

Are You Thinking Without Thinking? A Study on Unconscious Gender Bias & its effects on Hiring and Promotional Decisions in IT Sector

Parul Kaushik

Student (MBA), Institute of Management Christ(Deemed to be University), Bangalore
parul.kaushik@mba.christuniversity.in

Dr. Archana Singh

Associate Professor, Institute of Management Christ(Deemed to be University), Bangalore
archana.singh@christuniversity.in

Abstract

Unconscious Bias or Implicit bias refers to the concept of taking decisions based on one's past experiences and predefined stereotypes. Unconscious Gender Bias is an overlooked phenomenon proposed to be responsible for women's underrepresentation in IT Sector. There are beliefs that women are incompetent in workplace and can't handle core work in the technical field. There exists various gender related biases like likability, motherhood penalty, attribution and performance bias acting as hurdles for women to break glass ceilings. This research provides a review of unconscious gender bias and its effects in hiring, promotional decisions and career advancements of female employees in the IT organisations. It provides models to mitigate and overcome unconscious gender bias in the workplace. Our findings demonstrate that low correlation between gender and other dependent variables. But literature review suggests that implicit gender bias is pervasive in IT organisations particularly in technical and leadership roles. The gender bias creates negative impact on the IT organisations by reducing innovativeness and inclusivity.

Keywords: unconscious gender bias; implicit gender bias, gender equality; gender diversity in IT.

1. Introduction :

We tend to draw assumptions unknowingly about our experiences with individuals or groups and make decision based on those assumptions. This is a psychological phenomenon that happens to everyone. Since we make thousands of decisions in a day and our mind can't store all of them, it creates some shortcuts by categorising the information. In this way the brain generalises and unknowingly becomes the victim of unconscious bias. There exist different

types of unconscious biases based on appearance, voice & tone, likability, performance and gender. In this paper we are going to focus on Unconscious Gender Bias. Although Implicit stereotype was first defined by psychologists Mahzarin Banaji and Anthony Greenwald in 1995, Unconscious gender bias was first got highlighted when Google realised that 70% of its workforce were male in 2014. Most of the IT Corporations are having few ladies at the top level positions and said to be a male dominated companies. Unconscious Gender Bias affected Hiring and Promotional decisions at google which lead to very poor gender diversity. Universally, women are underrepresented in organizations, and the presence of women reduces with each progression to the higher level of the corporate chain. Women face numerous obstructions to progression into corporate administration positions, and these boundaries incorporate discrimination on the basis of gender and unconscious bias. Numerous organizations have demonstrated their responsibility to gender fairness by building up family policies and encouraging women in workplace and in their careers. Still Implicit Gender Bias keeps on affecting women in the work environment, and require greater concentration over the issue to empower women with what they are capable of, without stereotyping. Along with google many other tech giants like KPMG, Apple have started observing Unconscious gender bias and conducts training sessions for their workforce. Implicit Association Test was introduced in 1998 by Anthony Greenwald, Debbie McGhee, and Jordan Schwartz to detect the strength of a person's subconscious association. After that, Harvard Introduced IAT that measures attitudes and beliefs that people may be unwilling or unable to report. The test helps in finding out which type of bias a person is possessing so that it can be mitigated accordingly.

This research note provides a review of unconscious gender bias and how it effects the hiring and promotional decisions, career advancements for women in the IT organisations. It will also provide ways to mitigate and overcome unconscious gender bias in the workplace.

1.1 Research Background :

Whenever women tries to fit in male-dominated fields, structural barriers, often described as glass ceilings, continue to limit their advancement. Educated married scientists and engineers shows large gender gaps in earnings and, among parents, in promotions (Xie and Shauman 2003) Gendered barriers has been documented in professional service firms, many of which support science and technology companies. The employers makes decisions based on the gender stereotypes, which led to risking the productivity of potential employees (M José González, Clara Cortina, Jorge Rodríguez). Men has been in the position of leadership for a very long period of time and still continue to be, therefore the term leadership is being stereotyped having masculine traits like aggressive and dominant. Women who have made it to the executive positions are often considered as more arrogant and abrasive that is not the case with male executives (Pew Research). Unconscious bias can have a big impact on people-related decisions at work, especially when it comes to recruitment, promotion, performance management and idea generation (Cathryn Newbery, 2019).

1.2 Problem Statement :

The study will focus on identifying whether decisions are biased and what happens to the organisations having unconscious bias. Even after identifying the unconscious bias the problem lies how to change the long lived bias in the minds of people as it can't be fixed in one shot.

Implicit or unconscious bias is generally responsible for underrepresentation of women in IT sector specifically. It is high time to be concerned about the issue as less hiring and promotion of women higher positions affects business decisions, hinders innovativeness, inclusivity in the workplace. The presence of even a single women in top level management makes a huge difference to the way of functioning and work environment. About 1 in 5 C-suite executives is a woman—and only 1 in 25 C-suite executives is a woman of colour. (Irina Starikova) If women are promoted and hired to first-level manager at the same rates as men, we will add one million more women to management in corporate America over the next five years. (Jess Huang).

1.3 Research Questions :

1. What is the level of existence of Unconscious Gender Bias in Hiring Decisions of IT organisations ?
2. What is the level of existence of Unconscious Gender Bias in Promotional Decisions of IT organisations ?
3. Does Unconscious Gender Bias effects Career Advancements specifically of female employees?
4. Does Unconscious Gender Bias effects of Leadership roles of female employees ?

1.4 Objective :

The overall objective of this research is to analyse the effects of Unconscious Bias on the organisational diversity and female employees while, the specific objectives of this research are:

1. To find if Unconscious Gender Bias exists in Hiring Decisions of IT organisations.
2. To find if Unconscious Gender Bias exists in Promotional Decisions of IT organisations.
3. To find if Unconscious Gender Bias effects Career Advancements of female employees.
4. To find if Unconscious Gender Bias have any effects of Leadership of female employees.

1.5 Research Scope :

The population pools of this study are all the employees of IT sector of India. The sample of this study is 200 respondents. This research was conducted in online mode via LinkedIn and other platforms. The non-probability sampling is used in this research since the number of the population selected is unknown. This research was conducted by using the quantitative method. The questionnaire were distributed among the sample of population.

1.6 Significance of Research :

Underrepresentation of women in technical and higher level jobs creates a sense of demotivation and fear in the minds of most of the women, this is the reason why women are less likely to think that they are ready for a promotion even after being fully eligible and men on the other hand thinks they are going to be promoted only by being 60% eligible for it.

There is always a fear that a women would loose her dedication in work after getting married or being a mother, on the other hand men are considered as more responsible after becoming a father.

This research tries to connect the dots with reality of how implicit bias can change whole perspective of people over the years. This research tries to highlight the aspects relating to the effects of unconscious gender bias within the IT organisations and tries to give corrective measures for the same.

2. Literature Review

2.1 Origin of Unconscious Bias :

Defined by psychologists Mahzarin Banaji and Anthony Greenwald in 1995, Unconscious Biases or Implicit Biases are the presumed thoughts about qualities of people developed through experiences and associations with them. It can be related to one's colour, caste, physical appearance, actions or backgrounds. Our brain has evolved to decide quickly even before thinking about the situation. We can be exposed to 11 million pieces of information at once but can only process 40 of them. These information can be filtered by having more and more experiences, perceptions and interpretations.

"The last elected President whose height was below average was William McKinley in 1896, and he was "ridiculed in the press as 'a little boy'." (Howard Ross, 2008) The appearance of an individual also effects his performance appraisal ratings.

Unconscious bias can be present in any decision a person makes at work or even at home. It is a situation where the person is not aware about and has no control while taking the decisions. (Himani Oberai and Ila Mehrotra Anand) This affects one's capability of taking accurate decisions.

2.2 Definition of Unconscious Gender Bias :

Unconscious Gender Bias refers to the situation where a person attributes certain characteristics with one gender in particular. In other words, it can be regarded as the tendency of choosing one type of gender over the other. Unconscious Gender bias is the reason why google has only 3 women out of 36 people as executives. It can not be seen , therefore

organisations realise the effects of unconscious gender bias long after taking the decisions and when it becomes really difficult to correct it.

2.3 Realising the Bias :

Unconscious gender bias starts from home where boys are looked to have brain and be strong on the other hand girls are looked to be soft spoken and emotional. It is identified by google through the searches about unconscious gender bias that “When it came to a son, parents were much more likely to ask Google if their son was ‘gifted’ or ‘genius’ while they used terms like being ‘overweight’ or ‘ugly’ for girls. (Melissa Shedden, 2018)

Unconscious Bias is so engraved in our lives that it becomes very difficult to separate bias from a person if they are not aware of it. It becomes natural and unintentional decision making behaviour for them. Unconscious bias is not clearly visible until one gets to know or experience it. Same happens with Google where unconscious gender bias was rooting its presence over the years. Google being an organisation that lays example of perfect workforce realised that it comprises of 70% male workforce and unconscious gender bias is effecting the hiring and promotional decisions within the company. Also, biasing over the competencies of female employees, google has employed majority (83%) males as engineers and managers. (Farhad Manjoo, 2016)

Although a report from McKinsey showed that the situation is getting better with gender disparity in various IT organisations over the years. There has been 5% increase in women getting top level positions. But Women still struggle to find a position in C-Suite jobs even after having the potential and competencies. If women are promoted and hired to first-level manager at the same rates as men, we will add one million more women to management in corporate America over the next five years. (Jess Huang and Irina Starikova).

2.4 Types of Women Related Bias :

2.4.1 The Tightrope

At the point when a circumstance comes where the manager need to promote one individual among similarly meriting and potential male and a female employee. The choices significantly comes downs to factors like their tone and demeanor or nature. Words like bossy, grating, offensive, and forceful are utilized to depict ladies' practices when they lead; words like enthusiastic and nonsensical portray their practices when they object. (Kieran Snyder, 2014). Women often walk a tightrope between behaving as per others predefined assumptions and showing their potential.

2.4.2 Prove-it-Again

It is more difficult for a women to join more crucial professional networks in male-dominated fields than a man in female dominated fields.They have to prove their competence but still often denied credit for their success and face stigmatised for doing the tasks that are considered as masculine.(Erin A. Cech, Mary Blair-Loy,2014).

2.4.3 The Maternal Wall

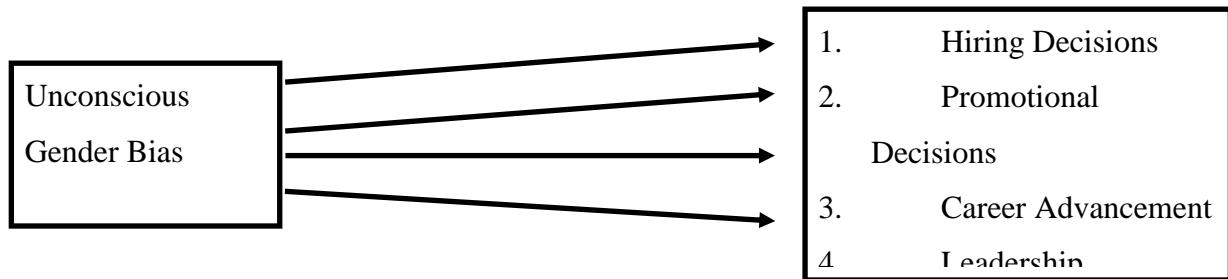
“When professional women become mothers they suddenly are perceived as less competent– a trade-off which does not affect men when they become fathers.” (Magdalena Zawisza, 2016).Motherhood is described as Status Characteristics Theory, where there is a bias against mothers in salary, promotions and hiring decisions.Mothers are being offered starting salary even after having the competencies, on the other hand men did not face such problem, but get benefited of being a parent. (Shelley J. Correll, Stephen Benard, and In Paik)

2.4.4 Affinity Bias

A female member of the team makes a point that no one seems to feel too strongly about. Thirty minutes later, a male member of the team makes the same point—and everyone jumps on board with “his” idea.

2.4.5 Technology Bias

A lots of women face problems with facial recognition technology at their workplace that is because of lack of gender diversity in the technical teams of the organisations.Starbucks and Sephora and many others who discovered facial profiling incidents planned to conduct trainings for unconscious bias.(Lattice,2019)



2.5 Research Framework

Figure 1: Research Framework

Based on Figure 1, Hiring Decisions, Promotional Decisions, Leadership, Career Advancement are the elements in the IT organisations that will be affected by the Unconscious Gender Bias.

Thus,

four hypotheses were formulated from the proposed model.

Independent Variable : Unconscious Gender Bias (X)

Dependent Variables : Hiring(Y1), Promotions(Y2), Career Advancements(Y3), Leadership(Y4)

H1a : Unconscious Gender Bias (X) exists in Hiring Decisions (Y1) in IT organisations.

H2b : Unconscious Gender Bias (X) exists in Promotional Decisions (Y2) in IT organisations.

H3c : Unconscious Gender Bias (X) effects Career Advancements (Y3) of female employees in IT organisations.

H4d : Unconscious Gender Bias (X) effects Leadership (Y4) of female employees in IT organisations.

3. Methodology:

3.1 Research Design

The research design is an empirical study. The research was conducted based on descriptive and correlational study. This research were conducted using the survey design which is a non-experimental setting.

3.2 Population and Sampling

For this study, the target population is the employees of IT sector in India. The total sample is 200 employees that were selected randomly. A good sample size depends on three key factors namely, the level of confidence desired, the margin of error and the variability of the population.

3.3 Instrument

This is a quantitative research that focuses on data collection from large number of population to obtain general cognition, objective method or research question phenomenon. This study used primary data and the main data collection technique used was structured questionnaire. The questionnaire used is an instrument for the collection of data and was divided by 3 sections namely

Question code : (HD) Hiring Decisions, (PD) Promotion Decisions, (ID) Individual Factors

The questionnaire contains 20 questions. Demographics of the respondent were collected first. Section A is about questions relating to the Hiring Decisions, Section B and Section C consist of Promotional Decisions, career advancements and leadership of women in IT organisations. The questionnaire had questions containing five-point Likert scale (1- Strongly disagree, 2- Disagree, 3- neutral , 4- Agree, 5- Strongly Agree). Statistical Package of SPSS 23.0 was used to analyse the data obtained. This study utilized the quantitative methodology and follows a survey method design.

3.4 Pilot Test

Pilot test was conducted before collecting the actual data in order to assess the reliability of the research instrument. To complete the pilot test, a total 35 respondent were pick randomly to answer the prepared questionnaire. From the feedback received, the finding shown in the Table 3.2 which the alpha value is 0.727 for overall variable. The value shows that the alpha value obtained is appropriate for this research.

Table 1. Reliability Statistics for Measurement Scales

Variables	Cronbach's Alpha (N=35)	Cronbach's Alpha Based On Standardized Item	N of Item
Hiring	0.697	0.701	4
Promotional Individual Factors	0.607	0.615	4
Overall	0.705	0.699	4
	0.727	0.729	12

4. Findings and Data Analysis

4.1 Analysis of Demographic :

Table 2. Demographic Information

Demographic information (N = 200)	Frequency	Percentage
Gender		
Male	86	43
Female	114	57
Age		
Below 30 years old	132	66
31 – 40 years old	39	19.5
40 and more	29	14.5
Qualification		
Under Graduate	25	12.5
Graduate	99	49.5
Post Graduate	71	35.5
PhD	5	2.5
Marital Status		
Single	148	74
Married	52	26

Based on result obtained, the percentage of female respondent is higher with 114 respondents (57%) compared to the male respondent which is 86 respondents (43%). Frequencies of the respondent's age were divided into three categories which is from below 30 years old to above 40 years old. Most of respondent age which is 66% is below 30 years old, while there are only 14.5 % of the respondent ages 40 years and above. For the academic qualification, most of the respondents are Graduates which contributes to 49.5% while only 2.5% of the respondents are PhD. 74% of respondents are Single while 26% are married.

4.2 Descriptive Analysis

In descriptive analysis, this section involved analysis of mean level and standard deviation. Mean Score Range 1.00-2.24(Low), 2.25-3.49(Average), 3.50-4.74(High), 4.75-6.00(Very High)

Table 3. Level of Unconscious Gender Bias

Level of Unconscious Gender Bias	Variable
Low	HD
Average	PD
High	ID

4.3 Bivariate Correlation Analysis

The correlation coefficient is measures that determine the degree to which two variables' movement are associated. SPSS will mark a 0.05 significance level with one asterisk (*) and a 0.01 significance level with two asterisks (0.01). Since the normality test results shows that the data are normally distributed, thus, Pearson Correlation Analysis is used to examine the relationship between gender of the employee and HD(Hiring Decisions), PD(Promotional Decisions) & ID(Individual Decisions).

The Extent Level of Correlation

Very Strong(0.91 to 1.00// -0.91 to -1.00) Strong(0.71 to 0.90 / -0.71 to -0.90) Moderate(0.51 to 0.70 / -0.51 to -0.70) Weak (0.31 to 0.50 / -0.31 to -0.50)Very Weak (0.01 to 0.30 / -0.01 to -0.30 0.00)No Relationship(0.00)

Table 4. Correlation between gender of the employee and HD(Hiring Decisions), PD(Promotional Decisions) & ID(Individual Decisions).

Variables	Pearson Correlation	Significant Value
HD	0.73	0.021
PD	0.54	0.001
ID	0.82	0.035

5. Discussion of Finding

Table 5. Summary on Level of Bias in Hiring Decisions

Hiring Decisions	Level	Frequency	Percentage
HD1	Low	63	31.5
HD2	High	86	43
HD3	Low	87	43.5
HD4	Very low	90	45
HD5	High	121	60.5

The first Hypothesis of the research is,

H1a : Unconscious Gender Bias (X) exists in Hiring Decisions (Y1) in IT organisations.

Since HD i.e. Hiring Decisions show less correlation with Gender of the employee in the collected set of data having significant value 0.021.

Table 6. Summary on Level of Bias in Promotional Decisions

Promotional Decisions	Level	Frequency	Percentage
PD1	Low	91	45.5
PD2	High	91	45.5
PD3	Low	79	39.5
PD4	Low	69	34.5
PD5	High	95	47.5

PD6	Low	61	30.5
PD7	High	72	36
PD8	Very High	106	53.4
PD9	Low	83	41.9

Hypothesis 2 & 3 comes under promotional decisions :

H2b : Unconscious Gender Bias (X) exists in Promotional Decisions (Y2) in IT organisations.

H3c : Unconscious Gender Bias (X) effects Career Advancements (Y3) of female employees in IT organisations.

Here, in table 6, few questions showed high level of correlation, but majority of the questions seem to be having low correlation. Null Hypothesis is rejected. Therefore, it is Promotional Decisions have low correlation to the gender of the employee.

Table 7. Summary on Level of Bias in Career Advancements of Females(Individual Decisions)

Individual Decisions	Level	Frequency	Percentage
ID1	Low	78	39
ID2	Very Low	75	37.5
ID3	Low	84	42
ID4	Low	76	38
ID5	Very High	94	47

Hypothesis 4 includes :

H4d : Unconscious Gender Bias (X) effects Leadership (Y4) of female employees in IT organisations.

Here also, the Individual Decisions showed very less correlation with the gender, hence the null hypothesis H4d is rejected.

6. Recommendation

Although the research shows low correlation with the dependent factors of unconscious gender bias, it is a phenomenon that gets noticed after a long period of time. Mere

questionnaire method can not examine the minds of people who are responding. Therefore, IT companies should take other necessary steps to find out the bias and reduce it. The best way to find out our own biases is to see if the people around us i.e our friends and colleagues are of the same background like us or we make friends from diverse society. The other way is to develop empathy towards others. If we know how would others feel being judged, we will try to fight with our biases.

Most of the tech companies today hire males as the engineers bringing innovation and they make the innovative technology that only suites the homogeneous group of engineers. Many tech organisations having facial and voice recognition techniques found that the technology they have built is only feasible for men that to having fair completion and of the age 18-35. The face, voice and gesture recognition technology only understands the commands of males and locked the women as well as children out (Abhijit Bhaduri, 2020).

7. Suggestions to Reduce the Unconscious Gender Bias

Unconscious bias is termed as a gut feeling in this article, and it is not always accurate. There are different types of unconscious biases present in an organisation (Bailey Reiners). Manager should Notice if any similarities they share with the candidate that are making them more inclined towards hiring that candidate. They should Conduct blind screenings of applications that should exclude candidates name, gender and any other aspect revealing their gender while hiring.

SELF model by (Hudson, 2020) to overcome the problem of unconscious bias.

S : Slowing down the thinking, decision making & processes.

E : Empathising with the feelings and view points of others

L : Learning about different diversity groups

F : Finding evidence against stereotypes.

8. Drawbacks

Unconscious Gender Bias is a very sensitive area to talk about for any IT company or even an individual. The main drawback in this research is that it can be best done via Implicit Tests and observations. Data Collection through questionnaire can not be as reliable as direct observation, also people tend to give false feedback in questionnaire.

9. Conclusion

All of us have some sort of Unconscious Bias in our minds. It is not directly noticeable until something major effects happens. Gender Unconscious Bias also exists in the real world as well as IT industries. Having females at all the levels of organisation is not only a good thing ethically, but it is a smart and strategic business approach as well. There are a lot of factors that lead women to join work in IT sectors and leaving it too. The survey showed that half of women (49%) have experienced some form of discrimination in the workplace, and a fifth (20%) have resigned in the past because of discrimination or harassment in the workplace. (Laurence Bradford, 2018) we should plan each program and strategy with some predispositions top of brain." Like during the employing procedure, questioners are prepared to ask "organised inquiries that are deductively demonstrated to diminish inclination during the recruiting procedure." (Cathryn Newbery, 2019)

Google has very poor gender diversity and hence tried to fix this. But the problem lies how to change the long lived bias in the minds of people & can't be fixed in one shot. Having women equally involved in all the level of work is not only a good thing but it's a smart and strategic business approach as well.

References :

1. Manjoo, F. (2014). Exposing hidden bias at Google. The New York Times, 24.
2. Shedden, M. (2018). The Shocking Unconscious Gender Bias In Our Google Searches. Whimm.
3. González, M. J., Cortina, C., & Rodríguez, J. (2019). The role of gender stereotypes in hiring: a field experiment. *European Sociological Review*, 35(2), 187-204.
4. Slaughter, A. M. (2015). Why women still can't have it all (pp. 84-102). OneWorld.
5. Dresden, B. E., Dresden, A. Y., Ridge, R. D., & Yamawaki, N. (2018). No girls allowed: women in male-dominated majors experience increased gender harassment and bias. *Psychological reports*, 121(3), 459-474.

6. Tetlock, P. E., Mitchell, G., & Anastasopoulos, L. J. (2013). Detecting and punishing unconscious bias. *The Journal of Legal Studies*, 42(1), 83-110.
7. McGrath-Champ, S., & Jefferson, T. (2013). Gender and pay equity in a global knowledge organisation. *The Economic and Labour Relations Review*, 24(1), 97-123.
8. Fiarman, S. E. (2016). Unconscious bias: When good intentions aren't enough. *Educational Leadership*, 74(3), 10-15.
9. Snyder, K. (2014). The abrasiveness trap: High-achieving men and women are described differently in reviews. *Fortune Magazine*, 627-660.
10. Cech, E. A., & Blair-Loy, M. (2010). Perceiving glass ceilings? Meritocratic versus structural explanations of gender inequality among women in science and technology. *Social Problems*, 57(3), 371-397.
11. Dunham, Y., Baron, A. S., & Banaji, M. R. (2016). The development of implicit gender attitudes. *Developmental Science*, 19(5), 781-789.
12. Quadlin, N. (2018). The mark of a woman's record: Gender and academic performance in hiring. *American Sociological Review*, 83(2), 331-360.
13. Correll, S. J. (2017). SWS 2016 Feminist Lecture: Reducing gender biases in modern workplaces:
14. A small wins approach to organizational change. *Gender & Society*, 31(6), 725-750.
15. Moule, J. (2009). Understanding unconscious bias and unintentional racism. *Phi Delta Kappan*, 90(5), 320-326.
16. Allen, B. J., & Garg, K. (2016). Diversity matters in academic radiology: acknowledging and addressing unconscious bias. *Journal of the American College of Radiology*, 13(12), 1426-1432.
17. Devlin, H. (2018, December 2). Unconscious bias: what is it and can it be eliminated? *The Guardian*.
18. Ross, H. (2008). Exploring unconscious bias. *Diversity best Practices*.
19. Oberai, H., & Anand, I. M. (2018). Unconscious bias: thinking without thinking. *Human Resource Management International Digest*.

20. Rooy, A. J. (2019, June 14). What we really mean when we talk about unconscious bias. Medium.
21. What we really mean when we talk about unconscious bias. (2019). Medium, 1–3.
22. Huang, J., Krivkovich, A., Starikova, I., Yee, L., & Zanoschi, D. (2019). Women in the Workplace 2019. San Francisco.
23. Reiners, B. (2019). 12 UNCONSCIOUS BIAS EXAMPLES AND HOW TO AVOID THEM IN THE WORKPLACE. Built In, 1–8.
24. 31, M. 2. (2018, October 22). The Truth About Unconscious Bias in the Workplace.
25. Lattice. (2019). How to Reduce Unconscious Bias at Work. Resources for Humans , 1–5.
26. Basu Mallick, C. (2019). Is Unconscious Bias Training Enough to Eliminate Workplace Bias? HR Technologist , 1–4.
27. Agarwal, D. P. (2020). It’s the perfect time to stop our unconscious bias going viral. The Guardian, 1–5.
28. Bhaduri, A. (2020, March 28). Before fixing bias in AI, let us fix our own.
29. Agarwal, P. (2020, March 4). Gender Bias In STEM: Women In Tech Still Facing Discrimination.
30. Bradford, L. (2018, September 27). How These 4 Tech Companies Are Tackling Unconscious Bias.
31. McCormick, H. (2015). The real effects of unconscious bias in the workplace. UNC Executive Development, Kenan-Flagler Business School. DIRECCIÓN.
32. Veihmeyer, Doughtie, John, Lynne. (2015). Moving Women Forward into Leadership Roles The Path to Female Leadership KPMG Women’s Leadership Study (1–23).
33. Leadership Gender Gap in the US. (2020, January 15).
34. The Data on Women Leaders. (2019, December 31). Retrieved from <https://www.pewsocialtrends.org/fact-sheet/the-data-on-women-leaders/>
35. Newbery, C. (2019, August 8). What is unconscious bias in the workplace, and how can we tackle it?
36. Hudson. (2018). 4 ways to reduce unconscious bias | Hudson.

37. inspHER tech. (2019). 6 Simple Ways to Remove Unconscious Office Bias. InspHER Tech, 1–10.
38. International Labour Organisation. Breaking barriers: Unconscious gender bias in the workplace. The Bureau of Employer's Activities .
39. Saeed, H. (2018, October 9). Recognizing and Questioning Unconscious Gender Bias. Miller Center.
40. Correll, S. J. (2017). SWS 2016 Feminist Lecture: Reducing gender biases in modern workplaces: A small wins approach to organizational change. *Gender & Society*, 31(6), 725-750.
41. Leckenby, D. (2007). Feminist empiricism: Challenging gender bias and “setting the record straight”. *Feminist research practice: A primer*, 27-52.
42. Cuellar, N. G. (2017). Unconscious bias: What is yours?.
43. Weingarten, E., & Garcia, M. (2015). (Rep.). *New America*. Retrieved August 14, 2020, from www.istor.org/stable/resrep10470
44. Bradley, R. (2020). How to Solve AI Bias.
45. Wang, Y., & Redmiles, D. (2019, May). Implicit gender biases in professional software development: An empirical study. In *2019 IEEE/ACM 41st International Conference on Software Engineering: Software Engineering in Society (ICSE-SEIS)* (pp. 1-10). IEEE.
46. Verbick, T. (2002). Women, technology, and gender bias. *Journal of Computing Sciences in Colleges*, 17(3), 240-250.
47. Romero Jr, A. (2017). Does unconscious bias effect higher ed hiring?.
48. Tang, S., Zhang, X., Cryan, J., Metzger, M. J., Zheng, H., & Zhao, B. Y. (2017). Gender bias in the job market: A longitudinal analysis. *Proceedings of the ACM on Human-Computer Interaction*, 1(CSCW), 1-19.
49. Leavy, S. (2018, May). Gender bias in artificial intelligence: The need for diversity and gender theory in machine learning. In *Proceedings of the 1st international workshop on gender equality in software engineering* (pp. 14-16).
50. Chang, K. (2012). Bias persists for women of science, a study finds. *The New York Times*, 24.