DIVERSITY AND JOB SATISFACTION IN THE FEDERAL WORKFORCE:
UNDERSTANDING HOW A HETEROGENEOUS WORKFORCE RESPONDS TO
MATTERS OF DIVERSITY

by

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ABSTRACT

ROBERT PINKA III. Diversity and Job Satisfaction in the Federal Workforce: Understanding
how a Heterogeneous Workforce Responds to Matters of Diversity
(Under the direction of DR. JACLYN PIATAK)

This dissertation explores the impact of diversity, intersectionality, and diversity management on job satisfaction within the federal workforce. The three constituent studies use disaggregated ethnoracial data from the Federal Employee Viewpoint Survey (FEVS) to examine the effects of demographic congruence, demographic heterogeneity, and perceptions of diversity management practices on the outcome variable of job satisfaction.

The first study tests the effects of demographic congruence (representation) and heterogeneity (diversity) on job satisfaction across federal agencies for members of different ethnoraces by employing mixed-effects models to a combination of 2020 FEVS data and FedScope data on agency-level demographics. Findings from this study show that increased demographic congruence is positively associated with job satisfaction for all minority groups and that demographic heterogeneity, in contrast, presents a more complex relationship, where initial increases in diversity are linked to lower job satisfaction but later rebound past a certain threshold. The second study explores how intersectional identities—race and gender—influence job satisfaction and are mediated by perceptions of DEI management. By using mixed-effects models on 2022 FEVS data, the results show that minority status is generally associated with higher job satisfaction but that gender and perceptions of DEI Management moderate this relationship. For all ethnoracial groups and genders, perceptions of positive DEI management—especially equity and inclusion—are positively associated with job satisfaction. The third study employs Random Forest models on 2022 FEVS data to predict job satisfaction

based on demographic and job-related factors. All models achieve high predictive accuracy across various racial and gender subgroups, with intrinsic work experience, job inspiration, satisfaction with pay, and personal attachment to the organization emerging as the most influential factors for all. Noticeable differences between ethnoracial and intersectional groups emerge. These results highlight the potential for AI techniques to enhance public administration by offering practical tools for HR managers to proactively address issues related to employee satisfaction, especially as it pertains to specific populations.

This dissertation advances the theoretical understanding of social identity and diversity management while offering practical guidance for improving job satisfaction in the federal workforce. All three studies show that targeted and effective DEI management practices can improve employees' job satisfaction. As public managers respond to policy changes and adjust their approach to diversity, this research can help improve data-driven strategies to better address their workforces' needs.

ACKNOWLEDGEMENTS

DEDICATION

This dissertation is dedicated to my grandmother, Rita Caiazza, whose museum visits, metaphysical teachings, and introduction to sushi sparked my lifelong thirst for experience and knowledge.

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LIST OF ABBREVIATIONS

ADA	Americans with Disabilities Act
AI	Artificial Intelligence
CFI	Comparative Fit Index
CFA	Confirmatory Factor Analysis
DEI	Diversity, Equity, and Inclusion
DEIA	Diversity, Equity, Inclusion, and Accessibility
EHRI-SDM	Enterprise Human Resources Integration Statistical Data Mart
FEORP	Federal Equal Opportunity Recruitment Program
FEVS	Federal Employee Viewpoint Survey
GAO	United States Government Accountability Office
GBM	Gradient Boosting Machines
HRIM	Human Resource Information Systems
IWE	Intrinsic Work Experience Subindex
LGBTQ+	Lesbian, Gay, Bisexual, Transgender, Queer +
OLS	Ordinary Least Squares
OPM	United States Office of Personnel Management
SUP	Employee Engagement Index - Supervisors Subindex

CHAPTER 1: INTRODUCTION

Introduction

Over the past several decades, the discourse and research on workplace diversity have evolved significantly. Initially, initiatives such as affirmative action and non-discrimination laws primarily focused on increasing demographic representation in the workforce. However, more recently, the focus has shifted to comprehensive diversity, equity, inclusion, and accessibility (DEIA) programs designed to foster not only representation but also a sense of belonging and fairness in the workplace. The federal government has been at the forefront of these efforts, managing one of the most diverse workforces in the country and setting a national example through agencies like the Office of Personnel Management (OPM). Yet, as DEIA initiatives have grown in prominence, they have also come under increasing political scrutiny and attack, with critics questioning their necessity and effectiveness. Amid this shifting landscape, the policy need for robust diversity management has become more pressing, especially as the federal government continues to navigate both internal and external pressures. While the impact of these programs on hiring and representation is well-documented, their influence on outcomes such as job satisfaction—particularly in an increasingly heterogeneous workforce—remains underexplored and demands further investigation.

The theories underpinning research on diverse workplaces take many forms and often provide contradictory logic. Some offer a positive perspective on diversity: representative bureaucracy literature often argues that demographic congruity between government service providers and constituents leads to more favorable interactions (potentially leading to more favorable workplace sentiments; Bishu & Kennedy, 2020), while the value-in-diversity

hypothesis (Cox & Blake, 1991) emphasizes the positive effects that differences in experiences can have on knowledge exchange and opinion formation in the workplace. Other theories emphasize the potentially negative outcomes of diversity: group/social/minority threat theory assumes hegemonic resistance to organizational change (Chiricos et al., 2020), and social identity theory describes the segregation and conflict that can occur when in-groups with an established culture reject others (outgroups) in contexts such as the workplace (Brown, 2000; Mummendey et al., 1999). Finally, similarity attraction theory (Goldberg, 2005) lands somewhere in the middle, positing that applicants may favor organizations where the recruiter or hiring manager shares their demographic characteristics, which can lead to more workplace satisfaction (and segregation). While helpful for describing the possible causes of particular phenomena, the literature ultimately points to an exorbitant amount of possible workplace outcomes related to diversity.

To make sense of these theories and add layers of depth to the matter of workplace diversity and diversity management's effects on individuals in the federal workforce, I seek to conduct a series of studies that empirically investigate the effects of diversity and its management on the job satisfaction of federal employees. In this dissertation, I will investigate the following research questions:

1. How do representation and demographic heterogeneity influence job satisfaction for individuals of different ethnoraces in the federal workforce?

2. How does the interaction between various social identities such as gender and ethnorace—intersectionality—influence job satisfaction in the federal workforce?

3. Can machine learning techniques, such as Random Forests, bolster more equitable and inclusive management practices through a better understanding of employee sentiments?

In sum, this dissertation aims to understand better how diversity and its management impact the job satisfaction of federal employees of different ethnoraces in the federal workforce in order to direct effective diversity management practices. By focusing these studies on the heterogeneous outcomes related to job satisfaction that members of different ethnoracial groups experience, more targeted interventions to improve job satisfaction can be explored by public managers.

Significance and Theoretical Framework

In 1978, the federal government established the Federal Equal Opportunity Recruitment Program as part of the Civil Service Reform Act, which mandated that federal employers manage recruitment efforts designed to increase minority representation and more closely mirror the nation's demographics. Since then, several administrations have enacted policies and task forces such as President Obama's 2015 Executive Order "Strengthening the Senior Executive Service," to increase the ratios of specific ethnicities, people with disabilities, women, and sexual minorities. These efforts appear to be working. The federal workforce is becoming increasingly diverse and is outpacing the demographic changes in the United States as a whole—from 2001 to 2021, the rates of non-White federal employees increased from about 28% to about 39% while, for the demographics of the U.S., the same group increased from about 31% to about 41% (OPM, 2006; OPM, 2022; USAFacts, 2024). However, the effects of these demographic shifts are not fully understood.

Of the many theories in public administration literature, representative bureaucracy literature has investigated the impact of diversity on the federal workforce most thoroughly. Research often suggests that demographic congruence between bureaucrats and constituents can

result in more cooperation between parties, better social equity, and ultimately a stronger democracy (Riccucci & Ryzin, 2016). However, even early literature in this space notes that the symbolic importance of representation must be balanced with organizational buy-in (Romzek & Hendricks, 1982). That is to say, even when an ideal match exists between bureaucrat, constituent, and agency—say, a veteran bureaucrat working in Veterans Affairs, serving a fellow veteran—agencies where there is resistance or disagreement over the importance of representative bureaucracy may see tension between workers and ultimately hamstring affirmative efforts.

Matters of workplace diversity extend far beyond the paradigm of bureaucracy and service. Differing value preferences, for example, exist across demographic lines. Stazyk, Davis, & Portillo (2017) find that minority public managers prefer social equity-oriented values more than their White counterparts. When these preferences for values are aligned between employees and their managers, employees are more likely to be satisfied with their jobs and more likely to remain employed with their agency. Differing experiences across race and gender significantly impact job satisfaction and workplace outcomes in diverse settings. Smith et al. (2020) found that women face more workplace incivility than men, with white women experiencing more than minority women, and minority women more than minority men. Further, workplace outcomes such as job satisfaction and healthy work environments are reportedly impacted by the interaction between demographics and discrimination complaints (Alteri, 2020), ethical leadership (Moon & Jung, 2018), and emotional intelligence (Gardenswartz et al., 2002) to name a few. Taken together, we see a need to understand these phenomena at a more nuanced level, investigating why only some studies exhibit significant results for aggregated minority groups and how different intersections of demographics may further vary.

In order to understand the impact that diverse public organizations have on their employees, work is needed to more explicitly describe what it is to experience diversity in the workplace. An appropriate theoretical foundation from which to begin is that of phenomenological research. Phenomenology is a philosophical tradition focused on understanding how subjects and objects interact—a way of interpreting "reality" through perspective rather than notions of objective facts and experiences. As such, phenomenology requires an investigator to "turn toward" the subject to garner meaningful information (Ahmed, 2020; Husserl, 2013). In any physical or psychological interaction, subjects and objects leave impressions on one another that ultimately become markers of the subject or object's being or essence. In this sense, we can think about one's identity as a coproduction of meaning between two or more parties; "I see myself in this way" or "This person sees me in this way." Put differently, through interpersonal interactions, the impressions left on one another produce affective responses that, in turn, produce identities. When thinking about diversity through the lens of phenomenology, then, we must consider how a person's conception of themselves changes, is challenged, or is affirmed in response to those that they interact with in a given context. The workplace is, of course, an environment where these interactions happen all of the time.

Social identity theory also helps explain how diversity operates in the workplace. First developed by Tajfel and Turner (1979), social identity theory argues that individuals derive a sense of self from their roles and group memberships within social structures. These identities are not static but are shaped through interactions with others, where individuals continuously negotiate their self-concept and their place within an organizational environment. Intersectionality—the idea that social categorizations like race, gender, and class create

overlapping systems of discrimination or disadvantage—further deepens this understanding by highlighting how multiple aspects of an individual's identity interact to shape their experiences in the workplace (Crenshaw, 2013; Salter et al., 2021). Through interactions with others, an individual's identity is continuously affirmed, challenged, or reshaped, leading to varied emotional and psychological outcomes. For example, when an individual's identity aligns with the dominant culture of the workplace, they may experience a sense of inclusion, which can enhance job satisfaction and feelings of fulfillment. Conversely, when an individual perceives themselves as marginalized or excluded, whether through overt acts by others or subtle cues, it can lead to feelings of Otherness, which may overshadow other positive aspects of the work environment and negatively impact their overall job satisfaction and sense of belonging.

These experiential concerns related to inclusion and alienation are described in the existing literature theoretically and empirically. Contact hypothesis theory, tracing back to Allport (1954), suggests that increased social proximity and interpersonal exchange between different groups is the most effective way to reduce negative bias and discrimination—aimed at reducing the alienating experience of being a minority. Further, critical mass theory suggests that when a population grows to a certain level (typically no less than 15%) the culture is changed in such a way that the minority group can improve their conditions—effectively shifting from symbolic or passive representation (tokenism) into active representation where culture and values within an organization can shift (Alteri, 2020; Hauret & Williams, 2020). However, the matter of demographics alone does not contribute to an inclusive environment. Brimhall & Mor Barak (2018) demonstrate that inclusion management (distinctly different from diversity management; Mor Barak, 2015; Nishii, 2013) is positively associated with job satisfaction.

In order to address the questions raised by the existing literature, this study intends to dive deeper into the specific differences between the effects of diversity, diversity management, and inclusion management while paying particular attention to the heterogeneous effects of these factors on the outcomes of members of specific ethnoracial groups and the intersection of these ethnoracial groups with gender.

Format

To examine how employees of different ethnoracial identity groups experience diverse workplaces and factors that influence job satisfaction, I will conduct three separate but interrelated studies to address the identified research questions. The first will investigate the effects of demographic congruence and demographic heterogeneity within federal agencies on job satisfaction. The second will investigate the effects of ethnorace, gender, and intersectional identities on perceptions of diversity, equity, and inclusion management and their interaction with job satisfaction. Finally, the third will employ random forest modeling to identify further trends between ethnorace, gender, job satisfaction, and other employee sentiments that might be less amenable to traditional regression models.

Chapter 2

The first paper in this study investigates the effects of representation (demographic congruence) and diversity (demographic heterogeneity) on job satisfaction. However, rather than looking at this question through the binary lens of White non-Hispanics versus a monolithic "minority" group, this research measures the effects of representation and diversity on job satisfaction for members of individual ethnoracial groups. I will use a combination of the 2020

Federal Employee Viewpoint Survey (FEVS) and FedScope data about the demographic makeup of individual agencies within the federal government to investigate individual- and agency-level factors contributing to matters of diversity, its management, and job satisfaction.

Methodologically, I employ mixed-effects models that measure levels of job satisfaction based on demographic congruence and demographic heterogeneity within agencies while also testing for the effects that supervisor diversity has on an individual's job satisfaction. This study intends to understand if there are differences in how employees of distinct ethnoracial categories report their job satisfaction in light of changes in the demographic makeup of their federal agencies.

Chapter 3

The second paper in this series of studies will investigate potential differences in levels of job satisfaction across ethnoracial and gender lines, with the potential to significantly improve our understanding of diversity and inclusion in the workforce. Incorporating elements of social identity theory and the concept of intersectionality, the primary focus of this study will be to understand how the lived experiences of smaller, more demographically homogeneous groups might report on job satisfaction in the federal workforce. Rooted in the idea that experiences of overlapping marginal identities do not necessarily make someone more likely to have negative outcomes (especially when perceived threats from one identity are reduced by another identity), this investigation will consider the non-additive elements of intersectionality (Pedulla, 2014). Further, this paper will attempt to measure differences in levels of job satisfaction as they relate to differing levels of perceived diversity, equity, and inclusion management.

This study is methodologically similar to paper one. I will use mixed-effects models on 2022 FEVS with random intercepts for agencies to control for organizational differences. Interaction terms will be included in certain models to test potential differences in effects between subsets of ethnoracial and gender subcategories. Further, three-way interactions will be used to test the effects of these intersectional identity categories and various diversity management indicators on job satisfaction. Thanks to the addition of a new set of DEIA questions, far more insight into the perception of agency and direct supervisor efforts to foster diverse, inclusive, and accessible climates can be found.

Chapter 4

The final paper in this series of studies will explore the potential of machine learning techniques to promote better diversity management practices. While the former two papers focus on explanatory functions to measure the likelihood of particular outcomes, this paper will functionally focus on the predictive relationships between variables in the FEVS and the outcome of job satisfaction. As noted by Johnson et al. (2022), the predictive decision-making tasks of human resource managers related to finding strong candidates, predicting who will be a potential leader or who might turnover more quickly are well suited for the predictive functions of many artificial intelligence (AI) models.

For the specific use-case of identifying what groups of individuals might be more or less likely to be satisfied with their federal job, random forests emerge as the most suitable option due to their adaptability and flexibility. For this study, job satisfaction will remain the outcome variable, but the predictor variables—or inputs—do not need to be strictly defined. Instead, the model identifies connections between the inputs as well as the many possible interactions

between these terms and traces paths toward the various outcome possibilities. Random forest models provide a measure of feature importance which shows which inputs had the most influence on the models predictions. These outputs are easily interpretable and are thus more amenable to public managers than the outputs of traditional regressions. Additionally, models will also be trained on subsets of data broken down by race and gender to test for differences in the predictive power of the various inputs. Findings from this study will be discussed in light of existing management theories and potential best practices gleaned from the models.

Conclusion

In this series of studies, I provide previously unrealized insights into the effects of diversity on job satisfaction in the federal workforce. The reviewed literature shows that a curious mix of findings exists when empirically investigating the effects of diversity on job satisfaction and its overlapping constructs. However, this should be expected as we are investigating phenomena dependent on identity and subjective experiences. This study further teases out the specificities inherent in the complex social paradigms of the workplace, emphasizing the interactions between individuals and various organizational dynamics including diversity and its management. This body of work reinforces social identity theory by showing how group membership influences sentiments of job satisfaction, especially in environments with different diversity climates. Practically, this research shows that belongingness can improve self-reported job satisfaction for all employees. However, strategies to improve outcomes for specific groups can be enacted based on data-driven decision-making.

CHAPTER 2: SATISFACTION IN THE FEDERAL WORKFORCE ACROSS
ETHNORACIAL GROUPS
IS AGENCY DIVERSITY A PREDICTOR OF JOB SATISFACTION?

Abstract

This study investigates the relationship between diversity and job satisfaction in the federal workforce, focusing on the effects of both demographic congruence and demographic heterogeneity. Using 2020 data from the FedScope Diversity and Employment Cubes and the Federal Employee Viewpoint Survey (FEVS), I examine how job satisfaction varies across different ethnoracial groups in agencies with varying levels of diversity. The study reveals that individuals of different ethnoracial groups exhibit varying relationships between job satisfaction and both demographic congruence and agency diversity. Results from OLS regressions with random effects indicate that while increased demographic congruence generally enhances job satisfaction for minorities, the impact of overall diversity is more complex, often showing a curvilinear relationship. Perceptions of diversity management also significantly affect job satisfaction across all groups. These findings contribute to understanding how diversity dynamics influence employee satisfaction and highlight the importance of effective diversity management in fostering an inclusive work environment.

Introduction

The federal workforce has become increasingly diverse over the past several decades. From 2006 to 2017 alone, the rates of ethnic and racial minorities (defined here as all but non-Hispanic Whites) have increased from about 32% to nearly 37% (OPM, 2021)[1]. Though the demographics of the United States as a whole are also changing—a near 6% decrease in the number of non-Hispanic Whites nationwide (Jensen et al., 2021)—the increase in minority representation within the federal workforce might indicate that diversification efforts on the part of the federal government are working. Considering this increased heterogeneity in the federal workforce, it is important to understand how members of previously and continuously underrepresented ethnoracial groups are faring in light of these shifts. Moreover, we must consider how cultures and values may clash in particularly heterogeneous agencies to potentially create undesirable workplace consequences. This research investigates the impact of agency and supervisory-level diversity on job satisfaction among specific underrepresented groups in the federal workforce. By examining both demographic congruency and heterogeneity, the study provides insights into how representation and diversity management affect job satisfaction, utilizing FedScope Diversity and Employment Cubes and Federal Employee Viewpoint Survey (FEVS) data.

The approach taken to measure diversity and its effects on members of specific groups is critical to better understanding the phenomena associated with diversity in the workplace. First, there is the matter of representation—do one's peers and superiors match one's identity? This concept of demographic congruence has been shown to affect workplace outcomes, as individuals tend to feel more included and satisfied when they see others like themselves in their organization (Byrne, 1971; Grissom & Keiser, 2011). Second, there is the matter of workplace

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[1] The only minority category to have declined in this timeframe is American Indian / Alaska Native (OPM, 2021).

diversity—how heterogeneous is the workplace? Studies have demonstrated that a diverse workplace can enhance creativity and problem-solving but may also introduce challenges related to intergroup dynamics and bias (Cox & Blake, 1991; Allport, 1954). Third, there is the matter of diversity management—does an individual consider the workplace welcoming? Effective diversity management practices have been linked to higher job satisfaction and reduced turnover intentions among employees (Nishii, 2013; Roberson, 2019). By considering these three distinct characteristics of a workplace from the perspective of the individual experiencing it, we can gather deeper insights into why individuals of a particular group might respond differently to questions about workplace satisfaction.

While some researchers have indicated that diversity within an organization significantly impacts federal employees' satisfaction with their job (Choi, 2013; Moon & Jung, 2018), the findings are typically evaluated on a binary basis—non-Hispanic Whites are compared to everyone else. This study intends to fill an important gap in the literature by evaluating one's job satisfaction as it relates to the interaction between agency diversity and the individual's specific ethnorace. By increasing the number of categories that are evaluated, we can better describe patterns of job satisfaction for different minority groups and come closer to understanding how diversity management theories can be utilized to improve workplace outcomes in the federal workforce.

In what follows, I will discuss some of the relevant literature and describe several hypotheses regarding the expected effect of agency diversity on job satisfaction within the federal workforce. Combining data from the Federal Employee Viewpoint Survey and the FedScope Diversity and Employment Cubes, I examine how an individual's sentiments and demographics interact with agency-level demographic indicators to produce heterogeneous

effects. I find that individuals of different ethnoraces respond quite differently to these phenomena and that different measures of diversity produce extremely different results.

Representation in the (Federal) Workforce

Diversity management efforts in the federal government have been ongoing. Beginning their efforts in the 1970s, the federal government established the Federal Equal Opportunity Recruitment Program (FEORP) as part of the Civil Service Reform Act of 1978. The FEORP mandated that federal employers manage recruitment efforts designed to increase minority representation in the federal government with the intention of more closely mirroring the demographics of the nation. This effort specifically navigates the terrain between soft affirmative action (positive action that seeks out minority candidates) and the more controversial hard affirmative action (numerical goals and quotas for underrepresented populations; Urofsky, 2020).[2] Since the establishment of the FEORP, several administrations have enacted policies and task forces with the goal of increasing the ratios of specific ethnicities, people with disabilities, women, and sexual minorities (The United States Government, 2021).[3]

As with any substantial change in an organization's policies and procedures, there are bound to be both positive and negative consequences on the organization's workforce. For example, increased cooperation between different groups can be expected over time according to contact hypothesis theory. Following this line of reasoning, the value-in-diversity hypothesis (Cox & Blake, 1991) emphasizes the positive effects of differences in experiences on knowledge exchange and opinion formation. As such, heterogeneity within a group or organization is

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[2] The results of these programs have been hotly debated for nearly half a century now (see Pitts, 2006; Urofsky, 2020) and will not be a topic of primary concern in this paper. However, the psychological impact of these controversies are important to consider when interpreting the results of this study.
[3] See President Biden's briefing on Executive Order 14035 for a recent comprehensive list of policies and executive orders related to these goals.

sometimes thought to contribute to better workplace outcomes, especially those related to strategic problem-solving. Conversely, however, minority group threat theory (Blumer, 1958) suggests that increasing levels of minorities in a given paradigm might cause reactionary opposition from the majority group. With these ideas in mind, the added complexity of a diversifying employee base and the differences in values and cultures that come along with it might shift employee sentiments, resulting in complex and understudied organizational changes including employees' job satisfaction.

The effects of diversity on an individual's perceived acceptance within an organization is thought to be partially determined by the level at which their identity is represented within their organization—hereafter referred to as demographic congruence. These arguments are relatively straightforward; low levels of representation (15% or less) within an organization lead to a shared feeling of tokenism (Kanter, 1977) whereas higher levels of representation may result in feelings of inclusion (Byrne, 1971). This relational conception of diversity's impact on workplace satisfaction has found empirical support in recent years. For example, Hauret and Williams (2020) find a U-shaped relationship between job satisfaction and demographic congruence. For ethnoracial minorities, it appears that their job satisfaction decreases as levels of their demographic category increase, but only until a critical threshold is reached at which point the relationship becomes positive (Hauret & Williams, 2020; Kanter, 1977).

Few studies attempt to directly test the effect of demographic congruence on employees' job satisfaction. Aside from the aforementioned studies that found U-shaped relationships between job satisfaction and demographic congruence (Enchautegui-de-Jesús et al., 2006; Hauret & Williams, 2020), the results tend toward the negative. Frijters et al. (2006) and Haile (2013) find that increased levels of minorities in the workplace is associated with decreased job

satisfaction among White employees—this relationship is stronger for males than females in both studies. Additionally, Choi (2017) finds that being the minority in the workplace (whether White or Black) negatively impacts job satisfaction. Incongruously, Maume and Sebastian (2007) find that White employees are not necessarily less likely to be satisfied with their jobs when there is a higher percentage of minorities. Instead, they argue that this dissatisfaction might be more accurately attributed to the type of job they hold—jobs that have higher percentages of minority workers might be less satisfying (Maume & Sebastian, 2007)[4].

With the limited quantity of studies investigating the direct relationship between demographic congruence and job satisfaction, it is important to look at studies that consider how certain workplace outcomes might subsequently impact job satisfaction. Suppose demographic congruence can impact other workplace outcomes. In that case, we can, theoretically, expect these positive or negative outcomes to translate into a more positive or negative work environment, leading to increased job satisfaction among affected groups. Similar to the findings of Hauret and Williams (2020), Earley and Mosakowski (2000) also identified a curvilinear relationship between demographic congruence, specifically European nationality, where both the most homogeneous and the most heterogeneous teams yielded more favorable outcomes in terms of team performance and member satisfaction. The results, however, are inconsistent across studies. Some find that in a European setting, diversity in nationality increases team effectiveness (Wong et al., 2017) while others find that increased heterogeneity in nationality leads to decreased organizational commitment (Alfes & Van Engel, 2017).

Though limited in quantity, some studies have combined the Federal Employee Viewpoint Survey (FEVS) and FedScope data to better understand the relationship between

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[4] This last finding specifically sheds light on a more pervasive issue with understanding the interaction between job satisfaction and ethnoracial minorities in the workplace—there are likely deeper associations between the types of jobs that minorities and Whites are comfortable performing.

demographic congruence and workplace outcomes in the U.S. Federal workplace. These findings, too, are mixed. Moon and Jung (2018) find that gender representation in management is not correlated with job satisfaction in federal agencies but that ethnoracial representation of management does have a strong and significant relationship with job satisfaction. They also find that employees' perceptions of ethical management are associated with increased levels of job satisfaction and that when these perception indicators interact with both gender and race representation, the results are positive and significant (Moon & Jung, 2018). These findings suggest that demographic congruence at the managerial level may have different effects than those measuring congruence in the organization as a whole. Additionally, Hoang, Suh, and Sabharwal (2022) highlight that mere numerical diversity is insufficient to enhance employees' perceptions of organizational justice. Their study emphasizes the importance of effective inclusion practices, which ensure all employees feel valued and have equal opportunities to participate and contribute. They find that perceived organizational justice mediates the relationship between diversity and inclusion practices and employees' job satisfaction and commitment. This underscores the need for public organizations to focus on both increasing diversity and implementing robust inclusion strategies to foster a sense of fairness and justice among employees (Hoang et al., 2022).

Finally, several studies investigate the impact of representation on discrimination complaints in the federal workforce—an experience shown to have negative consequences for employees' job satisfaction (Ensher et al., 2001; Xu & Chopik, 2020). Alteri (2020) hypothesizes that as the rate of diverse employees increases, the rate of discrimination complaints will increase as a result of one's increased confidence in a fair outcome. According to the results, there is a positive and significant relationship between the ratios of minorities and discrimination

complaints for Asians and Blacks, but for other groups, the likelihood of reporting is increased when diversity levels are low. These results indicate that trust might be associated with demographic congruence and that minority groups with the lowest levels of representation are careful about the costs and stigma that reporting might have on their group. Moreover, females are more likely to file a sex discrimination report when there are increased levels of female employees but less likely to report when there are increased levels of female supervisors (Alteri, 2020). This finding further demonstrates the need for studies to dissect the impacts of demographic congruence at various levels of the organization. As a final note on this particular study, Alteri (2020) finds that increased levels of minority representation within a federal agency increased the likelihood of sex-based complaints. Additionally, Yu (2023) explores bystander behavior in reporting workplace discrimination and finds that less than one-fifth of bystanders report incidents of race-based (18.7%) and sex-based (16.6%) discrimination. The study highlights the influence of personal and occupational characteristics on reporting behaviors, emphasizing the need for policies and training to encourage bystander reporting and enhance agency accountability for workplace discrimination (Yu, 2023). These studies may suggest that a more general definition of diversity—one that incorporates levels of minority representation across ethnoracial groups and genders—could shed light on additional understanding of diversity's effects on workplace outcomes, including job satisfaction.

Theory and Hypotheses

The evolving dynamics of diverse workplaces, shaped by a multitude of social and psychological theories, present a complex picture of how demographic representation and diversity management influence job satisfaction. This section delves into the current research in

this space by leveraging various theoretical frameworks. Beginning with Byrne's (1971) similarity-attraction approach, which posits a positive link between demographic congruence and workplace satisfaction, I consider how tokenism can disrupt this, as outlined by Kanter (1977). Additionally, the contact hypothesis theory (Allport, 1954) and social contact perspective (Blau, 1977; Kanter, 1977) emphasize the benefits of intergroup interactions in reducing biases, while the categorization elaboration model (van Knippenberg, De Dreu, & Homan, 2004) and social identity theory (Tajfel & Turner, 1979) provide insights into the cognitive processes underlying group categorizations and their impact on information exchange and group dynamics. Further, theories like minority group threat stemming from Key (1949) offer perspectives on majority group reactions to increasing heterogeneity in the workplace. Taken together, these theories suggest that interpersonal dynamics can shift due to a plethora of circumstances when personal identities converge in the workplace.

To investigate the effects of agency diversity on job satisfaction, I will primarily investigate three lines of inquiry. First, is demographic congruence with one's colleagues and/or supervisors associated with higher levels of job satisfaction? Second, is a heterogeneous agency associated with higher levels of job satisfaction, and if so, for whom? Third, is a perception of diversity management associated with higher levels of job satisfaction?

Demographic Congruence

According to Byrne's (1971) similarity-attraction approach, people will often flock to those with whom they have the most in common. In situations without an opportunity to understand another's personality and dispositions, observable characteristics serve as a proxy for these deeper connections in new environments (Roberson, 2019). As such, we can begin to

understand why demographic congruence might be important to an employee, especially in a new organization. Two of the most relevant studies using FEVS data show a positive relationship between increased representation and positive workplace outcomes for minorities (Alteri, 2020; Moon & Yung, 2018). However, when specifically investigating the effects of demographic congruence on job satisfaction, results tend to show more of a U-shape (Enchautegui-de-Jesús et al., 2006; Hauret & Williams, 2020) which might be the result of tokenism as described by Kanter (1977). However, considering the theories in aggregate, I expect to see an overall positive relationship between demographic congruence and job satisfaction. As such, the following hypothesis is proposed:

H1a: Demographic congruence within one's agency will be positively associated with increased job satisfaction.

Additional research on demographic congruence—especially those studies engaging with the categorization elaboration model—identify ethnorace as a possible point at which the exchange of information between groups might be interrupted (van Knippenberg et al., 2004; Roberson, 2019). This phenomenon has been shown to extend to the relationship between recruiters and applicants (Goldberg, 2005) as well as mentors and mentees (Dreger & Cox, 1996) where demographic congruence results in positive outcomes. Further, the effects of demographic congruence with supervisors on workplace outcomes show that the relationship is typically positive for minorities (Grissom & Keiser, 2011). I wish to extend these findings to the concept of demographic congruence with the supervisors in one's agency—those who can act as both mentors and potential hiring managers for advancement. As such, I suggest the following hypothesis:

H1b: Demographic congruence with the supervisors within one's agency will be positively associated with increased job satisfaction.

Diverse Workplaces

Increasing levels of diversity have a complex impact on organizational performance and the outcomes of individuals within them. Contact hypothesis theory (Allport, 1954) suggests that increased social proximity and interpersonal exchange between different groups is the most effective way to reduce negative bias and discrimination. This idea took hold in the subsequent literature. By the 1970's, social contact perspective (Blau, 1977; Kanter, 1977) argued that increased interaction between groups would result in positive experiences that negate the harmful effects of prejudice. The idea that diversity can increase intergroup communication has since been extended through information processing theory to consider workplace outcomes (Lord & Maher, 1990). According to this theory, efficiency in decision-making is improved when diverse points of view are exchanged. However, Hauret and Williams (2020) posit that this positive aspect of workplace diversity is only achieved when minority groups reach a sufficiently high level of representation—a finding supported by Richard et al. (2007).

The effects of an increasingly diverse workforce may affect members of various groups differently, particularly for the majority group that might be experiencing unaccustomed change. A theoretical explanation for a negative response from the majority can be traced back to V.O. Key's idea of minority group threat. In his book Southern Politics in State and Nation (1949), Key describes how the introduction of Black voters in the U.S. South resulted in the perception of this group as a threat to the White majority, resulting in political activism designed to rally the majority to action. These threat-oriented theories have persisted (Blumer, 1958; Blalock, 1967;

Chiricos, 2020; Hogg, 2016), but organizational psychology has contributed more nuanced arguments in recent decades. The cognitive processes and social beliefs that underpin intergroup relations are expounded upon in Social Identity Theory (Tajfel & Turner, 2004), wherein the in-group/out-group dynamics of a workplace might fall along ethnoracial lines, potentially impacting an individual's job satisfaction within an organization (Hogg, 2016). Further, Lau and Murnighan (1998), introduce the concept of "demographic faultlines," or the idea that subjective identities might further divide one group into smaller groups. Testing this theory, Lau and Murnighan (2005) find that the convergence of gender and ethnicity can negatively impact group communication; a correlate of job satisfaction. Lastly, the categorization-elaboration model (van Knippenberg, De Dreu, & Homan, 2004) describes how the process of social categorization inhibits a free flow of information between groups. With these theories in mind, simply increasing diversity within an organization might not increase the exchange of information that would result in the organizational benefits of diversity.

The empirical studies on the federal workplace outcomes offer some support for these theories. For example, Lee (2019) found that increased ethnoracial minority representation lowers agencies' goal achievement. However, both Lee (2019) and Choi and Rainey (2010) find that these variables are powerfully mediated by perceptions of diversity management, resulting in positive relationships between the interaction of perceived diversity management and increased levels of diversity.

Considering the categorization model, social identity theory, and theories of minority group threat together, there is reason to believe that increased levels of general diversity within an organization might result in decreased satisfaction in the workplace. Though studies that empirically test these hypotheses usually investigate the sentiments of White employees (Frijters

et al., 2006; Haile, 2013), some also show evidence of a negative relationship for Black employees (Choi, 2017). Increased levels of diversity in management, however, are typically found to be associated with increased levels of workplace satisfaction for ethnoracial minorities (Alteri, 2020; Choi, 2013; Park & Liang, 2020). These are often theorized to be the result of complex person-environment interactions wherein individuals of minority groups find comfort in workplaces where their Otherness is more likely to be accepted. Consequently, in the absence of diversity management interactions, two additional hypotheses are tested:

H2a: Diversity within one's agency will result in decreased job satisfaction for minority groups in the workplace.

H2b: Supervisor diversity within one's agency will result in decreased job satisfaction for minority groups.

Diversity Management

With a wide range of organizational outcomes and employee sentiments affected by heterogeneous workplaces, the need for organizations to effectively manage changing climates is critical to organizational success and employee satisfaction. This field of study is, however, in its early stages and the effects that diversity management has on employee satisfaction are just beginning to be understood. In a review of the literature, Roberson (2019) identifies several components of diversity management that are currently in the act of theoretical disentanglement. First is the cooperative component of inclusion management (Mor Barak, 2015; Nishii, 2013; Robison, 2019). Inclusion management refers to the processes of incorporating diverse viewpoints within a heterogeneous workplace into workplace policies. Through this management practice, the opinions and expertise of formerly silenced or undervalued employees might now

be better represented within the organization, leading to increased feelings of value and appreciation. These inclusive shifts in organizational management are found to be positively associated with job satisfaction (Brimhall & Mor Barak, 2018; Nishii, 2013), as well as workplace belongingness and tacit knowledge sharing (Enwereuzor, 2021). Moreover, Ashikali, Groeneveld, and Kuipers (2021) highlight the critical role of inclusive leadership in fostering an inclusive climate in diverse public sector teams, emphasizing that inclusive leadership can mitigate the challenges that come with diversity.

The concept of "diversity training" must also be understood independently of diversity management. Especially in the form of lectures or online courses, diversity training is limited in its ability to shift organizational climates—alone, it does not incorporate the affective and cooperative experiences necessary for harnessing the value of diversity such as increased knowledge sharing or cultural appreciation (Roberson, 2019). Empirically, Dobbin et al. (2007) find only weak effects (some positive, some negative) on workers and supervisors from diversity training. However, when managers are directed to oversee diversity projects for which training is only a small component, organizational outcomes are shown to improve at far higher levels (Dobbin et al., 2007; Kalev et al., 2006). Taken together, these findings imply that diversity training might be more effective when it is used to supplement a more holistic diversity management approach that includes manager participation.

Following the United States Government Accountability Office's visions for diversity management, the federal government has a comprehensive strategic plan incorporating many aspects of the aforementioned theories regarding inclusive management styles (GAO, 2005). Accordingly, the literature shows significant findings related to the federal government's initiatives. Choi (2009) finds that increased levels of diversity—calculated using an entropy

indicator—are associated with increased intention to turnover and decreased levels of job satisfaction for minorities. These findings, however, appear to be mediated by diversity management. Further, Choi (2009) found that sub-agencies with jointly higher levels of ethnoracial diversity and effective diversity management were positively associated with job satisfaction, while perceptions of ineffective diversity management were associated with lower levels of job satisfaction. In a follow-up to their earlier research, Choi (2013) investigated the relationship between diversity and job satisfaction in the federal government with the added component of supervisor diversity. While the results were largely similar—increases in ethnoracial diversity were associated with decreased levels of job satisfaction in the sub-agency—ethnoracial diversity at the supervisor level was positively associated with job satisfaction. However, results are not observed by ethnoracial groups, leaving unanswered questions about potentially heterogeneous experiences of the people in these demographic categories.

Leveraging this prior research, this study attempts to control for a variety of psychological and experiential factors by incorporating the respondent's perception of their organization's diversity management to better isolate the effects of demographic congruence and diversity on job satisfaction. However, some evidence shows that when increased levels of ethnic and racial diversity are perceived to be well-managed, job satisfaction increases (Fernandez et al., 2015). For this reason, the following hypothesis is also proposed:

H3: Positive perceptions of diversity management will be associated with increased workplace satisfaction for all minority groups.

In sum, the reviewed literature shows that a curious mix of findings exists when empirically investigating the effects of diversity on job satisfaction and its overlapping constructs. This study builds on existing literature by isolating the effects of two distinct phenomena—demographic congruence and diversity—and examining their interactions with respondents of mutually exclusive ethnoracial groups to more clearly articulate their effects on various populations and social identities. Hypotheses H1a and H1b examine the relationship between job satisfaction and the demographic congruence of the respondent and their agency as a whole or the demographic congruence of the respondent and the supervisors in their agency, respectively. Hypotheses H2a and H2b examine the relationship between job satisfaction and the demographic heterogeneity (more simply put, diversity) of the agency as a whole or the diversity of the supervisors in their agency, respectively. By investigating these hypotheses and the respondents' perceptions of diversity management within the agencies, we can better understand how diversity and its management impact the job satisfaction of federal employees.

Data & Methods

The Federal Employee Viewpoint Survey (FEVS)

The Federal Employee Attitudes Survey—a precursor to the current FEVS survey—was implemented as a response to the Civil Service Reform Act of 1978. The survey of 225 questions was distributed in 1979 to a stratified random sample of 20,000 civil service employees across 20 departments as a way to measure employee satisfaction, work relationships, and attitudes about group and agency performance (Fernandez et al., 2015). These values were deemed necessary for tracking sentiment regarding the ongoing reforms throughout the federal government. Similarly, the FEVS as we know it today was created to address concerns about federal agency human

resource management during the George W. Bush administration. Since 2002, the survey—under several different names—was conducted biannually until 2011 when it was renamed to FEVS and conducted annually (Fernandez et al., 2015).

The current survey uses a stratified sampling approach to produce the most generalizable data possible while protecting individuals' identities from the most vulnerable populations. The level of demographic detail provided in the publicly available data varies across time. In some years, data is available for individual races, ethnicity, gender, sexual orientation, disability, veteran status, length of service, and supervisory status. In other years, some of these indicators are collapsed into larger categories (race, for example, is limited to minority and non-minority categories for the years 2011 to 2019) and other categories are missing altogether (sexual orientation is missing in recent years, for example). The year 2020 is used in this survey where individual data is available on gender, race, ethnicity, and other relevant demographic variables discussed below.

FedScope Diversity and Employment Cubes

The U.S. Office of Personnel Management (OPM) manages several databases related to employment statistics within the federal government. In 2010, the OPM established the Enterprise Human Resources Integration Statistical Data Mart (EHRI-SDM), an automated system that provides access to personnel data throughout the federal government, excluding only a few defense organizations and the United States Postal Service (Jennings & Nagel, 2020). These data are publicly available through five sources, but for the purposes of this study, data were gathered through the FedScope Diversity Cube and Employment Cube. These systems report headcounts of all employees (full-time, part-time, and seasonal) at the end of each fiscal

quarter; thereafter the available data can be filtered via several indicators. For this study, 2020 data were collected by age, ethnorace which includes those of Hispanic origin as a separate category, gender, education, and supervisory status at the agency-level.

Table 2.1. Variables

Dependent Variable

Job Satisfaction	Question from the FEVS: "Considering everything, how satisfied are you with your job?" Answers are reported on a 5-point scale from (1) Very Dissatisfied to (5) Very Satisfied

Independent Variables

Sex	The FEVS respondent's self-reported sex (Male/Female; 0/1)
Race	The respondent's self-reported race. Black, Hispanic, Asian, and Other (collapsed for privacy) are recorded from FEVS responses as dummy variables (1 = yes, 0 = no). White is the reference category in all models.
% Females in Agency	Data collected from FedScope Employment Cube by agency
% Race in Agency	Data collected from FedScope Diversity Cube by agency. Information gathered for Whites, Blacks, Hispanics, Asians, and Others (summation of American Indian or Alaskan Native, Native Hawaiian or Pacific Islander, and More Than One Race). White is the reference category in all models
% Female Supervisors in Agency	Data collected from FedScope Employment Cube by agency. Summation of the ratio of females in the "Supervisor" and "Leader" categories
% Supervisors in Agency by Race	Data collected from FedScope Diversity Cube by agency. Information gathered for White, Black, Hispanic, Asian, and Other (summation of American Indian or Alaskan Native, Native Hawaiian or Pacific Islander, and More Than One Race) Supervisors. White is the reference category in all models.
Diversity Indicator (DI)	Sum of all the ratios of minorities in the agency (all races but White) multiplied by the ratio of females in the agency, scaled by standard deviation.
Supervisor Diversity Indicator (SDI)	Sum of all the ratios of minority supervisors in the agency (all races but White) multiplied by the ratio of female supervisors in the agency, scaled by standard deviation.

Perceived Diversity Management	Question from the FEVS: "My supervisor is committed to a workforce representative of all segments of society." Answers are reported on a 5-point scale from 1 (Strongly Disagree) to 5 (Strongly Agree).

Control Variables

Disability	The FEVS respondent asked, "Are you an individual with a disability?" (0/1)
Age	Age groups (Over 40/Under 40; 0/1)
Supervisor	Non-Supervisor/Team Leader = 0, Supervisor/Manager/Executive = 1
Military Service	Question from the FEVS: "What is your US military service status?" 0 (No Prior Military Service) and 1 (Military Service)
Length of Service	Answers coded to 1 (10 years or fewer), 2 (11 to 20 years), and 3 (More than 20 years).
Non-Supervisor Diversity Indicator (NSDI)	Sum of all the ratios of minority non-supervisors in the agency (all races but White) multiplied by the ratio of female non-supervisors in the agency, scaled by standard deviation. Used as a control in models where SDI is a predictor.

Table 2.2. Descriptive Statistics for Survey Questions

	Mean	SD	Median	Min.	Max.
Job Satisfaction (Q36)	3.88	1.02	4.00	1.00	5.00
Diversity Management (Q20)	4.19	0.95	4.00	1.00	5.00

Table 2.3. Demographic Statistics

	n	%
White	287,550	63.68%
Black	64,278	14.23%
Hispanic	43,066	9.54%
Asian	26,180	5.80%
Other Race	30,505	6.76%
Female	202,433	44.83%
Male	249,146	55.17%

Supervisor	106,950	23.68%
Non-Supervisor	344,629	76.32%
Veteran	132,221	29.28%
Non-Veteran	319,358	70.72%
Disability	64,802	14.35%
No Disability	386,777	85.65%
Total Sample	**451,579**	

Table 2.4. Agency Details

		n	%
AF	United States Department of the Air Force	28,116	6.23%
AG	Department of Agriculture	27,205	6.02%
AM	U.S. Agency for International Development	1,477	0.33%
AR	United States Department of the Army	68,481	15.16%
CM	Department of Commerce	17,002	3.77%
CU	National Credit Union Administration	541	0.12%
DJ	Department of Justice	22,141	4.90%
DL	Department of Labor	5,156	1.14%
ED	Department of Education	1,578	0.35%
EE	Equal Employment Opportunity Commission	736	0.16%
EP	Environmental Protection Agency	6,192	1.37%
GS	General Services Administration	5,655	1.25%
HE	Department of Health and Human Services	40,643	9.00%
HS	Department of Homeland Security	67,867	15.03%
HU	Department of Housing and Urban Development	3,224	0.71%
IN	Department of the Interior	20,968	4.64%
NF	National Science Foundation	581	0.13%
NL	National Labor Relations Board	350	0.08%
NN	National Aeronautics and Space Administration	8,580	1.90%
NQ	National Archives and Records Administration	1,005	0.22%
NU	Nuclear Regulatory Commission	1,474	0.33%
NV	United States Department of the Navy	42,354	9.38%
OM	Office of Personnel Management	850	0.19%
SB	Small Business Administration	817	0.18%
ST	Department of State	8,660	1.92%

SZ	Social Security Administration	21,261	4.71%
TD	Department of Transportation	17,629	3.90%
TR	Department of the Treasury	31,036	6.87%
		Total 451,579	

Variables

As mentioned, data are gathered at both the individual and agency levels. Individual level predictors are collected through the FEVS, including race and ethnicity, gender, disability, age, former military service, supervisory status, and the employee's length of service. Agency-level indicators are collected through the OPM's EHRI-SDM including ethnorace, gender, and supervisory status. A full list of the variables and their descriptions are shown in Table 2.1, descriptive statistics are shown in Table 2.2, demographic statistics of the sample are shown in Table 2.3, and additional information about the agencies used in the sample can be found in Table 2.4.

Dependent Variable

For the purposes of this study, one measure is used as the dependent variable throughout all models. On the FEVS, question thirty-six asks, "Considering everything, how satisfied are you with your job?" A similar question asks, "Considering everything, how satisfied are you with your organization?" Though this question is indeed valuable in determining workplace satisfaction, the term "organization" is a concern for the purposes of this study. As addressed by Thompson and Siciliano (2021), the term "organization" lacks conceptual continuity for all respondents due to the hierarchical structure of agencies within the federal government. Some respondents may consider their organization to be their sub-agency, agency, or the federal

government as a whole. Given that the models incorporate agency-level indicators, an inconsistent conceptualization of the term "organization" might lead to problematic results. Thus, as defined by question thirty-six, job satisfaction is the sole outcome measure for this study. The descriptive statistics for job satisfaction (Q36) reveal a mean score of 3.88 (SD = 1.02), with a median score of 4.00, ranging from a minimum of 1.00 to a maximum of 5.00 (see Table 2.2).

Independent Variables

The primary variables of interest in this study are ethnorace, gender, and perceived diversity management. Ethnorace and gender are captured at the agency-level via FedScope and reported as percentages of the total agency workforce. Ethnorace and gender are captured at the individual-level via FEVS. Perceived diversity management is captured via a proxy variable. In previous studies, FEVS researchers have used summative measures of diversity management using three questions: (i) "Managers/supervisors/team leaders work well with employees of different backgrounds," (ii) "My supervisor/team leader is committed to a workforce representative of all segments of society," and (iii) "Policies and programs promote diversity in the workplace" (Fernandez et al., 2015). Due to an effort to reduce redundancy within the survey, the OPM has eliminated two of these prompts, leaving a single measure: "My supervisor is committed to a workforce representative of all segments of society." Given the high Cronbach's alpha reported in previous studies for these questions (>90%), the single measure should provide strong results (Fernandez et al., 2015). The descriptive statistics for perceived diversity management (Q20) reveal a mean score of 4.19 (SD = 0.95), with a median score of 4.00, ranging from a minimum of 1.00 to a maximum of 5.00 (see Table 2.2). Sample-wide statistics on workplace demographics can be found in Table 2.3.

Control Variables

Additional individual-level characteristics are used as controls in this study. An individual's age—indicated as over/under 40 to protect identities—is included as a control in all models to minimize the risk of systematic differences between other groups of interest. Moreover, age is a relatively strong predictor of turnover and intended turnover, which could affect the individual's job satisfaction (Cho & Lewis, 2015; Ertas, 2015; Pitts et al., 2011). Length of service and supervisory status are also included in the models to ensure that individuals with greater understanding of the agency's procedures and goals are controlled for (Ertas, 2015; McCarthy et al., 2020; Pitts et al., 2011; Wang & Browser, 2019). The individual's disability status is included to control for their lived experiences with diversity management (Chordiya, 2022). Though not a central topic of this study, familiarity with mandated accommodation practices and the history of the Americans with Disabilities Act (ADA) might create systematic differences in this group's perception of diversity and its merits (Muyia et al., 2010). Lastly, the individuals' veteran status is included to control due to the relationship between prior military service as an identity and due to previous findings of the significance of this variable on job satisfaction in the federal workforce (Chordiya, 2022; Vanderschuere & Birdsall, 2019).[5]

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[5] To ensure the results were accurate in light of changes in the workplace related to COVID-19, alternative models were constructed with six additional control variables. The results showed insignificant changes to the interactions of interest and reduced the sample size by about 25,000 due to non-responses. Thus, these controls were excluded for model parsimony. These additional controls included questions about flexible schedules, agency and supervisor responses to pandemic-related workplace policies and procedures, and perceptions of the effect of the pandemic on the employee's work (V1, V8, V10, V11, V15, and V16 on the FEVS).

Methods

To test this study's hypotheses, several linear model specifications are used. First, linear mixed-effect models with random intercepts for between-agency differences are employed to consider trends within the entire available FEVS sample. Each hypothesis—H1a, H1b, H2a, and H2b—have unique specifications to test demographic congruence, demographic heterogeneity (diversity), and differences in supervisory diversity respectively. To better understand the nature of particular relationships, agency-level demographic indicators are squared to test curvilinear fit. As such, two models are constructed for each of the four hypotheses, resulting in eight models. Throughout, perceived diversity management is used as an independent variable to ensure that the effects of diversity on each group are examined without any confounding additions to the interaction terms. As such, hypothesis three (H3) is also tested within these same models.

<div align="center">

Results

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Demographic Congruence at the Agency Level

Some support is found for the first hypothesis (H1a) that demographic congruence would be associated with an increase in job satisfaction for ethnoracial minorities. Holding other factors constant, demographic congruence within one's agency corresponds to higher levels of job satisfaction for all ethnoracial minorities—this is most easily understood by examining the marginal effects plots in figures 1-4. However, distinctions must be made between whether or not we consider the functionally significant aspect of this finding to be if the minority group shows a relationship in a particular direction or if they are significantly different in their response

from all other groups. The difference between the groups of interest and the reference groups (all other ethnoraces) are often a matter of magnitude rather than a difference in trends.

For members of the aggregated "other race" category, the positive relationship between demographic congruence and job satisfaction is the most pronounced of all groups. While the reference group shows a very slight positive relationship, the respondents of the smallest minority groups are more likely to be less satisfied with their jobs will low levels of representation and much more likely to be satisfied with their jobs with higher levels of representation in comparison to the reference group (p<.01 at all levels; see Table 2.6 and Figure 2.5).

For Black respondents in the federal government, the positive relationship between demographic congruence and job satisfaction is nearly linear and quite pronounced, showing a job satisfaction differential of more than .25 points on a 5-point Likert scale as it increases from the lowest amount of demographic congruence to the highest (shown in Figure 2.1). Also, of note is the similarity between the effects of the percentage of Black employees in the agency on both Black respondents and those of all other races; both show a positive relationship between the number of Black employees and the likelihood that the respondent is satisfied with their job, but the effects for Black respondents are stronger (p<.01; Table 2.6). The effects of demographic congruence on Asian respondents is similarly positive but minimal in its strength (shown in Figure 2.3). Curiously, there appears to be a more pronounced impact on job satisfaction for the reference group when the percentage of Asians in the agency increases. Nonetheless, the effects for Asian respondents are higher than they are for the reference group (p<.01; Table 6). The effects of demographic congruence on Hispanic respondents are somewhat more complicated. Hispanic respondents show a clearly curvilinear relationship with demographic congruence and

job satisfaction where the strongest positive effect is at a threshold of roughly 16%. Overall, the relationship trends positive for Hispanic respondents while the relationship appears slightly negative for the reference group (see Figure 2.2).

Table 2.5. Main Interaction Results

	Dependent variable: Job Satisfaction							
	Models:							
	Demographic Congruence				Demographic Heterogeneity (Diversity)			
	All Colleagues		Supervisors		All Colleagues		Supervisors	
	H1a	H1a w/ Sq	H1b	H1b w/ Sq	H2a	H2a w/ Sq	H2b	H2b w/ Sq
Black Interaction	-0.087	-1.181***	-0.766	-5.143**	-0.010***	-0.027***	-0.004	-0.024***
	(0.058)	(0.294)	(0.772)	(2.587)	(0.004)	(0.006)	(0.005)	(0.008)
Asian Interaction	-0.579***	-0.439	3.63	18.038	-0.001	-0.007	0.003	0.016
	(0.184)	(1.151)	(3.851)	(11.748)	(0.005)	(0.009)	(0.008)	(0.013)
Other Interaction	1.636***	0.797	-4.298	-24.871**	0.039***	0.012	-0.044***	-0.041***
	(0.113)	(1.050)	(3.885)	(10.095)	(0.005)	(0.008)	(0.009)	(0.013)
Hispanic Interaction	0.780***	1.858***	1.229	7.802	0.001	0.024***	0.059***	0.084***
	(0.070)	(0.473)	(1.586)	(7.018)	(0.005)	(0.007)	(0.007)	(0.010)
Female Interaction	0.093***	0.707***	-0.234	-0.301	0.007***	0.006	-0.003	-0.002
	(0.022)	(0.206)	(0.247)	(0.891)	(0.003)	(0.004)	(0.004)	(0.006)
Black Interaction^2		2.571***		68.633*		0.017***		0.014***
		(0.670)		(39.253)		(0.005)		(0.003)
Asian Interaction^2		-1.142		-960.933		0.007		-0.003
		(7.092)		(712.101)		(0.007)		(0.005)
Other Interaction^2		4.949		731.693**		0.030***		-0.002
		(6.187)		(334.424)		(0.008)		(0.007)
Hispanic Interaction^2		-3.854**		-99.621		-0.022***		-0.010**
		(1.665)		(195.663)		(0.006)		(0.005)
Female Interaction^2		-0.667***		-0.943		0.002		-0.001
		(0.222)		(6.431)		(0.004)		(0.002)
Constant	1.850***	2.094***	1.785***	1.097	1.692***	1.676***	1.696***	1.685***
	(0.118)	(0.524)	(0.124)	(2.000)	(0.024)	(0.031)	(0.023)	(0.032)
Observations	451,579	451,579	451,579	451,579	451,579	451,579	451,579	451,579
Log Likelihood	-583,911	-583,872	-583,881	-583,764	-584,075	-584,078	-584,042	-584,070
Akaike Inf. Crit.	1,167,871	1,167,814	1,167,832	1,167,637	1,168,192	1,168,208	1,168,137	1,168,216
Bayesian Inf. Crit.	1,168,135	1,168,188	1,168,206	1,168,232	1,168,412	1,168,495	1,168,424	1,168,635

Note: all models include variables and controls described in Table 1;
results in this table are truncated for readability   *p<0.1; **p<0.05; ***p<0.01

Table 2.6. Marginal effects

	Dependent variable: Job Satisfaction											
	Models:											
	Demographic Congruence						Demographic Heterogeneity (Diversity)					
	All Colleagues			Supervisors			All Colleagues			Supervisors		
	H1a			H1b			H2a			H2b		
	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max
Black	0.180***	0.097***	0.153***	0.141***	0.110***	0.162**	0.138***	0.089***	0.119***	0.158***	0.093***	0.282***
	(0.019)	(0.005)	(0.021)	(0.017)	(0.005)	(0.064)	(0.008)	(0.006)	(0.014)	(0.015)	(0.005)	(0.045)
Asian	0.132***	0.109***	0.074***	0.085***	0.121***	0.157***	0.102***	0.101***	0.099***	0.097***	0.101***	0.114***
	(0.011)	(0.006)	(0.011)	(0.002)	(0.014)	(0.051)	(0.009)	(0.006)	(0.013)	(0.013)	(0.006)	(0.036)
Other	-0.100***	-0.050***	0.130***	0.083*	-0.041**	-0.093***	-0.046***	-0.005	0.087***	0.083*	-0.009*	-0.216***
	(0.009)	(0.006)	(0.011)	(0.044)	(0.017)	(0.028)	(0.008)	(0.005)	(0.013)	(0.044)	(0.005)	(0.042)
Hispanic	-0.004	0.108***	0.183***	0.012	0.105***	0.128***	0.085***	0.136***	0.072***	-0.031	0.116***	0.295***
	(0.019)	(0.007)	(0.009)	(0.049)	(0.009)	(0.022)	(0.010)	(0.007)	(0.017)	(0.021)	(0.006)	(0.088)
Female	-0.033***	0.008*	0.006	0.007	-0.004	-0.043	-0.010**	-0.002	0.015**	-0.001	-0.001	-0.038
	(0.007)	(0.004)	(0.007)	(0.009)	(0.004)	(0.039)	(0.004)	(0.003)	(0.007)	(0.011)	(0.007)	(0.037)

Note: Marginal effects from full model   **p<0.1; **p<0.05; ***p<0.01*

Table 2.7. Control Variables

	Dependent variable: Job Satisfaction							
	Models:							
	Demographic Congruence				Demographic Heterogeneity (Diversity)			
	All Colleagues		Supervisors		All Colleagues		Supervisors	
	H1a	H1a w/ Sq	H1b	H1b w/ Sq	H2a	H2a w/ Sq	H2b	H2b w/ Sq
Disability	-0.091***	-0.091***	-0.091***	-0.091***	-0.091***	-0.091***	-0.091***	-0.091***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Age (Under 40)	-0.127***	-0.126***	-0.127***	-0.126***	-0.126***	-0.126***	-0.127***	-0.126***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Former Military	0.022***	0.022***	0.022***	0.022***	0.022***	0.022***	0.022***	0.022***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Supervisor/Team	0.058***	0.058***	0.058***	0.059***	0.059***	0.059***	0.059***	0.059***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Length of Service	0.007***	0.007***	0.007***	0.007***	0.008***	0.008***	0.008***	0.008***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Diversity	0.521***	0.522***	0.522***	0.522***	0.521***	0.521***	0.521***	0.521***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)

Note: all models include variables and controls described in Table 1;
results in this table are truncated for readability   **p<0.1; **p<0.05; ***p<0.01*

Figure 2.1. Marginal Effects - Black

Demographic Congruence

Overall Diversity

Agency

Supervisors in Agency

Note: figures show prediction intervals and do not indicate statistical significance
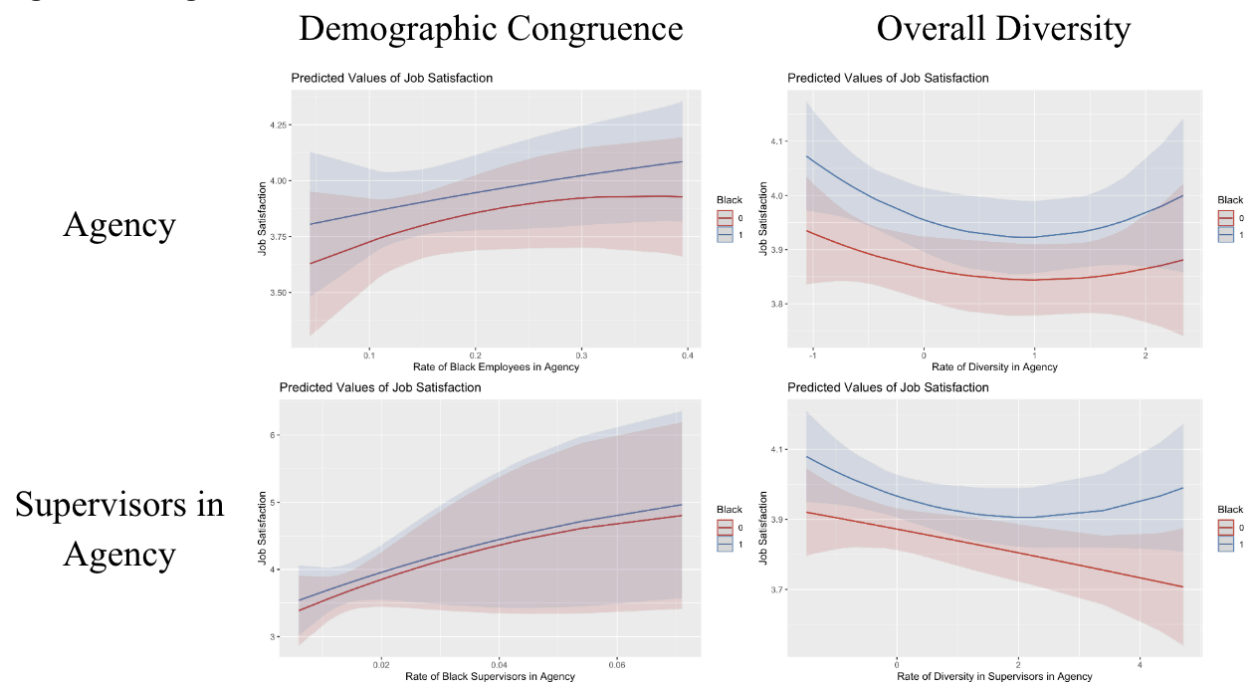
Figure 2.2. Marginal Effects - Hispanic

Demographic Congruence

Overall Diversity

Agency

Supervisors in Agency

Note: figures show prediction intervals and do not indicate statistical significance
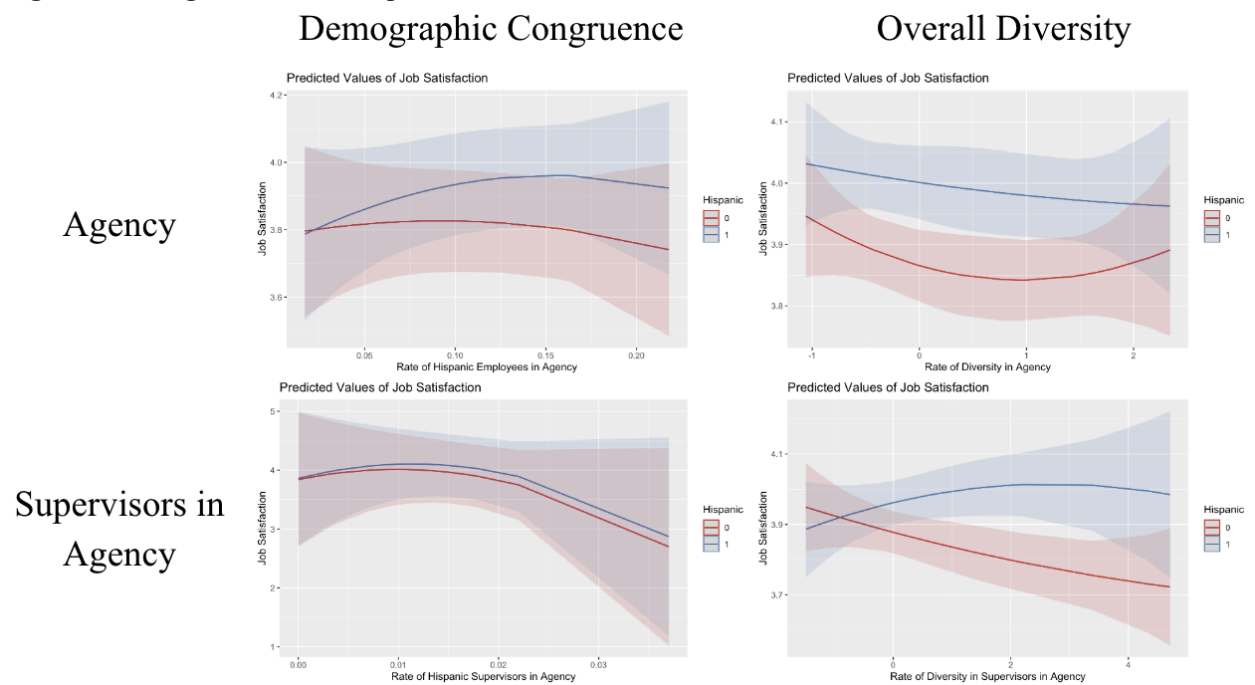
Figure 2.3. Marginal Effects - Asian
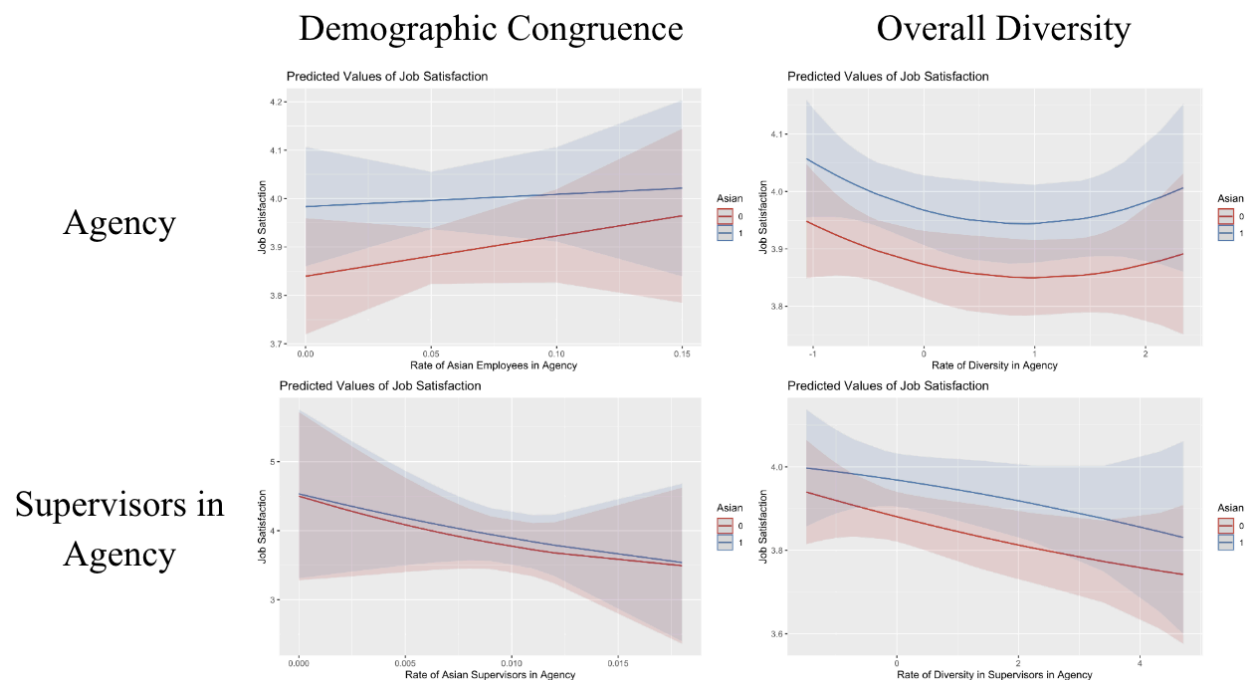
Note: figures show prediction intervals and do not indicate statistical significance

Figure 2.4. Marginal Effects - Other Race
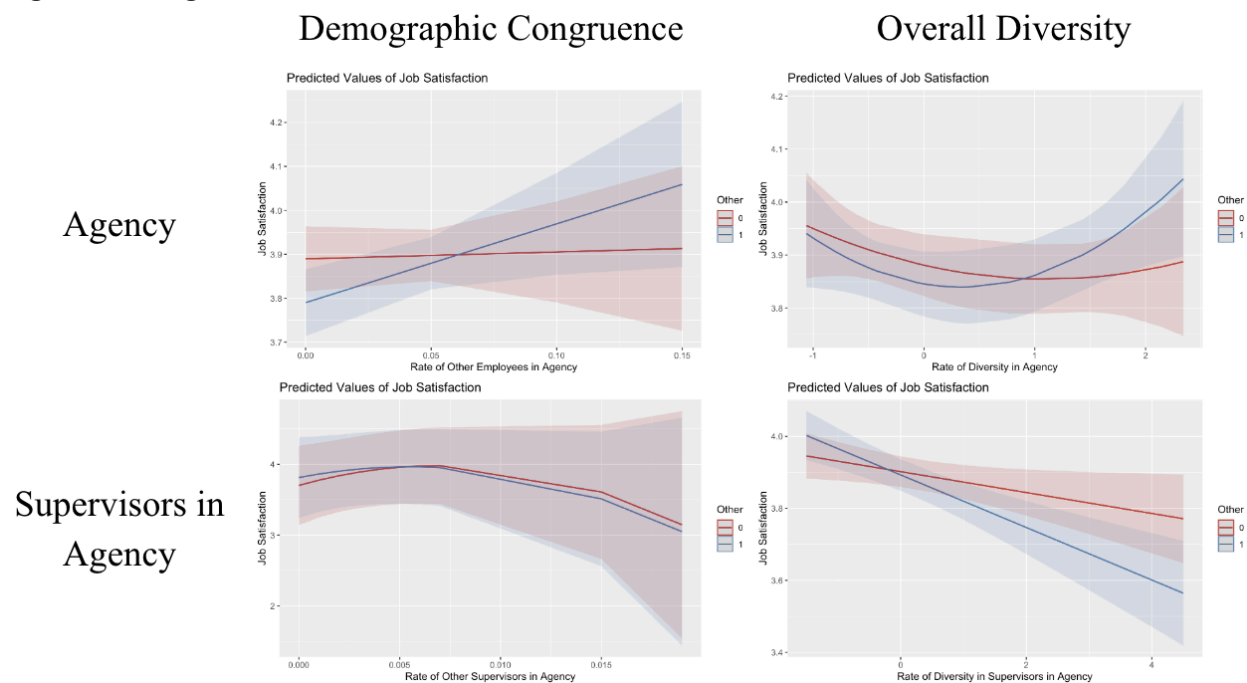
Note: figures show prediction intervals and do not indicate statistical significance

Figure 2.5. Marginal Effects - Female
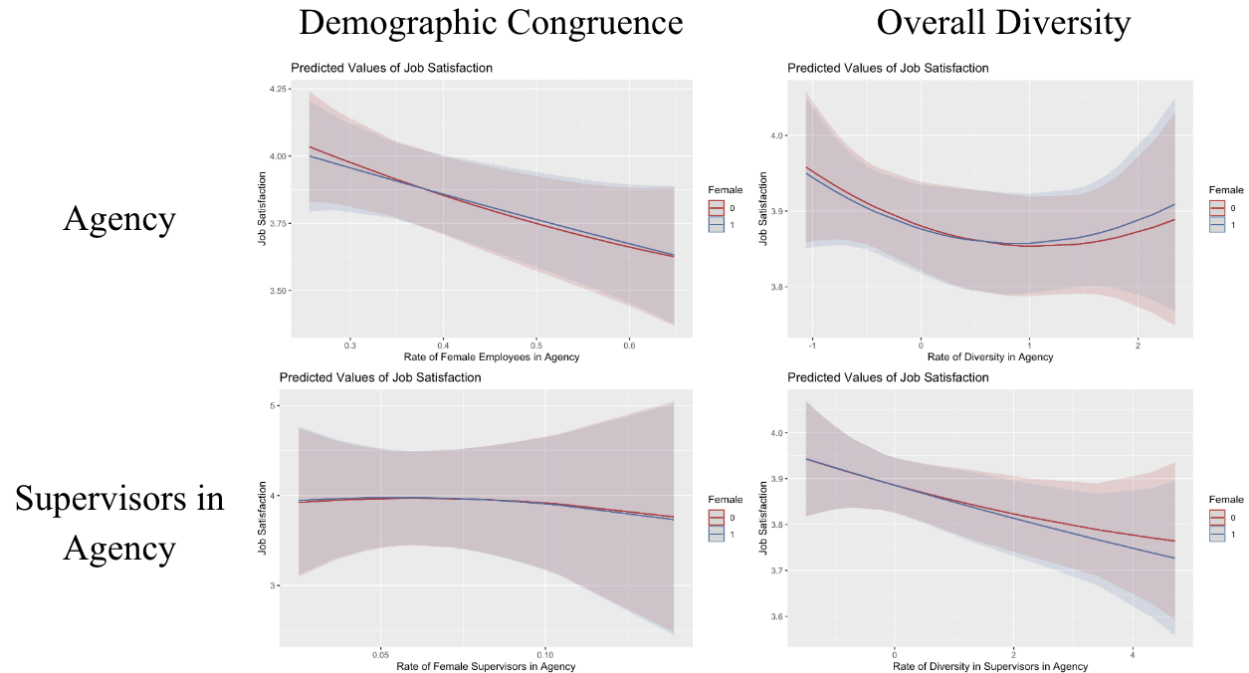
Note: figures show prediction intervals and do not indicate statistical significance

Demographic Congruence with Supervisors

When testing the effects of the demographic congruence with supervisors in the agency on job satisfaction, hypothesis H1b was largely unsupported. Holding other factors constant, Black respondents show a positive relationship between job satisfaction and demographic congruence with supervisors in their agency while all other ethnoracial minorities exhibit a negative relationship. Though these groups vary in directionality, members of the particular minority group in question largely respond more positively to the presence of members of their group than does the reference—the only group where this is not true is the "other race" category.

Diversity (Demographic Heterogeneity)

When testing the effect of overall diversity on individual employees working in the federal government (H2a), the results largely match that of previously reported findings: when

diversity increases in an agency, the job satisfaction of employees decreases. In figures 1-4, we see that the reference group in these models share an extremely similar, curvilinear shape. As the rate of diversity in the organization begins to increase, job satisfaction decreases until a critical threshold is reached and the rates of job satisfaction begin to rise. This holds for all ethnoracial subgroups except for Hispanics who exhibit a purely negative relationship (see Figure 2.2).

Diversity in Leadership

The models testing for H2b show a very complicated series of relationships between job satisfaction and the level of diversity of supervisors in the agency which makes it difficult to state definitively whether the hypothesis is supported or not. It is helpful to first note that the marginal effects of supervisor diversity on job satisfaction exhibit a negative relationship for the reference group across all models, holding other factors constant, including the non-supervisor diversity (see Figures 1-4). This signals that the vast majority of respondents have lower job satisfaction levels in agencies with more minority supervisors (holding other factors constant).

Each ethnoracial minority group, however, appears to have varying relationships with supervisor diversity levels. For Black respondents, the marginal effects of supervisor diversity on job satisfaction show a decline until a critical threshold—at roughly the mean—is reached and levels of job satisfaction increase substantially above the reference group (p<.01; see Table 2.6 and Figure 2.1). For Hispanic respondents, the results are even more positive, showing a curvilinear relationship between supervisor diversity on job satisfaction where the levels of supervisor diversity increase job satisfaction until a critical threshold—slightly past the mean—and the effects of supervisor diversity slightly wane (see Figure 2.2). However, due to the more positive relationship between supervisor diversity and job satisfaction for Hispanic

respondents, we see much higher levels of job satisfaction than the reference group at both the supervisor diversity level's mean and max (p<.01; Table 2.6). Asian respondents show a very similar negative trend to the reference group but show higher levels of satisfaction at all levels (p<.01; see Table 2.6 and Figure 3). For the "other race" category, we observe a relationship between supervisor diversity and job satisfaction that is actually more negative than the reference group; marginally significant at the mean (p<.1) and significant at the max (p<.01).

Perceptions of Diversity Management

Lastly, the effects of perceived diversity management offer support to the final hypothesis, H3. In all eight models, there is a positive association between a higher perception of one's agency's diversity management and the individual's job satisfaction, holding other factors constant (p<.01; see Table 2.4). This result shows the strongest effect across all independent variables; for every 1-point increase on a 5-point Likert scale in perceived diversity management, the respondent exhibits a more than half-point increase in job satisfaction on the same 5-point scale, holding other factors constant.

Discussion

The findings from this study illuminate some of the complex relationships between ethnorace and job satisfaction within the federal workplace. This study demonstrates that demographic congruence with colleagues generally correlates with higher job satisfaction among ethnoracial minorities, consistent with the similarity-attraction approach (Byrne, 1971). This alignment could indicate that shared experiences or identities among colleagues foster a sense of belonging, potentially mitigating feelings of isolation or tokenism, as described by Kanter

(1977). However, the differential impact of demographic congruence on job satisfaction, particularly when considering supervisor minority representation, hints at the nuanced realities of navigating identity within professional settings. It suggests that mere numerical representation is insufficient to guarantee job satisfaction; the quality of representation, especially in leadership, plays a critical role.

Consistent with the similarity-attraction approach (Byrne, 1971), the results suggest that demographic congruence with one's colleagues is generally associated with higher job satisfaction among ethnoracial minorities. This alignment could indicate that shared experiences or identities among colleagues foster a sense of belonging, potentially mitigating feelings of isolation or tokenism as described by Kanter (1977). However, the differential impact of demographic congruence on job satisfaction, particularly when considering supervisor minority representation, hints at the nuanced realities of navigating identity within professional settings. It suggests that mere numerical representation is insufficient to guarantee job satisfaction; the quality of representation, especially in leadership, plays a critical role.

While Kanter's theory would suggest that increased representation should uniformly enhance job satisfaction through reduced tokenism, the mixed results indicate that the presence of minority supervisors does not universally increase job satisfaction for all minority groups. This may reflect underlying tensions or perceived barriers that minority supervisors face, which could affect their interactions with subordinates. The concept of social closure mechanisms, developed by Weber (2019), offers a lens through which to understand these dynamics. Social closure mechanisms refer to the processes by which groups maintain social, economic, or professional advantages through the exclusion of others based on various criteria, including race or ethnicity (Albiston & Green, 2018). In the context of this study, the varying levels of job

satisfaction across different minority groups in relation to supervisor diversity may reflect underlying social closure processes. For instance, the negative reactions to increased supervisor diversity among certain groups could indicate perceived threats to existing social orders, wherein the promotion of minorities to leadership positions challenges the traditional hierarchies within the organization.

The findings related to agency heterogeneity challenge and complicate the optimistic view posited by contact hypothesis theory (Allport, 1954). While diversity is theoretically beneficial for organizational outcomes, including job satisfaction, the results suggest that increased heterogeneity does not uniformly lead to higher job satisfaction. For Hispanics, one of the largest minority groups in the U.S., the negative relationship between agency heterogeneity and job satisfaction is most pronounced, perhaps reflecting unaddressed intergroup tensions or the inadequacy of superficial contact to overcome deep-seated biases and structural inequalities (Choi, 2017). This is contrasted by the findings related to respondents of the "other race" category, comprised of the least represented minorities in the U.S., wherein job satisfaction shows a generally positive relationship to agency diversity (though the data shows a certain sensitivity to the negative effects of lower diversity levels which, again, might be attributed to feelings of tokenism). This discrepancy might be understood through social identity theory, which asserts that individuals derive a sense of identity from their group memberships (Tajfel & Turner, 1979). As agency diversity increases, the potential for intergroup conflict or feelings of group threat may also rise, potentially invoking social closure mechanisms as majority groups seek to maintain their status and thereby negatively impact job satisfaction for some, while those with less strong identity ties might be less affected or feel positively toward diversity.

The mixed findings underscore the importance of effective diversity management in harnessing the benefits of diversity while mitigating its potential drawbacks. The positive association between perceptions of diversity management and job satisfaction shows the importance of how diversity initiatives are perceived within organizations (Nishii, 2013; Roberson, 2019). The divisive nature of affirmative action policies, as noted by Urofsky (2020), may exacerbate these tensions, suggesting that the negative feelings towards diversity management among certain groups could, again, be a manifestation of social closure mechanisms, where diversity efforts are seen as threatening the social order (Albiston & Green, 2018). Theories such as the categorization elaboration model (van Knippenberg, De Dreu, & Homan, 2004) and social identity theory (Tajfel & Turner, 1979) further illustrate how diversity management practices can influence organizational dynamics and employee satisfaction. These theories, as well as the findings of this study, indicate that how diversity is managed—potentially through inclusive policies, genuine engagement with diversity issues, and the promotion of an inclusive culture—is perhaps more critical to job satisfaction than the mere presence of diversity itself (Choi, 2009; Fernandez et al., 2015).

Limitations and Directions for Future Research

The results of this study contributes new findings to research investigating the ways in which demographic makeups of federal agencies might contribute to varying levels of job satisfaction for particular groups. Recall that very few studies have been able to examine the sentiments of federal employees based on individual ethnoraces—until 2020, the FEVS only reported race in a binary manner (White vs. everyone else). However, much more work is needed to advance the field on matters of diversity and its management in the federal workplace.

The need to develop public administration theories that explain the effects of representation and diversity is of primary importance. Though helpful in showing that demographic alignment between constituents and bureaucrats helps build trust and foster better working relationships in a plethora of contexts, it does not necessarily provide all of the answers we need to improve workplace-related sentiments and outcomes such as job satisfaction within federal agencies. The results from this study clearly show that the experiences of particular racial groups vary greatly when it comes to their experiences of both demographic congruence, but less so when it comes to diversity. From this joint discovery, we can conclude two things. First, when the effects of demographic heterogeneity are measured as a singular concept, diversity, we do not understand the full picture. We can recognize this due to the fact that when testing for demographic congruence, the marginal effects elicit explicitly different results for the reference group for each race, even when accounting for cultural workplace differences with random effects for agency. Second, further work is needed to understand why respondents might have such different responses to various minority groups in the workplace and how these responses to the matter of job satisfaction differ across ethnoracial groups. These phenomena cannot be understood by only investigating the relationships between individuals of the same ethnorace; everyone is responding differently to varying levels of representation and diversity in the workplace.

Related is the need to better understand how overlapping identities (intersectionality) is experienced in relation to job satisfaction. While this study clearly shows that the experiences of ethnoracial minority groups are far from monolithic, I expect there to be even greater variation in results when more than a single component of one's identity is examined in relation to job satisfaction. However, it becomes increasingly difficult to map measurements of representation

or demographic congruence onto the infinitely complex realm of genuine identity, meaning that the methodological tactic of modeling demographic congruence would be quite challenging. To investigate some of these effects, deep dives into interactions between individual ethnoracial groups, gender, and other markers of social identity constructs should be investigated in relation to job satisfaction while controlling for additional elements about the workplace and the work itself.

Further, the interaction between diversity management and the responses of particular ethnoracial groups deserves a closer look—indeed this work has had several meaningful contributions already, but deeper views into the marginal effects of diversity management on job satisfaction for particular minority groups and intersections will be critical in identifying key gaps in inclusionary work.

As a final consideration on future research, understanding the effects of demographic congruence and heterogeneity on turnover attention is worth pursuing. Are employees more likely to leave their role if they are not represented in their agencies? If that is the case, it is possible that we may never receive insights from them on the FEVS. Further research, perhaps within the OPM, is necessary to fully understand whether or not demographic trends within agencies might predict turnover for members of particular ethnoracial groups.

This study is, of course, limited in scope. Due to the merging of the FEVS and FedScope data, categories such as age or supervisory status were condensed to match categorizations across datasets—as a result, some nuance is lost. Findings related to demographic congruence and heterogeneity are also limited to the agency-level based on data from FedScope—different findings might be found if office-level data were tested. Further, investigations into the data are limited to the demographic information collected by the FEVS. Items like employee education

and LGBTQ+ status could prove to elicit even greater understanding of these phenomena related to diversity and job satisfaction. Additionally, matters of employee job rewards such as salary would be valuable additions to similar studies in the future should this information become public—it is possible that pay, understood separately from satisfaction with pay, might serve as a meaningful control. Lastly, measures of diversity management were extremely limited in the 2020 FEVS data. The 2022 data, for example, contains multiple questions that address sentiments related to diversity, equity, inclusion, and accessibility as distinct phenomena. Interesting results may come from investigating these sentiments in the context of diversity and demographic congruence in workplaces.

Conclusion

This research is intended to shed light on the multifaceted work necessary to uncover the tremendously diverse experiences of federal employees as they relate to diversity. The findings of this study confirm that demographic congruence with colleagues is associated with increased job satisfaction for ethnoracial minorities. This seems to highlight the significance of representation and inclusion within organizations. However, demographic congruence with supervisors is not always associated with higher levels of job satisfaction, suggesting that there is more to understand about representation within federal agencies. This study also shows that the relationship between agency heterogeneity and job satisfaction is complex and varies by group. While diversity may introduce challenges in interpersonal dynamics, it also holds potential for enhanced job satisfaction if managed effectively. The clear association between positive perceptions of diversity management and job satisfaction across all groups in this study

reinforces the importance of proactive and inclusive diversity management practices in fostering a satisfying work environment.

Though no policy or program will create an environment where all employees feel perfectly satisfied with their job, the federal government can remain attentive to trends in sentiments across groups. This research can help guide future interventions that are aimed at addressing concerns related to job satisfaction for particular groups by showcasing the diversity climates in which these groups show the highest or lowest levels of job satisfaction. Further, this research reinforces the idea that organizations should move beyond tokenistic and equal opportunity approaches to diversity, advocating for substantive changes in culture, policy, and leadership practices to truly enhance job satisfaction and harness the benefits of a diverse workforce.

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CHAPTER 3: EXPLORING INTERSECTIONALITY AND JOB SATISFACTION IN THE
FEDERAL WORKFORCE
THE ROLE OF IDENTITY AND THE PERCEPTION OF DIVERSITY MANAGEMENT

Abstract

By integrating the theoretical perspectives of intersectionality and social identity theory, this study aims to explore how race and gender intersect to shape job satisfaction within the federal workforce and how effective diversity management can mediate these experiences. Using 2022 FEVS data, mixed-effects regression models are employed to investigate the effects of intersectionality on job satisfaction. Further, the newly added DEIA index is incorporated into interaction effects with ethnorace and gender to test the mediating effects of diversity, equity, and inclusion on job satisfaction for various intersectional identity groups. Findings suggest that: (i) the effect of identifying as a minority is positively associated with job satisfaction in the federal workforce for both men and women, (ii) there are differences between men and women as it relates to the relationship between job satisfaction and minority status across ethnoracial groups, and (iii) perceived DEI management shapes the outcome of job satisfaction significantly for all intersectional identity groups including the reference categories, with little variation in perceived equity and inclusion, but significant variation in perceived diversity.

Introduction

Diversity within the federal workforce has increasingly become a focal point for understanding job satisfaction, especially as it relates to the experiences of underrepresented groups. From fiscal year 2001 to 2021, the rates of non-White federal employees increased from about 28% to about 39%, raising questions about how outcomes might differ across ethnoracial groups. In terms of gender, the federal workforce has remained relatively consistent over time, with approximately 43.8% women (slightly lower than the overall U.S. workforce at 46.9%; OPM, 2006; OPM, 2022; Schaeffer, 2024).

To better understand job satisfaction within the increasingly diverse federal workforce, it is helpful to consider the relevance of social identity theory and intersectionality. Social identity theory posits that individuals derive a sense of self from their roles and group memberships within social structures, including their workplaces (Tajfel & Turner, 1979). This theory suggests that job satisfaction is closely tied to how well an individual's identity aligns with their roles within an organization. For example, when employees share demographic similarities with their colleagues and superiors, their sense of belonging and job satisfaction tends to increase (Brunetto & Farr-Wharton, 2002). However, this satisfaction can be disrupted in environments where their identity is marginalized or where they face discrimination. Intersectionality, a concept introduced by Kimberlé Crenshaw, offers a framework for analyzing how multiple aspects of an individual's identity—such as race, gender, and class—interact to shape their experiences in the workplace (Crenshaw, 2013). In the context of job satisfaction, intersectionality highlights how these overlapping identities can produce unique challenges for individuals, particularly those who belong to multiple marginalized groups.

This research intends to connect these theories to the concern of diversity management in the federal workforce by better understanding the relationship between these phenomena and job satisfaction. Lee (2021) illustrates how previous research shows that demographic dissimilarity within federal agencies can impact job satisfaction differently across various identity groups and consequently emphasizes the importance of considering intersectionality in organizational studies. For example, women of color may face distinct barriers that affect their job satisfaction differently than their White male or female counterparts—perhaps in ways that are not always additive or cumulative. Research consistently demonstrates that diversity management also plays an important role in influencing job satisfaction across different demographic groups. Prior research shows that there are disparate workplace outcomes for individuals of different races when diversity levels in an organization shift (Choi & Rainey, 2010; Choi, 2017). However, the negative effects that might result from this workplace heterogeneity have been shown to be mediated by successful diversity management (Pitts, 2009; Choi, 2013; Stazyk et al., 2021). Using the 2022 Federal Employee Viewpoint Survey (FEVS) with its newly added Diversity, Equity, Inclusion, and Accessibility (DEIA) section, I seek to address two key research questions. First, how do the intersecting identities of race and gender influence self-reported job satisfaction in the federal workforce? Second, how do perceptions of diversity, equity, inclusion, and accessibility (DEIA) management impact self-reported job satisfaction across different demographic groups?

This paper will explore the intricate ways in which the identity intersections of race and gender shape job satisfaction differently amongst these different demographic groups within the federal workforce. By analyzing how these overlapping identities uniquely influence employee experiences, the study aims to shed light on the complex effects of intersectionality on job

satisfaction. Additionally, the paper will assess how perceptions of diversity management mediate this relationship, examining whether effective diversity management practices can mitigate the challenges employees face at these intersections. Through this dual focus, the research seeks a more nuanced understanding of how identity and organizational practices interact to influence job satisfaction, ultimately providing insights that can inform more inclusive and effective diversity management strategies in the federal workforce.

In subsequent sections, I will unpack the existing literature on diversity, equity, and inclusion in the federal workforce in relation to job satisfaction. Further, I will propose a theoretical union of both social identity theory and intersectionality that is attentive to the effects of diversity management practices. I will then test this theory on FEVS data, seeking to better understand the relationship that various groups have with job satisfaction and diversity management.

Literature Review

Job satisfaction has long been recognized as an indicator of both organizational health and individual well-being. Meta-analyses across various sectors have established a strong correlation between job satisfaction and positive organizational outcomes such as increased productivity and reduced turnover (Judge et al., 2001; Harrison, Newman, & Roth, 2006). Within the federal workforce, job satisfaction is influenced by several factors including job characteristics, perceived fairness, organizational trust, and employee empowerment (Choi, 2017; Fernandez & Moldogaziev, 2015; Ting, 1996; Ting, 1997). However, the influence of these factors is not uniform across all employees—race and gender significantly shape these experiences. Research shows that racial and gender disparities in job satisfaction are often linked

to tangible job rewards and structural positions within the organization. Historically, Black employees, for example, have reported lower workplace satisfaction, often due to lower pay, occupational prestige, and supervisory status (Tuch & Martin, 1991). More recent studies indicate that these disparities persist, although the determinants of job satisfaction may vary subtly by race and gender. For instance, employee development is associated with more positive outcomes for men, recognition for Whites, and pay, job status, and diversity management are more impactful for minority women (Lee, Robertson, & Kim, 2020).

The role of diversity management in shaping job satisfaction has been shown to be particularly pronounced in prior research. Effective diversity management—defined here as the implementation of policies and practices that promote inclusion and equity across all demographic groups—has been shown to improve job satisfaction for all employees (Choi, 2017), though some studies show stronger effects for minorities (Pitts, 2009) and women (Choi & Rainey, 2014). However, the impact of diversity management is not solely about the mere presence of policies but also how employees perceive these policies. Perceptions of fairness and inclusivity play a role in determining the success of diversity management initiatives as well as the mediating effects it may have on other workplace outcomes. Research by Choi (2013) found that while increased racial diversity at the supervisory level is associated with higher job satisfaction among minority employees, this does not hold for the majority. The overall perception of the diversity climate was a clearer predictor of job satisfaction as a better climate mediated the negative effects of increased diversity on job satisfaction. This supports the idea that if diversity efforts are perceived as ineffective or tokenistic, they can lead to dissatisfaction, particularly among those already facing discrimination or marginalization (Choi, 2013; Stazyk et al., 2012).

Diversity management has become an increasingly central focus in public administration and within the federal workforce itself. The concept of diversity management refers to the deliberate efforts made by organizations to create an inclusive environment that recognizes and values the differences among employees, including race, gender, age, disability, and other social identities. Policies and programs such as Equal Employment Opportunity (EEO) and affirmative action have led to improvements in the integration of minorities and women within federal agencies as early as the 1940's and gained further traction in the 1970's after the Civil Rights Act of 1964 (Dobbin, & Sutton, 1998; Kellough, 1990). The effectiveness of these programs have been shown to be influenced by factors such as agency size, union presence, and the rate of new hires (Kellough, 1990), and to be quite divisive, especially when discussed as a zero-sum game (Urovsky, 2020). In more recent decades, diversity management has expanded beyond compliance with EEO and affirmative action policies and has begun to shift into the intentional construction of inclusive spaces. For example, the federal government's comprehensive strategic plan for diversity management includes elements of inclusive leadership and participation, not only encouraging diversity training but emphasizing the need to measure outcomes and hold agencies accountable (GAO, 2005). This evolution of diversity management has led to the inclusion of new Diversity, Equity, Inclusion, and Accessibility (DEIA) questions included in the 2022 FEVS.

As diversity, or DEIA, management becomes more prevalent, so too does the work to disentangle the various components of managing (increasing) diversity within organizations (Roberson, 2019). The first, diversity, refers to the practices of increasing representation of different groups across organizations and at different levels—many of the aforementioned policies and practices such as EEO address this component. The second, equity, has been

interpreted by the federal government as fairness and access to opportunities, as well as the work of removing barriers that might perpetuate inequality in the workplace (OPM, 2022). Hoang, Suh, and Sabharwal (2022) capture this in what they describe as "active diversity management and organizational justice," describing the efforts of both identity-blind and identity-conscious hiring and promotion policies that seek to enhance the role of merit in the process and increase human capital in historically marginalized groups respectively. The third, inclusion management, incorporates diverse viewpoints and experiences into policy and procedure in order to increase feelings of value and appreciation throughout the workforce (Mor Barak, 2015; Nishii, 2013; Robison, 2019). Finally, accessibility management, though not a primary topic of inquiry in this study, refers to the efforts made to provide individuals with disabilities with accommodations such as assistive technology and modified workspaces while continuously training the workforce to increase awareness of accessibility programs.

Theory and Hypotheses

Theoretical Framework

To better understand the diverse experiences of job satisfaction within the federal workforce, we can turn to intersectionality theory and social identity theory. Intersectionality theory teaches us that social identities, such as race and gender, are not merely additive but interact in unique ways that produce experiences distinct from those shaped by a single identity alone. A Black woman, for example, does not simply experience the world through the lens of race or gender—her experiences are informed by her unique positionality in society (Bow et al., 2017). This intersectional approach reveals how power and privilege—or a lack thereof—are distributed and experienced differently. Social identity theory (Tajfel & Turner, 1979)

complements intersectional theory by emphasizing the centrality of these identities in shaping how individuals derive their sense of self and navigate their roles within society. Social identity theory posits that individuals categorize themselves into groups—be they race, nationality, religion, or profession—to understand where they fit it (Hogg, 2016). Not only do these identities influence how we see ourselves, but they influence how others perceive us and how we engage with our environments and manage the expectations placed upon us. These identities become the basis for many in-group/out-group dynamics which can lead to exclusion, prejudice, and discrimination. As such, increased levels of diversity in an organization have been associated with decreases in workplace satisfaction across demographic groups (Frijters et al., 2006; Haile, 2013; Choi, 2017).

These theories converge with recent federal efforts to increase Diversity, Equity, and Inclusion (DEI) management in the workplace. Specifically, the perception of DEI efforts within an organization might serve as a mediator between intersecting identities and the experience of workplace or job satisfaction—those whose identities intersect at multiple points of marginalization might be more sensitive to the effectiveness and sincerity of DEI initiatives. Further, these perceptions might shape whether the organization is seen as a space where diverse identities are recognized, valued, and supported. When DEI practices are perceived positively, we might expect lesser differences in workplace outcomes—such as job satisfaction—between the most marginalized groups and that of the majority. Conversely, superficial or ineffective DEI efforts may exacerbate feelings of isolation or dissatisfaction, particularly for those at the intersection of multiple minority identities, resulting in lower level of job satisfaction.

Research Approach

The identity groups we associate ourselves with can be exclusionary—they are definitionally closed to those who are not that identity. However, people can be associated with multiple identities and subcategories of multiple identities. Returning to the example of a self-identified Black woman, this person fits into the category of Black, this person fits into the category of women, and this person fits into the subcategory or intersection of these categories: Black women. From an analytic standpoint, this requires us to understand differences between those social closures so to speak. For women, what is the effect of being Black on a particular outcome? For Black employees, what is the effect of being a woman on that outcome? Measuring these differences is the heart of what empirical intersectional research must be if we are to understand how the effects of layered categories of marginalization affect outcomes differently.

Past intersectional research has emphasized that qualitative research is preferable in understanding how these identities interact with social phenomena, particularly regarding the power and privilege afforded to hegemonic groups (Alexander-Floyd, 2012; Breslin et al., 2017). Similarly, some scholars argue that our society does not afford us the luxury of neatly separating people into categories of gender, race, and other identities such as religion or sexuality (Beckwith & Baldez, 2007; Bowleg, 2008). However, others argue that while constrained, quantitative techniques such as regression analyses are necessary to capture intersectional effects by comparing categories and subcategories of identity (Weldon, 2006; Block et al., 2023).

This complexity introduces a slight challenge for quantitative research. Much of the existing research on job satisfaction or workplace outcomes often looks at race, gender, and other identities in isolation or through additive models, which might miss the nuanced and potentially

compounded effects of intersectionality. For instance, traditional studies might compare job satisfaction between men and women or between racial groups but fail to account for how these categories intersect to produce unique outcomes for, say, Black women or Hispanic men. Addressing this gap requires the application of more sophisticated analytical methods that can account for the non-additive nature of intersectionality—namely, interaction terms in regression models. By doing so, we can better understand and address the unique challenges faced by employees at the intersections of multiple social identities.

Hypotheses

When testing intersectional claims, there are an extremely large number of effects to consider. If we were to test only the effects of Black and White men and women, we would have five directional effects to hypothesize regarding the effects of identity on job satisfaction: (i) the intersectional effect of gender and race, (ii) the effect of gender for White people, (iii) the effect of gender for Black people, (iv) the effect of race for men, and (v) the effect of race for women (Block et al., 2023). Considering that this study will examine individual ethnoraces beyond a Black/White dichotomy and also test the mediating effects of perceptions of DEI policies in the workplace, there are far too many directional outcomes to coherently describe without redundancy or confusion. Instead, I will briefly describe the overarching patterns I expect to emerge based on these theoretical insights and empirical findings.

Lee, Robertson, and Kim (2020) show that when controlling for other factors, the direct effect of ethnoracial identity on job satisfaction is not significantly different between ethnoracial minorities and Whites in the federal workforce. Further, other workplace factors such as organizational climate, perceived fairness, and diversity management are all shown to play a

more significant role in influencing job satisfaction (Pitts, 2009; Choi, 2017) and mediate job satisfaction directly (Stazyk, Davis, & Liang, 2021). While social identity theory would suggest that minorities might experience lower levels of job satisfaction due to out-group status, successful diversity management should theoretically control for these adverse experiences. With DEI management being controlled for, I propose the following:

H1: Identifying as an ethnoracial minority will not have a different effect on job satisfaction than identifying as White when holding other factors constant.

Prior research shows that gender alone may not directly affect job satisfaction when factors such as job characteristics, organizational climate, and management practices are controlled for (Ting, 1996; Saari & Judge, 2004; Fernandez & Moldogaziev, 2015; Alegre et al., 2016). Similar to ethnorace, the perception of diversity management is shown to potentially mediate the relationship between gender and job satisfaction (Pitts, 2009; Stazyk et al., 2021). With DEI management, intrinsic work experience, and supervisor sentiments being controlled for, I propose the following:

H2: Identifying as a woman will not have a different effect on job satisfaction than identifying as a man when holding other factors constant.

Studies have shown that minority women experience compounded disadvantages in the workplace such as higher levels of discrimination or perceived discrimination (Salter et al., 2021), lower perceptions of fairness (Nelson & Piatak, 2021), and greater emotional labor (Sloan & Unnever, 2016). However, other research conducted on large workforce datasets have shown that minority women are less likely than White women to report perceived discrimination, while the opposite is true for minority men—though these studies did not test the difference between

minority men and minority women (Hirsh & Lyons, 2010; Yang, 2021). To summarize, while research suggests that while ethnoracial minority men do face challenges related to race in the workplace, these challenges may not be as severe as those faced by minority women, leading to a relatively smaller negative impact on job satisfaction. With this information, I propose the following:

> *H3: For women, identifying as an ethnoracial minority will have a negative effect on job satisfaction holding other factors constant.*
>
> *H4: For men, identifying as an ethnoracial minority will not have a negative effect on job satisfaction holding other factors constant.*

Finally, prior research demonstrates that successful DEI management can moderate negative sentiments toward job satisfaction for both women and ethnoracial minorities (Pitts, 2009; Choi, 2017; Stazyk et al., 2021). These initiatives help foster a sense of belonging and fairness, mitigating the negative effects of exclusion or marginalization. Social identity theory suggests that individuals are more likely to derive satisfaction from their work environments when they perceive their social identity as being valued and supported within the organization. In light of this, I propose that the moderating effects of DEI practices will be felt across all demographic groups. However, considering that identity theory suggests women of ethnoracial minorities stand to benefit the most from environments that actively counteract the intersectional disadvantages they face, the moderating effects of perceived DEI management will be more pronounced for these groups. This leads to the following hypothesis:

H5: The moderating effects of the perception of diversity, equity, and inclusion practices in the workplace on intersectional identities and job satisfaction will be positive for all and strongest for women of ethnoracial minorities.

Data and Methodology

Data Source

The Federal Employee Viewpoint Survey (FEVS), administered annually by the Office of Personnel Management (OPM), is a vital tool for assessing workplace experiences and outcomes across the federal workforce. As one of the most extensive surveys of its kind globally, the FEVS provides a large amount of data on job satisfaction, employee engagement, and organizational culture, helping federal agencies identify areas for improvement and track progress over time. The 2022 survey introduced new questions focused on Diversity, Equity, Inclusion, and Accessibility (DEIA), reflecting the federal government's commitment to fostering an inclusive and equitable work environment. These additions aim to highlight and address gaps in inclusivity, ensuring that all employees feel valued and supported in their roles.

Variables

The dependent variable in this study is job satisfaction, captured by question number sixty-eight: "Considering everything, how satisfied are you with your job?". The independent variables in this study are ethnorace, gender, and three DEI indices—diversity, equity, and inclusion—which capture employee attitudes toward their work unit and supervisors as they relate to these initiatives (details on the constituent questions can be found in Table 1).

The control variables in this study consist of supplemental demographics and two additional indices from the FEVS. Age is a relatively strong predictor of turnover and intended

turnover, potentially having implications for job satisfaction (Cho & Lewis, 2015; Ertas, 2015; Pitts et al., 2011). Similarly, tenure and supervisory status have been shown to be associated with turnover intention and are included as controls (Ertas, 2015; McCarthy et al., 2020; Pitts et al., 2011; Wang & Browser, 2019). Disability status, though not a primary topic of this study, is included to control for additional experiences with diversity management (Chordiya, 2022). Finally, former military status is included due to previous statistically significant relationships with job satisfaction in the federal workforce (Chordiya, 2022; Vanderschuere & Birdsall, 2019). Intrinsic Work Experience (IWE; a subindex of the FEVS) has been found to predict worker engagement significantly, which is closely linked to job satisfaction (Byrne et al., 2017). Finally, the employee engagement subindex related to supervisors is included to account for experiences with one's supervisors outside of a DEI context despite having been shown to be only slightly associated with positive workplace outcomes (Byrne et al. 2017).

To ensure the five reliability and validity of the indices used in this analysis—intrinsic work experience (IWE), supervisor subindex (SUP), diversity, equity, and inclusion—a Confirmatory Factor Analysis (CFA) was conducted. The CFA results indicate a good model fit, with most items loading strongly onto their respective latent constructs (CFI = 0.932). This model fit score confirms that the indices are internally consistent and represent coherent constructs (as defined by the FEVS). However, the CFA revealed high covariances between the IWE and SUP indices (0.672) and the equity and inclusion indices (0.799). These high covariances indicate that these constructs capture overlapping aspects of the employee experience. For example, the relationship between IWE and SUP may reflect that employees who perceive a strong sense of their workplace contributions are also more likely to experience supportive supervision. Similarly, the relationship between equity and inclusion suggests that, in

this context, employees might view these two constructs as part of a unified approach to fairness and belonging in the workplace. It is important to acknowledge these relationships as they highlight how different aspects of the federal work environment can be interconnected; however, given that the FEVS predefines these indices, no adjustments were made—the findings of this CFA are reported to provide a clearer understanding of how these related constructs may influence the outcomes in this study.

Table 3.1. Variables

Dependent Variable

Job Satisfaction	Question from the FEVS: "Considering everything, how satisfied are you with your job?"
	5-point scale: 5 = Very Satisfied, 1 = Very Dissatisfied

Demographic Variables

Sex	Respondent's self-reported sex (Male/Female; 0/1)
Ethnorace	Respondent's self-reported ethnorace. Black, White, Hispanic, Asian, and Other (collapsed for privacy) are recorded from FEVS responses as dummy variables (0/1). All ethnoraces other than Hispanic have identified as non-Hispanic.
Disability	Respondent asked, "Are you an individual with a disability?" (0/1)
Age (under40)	Age groups (Over 40/Under 40; 0/1)
Supervisor	Non-Supervisor/Team Leader = 0, Supervisor/Manager/Executive = 1
Military Service	Respondent asked, "What is your US military service status?" 0 = no prior military service and 1 = prior military service
Tenure	Answers recoded: 1 = ten years or fewer, 2 = eleven to twenty years, and 3 = more than twenty years
Turnover Intention	Answers recoded: 0 = No, 1 = Yes

Diversity, Equity, and Inclusion Subindices

Diversity	**DEIA - Diversity Subindex; 5-point scale; Averaged responses from following questions:**
Cronbach's Alpha = .85	My organization's management practices promote diversity (e.g., recruitment, promotion opportunities, development).
	My supervisor demonstrates a commitment to workforce diversity (e.g.,

recruitment, promotion opportunities, development).

Equity	**DEIA - Equity Subindex; 5-point scale; Averaged responses from following questions:**
Cronbach's Alpha = .89	I have similar access to advancement opportunities (e.g., promotion, career development, training) as others in my work unit.
	My supervisor provides opportunities fairly to all employees in my work unit (e.g., promotions, work assignments).
	In my work unit, excellent work is similarly recognized for all employees (e.g., awards, acknowledgements).
Inclusion	**DEIA - Inclusion Subindex; 5-point scale; Averaged responses from following questions:**
Cronbach's Alpha = .92	Employees in my work unit make me feel I belong.
	Employees in my work unit care about me as a person.
	I am comfortable expressing opinions that are different from other employees in my work unit.
	In my work unit, people's differences are respected.
	I can be successful in my organization being myself.

Control Subindices

IWE	**Intrinsic Work Experience Subindex; 5-point scale; Averaged responses from following questions:**
Cronbach's Alpha = .88	I feel encouraged to come up with new and better ways of doing things.
	My work gives me a feeling of personal accomplishment.
	I know what is expected of me on the job.
	My talents are used well in the workplace.
	I know how my work relates to the agency's goals.
SUP	**Employee Engagement Index - Supervisors Subindex; 5-point scale; Averaged responses from following questions:**
Cronbach's Alpha = .95	My supervisor listens to what I have to say.
	My supervisor treats me with respect.
	I have trust and confidence in my supervisor.
	Overall, how good a job do you feel is being done by your immediate supervisor?

Note: For all subindices, responses listed as "do not know," "no basis to judge," and "not applicable" are recoded as n/a

Methods

Three mixed-effects regression models are employed to investigate the hypotheses. Using job satisfaction as the dependent variable, the first model measures fixed effects for all identified independent and control variables and uses random effects (intercepts only) to account for agency-level differences in outcomes. This model will primarily be used to test hypotheses 1 and 2: the effects of ethnorace and gender on job satisfaction without any interactions. Second, a similar mixed-effects model is specified with interaction terms between all ethnorace categories and binary gender. This model will be used to test hypotheses 3 and 4 by evaluating the different effects that race has on gender and gender has on race vis-à-vis job satisfaction. Finally, a third mixed-effects method is specified with three-way interaction terms between each ethnorace, gender, and each DEI subindex. This final model will test hypothesis 5, investigating whether attitudes about DEI practices mediate job satisfaction for particular groups.

Results

Descriptive Statistics

In the sample used for this study (comprising FEVS respondents in FY2022 that answered the questions included in model specifications), we find a relatively representative sample of the federal workforce: approximately 36% of respondents identify as an ethnoracial minority and approximately 46% identify as female (see Table 3.2 for full results). Regarding descriptive statistics of selected subindices, we see that the average responses range from about 3.84 to 4.29 on a 5-point Likert scale, indicating that the answers to these questions are skewed toward the positive (see Table 3.3). Finally, the number and percentages of respondents from the twenty-nine largest civilian agencies can be found in Table 3.4.

Table 3.2. Demographics

	n	*%*
White	218,782	63.86%
Black	48,071	14.03%
Hispanic	36,271	10.59%
Asian	20,700	6.04%
Other Race	18,793	5.49%
Female	158,426	46.24%
Male	184,191	53.76%
Supervisor	84,814	24.75%
Non-Supervisor	257,803	75.25%
Veteran	94,550	27.60%
Non-Veteran	248,067	72.40%
Disability	53,180	15.52%
No Disability	289,437	84.48%
Total Sample	**342,617**	

Table 3.3. Descriptive Statistics

	Mean	*SD*	*Median*	*Min.*	*Max.*
Diversity Subindex	3.99	0.95	4.00	1.00	5.00
Equity Subindex	3.84	1.04	4.00	1.00	5.00
Inclusion Subindex	4.06	0.87	4.00	1.00	5.00
IWE Subindex	3.99	0.85	4.00	1.00	5.00
Supervisor Subindex	4.29	0.90	4.60	1.00	5.00

Table 3.4. Agency Details

		n	*%*
AF	United States Department of the Air Force	19,226	5.61%
AG	Department of Agriculture	27,791	8.11%
AM	U.S. Agency for International Development	1,033	0.30%
AR	United States Department of the Army	38,911	11.36%

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CM	Department of Commerce	12,329	3.60%
CU	National Credit Union Administration	400	0.12%
DJ	Department of Justice	15,060	4.40%
DL	Department of Labor	4,240	1.24%
DN	Department of Energy	5,466	1.60%
DR	Federal Energy Regulatory Commission	538	0.16%
ED	Department of Education	1,487	0.43%
EE	Equal Employment Opportunity Commission	377	0.11%
EP	Environmental Protection Agency	4,694	1.37%
FT	Federal Trade Commission	360	0.11%
GS	General Services Administration	4,835	1.41%
HE	Department of Health and Human Services	32,539	9.50%
HS	Department of Homeland Security	46,324	13.52%
HU	Department of Housing and Urban Development	2,658	0.78%
IN	Department of the Interior	17,056	4.98%
NF	National Science Foundation	547	0.16%
NQ	National Archives and Records Administration	672	0.20%
NU	Nuclear Regulatory Commission	1,037	0.30%
NV	United States Department of the Navy	25,181	7.35%
OM	Office of Personnel Management	713	0.21%
SB	Small Business Administration	1,879	0.55%
ST	Department of State	4,872	1.42%
SZ	Social Security Administration	14,812	4.32%
TD	Department of Transportation	11,875	3.47%
TR	Department of the Treasury	20,628	6.02%
XX	All Other Agencies	5,443	1.59%
	Total	**342,617**	

Model Results

In model 1, we see statistically significant effects for all ethnoraces; all minority ethnoraces are more likely to have a higher level of job satisfaction (see Table 3.5). Put differently, the effect of being Black, Asian, Hispanic, or some other race all appear to have a positive relationship with job satisfaction holding other factors constant. Also in this model, we see that the effect of being female has a minimal but statistically significant negative effect on

job satisfaction. Regarding DEI indices, we see that the perception of diversity, equity, and inclusion in one's workplace are all positively correlated with job satisfaction (holding other factors constant), with inclusion and equity having stronger effects than diversity.

To interpret the findings from model 2 with two-way interactions between ethnorace and gender, we can observe some statistics directly from the model output, however, we must make a few additional calculations to understand the interaction effects. The effect of being female when White is simply the Female coefficient: -0.007 ($p<.01$). The effect of being a minority as a male can also be read directly from the model output: Black = 0.105; Asian = 0.035; Other = 0.042; and Hispanic = 0.078 (all $p<.01$). To evaluate the effects of being female when minority, we must add the female coefficient and the relevant interaction term coefficient. Doing so provides us with the following: Black = -0.030 ($p<.01$); Asian = -0.020 ($p<.05$); Other = 0.032 ($p<.01$); and Hispanic = -0.002 ($p>.1$). To evaluate the effects of being minority when female, we must add the relevant minority coefficient and the relevant interaction term coefficient. Doing so provides us with the following: Black = 0.082 ($p<.01$); Asian = 0.022 ($p<.01$); Other = 0.081 ($p<.01$); and Hispanic = 0.083 ($p<.01$; all effects are shown in Table 3.6).

The results from model 3 with three-way interactions are best observed through the use of marginal effects. Though it is possible to calculate the marginal effects of the perception of the DEI subindices on job satisfaction for individual intersectional subgroups, plotting the effects and interpreting them visually is more effective. As shown in figures 1-4, minority women are much more sensitive to the effects of the diversity subindex on job satisfaction compared to minority men ($p<.01$; see Table 3.5). The difference between White men and women is much less pronounced (see Figure 3.5). For the equity subindex shown in figures 6-9, we see that minority men are more sensitive to the effects of the equity subindex than minority women, but

that, generally, the differences between genders are far less pronounced than the diversity subindex (p<.01; see Table 3.5). There is almost no difference between White men and women regarding the effects of equity on job satisfaction (see Figure 10). In figures 11, 12, and 14, we see that Black, Asian, and Hispanic men are slightly more sensitive to the effects of inclusion on job satisfaction, though the effects are only statistically significant for Black and Hispanic respondents (p<.05; see Table 3.5). The differences in effects for White and "Other" men and women are not significant (see Figures 13 & 15; Table 3.5).

Table 3.5. Model Results

	Dependent Variable: Job Satisfaction		
	Models:		
	Model 1	Model 2	Model 3
Black	0.091***	0.105***	0.110***
	(0.003)	(0.005)	(0.01)
Asian	0.028***	0.035***	0.036***
	(0.005)	(0.007)	(0.006)
Other	0.062***	0.042***	0.055***
	(0.005)	(0.007)	(0.007)
Hispanic	0.080***	0.078***	0.086***
	(0.004)	(0.005)	(0.005)
Female	-0.008***	-0.007**	-0.002
	(0.002)	(0.003)	(0.003)
Diversity Index	0.022***	0.022***	0.016***
	(0.002)	(0.002)	(0.002)
Equity Index	0.141***	0.141***	0.146***
	(0.002)	(0.002)	(0.002)
Inclusion Index	0.140***	0.140***	0.142***
	(0.002)	(0.002)	-0.002
IWE Subindex	0.580***	0.580***	0.580***
	(0.002)	(0.002)	-0.002

Supervisor Subindex	0.083***	0.083***	0.083***
	(0.002)	(0.002)	-0.002
Disability	-0.001	-0.001	-0.001
	(0.003)	(0.003)	(0.003)
Under 40	-0.105***	-0.105***	-0.105***
	(0.003)	(0.003)	(0.003)
Former Military	0.026***	0.026***	0.026***
	(0.003)	(0.003)	(0.003)
Supervisor	-0.069***	-0.069***	-0.069***
	(0.003)	(0.003)	(0.003)
Turnover Intention	-0.396***	-0.396***	-0.396***
	(0.00)	(0.00)	(0.00)
Tenure	0.015***	0.015***	0.015***
	(0.00)	(0.00)	(0.00)
Black:Female		-0.023***	
		(0.01)	
Asian:Female		-0.013	
		(0.01)	
Other:Female		0.039***	
		(0.01)	
Hispanic:Female		0.005	
		(0.01)	
Black:Female:Diversity			0.024***
			(0.01)
Asian:Female:Diversity			0.051***
			(0.01)
Other:Female:Diversity			0.033***
			(0.01)
Hispanic:Female:Diversity			0.051***
			(0.01)
Black:Female:Inclusion			-0.013**
			(0.01)
Asian:Female:Inclusion			-0.012
			(0.01)

Other:Female:Inclusion			0.011
			(0.01)
Hispanic:Female:Inclusion			-0.029***
			(0.01)
Black:Female:Equity			-0.019***
			(0.01)
Asian:Female:Equity			-0.045***
			(0.01)
Other:Female:Equity			-0.043***
			(0.01)
Hispanic:Female:Equity			-0.025***
			(0.008)
Constant	0.096***	0.095***	0.091***
	(0.013)	(0.013)	(0.013)
Observations	342,915	342,915	342,915
Log Likelihood	-338,612.30	-338,612.30	-338,599.00
Akaike Inf. Crit.	677,262.60	677,270.70	677,260.00
Bayesian Inf. Crit.	677,466.70	677,517.80	677,593.10

*p<0.1; **p<0.05; ***p<0.01

Table 3.6. Interaction Effects

	Dependent Variable: Job Satisfaction
Being Female if White	-0.007**
	(0.003)
Being Female if Black	-0.030***
	(0.010)
Being Female if Asian	-0.020**
	(0.010)
Being Female if Other	0.032***

	(0.010)		
Being Female if Hispanic	-0.002		
	(0.010)		
Being Black if Female	0.082***	Being Black if Male	0.105***
	(0.009)		(0.005)
Being Asian if Female	0.022***	Being Asian if Male	0.035***
	(0.008)		(0.007)
Being "Other" if Female	0.081***	Being "Other" if Male	0.042***
	(0.007)		(0.007)
Being Hispanic if Female	0.083***	Being Hispanic if Male	0.078***
	(0.009)		(0.005)

Note: Results are calculated from main model interactions   *p<0.1; **p<0.05; ***p<0.01

Figure 3.1.   **Figure 3.2.**

Figure 3.3.

Interaction Plot: Diversity Index, Female, and Other

Figure 3.4.

Interaction Plot: Diversity Index, Female, and Hispanic

Figure 3.5.

Interaction Plot: Diversity Index, Female, and White

Figure 3.6.

Interaction Plot: Equity Index, Female, and Black

Figure 3.7.

Interaction Plot: Equity Index, Female, and Asian

Figure 3.8.

Interaction Plot: Equity Index, Female, and Other

Figure 3.9.

Interaction Plot: Equity Index, Female, and Hispanic

Figure 3.10.

Interaction Plot: Equity, Female, and White

Figure 3.11.

Interaction Plot: Inclusion Index, Female, and Black

Figure 3.12.

Interaction Plot: Inclusion Index, Female, and Asian

Figure 3.13.

Figure 3.14.

Interaction Plot: Inclusion Index, Female, and Other

Interaction Plot: Inclusion Index, Female, and Hispanic

Figure 3.15.

Interaction Plot: Inclusion, Female, and White

Hypothesis Testing

When testing the effects of identifying as an ethnoracial minority on job satisfaction, the results show a statistically significant difference (positive) from the reference group (White). As such, H1, which suggested there would not be a difference, is not supported. However, the coefficients (shown in model 1; Table 3.5) are small—less than one-tenth of a unit difference on a 5-point Likert scale. The small magnitude of difference should qualify claims about higher levels of job satisfaction for minorities. When testing the effects of identifying as a woman on

job satisfaction, the hypothesis that there would be no significant difference between men and women as it related to the outcome of job satisfaction holding other factors constant, H2, is somewhat supported. Though there is a statistically significant difference between men and women, the coefficient is minimal (.007) and insignificant for practical purposes (see Table 3.5).

The effects from the two-way interaction models, testing the effects of intersectional identities on job satisfaction, do not support the hypotheses proposed. For women, identifying as an ethnoracial minority is associated with higher levels of job satisfaction holding other factors constant (p<.01; Table 3.6). Thus, H3 is not supported. For men, identifying as an ethnoracial minority also has a statistically significant positive effect on job satisfaction (p<.01; Table 3.6). Further, the differences for being a minority are not much different between men and women—the only statistically significant differences are for Black respondents (being Black is associated with higher levels of job satisfaction for men compared to women; p<.05) and for "Other" respondents (being "Other" is associated with higher levels of job satisfaction for women compared to men; p<.01; see interaction terms from model 2 in Table 3.5). As such, H4 is supported.

Finally, the moderating effects of the workplace perception of diversity, equity, and inclusion practices are positive for all identity groups across all three indices, including the reference group. I had hypothesized that the moderating effects of these indices would be strongest for minority women and, as it relates to the diversity subindex, this holds and is statistically significant (p<.01; see model 3, Table 3.5). However, for the equity subindex, the differences in effects between genders are minimal and largely statistically insignificant. For the inclusion subindex, the statistically significant effects are stronger for minority men than they are for minority women, but so minuscule that they cannot really be observed visually—as such,

making claims about differences in effects between genders (or ethnocracy for that matter), should only be done carefully. In sum, H5 is mostly supported, but the effects for minority women are not more substantial than those for minority men in the equity and inclusion subindices.

Discussion

This study offers important insights into the role of diversity management in determining job satisfaction in the federal workforce. As shown by the results, there are significant differences between outcomes of intersectional identities as it relates to job satisfaction, but that the effects of certain aspects of diversity management on the workforce might be more uniform than the theories identified in this paper might lead us to believe.

The findings of this study related to intersectional identities expand upon existing theories and research, and offer opportunities for deeper investigations into the determinants of disparities in outcomes. Contrary to Hypotheses 3 which anticipated that identifying as an ethnoracial minority would have a more negative effect on job satisfaction for women due to compounding marginalization (Bowleg, 2008), the results revealed that both minority men and women reported higher levels of job satisfaction compared to their White counterparts. However, there are notable differences in effects for some intersectional identities. The effect of identifying as Black has a stronger positive effect on job satisfaction for men than it does women, and the positive effect is stronger women who identify as an ethnorace in the collapsed "other" category than it does for men.

The higher levels of job satisfaction reported by minority men and women can also be interpreted through the lens of social identity theory. Belonging to a minority group within a diverse workplace such as the federal government may foster a sense of solidarity and collective

identity that enhances job satisfaction. This sense of belonging might counterbalance any possible adverse effects of marginalization, especially in environments where diversity is actively managed and valued (Hogg & Terry, 2000).

The moderating effects of the perception of diversity, equity, and inclusion management practices in the workplace on intersectional identities and job satisfaction is an extremely important aspect of this study and there are several ways to interpret the findings. DEI practices, when effectively implemented and thus perceived positively, were expected to reinforce positive social identities by creating environments where all employees feel valued and supported, thus enhancing job satisfaction. This claim is supported by the findings that show a positive correlation between the diversity, equity, and inclusion subindices and job satisfaction across all models for all identities. However, the varied impact of the DEI subindices on different demographic groups—some having stronger effects for minority men than for minority women—suggests a more complex dynamic. This complexity might be explained in part by organizational justice theory which posits that perceptions of fairness and equity within an organization are central to understanding employee satisfaction (Colquitt et al., 2001).

The results suggest that minority men might be more sensitive to the effects of equity management practices in the federal workforce. It is possible that minority men perceive these aspects of DEI as more closely related to fairness and equitable treatment, which are critical to their job satisfaction. This finding supports the idea of non-additive intersectionality. If we are to believe that the effects of being a minority ethnorace and a minority as a woman would be compounding, then we might expect the moderating effects of equity management—the subindex most closely tied to ideas of fairness—to be strongest for minority women. However, Salter, Sawyer, and Gebhardt (2021) found that perceptions of diversity climate were negatively

associated with the number of minority statuses held by an individual, potentially implying that minority women may be less likely to perceive that equity is actually taking place in the workplace. It is also possible that minority women might place more emphasis on diversity practices that address broader issues of representation and visibility within the organization—supported by the findings that minority women are the most sensitive to the diversity subindex.

The results of this study also have practical implications for diversity management strategies within the federal workforce. First, the finding that minority employees generally report higher job satisfaction challenges the narrative that increased diversity automatically leads to negative outcomes such as lower job satisfaction or higher turnover intentions. While this study does not control for the diversity levels of specific agencies, the use of random intercepts at the agency level and the fact that we know there are relatively high levels of diversity in the federal workforce as a whole provide confidence that we are testing the effects within a relatively diverse workplace. Taken together with the finding that all DEI subindices are positively correlated to job satisfaction for all groups including the reference, this may suggest that when diversity is managed effectively, it can enhance job satisfaction across various demographic groups and mitigate previous findings of the negative effects of demographic heterogeneity on workplace outcomes.

Second, the differential effects of DEI subindices on job satisfaction suggest there may be a need for a more nuanced approach to diversity management. For example, while diversity initiatives might be particularly effective for enhancing job satisfaction among minority women, efforts to promote equity might require different approaches to be as effective for minority women as they are for minority men. A further consideration to make when interpreting these

results is that equity and inclusion subindices might capture sentiments about the culture of the organization and reflect the way people are treated whereas the diversity subindex is more likely to capture the policies and practices implemented by human resource managers. While further work is needed to disentangle the effects of various sentiments within these indices, what these findings ultimately tell us is that measuring the effectiveness of DEI policies and practices on specific demographic subgroups will elicit, sometimes surprising, findings.

Limitations & Future Research

While this study provides valuable insights into the effects of both intersectionality and DEI management practices within the federal workforce, it is not without limitations. The use of self-reported data from the Federal Employee Viewpoint Survey (FEVS) may introduce bias as responses are subject to individuals' perceptions as well as social desirability effects. Additionally, the study's focus on intersectional identities is limited to race and gender—while important, it does not consider other critical aspects of identity that are available on the FEVS such as disability and veteran status nor can it consider demographic variables currently not collected such as socioeconomic status, sexual orientation, or religion which may also interact to influence job satisfaction. Future research could explore these additional dimensions of identity and their interaction with DEI practices in the workplace. Future research might also provide a deeper understanding of how changes in diversity management practices over time impact job satisfaction among different demographic groups (assuming the FEVS continues to capture the DEIA subindices). Quasi-experimental designs might even be employed if diversity policies are well understood in a few agencies where there can be clean treatment and control groups.

Returning to the findings of this study, there are additional avenues to explore that might expand this research in helpful ways. The lack of support for hypotheses 1, 3, and 4 suggests that the relationship between identity and job satisfaction is more complex than initially anticipated. One potential explanation for this divergence from previous research is that the positive effects of minority status on job satisfaction is a result of the federal workforce operating differently than in other contexts—minority employees may experience the federal workplace in ways that bolster their job satisfaction, possibly due to effective diversity management or other organizational factors that were not fully captured in this study. Future research might compare the outcomes of federal or public employees to private employees. Further, as the reader may recall, the covariance between the inclusion and equity subindices was quite high, indicating that the constructs may be measuring phenomena that are too similar to capture effects that are occurring at a more micro level. As such, future research should disentangle these subindices to test the effects of particular questions on intersection identity groups to ensure these findings are indeed null or close to null.

Conclusion

This study introduces novel findings to the public administration field by simultaneously studying intersectional effects on job satisfaction and incorporating DEI management within the intersectional framework. There are several potentially surprising findings: (i) the effect of identifying as any ethnoracial minority is positively associated with job satisfaction in the federal workforce for both men and women, (ii) there are differences between men and women as it relates to the relationship between job satisfaction and minority status across ethnoracial groups with Black and Asian women showing lower levels of job satisfaction than men and women of

the "other race" category showing higher levels of job satisfaction compared to men, and (iii) perceived DEI management shapes the outcome of job satisfaction significantly for all intersectional identity groups including the reference categories, with little variation in perceived equity and inclusion, but significant variation in perceived diversity where women of all ethnoracial minorities show significantly more sensitivity to perceived diversity management on the outcome of job satisfaction than men.

The findings that DEI practices have a moderating role on job satisfaction align with the theoretical foundations of social identity theory and intersectionality theory. Social identity theory posits that individuals derive their self-concept from their membership in social groups, while DEI practices, when implemented effectively, help to reinforce positive social identities by creating environments where all employees feel valued and supported, thus enhancing job satisfaction. Intersectionality theory, which explores how various social identities intersect to create unique experiences of advantage or disadvantage, also supports the importance of DEI practices. The more substantial positive effects of DEI practices observed for minority women in relation to diversity perceptions lend evidence to the idea that these practices are essential to address the potentially compounded disadvantages that intersectionality theory predicts for this subgroup. Additionally, the finding that minority men are more sensitive to perceptions of equity management supports notions that intersectionality is not always additive in nature. Taken together, these findings suggest that while DEI practices are broadly beneficial, their effectiveness may depend on how well they align with the specific concerns and expectations of different demographic groups.

Discussions about the nuanced findings between intersectional identities are important, however, another key takeaway from this study is the general positive impact of diversity, equity,

and inclusion (DEI) management on job satisfaction across all ethnoracial groups, including White employees. This effect persists even when controlling for other factors such as intrinsic work experience and supervisory relationships. This finding supports the idea that effective DEI management is not just beneficial for marginalized groups but enhances the workplace experience for everyone, fostering a more inclusive and satisfying work environment while reinforcing the commonality of employees' desires for fairness, recognition, and belonging. This universality suggests that well-implemented DEI policies can serve as a cornerstone for building more cohesive and effective workplace cultures, benefiting all employees and ultimately strengthening organizational performance.

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CHAPTER 4: EXAMINING JOB SATISFACTION AND RACE IN THE FEDERAL
WORKFORCE WITH AI
INSIGHTS FROM CATEGORICAL RANDOM FOREST MODELS

Abstract

The field of public administration has long examined the motivations and factors that influence job satisfaction in the public sector. However, measuring the impact of various workplace indicators on outcomes like job satisfaction within the Federal Workforce remains a complex task, often more accessible to academics than to human resource practitioners. This paper aims to simplify the understanding of the determinants of job satisfaction in the federal workforce by applying categorical random forest models to the 2022 Federal Employee Viewpoint Survey (FEVS) data. Job satisfaction—a key indicator of employee contentment and organizational performance—is analyzed through a sophisticated yet accessible artificial intelligence (AI) approach, providing novel insights for public managers and researchers. By training categorical random forest models on job satisfaction, this study identifies the variables most closely associated with job satisfaction levels among all federal employees, both broadly and disaggregated by race and gender. By showcasing how these determinants vary across racial and gender lines, the findings enrich the academic discourse on workforce satisfaction and empower HR practitioners to develop targeted strategies for enhancing job satisfaction. Key findings indicate that intrinsic work experiences and satisfaction with pay are the most significant predictors of job satisfaction, with notable differences observed across different racial and gender groups.

Introduction

Public administration literature has long debated what motivates people to work in the public sector and what drives job satisfaction. Public service motivation (PSM; Naff & Crum, 1999; Bright, 2008; Christensen et al., 2017), pay satisfaction (Ting, 1997; Lee et al., 2020), supervisor management styles (Vermeeren et al., 2014; Wang & Brower, 2018), intrinsic work experience (Cherniss & Kane, 1987; Byrne et al., 2017), and diversity management (Pitts, 2009; Choi, 2013; Stazyk et al., 2021) have all been shown to be related to job satisfaction in the federal workforce. However, the strength of these relationships and the effects of each on employees of various demographic groups is more difficult to understand. In this paper, I address two primary research questions: (i) Which factors are most important for predicting job satisfaction? And (ii) are these factors consistent across demographic groups?

A vital tool in understanding the relationship between various workplace sentiments including job satisfaction in the federal workforce is the Federal Employee Viewpoint Survey (FEVS). However, the analysis of large datasets such as the FEVS to uncover patterns in the predictors of job satisfaction has historically required advanced statistical training. As such, research and practice can easily become dissociated. Academic work can be difficult to engage with outside of journals and conferences, and practitioners who are busy managing the minutiae and bureaucracy of public organizations might not have the time to engage with this literature. To address this understandable gap, this research intends to show, simply and straightforwardly, the relationship between various workplace indicators and the outcome of job satisfaction in the federal workforce by employing artificial intelligence (AI) models to evaluate administrative data—collectively and across races. By investigating disaggregated racial subsets of the FEVS, it is possible to gain a more nuanced understanding of how different groups experience job

satisfaction. By examining these differences, we can identify specific challenges and opportunities that may not be apparent when looking at aggregate data alone. This approach helps ensure that policies and practices can be tailored to meet the diverse needs of the increasingly diverse federal workforce.

Though there are countless theories that might explain the many associations explored in this study and countless conclusions that can be drawn from the findings, the primary purpose of this paper is to show how a data-forward approach might be more accessible to practitioners, especially when dealing with group-level differences in outcomes. Similarly, academic researchers might benefit from an exploration of AI approaches to research areas traditionally dominated by regression techniques, which typically rely on conventional causal theory-based methods. To provide researchers and practitioners with a clear understanding of the importance of various workplace indicators on an individual's self-reported job satisfaction in the federal workforce, this study turns to random forest modeling using the 2022 FEVS data. Models are trained on the aggregate data as well as subsets of the data divided by race and gender. The results unostentatiously show which variables from the FEVS are the most important when predicting variation in the outcome of job satisfaction—for all and across groups.

In what follows, I will briefly unpack the significance of job satisfaction as a workplace indicator as well as the importance of various public management practices on job satisfaction. I will then describe recent developments in data analysis and AI in public administration before presenting the methods and findings of this study.

Job Satisfaction in the Federal Workforce

Experiences of Job Satisfaction

For human resource professionals, the measurement of job satisfaction within the workplace is a critical indicator of organizational health. Understanding and improving job satisfaction can enhance positive outcomes such as the quality of employee performance and reduce negative outcomes such as turnover and turnover intention. Meta-analyses of primarily private sector workplaces consistently show positive correlations between job satisfaction and employee performance—employees who are happy with their jobs are more likely to exhibit higher levels of productivity and quality in their work (Petty et al., 1984; Judge et al., 2001). This relationship implies that efforts to enhance job satisfaction benefit employees' well-being and are strategic investments toward improving organizations' performance outcomes (Harrison et al., 2006). Further, a higher level of job satisfaction is associated with greater organizational commitment and a reduced propensity to quit (Spector, 1985). These findings have been supported by more recent studies in a variety of fields including child welfare (Li et al., 2020), nursing (Mahoney et al., 2020), the federal workforce (Pitts et al., 2011), and multi-sector studies (Sainju, 2021; Mathieu et al., 2016).

Job satisfaction can also have a profound reciprocal relationship with various employee attitudes including perceptions of their job roles and supervisors (Saari & Judge, 2004). These attitudes can shape an organization's overall work environment and culture, impacting team dynamics, collaboration, and workplace psychological safety (Alegre et al., 2016; Mitterer & Mitterer, 2023). Job satisfaction is also a broader indicator of the quality of employment, reflecting not only on the employer's commitment to creating a fulfilling work environment but also on societal and organizational values (Seashore, 1974). As such, these outcomes indicate

that job satisfaction is important for HR professionals to manage—retaining skilled employees is not only beneficial for sustaining organizational continuity and reducing the costs associated with hiring and training but also for ensuring institutional knowledge is preserved through a healthy workplace culture and stability within the workforce.

In the literature on job satisfaction within the federal workforce, several studies have unpacked the various factors and dynamics influencing this measure of employee well-being and organizational performance. A consistent theme across these investigations is the profound impact of perceived compatibility, job characteristics, organizational trust, employee empowerment, and demographic differences on job satisfaction. Notably, Yuan Ting's work (1996, 1997) highlights the influence of job and organizational characteristics such as pay satisfaction, promotion opportunities, task clarity, significance, skills utilization, organizational commitment, and the quality of relationships with supervisors and co-workers in determining job satisfaction levels among federal employees. This latter point is explored more deeply by Wang et al. (2019) where perceived compatibility between federal employees and their jobs, workgroups, and supervisors is demonstrated to affect job satisfaction significantly. Other indicators associated with higher levels of job satisfaction in the federal workforce are PSM (Naff & Crum, 1999; Bright, 2008; Christensen et al., 2017), empowerment practices (Fernandez & Moldogaziev, 2015), performance orientation/accountability and innovative culture (Yang & Kassekert, 2010), diversity management (Stazyk et al., 2012; Pitts, 2009), and remote- or telework availability and usage (though this is shown to be more important for female employees; Bae & Kim, 2016).

While there has been relative consistency in research over time about what general factors contribute to and are impacted by job satisfaction across sectors, how these factors differ

across groups is less clear. Racial disparities in job satisfaction are often linked to tangible job rewards and structural positions. For example, Black employees have historically reported lower workplace satisfaction, which can be traced back to comparatively lower pay, occupational prestige, and supervisory status (Tuch & Martin, 1991). However, more recent studies in the public sector have shown that the determinants of job satisfaction in the federal workforce do not vary significantly by race, with only subtle differences apparent—employee development is more important for men, recognition is more important to Whites, and pay, job status, and diversity management are shown to be more important to minority women (Lee et al., 2020).

Perceptual aspects of workplace experiences are also shown to be highly pervasive across sectors, especially as they relate to race. While investigating perceptions of Black workplace disparities through the lens of White supervisors and subordinates, Smith and Hunt (2020) find that the belief held by Whites that Black employees are less likely to get ahead due to a lack of motivation is particularly pervasive—it is the most widely held belief amongst Whites over time. However, some evidence suggests that these beliefs are less apparent in the public sector where there are more integrated workplaces (Smith & Hunt, 2020).

The perception of employment discrimination also plays a significant role in job satisfaction, with Black employees more likely to report experiences of discrimination than their counterparts who identify as White or of another minority background—this perception impacts job satisfaction levels and can contribute to observed and experienced racial disparities (Yang, 2021). For Black employees, these experiences are also shown to manifest in additional emotional labor required to navigate their work environments, negatively affecting their job satisfaction (Sloan & Unnever, 2016). Moreover, in a study focusing on intersectional experiences in the federal workplace, Nelson and Piatak (2021) find that minority women are

least likely to find their workplaces fair, open, or supportive, further demonstrating the need for management practices that address these disparate experiences.

Management Practices & Job Satisfaction

When examining the evolving priorities of public managers concerning employee job satisfaction within governmental sectors, significant emphasis has been placed on maintaining classical management practices while adapting to modern challenges that influence workplace satisfaction and efficiency. Some management reforms, including contracting out and civil service overhauls, can negatively influence job satisfaction—the success of such reforms often depends on high levels of trust in leadership (Yang & Kassekert, 2010). The specific characteristics of public sector work environments such as organizational goal conflicts and procedural constraints can also negatively impact job satisfaction, however, well-defined job roles and active communication between supervisors and employees are shown to mitigate some of these effects (Wright & Davis, 2003). Moreover, transforming traditional hierarchical organizational structures into ones that promote autonomy and participation is demonstrated as a way to promote a positive work culture and higher levels of job satisfaction (Durst & DeSantis, 1997).

Participative management—a more empowering management style that prioritizes employee input and open communication—has proven effective in fostering job satisfaction (Kim, 2002). Further, this style of management is associated with improved intrinsic work experiences that are indirectly associated with increased levels of job satisfaction (Wright & Kim, 2004). Recent work in participative management has incorporated components of diversity

and inclusion management practices to ensure that diverse voices can enrich strategic planning and foster a workplace culture that respects a wide range of perspectives (Mor Barak, 2015).

Research in public administration highlights the significant role that effective diversity management and perceived organizational fairness play in enhancing job satisfaction within public organizations. There is some evidence that more diverse workplaces are associated with lower job satisfaction. For example, lower levels of job satisfaction have been reported when an employee is a member of a minority group in the workplace (Choi, 2017) and there is a greater diversity of nationalities in the workplace (Hauret & Williams, 2020). Similarly, Choi (2013) finds that job satisfaction among minorities increases with greater diversity in management roles but that, in the aggregate, greater diversity is negatively associated with job satisfaction unless the perception of the diversity climate is positive. However, these negative effects have been shown to be mediated by successful diversity management (Pitts, 2009; Choi, 2013; Stazyk et al., 2021). Effective diversity management within public sector work environments help navigate organizational goal conflicts and procedural constraints by addressing diverse needs and barriers faced by employees from different backgrounds, thus, promoting a more inclusive and satisfying work environment (Shore et al., 2011; Ashikali & Groeneveld; 2015). Research also shows that diversity policies enhance job satisfaction by promoting organizational goal clarity (Stazyk et al., 2021) and employee performance (Pitts, 2009). As a final note, while fair practices and effective management of diversity are generally positively associated with job satisfaction, smaller positive impacts for ethnoracial minorities compared to Whites and a larger positive impact for women compared to men have been found (Choi & Rainey, 2014; Ordu, 2016).

In recent years, there has been a strategic shift towards addressing modern challenges heightened by the COVID-19 pandemic and remote work. For instance, transformational

leadership (defined as leaders who motivate by coaching employees to shift attitudes and assumptions; Burns, 1978) has recently gained traction. Though slow to emerge as a leadership style in public administration due to lasting bureaucratic norms (Wright & Pandey, 2010), transformational leadership has become increasingly significant due to (i) increased prevalence of diversity and (ii) inclusion management and during crises such as the COVID-19 pandemic. Almohtaseb et al. (2021), show that leaders who inspire and motivate their workforce enhance job satisfaction and organizational commitment even during times of stress. This leadership style might be even more prescient with the pandemic introducing turbulence in the workplace (Wesemann, 2023) and shifts to remote work (Lewis et al., 2023; Ki & Lee, 2024).

These developments illustrate ways that traditional management practices have evolved to become more understanding of the impacts of leadership, strategic human resource management, diversity and inclusion management, and crisis-driven challenges on job satisfaction. Notably, these practices all focus on intrinsic work experiences rather than performance-based metrics. This evolution reflects public managers' need to adapt to rapidly changing work environments and societal expectations of how work should *feel*, ensuring that public sector employment remains both effective and satisfying. To support these administrative efforts, a clearer understanding of what aspects of the workplace most influence job satisfaction can help improve efforts to strategically manage employee outcomes.

Use of Data & AI in Public Administration Contexts

The use of large datasets in public human resource contexts holds significant potential for managing workforce dynamics and achieving higher levels of job satisfaction. Organizational data sourced from human resource information systems including sentiment surveys like the

FEVS, operational databases, and communication records are growing and can provide comprehensive insights into workforce behavior and organizational performance (Guzzo, 2022; Nocker & Sena, 2019). This data's systematic collection and analysis allow for detailed performance metrics and predictive analytics, helping HR managers proactively identify and address factors impacting job satisfaction (Hamilton & Sodeman, 2020).

In practice, HR managers in the federal workforce have employed various strategies to leverage insights from increasingly large internal datasets. For instance, descriptive, predictive, and prescriptive analytics have been used to enhance decision-making in recruitment, retention, and performance management (Soares et al., 2022), and government agencies have successfully used predictive models to improve recruitment processes and reduce turnover by understanding job satisfaction drivers and retention factors (Cho et al., 2023).

The potential to use AI and machine learning in HR analytics to achieve powerful results efficiently is considerable. As Kang, Croft, and Bichelmeyer (2021) show, machine learning techniques such as Classification and Regression Tree (CART) analysis can predict turnover intentions by identifying strong predictors like job satisfaction and organizational support. These techniques offer granular insights into employee behaviors and motivations, enabling HR managers to develop more effective and personalized interventions. Furthermore, Hamilton and Sodeman (2020) emphasize that big data analytics such as AI modeling can strategically manage human capital resources by providing accurate, multidimensional analyses of HR constructs. This approach enhances theoretical insights and translates into practical improvements in recruitment, performance management, and employee retention, ultimately fostering a more satisfied and productive workforce.

Similarly, Random Forests—known for their robustness and efficacy in handling high-dimensional datasets—have been widely utilized across various sectors to analyze and predict outcomes. For example, Chang et al. (2022) utilized a Random Forest model to predict turnover risks and identified job satisfaction as the most important feature influencing these decisions. Further, in a comparison of multiple machine learning algorithms including Random Forests, Rustam et al. (2021) successfully predict job satisfaction from employee reviews. Their research highlights the adaptability of Random Forests in managing high-dimensional data typically encountered in job satisfaction studies. This technique is also beneficial for repeat use, as trained models can be deployed in future data sets, enhancing predictive analytics capabilities across various research questions (Sipper & Moore, 2021).

The strength of Random Forests in these applications is significantly enhanced by the feature importance mechanism, which reliably identifies the best predictors of outcomes. As noted by Ziegler and König (2014), this aspect of Random Forests is helpful for effectively managing high-dimensional data sets such as the FEVS where many of the constructs can be highly correlated. Identifying significant predictors can also help refine models and improve accuracy should a researcher wish to employ a more traditional regression technique after identifying the most important predictors (or features) of the outcome (Paul & Dupont, 2015; Degenhardt et al., 2017).

These findings from Random Forests share the same caveats associated with most AI models—the black-box nature of their results. While more traditional statistical models are defined and programmed by the researcher by defining dependent, independent, and control variables in order to test specific effects, the model specification associated with AI techniques is

more limited. Consequently, the results can suffer from biases unless they are accounted for in other ways.

AI offers both significant opportunities and complex challenges to the public sector. A systematic literature review by Chang et al. (2022) demonstrates the potential of AI to improve efficiency, decision-making, and service delivery but also points to the need for robust empirical methodologies and multidisciplinary theoretical frameworks to comprehensively understand AI's role in public governance. This is particularly true when dealing with data that can become decontextualized. When race, gender, and other demographics are associated with unique experiences of workplaces and services, those evaluating data and results from AI models must remain aware of the potential biases of the data and the (lack of) applicability to all groups (Cho et al., 2023). These applications of AI necessitate a balanced governance approach that integrates both outcome-focused and ethical considerations to ensure that AI systems align with legal and social standards.

Investigating the previously identified sentiments associated with job satisfaction in the federal workforce using advancements in AI and machine learning presents a promising avenue for enhancing management practices within the federal workforce. While traditional studies have identified key factors influencing job satisfaction, the integration of AI techniques like Random Forests allows more effective analysis of high-dimensional datasets such as the FEVS. This approach might reveal patterns within the predictors of job satisfaction across diverse employee groups, potentially exposing disparities and areas for improvement that conventional methods might overlook. Considering this potential, this study explores the question: Can machine learning techniques, such as Random Forests, bolster more equitable and inclusive management

practices by better understanding employee sentiments? The following section outlines the data and methodology employed to investigate this question.

Description of Data & Methodology

2022 Federal Employee Viewpoint Survey

The FEVS, first known as the Federal Employee Attitudes Survey (FEAS), was launched in 1979 following the Civil Service Reform Act of 1978. The survey assesses employee satisfaction, work relationships, perceptions of group and agency performance, and emerging changes in the federal workplace over time (Fernandez et al., 2015). The 2022 FEVS used in this study employs a stratified sampling method to maximize the generalizability of the data while protecting the anonymity of the most identifiable participants. The granularity of demographic details has varied over the years. For example, specific categories like race, ethnicity, gender, sexual orientation, disability status, veteran status, length of service, and supervisory status are detailed in some years, while in other years, data is aggregated into broader categories—such as classifying race into minority and non-minority groups from 2011 to 2019. Notably, certain categories like sexual orientation have been omitted in recent iterations of the survey. The 2022 survey includes detailed individual data on gender, race, ethnicity, and other pertinent demographic variables.

As has been common for decades, regression analyses remain the most popular statistical technique used to analyze human resource survey data (Batista-Foguet et al., 1990; Judge et al., 2017). In a synthesis of roughly a decade of FEVS research, Fernandez et al. (2015) chronicled the various methods used by researchers. The majority of the compiled studies utilized basic regression analyses including ordinary least squares and logistic regression. Some opted for

hierarchical regressions such as mixed-effects models, while others employed more complex analyses including structural equation modeling (Fernandez et al., 2015). These methods often seek to confirm correlational hypotheses related to specific variables (most of which are a Likert scale), building upon existing or newly devised theories.

In assessing job satisfaction using Federal Employee Viewpoint Survey (FEVS) data, the choice between treating outcome variables such as job satisfaction with Likert scale responses as categorical or continuous variables involves significant methodological considerations dependent upon the research questions. Treating Likert scale data as continuous simplifies the analytical process and offers straightforward interpretation. Continuous treatment can provide greater statistical efficiency and sensitivity in detecting small changes in attitudes or perceptions so long as the distribution is relatively normal and the populations are homogenous (Lubke & Muthen, 2004; Sullivan & Artino, 2013). However, the reliance of parametric measures on means from a Likert scale inherently deforms the nature of this ordinal data (Jamieson, 2004; Fitriyati et al., 2022), and the "coarseness" of Likert scales can lead to a significant amount of information loss when incorporating interaction effects in regression models due to unknown systematic error (Russell & Bobko, 1992).

Using models with categorical outcomes such as ordinal logistic regression or multilevel generalized linear models for Likert scale data can allow for analyses that properly reflect the scale's structure which might not necessarily have equal intervals between response options (Lubke & Muthen, 2004; Hox et al., 2017). This approach might also mitigate the risk of distorted factor structures across different groups (Lubke & Muthen, 2004). However, analyzing Likert scale data categorically can complicate statistical procedures. Multigroup confirmatory factor models, for example, require robust methodologies that can handle the ordered nature of

data while testing for measurement invariance across groups (French & Finch, 2008; Hirschfeld & Brachel, 2014). This complexity can limit the practicality of analyses and make interpretation and application more difficult. Even multinomial logistic regression may require more parameters and assumptions that can be challenging to validate (Camminatiello & Lucadamo, 2008; El-Habil, 2012). Treating responses as categorical can also lead to a reduction in the statistical power of the analysis. As Wagner et al. (2001) note, discretization of data into fewer categories can significantly reduce the precision of measurements, potentially obscuring real differences or changes in the outcome variable over time or between groups.

As shown, the decision to treat FEVS data as categorical or continuous should be driven by the specific research objectives and the theoretical underpinnings of the study. This decision, while challenging, has the potential to significantly advance our understanding of employee perceptions within the federal workforce. For analyses focusing on detailed, nuanced differences in perceptions across diverse groups, a categorical approach might provide more accurate insights, respecting the ordinal nature of the data. For this study, likert scale variables are treated as ordinal categories, a decision that could inspire further research and contribute to the ongoing dialogue in the field.

Random Forest Specification

For this study, I use a categorical random forest model to predict job satisfaction based on various demographic and sentiment indicators from the 2022 FEVS. Essentially, this model functions by constructing multiple decision trees during the training phase, where each tree is constructed from a random subset of the data. In this specification, 70% of the individual responses are used to train the model, while 30% are retained for testing the model's fit. This

sampling is done with replacement, a method known as bootstrapping. Each sample may contain certain data points more than once and others not at all, which helps build diverse trees and, thus, a robust model. At each tree node, a random subset of the predictor variables (age, race, or a Likert scale response to a survey question, for example) is selected to determine the best split. This randomness ensures that the model does not overly rely on any single predictor, reducing the risk of overfitting and improving the model's generalizability. The decision trees in a random forest model split the data into branches based on these predictors. The aim is to create groups (or leaves) as homogenous as possible with respect to the outcome variable (in this case, job satisfaction). The process continues recursively, splitting each branch further until a specified stopping criterion is met (in the case of this specification, 123,377 nodes).

The input data is passed down each tree (500 in this specification) to ultimately make a prediction. Each tree provides a prediction of the job satisfaction category, and the final output is typically the mode of all these individual tree predictions. This aggregation method is known as majority voting and helps achieve higher accuracy by balancing out biases in individual trees. Aside from the prediction itself, one of the most helpful outputs of a random forest model is the measure of feature importance. This metric indicates how valuable each variable was in making accurate predictions across all the trees. Variables that significantly improve homogeneity when used in splits are considered more important.

This study uses categorical random forest models to capture complex interactions and nonlinear relationships between multiple predictors and job satisfaction. First, the model is trained on the aggregate training data (excluding observations with omitted variables; 268,555) and tested on the remaining data (115,092 observations). Next, the data is subsetted by race and,

in the case of Black and White employees, also by gender. New models are again trained on 70% of the observations and tested on the remaining 30%.

A key benefit to using this model is the ability for random forests to account for significantly more variables than traditional regressions without the risk of overfitting. As such, this study is able to include over forty variables.

Variables

The outcome variable (otherwise known as the dependent variable) for this study is the self reported level of job satisfaction (see Table 4.1). Respondents are asked, "Considering everything, how satisfied are you with your job?" to which the responses range from "very dissatisfied" to "very satisfied."

Demographic variables including binary sex, race, ethnicity, disability status, supervisory status, and veteran status are used as predictors of job satisfaction. Twenty-three survey questions such as "Supervisors in my work unit support employee development" are also used as predictor variables where the responses are coded to an ordinal 1-5 likert scale with an additional "99" response for answers such as "Do Not Know," "No Basis to Judge," and "Not Applicable" (details on all variable can be found in Table 4.1). The model interprets 99 as a separate phenomena as it is distant enough from 1-5 (which are interpreted as ordinal and closely related). Additionally, five questions related to the pandemic, transitions (back) to the worksite, and workplace flexibilities are included. Intrinsic Work Experience (IWE) and the Employee Engagement Index - Supervisors Subindex (SUP) are included as predictors as well.

Table 4.1. Variables

Dependent Variable

Job Satisfaction	Question from the FEVS: "Considering everything, how satisfied are you with your job?"
	5-point scale: 5 = Very Satisfied, 1 = Very Dissatisfied

Demographic Variables

Sex	Respondent's self-reported sex (Male/Female; 0/1)
Race	Respondent's self-reported race. Black, White, Asian, and Other (collapsed for privacy) are recorded from FEVS responses as dummy variables (0/1)
Hispanic	Respondent's self-reported ethnicity. Non-Hispanic or Hispanic are recorded from FEVS responses as dummy variables (0/1)
Disability	Respondent asked, "Are you an individual with a disability?" (0/1)
Age (under40)	Age groups (Over 40/Under 40; 0/1)
Supervisor	Non-Supervisor/Team Leader = 0, Supervisor/Manager/Executive = 1
Military Service	Respondent asked, "What is your US military service status?" 0 = no prior military service and 1 = prior military service
Length of Service (DFEDTEN)	Answers recoded: 1 = ten years or fewer, 2 = eleven to twenty years, and 3 = more than twenty years
Turnover Intention (leaving)	Answers recoded: 0 = No, 1 = Yes

Survey Questions

Q46	**Supervisors in my work unit support employee development.**
	5-point scale: 5 = Strongly Agree, 1 = Strongly Disagree; 99 = Do Not Know
Q55	**In my organization, senior leaders generate high levels of motivation and commitment in the workforce.**
	5-point scale: 5 = Strongly Agree, 1 = Strongly Disagree; 99 = Do Not Know
Q56	**My organization's senior leaders maintain high standards of honesty and integrity.**
	5-point scale: 5 = Strongly Agree, 1 = Strongly Disagree; 99 = Do Not Know
Q57	**Managers communicate the goals of the organization.**
	5-point scale: 5 = Strongly Agree, 1 = Strongly Disagree; 99 = Do Not Know
Q59	**Overall, how good a job do you feel is being done by the manager directly above your**

immediate supervisor?

5-point scale: 5 = Very Good, 1 = Very Poor; 99 = Do Not Know

Q60   **I have a high level of respect for my organization's senior leaders.**

5-point scale: 5 = Strongly Agree, 1 = Strongly Disagree; 99 = Do Not Know

Q69   **Considering everything, how satisfied are you with your pay?**

5-point scale: 5 = Very Satisfied, 1 = Very Dissatisfied

Q71   **My organization's management practices promote diversity (e.g., outreach, recruitment, promotion opportunities).**

5-point scale: 5 = Strongly Agree, 1 = Strongly Disagree; 99 = Do Not Know

Q72   **My supervisor demonstrates a commitment to workforce diversity (e.g., recruitment, promotion opportunities, development).**

5-point scale: 5 = Strongly Agree, 1 = Strongly Disagree; 99 = Do Not Know

Q73   **I have similar access to advancement opportunities (e.g., promotion, career development, training) as others in my work unit.**

5-point scale: 5 = Strongly Agree, 1 = Strongly Disagree; 99 = Do Not Know

Q74   **My supervisor provides opportunities fairly to all employees in my work unit (e.g., promotions, work assignments).**

5-point scale: 5 = Strongly Agree, 1 = Strongly Disagree; 99 = Do Not Know

Q75   **In my work unit, excellent work is similarly recognized for all employees (e.g., awards, acknowledgements).**

5-point scale: 5 = Strongly Agree, 1 = Strongly Disagree; 99 = Do Not Know

Q76   **Employees in my work unit treat me as a valued member of the team.**

5-point scale: 5 = Strongly Agree, 1 = Strongly Disagree; 99 = No Basis to Judge

Q77   **Employees in my work unit make me feel I belong.**

5-point scale: 5 = Strongly Agree, 1 = Strongly Disagree; 99 = No Basis to Judge

Q78   **Employees in my work unit care about me as a person.**

5-point scale: 5 = Strongly Agree, 1 = Strongly Disagree; 99 = No Basis to Judge

Q79   **I am comfortable expressing opinions that are different from other employees in my work unit.**

5-point scale: 5 = Strongly Agree, 1 = Strongly Disagree; 99 = No Basis to Judge

Q80   **In my work unit, people's differences are respected.**

5-point scale: 5 = Strongly Agree, 1 = Strongly Disagree; 99 = No Basis to Judge

Q81   **I can be successful in my organization being myself.**

5-point scale: 5 = Strongly Agree, 1 = Strongly Disagree; 99 = No Basis to Judge

Q85   **My job inspires me.**

5-point scale: 5 = Strongly Agree, 1 = Strongly Disagree

Q86	**The work I do gives me a sense of accomplishment.**
	5-point scale: 5 = Strongly Agree, 1 = Strongly Disagree
Q87	**I feel a strong personal attachment to my organization.**
	5-point scale: 5 = Strongly Agree, 1 = Strongly Disagree
Q88	**I identify with the mission of my organization.**
	5-point scale: 5 = Strongly Agree, 1 = Strongly Disagree
Q89	**It is important to me that my work contributes to the common good.**
	5-point scale: 5 = Strongly Agree, 1 = Strongly Disagree

Pandemic, Transition to the Worksite, Workplace Flexibilities

Q90	**What percentage of your work time are you currently required to be physically present at your agency worksite (including headquarters, bureau, field offices, etc.)?**
	4-point scale: 1 = 100%, 2 = 50%-99%, 3 = <50%, 4 = 0%
Q94	**My agency's re-entry arrangements are fair in accounting for employees' diverse needs and situations.**
	5-point scale: 5 = Strongly Agree, 1 = Strongly Disagree; 99 = Not Applicable
Q96	**My organization's senior leaders support policies and procedures to protect employee health and safety.**
	5-point scale: 5 = Strongly Agree, 1 = Strongly Disagree; 99 = No Basis to Judge
Q98	**My supervisor supports my efforts to stay healthy and safe while working.**
	5-point scale: 5 = Strongly Agree, 1 = Strongly Disagree; 99 = No Basis to Judge
Q99	**My supervisor creates an environment where I can voice my concerns about staying healthy and safe.**
	5-point scale: 5 = Strongly Agree, 1 = Strongly Disagree; 99 = No Basis to Judge

Subindices

IWE	**Intrinsic Work Experience Subindex; 5-point scale; Averaged responses from following questions:**
	I feel encouraged to come up with new and better ways of doing things.
	My work gives me a feeling of personal accomplishment.
	I know what is expected of me on the job.
	My talents are used well in the workplace.
	I know how my work relates to the agency's goals.
SUP	**Employee Engagement Index - Supervisors Subindex; 5-point scale; Averaged responses from following questions:**
	My supervisor listens to what I have to say.

> My supervisor treats me with respect.
>
> I have trust and confidence in my supervisor.

Results

Model Performance Statistics

The results of the full model are promising. In 70.66% of cases, the model can accurately predict the respondent's job satisfaction level based on the predictor variables (p-value < .01; see Table 4.2). A full report of the correct and incorrect predictions can be seen in Table 4.3; the correct predictions are shown in the diagonal line from the top left to the bottom right. The tapering of incorrect predictions across classes indicates that the model, if not precisely accurate, is quite good at approximating the respondent's job satisfaction within a class or two for the large majority of observations. The model performs best for class 5 ("Very Satisfied"), but also very well for classes 1 and 4—"Very Dissatisfied" and "Satisfied," respectively—as shown in the high levels of positive predictive values (precision) and balanced accuracy scores in Table 4.4.

When testing the subsetted data, the models also perform quite well. The model using observations from respondents who identify as White has an accuracy rate of 70.28%, Black 71.15%, Asian 73.54%, and Other 67.4%. Further subsetting of race by gender elicits similar results: Black Female 70.22%, Black Male 71.77%, White Female 70.48%, and White Male 70.16%. See Table 4.2 for these results (confusion matrices and statistics by class for subsetted models can be found in the appendix).

Table 4.2. Model Performance Statistics

Accuracy	Accuracy Lower	Accuracy Upper	Accuracy Null	Kappa	Accuracy P Value	McNemar P Value

Aggregate	0.706574	0.703934	0.709204	0.430708	0.571881	< 2.2e-16	< 2.2e-16
White	0.702788	0.699682	0.705879	0.429687	0.567033	< 2.2e-16	< 2.2e-16
Black	0.711536	0.704527	0.718470	0.430771	0.570552	< 2.2e-16	< 2.2e-16
Other	0.673952	0.663438	0.684336	0.401968	0.542220	< 2.2e-16	< 2.2e-16
Asian	0.735374	0.724865	0.745686	0.475182	0.589496	< 2.2e-16	< 2.2e-16
Black Female	0.702150	0.693224	0.710962	0.440624	0.559371	< 2.2e-16	< 2.2e-16
Black Male	0.717715	0.706178	0.729042	0.413907	0.572189	< 2.2e-16	< 2.2e-16
White Female	0.704776	0.700058	0.709461	0.443950	0.563303	< 2.2e-16	< 2.2e-16
White Male	0.701605	0.697469	0.705717	0.418779	0.570367	< 2.2e-16	< 2.2e-16

Table 4.3. Aggregate Confusion Matrix

		Reference			
Prediction	**1**	**2**	**3**	**4**	**5**
1	**3506**	1077	279	81	24
2	1536	**5099**	2394	723	41
3	301	2616	**6950**	2888	97
4	195	1820	7146	**40870**	7302
5	6	56	180	5009	**24896**

Table 4.4. Aggregate Class Statistics

	Class: 1	Class: 2	Class: 3	Class: 4	Class: 5
Sensitivity	0.6324	0.4780	0.4101	0.8245	0.7693
Specificity	0.9867	0.9550	0.9399	0.7487	0.9365
Pos Pred Value	0.7059	0.5207	0.5408	0.7129	0.8258
Neg Pred Value	0.9815	0.9471	0.9022	0.8494	0.9121
Prevalence	0.0482	0.0927	0.1473	0.4307	0.2812
Detection Rate	0.0305	0.0443	0.0604	0.3551	0.2163
Detection Prevalence	0.0432	0.0851	0.1117	0.4981	0.2619
Balanced Accuracy	0.8095	0.7165	0.6750	0.7866	0.8529

Feature Importance

As previously mentioned, a key advantage of Random Forest models is their ability to output feature importance metrics which help in understanding how different variables contribute to the model's predictions. One straightforward way to interpret these metrics is by evaluating the increase in node purity—a measure of how homogeneous the responses within a node become following a split based on a specific variable. The randomForest package in R quantifies this through a Gini index, which tracks each variable's contribution to increasing purity across all nodes in the forest. By analyzing which features lead to the most significant increases in node purity, we can identify the most influential variables in predicting the outcome.

As shown in Table 4.5, the most important features in the aggregate model are, in order of importance, the Intrinsic Work Experience Subindex, Q85 (my job inspires me), Q86 (the work I do gives me a sense of accomplishment), Q69 (considering everything, how satisfied are you with your pay?), and Q87 (I feel a strong personal attachment to my organization). Though these questions are consistently shown to be the five most important questions across all subsets, the results shift somewhat by race. For example, while IWE is the most important for the White and Other Race subsets, satisfaction with pay is the most important in the Asian and Black subsets with the effect being larger for Black women than Black men. Also of note is the relative importance of pay for White women as opposed to White men. In the context of intersectional effects, it is worth noting that pay is nearly twice as important compared to 'having a strong personal attachment to one's organization' for Black women but only 5.9% more important for White men.

Table 4.5. Feature Importance - Top 5 Ranked

All Respondents (Aggregate Model)

Aggregate Respondents (n = 383,647)	Importance
IWE Intrinsic Work Experience Subindex	12017.15
Q85 "My job inspires me."	11235.92
Q86 "The work I do gives me a sense of accomplishment."	11153.18
Q69 "Considering everything, how satisfied are you with your pay?"	10767.64
Q87 "I feel a strong personal attachment to my organization."	7575.48

Subsets by Race

White Respondents (n = 121,238)	Importance
IWE Intrinsic Work Experience Subindex	9836.74
Q86 "The work I do gives me a sense of accomplishment."	8494.42
Q85 "My job inspires me."	8221.29
Q69 "Considering everything, how satisfied are you with your pay?"	7213.31
Q87 "I feel a strong personal attachment to my organization."	5454.30

Black Respondents (n = 54,562)	Importance
Q69 "Considering everything, how satisfied are you with your pay?"	1936.91
Q85 "My job inspires me."	1680.25
IWE Intrinsic Work Experience Subindex	1633.88
Q86 "The work I do gives me a sense of accomplishment."	1490.74
Q87 "I feel a strong personal attachment to my organization."	1049.96

Subsets by Race and Gender (Black and White Only)

Black Female Respondents (n = 34,421)	Importance
Q69 "Considering everything, how satisfied are you with your pay?"	1249.20
Q85 "My job inspires me."	1108.45
IWE Intrinsic Work Experience Subindex	1082.89
Q86 "The work I do gives me a sense of accomplishment."	955.04
Q87 "I feel a strong personal attachment to my organization."	632.97

Black Male Respondents (n = 20,141)	Importance
IWE Intrinsic Work Experience Subindex	628.64
Q69 "Considering everything, how satisfied are you with your pay?"	604.59
Q86 "The work I do gives me a sense of accomplishment."	595.03
Q85 "My job inspires me."	539.37
Q87 "I feel a strong personal attachment to my organization."	440.72

Asian Respondents (n = 23,315)		Importance	White Female Respondents (n = 121,238)		Importance
Q69	"Considering everything, how satisfied are you with your pay?"	787.34	IWE	Intrinsic Work Experience Subindex	4049.12
IWE	Intrinsic Work Experience Subindex	680.68	Q69	"Considering everything, how satisfied are you with your pay?"	3689.40
Q86	"The work I do gives me a sense of accomplishment."	617.39	Q85	"My job inspires me."	3406.47
Q85	"My job inspires me."	577.25	Q86	"The work I do gives me a sense of accomplishment."	3401.87
Q87	"I feel a strong personal attachment to my organization."	533.56	Q87	"I feel a strong personal attachment to my organization."	2234.11

Other Race Respondents (n = 26,086)		Importance	White Male Respondents (n = 158,446)		Importance
IWE	Intrinsic Work Experience Subindex	914.39	IWE	Intrinsic Work Experience Subindex	5709.38
Q85	"My job inspires me."	805.10	Q85	"My job inspires me."	5090.40
Q69	"Considering everything, how satisfied are you with your pay?"	804.19	Q86	"The work I do gives me a sense of accomplishment."	5033.58
Q86	"The work I do gives me a sense of accomplishment."	798.38	Q69	"Considering everything, how satisfied are you with your pay?"	3639.21
Q87	"I feel a strong personal attachment to my organization."	561.93	Q87	"I feel a strong personal attachment to my organization."	3437.14

Note: Feature importance is calculated via a Gini index of increasing node purity. Importance values should not be compared across models.

Discussion & Future Use Considerations

This study shows the importance of understanding structural and perceptual indicators of job satisfaction in the federal workforce through the lens of race and gender. By employing categorical random forest models, the variables most closely associated with job satisfaction across groups were delineated, offering both theoretical and practical implications.

In terms of theory, these results support and expand upon existing discussions of job satisfaction and organizational behavior. The significant role of variables such as the IWE and satisfaction with pay aligns with the human resource management literature that highlights the

importance of intrinsic motivation and equitable compensation (Saari & Judge, 2004; Alegre et al., 2016). The remaining three questions that emerge in the top five features for all groups appear to address aspects of PSM and inclusion. While "My job inspires me" and "The work I do gives me a sense of accomplishment" do not directly map onto constructs designed to directly test PSM (Perry, 1996; Christensen et al., 2017), the connection between the value one places on their work might suggest a close proxy (Weaver, 2015). Similarly, "I feel a strong personal attachment to my organization" might be associated with constructs of PSM and even inclusion management.

Though the most powerful predictors of job satisfaction are consistently present across groups, their relative importance changes. As such, this study leads us to two complementary conclusions. First, public managers can be assured that all employees most value the same five workplace sentiments—moving the needle in any of these areas should improve job satisfaction across the board. Second, these results confirm that racial and gender disparities in workplace experiences and outcomes exist. Notably, the perceived importance of pay among Black and Asian employees might suggest a continuing disparity in perceived fairness and recognition, despite ongoing diversity management efforts (Stazyk et al., 2012; Pitts, 2009). Moreover, the relative importance of pay for Black women compared to White men may lend evidence to findings in federal workforce research that suggest minority women are less likely to find their workplaces to be fair (Nelson & Piatak, 2021). As noted in the results, compared to 'having a strong personal attachment to one's organization,' pay is nearly twice as important for Black women, but only 5.9% more important for White men, suggesting that underlying motivations may differ substantially between groups. These insights are especially important for HR

practitioners who aim to tailor interventions that address these disparities and foster a more inclusive work environment.

The findings of this study also highlight the need for practices that are supportive of diversity and inclusion management efforts. The importance of IWE underscores the role of supportive management practices such as participative management and transformational leadership styles that emphasize empowering employees and creating a motivating work environment (Kim, 2002; Ashikali & Groeneveld, 2015). By identifying how the predictors of job satisfaction shift across racial lines, HR professionals can tailor interventions that address the specific challenges faced by different racial groups. These efforts could involve strategies aimed at improving the objective rewards associated with jobs, fostering an inclusive culture that mitigates perceptions of discrimination, and supporting employees in managing the emotional demands of their work.

Practically, the simple methods associated with this study provide researchers and HR professionals with a more novel approach to identifying needs, concerns, and disparities in subjective outcomes with their employees. The application of categorical random forest models in this context not only highlights the value of AI and machine learning in public administration research, but also reveals the complexity and diversity of employee experiences. Additionally, the application of random forest models in this context offers an alternative to traditional regression methods, which may not adequately capture the complex interactions or nonlinear relationships between variables. The feature importance metrics provide a clear indication of which factors are most predictive of job satisfaction which can offer a data-driven foundation for policy recommendations.

Several avenues for future research emerge from this study. First, human resource managers might use these methods to uncover even deeper trends with information that is not publicly available. For example, pay satisfaction, IWE, and sentiments about the importance of one's work (potentially measuring PSM), might show up very differently for groups of individuals with different pay grades. Understanding these differences can help managers better target interventions for specific groups, especially when pay cannot be adjusted for particular roles. Second, future research could benefit from a mixed-methods approach, combining quantitative findings with qualitative insights to capture the full spectrum of employee experiences. While seeing that "My job inspires me" is an important sentiment for job satisfaction, we cannot easily know what it is about an individual employee's job that inspires them without qualitative interviews. These data would complement each other well to create more evidence-based policy interventions.

Conclusion

This study sought to understand the determinants of job satisfaction within the federal workforce by employing categorical random forest models on data from the 2022 Federal Employee Viewpoint Survey. The findings reveal that intrinsic work experiences and satisfaction with pay are powerful predictors of job satisfaction in the federal workforce. However, notable differences are observed across racial and gender groups—satisfaction with pay emerged as a more significant predictor for minority employees, particularly Black women. At the same time, IWE is shown to be a more significant predictor for both White men and women.

The results of this study support and expand upon existing theories of job satisfaction and organizational behavior. The significant role of intrinsic work experiences aligns with the human

resource management literature, which emphasizes the importance of intrinsic motivation and equitable compensation. The findings also highlight differences in workplace experiences across race and gender lines, suggesting continued efforts in diversity management are necessary. This study also offers actionable insights for HR practitioners. By identifying key predictors of job satisfaction and understanding how these predictors vary across different groups, HR professionals can develop targeted interventions to enhance job satisfaction. For example, strategies to improve objective job rewards, foster an inclusive culture, and support employees in managing the emotional demands of their work could positively impact IWE and reinforce PSM.

The methodological approach taken in this study demonstrates the potential value of AI analytics in a public administration context. It uncovers workforce dynamics that might not be understood through traditional analytic approaches. Using categorical random forest models, for example, can provide straightforward analyses that can be used for policy recommendations to improve job satisfaction for employees across demographic groups. As public managers continue to navigate the complexities of diversity and inclusion in their organizations, insights such as these will be invaluable in shaping policies and practices that meet the needs of an increasingly diverse federal workforce.

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CHAPTER 5: CONCLUSION

Introduction

This body of work represents an in-depth analysis of the way that diversity and the management of diversity impact the outcome of job satisfaction in the federal workforce. Though a significant amount of prior research has been conducted testing the effects of demographic heterogeneity, demographic congruence, and diversity management on job satisfaction, the work has primarily focused on differences in outcomes between Whites and Minorities due to the lack of disaggregation of ethnoracial identities prior to the 2020 FEVS. The novelty of this work lies in the testing of the effects that belonging to a specific identity group might have on the relationship between diversity and the workplace outcomes. This was accomplished in three distinct ways.

In Chapter 2, I tested the effects of both demographic congruity (representation) and demographic heterogeneity (diversity) in one's agency on job satisfaction in the federal workforce. This was accomplished by merging individual-level demographics and sentiment responses from the FEVS with agency-level demographic data from FedScope.

In Chapter 3, I sought to understand how intersectional identities might differ in their relationship to job satisfaction, especially as it relates to the perception of diversity management in the federal workforce. This was accomplished by creating interaction effects within models between gender and race, as well as gender, race, and diversity management.

In Chapter 4, I set out to understand two questions simultaneously: (i) what factors most impact one's job satisfaction and does this differ by race, and (ii) is there an efficient AI methodology that might be more practical to use than traditional regression analyses for public

human resource managers. I successfully employed categorical random forest models with straightforward results to measure the importance of various predictors of job satisfaction across demographic groups.

In what follows, I will provide a recap of the results of these studies, followed by a synthesis of the findings in relation to the theory. I will end by describing what I see as the practical implications of this work and avenues for future research.

Summary of Key Findings

Chapter 2 Findings

The findings from Chapter 2 reveal a nuanced relationship between demographic congruence within federal agencies and job satisfaction among ethnoracial minorities. Across the board, increased demographic congruence—meaning a higher representation of an individual's own ethnoracial group within an agency—correlates with higher job satisfaction. However, the magnitude of this effect varies by group. The positive relationship is most pronounced among the smallest minority groups categorized as "other race," and those who identify as Black. For Asian respondents, while the positive relationship exists, it is less pronounced, and interestingly, the job satisfaction of the reference group (all other ethnoraces) increases more noticeably as the proportion of Asian employees grows. Hispanic respondents show a curvilinear relationship, where job satisfaction peaks at a certain level of demographic congruence before tapering off.

The analysis of demographic heterogeneity, or diversity, within federal agencies reveals a complex and generally negative relationship with job satisfaction among employees. As diversity within an agency increases, job satisfaction tends to decrease across most ethnoracial groups, with a notable curvilinear pattern emerging. Initially, as diversity levels rise within an agency,

job satisfaction declines, reaching a low point before gradually increasing again after a certain threshold of diversity is surpassed. This pattern holds true for most groups, suggesting that there might be an initial period of adjustment or discomfort as agencies become more diverse. However, the response among Hispanic employees deviates from this trend, exhibiting a consistently negative relationship with increasing diversity, indicating that higher levels of demographic heterogeneity do not correspond to improved job satisfaction for this group. These findings highlight the potential challenges that come with increasing diversity in the workplace, suggesting that while a more heterogeneous workforce may eventually lead to higher satisfaction, the process of getting there can be associated with reduced job satisfaction, particularly among certain groups.

The findings of this study show the importance of carefully managing diversity to mitigate its initial negative impacts on employee morale and emphasize the importance of representation within one's organization.

Chapter 3 Findings

The findings from Chapter 3 show that ethnoracial identity, gender, and perceptions of diversity management interact to affect the outcome of job satisfaction within the federal workforce. The analysis reveals that being a member of any minority ethnoracial group—whether Black, Asian, Hispanic, or categorized as "other"—is positively associated with higher levels of job satisfaction compared to White employees. This finding suggests that, when holding other factors constant, minority status itself may contribute to a greater sense of fulfillment or contentment in the workplace. However, gender complicates this relationship slightly. The effect of being female is minimal but negative for white employees but stronger for

Black and Asian employees. Put differently, the positive effects of identifying as a minority on job satisfaction are weaker for Black and Asian women than they are for Black and Asian men. However, the inverse is true for minorities who identify as an ethnorace in the "other" category.

The analysis in chapter three also highlights the significant role that perceptions of DEI practices play in shaping job satisfaction across all groups. Higher perceptions of equity and inclusion are strongly correlated with increased job satisfaction, more so than diversity alone. Minority women, in particular, are more sensitive to the impact of diversity management practices on their job satisfaction, suggesting that effective initiatives aimed at increasing diversity in the workplace can strongly impact positive workplace outcomes. However, the differences in how men and women of various minority groups respond to equity and inclusion initiatives are subtle, indicating that while DEI efforts are critical indicators of job satisfaction, their effectiveness may vary slightly across different demographic groups.

Overall, these findings emphasize the importance of DEI management practices in the federal workforce and offer insights into how targeted practices that consider both gender and ethnoracial identity might foster a more inclusive and satisfying work environment.

Chapter 4 Findings

The findings from Chapter 4 demonstrate the effectiveness of using Random Forest models to predict job satisfaction within the federal workforce based on various demographic and job-related factors from the FEVS. The models' predictive accuracies are strong, correctly identifying the job satisfaction levels of respondents in over 70% of cases and within one class for the large majority of other cases. This level of accuracy holds across different racial and gender subgroups.

The analysis of feature importance within the model reveals key factors that drive job satisfaction. The Intrinsic Work Experience (IWE) subindex emerged as the most influential predictor of job satisfaction in the aggregate test, followed by the degree to which their job inspires them, the sense of accomplishment they derive from their work, satisfaction with their pay, and finally, their personal attachment to their organization. These same five features remain the strongest predictors of job satisfaction across all identity subgroups, however, the importance of these features varies slightly by race and gender. For instance, satisfaction with pay is particularly critical for Black and Asian respondents, with Black women showing the highest sensitivity to pay. In contrast, White respondents place relatively more importance on intrinsic job-related factors like inspiration and accomplishment. These insights suggest that while certain factors universally influence job satisfaction, there are nuanced differences that public administration leaders should consider when tailoring strategies to enhance employee satisfaction across diverse groups.

Theoretical Significance

There are several theories discussed in this body of work that deserve revisiting. The first, social identity theory (Tajfel & Turner, 2004), relates to the experience of individuals as they navigate identity in the context of society and work. The findings of this study demonstrate that individuals' experiences of job satisfaction are deeply intertwined with their social identities, particularly in the context of a diverse workplace. Chapter 2 highlights that the alignment between one's social identity and the demographic makeup of the workplace has a direct effect on job satisfaction, while Chapter 3 shows that the perception of effective diversity management in the workplace significantly influences job satisfaction as well. Together, these findings suggest

that social identity is navigated differently through diverse interactions within the organizational environment—as individuals navigate their roles and relationships at work, their sense of belonging and satisfaction is impacted by how well their identities are recognized, valued, and supported. These findings reinforce the central tenet of social identity theory, which states that individuals derive meaning and self-concept from their group memberships. When these memberships are affirmed within the workplace, it leads to more positive work experiences.

The second theory I would like to return to is the value-in-diversity hypothesis, which posits that diversity in a team or organization can improve organizational outcomes by encouraging innovation and challenging groupthink (Cox & Blake, 1991). In terms of job satisfaction, this can be realized through the intrinsic benefits of not only finding success at work but feeling as though one's contributions are vital to the organization's success, which fosters a sense of belonging. The findings from Chapter 2 both challenge and support the value-in-diversity hypothesis by providing empirical evidence that increased demographic diversity within federal agencies can negatively influence job satisfaction initially, but that as workplace diversity increases past a certain threshold, job satisfaction might increase again. Complimenting this relationship, Chapter 3 shows that when employees perceive strong diversity, equity, and inclusion (DEI) practices, this leads to higher levels of job satisfaction across various ethnoracial groups, possibly suggesting that as diversity initially increases, it can create strife in the workplace potentially by disrupting groupthink. However, more work is needed to confirm these ideas. These studies test the effects of diversity and diversity management on job satisfaction specifically without testing for the effects of these phenomena on organizational effectiveness or success.

Contributions to Public Administration

This series of studies has practical implications for public managers addressing the question of diversity management in their organizations. The evidence across all three studies suggests that strategies to increase an organization's belongingness can improve job satisfaction within federal agencies. While Chapter 2 highlights the benefits of representation within the workplace for minority employees, Chapter 3 showcases the direct benefits of effective diversity management practices on all employees' job satisfaction. Chapter 4 reveals that though all employees' job satisfaction appear to be influenced by the same factors, the importance of these factors shift amongst groups, suggesting that targeting DEI management practices might help support certain groups within organizations. These findings suggest that DEI policies are crucial in supporting employees in their public service.

Chapter 4 also reveals the potential benefits of employing AI analysis techniques on large data within public organizations. AI techniques such as random forests offer predictive tools that can be used by public agencies to proactively address issues related to job satisfaction or other workplace outcomes. A major benefit to random forests is that their implementation is relatively simple after the data-cleaning process, and interpretation using feature importance is extremely straightforward. This opens opportunities for human resource managers to study more granular and private data at the agency or team level to gain valuable insights about trends within their specific agency to address matters of equity. This type of targeted solution-making can introduce a new dimension of diversity management in public administration.

Future Research Directions

Several directions for future research emerge from this body of work. First, the relationship between demographic congruence and heterogeneity should be interacted with perceptions of DEI management to test the joint effects on job satisfaction across groups. The findings suggest that increased demographic congruence is positively associated with job satisfaction, while demographic heterogeneity is generally associated negatively with job satisfaction. Based on findings from Chapter 3, there is a strong possibility that these negative outcomes from demographic heterogeneity would be mediated by effective diversity management.

Second, employees' satisfaction with pay should be investigated in the context of both intersectionality and job satisfaction. Chapter 3 reveals that differences in job satisfaction exist between demographic groups, while Chapter 4 reveals that the determinants of job satisfaction, such as satisfaction with pay, are subject to differences between intersectional identities. These combined findings suggest that real or perceived pay discrimination may be at play in these data. Understanding how job satisfaction is mediated by real or perceived pay discrimination will help public administrators identify policy solutions for a more equitable workforce.

Though limitations in FEVS data currently exist, more robust intersectional investigations are currently possible and may become possible in the future. Currently, the FEVS reports demographic information such as age and disability status—these social identity groups can be interacted with ethnorace and gender to elicit even more nuanced findings. Further, the FEVS does not currently account for LGBTQ+ identities. If gender categories in excess of a male/female dichotomy were available, and if indicators of sexuality were present, additional intersectional identities would be possible.

Lastly, the application of categorical random forests in Chapter 4 represents only one potential use of AI analysis. One promising approach that could be applied to Human Resource Information Systems (HRIM) is Gradient Boosting Machines (GBMs), which sequentially create a series of models that correct the errors of previous models (Ajit, 2016; Brandon & Frank, 2024). Similar to random forests, GBMs can be particularly useful in identifying complex, non-linear relationships between variables, which might exist in the relationships between intersectional identities, mediating variables such as diversity management and satisfaction with pay, and their impact on job satisfaction. However, these models often outperform other algorithms in predictive accuracy and can be used to delve deeper into understanding which combinations of demographic and workplace factors most significantly influence job satisfaction across different groups. Within HRIM, neural networks, particularly deep learning models, could be employed to detect subtle patterns and interactions between demographic variables and workplace experiences that simpler models might miss. This type of model would be best suited to raw data collected within agencies directly, providing a rich understanding of the data prior to aggregation techniques aimed at protecting privacy when presented to the public.

Conclusion

This body of work comprehensively analyzes how diversity, intersectionality, and diversity management impact job satisfaction within the federal workforce. By examining the relationships between demographic congruence, demographic heterogeneity, and perceptions of diversity practices, this research shows the value that targeted and effective DEI management practices can have on employees' job satisfaction. Further, the successful application of random forests highlights the potential for innovative AI methodologies in public administration and

human resource management. Together, these lines of research offer new avenues for research and practical tools that might enhance organizational effectiveness in public agencies. As public agencies continue to evolve in their approach to diversity, the insights from this research can bolster efforts to improve adaptive and data-driven strategies that can better address their workforce's diverse needs.

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APPENDIX A: SUPPLEMENTAL TABLES AND CHARTS - CHAPTER 4

Table i. White Confusion Matrix

			Reference		
Prediction	**1**	**2**	**3**	**4**	**5**
1	**2524**	795	174	49	15
2	1241	**4077**	1779	595	28
3	151	1846	**4747**	2016	51
4	145	1462	5432	**29610**	5227
5	4	38	107	3782	**18008**

Table ii. Black Confusion Matrix

			Reference		
Prediction	**1**	**2**	**3**	**4**	**5**
1	**466**	149	41	13	6
2	175	**471**	235	78	8
3	59	329	**946**	384	25
4	35	253	1018	**5836**	1128
5	3	6	37	739	**3926**

Table iii. Other Confusion Matrix

			Reference		
Prediction	**1**	**2**	**3**	**4**	**5**
1	**347**	111	29	10	5
2	98	**305**	164	39	1
3	45	229	**642**	237	21
4	24	141	556	**2499**	455
5	0	4	22	360	**1480**

Table iv. Asian Confusion Matrix

Prediction	Reference				
	1	**2**	**3**	**4**	**5**
1	**137**	43	11	5	0
2	53	**160**	82	19	2
3	24	151	**469**	183	8
4	12	91	444	**2856**	446
5	0	5	12	259	**1519**

Table v. Black Female Confusion Matrix

Prediction	Reference				
	1	**2**	**3**	**4**	**5**
1	**320**	95	25	7	5
2	116	**289**	149	66	2
3	42	265	**663**	266	15
4	24	170	676	**3738**	643
5	0	8	29	472	**2239**

Table vi. Black Male Confusion Matrix

Prediction	Reference				
	1	**2**	**3**	**4**	**5**
1	**139**	55	18	7	5
2	65	**136**	69	23	5
3	18	106	**261**	105	11
4	13	81	372	**2022**	390
5	1	3	15	343	**1777**

Table vii. White Female Confusion Matrix

		Reference			
Prediction	**1**	**2**	**3**	**4**	**5**
1	**838**	256	64	13	4
2	527	**1694**	724	234	8
3	71	899	**2114**	930	14
4	61	652	2421	**13421**	2251
5	0	20	40	1548	**7565**

Table viii. White Male Confusion Matrix

		Reference			
Prediction	**1**	**2**	**3**	**4**	**5**
1	**1703**	502	134	33	7
2	676	**2381**	1025	336	16
3	106	1062	**2678**	1173	55
4	78	732	2971	**16195**	3017
5	4	20	68	2168	**10391**

Figure i. Feature Importance from Random Forest Model

Feature Importance from Random Forest Model

Figure ii. Feature Importance from White Subset

Feature Importance from White Subset

Figure iii. Feature Importance from Black Subset

Feature Importance from Black Subset

Figure iv. Feature Importance from Asian Subset

Feature Importance from Asian Subset

Figure v. Feature Importance from Other Race Subset

Feature Importance from Other Race Subset

Figure vi. Feature Importance from Black Female Subset

Feature Importance from Black Female Subset

Figure vii. Feature Importance from Black Male Subset

Feature Importance from Black Male Subset

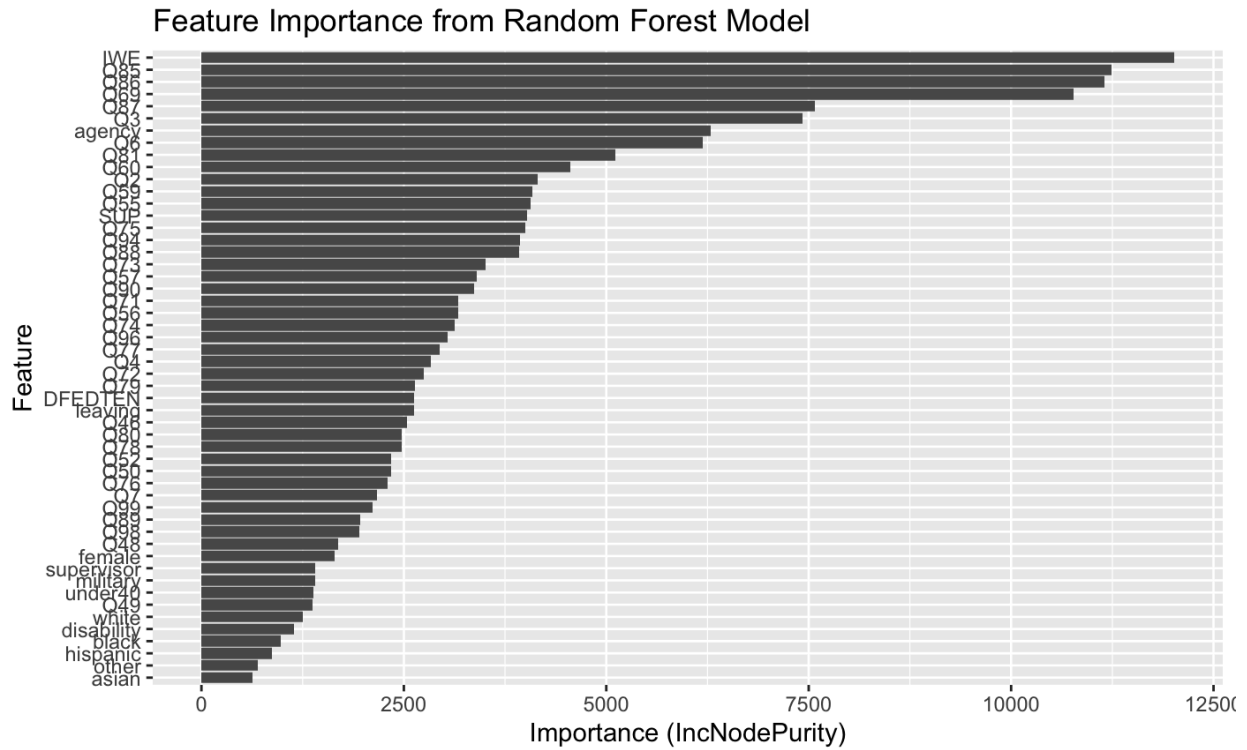**Figure viii. Feature Importance from White Female Subset**
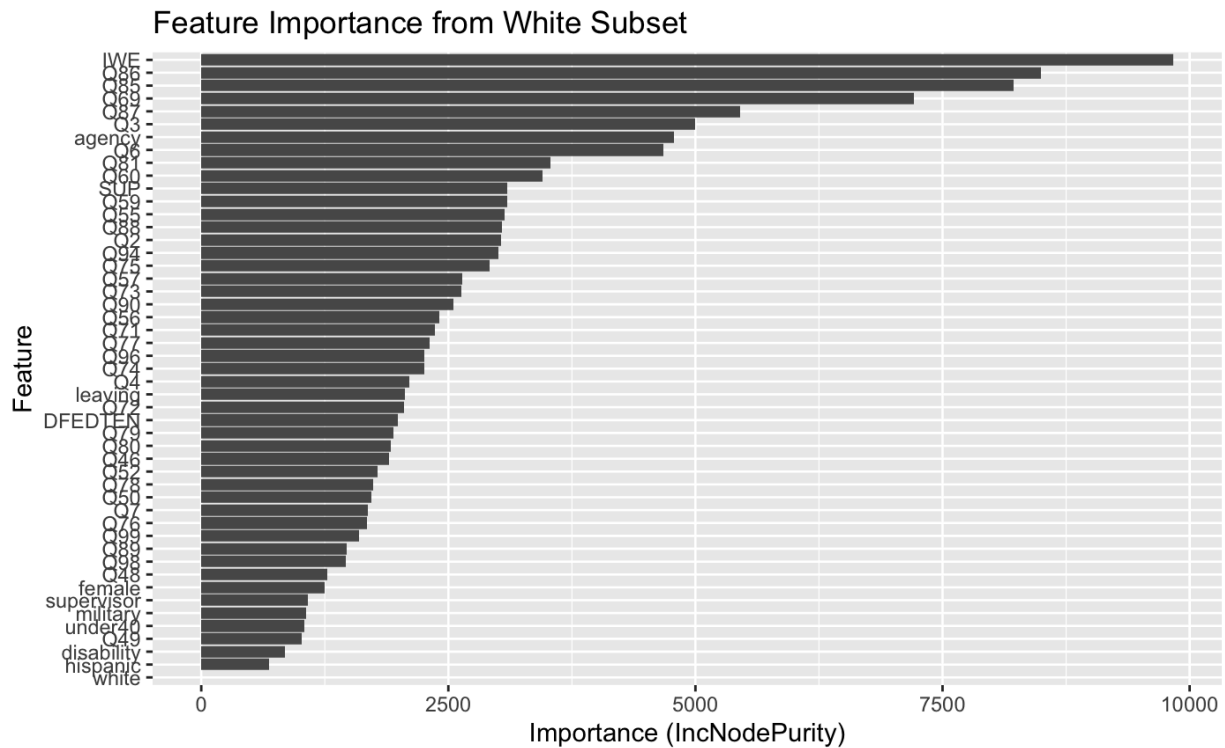

Feature Importance from White Female Subset

Figure ix. Feature Importance from White Male Subset

Feature Importance from White Male Subset