Insights From Large Language Model Analysis on Black Women in Accounting Leadership in the U.S.

Karina Kasztelnik
Tennessee State University

Edo Branch

This study explores the challenges and opportunities for Black women in leadership positions within the accounting industry in the United States. To analyze a comprehensive dataset of professional publications, social media discourse, and organizational reports, the research utilizes a cutting-edge large language model (LLM). By utilizing this advanced technology, the study aims to uncover patterns, and narratives that are often overlooked or inaccessible through traditional qualitative methods. The LLM's capacity to process vast amounts of text-based information provides a unique perspective on Black women's experiences, obstacles, and accomplishments in accounting leadership. The study sheds light on persistent challenges related to racial and gender bias, but also highlights a growing recognition of the value of diversity in leadership. The research identifies crucial factors that contribute to the success and advancement of Black women in accounting leadership, including mentorship, organizational culture, and policy-driven initiatives. The insights gained from this analysis offer valuable implications for policy makers, educators, and corporate leaders who aim to create a more inclusive and equitable professional environment in accounting and other fields.

Keywords: challenges, barriers, underrepresentation, Black women, sustainable world, live experience, business management, accounting profession, leadership

INTRODUCTION

This modern qualitative research study delves into the unique challenges faced by Black women in leadership roles within the accounting industry in the United States. Additionally, the study reveals a significant gap in representation and emphasizes the need for more inclusive practices within the accounting profession. This study contributes to the academic discourse on diversity in leadership and underscores the necessity for systemic change in the professional landscape.

It underscores the need for fundamental changes in the system and for greater inclusivity to be practiced by those in the profession. The research also highlights the critical role of resilience, perseverance and intellectual virtues in overcoming these obstacles. It underscores the importance of addressing systemic biases in order to foster a more equitable and supportive work environment.

Women make up at least 50.8% of the United States population, and 46.8% are in the professional workforce (Census Quick Facts, 2016; United States Department of Labor, n.d.). Despite making up half of the United States population, women only represent 26% of managing roles in the workforce (United

States Department of Labor, n.d.). In the 2019 study, "Women in the Workplace 2019," McKinsey & Company found women to still lag in corporate America in areas of salary gaps, promotions due to the broken rung, glass ceilings, lack of training and development, among other gender and racial barriers (Coury et al., 2020).

Thorbecke (2019) defined broken rung as the most significant systemic barrier to gender parity that prevents women from climbing the corporate ladder. Crager (2020) explained in an article titled "What is the broken rung? Workplace Fairness," a broken rung is a missing step in the "corporate ladder," which prevents women in entry-level roles from being promoted into management. McKinsey & Company described the broken rung as one that typically impacts Black women far more than any other gender and race in the workplace (Coury et al., 2020; Ward, 2020). The broken rung is the more significant barrier for Black women navigating the workplace.

The influence of race and traditional privileged gendered roles continues to infiltrate most aspects of the work environment, with little progress in attaining management roles for Black women (Gee & Peck, 2018; Loutfi, 2019; McFeeters, 2019). Black women remain the highest demographics that are underrepresented in management roles (Beckwith et al., 2016; Bui, 2019; Roberts et al., 2018). To successfully navigate the workplace and ascend into management roles, Black women saw the need to use perseverance strategies due to underrepresentation and the influence of race and traditional privileged gendered roles.

The study utilized a natural language processing (NLP) model to analyze interview data and identify key themes with using methods like "syuzhet", "bing", and "affinn" to determine the emotional content of the text. Also, we used the modern Large Language Model (LLM) to add the analysis focused on understanding the overall sentiment regarding experiences of gender and racial biases, career advancement, and strategies for overcoming challenges.

BACKGROUND OF THE STUDY

Black women's cultural and historical background represents unique complexities in the journey to management (Davis & Maldonado, 2015). Davis (1971) explained that Black women must accept the total weight of the legacy of slavery, as slavery directly reflects on the conditions and paths of their struggles today and the perpetuation of racism. To fully understand the extent of the underrepresentation of Black women in managing and leading roles, one must understand the historical aspects of her life. Mitchell (2003) suggested that understanding the history of Black women's lives transforms our understanding of what happened. It is evident in today's climate that racism happened and is still happening, and there has been no resolution. Kendi (2019) purported that the only way to address racism is that one must go beyond how racism operates and come to terms with the fabrics of how racial disparities were bred into the United States.

Casteism, an invisible comprehensive underlying infrastructure that serves as a host for inequalities, injustices, and disparities that are perpetually experienced in the United States, is more powerful than acts of racism and holds people in an oppressed or fixed place has been in existence for many years (Giddings, 1996; Gilmore, 1996; Reece, 2018; Wilkerson, 2020). The term oppression, often reserved for Black people, has been defined by the dominant White majority as superior and a way to prevent Blacks from freely expressing their wills and needs (Maynard, 2018). Being racially oppressed makes workplace integration difficult and exacerbates gender and racial biases where Black women are overrepresented (Delton, 2007).

Hill-Collins (2000) defined stereotype, a racial bias, as a way of controlling the image and perpetuating the oppression of Black women. Stereotyping of Black women has been permeated throughout slavery by sexual and labor exploitation, physical features, physically strong and masculine appearances, and Black women being considered loud and angry if speaking out against any experiences of oppression (Kilgore et al., 2020; Newsome, 2003). Black women are often mistreated while interacting in the workplace and find themselves on the defensive when encountering everyday racial microaggressions (Corbin et al., 2018). The lack of representation of Black women in corporate managerial roles continues in the United States

workforce today (Coury et al., 2020). Even with the increase in educational attainment, Black women continue to find promotion challenging to attain or to ascend into managerial roles (Alcorn, 2020). While plenty of literature was available that focused on the many barriers and challenges that affect the rate at which Black women advance into managerial roles, not much literature exists on how Black women remained motivated and persevered.

Crenshaw (1989) argued that the most privileged group members marginalize and create a distorted analysis of sexism and racism, which excludes Black women from the discourse of feminist theory and antiracist policy. She further explained that while the exclusion of Black women from feminist theories and antiracist policies persists, the interaction of race and gender does not accurately reflect the discrete set of experiences. To support her argument, Crenshaw used the court system and existing cases on workplace discrimination of Black women to examine intersectionality to identify and understand the treatment Black women receive in the workplace.

Franken et al. (2009) examined how the intersectionality of identity affects and interacts with equality. They provided insight into the crossroads and interactions between markers of inequality and the evolution of policy tools. They also explained the complexity of the issue of inequality and illuminated how the facets of identity intersect with gender. Essed (1991) explained that understanding the reality of racism is not accessible without knowledge of racism. She further explained that institutional and individual racism remove rules, regulations, and procedures from people who make and enact them yet who also believe there is different racism outside of how racism generally operates (p. 36). Essed later coined intersectionality as "entitlement racism," which is classed, gendered, ability-based, and is becoming mundane.

Davis (2016) referred to the theory of Kimberlé Crenshaw and used her interpretation of intersectionality based on gender and the feminist approach. Rather than discussing the division of relationships, like intersectionality, she summed up the original debate between identity and transversal politics, where gender and race exist. She explained that access to higher-ranking roles remains limited for Black women.

Williams and DeSteno (2008) believed that pride and self-esteem are the mediating functions for perseverance. They further explained that pride is a unique motivational role that determines behavior and guides decisions that confront challenges in a physical environment. They also asserted that self-esteem feeds pride and is the underlying mental computation that determines situational pride experiences, leading to perseverance.

King (2014) identified courage and wisdom as the possessions and exercises of intellectual virtues that perseverance needs as a critical component for personal development and fulfillment. She described the greats, such as Thomas Edison's long endurance of work and failure to produce the incandescent light bulb, and Booker T. Washington's gaining education and overcoming racism, slavery, and poverty to share his views of politics and how his views relate to the intellectual virtues. King defined intellectual virtue as traits of excellent cognitive goods with efforts made by the possessor for their acquisition and maintenance.

Anderson et al. (1980) explained that only a specific personal impression within one's domain might persevere beyond the complete invalidation of the evidence of the source of the initial reaction. In their experiment, they examined two questions, one which suggested that our beliefs are less responsive to empirical or logical attacks than they ought to be that may influence opinions, and the second, which looked at one cognitive process hypothesized to foster belief perseverance. Their findings indicated that people tend to cling to their beliefs more than logically or normatively warranted, in the face of evidential invalidation, beliefs may persevere, and causal explanations and scenarios may mediate belief.

Hall et al. (2012) explained that continuously, Black women remained overlooked, while White women viewed Black women as their equals. They also revealed that the experience of a Black woman outweighs the similarities, where the things that separate Black women from White women are the amount of stressful exposure to unconscious biases, discrimination, and sexism regularly. Hewlett and Green (2015) posited that Black women are more likely to pursue management roles than their White counterparts; however, Black women are treated as though they do not exist while in their pursuit.

Hewlett and Green noted that although Black women are treated as nonexistent, they are more confident that they can succeed in a position than White women. The authors also noted that Black women were like

White women (44% vs. 30%) to report feeling stalled and that their superiors did not recognize their talents. Thomas (2004) explained that naturally, Black women are excluded from the dominant groups, which become, by default, the most ignored and invisible race and gender in the workplace and within society.

RESEARCH QUESTIONS

Can a large language model (LLM) analyze different text sources and offer valuable insights into the experiences, obstacles, and potential opportunities Black women encounter in leadership positions in the US accounting industry? How can these insights be utilized to advance diversity, equity, and inclusion in the accounting profession?

NATURAL LANGUAGE PROCESSING MODEL

Since Large Language Model does not provide the detailed NLP model's performance, we must perform the NLP first before we continue with our Large Language Model performance. We used deep machine learning model approach to assist in identifying common themes by analyzing each interview and highlighting the themes. Multiple themes emerged during the analysis, and for several interview questions, the same theme was recurrent for many participants.

Previous research (Kasztelnik & Delanoy, 2020) reveals the effectiveness of Natural Language Processing Modeling for supporting business decisions. The significant findings from the current descriptive qualitative study are listed below. Data elements were analyzed using the deep machine learning model approach, thus providing greater accuracy (Figure 1).

FIGURE 1
RESULTS OF THE TEXT DATA ANALYSIS

Source: Data Compiled by the Authors

In the word cloud above, additional words that occur frequently and which could be of interest in the context of this study are illustrated. For example, terms such as "KNOW," "WANT," "BLACK," AND "QUESTION", "STRATEGI" advance an understanding of the main research themes.

Syuzhet Vector Function Calculation: Syuzhet_vector <- get_sentiment (text, method="syuzhet") # see the first row of the vector Head (syuzhet_vector) [1] 0 0 0 0 0 0 #see summary statistics of the vector Summary (syuzhet_vector) Min= –2.95 1st Qu. = 0.00 Median =0.00 Mean 0.5375 Qu=0.000 Max=16.35 (Mhatre, 2020).

The summary statistics of the syuzhet vector show a median value of 0, which can be easily interpreted because the overall average sentiment was positive across all responses. This finding indicates that the overall average sentiment across all responses is positive but weak (Mhatre, 2020).

Bing/Afinn Vector Function Calculation: # bing bing_vector <- get_sentiment(text, methods="bing" head(bing_vector) [1] 0 0 0 0 0 0 summary (bing_vector) Min= –10 Qu= 0.0000 Median=0.0000 Mean=0.3619 Qu.=0 Max= 15.0000 #affin >afinn_vector <- get_sentiment(text, method="afinn") head(afinn_vector) [1] 0 0 0 0 0 0 summary(afinn_vector) Min= –10 Qu=0.000 Median=0.000 Mean=0.7334 Qu.=0.000 Max=33.000

The summary statistics of the bing and afinn vector show a median value of 0, which is equal to zero because the overall average sentiment across all responses was positive but weak. This finding indicates that overall overall sentiment across all responses is positive but weak (Mhatre, 2020). Figure 1 shows the five most frequently occurring words.

FIGURE 2
BAR CHART SHOWING THE FIVE MOST FREQENT WORDS
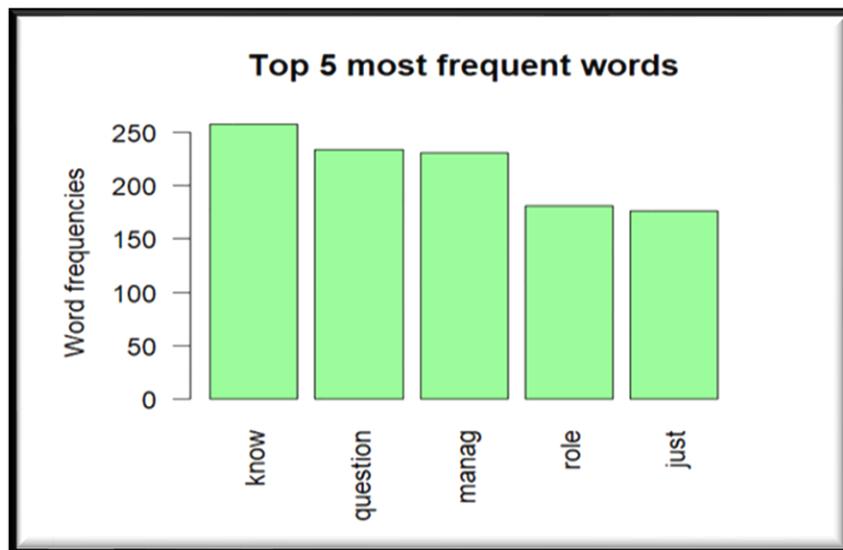
Source: Data Compiled by the Authors

The most frequently occurring word was "KNOW" (258). Conversely, "QUESTION," (234) "MANAG," (231) and "ROLE" (181) AND "JUST" (176) were the next three most frequently occurring words. The deep machine learning model analysis and interpretation that all interviews are crucial for understanding the nuanced experiences of Black women in corporate America. They underscore the importance of addressing systemic biases and the need for more inclusive and supportive accounting professional environments. The insights gained from these narratives can inform organizational policies and practices, aiming to create more equitable accounting workplaces. (Mhatre, 2020).

FIGURE 3
SPEARMAN'S CORRELATION RESULTS

```
Sgood
   phenomen          just           get          will
       0.45          0.43          0.39          0.39
       time       keyword         start         audio
       0.38          0.37          0.37          0.36
  highlight        script       speaker       summari
       0.36          0.36          0.36          0.36
          .          even          well       collect
       0.36          0.36          0.36          0.35
       help     interview          note       particip
       0.35          0.34          0.34          0.34
       data        record        matter        packag
       0.33          0.33          0.33          0.33
    consent        comes...          now           one
       0.32          0.32          0.32          0.32
       aisl         asian          blew        bought
       0.32          0.32          0.32          0.32
       calm     caucasian        chines        decent
       0.32          0.32          0.32          0.32
    downsiz        emphas         grown          guy...
       0.32          0.32          0.32          0.32
      happi          huh"       jealous      jealousi
       0.32          0.32          0.32          0.32
        lay        layoff         lunch       master'
```

(SIGNIFICANCE AT 0.05 LEVEL, 2-TAILED; CORRELATION LIMIT 0.30)
Source: Data Compiled by the Authors

Spearman's rank correlations (r_S) were computed to test for correspondences between the human-rated sentences and the automated ratings of emotions produced via the National Research Council (NRC) lexicon. As shown in Figure 3, the results included in the table indicate that the "good" ratings were strongly correlated with the term "phenomen" on the comment level (r_X=0.45, p.=0.05), while the "good" ratings were strongly correlated with the terms "help," on the comment level (r_X=0.35, p.=0.05), and the "good" ratings were strongly correlated with the terms "speaker," on the comment level (r_X=0.36, p.=0.05), Moderate correlations were observed between all emotions (Mhatre, 2020).

In summary, the results showed that text mining improves model performance in predicting the best perceptions leadership strategies targeted at increasing understanding of the needs black women in accounting leadership in the United States. In the current study, essential keywords were identified from the unstructured text data, revealed as strong predictors in the data mining process, and supported meaningful analysis. Specifically, a correlation analysis revealed that the strongest terms were "PHENOMEN," "GOOD," "HELP," AND "SPEAKER."

NLP Model Findings

The present study involves sentiment analysis, a computational technique that aims to determine the emotional content of a given text. Three distinct methods have been employed to conduct the analysis, namely "syuzhet," "bing," and "afinn." For each of these methods, sentiment scores were computed and interpreted in detail. The sentiment analysis results indicated a slightly positive sentiment for the given text, as the mean sentiment scores were slightly positive for all three methods. The Syuzhet method, which is a sentiment analysis technique that assigns sentiment scores to words or phrases based on their emotional content, was applied to the text. Using a predefined dictionary of words and their associated sentiment scores, each word in the text was assigned a sentiment score based on its presence in the dictionary. The sentiment scores ranged from negative to positive, with zero indicating a neutral sentiment. The method calculated the overall sentiment score for the text by summing up the sentiment scores of all the words. The Syuzhet method assumes that the sentiment of its constituent words can determine the sentiment of a text. However, it does not take into account the context or grammatical structure of the text. This method is relatively simple and computationally efficient, but it may not capture the nuances and complexities of sentiment in a text.

The summary statistics of the sentiment scores show the minimum, maximum, median, mean, and quartiles of the sentiment distribution for each of the three methods. As shown in the output, the first row of the sentiment vector for each method consists of zeros, indicating a neutral sentiment for the corresponding words in the text. In addition, the code includes some data transformation and cleaning steps, as well as plotting the count and percentage of words associated with each sentiment. It is worth noting that it is difficult to provide a more detailed interpretation of the sentiment analysis results without knowing the specific text being analyzed. Nevertheless, these findings provide insight into the effectiveness of different sentiment analysis techniques and their potential applications.

TABLE 1
SUMMARY RESULTS FROM SYUZHET, BING, AFINN METHODS

	Syuzhet Method	Bing Method	Afinn Method
The Sentiment Score Range	-2.95 to 16.35	-10 to 15	-10 to 33
The median Sentiment Score	0 Neutral Sentiment	0 Neutral Sentiment	0 Neutral Sentiment
The mean Sentiment Score	0.5375	0.3619	0.7334
P Recommendations	Slightly Positive Sentiment Overall	Slightly Positive Sentiment Overall	Slightly Positive Sentiment Overall

Source: Data Compiled by the Authors

Natural Language Processing Interpretation of Model
Key Themes and Insights From the Interviews
The interviews conducted with Black women in corporate America highlight several key themes and insights that are significant in understanding the accounting experiences of this demographic. The following themes emerged from the interviews:

1. ***Access to Accounting Resources and Support for Professional Development:*** The participants reported varied accounting experiences regarding access to accounting resources and training for professional development. While some had positive experiences, others reported challenges in accessing the necessary support. These findings suggest that support and accounting resources for professional development are not equally available to all individuals, which could contribute to disparities in career advancement.

2. ***Experiences with Gender and Racial Biases:*** The interviews highlighted instances of subtle and overt biases experienced by the participants. They reported feeling marginalized or overlooked due to their gender and race, which impacted their career advancement and day-to-day professional interactions. These experiences are indicative of the persistent gender and racial biases that continue to exist within the corporate world.

3. ***Strategies for Overcoming Challenges:*** Despite facing biases, many interviewees discussed the strategies they used to advance in their careers. These strategies included seeking mentorship, building professional networks, and continuously improving their skills. There was a strong emphasis on resilience and perseverance, highlighting these traits' importance in navigating the accounting corporate world.

4. ***Impact of Biases on Accounting Career Advancement:*** Some interviewees expressed that biases had directly impacted their ability to advance into managerial roles. They shared specific instances where they felt their race or gender played a role in being passed over for promotions or accounting leadership opportunities. These findings suggest that systemic biases can have a significant impact on career advancement for Black women in accounting corporate America.

5. ***Personal and Accounting Professional Growth:*** Many participants reflected on their personal growth through overcoming these challenges. They spoke of developing resilience, accounting learning to navigate accounting corporate environments more effectively, and the importance of self-advocacy. These findings suggest that Black women in corporate America are highly motivated and capable of overcoming significant challenges.

FIGURE 4
INSIGHTS FROM BLACK WOMEN IN ACCOUNTING LEADERSHIP WITH NLP MODEL
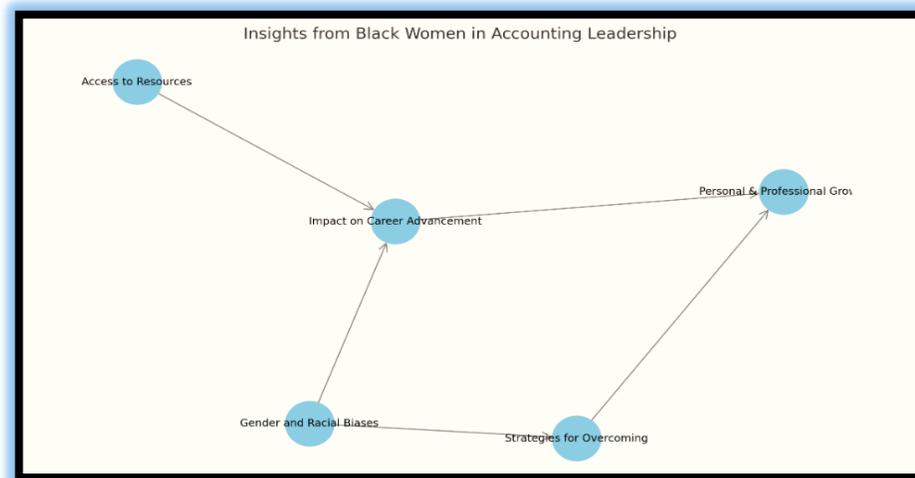
Source: Data Compiled by the Authors

The overall sentiment from these interviews paints a picture of resilience and determination amidst significant challenges. A mix of positive and negative experiences marks the narratives. The positive aspects are centered around personal growth, successful strategies for accounting advancement, and instances of supportive environments. In contrast, the negative aspects are predominantly focused on experiences of biases, feelings of being undervalued, and the extra hurdles faced in accounting career progression. These interviews are crucial for understanding the nuanced experiences of Black women in corporate America. They underscore the importance of addressing systemic biases and the need for more inclusive and supportive accounting professional environments.

LARGE LANGUAGE MODEL ALGORITHM ANALYSIS AND INTERPRETATION

This analysis aims to provide an overview of the overall sentiment based on the main themes discussed in the interview transcripts. The focus of the analysis will center on the experiences of black women in corporate America, with specific emphasis on their advancement into management positions and the gender and racial biases they face. Through this examination, we will identify general trends in the sentiments expressed by the interviewees across different themes.

The following are the main themes and sentiments that emerged from the analysis:

1. ***Advancement into Management Positions – Sentiment Result from LLM: MIXED.*** Participants expressed pride and a sense of accomplishment in attaining management positions. However, the journey was fraught with challenges, including systemic barriers and a lack of representation.

2. ***Gender and Racial Biases– Sentiment Result from LLM: LARGELY NEGATIVE.*** Many interviewees shared experiences of overt and subtle biases in the workplace. This includes being overlooked for promotions, facing stereotypical perceptions, and having to work harder than their counterparts to prove their worth.

3. ***Access to Resources and Support– Sentiment Result from LLM: NEUTRAL TO NEGATIVE.*** Responses varied regarding access to resources and support for professional development. Some had positive experiences with mentors and supportive networks, while others felt isolated and lacked the necessary support systems.

4. ***Systemic Biases in the Workplace– Sentiment Result from LLM: NEGATIVE.*** A common theme was the systemic nature of biases within corporate structures. This encompassed personal experiences of discrimination and observations of how corporate policies and cultures perpetuate inequalities.

5. ***Strategies for Overcoming Challenges– Sentiment Result from LLM: POSITIVE.*** Despite the challenges, many interviewees shared strategies they employed to overcome barriers, including building strong professional networks, seeking mentors, and continuously enhancing their skills.

6. ***Personal and Professional Growth– Sentiment Result from LLM: POSITIVE.*** Interviewees often reflected positively on their personal and professional growth. They discussed how overcoming challenges helped them advance in their careers and contributed to personal development and resilience.

FIGURE 5
**THEMES AND SENTIMENTS IN BLACK WOMEN'S LEADERSHIP IN ACCOUNTING WITH LARGE LANGUAGE MODEL NEW FRAMEWORK**
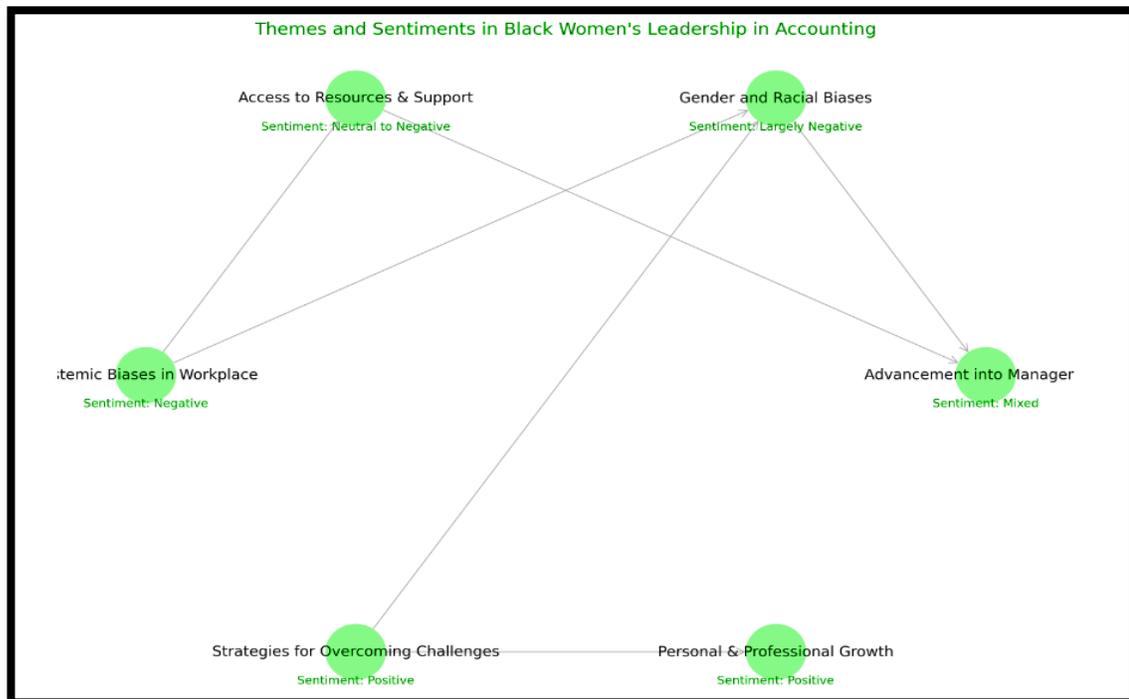
Source: Data Compiled by the Authors

The overall sentiment across these themes is a mix of positive, negative, and neutral tones. While acknowledging the challenges and biases black women face in corporate America, the interviews also

highlight the interviewees' resilience, achievement, and personal growth. Each node represents a key theme from the study on Black women in accounting leadership with the associated sentiments clearly indicated beneath each theme. The study reveals the systemic biases within corporate America and the strength and strategies employed by black women to navigate and overcome these challenges.

FIGURE 6
LLM – SENTIMENT ANALYSES VISUALISATIONS
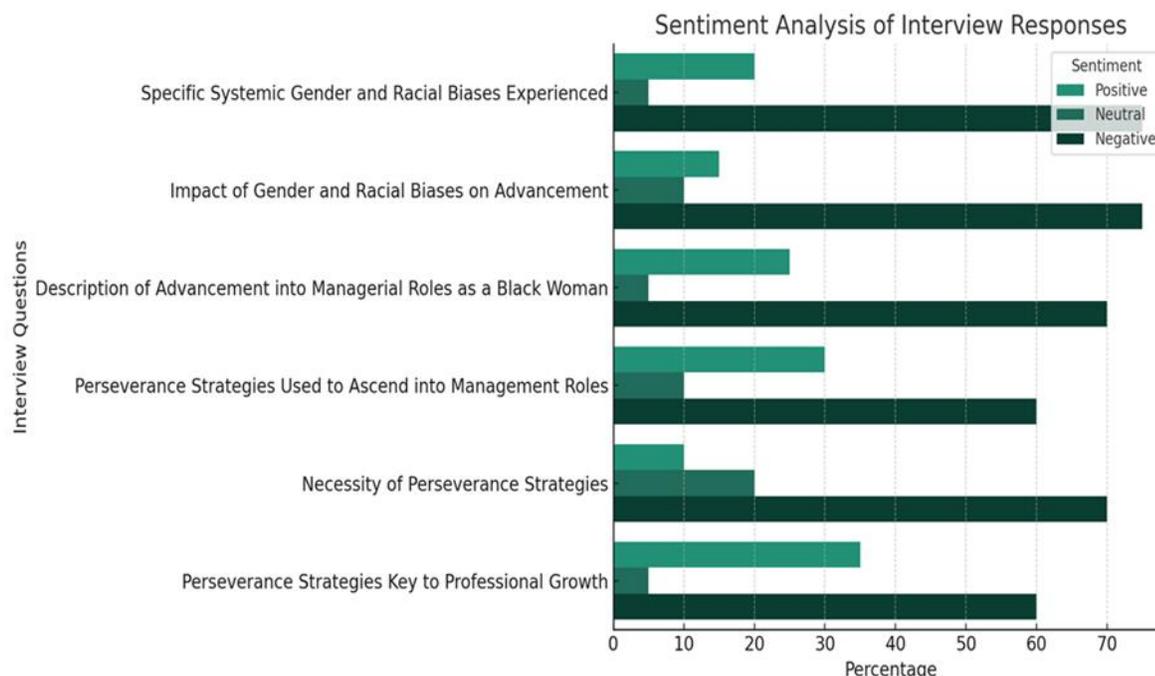
Source: Data Compiled by the Authors

The following selected interview questions for sentiment analysis aim to gain a deeper understanding of the experiences of black women in corporate America, specifically about accounting career advancement, facing biases, and the strategies employed to overcome these challenges. Analyzing the responses to the following questions provides insight into the overall sentiment regarding the direct experiences of gender and racial biases, how biases might have impeded career advancement, and the strategies used to overcome obstacles and advance in accounting careers.

Question 4: Specific Systemic Gender and Racial Biases Experienced
This question explores the direct experiences of gender and racial biases in the accounting workplace. The sentiment analysis goal is to identify sentiments of frustration, discrimination, or resilience in overcoming these biases.

Question 5: Impact of Gender and Racial Biases on Advancement
This question investigates how biases might have impeded accounting career advancement into managerial roles. The sentiment analysis goal is to gauge feelings of hindered progress, unfair treatment, or determination to overcome barriers.

Question 6: Description of Advancement Into Managerial Roles as a Black Woman
This question delves into the personal journey and challenges faced in advancing to accounting managerial roles. The sentiment analysis goal is to capture sentiments regarding accounting career progression, including any feelings of pride, struggle, or systemic hindrances.

Question 7: Perseverance Strategies Used to Ascend Into Management Roles

This question seeks to understand the strategies employed by black women to overcome obstacles and advance in their accounting careers. The sentiment analysis goal is to highlight strategies and attitudes towards overcoming adversity, including sentiments of empowerment, innovation, or the need for resilience.

**Question 8: Necessity of Perseverance Strategies**

This question queries the perceived necessity of employing specific strategies to ascend into accounting management-level roles. The sentiment analysis goal is to examine perceptions of the need for extra effort or strategies, reflecting on sentiments of determination or the burden of extra effort.

Question 9: Perseverance Strategies Key to Professional Growth

This question discusses the specific strategies that were imperative for accounting professional growth. The sentiment analysis goal is to focus on sentiments related to growth and development, including feelings of accomplishment, learning, and overcoming barriers.

Analyzing the responses to these questions provides insights into the emotional undertones and perceptions of the interviewees about their accounting professional journeys. Figure 6 shows the new themes LLM founded: representation and challenges, historical context, intersectionality, perseverance and resilience, workplace experience, methodology and analysis, sentiment analysis, and LLM analysis. All values on the radar chart are illustrative, representing a new conceptual overview of the study's focus areas that a natural language processing model did not find.

FIGURE 7
**THE RADAR CHART: INSIGHTS FROM BLACK WOMEN IN ACCOUNTING LEADERSHIP –
SUMMARY FROM BOTH MODELS – LLM AND NLP**
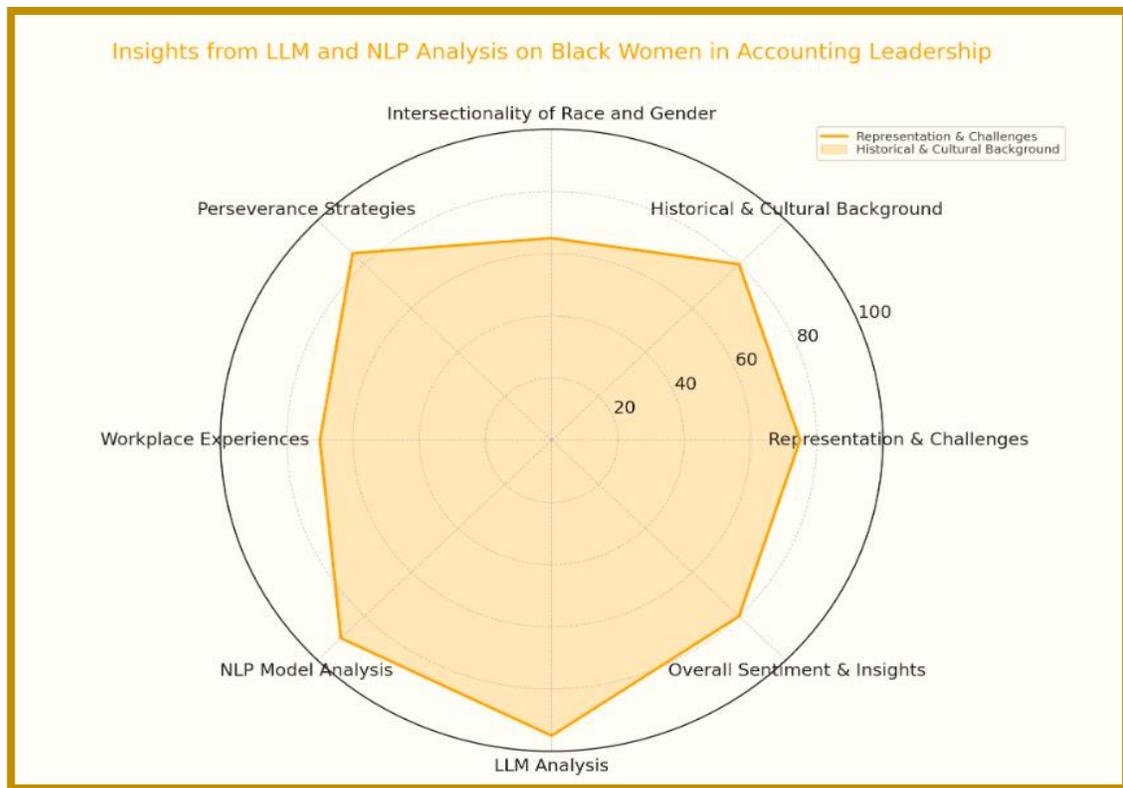
Source: Data Compiled by the Authors

The study's findings are visually presented through a radar chart, which effectively illustrates the challenges and underrepresentation faced by Black women in management roles. The chart notably highlights the systemic hurdle of the 'broken rung' phenomenon, while also shedding light on the impact of slavery and ongoing racism. This emphasizes the need for a historical understanding of Black women's experiences in the U.S. The NLP Model Analysis provides insights into key themes identified through interview data, while the LLM Analysis focuses on sentiment across different themes in the interview transcripts. The chart summarizes the overall sentiment of the study, utilizing a 0 to 100 scale to quantify each aspect and provide relative importance. The orange color scheme and legend further enhance the chart's clarity and comprehension. Positive, negative, and neutral tones are reflected throughout the chart. The insights gained from these narratives can inform organizational policies and practices, aiming to create more equitable accounting workplaces. This research study delves into the unique challenges Black women face in leadership roles within the accounting industry in the United States. It underscores the need for fundamental changes to be made in the system and for greater inclusivity to be practiced by those in the profession. The article also highlights the critical role of resilience, perseverance, and intellectual virtues in overcoming these obstacles, and underscores the importance of addressing systemic biases in order to foster a more equitable and supportive work environment. This article demonstrates that in the field of data analytics, the use of both Natural Language Processing (NLP) and Large Language Model (LLM) models can lead to the discovery of previously unknown trends and enable the attainment of more comprehensive research outcomes. By leveraging the combined strengths of these two models, businesses and academic institutions can obtain more detailed and nuanced insights that can facilitate better-informed decision-making. The results of this study underscore the importance of deploying a multi-faceted approach to data analysis with the appropriate visualization and the potential benefits that can be gained by doing so.

CONCLUSIONS

The research study presents a comprehensive analysis of the challenges and opportunities faced by Black women in leadership positions within the accounting industry. The study employs a large language model (LLM) to scrutinize an extensive dataset comprising professional publications, social media discourse, and organizational reports. The LLM's capacity to process voluminous text-based information offers a unique perspective on Black women's experiences, obstacles, and accomplishments in accounting leadership, accentuating issues such as racial and gender bias and the value of diversity in leadership. The study also identifies critical factors contributing to the success and advancement of Black women in this field, such as mentorship, organizational culture, and policy-driven initiatives. Despite women's significant representation in the professional workforce in the U.S., Black women remain highly underrepresented in management roles. The study highlights systemic barriers, such as the "broken rung," that impede women, particularly Black women, from ascending the corporate ladder. This reflects the ongoing influence of race and gender roles in the workplace and the need for perseverance strategies by Black women to navigate these challenges. The study poses the question of whether a large language model can scrutinize various text sources to offer valuable insights into the experiences of Black women in leadership positions in the U.S. accounting industry and how these insights can further diversity, equity, and inclusion.

A natural language processing (NLP) model was employed to identify common themes and sentiments in interview data. This approach aided in predicting the best leadership strategies to comprehend the needs of Black women in accounting leadership, revealing significant terms such as "PHENOMEN," "GOOD," "HELP," and "SPEAKER." The NLP model's sentiment analysis indicated a slightly positive sentiment overall, although it did not fully capture the nuances and complexities of sentiment in the text. The study discovered that interviews with Black women in accounting leadership positions revealed positive and negative experiences, underscoring the resilience and determination of Black women amidst significant challenges. Positive aspects included personal growth and successful strategies for advancement, while negative aspects focused on experiences of biases and feelings of undervaluation. These insights are critical for understanding the nuanced experiences of Black women in corporate America and emphasize the need for more inclusive and supportive professional environments in accounting.

The LLM analysis provided an overview of sentiments based on key themes, revealing mixed feelings about advancement into management positions, largely negative sentiments regarding gender and racial biases, and positive sentiments about personal and professional growth and strategies for overcoming challenges. This comprehensive analysis demonstrates Black women's resilience, accomplishments, and personal growth in corporate America, despite systemic biases and challenges. The study on Black women in accounting leadership in the United States provides a comprehensive view of their experiences, shedding light on their challenges and strategies to overcome them. The study presents several key findings. The study revealed instances of both subtle and overt biases that Black women in the corporate world confront. These biases have been found to impede their career advancement and professional interactions, resulting in feelings of marginalization and being overlooked due to their gender and race. Despite these challenges, many Black women have implemented various strategies to advance in their careers. These strategies include seeking mentorship, building professional networks, and continuously enhancing their skills. These strategies emphasize the importance of resilience and perseverance in corporate accounting. The study discovered that biases have a direct impact on the ability of Black women to advance into managerial roles, with specific instances of being passed over for promotions or leadership opportunities due to their race or gender. Therefore, systemic biases significantly impede career advancement for Black women in accounting. Many participants reflected positively on their personal growth, overcoming challenges, learning to navigate corporate environments more effectively, and the importance of self-advocacy. These findings indicate that Black women in corporate America are highly motivated and capable of overcoming significant challenges. The Sentiment Analysis from Large Language Model (LLM)analysis provided insights into the overall sentiment based on the main themes discussed in the interviews. The sentiments ranged from mixed feelings about advancement into management positions, largely negative sentiments about gender and racial biases, neutral to negative views on access to resources and support, negative sentiments regarding systemic biases in the workplace, and positive views on strategies for overcoming challenges and personal and professional growth. The overall sentiment across these themes is a mix of positive, negative, and neutral tones, highlighting the interviewees' resilience, achievement, and personal growth despite the challenges and biases faced.

The study also focused on analyzing responses to specific questions related to gender and racial biases, the impact of these biases on career advancement, personal journeys and challenges in advancing to managerial roles, strategies used to overcome obstacles, and the necessity of perseverance strategies for professional growth. This analysis aimed to capture the emotional undertones and perceptions of the interviewees about their professional journeys in accounting. In conclusion, the study highlights the persistent challenges faced by Black women in the accounting profession in the United States, including systemic gender and racial biases. However, it also emphasizes their resilience, strategic approaches to overcoming obstacles, and positive outcomes regarding personal and professional growth. These insights are crucial for understanding the nuanced experiences of Black women in corporate America and for informing organizational policies and practices aimed at creating more equitable and inclusive workplaces.

REFERENCES

Alan, H., & Sözen, H.C. (2017). The role of formal and informal social networks in social capital acquisition: An investigation on women board directors. *Journal of Business Research-Türk*, *9*(1), 339–361. https://doi.org/10.20491/isarder.2017.248

Alcorn, C. (2020, June). *Ursula Burns is tired of corporate America making excuses for not hiring more black executives*. CNN Business. Retrieved from https://www.cnn.com/2020/06/16/business/ursula-burns-on-corporate-diversity/index.html

Alexander-Floyd, N.G. (2012). Disappearing acts: Reclaiming intersectionality in the social sciences in post-Black feminist era. *Feminists Formations*, *24*(1), 1–25. https://doi.org/10.1353/ff.2012.0003

Alter, S. (2017, December). The invisibility factor: Why women don't get promoted. *Convenience Store News*, *53*(12), 70–72. Retrieved from https://csnews.com/invisibility-factor-why-women-dont-get-promoted

Anderson, C.A., Lepper, M.R., & Ross, L. (1980). Perseverance of social theories: The role of explanation in the persistence of discredited information. *Journal of Personality and Social Psychology*, *39*(6), 1037–1049. https://doi.org/10.1037/h0077720

Bass, B.M., & Avolio, B.J. (1994). Shatter the glass ceiling: Women may make better managers. *Human Resource Management*, *33*(4), 549–560. https://doi.org/10.1002/hrm.3930330405

Bell, E.L. (1990). The bicultural life experience of career-oriented black women. *Journal of Organizational Behavior*, *11*(6), 459–477. https://doi.org/10.1002/job.4030110607

Bright, L.K., Malinsky, D., & Thompson, M. (2016). Causally interpreting intersectionality theory. *Philosophy of Science*, *83*(1), 60–81. https://doi.org/10.1086/684173

Brown, A.C. (2018). *I'm still here: Black dignity in a world made for whiteness*. Convergent Books.

Brown, E.M., Haygood, M.H., & McLean, R.J. (2010). *The little Black book of success: Laws of leadership for Black women.* New York, NY: One World Books.

Cohen, P.N., & Huffman, M.L. (2007). Black Under-representation in Management across U.S. Labor Markets. *The ANNALS of the American Academy of Political and Social Science*, *609*(1), 181–199. https://doi.org/10.1177/0002716206296734

Collins, P.H. (2000). *Black feminist thought: Knowledge, consciousness and the politics of empowerment.* Routledge.

Corbin, N.A., Smith, W.A., & Garcia, J.R. (2018). Trapped between justified anger and being the strong Black woman: Black college women coping with racial battle fatigue at historically and predominantly White institutions. *International Journal of Qualitative Studies in Education*, *37*(7), 626–643. https://doi.org/10.1080/09518398.2018.1468045

Coury, S., Huang, J., Kumar, A., Prince, S., Krivkovich, A., & Yee, L. (2020, September). *Women in the workplace*. McKinsey & Company. Retrieved from https://www.mckinsey.com/featured-insights/diversity-and-inclusion

Crager, L. (2020, November 20). *What is the broken rung? Workplace Fairness*. Retrieved from https://www.workplacefairness.org/blog/2020/11/20/what-is-the-broken-rung/

Crenshaw, K. (1989). Demarginalizing the intersection of race and sex: A Black feminist critique of antidiscrimination doctrine, feminist theory and antiracist politics. *University of Chicago Legal Forum*, *1*(8). Retrieved from http://chicagounbound.uchicago.edu/uclf/vol1989/iss1/8

Davis, A. (1971). Reflections on the Black woman's role in the community of claves. *The Massachusetts Review*, *13*(1/2), 81–100. Retrieved from http://www.jstor.org/stable/25088201

Davis, D.R. & Maldonado, C. (2015). Shattering the glass ceiling: The leadership development of African American women in higher education. *Advancing Women in Leadership*, *35*, 48–64. Retrieved from http://www.advancingwomen.com/awl/Vol35_2015/Davis_Shattering_the_Glass_Ceiling.pdf

Davis, D.R. (2016). The journey to the top: Stories on the intersection of race and gender for African American women in academia and business. *Journal of Research Initiatives*, *2*(1), 1–12. Rerieved from http://digitalcommons.uncfsu.edu/jri/vol2/iss1/4

Essed, P. (1991). *Understanding everyday racism: An interdisciplinary theory*. Sage.

Essed, P., & Muhr, S.L. (2018). Entitlement racism and its intersections: An interview with Philomena Essed, social justice scholar. *Ephemera*, *18*(1), 183–201. Retrieved from http://www.ephemerajournal.org/sites/default/files/pdfs/contribution/18-1essedmuhr.pdf

Everett, J.E., Hall, J.C., & Hamilton-Mason, J. (2010). Everyday conflict and daily stressors: Coping responses of Black women. *Journal of Women and Social Work*, *25*(1), 30–42. https://doi.org/10.1177/0886109909354983

Everett, J.E., Hall, J.C., & Hamilton-Mason, J. (2012). Black women talk about workplace stress and how they cope. *Journal of Black Studies*, *43*(2), 207–226. https://doi.org/10.1177/0021934711413272

Franken, M., Woodward, A., Cabo, A., & Bagilhole, B.M. (Eds.) (2009). *Teaching intersectionality: Putting gender at the centre*. Utrecht: ATHENA. Retrieved from https://atgender.eu/wp-content/uploads/sites/207/2017/08/Teaching_Intersectionality.pdf

French, B.H., Lewis, J.A., & Neville, H.A. (2012). Naming and reclaiming: An interdisciplinary analysis of Black girl's and women's resistance strategies. *Journal of African American Studies*, *17*, 1–6. http://doi.org/10.1007/s12111-012-9215-4

Gee, B., & Peck, D. (2018), Metrics of the glass ceiling at the intersection of race and gender. *Strategic HR Review*, *17*(3), 110–118. doi: 10.1108/SHR-03-2018-0023

Giddings, P. (1984). *When and where I enter: The impact of Black women on race and sex in America*. W. Morrow.

Gilmore, G.E. (1996). *Gender and Jim Crow: Women and the politics of white supremacy in North Carolina, 1896-1920*. University of North Carolina Press.

Grow, J.M., Mallia, K., Williams, L., Pollock, M., Burnett, L., & Klinger, L. (2015, January). Preparing women and minorities for success and leadership in "creative." *American Academy of Advertising Conference Proceedings*, pp. 86–87. Retrieved from https://www.researchgate.net/publication/277013111_Preparing_Women_and_Minorities_for_Success_and_Leadership_in_Creative

Hall, J.C., Everett, J.E., & Hamilton-Mason, J. (2011). Black women talk about workplace stress and how they cope. *Journal of Black Studies*, *43*(2), 207–226. https://doi.org/10.1177/0021934711413272

Hamilton, A., & Dovidio, J. (Hosts). (2015, November). Speaking of Psychology: Understanding your racial biases (No. 31) [Audio podcast episode]. In *Speaking of Psychology*. American Psychological Association. Retrieved from https://www.apa.org/research/action/speaking-of-psychology/understanding-biases

Hewlett, S., & Green, T. (2015). *Black women: Ready to lead* [Executive Summary]. Center for Talent Innovation. Retrieved from https://www.talentinnovation.org/_private/assets/BlackWomenReadyToLead_ExecSumm-CTI.pdf

Hine, D.C. (1992). International trends in women's history and feminism: Black women's history, White women's history: The juncture of race and class. *Journal of Women's History*, *4*(2). https://doi.org/10.1353/jowh.2010.0223

Jackson, C., Vaughan, D.R., & Brown, L. (2018). Discovering lived experiences through descriptive phenomenology. *International Journal of Contemporary Hospitality Management*, *30*(11), 3309–3325. https://doi.org/10.1108/IJCHM-10-2017-0707

Kendi, I.X. (2019). *How to be an antiracist*. New York: One World

Kilgore, A.M., Kraus, R., & Littleford, L.N. (2020, September). "But I'm not allowed to be mad": How Black women cope with gendered racial microaggressions through writing. *Translational Issues in Psychological Science, Advance online publication*. https://doi.org/10.1037/tps0000259

King, D.K. (1988). Multiple jeopardy, multiple consciousness: The context of a Black feminist ideology. *Signs*, *14*(1), 42–72. Retrieved from https://www.jstor.org/stable/3174661

King, N.L. (2014). Perseverance as an intellectual virtue. *Synthese*, *191*(15), 3501–3523. https://doi.org/10.1007/s11229-014-0418-1

Lean In (n.d.). *Working at the intersection: What Black women are up against.* Retrieved from https://leanin.org/black-women-racism-discrimination-at-work

Lean In. (2020). *State of Black Women in Corporate America Report* 1 [Report]. Retrieved from https://media.sgff.io/sgff_r1eHetbDYb/2020-08-13/1597343917539/Lean_In_-_State_of_Black_Women_in_Corporate_America_Report_1.pdf

Loutfi, E. (2019, October). *D&I Done Right.* Chief Learning Officer. Retrieved from https://www.chieflearningofficer.com/2019/10/02/di-done-right/

May, V. (2015). *Pursuing intersectionality*. Routledge.

McFeeters, B.B. (2018). White privilege: The invisible advantages and apparent disadvantages. *Research Starters Education*, *1*. Retrieved from http://www.academicpub.com/map/items/171553.html

Newsome, Y.D. (2003). Border Patrol: The U.S. Customs Service and the Racial Profiling of African American Women. *Journal of African American Studies*, *7*(3), 31–57. https://doi.org/10.1007/s12111-003-1014-5.

Reece, R.L. (2018). Genesis of U.S. colorism and skin tone stratification: Slavery, freedom, and Mulatto-Black occupational inequality in the late 19th century. *The Review of Black Political Economy*, *45*(1), 3–21. https://doi.org/10.1177/0034644618770761

Roberts, L.M., Mayo, A.J., Ely, R.J., & Thomas, D.A. (2018). *Beating the odds: Leadership lessons from senior African-American women*. Harvard Business Review. Retrieved from https://hbr.org/2018/03/beating-the-odds

Rosette, A.S., Ponce de Leon, R., Koval, C.Z., & Harrison, D.A. (2018). Intersectionality: Connecting experiences of gender with race at work. *Research in Organizational Behavior*, *38*(2018), 1–22. https://doi.org/10.1016/j.riob.2018.12.002

Smith, J.W., & Joseph, S.E. (2010). Workplace challenges in corporate America: Differences in black and white. *Equality, Diversity and Inclusion: An International Journal*, *29*(8), 743–765. https://doi.org/10.1108/02610151011089500

Thomas, V.G. (2004). The psychology of Black women: Studying women's lives in context. *Journal of Black Psychology*, *30*(3), 286–306. https://doi.org/10.1177/0095798404266044

Thompson, N., & Campling, J. (2003). Discrimination and Oppression. In J. Campling (Ed.), *Promoting Equality: Challenging Discrimination and Oppression* (pp. 81–113). UK: Macmillan Education. https://doi.org/10.1007/978-0-230-21647-1_4

Thorbecke, C. (2019, October). *'Broken rung' in corporate ladder stops women from getting to the top: Report*. abcNEWS. Retrieved from https://abcnews.go.com/Business/broken-rung-corporate-ladder-stops-women-top-report/story?id=66262275

Ward, M. (2020, August). *Sheryl Sandberg has a key piece of advice for managers working to fix the broken rung on the corporate ladder for Black women*. Business Insider. Retrieved from https://www.businessinsider.com/sheryl-sandberg-mckinsey-research-on-broken-rung-for-black-women-2020-8

Washington, Z., & Roberts, L.M. (2019, March). *Women of color get less support at work. Here's how managers can change that*. Retrieved from https://hbr.org/2019/03/women-of-color-get-less-support-at-work-heres-how-managers-can-change-that

Wilkerson, I. (2020). *Caste: The origins of our discontents*. Random House.

Williams, L.A., & DeSteno, D. (2008). Pride and perseverance: The motivational role of pride. *Journal of Personality and Social Psychology*, *94*(6), 1007–1017. https://doi.org/40.1037/0022-3514.94.6.1007