| s2 | 0.0152 | s2 | 0.0137 | alpha = .05 | 1.9876 |
| N | 47 | n | 42 | alpha = 1.0 | 1.6626 |

When testing the overall female to total c-suite proportion (Test #2/Table 6) the results are similar to those in test #1. By reviewing the absolute value of the 2-Sample T result it also doesn't have a statistical significance due to the 2-Sample T result not being greater than either alpha T's. Although not seen as statistically significant the second test shows a computed mean proportion of higher female representation already present in female CEO companies. This begs the question of causality, about whether it is more likely to have a female CEO emerge in companies already having more females in the c-suite.

To further understand the relationships involved in the study, two regression analyses were completed. The first analysis reviews the entire data set as a whole and forces the intercept to be zero. Forcing the intercept to zero reinforces the logical reasoning that from year to year there should be no change in female to total ratios. Significant conclusions can be drawn from the regression analysis, Table 7, on the entire pool by using this method. The analysis shows that female representation on all executive teams increased by 6% from year to year, regardless of the

sex of the CEO. On the table below year and CEO sex are held as independent variables with the annual change in female proportion of the c-suite as the dependent variable. Across all companies the sex of the CEO was found to be insignificant in this analysis.

**Table 7.**
**Regression Analysis – Delta with Forced 0 Intercept**

| | *Coefficients* | *t Stat* | *P-value* |
|---|---|---|---|
| Intercept | 0 | N/A | N/A |
| Year | 0.060145354 | 2.890064022 | 0.004861855 |
| CEO | -0.090969611 | -0.068436942 | 0.387544517 |

The second regression analysis, results from Table 8, focuses on the female to total ratio. None of the coefficients in this analysis were statistically significant at the .05 level, but companies led by female CEOs have a higher proportion of females in their c-suite, which is significant at the .10 level. Female CEO led companies have 4.3% more women in the c-suite than their male let counterpart companies, but the direction of causality is likely from greater female proportion toward having a female CEO than the other way around.

**Table 8.**
**Regression Analysis – Female/Total**

| | *Coefficients* | *t Stat* | *P-value* |
|---|---|---|---|
| Intercept | 0.135449964 | 4.151504298 | 7.74668E-05 |
| Year | 0.013241864 | 1.381208598 | 0.17079321 |
| CEO | 0.043490779 | 1.702306917 | 0.09231009 |

## STEM Industries

Only one out of the twenty companies that were analyzed, DuPont, had zero females on the executive team for the past five years. Two other companies, Apple and PG&E, had zero females on the executive team for the past five years up until the 2014 fiscal year.

DuPont's company comes from the list of female CEO run companies that were analyzed for my thesis. Both Apple and PG&E come from the list of male CEO-run companies. Ellen

Kullman has been the CEO of DuPont since 2009 and has been with the company since 1988. (DuPont) Before joining the DuPont team, Mrs. Kullman worked for two energy companies. Mrs. Kullman not only worked, but also holds numerous degrees in Science Technology Engineering, and Math (STEM) industries: a bachelor of science in mechanical engineering, a master of science in management, and a doctorate in science and engineering. In 2012, STEMConnector published *100 Women Leaders in STEM,* and named Mrs. Kullman as one of the most influential.

Mrs. Kullman is passionate about her belief in educating children in STEM programs. She serves as a board member of Change the Equation (CTEq), a national coalition of 100 CEOs that are committed to improving STEM learning for U.S. students from pre-kindergarten to grade 12. CTEq coordinates with various industry CEO's, like Mrs. Kullman, to ensure that through education students become more literate in STEM and that schools are capable of implementing successful programs (About change the equation, 2015).

DuPont, Apple and PG&E represent industries that STEM careers. With industries that fall in the STEM category, it becomes harder to find female applicants ready to be hired as a CEO, or for the executive team, due to the higher percentage of males within the industries.

While women do make up 47% of the total US workforce, we still see a much lower representation in areas such as science and engineering. The *U.S. Department of Labor, Bureau of Labor Statistics from the Women in the Labor Force: A Databook* from 2014, shown in Table 9, breaks down the percentage of female representation in STEM related jobs: (National girls collaborative project)

**Table 9.**
**Bureau of Labor Statistics Databook: Women in the Labor Force, 2014**

| % of Female | STEM Professions |
|---|---|
| 7.2% | Mechanical Engineers |
| 8.3% | Electrical Engineers |
| 12.1% | Civil Engineers |
| 15.6% | Chemical Engineers |
| 17.2% | Industrial Engineers |
| 27.9% | Environmental and Geoscientists |
| 39% | Chemists and Materials Scientists |

Low percentages of female representation in STEM professions leads to a continuous cycle of women having difficulties penetrating the market and "competing" with the men. With careers in STEM industries already booming, adding unneeded female stereotypes makes it more difficult to penetrate the already competitive job market.

While researching women working in STEM related industries, numerous articles about the wage gap soon arose. The U.S. Department of Commerce: Economics and Statistics Administration (Beede) released a report in 2011 that focused on the various gaps for women working in STEM related careers. A study they conducted in 2009 showed that in STEM jobs men made up 76% of that population while women made up the remaining 24%. This is compared to the 52% for men and 48% for women holding jobs overall in the U.S. Next in their executive summary, they highlighted three possible factors contributing to the low attendance of women in STEM jobs. Discrepancies include: lack of female role models, gender stereotyping, and less family-friendly flexibility. If companies and various organizations don't continue to develop their female employees or even educate young girls about jobs in STEM then it's hard to fight the discrepancies that are in place.

Although the ratio of females vs. males is a large gap, it's a different story when comparing the gender wage gap. In the same 2009 study the U.S. Department of Commerce calculated that within STEM jobs there is only a 14% gender wage gap compared to 21% in non-STEM jobs (Beede, 2011).

To help increase the representation of females in STEM professions, especially those from Table 1, President Obama established in November 2009 an Educate to Innovate Campaign. This campaign focused on moving U.S. students from the middle to the top in the areas of math and science achievement. President Obama stated, "I always hear stories about how we can't find enough engineers, we can't find enough computer programmers. And that's why we're emphasizing teaching girls math and science." The millions of dollars invested from various companies and from government support all focus around the nation's ability to out-build, out-educate and out-innovate against future competitors, and it begins with building an interest in more young girls within STEM programs (Executive Office of the President, 2011).

One of the commitments of the campaign is to expand STEM education and careers for young girls. To further support these young girls that have a passion and are interested in STEM careers, President Obama invited the winners of the first annual Google Science Fair to the Oval Office to showcase their achievements. More than 10,000 students from 91 countries competed in the science fair, and President Obama was very happy to see that not only did three students from America place first in their age division, but they were all young girls (Curtis, 2011).

## Executive Team Quotas

With low numbers of female representation currently on executive teams, will the United States observe a future where companies must reach gender quotas? Although the United States currently doesn't have any legislation in place, many countries have legislation set or are in the

process of writing legislation. In many European countries, the legislation doesn't focus on the gender ratio of the executive team, but rather the gender of the board of directors for the company. The board of directors absorbs the legal responsibility of the company and also ensures that the company, including the executive team, stays on track to accomplish the company's mission.

According to an article from November 2014 written by BBC Business News, new laws are being put in place to ensure that 30% of board positions at some of Germany's largest companies will be filled by women beginning in 2016. While many businesses have criticized the recent legislation, some do speak in support of the quota. Chancellor Angela Merkel, who was a late convert of using quotas, stated, "This law is an important step for equality because it will initiate cultural change in the workplace."

According to a report from New Republic about the impact of gender quotas, Norway first introduced corporate board gender quotas in 2003. The gender quota that was passed in Norway requires companies to have 40% female representation on their boards or be shutdown. The article states that since Norway's use of gender quotas, other countries have followed suit – Spain in 2007, France and Iceland in 2010 and of course other European countries. (Lee)

**Moving Forward**

From my current data, conclusions can't statistically be drawn that women are either supporting or sabotaging each other for c-suite positions. The way women treat others varies, and it's not clear on how women are treating others in executive positions. Especially depending on the industry, it's harder for a female CEO to support other females when the majority of applicants are males. On the other hand, female CEOs could possibly be hiring the best people or they simply prefer working with men.

Without a statistical significance from the 2-Sample T-Test it shows that women are receiving positions as CEOs, but aren't necessarily bending over backwards to ensure that other women are receiving promotions. With a small sample size of only 20 companies from various industries my collection doesn't reflect the entire population of publicly traded companies and the female ratio of their c-suites. Due to time constraints I wasn't able to collect a larger sample size that might've led to statistically significant results. In the future I suggest analyzing and gathering data from the *Fortune 500* companies to gain a better idea of female representation in the c-suite due to the sex of the CEO.

Throughout my thesis project I learned a lot about the various obstacles that I'm going to face as a millennial starting out in the business world. I have accepted a position at Sam's Club in Bentonville, AR at their corporate office and I'm excited about the potential growth in my career. I'm fortunate enough to grow up in a generation that is more exposed to women in the workplace and don't have as many obstacles to face as women in the 1970s when they began receiving more executive positions. As of 2014 Sam's Club CEO is Rosalind Brewer and as a female myself it gives a more positive outlook on the success of females in the company. Even further, out of Mrs. Brewer's executive team there are five males and three females. This past year the company did replace one of the executive and Mrs. Brewer replaced that vacant position with another female. Though I can't say for certain the demographic of the applicant pool it's still reassuring that she isn't "stacking" her executive team with more males but rather hiring the best applicant which in this case was a female.

My thesis has made me look at corporate positions more in depth and begin to ask those difficult questions to upper management. Whether I stay with Sam's Club for the rest of my

career or switch companies I want to be certain that as a business professional I will be given every opportunity to continue to strengthen my skills and grow.

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