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Gender Role as a Mediating Factor in Gender Pay Equity Analysis

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by

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Abstract

The gender wage gap has been persistent despite the introduction of new laws designed to address the disparity (Seyfarth's Pay Equity Group, 2016; World Economic Forum, 2019). One of the challenges in addressing this inequity is the lack of complete understanding of the driving factors of the pay gap. One yet unexplored factor is the impact of the gender role, which is a social role based on sex/gender which provides a structure and expectations for social relationships. The purpose of this research was to explore the relationship between gender role, biological sex, and base pay.

A matched, cross-sectional sample drawn from large U.S. cities was utilized to test the mediating impact of gender role, specifically the masculine and feminine gender roles. In addition to determining if a mediating impact occurred, a decomposition analysis was utilized in order to understand the way in which gender role differences were impacting males and females. Additional analyses were performed to address the impact of gender role within the public and private sectors and the within sex-typed industries (defined as industries with more than 70% male or female workers).

The feminine gender role may have a mediating impact, with less pay for both males and females who exhibited the feminine gender role. Females were more likely to experience this negative impact compared to males. However, there was not an impact found for the masculine gender role. Respondents from the private sector mirrored this overall finding, but the impact of the feminine gender role for respondents from the public sector was lessened. The impact within sex-typed industries was inconclusive. Gender role as it relates to pay equity may be an important avenue for future research.

Dedication

I dedicate this dissertation to my Aunt Theresa and Uncle Charlie who made this work possible. Thank you.

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I. Introduction

Pay equity has been a matter of public concern for decades. It is well established that female wage earners in countries around the globe earn less than their male counterparts (World Economic Forum, 2019, pp. 17-19). Despite this awareness and numerous policy interventions, the pay gap persists. Although laws mandating equal pay have been in place in the United States for over 50 years, female wage earners currently earn around 82 cents for every dollar earned by male wage earners (American Association of University Women, 2019). This incremental difference can add up to substantial sums over the course of a full career. The pay gap is critical to examine, not only from an equity perspective, but also due to the relationship to other social issues, such as the higher rates of women living in poverty (12.9% in 2018) compared to men (10.6%) (U.S. Census Bureau, 2019). Further, the earnings gap affects not only working adults but also their families and continues to affect workers even after they leave the workforce due to the way in which retirement systems and social security are structured (Leisenring, 2020). Thus, pay equity concerns can have broad reaching impacts and will be important to address for equity in a variety of arenas.

One aspect of gender pay equity that makes it a particularly challenging issue is the relationship gender has with many other social structures, "structures that are dependent on social factors" (Ritchie, 2020, p. 404) as opposed to natural factors, such as education systems or race categories. Social structures help govern the relations between and within social groups (Ritchie, 2020). These groups help us navigate the complex social world in which we exist. Within these social structures, individuals occupy

different roles. One role that an individual could occupy is based on ones' gender, known as the gender role. Specifically, a gender role is a set of "culturally prescribed behaviors and traits that dictate how males and females should act" within the given social structure of the community (Rider, 2005, p. 21).

Gender role and the associated "behaviors and traits" are socially and communally determined and maintained (Rider, 2005, p. 21). While a gender role may be consistent with some stereotypes, a gender role is generally more expansive than stereotypes. In the United States context, the masculine gender role tends to be associated more with males and, likewise, the feminine gender role with females. Gender role is salient in many social interactions, including the workplace (Ridgeway, 2011, pp. 119-122). Differences in gender roles, primarily those associated with males and females, may lead to different opportunities, perceptions, and compensation among workers. Indeed, masculine and feminine gender roles have already been shown to have an impact on social capital attainment and workplace perceptions (Buchanan, 2014; Kosteas, 2013), but the extent to which gender role explains the gap in pay between males and females in the United States has yet to be explored. Gender role may be an important underlying factor that may further help explain the pay gap, and lead to more nuanced policy development.

A google search for news articles related to pay equity in the United States returned over 50 million results. Within those searches we see the assumptions about 'proper' gender roles emerge over and over again with statements such as…

> If businesses are forced to pay women the same as male earnings, that means they will have to reduce the pay for the men they employ, simple economics. If that happens, then men will have an even more difficult time earning enough to support their families, which will mean more Mothers will be forced to leave the home (where they may prefer to be) to join the workforce to make up the difference. (as cited in McAleer, 2017)
>
> For women in particular, [the Paycheck Fairness Act] will backfire. Women — especially mothers — value flexible workplaces more than men….Men are simply more likely to value higher pay, while women — particularly mothers — are more willing to trade high pay for other benefits, like flexibility. (Manning, 2019)
>
> When it comes to education, for example, women tend to choose less lucrative courses of study. They dominate fields that specialize in quasi-familial types of personal care (e.g., early childhood education, social work, counseling, etc.) ...At the same time, men dominate more lucrative engineering fields that tend to be abstracted away from these kinds of social engagement. (Cochran, 2015)

These statements are not intended to represent the range of arguments in the area of pay equity currently under debate. However, they are certainly a part of the national conversation and clearly reveal how masculine and feminine gender roles are linked to pay. In the first statement, there is a clear gender role identified for men who are socially assumed to be the 'breadwinner' and responsible for providing financial resources for their family. This statement does not consider the fact that many women are themselves the family's primary income earner nor does it consider that paying women more could also help the same families that the author believes the Paycheck Fairness Act will hurt. In the second example, the author links the flexibility required to care for children with less pay. Additionally, the flexibility is linked to women rather than men, which underscores the traditional sex-roles of women as the caregiver rather than men. The third example also links the caregiver role to women but relates it to women's role in the

workforce as well as their home. Little consideration is given to the underlying question of how housework and childcare is distributed in the home or whether lower paying 'quasi-familial' jobs such as early childhood education and social work are properly valued given their importance to society as a whole. These are just some of the ways in which the concept of gender roles enter the pay equity conversation.

Tracking the Gap: US Pay Gap History and Policy Interventions

The debate over pay equity is certainly not new as demonstrated by one concerned reader who wrote to the New York Times in 1869, "Very few persons deny the justice of the principle that equal work should command equal pay without regard to the sex of the laborer...But it is one thing to acknowledge the right of a principle and quite another to practice it" (Alter, 2015). In the following year, 1870, Congress prohibited pay discrimination among federal employees, although it only applied to new employees and was rarely enforced (Yourougou, 2013). In the later 1800's, the Western Union Telegraph Company employees went on strike and among their demands was "equal pay for equal work" (Alter, 2015). Although the strike was ultimately unsuccessful, the idea of equal pay has been part of the national conversation for over a century and these early voices contributed the idea of equal pay for equal work to the movement.

The equal pay agenda was pushed further during World War I. Due to the importance of women in the labor force during the war, the United States Employment Service published a list of occupations which could be occupied by women, freeing up the men for other work. The National War Labor Board supported this effort by declaring that the jobs vacated by men and filled by women should be compensated at the same rate

(Alter, 2015). A similar approach was taken during World War II when women were also encouraged to join the workforce in greater numbers (U.S. National Archives, 2016). During both wars, the composition of the workforce changed and with more women present in the workforce, there was a call for greater equity in pay. However, following each of the wars, as male workers returned and women vacated the positions they temporarily occupied. With this change, the call for equal pay once again became less active.

In the 1950s, again, there was a movement of women into the workforce and the call for equal pay was renewed in the 1960's (Toossi & Morisi, 2017). President Kennedy charged Eleanor Roosevelt with chairing the President's Commission on the Status of Women. The commission was formed with the intention of "evaluating and making recommendations to improve the legal, social, civic, and economic status of American women" (cited in Newton, 2019, p. 40). The committee ultimately made a recommendation to support the Pay Equity Act as well as added national legitimacy to its cause, among other important work. That law was signed into effect by President Kennedy in 1963 with members of the American Association of University Women standing at his side (U.S. Equal Employment Opportunity Commission, n.d.). In the following year, 1964, the Civil Rights Act, which prohibited discrimination on the basis of sex, was signed into law and reiterated the equal place of women in the workforce (U.S. Equal Employment Opportunity Commission, n.d.). President Obama strengthened the national pay equity landscape when he signed the Lilly Ledbetter Fair Pay Act in

2009, which established each paycheck as a new instance of pay discrimination (U.S. Equal Employment Opportunity Commission, n.d.).

Prior to the signing of the 1963 Pay Equity Act, in 1960, the gap between median pay for males and females for full-time, full-year employees was approximately 40 cents, meaning that women earned around 60 cents for every dollar earned by men (Leisenring, 2020). Between 1963 and 2000 the gap decreased at a steady rate, due in part to the Pay Equity legislation as well as the continuing growth of women in the workforce (Graf, Brown, & Patten, 2019). However, since 2000, the rate at which the gap is closing has slowed. If the trend follows the historical trend, stretching from 1960, the pay gap is not expected to close completely until the year 2059. However, if the rate of change continues in the pattern that has persisted since 2000, the gap is not projected to close until 2106 (Vogelstein & Bro, 2019). Figure 1, which shows the proportion of female to male earnings from 1960 through 2018, illustrates the slow but steady reduction of the gap in median wages between male and female full time, full year workers in the United States.

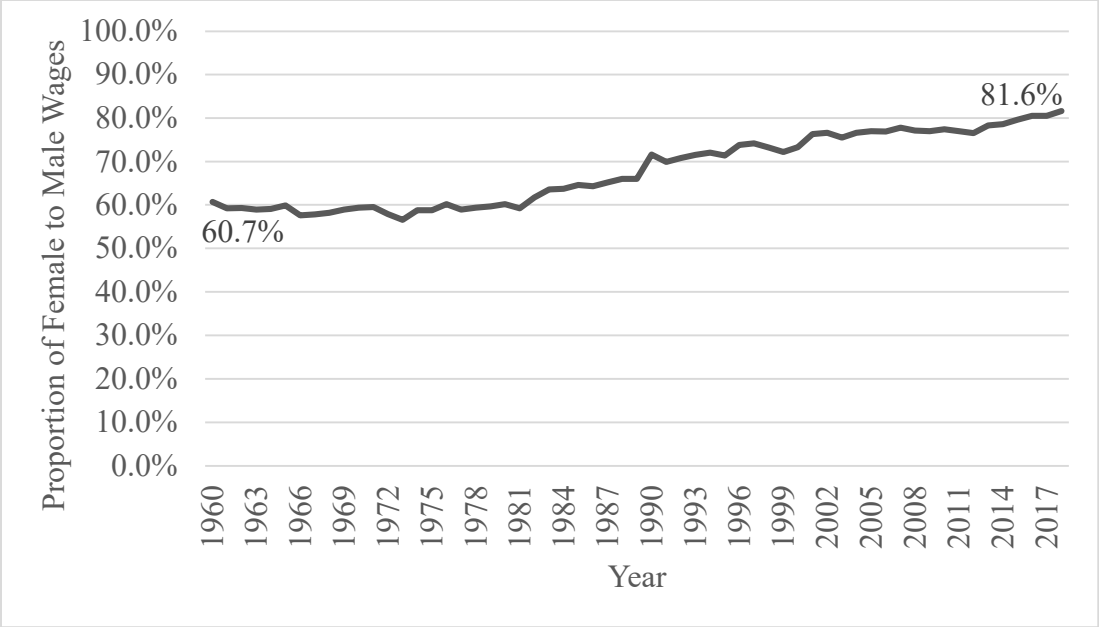


Figure 1: The proportion of median female to male earnings, for workers at least 15 years of age from 1960 – 2018 (National Committee on Pay Equity, 2019).

Recent Trends in Pay Equity

There have been promising trends that have led to greater equality of pay for women in the workforce. For example, between 1950 and 2015, the proportion of the workforce comprised of female workers rose from about a third of the labor force to nearly half (46.8%) (Toossi & Morisi, 2017, p. 3). Additionally, in 1960, approximately 17% of women between 15 and 44 years of age had completed at least some college. By 2011, that number rose to 59% of females (Livingston & Cohn, 2013). Trends such as these have pushed women into higher paying jobs and helped to reduce the pay gap. However, despite these gains, there is still much room for improvement. For example, women are far less likely to hold a job in the relatively high paying STEM fields. As of

2009, only 24% of STEM jobs were held by women, and over the following six years there was no increase, holding steady at 24% in 2015 (West & Zimmerman, 1987, p. 4). Further, the proportion of women in some STEM occupations, such as computer science and math, have actually decreased the proportion of women (West & Zimmerman, 1987, p. 4).

The issue of pay equity is particularly salient at this moment in time given the emphasis placed on pay equity in recent legislation. Since 2017, a slew of states expanded pay equity protections, including California, Connecticut, Delaware, Hawaii, Maine, Massachusetts, Oregon, and Vermont as well as other jurisdictions including New York City and Puerto Rico. Pay equity has become a point of discussion at the national level as well, with presidential candidates commonly including pay equity concerns in their talking points as they prepare for the 2020 election, and Congress identified pay equity as a priority for the legislative session (McPherson, 2019). As more states enact pay equity laws and national leaders continue to move this work forward, a robust understanding of the drivers of pay is needed. By better understanding the mechanisms which lead to inequitable pay outcomes, the nation is better able to respond to these inequities.

In addition to the political salience of this topic, research performed in the past fifty years has also led to important advancements in our understanding of the issue. Many factors have been identified by scholars as contributing to the difference in pay between male and female wage earners. Educational attainment, full-time work experience, motherhood, race, union status, industry, and occupation are just some of the

factors that have explained a significant portion of the pay gap between males and females (Blau & Kahn, 2017; Blau, Simpson, & Anderson, 1998; Correll, Benard, & Paik, 2007). As noted previously, one such factor that has yet to be fully incorporated into the pay equity literature is that of the impact of gender roles. The purpose of this research is to explore the connection between gender role, biological sex, and wages more thoroughly and contribute to the pay equity body of literature. Although it is not presumed that this one additional factor, gender role, will fully account for the remainder of the gap, it is hypothesized that it will act as a mediator and explain a portion of the current gap between male and female wages. It is hypothesized that biological sex (male/female) has impacts on pay that are independent of one's gender role (e.g., discrimination based on sex). However, it is also proposed that gender role mediates this relationship by interacting with biological sex and ultimately, this interaction also impacts wages. It is hoped that by having a better understanding of this relationship, there can be policies, laws, and social change efforts that are more targeted in addressing the current inequity.

Overview of the Research

Using a cross-sectional sample of over 1400 wage earners from large US cities, this research sought to examine the relationship between biological sex, sex-role, and wages. Data was collected, through a stratified, non-random sampling approach, and the resulting groups, males and females, were matched using propensity scores. The data were first tested to confirm that males in the sample earn more than females, which would be expected based on larger patterns of pay inequity. Additionally, tests to assess

the relationship between biological sex and gender role were also performed. Since gender roles can change over time (Donnelly & Twenge, 2017), this review is an essential step to understanding the current state of the relationship. Finally, the mediating properties of the masculine and feminine gender roles were tested for the sample as a whole, for private sector employees only, for public sector employees only, and among those respondents who work in an industry which is dominated by either males or females (sex-typed industries).

In the following chapter, relevant bodies of literature will be discussed. This includes a more in-depth examination of gender roles and gendered behavior and summarizes the literature related to pay equity. In addition, important terms will be defined, such as sex and gender. Finally, the theoretical model and the relevant controls will be introduced and discussed. Following the literature review, the methods section will be introduced and a description of the data collection methods, data cleaning procedures, and descriptive statistics will be provided. A description of the propensity score matching procedure will also be included in the methods chapter. The final two chapters provide the results of the analyses, in chapter four, and a discussion and conclusion section, in chapter five.

II. Literature Review

As discussed in the prior chapter, the pay equity debate has resurfaced as a major public policy concern across the United States (Hobbs, 2019). Lawmakers and employers have been charged with developing policy aimed at closing the remainder of the pay gap between male and female workers, but exactly how to drive that change remains less clear (Lam, 2016). Despite much work being done to deliberately track and reduce the wage gap since the 1960s, the gap persists and progress has slowed (Blau & Kahn, 2000; Lips, 2013). Policy development and intervention is made all the more difficult due to the complex systems which impact pay. Due to this complexity, not all factors contributing to pay inequity are thoroughly explored or discussed in the literature. One area in need of further examination is the relationship between gender role and pay.

It is hypothesized that one's gender role, which is the set of "culturally prescribed behaviors and traits that dictate how males and females should act" (Rider, 2005, p. 21), serves as a mediator in the relationship between biological sex and pay. Further impacting this relationship are additional factors which have been documented throughout the pay equity literature, such as aspects of identity other than biological sex, including human capital factors, occupation, and industry (Alkadry & Tower, 2006; Blau & Kahn, 2000; Blau, Simpson, & Anderson, 1998; Choi, 2018). In addition, the lack of consistent terminology used to refer to sex and gender contributes to the confusion surrounding pay equity. In order to first resolve the lack of consistent terminology, this chapter will begin with a review of important concepts related to the hypothesis in order to develop a common understanding of these terms and concepts. Finally, a description of

additional relevant factors will be introduced and a new theoretical model is proposed by incorporating these relevant factors.

Defining Sex and Gender

Since the concepts of sex and gender are critical in the theoretical model, a shared understanding of these concepts is important at the outset. Biological sex is defined as "differences in genetic composition and reproductive anatomy and function" (Unger & Crawford, 1992, p. 27). In the United States' context, this term is typically used to note the binary classification system of males and females based on reductive anatomy, which most frequently is determined at birth (Kessler, 1990;; West & Zimmerman, 1987). The binary classification of individuals as male or female has historically been an important identity in American and other western societies (Elizabeth, 2013). Sex categories have been used to divide labor both within and external to the home as well as shape shared behavioral and role expectations, as described by expectation state theory which specifically examines the processes by which expectations are generated and acted upon (Wagner & Berger, 2002). Additionally, this classification system has historically been used to compare males and females across the United States for the purposes of, among other things, reporting the wage gap.

The biological basis for this definition of sex belies a more complicated reality. Sex is derived from a number of biological characteristics including: reproductive anatomy, chromosomes, and hormonal development (Kessler, 1990). These are complex processes that may show up in multiple ways, and not only in the female/male binary. As stated by Westbrook and Saperstein (2015), "Although this schema draws on biological

criteria, research demonstrates that the specific distinctions are neither natural nor stable; our beliefs about sex have varied widely over time, differ between cultures, and tend to erase naturally occurring differences in physical development such as 'intersex' people" (p. 537). There are a number of states (e.g., Oregon, Washington, California, Maine, Arkansas) as well as cities (e.g., Washington D.C., New York City) that have begun to legally recognize a third, non-binary option for sex categories to better serve individuals who do not identify as either male or female (Movement Advancement Project, 2020). Although it is encouraging to see these changes, which better reflect the diversity of the human experience, the historical framework and structures that are present across the United States context still largely reflect the male/female binary. Since this particular research explores the impact of traditional gender roles on pay, and since these behaviors are traditionally rooted in the male/female binary in the U.S. context, the focus will remain on the binary categories of male/female throughout this analysis to reflect the social framework upon which many pay structures have been built and maintained.

Gender is a distinct concept, but is related to sex. The terms gender and sex have, at times, been conflated in the literature and it was not until the 1950s that gender became a subject of study distinct from sex at a widespread level (Money, 1994, p. 164; Muehlenhard & Peterson, 2011). Sex will be used in this context to refer to the biological based identity, most commonly assigned at birth. Gender, on the other hand, will be used to refer to the internal identity held by individuals as it relates to their self-conception.

The understanding of the relationship between sex and gender has evolved over time, which has been a rich source of analytic debate (Diamond, 2004). This debate has

also led to some confusion, such as how gender is conceptualized differently across different bodies of literature (Hollander, Renfrow, & Howard, 2011, p. 13). Additionally, the different conceptions add confusion in the policy world as well, particularly around gender pay equity policy. While competing views of gender exist in the literature, a clear definition of the way gender is utilized in respect to this specific research can help alleviate confusion around the way sex and gender are used in the context of this particular research.

One view, the essentialist perspective, suggests that gender is something innate within each individual, rather than something created external to oneself. Essentialists "portray gender in terms of fundamental attributes that are conceived as internal, persistent, and generally separate from the on-going experience of interaction with the daily sociopolitical contexts of one's life" (Bohan, 1993, p. 7). For essentialists, gender is separate from biology, but is a characteristic that is determined by biological sex, where "biology is believed to determine the social behaviors and characteristics of males and females" (Hollander, Renfrow, & Howard, 2011, p. 13). Essentialists examine traits that reside in individuals, such as masculinity or femininity and attribute those traits to their underlying biology. However, others argue that this framing misses important variation within both males and females in terms of their gender identity and expression as well as exaggerates the differences between males and females (Stokoe, 2000).

In reaction to the essentialists, a group of scholars suggested that gender is socially constructed through interaction and, therefore, resides in the social world rather than within the individual (Bohan, 1993). In addition to a desire to recognize the social

aspect of gender, these scholars were also reacting to the implicit assumption of the essentialist's argument that if gender is biologically based, then one would expect to see universal and unchanging traits associated with males and females (Stokoe, 2000). For example, essentialists might see women as having universal traits, such as being more affectionate with children or more temperamental, and assume that these traits are inherent in all women. On the other hand, constructivists would suggest women are expressing their gender in these ways because they are the socially appropriate behaviors that are expected of them. Scholars describe the idea of the daily social construction of gender as "doing gender" (West & Fenstermaker, 1995; West & Zimmerman, 1987).

In more recent years, there has been a movement toward incorporating aspects of both the essentialist and constructivist conceptualization of gender. In part, this move is driven by the recognition that gender is a personal identity, one that is intimately tied to our sense of self. Without the understanding of gender as something that is held internally, it devalues the experience of individuals' internalized gender experience and identity (Bosson, Vandello, & Buckner, 2019, p. 9). The analytical belief that gender is *only* something external to oneself has been pushed against by both scholars as well as individuals who feel gender is part of their internal experience. Particularly for the transgender and genderqueer community, the belief that gender is solely external has been used to perpetuate harm against these groups (Galupo, Pulice-Farrow, & Ramirez, 2017, p. 164). As a result, it is suggested that a definition of gender as both internal and external provides a more accurate representation of the concept.

The dual internal and external conceptualization of gender allows for both the acknowledgement that there are parts of gender identity which are performative or social as well as aspects that are internalized. Particularly important to this research is that this conception of gender allows for the recognition of the role social structures play in gender formation and construction. The dual approach values the experience of individuals and their relationship to their internalized gender, while at the same time acknowledging the powerful role social interaction plays. Acknowledging that gender is both internal and external highlights the highly intertwined nature of sex and gender. If gender is ascribed a purely social role, it can be described as completely separate from biological sex. This fails to recognize the highly related nature of these concepts (Yoder, 2003). Some scholars recognize the distinctness of the concepts as well as the difficulty in fully divorcing one from the other by using the phrase "sex/gender" in order to "refer to a concept that cannot be understood to be either predominantly or only biologically or socially constructed" (van Anders, Caverly, & Johns, 2014, p. 174).

In the context of this research, I adopt the stance that while there exists biological difference between males and females, social norms, stereotypes and expectations exaggerate these differences as well as create differences where none exist from a biological perspective. Gender, for the purposes of this dissertation is thus defined as both an internal identity which shapes our relationship with our body as well as a social identity which is present in our everyday interactions. This particular research is most concerned with the externalized aspect of gender – that which is constructed daily through interaction. This external aspect of gender will be referred to as the gender role

throughout this research, as opposed to the more internal gender identity. Specifically, the masculine and feminine gender role will be measured and discussed throughout this research.

Gender Roles: A Social Expression of Gender

Social roles are the myriad positions which are occupied by individuals in a given social community. Social Psychologist Bruce J. Biddle (1986), defined social roles as "patterned and characteristic social behaviors, parts or identities that are assumed by social participants, and scripts or expectations for behavior that are understood by all and adhered to by performers" (p. 68). Social roles are shared within a community and function by reinforcing shared norms and expectations that can be enacted at various times by individuals occupying specified roles. These roles are social artifacts that are recognized by others in the shared community and due to this, are flexible and changeable across different communities (Ridgeway, 2011). Additionally, multiple social roles can be occupied and enacted by a single individual (such as mother, woman, Asian, and judge) depending on the context of the interaction (Sunstein, 1996). The overlapping of these multiple identities, known as intersectionality, can lead to complex social roles that may be expressed and perceived differently based on the context and community (Crenshaw, 1989; McCall, 2005).

Callero (1994) states that social roles must be "recognized, accepted, and used to accomplish pragmatic interactive goals in a community" (p. 232). In order for these roles to be recognized and accepted, there has to be some typified role to which cognitive comparisons can be made. For example, there is a shared understanding of the position of

'judge.' When we think about a judge and the role a judge plays, we are frequently thinking in generalities about a typified version of a judge rather than a specific individual. These typical social interactions and qualities may include behaviors that are seen as following legal procedures, exhibiting fairness in light of the facts of the case, wearing a black robe, and making decisions. These behaviors are not necessarily associated with a specific individual, but rather the abstract role of judge itself. These behaviors and attributes can then be used by individuals occupying the position of judge when they are enacting the role of judge as well as by other social participants in addressing the judge. In this way, others in the community can easily recognize a judge based on the abstract notion without ever having to interact with the specific individual who occupies the role. Thus, even if individuals in the community have never met a specific judge, there is a shared understanding of the typified judge which can be recognized without requiring a personal interaction.

A shared understanding of the socially determined roles can be used by individuals in the community to identify behavior that would be expected of themselves and others, develop authority or power, and expedite social interactions (Ridgeway, 2011, pp. 36-40). For example, a female judge may use her role in the courtroom to identify herself as the person with the authority and power to make decisions. To expand on this example, let us suppose that on her day off, that same judge enters a grocery store. The man walking in before her holds the door open to let her enter first, because that is the behavior expected in that particular situation based on the social roles associated with gender, rather than occupation. Finally, as she checks out at the grocery store, the judge is

met by a cashier who is new to the position. Rather than these two community members having to figure out how to proceed, the social roles of cashier and customer have been firmly engrained. Thus, both already know how the interaction is expected to proceed, expediting the process even though the two individuals had never previously interacted. This example not only illustrates the different ways in which social roles may appear in society and expedite interactions but also highlights the many social roles one person occupies within a single community. In this way social roles, including those based on sex/gender, can act as a "coordinating device for social relations through the construction of shared cultural beliefs" (Ridgeway, 2011, p. 43).

However, these same set of expectations can have negative consequences. As a more benign example, there can be confusion if the norms are unknown or unclear. For example, while a handshake may be an expected greeting among male and female colleagues in the United States, in another cultural context that same greeting may be considered inappropriate. Cultural errors of this type can cause confusion, humor, offense, and discomfort where the set of expectations are not shared. There can also be more critical, negative impacts of social roles within the community as well. Social roles can be restrictive to individuals in the community who do not conform to the shared social expectations. Where people do not act according to the norms and expectations of their role, the social implications can be damaging.

Social roles are enforced both prescriptively and proscriptively, prescriptive in the sense that individuals identified as occupying a particular role are expected to exhibit particular behaviors in social interactions and proscriptive in the sense that individuals

are also expected *not* to demonstrate other behaviors seen as inappropriate for their role. For example, males may be told to be strong, through phrases such as "man up" or "be a man." This is a prescriptive enforcement of gendered behavior because it dictates how males are expected to act. Males may also be told *not* to be weak or show emotion, through phrases such as "don't cry like a girl." This is proscriptive enforcement of gendered behavior because it is how a male is not expected to perform given their gender. As with any social role, there is often a social cost to not conforming to the norms surrounding gender. The social cost may be activities like bullying, physical confrontation, social exclusion, or lack of opportunity. Social roles are both constructed and reinforced by the community, thus there is a social risk and potential cost for behavior which do not fit with one's role. While gender roles may help individuals in the community understand the ways in which social groups interact through the associated norms and behaviors, an overly rigid view of these roles can present individuals in an overly simplistic manner as well as create expectations for behavior that can be restrictive (Hollander, Renfrow, & Howard, 2011, p. 18).

Social roles are expectations of behavior and attitudes that are collectively created and maintained. Individuals in the community are able to draw upon and use these roles to expedite social interaction as well as identify sources of power or prestige. However, there can also be negative consequences to the social expectations of how individuals should act. Ridgeway (2011) states that, "the participants need shared cultural knowledge that allows them to initiate the process of defining who the others are in the situation and, thus, how each person can be expected to act" (p. 36). In order for these social roles to be

developed and sustained, they need to be used. They are used in social interactions through the performance of expected behaviors as well as reinforcement by others (Eagly, 1997).

Gender role theory (Eagly, 1987) suggests that one's gender role, the social role based on sex/gender, interacts with other roles that one occupies. The female gender role is often viewed as communal and the male gender role is considered more agentic. Communal traits include attributes such as caring, understandings, and compassionate (feminine traits), whereas agentic traits are often described as aggressive, assertive, dedicated, and determined (masculine traits) (Abele, 2003). Similarly, there are certain occupations that are considered communal or agentic. For example, nursing and teaching are considered more aligned with communal traits and a surgeon and CEO are more associated with agentic traits. Gender role theory suggests that due to the overlap of the communal occupations (e.g., nursing, teaching) with the feminine gender role and the overlap of agentic occupations (e.g., surgeon, CEO) with the masculine gender role, there is significant overlap between gender role and occupational role. In other words, there can be congruency between occupation and gender roles.

Eagly and Karau (2002) suggest that this congruity between the male gender role and agentic occupations, including leadership positions, is one of the systems that explains the high representation of males in these types of positions. Conversely, Block et al. (2018) documented that men had less interest in occupations with a focus on caring for others, including healthcare and early education occupations. The authors also found that men view caring occupations as having less societal worth, compared to the perception

women have of this work. Role congruity theory, or the concept that certain roles have a shared set of expectations, helps to explain the overlap between gender roles and occupational roles (Eagly & Karau, 2002). Where there is congruency in roles, there is the highest social reward because multiple roles are in alignment. However, where occupational and gender roles are incongruent, the individual cannot simultaneously meet the expectations of both roles, resulting in a social penalty. This social penalty can be seen in some of the criticism of Hillary Clinton during her run for election in 2016, in which people criticized her for not being feminine enough while running for a historically masculine occupation. On the other hand, many female politicians who conform more closely to the feminine gender role expectations are likewise criticized for being too feminine for the occupation (Mekouar, 2019). The intersection and congruity between a traditionally male-dominated, agentic leadership position and gender role (masculine or feminine behavior) is illustrated in Table 1, below:

Table 1: Congruency, as well as lack of congruency, between an agentic, leadership position and gender role (see also Eagly and Karau, 2002 for additional discussion).

	Masculine Gender Role (agentic role expectations)	**Feminine Gender Role** (communal role expectations)
Male individual in leadership position (agentic role expectations of the occupation)	Congruent – Social reward (gender and occupational role expectations can be met simultaneously)	Incongruent – Social penalty (violates leadership and gender role expectations)
Female individual in leadership position (agentic role expectations of the occupation)	Incongruent – Social penalty (violates gender role expectations)	Incongruent – Social penalty (violates leadership role expectations)

Where resources, including pay and social power, are attributed to one social role over another, then equity can become a concern. For example, it is generally true that the average male has stronger biceps than the average female. Understanding this can help coordinate work where biceps are critical to the work being performed, such as moving bricks. However, this is not true of all individuals in the group, only of the average. Thus, a reliance on the group stereotype can lead to the exclusion of valuable resources for performing the work, such as a woman who has exceptionally strong biceps. In other words, the belief that generalities apply to every individual coupled with the social enforcement of the group roles can lead to differences in who is deemed 'appropriate' to perform particular tasks, resulting in large scale occupational segregation. However, this alone would not result in inequity of resources.

When resources are distributed based on social roles, inequities can develop. So, continuing the example, if we assume that resources in the community are distributed based on the ability to carry bricks, then we would expect more resources to go to the males in the group. Based on the communal enforcement of the male bricklayer role, women regardless of their strength may be discouraged from participation in moving the bricks. Thus a structural barrier has been created in which females in this community have less access to resources, including pay and social power.

However, social roles are not static. A female in this community could decide to go against their gender role and move bricks. This may have some benefit in terms of resource and power acquisition, but at the same time she may risk social exclusion from the group. On the other hand, a man that decides to adopt the more feminine gender role,

and not move bricks, would conversely be subject to loss of resources and social power, in addition to the social repercussions. Although this example of the link between sex/gender, gender role, and resource acquisition is overly simplified, it is intended to show the link between these concepts. When large scale patterns emerge across society in a way that results in greater resources and social power becoming associated with one particular group, inequities also emerge. So, in this example, it is not simply the relationship between biological sex and occupation that leads to greater resource acquisition for the men in the community, but the gender role enforcement by the community to maintain this relationship.

Introduction of the Hypotheses

In order to better understand if and how gender role mediates the relationship between biological sex and wages, it is important to establish that several assumptions are confirmed. First, the assumption that the gender roles remain aligned with biological sex needs to be reaffirmed for this sample. While this has been tested in the past, it is important to check this assumption for the sample prior to moving forward into further analysis. More recent studies have shown that gender roles have been changing over time and, critically, there has been a rise in females exhibiting qualities that are considered traditionally masculine (Donnelly & Twenge, 2017). While shifting has occurred, gender roles remain a primary social frame which is an important aspect organizing social relationships (Ridgeway, 2011, p. 43). Therefore, it is hypothesized that:

H_1: Males are more likely to exhibit the masculine gender role than females.

H_2: Females are more likely to exhibit the feminine gender role than males.

Testing these first two hypotheses is important in establishing if sex and gender role are in alignment, as past studies have suggested, and to understand the degree to which this relationship has shifted. Another important assumption that needs to be tested is that males earn more than females. While this is well documented in the broader U.S. context, it is essential to confirm this assumption for the given sample. This assumption will be addressed in the third hypothesis:

H_3: Males earn significantly more than females.

Once the three assumptions are tested in H_1-H_3, then the primary relationship presented in the model – the relationship between biological sex, gender role, and wages – can be examined. The fourth hypothesis will test both masculine and feminine gender roles to determine if gender role is a mediator:

H_4: Gender role is a mediator in the relationship between biological sex and the log of wages

As noted earlier, role congruity theory suggests that when sex and gender role are congruent, there will be a social benefit. Conversely, lack of alignment may result in a socially imposed penalty. It is hypothesized that one way in which the benefit and penalty may be distributed and socially applied is through pay. If pay is a social benefit or penalty that is allocated, to some extent, based on role congruity; then it is expected that individuals who are role congruent, i.e., females congruent with the feminine gender role and males with the male gender role, will have higher pay than those who are incongruent. In other words, there will be a benefit, in terms of wages earned, for congruence and a penalty for incongruence. It is hypothesized that:

H_5: There will be higher wages where gender role is congruent with one's biological sex as well as a wage penalty for incongruent roles.

Katz and Krueger (1992) suggest that "The increased wage variability observed in the private sector has hardly materialized in the public sector" (p. 43). The lessened variability in this sector is, in part, due to more structured pay systems which are common in public sector (Choi, 2018). The public sector frequently sets pay based on set ranges for the position and is more likely to set pay based on time in position (seniority) rather than merit (see United States Office of Personnel Management, 2020 for an example of the pay structure present at the level of the Federal Government). These structures limit both the range of pay variation through the use of pay ranges as well as reduce bias by linking pay to seniority rather than potentially more subjective merit determinations.

The difference in pay setting procedures is not just an administrative exercise but leads to different outcomes in terms of pay equity. Due to the different way in which pay is set in the public sector, incorporating this variable is key to fully understanding the pay difference. Prior research has shown that sector is a significant predictor of pay (Stanley & Jarrell, 1998). As such, it will be important to also consider how sector intersects with the incorporation of gender role as a mediator. Since the pay structure is more systematized, it is believed that both sex and gender role will have less of a relationship with pay among public sector respondents. As a result, it is hypothesized that gender role will have less of a mediating impact for this group:

H_6: The impact of gender role as a mediator will be reduced for employees working in the public sector.

Occupational segregation has been found to account for a significant amount of the pay difference between males and females, "even after controlling for differences in productivity and industrial characteristics" (National Research Council, 1989, p. 60). Where occupational segregation exists, defined as occupations and industries where the total workforce is made up of at least 70% of a single sex, the occupation or industry is categorized as sex-dominated. Abraham (2020) suggests that "Observed gender differences are most pronounced when gender is salient and task-relevant…such as in gender-typed roles and occupations, where stereotypically male or female traits are considered important for success" (p. 152).

In places where the work setting is dominated by either males or females, the work is more likely to be considered more aligned with one particular sex and gender role (Eagly & Carli, 2007).. For example, Fitzsimmons et al. (2014) found that occupants of the primarily male dominated C-suite occupations were also expected to exhibit masculine qualities and a more feminine gender role was seen in opposition to the occupational role. Thus, where the occupation is primarily occupied by a particular sex, the gender role relationship becomes even more pronounced (Eagly & Carli, 2007). Due to the relationship of sex-dominated industries to gender roles, this variable will be examined more directly than other control variables. Thus, where the industry is sex-dominated, defined as at least 70% male or female, the impact of biological sex and gender role is expected to be more pronounced. Where the industry is sex-dominated, it is

hypothesized that in these industries, the impact of gender role as a mediating variable will have a greater effect size. The final hypothesis is:

> H_7: The impact of gender role as a mediator will increase in highly sex typed industries.

Additional Factors that influence the relationship among sex, gender role and pay.

In addition to the primary factors of interest: sex, gender role, and pay, there are a number of additional factors also influence the relationship. Several of these factors have been identified as particularly salient in the pay equity literature, and are discussed below. However, there are additional factors that were not collected in the data collection process. These omitted variables may produce selection bias and endogeneity. Given the complexity of the social systems that are related to pay equity concerns, such as the way a given employer determines pay, the community in which one was raised, or the experiences one has at school, it is untenable to include the vast amount of variables that would be required to control for these factors. Thus, only those variables that have been well documented in the pay equity literature were included. In an effort to address the concerns related to selection bias and endogeneity, the male and female groups will be matched on observables.

These can be broadly broken into two categories: employee characteristics and work characteristics. The first of these, employee characteristics, includes characteristics of the individual holding the job. These are aspects of identity that would remain should a job change occur - such as age, race/ethnicity, and education. First, age has been well documented as an explanatory variable (Blau & Kahn, 2000; 2017). Stanley and Jarrell

(1998) in their meta-regression analysis, which included results from 41 studies and suggested that age is one of several variables, each of which were collected for this study, that should be included in any pay equity analysis in order to reduce the risk of omitted variable bias (p. 967). The authors, Stanley and Jarrell (1998), also highlighted the gender composition of the industry, experience, and sector as critical variables to include.

Experience was also identified by Blau and Kahn (2017) as one of the "prime human-capital determinants of men's and women's wages" (p. 794). The other primary human-capital determinant the authors identified was education. Education is particularly impactful on wages, for both males and females because education is so frequently tied to minimum job qualifications, particularly in higher paying occupations. In addition to the employee characteristics of age and education, race is also an important control to include. Race is a primary identity in American culture and many social structures are related to race (Sunstein, 1996). Many scholars have identified race as a significant variable in the United States pay equity setting (Blau & Kahn, 2017; Choi, 2018; Juhn, Murphy, & Pierce, 1993). As such, controlling for differences in pay based on race/ethnicity will be important to include in this work to reduce omitted variable bias.

The final three factors that will serve as controls are each lengths of time related to employment. Each of these factors measures a different element of experience. Due to the repeated and well-documented importance of experience as a predictor of pay (Blau & Kahn, 2017; Stanley & Jarrell, 1998), the inclusion of experience in the model is critical. Time in industry is the first of these variables. Time in industry is a measure of the total industry-related experience the individual possesses. This measure of experience

is a broader form compared to the second experience-related control, seniority. Seniority, or time in position, is intended to measure a much more specific type of experience, namely, the experience the individual gathers from working the same job over a period of time. Finally, a third type of experience is measure as tenure, or time at organization. The time at the organization measures experience related to the individual's organizational knowledge. Finally, age was already discussed as a control variable. Age is occasionally utilized as a control variable related to experience to measure the total life experience of the respondent (National Research Council, 1989). Experience is a critical factor related to pay equity (Blau & Kahn, 2017; Choi, 2018; Lips, 2013) and the inclusion of a variety of experience measures is an attempt to address a variety of different forms of experience in the model.

Past research has repeatedly identified the personal characteristics of age, race/ethnicity, and education as well as the job characteristics of time in industry, time in job, and time at the organization as critical to the relationship between sex and pay. Thus, these will need to be controlled for in order to assess the relationship between sex, gender role, and pay. After the first three hypotheses, which test assumptions about the sample, the personal and job characteristic controls will be included in each of the remaining hypotheses. Controlling for these critical variables should allow for a more complete understanding of the influence of gender role in the relationship between sex and pay.

Theoretical Model: Relationship among Sex, Gender Role, and Pay

Two bodies of literature were relied upon to develop the hypotheses. The first body of literature that shaped this model was the pay equity literature. The pay equity

literature was relied on to set the premise that a pay gap between males and females does exist and persist in the United States (Blau & Kahn, 2017; Block, Croft, & Schmader, 2018; Institute for Women's Policy Research, 2018; Lips, 2013). The pay equity literature was also relied upon to discuss the importance of closing the gap due to the inequity in experience to which the gap contributes, such as different rates of poverty (Acker, 1990; Leisenring, 2020). Finally, the pay equity literature was relied on to determine appropriate controls for the research, which include age, race/ethnicity, education, and a variety of forms of experience (Blau & Kahn, 2017; Choi, 2018; Juhn, Murphy, & Pierce, 1993; National Research Council, 1989; Stanley & Jarrell, 1998).

The second body of literature relied on in this research is based in the field of social psychology. Authors in this field suggest that gender and sex are related but distinct concepts (van Anders, Caverly, & Johns, 2014; Yoder, 2003). Further, scholars also suggest that humans in a community occupy a variety of roles which help them organize the world around them through shared behavioral and social norms and expectations (Callero, 1994; Hollander, Renfrow, & Howard, 2011; Ridgeway, 2011). There are roles associated with gender as well as with occupations and these roles can be described as congruous or incongruous with one's sex (Eagly, 1987; 1997; 2007; Fitzsimmons, Callan, & Paulsen, 2014). In the United States context, in which the roles discussed in this work exist, the roles associated with sex tend to be binary due to the historically binary treatment of sex in this context (Haas, 2004). The role congruity literature suggests that where sex and the qualities that are perceived appropriate for that role align, there is a social reward. Where the alignment is not present, there is a social

penalty or lack or reward (Eagly, 1987). One such reward or penalty in the context of the workplace may be pay. This research hypothesizes that where higher levels of congruity exist, such as a male exhibiting a masculine gender role in a traditionally masculine occupation, pay will be higher. Conversely, where roles are incongruous, such as a female in the same traditionally masculine occupation or a male in a traditionally feminine occupation, pay will be lower.

Prior research has shown a clear relationship between biological sex and pay (Blau & Kahn, 2000; Robb, 1987). The research concludes that in the context of the United States workforce, males on average earn more than females. In addition, there is also a documented relationship between sex, gender and occupation, as described in the literature related to gender role theory (Acker, 1990; Eagly, 1987; Eagly & Karau, 2002; Padavic & Reskin, 2002). Importantly, while gender role (masculine/feminine) is strongly related to biological sex due to the social structures which enforce this relationship, there are individuals who adopt alternative gender roles. Due to the congruence of higher paid occupations with the masculine gender role, and conversely, the congruence of the feminine gender role with lower paid occupations, gender role is an important factor to consider. Based on this formulation, the model shown in Figure 2 is proposed:

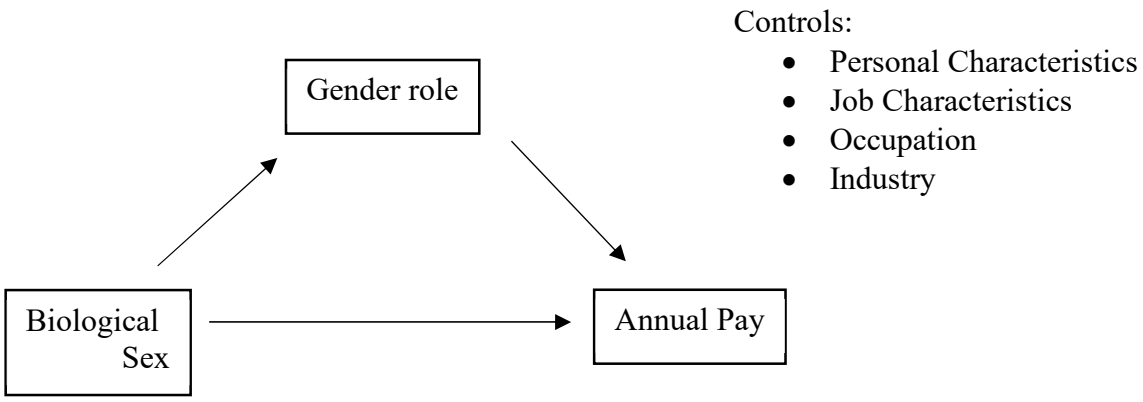


Figure 2: Theoretical Model Representation showing Gender role Mediating the Relationship between Sex and Pay

The model in Figure 2 shows the relationship between biological sex and annual pay. However, in addition to this relationship the mediating variable of gender role is also included as a factor which influences pay and is dependent upon the relationship to biological sex. The relationships between the individual's biological sex, gender role and their pay are critical to understanding the current state of pay equity, with the intent of informing meaningful pay equity policies in the future.

III. Methods

This chapter provides a detailed description of the methods used throughout this research. In order to test the hypotheses, a sample of adults working full-time was collected from large cities across the United States. The sample was drawn in such a way as to include respondents from a variety of industries and occupations. After cleaning the data, the final sample was developed by matching male and female respondents on observables so that the groups are similar in terms of both the observable and unobservable characteristics. Finally, each hypothesis was tested and the results reported in the following chapter.

Sample Selection Process

Sample selection was conducted by the independent contractor firm Qualtrics. Qualtrics has available pre-selected respondents grouped into panels. The panels are made up of people with a shared interest or a group of people were recruited using the same recruitment method. Recruitment strategies used by Qualtrics for their panels include: self-expressed interest by the respondent, data gathered when the respondent signs up for commercial promotions (e.g., grocery store points), and direct recruitment of individuals by Qualtrics. For this research a variety of panels were used to draw representation from a wide range of respondents. The multiple panel approach was utilized to reduce the bias of a single recruitment source or shared interest among the participants. However, it should also be noted that this is a convenience sample with non-

random selection of respondents and the ability of respondents to opt out of the survey at any time.

The survey was sent to individuals from the panels by Qualtrics and respondents were able to opt into the study. In addition, three screening questions were utilized as the inclusion criteria – city in which the respondent works, hours worked, and type of employment. In order to promote variation in the industries represented in the sample, while at the same time limiting factors tied to population size (e.g., rural v. urban), large US cities were chosen for inclusion. However, future research may benefit from further exploration of different contexts. Specifically, the sample was limited to individuals working in one of the four largest population cities within the United States – New York, Los Angeles, Chicago, and Houston. In addition to city in which the respondent was employed, they were also screened based on hours worked. Respondents who indicated that they work between 30 and 60 hours per week were included. Finally, respondents could not be self-employed. Since pay structure for self-employment is substantially different, self-employed individuals were excluded as part of the sample selection process.

Survey Administration

Qualtrics administered the survey via their online platform between April 10, 2019 and May 7, 2019. Prior to the full launch of the survey, a pilot test was done to test the time to complete the survey and to ensure the survey functioned as desired. The survey was sent to multiple panels of people, from which the sample was selected. The respondents who met the selection criteria were asked about their personal characteristics,

work characteristics and the Bem Sex Role Inventory (BSRI) questions, the BSRI is described below. Also, among those who met the inclusion criteria, the sample was stratified based on sector of employment with two strata, public and private. The sample was equally stratified between the two sectors.

However, the sample was not stratified by sex, the primary independent variable. An early assumption was made that there would be a large representation of both males and females in the panel without intentionally stratifying by sex. That assumption was flawed. An initial survey was distributed between April 10, 2019 and April 18, 2019 and 1020 responses were collected. Of those responses 713 (69.9%) were female and 307 (30.1%) were male. Due to the skew toward female respondents, the survey was re-opened to collect additional male responses. An additional 400 male responses were collected between April 26, 2019 and May 7, 2019. The total sample size was 1420, including 713 female responses and 707 male responses. Responses were only recorded if the respondent met the inclusion criteria, finished the full survey, and spent sufficient time taking the survey. Sufficient time to take the survey was defined as one-half the median time to complete the pilot survey. Summary descriptive statistics of the initial sample is shown in Table 2, below.

Table 2: Descriptive Statistics of the Sample based on the Inclusion Criteria and Stratification, n=1420.

Criteria	**Category**	**Descriptive Statistics**
City	Chicago, IL	n = 314 (22.1%)
	Houston, TX	n = 223 (15.7%)
	Los Angeles, CA	n = 368 (25.9%)
	New York, NY	n = 515 (36.3%)
Sector	Public	n = 710 (50%)

	Private	n = 710 (50%)
Hours per Week	Mean	41.24 hours/week
	Median	40.00 hours/week
	Standard Deviation	6.35
Sex	Female	n = 713 (50.2%)
	Male	n = 707 (49.8%)

Survey Instrument

A survey was developed to collect respondent information required for the analyses. The survey had two primary components: one set of questions to capture relevant demographic information and another set of questions pertaining to the assessment of the respondents' gender role. Two types of demographic information were collected: personal characteristics and job characteristics (shown in Table 3, below). The personal characteristics included: the respondents' year of birth, level of education, race and ethnicity, and biological sex (male or female only). The job characteristics included: city in which the respondent works, number of hours worked per week, sector of employment (public or private), industry of employment, hourly or annual wages, union representation status, time in current position, time with current employer, and time in current industry.

Table 3: Demographic Questions included in Survey Instrument

Personal Characteristics	**Job Characteristics**
• Year of birth • Level of education • Race and ethnicity • Biological Sex	• City in which the respondent works • Number of hours worked per week • Sector of employment • Industry of employment • Hourly or annual wages • Union representation status • Time in current position

	• Time with current employer • Time in current industry

For the second component of the survey with the gender role measurement, the Bem Sex Role Inventory (BSRI) was utilized (Bem, 1974; 1979). Sandra L. Bem proposed the use of this tool to, "assess the culturally-defined, desirable qualities for men and women (viz., gender stereotypes) that are then reflected in one's self-description by personally endorsing whether they have these qualities" (Dean & Tate, 2017, p. 645). The BSRI provides respondents a list of qualities, which are male-associated, female-associated, or non-gendered qualities (neutral). Individuals are asked to self-report the frequency of exhibiting the particular quality on a seven-point Likert-type scale ranging from *never or almost never (1)* to *always or almost always (7)*.

Building upon the work of Constantinople (1973), one of the major contributions made by Bem is the ability to measure the masculine and feminine qualities independently (Bem, 1974). This approach produces two scales, a masculinity scale and a femininity scale, as opposed to the bipolar continuum that had previously been favored (Constantinople, 1973). The original BSRI was a 60-item assessment with 20 traits of each type, masculine, feminine, and neutral (Bem, 1974). However, shortly after the introduction of the scale, Bem suggested a revision. In order to improve the correlation between the sex-typed items, she reduced the overall number of the items to 30 (Bem, 1981). The revised 30-item BSRI was used for this research because it has been shown to be more reliable (Bem, 1981). The revised scale is made up of 10 masculine qualities; 10

feminine qualities; and 10 neutral qualities (shown in Table 4, below). The survey instrument, with both the demographic and BSRI questions is in Appendix A.

Table 4: List of qualities included in the revised, 30-question BSRI

Masculine Qualities	Feminine Qualities	Neutral Qualities
• Aggressive • Assertive • Defends own beliefs • Dominant • Has leadership abilities • Independent • Self-sufficient • Strong personality • Willing to take a stand • Willing to take a risk	• Affectionate • Compassionate • Eager to soothe hurt feelings • Gentle • Loves children • Sensitive to the needs of others • Sympathetic • Tender • Understanding • Warm	• Adaptable • Conceited • Conscientious • Conventional • Jealous • Reliable • Secretive • Sincere • Tactful • Unpredictable

One important limitation of the BSRI is that it was developed within a particular culture, namely the United States in the 1970s. This tool was developed by identifying qualities which were considered, by the US culture, to be associated closely with either men, women, or neither. Since this is based on perception, it is likely that this tool will degrade in terms of its utility, due to loss of validity, over time (Donnelly & Twenge, 2017). There could be a risk in continuing to use the BSRI as the cultural context changes, including changes that occur with time, across different cultures, or within sub-cultures. Thus, as of today, validity is of particular concern given the time since the inception of the tool. Due to these concerns, a test of the association of masculinity with males in the sample and femininity with females in the sample is an important assumption test to perform.

Since the 1970s researchers have noted that the male and female responses are converging (Donnelly & Twenge, 2017; Holt & Ellis, 1998; Twenge, 1997). The primary driver of the change is female respondents more frequently identifying with historically masculine qualities, while males have remained relatively stable over the same period of time. In a recent meta-analysis (Donnelly & Twenge, 2017), the result of the increase in masculinity among female respondents has led to an increase among female respondents who are both high femininity and masculinity, but the same was not found for male respondents. Spence and Bucker (2000) also support this finding, suggesting that women are more frequently given "opportunities than their mothers to develop their agentic skills, particularly in the educational and occupational arenas" (p. 59). Although the male and female responses appear to be converging, the instrument remains valid when tested using both classical test theory and the Rasch method (Auster & Ohm, 2000; Geldenhuys & Bosch, 2019).

Another issue with the BSRI is the lack of clear definitions provided by Bem (1981) of specifically what the tool measures in its original formulation (Hoffman & Borders, 2001). Bem claimed that the tool could be used to measure not only individuals' masculinity and/or femininity, but also their view of the world through a gendered lens (Bem, 1981). This claim by Bem has been critiqued as the tool has not been shown as a valid measure of the respondent's world view. However, the tool has been shown to be a valid measure of masculinity and femininity (Auster & Ohm, 2000; Geldenhuys & Bosch, 2019). Since the measurement of masculinity and femininity is the primary

purpose of employing the BSRI in this research, Bem's reach in suggesting it measures world view is irrelevant.

An additional critique of the BSRI, beyond the validity concern, has less to do with the tool itself but rather its implication. Simply by categorizing respondents, the researcher is limiting the richness of the human experience. Further, since the tool is designed to identify differences between respondents, some scholars suggest that it further emphasizes the narrative that males and females are drastically different in their behaviors (Hollander, Renfrow, & Howard, 2011, p. 38). In other words, the concern is that the focus on difference between males and females in research perpetuates the social implication that there is little overlap in qualities between males and females. There is concern that, the focus on difference can take focus away from the argument that much of the difference is socially constructed rather than biological. Other scholars, including Bem (1981), however, have argued for the BSRI's continued utility on the basis that the tool measures an important social construct. Many structures in US society are built around the different roles held by males and females (Ridgeway, 2011, pp. 37-40). The tool, therefore, is intended to measure individuals acting within this context, not to describe the possible myriad of human experience. However, caution should be used when utilizing findings to not further imply that these categories, qualities, and gender roles are immutable. These roles may shift based on personal development of an individual, changes in the external context, or through large scale shifts over time in a given community.

Demographic Characteristics of the Respondents

There were four questions pertaining to the respondent's personal characteristics (year of birth, race and ethnicity, sex, and level of education) included in the survey. As mentioned above, there were 713 females and 707 males who completed the survey. Since sex is the independent variable of interest, the demographic information was evaluated for males and females. Overall, the sample was comprised of individuals born between 1943 and 2000, which is consistent with a working age population (ages 19-76). The median birth year was 1983. Year of birth was converted into age using 2019 as the year of comparison since this was the year of data collection. Both males and females had an average age of 38. For males, the median age was 37 whereas for females the median was 35. The majority of respondents identified as white (57.3%) with Black or African American being the second most frequent racial identity (22.7%). Respondents were also asked if they identified as Hispanic (regardless of race) and 23.6% (n=335) identified in this way.

The most frequent level of education for individuals in this sample was a four-year degree (30.8%). Relatively few of the respondents held a professional degree (e.g., JD, MD) (2.5%) or a doctoral degree (2.4%). Likewise, few respondents had less than a high school education or equivalent (0.8%). People with a college degree of some kind (Associates, Bachelors, Masters, Professional, or Doctorate) represented 64.8% of the sample. Those with less than high school, high school, or some college represented the remainder of the sample 35.2%, with individuals reporting some college education representing 20.4% of the sample. The United States Bureau of Labor Statistics indicates

that the most frequent educational attainment for workers 25 years and older is a high school diploma or equivalent (23.6%) followed by Bachelor's degree (23.5%) and some college (20.3%) (U.S. Bureau of Labor Statistics, Table 5.3, 2020). The higher level of education among respondents may indicate selection bias or as a result of the sample originating from large U.S. cities. Further research which involves a more varied geographic sample may be beneficial.

In addition to the personal characteristics, the survey also asked about job characteristics. As is consistent with previous scholarship, males in the sample tended to work slightly more hours per week (41.62 hours) compared to females (40.86 hours). Males also reported working for their current employer (7.90 years) longer than females (7.87 years). On the other hand, women reported slightly longer time in position (7.44 years) and time in industry (12.61 years) compared to their male counterparts (7.27 years and 11.90 years, respectively). Females also reported a higher rate of union membership (12.9% of females) compared to males (8.8% of males). These job characteristics will be important controls in the final model.

Data Cleaning and Variable Creation Procedures

Developing the Wage Variable

Respondents were asked to provide their base pay in either hourly or annual increments, depending on the way in which they receive their pay. This option was provided in order to reduce the potential error in people converting their wages from hourly to annual or vice versa. Wages were standardized across the sample by converting

hourly wages to annual based on the employees' reported hours per week. Following the conversion of hourly wages to annual wages, all wages were standardized to 1.0 full-time equivalent (FTE), or 40 hours per week. Although one source of pay inequity is the differences in hours worked by males and females, with females being more likely to take part-time work, in this case the standardized rate of pay was the value of interest. Five respondents either did not report their average number of hours worked per week or their wages, as a result they were excluded from the analysis (n=1415). While differences in base pay is one driver of pay inequity, there are other sources of pay that are unaccounted for in this research, such as overtime, bonuses, and additional vacation time. Additionally, standardizing to 1.0 FTE could remove important variation, such as females having less access to full time positions. Thus, while the standardization procedure helps to make more appropriate comparisons, it likely is a conservative estimate of the differences.

Once wages were standardized, they were examined to determine if the response was within reasonable bounds. Responses were considered to be outside of reasonable bounds if the pay rate was below the minimum wage requirement of the city or it appeared that the respondent entered annual earnings in the field that asked about hourly earnings (e.g., hourly earnings of $130,000). Thirty people reported wages that were too low, defined as reporting wages under the lowest standard minimum wage ($7.25 per hour) among the cities in the study. An additional 69 individuals were identified as extreme high outliers, earning over $200,000 per year. Several of these were due to respondents appearing to report annual earnings in the hourly field, resulting in an

extremely high calculation for their wage. Since this cannot be confirmed, they were excluded. The final annual range of pay for respondents in the sample was $15,900 - $198,750 (n=1316). For males in the sample (n=654) the mean wage after data cleaning was $63,911.71 and the median was $53,000.00. For females (n=662), the mean was $55,255.56 and the median was $48,030.20. As is consistent with prior research, females earn less than males in this sample. The distribution of wages for males and females, as shown in Figure 3, also reveals that the data are positively skewed.

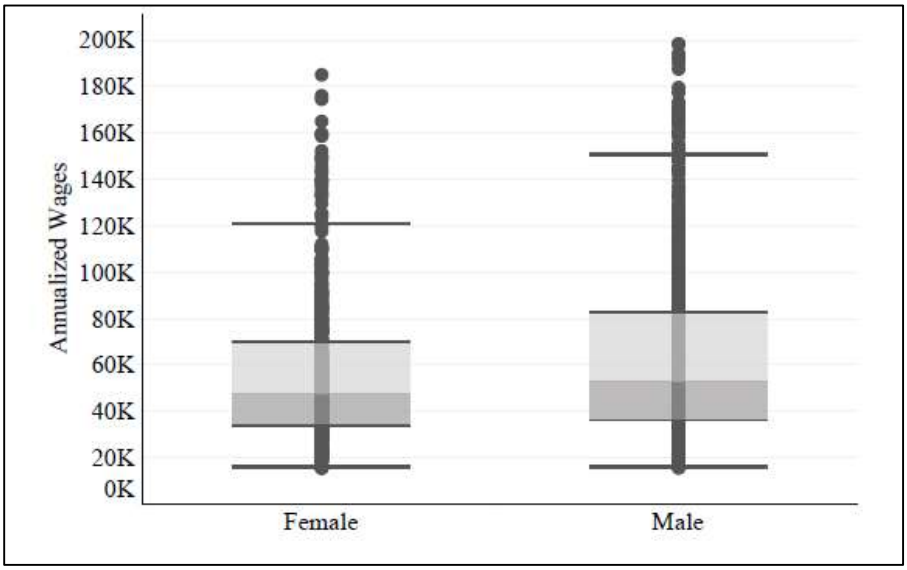


Figure 3: Box-and-Whisker Plot of Female and Male Annualized Wages.

Additionally, since the survey was distributed in four different cities, the variation in pay across respondents may be due to difference in cost of living. The median pay for New York was $57,191.43, for Los Angeles was $50,042.50, for Chicago was $47,563.80, and for Houston was $42,400.00. To account for this difference a cost of living adjustment was applied based on the respondents' city of employment. Chicago

was used as the base value and respondents from other cities were either adjusted to account for lower cost of living (Houston) or higher cost of living (New York and Los Angeles) (The Council for Community and Economic Research, 2019).

Finally, in order to address the skew in the sample, the log of the standardized, annualized wages was applied. This procedure is frequently used in the pay equity literature due to the common finding of a skewed distribution and the quality of only including positive values for wages (Jann, 2018). Logging the wages has two primary benefits for this research. First, it reduces the skew that is common in pay data since there is a relative lower limit to the data, but not an upper limit. Second, this allows for ratio comparisons across multiple employers. The resulting value for the log of wages is then interpreted as a relative scale, rather than an absolute values. The box plot of the log of wages for males and female, after standardizing across cities, is shown in Figure 4. Notably, after the log transformation was performed, the skew is reduced.

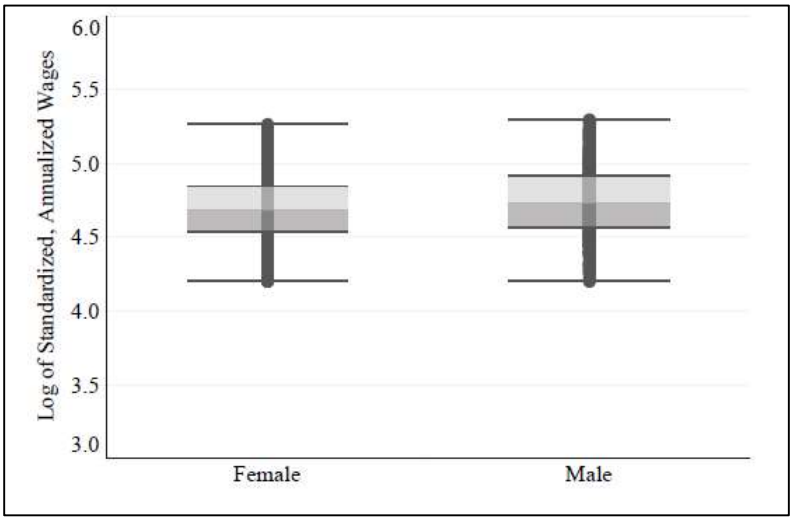


Figure 4: Box-and-Whisker Plot of Female and Male Standardized, Annualized Log of Wages.

Developing the Gender role Variables

The gender role variables were developed based on the BSRI data collected in the survey. First, the data was checked for respondents who had no variation in their responses. Seventeen respondents either answered never or almost never (1) to all questions or always or almost always (7) to all questions, these respondents were excluded as straight-line responses (n=1299). Next, reliability for each scale – masculine, feminine, and neutral – was examined using Cronbach's Alpha. For the masculine associated qualities, Cronbach's Alpha was .840, indicating a good fit. Among the ten masculine characteristics measured in the survey (See Table 3 earlier in this chapter for the list of characteristics), *Aggressive* was the only quality that negatively contributed to the scale and its removal would bring the Cronbach's Alpha up to .859. Since the scale was already reliable, aggressive was not excluded from the analysis in order to maintain consistency with the BSRI tool. For the feminine associated traits, the Cronbach's Alpha value was .907, indicating a good fit as well. Removal of any of the female associated qualities would negatively impact the reliability of the scale. The neutral items had the worst reliability, which is theoretically what would be expected since these items are not intended to measure a specific concept. The Cronbach's Alpha for the neutral items was .659.

In order to determine the BSRI category of each respondent, the median-split method of scoring was employed to identify respondents considered masculine and those considered feminine, which was proposed by Sandra Bem (Bem, 1977, p. 197). Originally, respondents were categorized as masculine (high in masculinity, low in

femininity), feminine (low in masculinity, high in femininity), androgynous (high in both), and undifferentiated (low in both) (Bem, 1974). However, Bem later acknowledged that this classification system loses valuable information by the introduction of the categories (Bem, 1977). Thus, masculinity and femininity are retained as two separate variables. Masculinity and femininity were measured using two distinct scales, so being considered masculine did not preclude the respondent from also being considered feminine.

The median split method begins by calculating the median response for each scale (Sedney, 1981, p. 218). Since alternate definitions of gender role could potentially influence the findings of this research, a brief review of alternative definitions and their impacts are included in Appendix B. Once calculated those who score above the median value of the masculine scale are considered masculine, those who score above the median value of the feminine scale are considered feminine. The median for male based characteristics, is 5.10 out of 7 and female based characteristics median is 5.30 out of 7. The number and percent of male and female respondents in each of the categories – high femininity, low femininity, high masculinity, and low masculinity – is shown in Table 5.

Table 5: Distribution of Male and Female Respondents for the Femininity Scale and Masculinity Scale based on the BSRI.

Feminine Associated Qualities:		
	Low Femininity	**High Femininity**
Female	281 (42.8% of females)	375 (57.2% of females)
Male	381 (59.3% of males)	262 (40.7% of males)
Masculine Associated Qualities:		
	Low Masculinity	**High Masculinity**
Female	350 (53.4% of females)	306 (46.6% of females)
Male	341 (53.0% of females)	302 (47.0% of males)

Demographic Variables

For the personal characteristic demographics (year of birth, race, ethnicity, sex, and level of education) there was limited data cleaning performed. Year of birth was transformed into age based on the year of the survey (2019). The range of age was then checked to confirm that respondents were of working age. The range in the final sample was 17 to 76 years old. Race, ethnicity, and sex variables were dummy coded. For race, zero (0) was used to indicate the absence of that category (e.g., 0 = not Asian; 1 = Asian). For sex, female was used as the reference category (0) to align with prior research in the field. Level of education was converted into the years required to complete the degree. This was done so that an individual who took 4 years to complete their Bachelor's degree (full-time student) had the same years of education in the model as another respondent who completed their Bachelor's degree in 8 years (part-time student). In this case, both would have been identified at 16 years of education total. Since the survey asked about level of education rather than years, those with less than a high school degree were assigned 11 years of education (the lowest on the scale) and those with some college were assigned 13 years of education, indicating more than high school (12 years) but less than an Associate's degree (14 years). This reflects that while individuals with some college may have more years of education than somebody with a 2-year degree, the lack of awarded degree negatively impacts their job opportunities. Therefore, it was determined that this would be lower on the scale than a 2-year degree.

For the job characteristics, the continuous variables (i.e., number of hours worked per week, time in position, time with employer, and time in industry) were checked to

ensure the responses fell within expected bounds. For hours worked, which was used as an inclusion criterion at the start of the survey, all responses were between 30 and 60 hours per week. For the time in position, employer, and industry variables, all respondents fell between 0 and 30 years. Union representation status was dummy coded with zero (0) indicating no union membership and one (1) indicating union membership.

Since one hypothesis deals specifically with sex-typed industries, a new variable was also created to indicate whether the respondents' industry is male-dominated, female-dominated, or neither (neutral). An industry was determined to be sex-dominated where more than 70 percent of individuals in the U.S. Labor Force Statistics from the Current Population Survey were of a single sex (Germain, Herzog, & Hamilton, 2012; U.S. Bureau of Labor Statistics, Table 18, 2020). Table 6, below, provides the list of male and female dominated industries, the percent and number in the sample, and the percent male and female according to the U.S. Bureau of Labor Statistics. Generally, industries that are female- or male-dominated industries in the United States, were also sex-dominated in the sample.

Table 6: The percent and number of females and males by industry. Also identifying which industries are considered sex-typed (70% or more of a single sex).

Female-Dominated Industries	**Percent; Number Female in Sample (Percent from U.S. Bureau of Labor Statistics)**	**Percent; Number Male in Sample (Percent from U.S. Bureau of Labor Statistics)**
Health care and Social Assistance	72.8%; n=142 (78.1%)	27.2%; n=53 (21.9%)

Male-Dominated Industries	**Percent; Number Female in Sample (Percent from U.S. Bureau of Labor Statistics)**	**Percent; Number Male in Sample (Percent from U.S. Bureau of Labor Statistics)**
Construction	14.3%; n=9 (10.3%)	85.7%; n=54 (89.7%)
Agriculture, forestry, fishing, and hunting	14.3%; n=1 (26.2%)	85.7%; n=6 (73.8%)
Manufacturing	17.5%; n=11 (29.4%)	82.5%; n=52 (70.6%)
Mining, quarrying, and oil and gas extraction	16.7%; n=1 (15.8%)	83.3%; n=5 (84.2%)
Transportation and Warehousing	28.8%; n=17 (24.8%)	71.2%; n=42 (75.2%)
Utilities	30.0%; n=9 (19.9%)	70.0%; n=21 (80.1%)
Wholesale Trade	26.3%; n=5 (28.6%)	73.7%; n=14 (71.4%)
Neutral Industries	**Percent; Number Female in Sample (Percent from U.S. Bureau of Labor Statistics)**	**Percent; Number Male in Sample (Percent from U.S. Bureau of Labor Statistics)**
Accommodation and Food Services	47.4%; n=9 (52.8%)	52.6%; n=10 (47.2%)
Other Administrative or Support Services	77.8%; n=49 (60.6%)	22.2%; n=14 (39.4%)
Arts, Entertainment, & Recreation	55.3%; n=21 (46.0%)	44.7%; n=17 (54.0%)
Educational Services	68.9%; n=124 (69.6%)	31.1%; n=56 (30.4%)
Finance and Insurance	43.5%; n=27 (54.7%)	56.5%; n=35 (45.3%)
Information	17.0%; n=8 (40.5%)	83.0%; n=39 (59.5%)
Management of Companies and Enterprises	52.5%; n=21 (44.9%)	47.5%; n=19 (55.1%)
Other Services	49.2%; n=96 (53.9%)	50.8%; n=99 (46.1%)
Professional and Technical Services	53.2%; n=50 (42.6%)	46.8%; n=44 (57.4%)
Real Estate or Rental and Leasing	60.0%; n=12 (47.7%)	40.0%; n=8 (52.3%)
Retail Trade	44.4%; n=44 (47.6%)	55.6%; n=55 (52.4%)

(U.S. Bureau of Labor Statistics, Table 18, 2020)

Propensity Score Matching

The method of inquiry utilized for this research was a cross-sectional quantitative approach. One of the challenges with non-random group assignment is that the researcher may have unaccounted for variables which explain the difference, rather than the treatment itself. Random assignment is theoretically designed to address this issue of unequal groups. Thus, traditionally researchers have relied on techniques, like random group assignment, to control for selection bias. However, since this approach was not feasible for the scope of this research, an alternative method was utilized, matching on propensity scores. Propensity score matching is a technique which reduces the likelihood that an underlying confounding factor explains the group difference. Rosenbaum and Ruben (1983) defined propensity score as "the conditional probability of assignment to a treatment given a vector of covariates." This approach is particularly important to address in cases where the group assignment was non-random, as is the case in this research. Propensity score matching is a method which is intended to address selection bias by correcting the sample so that the treated and untreated groups are equivalent in terms of their covariates. Propensity score matching pairs the sample on the independent variable, biological sex, so that the characteristics of the groups are relatively similar. In this case, the treatment condition is the respondents' biological sex, with males being included in the analysis as the treatment group (1) and females the untreated group (0).

In order to have increased confidence that the male and female groups are characteristically similar, thereby reducing the risk of selection bias, propensity score matching was undertaken. A propensity score is "the conditional probability of

assignment to a particular treatment given a vector of proposed covariates" (Rosenbaum & Rubin, 1983, p. 41). The underlying question in this research is whether or not there is a difference between males and females in terms of pay, and how gender role might mediate this relationship. To answer this question, the ideal, theoretical design would be to subject a group of individuals with their unique life experiences to a particular treatment. The treatment, in this case, is being male. Conceptually, one would also take that same group of people with the same set of experiences and gather data without subjecting them to the treatment. In this case, female is the non-treatment group. Then, the difference in pay between the individuals in the treatment versus non-treatment group would yield the answer to the research question, what is the average difference between males and females in terms of pay.

This theoretical approach would allow the researcher to understand the difference between males and females without issues related to covariates. For example, if a group of individuals earns an average of $75,000 while in the male treatment group, and that same group of individuals earns $72,000 without being in the treatment group, then the impact of biological sex on pay is an average of $3,000. Since these are the same people, there is no risk that this difference is due to some other underlying attribute or covariate. However, this counterfactual is impossible to test because the same group cannot simultaneously be both in the treatment and non-treatment groups.

Random group assignment in traditional experimental design is intended to develop groups that are similar in characteristics other than the intervention. Thus, in an experimental design, random assignment is critical to ensure that observed differences are

in fact due to the intervention or treatment. Given the quasi-experimental approach of this research, where non-random assignment was utilized, the risk of selection bias becomes particularly salient. For example, males in the sample may also have experienced less childhood trauma. This difference in trauma, rather than biological sex, may account for the difference in pay. Propensity score matching attempts to address this risk by matching the sample based on the observable covariates. Continuing with the example of males experiencing less trauma, the propensity score matching approach would address this by matching males and females on observables with the intent of mimicking the random group assignment that would be present in a random sample. This will ultimately result in a slightly smaller sample as not all respondents will be matched. However, the advantage is that the males and females remaining in the sample will be similar in terms of the observables but, more importantly, the risk of selection bias in the unobservable factors is similarly reduced. As a result, any difference in pay will likely not be due to difference in traumatic childhood experiences.

Functionally, the first step of this process is calculating the propensity score. The propensity score is calculated based on the observable attributes of the respondents. For this research the observed characteristics are: the personal demographic variables of age, race, ethnicity, and level of education and job related variables of tenure, time in position, and time in industry. These particular covariates and control variables were selected because they have been shown by prior scholars to impact pay (Blau & Kahn, 2017; Choi, 2018; Juhn, Murphy, & Pierce, 1993; Lips, 2013; Stanley and Jarrell, 1998). The next step is the matching. Once an individual in the treatment group's propensity score is

calculated, they can be matched based on the grouping variable. The independent variable, biological sex, will serve as the grouping variable. Ultimately, the matching will occur in such a way that the individuals in each group are similar in terms of the set of observable characteristics, reducing the variance across groups. This process will result in a sample that can be used for all of the hypotheses.

There are a number of assumptions required to be met in order to properly utilize propensity score matching. First, the covariates are observable and the covariates "are independent of the treatment status" (Heinrich, Maffioli, & Vázquez, 2010, p. 16). The complexity of the human experience precludes observing all possible factors that may impact pay. However, the information that was included has been shown by prior research to have significant impacts on pay. As such, the covariates that were identified in the literature review to be most impactful were collected via the survey instrument. Again, the controls and covariates in the study are: race, ethnicity, age, level of education, time in position, time with employer, and time in industry. Each of these covariates is independent of the treatment status, biological sex. The second assumption, is that for each covariate, there "is a positive probability of being both treated and untreated" (Heinrich, Maffioli, & Vázquez, 2010, p. 16). This assumption assures that there is sufficient overlap in the covariates between the groups, so that adequate matches can be found. The data collected for this research shows significant overlap in the covariates and the second assumption is met.

It is also recommended, although not an assumption of the matching process, that the data come from a single data collection instrument so that the construction of the

variables is consistent (Heinrich, Maffioli, & Vázquez, 2010, p. 17). This condition was met in the data collection process. Additionally, responses were required for each question of the survey, which reduced the quantity of missing data. While there may be errors in data entry, it is not expected that these errors would impact the treatment group to a greater degree than the non-treatment group. Thus, while error is a risk, it is not expected to impact males and females differently. Finally, since propensity score matching tends to reduce the number of observations in the final sample, it is also recommended that the sample size be relatively large (Heinrich, Maffioli, & Vázquez, 2010, p. 18). In this case, after data cleaning procedures, there were 1299 remaining observations. The proposed sample size for the population of interest is 385, well below the current sample size (Hanlon & Larget, 2011). Thus, even with some attrition during the matching procedure, the sample size is sufficiently large.

One critique of propensity score matching is that is only matches on observable characteristics (Rudner & Peyton, 2006, p. 9). When performing research in which random group assignment is feasible, the theoretical assumption is that the random assignment will result in similar groups in terms of both observable and unobservable covariates. However, in practice, it is possible that even with random assignment the covariates for any given data collection will not be identical. Thus, while random assignment clearly provides some benefit, it does not eliminate the risk of unequal covariates. From a practical standpoint, when using the best practice of informed consent for participants, it can be a challenge to randomly select and assign individuals to groups as there may be some groups who are more or less likely to participate. It can also be a

challenge from a practical standpoint to collect a randomized sample rather than a convenience sample in terms of the resources required to execute the research. While the risk of unequal unobservable covariates remains an issue in this research, the practical need to collect data in an efficient manner made a random sample overly burdensome.

In order to lessen the risk of unobservable covariates impacting the relationship between biological sex and annual wages, it is critical to collect appropriate data. The literature review highlighted those covariates that are known to have a significant impact on this relationship. By collecting this data from respondents, those covariates that are believed to have the greatest impact become observable and can be used to develop the propensity score. However, there remain myriad other covariates that are not observable in this research due to the design of the survey instrument. It is possible that these unobservable covariates are not equal between the groups and may lead to bias in the result. However, it is believed that collecting the most relevant, known covariates at the time of data collection will reduce the risk that there remains an unaccounted for covariate that is having a considerable impact on pay. Ultimately, this remains a weakness of this approach. Through the collection of covariate data that has been shown to have the greatest impact on pay and the propensity score matching process, the risk of unbalanced, observable covariates is reduced.

The propensity score matching for this research was performed using the MatchIt package in R (Ho, Imai, King, & Stuart, 2011). The grouping variable was biological sex whereas the predictor variables were the control variables discussed above (age, race, ethnicity, education, tenure, time in position, and time in industry). The model was

specified as a logit regression based on the work of Rosenbaum and Rubin (1983). A logit model indicates the likelihood of being in the male versus female group based on the individual's characteristics, known as the respondents' propensity score. Once the propensity score is calculated, the matching step evaluates the propensity scores and matches individuals with similar scores. So, if two individuals, one male and one female, are similar in terms of the controls and covariates (e.g., age, race, level of education, time in industry, etc.), then those respondents will have similar propensity scores. If they are the closest match, then those individuals will be included in the final sample as a matched pair.

The next step in the propensity score matching method is to determine the matching technique. There are a variety of techniques available for use, such as exact match, Kernel and local-linear matching, radius matching, and nearest neighbor (Heinrich, Maffioli, & Vázquez, 2010). The exact matching method finds only individuals who have an exact propensity score match. While this offers the confidence that respondents truly share the same set of characteristics, it can also severely reduce the number of matches. This was evaluated with the current sample, but was found to reduce the sample size significantly. Given the large number of covariates serving as controls, this is expected. Kernal and local-linear matching reduces variance in the sample because it compares each individual in the treatment group to a weighted average of untreated respondents. However, since the respondents are not compared at an individual level, this method can result poor matches.

Nearest neighbor matching overcomes some of the limitations of Kernal and local-linear matching by comparing individual propensity scores and matching the respondent from the treatment group with the nearest match in the untreated group. However, because the matches may be relatively dissimilar (although technically the nearest match) the resulting sample can have high variance. Radius matching overcomes this limitation to some degree by limiting the radius within which the match can fall. Thus, matches are only made between the treated and untreated groups where the propensity scores fall within an acceptable radius of difference. Ultimately, a combination of nearest neighbor and radius matching were chosen. This allows for the advantage of the nearest neighbor approach, but limits the risk of poor matches and high variance by specifying an acceptable radius within which the propensity scores must fall.

Once the matching method is determined, there are two additional considerations (Austin, 2011, p. 405). First, will the matching process be performed with or without replacement? If using replacement, the matching process will re-use cases in order to establish the best possible match. For example, one case in the non-treatment group may be the best match for two cases in the treatment group. If replacement is used, the non-treatment case would be matched to both treatment cases. However, if replacement is not used, then the next best match would be included, if there is a match within the specified radius. While replacement may yield more close matches, it also includes cases more than once. This can result in some cases being more heavily weighted in the analysis. For this reason, matching was performed without replacement approach was used for this

analysis. Due to the relatively large sample size available, ample matches were completed even without replacement.

The second consideration is how tightly to set the radius, known as the caliper in propensity score matching (Austin, 2011, p. 406). It is possible with nearest neighbor matching that two neighbors, which might technically be the nearest, are actually quite dissimilar. Including a radius within which the match can be made restricts matches to ensure that propensity scores are within a set distance from one another, adding to the nearest neighbor match criteria. The radius ensures that nearest neighbor matches fall within a set proximity, so that matches are acceptably similar in terms of the propensity scores. For this research, the caliper was set at 0.1 of the standard deviation of the propensity score, which is a relatively conservative caliper but resulted in more similar groups. As a reference, an even broader caliper width of 0.2 has been shown to "eliminate approximately 99% of the bias due to the measured confounders" in "several scenarios" (Austin, 2011, p. 407). Due to the relatively large sample size, there were sufficient matches and the conservative caliper did not reduce the sample size unacceptably.

This research is primarily concerned with matching demographics variables that have been shown to significantly impact pay or are central to at least one of the hypotheses. Thus, not all covariates or control variables were necessary to include in the matching procedure, such as city. For the personal characteristics: age, years of education, and race were included in the matching procedure. For the job characteristics, sector, time in current position, time with current employer and time in current industry were included. Once matched, the assumption is that the covariates will be relatively

similar between the treatment (males) and control (females) groups. Table 7, below, shows the final demographics after the matching procedure. However, it should also be noted that while performing this procedure allows for the comparison of similar groups, this may also reduce or remove some variation that is embedded in these populations of males and females. Possible future research may explore this further.

Table 7: Personal Demographic Characteristics (n and percent of the sample) by Sex, after propensity score matching procedure is performed.

Variable	**Male (n=557)**	**Female (n=557)**	**Sample (n=1114)**
Standardized Wages	$53,232.14	$48,407.54	$50,819.84
Mean Age*	37.7 years	37.8 years	37.7 years
Race	Number and Percent of Males:	Number and Percent of Females:	Number and Percent of Sample:
American Indian or Alaska Native	5 (0.9%)	9 (1.6%)	14 (1.3%)
Asian	50 (9.0%)	37 (6.6%)	87 (7.8%)
Black or African American	115 (20.6%)	118 (21.2%)	233 (20.9%)
Native Hawaiian or Pacific Islander	4 (0.7%)	5 (0.9%)	9 (0.8%)
Other	54 (9.7%)	60 (10.8%)	114 (10.2%)
White	329 (59.1%)	328 (58.9%)	657 (59.0%)
Ethnicity			
Spanish, Hispanic or Latino	140 (25.1%)	130 (23.3%)	270 (24.2%)
Level of Education			
Less than High School Degree	7 (1.3%)	0 (0.0%)	7 (0.6%)
High School or Equivalent	91 (16.3%)	60 (10.8%)	151 (13.6%)
Some College (No Degree)	122 (21.9%)	132 (23.7%)	254 (22.8%)
2-Year Degree	57 (10.2%)	62 (11.1%)	119 (10.7%)
4-Year Degree	160 (28.7%)	183 (32.9%)	343 (30.8%)
Master's Degree	86 (15.4%)	101 (18.1%)	187 (16.8%)
Doctoral Degree	21 (3.8%)	7 (1.3%)	28 (2.5%)
Professional Doctorate (JD, MD)	13 (2.3%)	12 (2.2%)	25 (2.2%)
Job Characteristics:			

Hours worked per week (mean)	41.65 hours	40.99 hours	41.32 hours
Union representation status (n)	195 (35.0%)	150 (26.9%)	345 (31.0%)
Time in current position (mean)	6.73 years	6.68 years	6.70 years
Time with current employer (mean)	6.96 years	6.79 years	6.88 years
Time in current industry (mean)	10.02 years	9.98 years	10.00 years

*year of birth was converted to age based on the survey distribution year (2019).
** all group differences are within the standardized difference range of 0.10.

The matching procedure naturally results in slight shifts of the descriptive statistics, these are documented in Table 8. All covariates and controls, whether used in the matching procedure or not, are shown in this table. Prior to matching, there were 656 females and 643 males in the sample (n = 1299). After matching, there were a total of 557 females and 557 males in the sample (n = 1114). The cases that were unmatched were removed from the sample. Covariates are shown with the average value and standard deviation whereas dichotomous variables are shown as the proportion of the sample exhibiting that particular characteristic. For both continuous and dichotomous variables, the difference is also shown.

Table 8: Change in Matched Variables after Propensity Score Matching Process

	Non-Matched		Matched		
Match Variables	Mean or Proportion	SD	Mean or Proportion	SD	Difference (* = significant)
Personal Characteristics					
Biological Sex (male)[1]	49.50%	n/a	50.00%	n/a	0.50%
Age (Years)	37.89	11.29	37.75	11.37	-0.14
Level of Education (Years)	15.18	2.41	15.1	2.42	-0.08
Race					
American Indian or Alaska Native[1]	1.20%	n/a	1.30%	n/a	0.10%
Asian[1]	7.90%	n/a	7.80%	n/a	-0.10%
Black or African American[1]	22.20%	n/a	20.90%	n/a	-1.30%
Native Hawaiian or Pacific Islander[1]	0.80%	n/a	0.00%	n/a	-0.80%
Spanish, Hispanic, or Latino[1]	23.80%	n/a	24.20%	n/a	0.40%
White[1]	58.00%	n/a	59.00%	n/a	1.00%
Other[1]	9.90%	n/a	10.20%	n/a	0.30%
Job Characteristics					
Self-Reported Wages (Annual)	$51,532.77	$29,587.61	$50,819.84	$29,386.07	-$712.93
City					
Chicago[1]	22.80%	n/a	22.90%	n/a	0.10%
Houston[1]	15.70%	n/a	15.50%	n/a	-0.20%
Los Angeles[1]	26.50%	n/a	27.60%	n/a	1.10%
New York[1]	35.00%	n/a	33.90%	n/a	-1.10%
Worked Hours per Week	41.3	6.16	41.32	6.19	0.02
Sector					
Public Sector[1]	46.20%	n/a	44.80%	n/a	-1.40%
Private Sector[1]	53.80%	n/a	55.20%	n/a	1.40%
Union Representation[1]	32.00%	n/a	31.00%	n/a	-1.00%
Time in Current Position (years)	6.68	6.98	6.70	7.01	0.020
Time with Current Employer (years)	6.76	7.06	6.88	7.08	0.120
Time in Current Industry (years)	10.02	8.28	10.00	8.22	-0.020

[1] Dichotomous variables: shown as proportion of sample

After these specifications were incorporated into the model, the group of male and female groups were more similar in their underlying characteristics. Table 9 shows the standardized difference between males and females for those characteristics that were used in the matching procedure. Again, these characteristics were chosen because they are most strongly associated with significant differences in pay (i.e., age, experience, race, education) or are critical to one of the hypotheses (i.e., sector). The standardized difference is calculated based on the suggested formula provided by Austin (2011, p. 412), who also indicates that a "standard difference that is less than 0.1 has been taken to indicate a negligible difference in the mean or prevalence of a covariate between treatment groups (Normand et al., 2001)." All of the standard differences are below this threshold. Similar to the table above, the means and standard deviations are shown for continuous variable and the proportion is shown for dichotomous variables. For additional demographic information, including the demographics by city (after matching) and by occupational code (after matching), see Appendix C.

Table 9: Standardized Difference of Treatment and Control Groups after Propensity Score Matching Procedure

	Males (n = 557)		Females (n = 557)		
Match Variables	Mean or Proportion	SD	Mean or Proportion	SD	Standardized Difference[2]
Personal Characteristics					
Age (Years)	37.74	10.53	37.75	12.15	0.00
Level of Education (Years)	15.04	2.56	15.17	2.28	-0.02
Race					
American Indian or Alaska Native[1]	0.90%	n/a	1.60%	n/a	-0.06
Asian[1]	9.00%	n/a	6.60%	n/a	0.09
Black or African American[1]	20.60%	n/a	21.20%	n/a	-0.01
Native Hawaiian or Pacific Islander[1]	0.70%	n/a	0.90%	n/a	-0.02
Spanish, Hispanic, or Latino[1]	25.10%	n/a	23.30%	n/a	0.04
White[1]	59.10%	n/a	58.90%	n/a	0.00
Other[1]	3.20%	n/a	1.80%	n/a	0.09
Job Characteristics					
Sector					
Public Sector[1]	44.00%	n/a	45.60%	n/a	-0.03
Private Sector[1]	56.00%	n/a	54.40%	n/a	0.03
Time in Current Position (years)	6.73	6.32	6.67	7.640	0.00
Time with Current Employer (years)	6.96	6.54	6.79	7.590	0.00
Time in Current Industry (years)	10.02	7.92	9.98	8.520	0.00

[1] Dichotomous variables: shown as proportion of sample

[2] Standardized Difference calculated based on suggested formula in Austin (2011).

Methods to Test the Hypotheses

The first three hypotheses are intended to test underlying assumptions about the sample before moving into further tests. As such, control variables were not used in the first three tests. The first two hypotheses address the concern that the masculine and feminine scales may not be related to biological sex in the sample collected. The first two hypotheses are:

H_1: Males are more likely to exhibit the masculine gender role than females.

H_2: Females are more likely to exhibit the feminine gender role than males.

Each of the gender role variables, masculinity and femininity, will be tested using Pearson's chi-square test to determine the relationship to biological sex (male/female). It is expected that males will be more likely to exhibit masculine qualities and females will be more likely to exhibit feminine qualities.

The third hypothesis, *Males earn significantly more than females*, is also intended to test one of the underlying assumptions of the research, namely that the males earn more than females among survey respondents. A Welch t-test will be utilized to determine if there is a significant difference between males and females in terms of their reported earnings. For this analysis, the log of pay will be the dependent variable while biological sex will be the independent variable. It is anticipated that the male respondents will earn more than female respondents prior to controlling for additional factors. The assumptions of no group being less than 5, no expected frequencies less than 0, and both variables being categorical were met.

Each of the remaining hypotheses are intended to better understand if and how gender role is mediating the relationship between biological sex and wages. The first of these hypotheses (H_4) tests gender role to determine if it is a mediator of the relationship between sex and wages. The following hypothesis (H_5), builds upon this work by specifically examining the way in which the mediator is affecting males and females in terms of role congruity. For example, if there is a reward for males who exhibit masculine qualities. The sixth hypothesis (H_6) further builds upon previous work by introducing the additional factor of sector (i.e., private sector v. public sector). Finally, the last hypothesis (H_7) is another variation in which the mediating impact is examined only in single sex dominated industries (defined as industries with 70% or more representation of a single sex).

Due to the similarities across this set of hypotheses, there are a number of aspects that are consistent across all remaining analyses. In each of the following analyses the log of wages is the primary dependent variable and biological sex is the primary independent variable. Additionally, each of these hypotheses uses gender role as the mediator. The average log of wages as well as the frequency of the masculine and feminine gender role are shown, in Table 10, for both males and females. After the log transformation, the skew was sufficiently reduced in the sample and the mean and median of the log of wages are the same when rounded to two decimal places.

Table 10: Log of Wages and Gender role Frequency for Males and Females are shown below:

	Mean Standardized Wage	Log of Wages (mean)	Masculine Gender role	Feminine Gender role
Female	$48,407.54	4.62 (SD = 0.22)	45.2% of Female Respondents	55.8% of Female Respondents
Male	$53,232.14	4.66 (SD = 0.24)	46.0% of Male Respondents	39.9% of Male Respondents

In addition, the relevant controls for all analyses were the personal characteristics (age, race/ethnicity, and education) and job characteristics (tenure, time in industry, and time in position). These variables were also included in the matching procedure. The matching step is purposefully designed to remove variation in controls and covariates across males and females (the treatment and control groups, respectively). As such, there is a possibility of omitting these variables in further analyses, since they have already been balanced between the groups. However, in doing this, the ability to review the different impacts of these variables on pay is lost. If only the propensity score is included, for example, there is no ability to compare the impact of education to the impact of tenure or identify differences among respondents based on race. While these are not the primary concern of the research, losing this level of detail is suboptimal.

Additionally, there is precedent for including the variables used in the matching procedure in the analysis as well. Stuart (2010) describes this approach as "similar to the idea of 'double robustness,' and the intuition is the same as that behind regression adjustment in randomized experiments, where the regression adjustment is used to 'clean

up' small residual covariate imbalance between the groups" (p. 15). This approach not only addresses any remaining differences between groups, but has the added benefit of allowing the comparison of the covariates to one another. This will allow for supplementary discussion of important variations, such as differences based on race. Due to these advantages, the covariates rather than the propensity score will be included in the following regression analyses. As detailed previously, the race variables were dummy coded with a dichotomous separate variable for each race identity. The racial demographics in the final sample are shown in Table 11.

Table 11: Race Identities for Matched Sample

American Indian or Alaska Native	n=14; 1.3% of the sample
Asian	n=87; 7.8% of the sample
Black or African American	n=233; 20.9% of the sample
Hispanic	n=86; 7.7% of the sample
Other	n=28; 2.5% of the sample
Pacific Islander	n=9; 0.8% of the sample
White	n=657; 59% of the sample

Based on the small sample size of American Indian or Alaska Native, Other, and Pacific Islander, these groups were not included in the final analyses individually. Instead they were combined into an "other race combination" variable (n = 51). White served as the reference category.

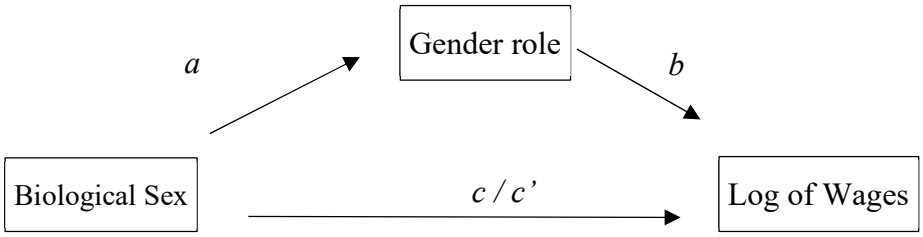
The fourth hypothesis will test the proposed model of the relationship between sex, gender role, and wages. It is hypothesized that *gender role is a mediator in the relationship between biological sex and the log of wages*. Based on the way in which gender role was measured using the 30-item BSRI, there are two distinct scales –

masculine and feminine. The masculine scale measures the frequency of the respondent exhibiting qualities that are typically male-associated. The feminine scale measures the frequency of the respondent exhibiting qualities that are typically female-associated. Using the median-cut point method suggested by Sandra L. Bem (1981), respondents were categorized as feminine or masculine if they exhibited qualities at a frequency above the median for the group. This means that individuals with a frequency above the median for female-associated qualities are considered feminine and individuals above median for male-associated qualities are considered masculine.

The feminine gender role variable was therefore treated as dichotomous with respondents categorized as either feminine (1) or not-feminine (0). Similarly, the masculine gender role variable categorized respondents as either masculine (1) or not-masculine (0). Since the gender role categories are not mutually exclusive, two separate analyses were performed. In order to test gender role as a mediator, a set of three linear regressions were analyzed. One of the challenges with this particular research is that both the independent and mediator variables are categorical. Much of the literature related to mediating variables assume a continuous mediator (Baron & Kenny, 1986; MacKinnon, Warsi, & Dwyer, 1995). The assumptions embedded in the analysis of a continuous mediator are not met when utilizing categorical mediators. Therefore, an alternative method appropriate to a categorical mediator was utilized.

Iacobucci (2012) compares multiple approaches to this particular issue. After outlining multiple options to address a categorical mediator, the author provides a solution which will be utilized in this research. The outlined solution includes fitting

three models, which are used to assess the relationship between the mediator, independent, and dependent variables. After fitting each of these three models, the elements are standardized and a z-test is used to determine if there is a significant mediation effect. While this follows the three model approach traditionally utilized to detect mediation impacts, it overcomes the challenges of categorical predictors with the additional standardization step. The general model is as follows:



Controls: Personal Characteristics (age, race – Asian, White, Black, and Hispanic, and education) and Job Characteristics (tenure, time in position, and time in industry)

Figure 5: Theoretical Model of the Mediating Impact of Gender Role

The first of the three models examines the relationship between the independent variable (biological sex) and the dependent variable (log of wages) without the mediator (gender role), as indicated by *path c* shown in Figure 5. This step is performed by running a multiple regression analysis, since the dependent variable (log of wages) is continuous. While the relationship between biological sex and pay was tested in the prior analyses, as part of the assumption testing process, no control variables were used in the previous analysis. In this iteration, all control variables will be included. In the second model, the relationship between biological sex and gender role will be tested, *path a* in the model

above. Since the dichotomous variable, gender role, will serve as the dependent variable for this analysis, a logistic regression will be performed and all control variables will also be included. The third model brings all of the components together. As with the first model, the dependent variable will be the log of wages and the independent variable will be biological sex (*path c')*. However, in this iteration, gender role will also be included as the mediator (*path b)*. The equations for the three model are shown below where Y = dependent variable, X the independent variable, M the mediator. The slope of the line corresponds to the pathway shown in Figure 5.

Model 1: $Y = b_1 + cX + covariates$

Model 2: $M = b_2 + aX + covariates$

Model 3: $Y = b_3 + c'X + bM + covariates$

Following the examination of gender role as a mediator, the fifth hypothesis was tested. The fifth hypothesis is: *There will be higher wages where gender role is congruent with one's biological sex as well as a wage penalty for incongruent roles.* An Oaxaca Blinder Decomposition regression method was used to assess this hypothesis. The decomposition analysis provides an estimate of the difference between the two groups (males and females) and decomposes that difference into explained variation (education, age, experience, etc.) and unexplained variation (the remaining unexplained difference). By decomposing the pay differentials into the explained and unexplained portions, additional insight is provided. Specifically, how gender role is impacting pay, including if the impact is benefiting a particular group or hindering the group.

For the next hypotheses, an Oaxaca Blinder Decomposition analysis was performed. As noted by the author of the R package, Marek Hlavac, "The aim of the Blinder-Oaxaca decomposition is to explain how much of the difference in mean outcomes across two groups is due to group differences in the levels of explanatory variables, and how much is due to differences in the magnitude of regression coefficients" (2018, p. 2). The use of the decomposition technique allows for an examination of the difference between males and females, but also takes that one step further by decomposing the difference into the explained and unexplained portion of the difference, as described below. The decomposition approach models two lines, one for males and another for females. Then, the difference between these lines, which is determined by both the intercept of the lines as well as their slope, can then be examined.

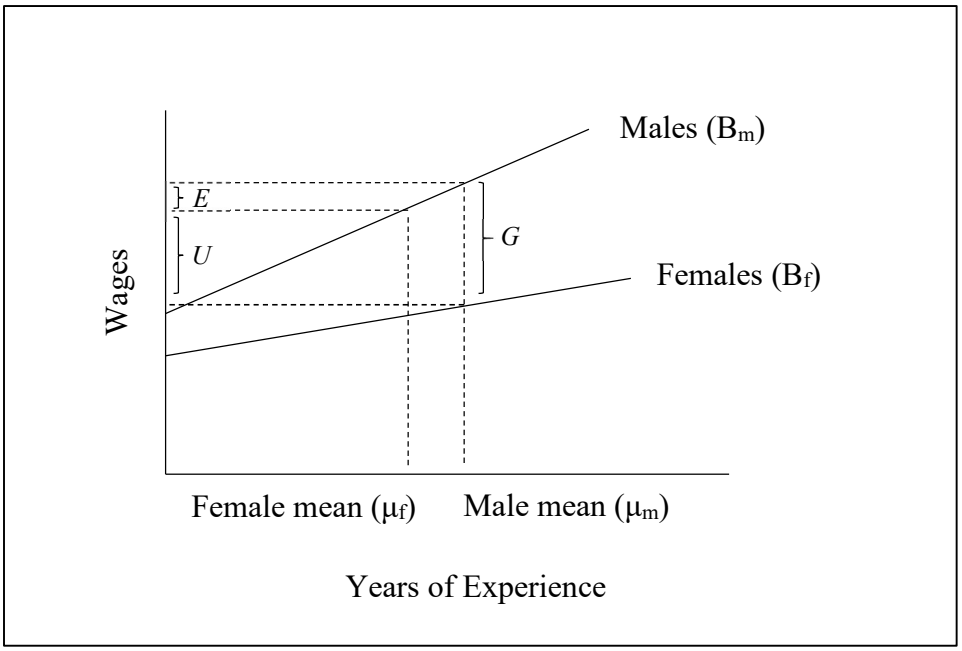


Figure 6: Theoretical Representation of Oaxaca Blinder Decomposition Approach to Analysis

In Figure 6, a theoretical explanation of the Oaxaca Blinder Decomposition approach is shown. First, the two lines indicate the linear regression of male and female wages with the years of experience as the predictor. The difference between the two lines becomes greater as experience increases. Thus, the point of intercept of the two lines, while important, is only part of the explanation for the difference. In addition, the slope of the line indicates that females earn less for each additional year of experience compared to the males in the figure. The vertical dashed lines indicate the mean years of experience for both males and females. As an example, let us suggest that the mean for males is 15 years. The total gap between males and females at 15 years of experience is represented as by *G* in the figure. The total gap is then decomposed into two parts, the explained portion and unexplained portion. The explained portion is the difference due to the predictors in the model, represented by *E* in the figure. The unexplained portion, *U* in the figure, includes factors that were unaccounted for in the model, including discrimination (Sen, 2014).

The effects represented in the model are also known as the endowment effect coefficient effect, and interaction effect. The endowment effect is the variation that is explained by the model, whereas the coefficient effect refers to the unexplained variation. The unexplained variation is often considered to be the impact of discrimination. However, since all variables that affect pay are not included in the model due to the vast number of factors that may affect pay, this is more accurately representative of both discrimination and additional factors. The third effect, the interaction effect, accounts for interaction of the endowment and coefficient effects. The threefold model examines these

three effects together whereas the twofold model breaks down the difference between the male and female iterations and decomposes the difference into the explained v. unexplained.

Another benefit of the decomposition approach is that this approach has been utilized in pay equity analyses in the past. The Blinder Oaxaca Regression has become a common tool used throughout the pay equity literature. Thus, the results in pay differences discussed throughout this work, particularly in the prior chapter, are largely derived from Oaxaca Blinder regression techniques. In order to maintain consistency with the literature from which this work was derived, the decomposition technique is useful. This will not only allow this work to be compared to others in the field but also reduces the risk that differences in findings from this research compared to others is due to a change in the methodology.

The sixth hypothesis, *the impact of gender role as a mediator will be reduced for employees working in the public sector*, will expand upon the understanding of gender role as a mediator. In this analysis, the mediating effect of gender role will be analyzed for respondents who identified themselves as working in the private sector as well as for respondents who indicated they work in the public sector. This test will follow the procedure outlined for hypothesis four, with three OLS regressions followed by the standardization procedure to address the categorical mediator. This may provide important insight into pay equity considerations given the different ways in which these sectors typically set pay.

Finally, the seventh hypothesis, *the impact of gender role as a mediator will increase in highly sex typed industries*, will also test the degree to which gender role is a mediator in the relationship between sex and pay. Specifically, if gender role is a mediator among respondents in sex dominated industries. It is suggested that the mediating impact will be greater in industries that are dominated by either males or females. Similar to the previous hypothesis, this test will follow the procedure outlined for hypothesis four, with three OLS regressions followed by the standardization procedure to address the categorical mediator. The following chapter will provide the results of these analyses.

IV. Results

In the prior chapter the data were matched on the observable characteristics and the methods were briefly outlined. The results from each analysis are detailed in this chapter. Each of the following tests are performed on the matched sample.

Results of Hypothesis 1: Males are more likely to exhibit the masculine gender role than females

For the first hypothesis, males are more likely to exhibit the masculine gender role than females, the analysis was performed using the matched sample (n=1114). There were a total of 557 males and 557 females in the sample, and 45.6% (n=508) of the sample was identified as masculine. The relationship between the variables (biological sex and masculinity) was not significant, χ^2 (1, n = 1114) = .06, n.s. The effect size was also extremely weak (Cramer's V = 0.01). This indicates that the masculine gender role is not more likely to be associated with males than females. Results are shown in Table 12.

Table 12: Chi Square Results and Distribution of Respondents by Sex and Masculinity

	Low Masculinity	**High Masculinity**	Total
Male	301 (54.0% of females) Adj. Resid. = 0.2	256 (46.0% of females) Adj. Resid. = -0.2	557 (50% of sample)
Female	305 (54.8% of males) Adj. Resid. = -0.2	252 (45.2% of males) Adj. Resid. = 0.2	557 (50% of sample)
Total	606 (54.4% of sample)	508 (45.6% of sample)	1114
χ^2 (1, n = 1114) = .06, p > .05			
Note: Analysis performed on matched sample.			

Results of Hypothesis 2: Females are more likely to exhibit the feminine gender role than males

For the second hypothesis, females are more likely to exhibit the feminine gender role than males, the analysis was again performed using the matched sample (n=1114). There were a total of 557 males and 557 females in the sample, and 47.8% (n=533) of the sample was identified as feminine. The relationship between the variables (biological sex and femininity) was significant, χ^2 (1, n = 1114) = 28.50, p < .001. However, the effect size was weak (Cramér's V = 0.16). This indicates that there is a weak relationship between femininity and biological sex. Results are shown in Table 13.

Table 13: Chi Square Results and Distribution of Respondents by Sex and Femininity

	Low Femininity	High Femininity	Total
Female	246 (44.2% of females) Adj. Resid. = -5.3	311 (55.8% of females) Adj. Resid. = 5.3	557 (50% of sample)
Male	335 (60.1% of males) Adj. Resid. = 5.3	222 (39.9% of males) Adj. Resid. = -5.3	557 (50% of sample)
Total	581 (52.2% of sample)	533 (47.8% of sample)	1114
χ^2 (1, n = 1114) = 28.50, p < .001			
Note: Analysis performed on matched sample.			

Regarding the first two hypotheses, males are not more likely to exhibit the historically male gender role than females (H_1). However, females are more likely to exhibit the historically female gender role than males (H_2). Thus H_1 was not supported but H_2 was supported. This aligns with findings from prior scholarship (Donnelly & Twenge, 2017; Holt & Ellis, 1998; Twenge, 1997) which suggests that the male gender role category measured by the BSRI is weakening as a distinguishing feature for males as female express traditionally male associated qualities to a greater extent over time.

Meanwhile, the males do not seem to be adopting the traditionally female associated characteristics. Future research into why this pattern is emerging, particularly with the BSRI tool, could be fruitful given the wide adoption of this tool across the globe. While both the masculine and feminine gender role will still be tested as mediators, it is unlikely that masculinity will emerge as a mediator given this finding.

Results of Hypothesis 3: Males earn significantly more than females

For the third hypothesis, male respondents earn significantly more than female respondents, the pay of male and female respondents was compared. The primary research questions of this work hinge on the assumption that males do, in fact, earn more than females. While the difference in pay between males and females is clearly documented in past research (World Economic Forum, 2019), it is possible that this sample did not follow that pattern. Before moving into the primary research questions, this assumption had to be examined. The Welch's t-test was chosen to compare the difference between males and females in regard to their reported pay because of the unequal variance between the groups. No additional factors were included in this analysis because the test was performed on the already matched sample. An Welch's t-test was performed to compare the log of self-reported earnings between males and females. There was a significant difference between the males ($M = 4.66$; $SD = 0.24$) and females ($M = 4.63$; $SD = 0.22$), $t(1104.80) = -2.41$, $p < .05$. Since this finding supports the assumption that males earn more than females, the primary hypothesis testing can proceed.

Overall, the second hypothesis, females are more likely to exhibit the feminine gender role, and third hypothesis, males earn significantly more than females, were supported. However, the first hypothesis, males are more likely to exhibit the masculine gender role, was not supported. This suggests that the BSRI tool is possibly continuing to weaken in terms of differentiating males and females in the expression of traditionally male-associated qualities. However, the female-associated qualities are not being adopted by males to the same degree. This may reflect the belief that traditionally masculine qualities are seen more positively, thus leading females to acquire those qualities more readily. Despite the lack of a significant finding for the first of the hypotheses, the results are sufficient to move forward into the primary hypotheses testing. The four primary hypotheses are:

H_4: Gender role is a mediator in the relationship between biological sex and the log of wages

H_5: There will be higher wages where gender role is congruent with one's biological sex as well as a wage penalty for incongruent roles.

H_6: The impact of sex role as a mediator will be reduced for employees working in the public sector.

H_7: The impact of sex role as a mediator will increase in highly sex typed industries.

Results of Hypothesis 4: Gender role is a mediator in the relationship between biological sex and the log of wages

The fourth hypothesis tests the mediating impact of the feminine and masculine gender role. Since these were measured independently, two analyses were conducted to assess the impact of each. Respondents were considered masculine if their average

response was above median on the masculine gender role scale. Likewise, respondents were considered to exhibit the feminine gender role if their average response was above median on the feminine scale. Thus, respondents could be masculine, feminine, both masculine and feminine, or neither. In a prior analysis, it was determined that there is no significant difference between males and females in the expression of the traditionally masculine gender role. This is in-line with previous literature, which indicates that the proportion of females exhibiting the traditional masculine gender role is increasing over time (Donnelly & Twenge, 2017; Holt & Ellis, 1998; Twenge, 1997).

Based on the work by Iacobucci (2012), three models were used to assess the relationship between the mediator, independent, and dependent variables. As stated previously, masculinity and femininity were measured independently. Thus, their mediating impact will be tested in two separate analyses. While the expression of the masculine gender role by males and females has already been shown to be insignificant, it will tested as a mediator as a confirmation. The three models, with masculine gender role as the mediator are shown below:

Model 1: [*Log of Wages*] = b_1 + c[*Biological Sex*] + covariates

Model 2: [*Masculine Gender role*] = b_2 + a[*Biological Sex*] + covariates

Model 3: [*Log of Wages*] = b_3 + c'[*Biological Sex*] + b[*Masculine Gender role*] + covariates

After fitting each of these three models, the elements are standardized and a z-test is used to determine if there is a significant mediation effect. While this follows the three model

approach traditionally utilized to detect mediation impacts, it overcomes the challenges of categorical predictors with the additional standardization step.

For model 1, multiple linear regression analysis was performed to evaluate how well biological sex and the relevant control variables predict the log of wages. The control variables were the personal characteristics (age, race/ethnicity, and education) and job characteristics (tenure, time in position, and time in industry). The overall model was significant and explained 27% of the variation ($R^2 = .27$, $F(10,1113) = 41.55$, $p < .001$). Sex was a significant predictor of the log of wages ($\beta = .08$, $p < .01$) with males predicted to earn more than females. Additionally, the control variables for Hispanic ($\beta = -.08$, $p < .01$) and Black or African American ($\beta = -.07$, $p < .05$) were significant. Both of the race/ethnicity identities, Hispanic and Black or African American, were predicted to earn less than the reference group (White). Education ($\beta = .36$) and time in industry ($\beta = .27$) were both positively significantly related to wages at the $p < .001$ level. This indicates that both higher education and longer time in industry are associated with higher wages. The results are shown in Table 14.

Table 14: Multiple Linear Regression for Model 1, testing masculine gender role as a mediator in the relationship between biological sex and log of wages.

Variable	B	SE B	β	t
Biological Sex	0.04	0.01	0.08	3.20**
Personal Characteristics				
Age	0.00	0.00	0.03	0.79
Race = White	Reference Group			
Race = Asian	-0.02	0.02	-0.02	-0.78
Race = Black or African American	-0.04	0.02	-0.07	-2.53*
Race = Hispanic	-0.06	0.02	-0.08	-2.85**
Race = Other	0.01	0.03	0.01	0.42

Education	0.03	0.00	0.36	13.62***
Job Characteristics				
Time in Position	0.00	0.00	-0.04	-0.96
Time with Employer (Tenure)	0.00	0.00	0.06	1.25
Time in Industry	0.01	0.00	0.27	5.95***
Constant	4.03	0.04		90.46***

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Note: Analysis performed on matched sample.

Next, the logistic regression for model 2 was performed. A logistic regression was performed to determine if sex is a significant predictor of masculinity. The overall model was not significant χ^2 (8) = 11.85, n.s. and explained 3% of the variation (Nagelkerke R^2 = 0.03). The model correctly classified 56.9% of cases compared to 54.4% in the null model. Sex was a not significant predictor of masculinity, as was expected based on the previous assumption testing. However, time in industry (B = 0.03, $p < .05$) and Black or African American (B = 0.52, $p < .01$) were both significant control variables. For each year in the industry respondents were 1.03 times more likely to express a masculine gender role and Black or African American respondents were 1.68 times more likely to express a masculine gender role. No other predictors were significant. Results are shown in Table 15.

Table 15: Logistic Regression for Model 2, testing masculine gender role as a mediator in the relationship between biological sex and log of wages

Variable	B	SE B	Wald χ^2	Exp(B)	95% CI Exp(B)
Biological Sex	0.05	0.12	0.19	1.05	0.83 - 1.34
Personal Characteristics					
Age	-0.01	0.01	0.55	0.99	0.98 - 1.01
Race = White	Reference Group				

Race = Asian	-0.25	0.24	1.11	0.78	0.49 - 1.24
Race = Black or African American	0.52	0.16	10.94**	1.68	1.23 - 2.28
Race = Hispanic	0.03	0.24	0.02	1.03	0.65 - 1.64
Race = Other	0.56	0.30	3.61	1.75	0.98 - 3.13
Education	-0.01	0.03	0.06	0.99	0.94 - 1.05
Job Characteristics					
Time in Position	0.02	0.01	1.21	1.02	0.99 - 1.05
Time with Employer (Tenure)	-0.02	0.02	1.96	0.98	0.95 - 1.01
Time in Industry	0.03	0.01	4.09*	1.03	1.00 - 1.05
Constant	-0.24	0.46	0.26	0.79	-

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Note: Analysis performed on matched sample.

For model 3, a second multiple linear regression was performed to test if sex significantly predicted the log of wages with masculinity as a mediator. The overall model was significant and explained 27% of the variation ($R^2 = .27$, $F(11,1113) = 37.78$, $p < .001$). Sex was a significant predictor of the log of wages ($\beta = .08$, $p < .01$) with males predicted to earn more than females. Additionally, the control variable for Hispanic ($\beta = -0.08$, $p < .01$) and Black or African American ($\beta = -0.07$, $p < .05$), with both predicted to earn less than the White reference group. Education ($\beta = .36$) and time in industry ($\beta = .27$) were both positively significantly related to wages at the $p < .001$ level. The incorporation of the masculinity dummy variable made relatively little difference in the model. The results are shown in Table 16.

Table 16: Multiple Linear Regression for Model 3, testing masculine gender role as a mediator in the relationship between biological sex and log of wages

Variable	B	SE B	β	t
Biological Sex	0.04	0.01	0.08	3.19**
Masculine Gender role	0.01	0.01	0.01	0.57

Personal Characteristics				
Age	0.00	0.00	0.03	0.80
Race = White	Reference Group			
Race = Asian	-0.02	0.02	-0.02	-0.76
Race = Black or African American	-0.04	0.02	-0.07	-2.57*
Race = Hispanic	-0.06	0.02	-0.08	-2.85**
Race = Other	0.01	0.03	0.01	0.38
Education	0.03	0.00	0.36	13.62***
Job Characteristics				
Time in Position	0.00	0.00	-0.04	-0.97
Time with Employer (Tenure)	0.00	0.00	0.06	1.27
Time in Industry	0.01	0.00	0.27	5.91***
Constant	4.03	0.04		89.75***

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Note: Analysis performed on matched sample.

From here the models were standardized to account for the use of both linear regression and logistic regression models, as outlined in Iacobucci (2012). Z scores are calculated from both model 2 and 3:

Derived from Model 2: $z_a = a/se_a = 0.43$

Derived from Model 3: $z_b = b/se_b = 0.58$

Once derived, the product is found ($z_a\ z_b = 0.25$) and their collected standard error is calculated $\sqrt{(z_a^2 + z_b^2 + 1)} = 1.24$. Finally, the standardized z-test is calculated to determine if the mediation effect is significant ($z_a\ z_b / \sqrt{(z_a^2 + z_b^2 + 1)} = 0.20$). As discussed above, the masculinity variable was not significantly related to sex in the prior exploratory analyses. Therefore, it was expected that the masculinity variable may not be acting as a mediator. When the tests were standardized and the z-test was calculated, masculinity was not a significant mediator between sex and wages (z=.20).

Femininity, on the other hand, was more strongly related to sex than masculinity in the initial tests. The approach to testing femininity as a mediator was exactly the same as that described for masculinity, above. Three regression analyses were performed, the results were standardized to address the difference between logistic and linear regression approaches, and then a z-test was performed. The three models, with masculine gender role as the mediator are shown below:

Model 1: [*Log of Wages*] = b_1 + c[*Biological Sex*] + covariates

Model 2: [*Feminine Gender role*] = b_2 + a[*Biological Sex*] + covariates

Model 3: [*Log of Wages*] = b_3 + c'[*Biological Sex*] + b[*Feminine Gender role*] + covariates

For model 1, multiple linear regression analysis was performed to test if sex significantly predicted the log of wages. Since the mediator is not included in the first regression, the results are the same as when performed for the masculinity mediator. In the prior discussion it was noted that biological sex is a significant predicator of the log of wages.

Next, the logistic regression for model 2 was performed. A logistic regression was performed to determine if sex is a significant predictor of femininity. The overall model was significant χ^2 (10) = 53.83, $p < .001$ and explained 6% of the variation (Nagelkerke $R^2 = .06$). The model correctly classified 58.3% of cases compared to 52.2% in the null model and the overall model fit was acceptable (Hosmer and Lemeshow = n.s.). Biological Sex was a significant predictor of femininity at the $p < .001$ level. Males were .52 times less likely to express femininity. Age was the only significant control variable

(p < .01). As people aged one year, they were 1.03 times more likely to express femininity. Results are shown in Table 17.

Table 17: Logistic Regression for Model 2, testing feminine gender role as a mediator in the relationship between biological sex and log of wages

Variable	B	SE B	Wald χ^2	Exp(B)	95% CI Exp(B)
Biological Sex	-0.65	0.12	27.49***	0.52	0.41 - 0.67
Personal Characteristics					
Age	0.03	0.01	10.86**	1.03	1.01 - 1.04
Race = White	Reference Group				
Race = Asian	-0.22	0.24	0.88	0.80	0.50 - 1.28
Race = Black or African American	0.11	0.16	0.47	1.11	0.82 - 1.52
Race = Hispanic	-0.08	0.24	0.12	0.92	0.58 - 1.47
Race = Other	0.23	0.30	0.60	1.26	0.70 - 2.26
Education	0.02	0.03	0.42	1.02	0.97 - 1.07
Job Characteristics					
Time in Position	0.02	0.01	1.46	1.02	0.99 - 1.05
Time with Employer (Tenure)	-0.01	0.02	0.15	0.99	0.96 - 1.03
Time in Industry	-0.01	0.01	0.50	0.99	0.97 - 1.02
Constant	-0.96	0.47	4.19*	0.38	

* p < 0.05, ** p < 0.01, *** p < 0.001
Note: Analysis performed on matched sample.

For the third model, a multiple linear regression analysis was performed to test if sex significantly predicted the log of wages with femininity as a mediator. The overall model was significant and explained 28% of the variation (R^2 = .28, F(11,1113) = 38.22, p < .001). Sex was a significant predictor of the log of wages (β = .07, p < .01) with males predicted to earn more than females. While femininity (β = - .05, p = .051) was not significant at the .05 level, but given the complexity of these relationships, the low p-

value warrant further investigation. Femininity showed a negative relationship with the log of wages. Additionally, the control variables for Hispanic ($\beta = -.08$, $p < .01$) and Black or African American ($\beta = -.07$, $p < .05$) were also significant, with both earning less than the White reference group. Education ($\beta = .36$) and time in industry ($\beta = .27$) were both positively significantly related to wages at the $p < .001$ level. The results for the control variables were similar to the results when run with the masculinity mediator. The results are shown in Table 18. Additionally, while sex and feminine gender role are related based on the results from Hypothesis 2, when collinearity diagnostics were assessed the VIF did not indicate that multicollinearity is problematic in this model (VIF=1.03 for biological sex and 1.05 for feminine gender role).

Table 18: Multiple Linear Regression for Model 3, testing feminine gender role as a mediator in the relationship between biological sex and log of wages.

Variable	B	SE B	β	t
Biological Sex	0.03	0.01	0.07	2.85**
Feminine Gender role	-0.02	0.01	-0.05	-1.96†
Personal Characteristics				
Age	0.00	0.00	0.04	0.98
Race = White	Reference Group			
Race = Asian	-0.02	0.02	-0.02	-0.83
Race = Black or African American	-0.04	0.02	-0.07	-2.49*
Race = Hispanic	-0.07	0.02	-0.08	-2.88**
Race = Other	0.01	0.03	0.01	0.46
Education	0.03	0.00	0.36	13.67***
Job Characteristics				
Time in Position	0.00	0.00	-0.04	-0.88
Time with Employer (Tenure)	0.00	0.00	0.06	1.23
Time in Industry	0.01	0.00	0.27	5.92***
Constant	4.04	0.04		90.48***

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, † $p < 0.10$
Note: Analysis performed on matched sample.

From here the models were standardized to account for the use of both linear regression and logistic regression models, as outlined above (Iacobucci, 2012). When the tests were standardized and the z-test was calculated, femininity was not a significant mediator between sex and wages at the .05 level ($z = 1.81$). However, this was very close to the $p < .05$ threshold and will be further analyzed.

Results of Hypothesis 5: There will be higher wages where gender role is congruent with one's biological sex as well as a wage penalty for incongruent roles.

For the following hypothesis, the analysis was performed in R, using the "Oaxaca" package as outlined by Hlavac (2018). The models included sex as the independent variable, the log of wages as the dependent variable, feminine gender role as a mediator, and the job and personal characteristics as controls. A stepwise regression was performed in which the femininity variable was included in the second iteration. This allows for the examination of the impact to the unexplained portion of the model with and without the mediating effect of femininity. The standard errors were estimated using a bootstrapping method and the pooled results are provided.

Importantly, the Oaxaca Blinder method is sensitive to the choice of reference category for the independent variable. The choice of reference category is tied to the assumption that there is no discrimination occurring for that group, either beneficially or detrimentally. So, any of the difference is theoretically assumed to be due to discrimination against the non-reference group. If males are chosen as the reference group, then any difference in the model (the unexplained portion) would be attributed to discrimination against women. This does not align with research in the area of pay equity

which suggests that not only is there discrimination against females but there is also a benefit for being male. Therefore, the difference between the sexes is not representative of simply discrimination against females but also benefits attributed to males.

Several authors have proposed alternative methods for dealing the challenge of a model which is sensitive to reference group. For example, Reimers (1983) has suggested using a weighted average of the coefficients. Another author, Cotton (1988), builds upon the work of Reimers (1983) and suggests the weighted average approach as well, but takes into account the number of observations in each group. A third option, suggested by Neumark (1988), and reaffirmed more recently by Jann (2008), calls for the reporting of pooled regression coefficients. Jann (2008) specifically calls for using the indicator variable in the pooled results in order to avoid a "distortion of the decomposition results because of the residual group difference spilling over into the slope parameters of the pooled model" (2008, p. 458). Using the pooled response allows for the identification of factors that are working against females but also in favor of males. The approach outlined by Jann (2008) was ultimately decided upon for this research because this approach better aligns with the theory that there is both a benefit to being male and a penalty for females. The Oaxaca Blinder method is also sensitive to the reference group of dummy variables used as control variables. However, the Oaxaca package in R corrects for this sensitivity so no additional actions were taken.

The twofold decomposition allows for the examination of the explained versus unexplained portion of the difference between males and females. There were a total of 1114 cases, with 557 male and 557 female. The difference between the log of wages in

males and females is 0.03, with male log of wages averaging 4.66 and female averaging 4.63. The endowment effect was -0.004, meaning a relatively small amount of the difference was explained by the control factors. Without the inclusion of the covariates, the gap would be slightly wider. On the other hand, the coefficient effect or the unexplained portion of the model accounts for the remaining 0.037 (se = .01) of the difference, attributing substantially more to the difference than the explained portion. The interaction effect was relatively small, -0.001 (se = .003).

Since some variation has already been accounted for using the propensity score matching approach, this is in line with expectations where the difference in covariates, or the set of variables attributing to the explained portion, is already accounted for. Similar to the results from the previous regression analyses discussed in regard to hypothesis 4, education ($p < .001$), Hispanic identity ($p < .01$), Black or African American identity ($p < .05$), and time in industry ($p < .001$) are all significant predictors in the pooled regression. The coefficients and standard errors for each variable in the first step of the regression, without feminine gender role included, are shown in Table 19.

Table 19: Pooled Results for Decomposed Regression with Biological Sex as the Independent Variable and Log of Wages as the Dependent Variable

Variable	B	SE B	t
Personal Characteristics			
Age	0.001	0.001	0.769
Race = White	Reference Group		
Race = Asian	-0.014	0.022	-0.638
Race = Black or African American	-0.039	0.015	-2.557*
Race = Hispanic	-0.064	0.023	-2.837**
Race = Other	0.007	0.028	0.241
Education	0.034	0.002	13.458***

Job Characteristics			
Time in Position	-0.001	0.001	-0.967
Time with Employer (Tenure)	0.002	0.002	1.300
Time in Industry	0.007	0.001	5.913***
Constant	4.053	0.044	91.58***

* p < 0.05, ** p < 0.01, *** p < 0.001, † p < 0.10
Note: Analysis performed on matched sample.

The second step of the Oaxaca Blinder decomposition analysis included the mediator variable, feminine gender role. As with the first regression step, the analysis included biological sex as the independent variable, the log of wages as the dependent variable, and the job characteristic and personal characteristic variables serving as controls. Again, coefficients from the pooled regression are reported in order to account for the sensitivity to reference group in the independent variable.

As before, the gap between the wages of males and females can be broken down into the explained and unexplained portion of the difference. The coefficient for the explained portion, the endowment effect, was 0.000 (se = 0.01). This is a slight increase compared to the model without the femininity variable. Based on the hypothesis, it was expected that the explained portion of the difference would increase with the inclusion of the mediating variable. The coefficient effect, or unexplained portion of the model, accounts for 0.035 (se = .01) of the difference, a slight decrease from the previous Oaxaca analysis without the femininity variable. Again, the decrease in the unexplained portion is expected based on the hypothesized relationship, with the mediator explaining an additional portion of the difference and thereby reducing the unexplained portion. Finally, the interaction effect accounts for -0.002 (se = .01).

After the inclusion of femininity as a mediator in the second step of the decomposition analysis, the significant control variables remain unchanged. Education ($p < .001$), Hispanic identity ($p < .01$), Black or African American identity ($p < .05$), and time in industry ($p < .001$) were all significant controls. Finally, the additional variable, feminine gender role, was negatively related to the log of wages ($B = -0.03$) at the $p < .05$ level. This supports the overall hypothesis that feminine gender role is a mediator in the relationship between biological sex and wages. Additionally, the negative relationship with wages further supports the theoretical framework which suggests that there is a penalty for the feminine gender role. The coefficients and standard errors are shown in Table 20 for each predictor.

Table 20: Pooled Results for Decomposed Regression with Biological Sex as the Independent Variable, Log of Wages as the Dependent Variable, and Feminine Gender Role as the Mediator.

Variable	B	SE B	t
Feminine Gender Role	-0.029	0.012	-2.430*
Personal Characteristics			
Age	0.001	0.001	1.008
Race = White	Reference Group		
Race = Asian	-0.016	0.022	-0.723
Race = Black or African American	-0.038	0.015	-2.509*
Race = Hispanic	-0.065	0.023	-2.869**
Race = Other	0.009	0.028	0.320
Education	0.034	0.002	13.544***
Job Characteristics			
Time in Position	-0.001	0.001	-0.879
Time with Employer (Tenure)	0.002	0.002	1.267
Time in Industry	0.007	0.001	5.877***
Constant	4.058	0.044	92.075***

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, † $p < 0.10$

Note: Analysis performed on matched sample.

One way in which the decomposition approach provides additional insight beyond the linear analysis is the examination of difference between the groups. The unexplained group differences are assessed as either benefiting a group, in favor of males in this case, or working against a group, working against females. As a reminder, the unexplained portion, or coefficient effect, is 0.035 of the difference in the log of wages. This can be further broken down in the twofold analysis. If the pooled results are not utilized, then the full portion of the difference would be attributed to discrimination against females. However, to recognize that discrimination both benefits and works against particular groups, the pooled results are shown. Based on the pooled, twofold decomposition, the amount of discrimination in favor of males and against females is relatively similar for the feminine gender role mediator, with 0.0164 attributed to discrimination in favor of males and 0.0164 attributed to discrimination against females. This suggests, that the unexplained portion of the difference in the feminine gender role is both benefiting males, who are less likely to exhibit the feminine gender role, and is simultaneously working against females.

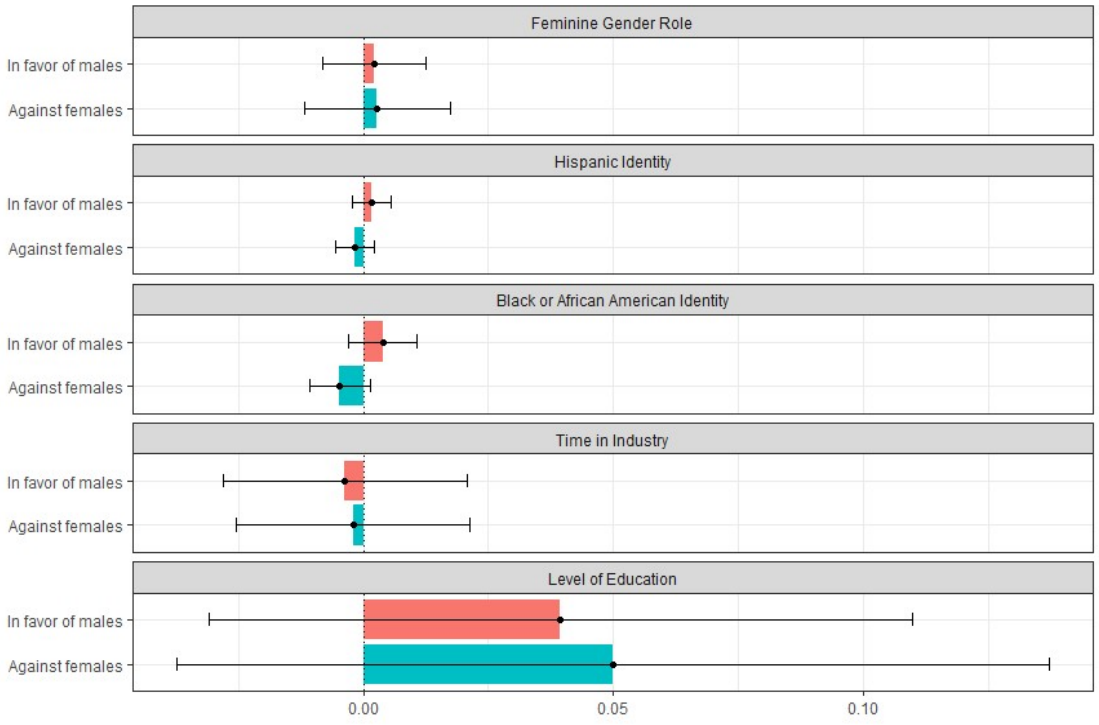


Figure 7: Decomposed, Pooled Regression Coefficients from Oaxaca Blinder Decomposition for Significant Predictor Variables.

A graphical representation of the twofold results are shown in Figure 7. In order to not misrepresent the relationship, the focus of this discussion will be on significant variables only. The feminine gender role decomposition of the coefficient effect is shown first, at the top of the figure. As discussed, the impact is relatively evenly distributed between discrimination in favor of males and against females. The length of the bars indicates the relative impact of the variable. Thus, the relatively short bars for feminine gender role indicate that the impact of this variable, while significant, has a relatively small effect.

Hispanic identity and Black or African American identity follow the feminine gender role in the figure. These are also significant predictors, with both identities expected to earn less than the white reference group. The larger bars of the Black or African American pooled, coefficient effect indicate that the effect size is slightly larger for Black or African American respondents compared to the Hispanic respondents. However, both of these race/ethnicity identities follow a similar pattern. For males, the pattern indicates that the discrimination in wages is working in favor of males, as indicated by the bar extending in the positive direction. Males from both Hispanic and Black or African American communities are expected to earn more than Females. However, the bar for discrimination against females is negative.

This indicates that for Black or African American and Hispanic females there may be a protective element in the sense that females in this group actually have a reduction in the amount of discrimination. This is also supported when examining the pay gap among Hispanic and Black or African American individuals in the United States, both of which have a more narrow pay gap compared to White workers. For Black or African American individuals the male-female pay gap is 6 cents between males and females and for Hispanic the pay gap is 15 cents. These are smaller gaps than for their White counterparts, with a 17 cent gap (U.S. Bureau of Labor Statistics, Table 3, 2020).

The pooled, coefficient decomposition for time in industry is negative for both males and females. This indicates that increasing time in industry leads to a reduction in the discrimination in favor of males as well as the discrimination against females. Education is one of the most impactful of the covariates as indicated by the length of bars

in the figure. Not only is education most impactful among the significant predictors, but this factor is contributing to both discrimination in favor of males and against females. The discrimination against females is slightly stronger than the discrimination in favor of males. If males and females had the same educational attainment, it would still be expected to be some discrimination against females, leading to slightly lower wages for females.

Following the fourth hypothesis, which demonstrated that feminine gender role does have a mediating impact, the fifth hypothesis provided additional insight. In the propensity score matching step, the male and female samples were matched on the control variables. The effect of this matching procedure was clearly seen in the Oaxaca Blinder Decomposition analysis due to the very small endowment effect. The endowment effect is the difference in the log of wages that is due to the explanatory factors. In this case, since the explanatory factors were matched prior, it would be expected that the difference in wages was not primarily due to the difference in these factors. Thus, the remaining difference is largely attributed to the coefficient effect, or the unexplained portion of the model. When specifically looking at the impact of the feminine gender role in the pooled, twofold analysis of the coefficient effect, it appears that the difference is both working in favor of males as well as against females.

Results of Hypothesis 6: The impact of gender role as a mediator will be reduced for employees working in the public sector

The sixth hypothesis, the different impact of the feminine gender role in the private versus public sectors was assessed. In order to test the hypothesis that gender role

will have a different mediating impact in the public (n=499) versus private (n=615) sectors, a set of linear regressions designed to examine whether or not feminine gender role is a mediator were performed along with the standardization procedure outlined by Iacobucci (2012). Two regressions were performed in order to compare the results for employees who identified as a member of the public sector versus employees in the private sector. Femininity served as the mediator based on the results from prior analyses, sex as the independent variable, the log of wages as the dependent, and the personal and job characteristics as the additional controls. Notably, union membership is also highly associated with sector; 17% of private sector respondents indicated that they belong to a union whereas 51% of public sector respondents belong to a union. The mean wages and number of responses by sex and sector are shown in Table 21, below.

Table 21: Mean wages and number of respondents by sector and sex.

Sector		Standardized Mean Wage
Private Sector	Female	$48,055.98 (n = 303)
	Male	$54,558.40 (n = 312)
Public Sector	Female	$48,826.92 (n = 254)
	Male	$51,543.20 (n = 245)

For the first analysis, only the respondents who indicated private sector employment were included. As with hypothesis four, three regressions were performed:

Model 1: [*Log of Wages*] = b_1 + c[*Biological Sex*] + covariates

Model 2: [*Feminine Gender role*] = b_2 + a[*Biological Sex*] + covariates

Model 3: [*Log of Wages*] = b_3 + c'[*Biological Sex*] + b[*Feminine Gender role*] + covariates

For model 1, the overall model was significant and explained 27% of the variation ($R^2 = .27$, $F(10,614) = 21.95$, $p < .001$). Sex was a significant predictor of the log of wages at the $p < .05$ level ($\beta = -0.08$, $p < .05$). The control variables for Hispanic ($\beta = -0.10$, $p < .01$) and Black or African American ($\beta = -0.09$, $p < .05$) were also significant, with both earning less than the White reference group. Education ($\beta = .36$) and time in industry ($\beta = .25$) were also both positively, significantly related to wages at the $p < .001$ level, as was the case with prior analyses. For private sector employees, time in position was also significant ($\beta = -0.11$, $p < .05$).

For model 2, in which the feminine gender role is the dependent variable, a logistic regression was performed to determine if sex is a significant predictor of the feminine gender role among private sector respondents. The overall model was significant $\chi^2 (10) = 19.74$, $p < .05$ and explained 4% of the variation (Nagelkerke $R^2 = 0.04$). The model correctly classified 57.1% of cases compared to 52.7% in the null model. Sex was a significant predictor of feminine gender role ($p < .001$), as was expected based on the previous tests performed. However, none of the additional control variables was a significant predictor of the feminine sex role.

For model 3, a second multiple linear regression was performed to test if sex significantly predicted the log of wages with femininity as a mediator. The overall model was significant and explained 27% of the variation ($R^2 = .27$, $F(11,614) = 20.45$, $p < .001$). Sex was not a significant predictor of the log of wages ($\beta = -0.07$, $p = .062$), but was close to the threshold. Feminine gender role was a significant predictor of the log of wages ($\beta = -0.07$, $p < .05$). Additionally, the control variable for Hispanic ($\beta = -0.10$, $p <$

.01) and Black or African American (β = -0.09, p < .05), with both predicted to earn less than the White reference group. Education (β = .36) and time in industry (β = .24) were both positively significantly related to wages at the p < .001 level. For this analysis time in position was close to significance as well (β = -0.10, p = .059). This is unique to this analysis and the negative relationship indicates that pay decreases with longer time in position, likely reflecting that people who stay in a position for a long period of time often top out on the wage scale compared to people who promote more frequently and have less time in position as a result. This could warrant further examination in future research. The results are shown in Table 22.

Table 22: Multiple Linear Regression with feminine gender role as a mediator in the relationship between biological sex and log of wages, for private sector respondents only.

Variable	B	SE B	β	t
Biological Sex	0.03	0.02	0.07	-1.87†
Feminine Gender role	-0.03	0.02	-0.07	-2.07*
Personal Characteristics				
Age	0.00	0.00	0.06	1.39
Race = White	Reference Group			
Race = Asian	-0.02	0.03	-0.03	-0.83
Race = Black or African American	-0.05	0.02	-0.09	-2.38*
Race = Hispanic	-0.09	0.03	-0.10	-2.85**
Race = Other	0.01	0.04	0.01	0.27
Education	0.04	0.00	0.36	9.98***
Job Characteristics				
Time in Position	0.00	0.00	-0.10	-1.89†
Time with Employer (Tenure)	0.00	0.00	0.08	1.45
Time in Industry	0.01	0.00	0.24	4.32***
Constant	4.04	0.06		63.12***

* p < 0.05, ** p < 0.01, *** p < 0.001, † p < 0.10
Note: Analysis performed on matched sample.

The final step in testing the mediating impact of feminine gender role in the private sector is the standardization procedure to determine if a mediation effect is occurring Iacobucci (2012). After standardization the z-score is 1.73, indicating that the mediating impact is marginally significant at the $p < .10$ level. This is consistent with other findings from hypothesis 4.

In the second set of analyses, only public sector employees were included in the analysis. The first model was significant and explained 31% of the variation ($R^2 = .31$, $F(10,498) = 21.41$, $p < .001$), the highest R^2 across all analyses. Sex was a significant predictor of the log of wages ($\beta = -0.09$, $p < .05$). Additionally, the control variables for Hispanic ($\beta = -0.04$, p = n.s.) and Black or African American ($\beta = -0.03$, p = n.s.) were not significant, which is a different pattern than has been previously described. On the other hand, education ($\beta = .38$) and time in industry ($\beta = .30$) were both positively, significantly related to wages at the $p < .001$ level, as has been seen in previous analyses.

For the second model, in which the feminine gender role is the dependent variable, a logistic regression was performed to determine if sex is a significant predictor of the feminine gender role among public sector respondents. The overall model was significant $\chi^2 (10) = 42.46$, $p < .001$ and explained 11% of the variation (Nagelkerke $R^2 = 0.11$). The model correctly classified 59.5% of cases compared to 51.5% in the null model. Sex was a significant predictor of feminine gender role ($p < .001$), as was expected based on the previous tests performed. Age was also significant ($p < .01$), which is was not seen in prior analyses.

For model 3, a second multiple linear regression was performed to test if sex significantly predicted the log of wages with femininity as a mediator. The overall model was significant and explained 31% of the variation ($R^2 = .31$, $F(11,498) = 19.46$, $p < .001$). Sex was a significant predictor of the log of wages ($\beta = -0.08$, $p < 05$), but feminine gender role was not a significant predictor of the log of wages ($p = .63$). Unlike previous analyses, none of the race variables were significant among public sector respondents. However, education ($\beta = 0.38$) and time in industry ($\beta = 0.30$) were both significant at the $p < .001$ level. Further, the standardized coefficient for feminine gender role is smaller in the public sector model compared to the private sector model. This indicates that for public sector employees, the feminine gender role appears to have minimal impact compared to the private sector, supporting the hypothesis. The results are shown in Table 23.

Table 23: Multiple Linear Regression with feminine gender role as a mediator in the relationship between biological sex and log of wages, for public sector respondents only.

Variable	B	SE B	β	t
Biological Sex	0.04	0.02	0.08	2.16*
Feminine Gender role	-0.01	0.02	-0.02	-0.49
Personal Characteristics				
Age	0.00	0.00	-0.02	-0.35
Race = White	Reference Group			
Race = Asian	-0.02	0.04	-0.02	-0.44
Race = Black or African American	-0.02	0.02	-0.03	-0.84
Race = Hispanic	-0.03	0.03	-0.04	-0.98
Race = Other	0.02	0.04	0.02	0.55
Education	0.03	0.00	0.38	9.68***
Job Characteristics				
Time in Position	0.00	0.00	0.08	0.99
Time with Employer (Tenure)	0.00	0.00	0.00	0.04
Time in Industry	0.01	0.00	0.30	3.96***

Constant	4.08	0.06		65.80***

* p < 0.05, ** p < 0.01, *** p < 0.001, † p < 0.10
Note: Analysis performed on matched sample.

The final step in testing the mediating impact of feminine gender role in the private sector is the standardization procedure to determine if a mediation effect is occurring Iacobucci (2012). After standardization the z-score is 0.46, indicating that the mediating impact is not significant.

The public sector is more likely to have the presence of pay mechanisms that limit variation, such as set pay ranges (Katz & Krueger, 1992). Thus, it was hypothesized that the impact of feminine gender role would be minimized in this group. The feminine gender role was not a significant predictor among public sector respondents, but was significant for private sector employees. Further, for private sector employees the standardized beta for feminine gender role was actually larger than the standardized beta for sex. This provides some evidence that the greater pay controls seen in the public sector do minimize the impact of bias related to feminine gender role. However, it should also be noted that sex remained significant in the public sector model. Also of note, the race and ethnicity variables, Hispanic and Black or African American, which had been significant in previous analyses were also not significant among public sector employees. So, the pay controls aimed at reducing bias may also apply to race and ethnicity, not just gender role. However, time in industry and education remained significant. Among private sector respondents, the impact of the feminine gender role as well as the race and

ethnicity variables was more substantial as well as statistically significant. Time in industry and education remain important factors related to pay regardless of sector.

In order to better understand the impact of union membership on these relationships, a second set of linear regressions were run in which union membership was an additional control was performed. This analysis was included after identifying how strongly union membership was related to public sector employment. Again, the private sector employees were analyzed first. The overall model was significant and explained 27% of the variation ($R^2 = .27$, $F(12,594) = 18.14$, $p < .001$). With the inclusion of union, sex was a significant predictor of wages ($\beta = .08$, $p < .05$) as was the feminine gender role ($\beta = -.07$, $p < .05$). Union was not a significant predictor. The patterns among controls variables remained unchanged from the prior analysis. The control variables for Hispanic identity ($\beta = -.10$, $p < .01$) and Black or African American ($\beta = -.09$, $p < .05$) were also significant, with both earning less than the White reference group, and education ($\beta = .35$) and time in industry ($\beta = .24$) were also both positively, significantly related to wages at the $p < .001$ level. Although not significant at the .05 level, time in position was marginally significant in this iteration ($p = .07$). The results are shown in Table 24.

Table 24: Multiple Linear Regression with feminine gender role as a mediator in the relationship between biological sex and log of wages and union membership included as an additional control, for private sector respondents only.

Variable	B	SE B	β	t
Biological Sex	0.04	0.02	0.08	2.10*
Feminine Gender role	-0.03	0.02	-0.07	-2.03*
Personal Characteristics				
Age	0.00	0.00	0.06	1.35
Race = White	Reference Group			

Race = Asian	-0.02	0.03	-0.03	-0.81
Race = Black or African American	-0.05	0.02	-0.09	-2.29*
Race = Hispanic	-0.09	0.03	-0.10	-2.78**
Race = Other	0.02	0.04	0.02	0.48
Education	0.04	0.00	0.36	9.83***
Job Characteristics				
Time in Position	0.00	0.00	-0.10	-1.83†
Time with Employer (Tenure)	0.00	0.00	0.08	1.50
Time in Industry	0.01	0.00	0.24	4.23***
Union Membership	-0.01	0.02	-0.02	-0.63
Constant	4.00	0.07		61.14***

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, † $p < 0.10$
Note: Analysis performed on matched sample.

As with the first iteration, public sector employees were examined in a separate regression analysis. The overall model was significant and explained 29% of the variation ($R^2 = .29$, $F(12,474) = 16.00$, $p < .001$). As was the case without the inclusion of union membership, sex was a significant predictor of the log of wages ($\beta = .08$, $p < .05$), but feminine gender role was not ($\beta = - .01$, p = n.s.). Union membership ($\beta = - .01$, p = n.s.) was also not significant in this model. Similar to the analysis without union membership, the control variables for Hispanic (Hispanic or Hispanic or Latinx) ($\beta = -.04$, p = n.s.) and Black or African American ($\beta = -.01$, p = n.s.) were also not significant. Education ($\beta = .37$) and time in industry ($\beta = .28$) were positively, significantly related to wages at the $p < .001$ level. Thus, the previous results, which indicated that the feminine gender role is not a mediator among public sector employees but is a mediator among private sector employees, does not appear to be attributable to union membership. This indicates that the way in which pay is determined across sectors may be an important factor to consider

in future pay equity studies. The results of the inclusion of union membership for public sector employees are shown in Table 25.

Table 25: Multiple Linear Regression with feminine gender role as a mediator in the relationship between biological sex and log of wages and union membership included as an additional control, for public sector respondents only.

Variable	B	SE B	β	t
Biological Sex	0.04	0.02	0.08	1.99*
Feminine Gender role	0.00	0.02	-0.01	-0.19
Personal Characteristics				
Age	0.00	0.00	0.00	-0.06
Race = White	Reference Group			
Race = Asian	0.00	0.04	0.00	-0.11
Race = Black or African American	-0.01	0.02	-0.01	-0.26
Race = Hispanic	-0.03	0.03	-0.04	-1.03
Race = Other	-0.01	0.04	-0.01	-0.24
Education	0.03	0.00	0.37	9.17***
Job Characteristics				
Time in Position	0.00	0.00	0.05	0.68
Time with Employer (Tenure)	0.00	0.00	0.03	0.32
Time in Industry	0.01	0.00	0.28	3.58***
Union Membership	0.00	0.02	-0.01	-0.21
Constant	4.04	0.07		60.83***

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, † $p < 0.10$
Note: Analysis performed on matched sample.

Results of Hypothesis 7: The impact of gender role as a mediator will increase in highly sex typed industries

The final hypothesis is that in sex typed industries (those with more than 70% male or female representation based Labor Force Statistics from the Current U.S. Population Survey) the impact of the mediator would be stronger. It is hypothesized that in industries that are sex typed, the incentive to adhere to traditional gender roles will be

even more pronounced. In order to examine this final hypothesis, the dataset was limited to respondents who worked in highly sex-typed industries. The male dominated industries are: construction; forestry, fishing, hunting, or agriculture support; manufacturing; mining; transportation or warehousing; utilities; and wholesale trade. The female dominated industry was healthcare or social assistance. The percent male and female for each industry and the number of respondents in the original sample are shown in Table 26.

Table 26: The percent and number of females and males by industry in the sample. Also identifying which industries are considered sex-typed (70% or more of a single sex).

Female-Dominated Industries	**Percent Female in Industry**	**Percent Male in Industry**
Health Care or Social Assistance	72.8% (n=142)	27.2% (n=53)
Male-Dominated Industries	**Percent Female in Industry**	**Percent Male in Industry**
Construction	14.3% (n=9)	85.7% (n=54)
Forestry, Fishing, Hunting, or Agriculture Support	14.3% (n=1)	85.7% (n=6)
Manufacturing	17.5% (n=11)	82.5% (n=52)
Mining	16.7% (n=1)	83.3% (n=5)
Transportation or Warehousing	28.8% (n=17)	71.2% (n=42)
Utilities	30.0% (n=9)	70.0% (n=21)
Wholesale Trade	26.3% (n=5)	73.7% (n=14)

In order to test the hypothesis that gender role will have a greater impact in sex typed industries two regressions were performed in order to examine results for employees in male dominated industries as well as employees the female dominated industry. In female dominated industries, it is expected that there will be reward for

exhibiting the feminine gender role whereas in male dominated industries there will be a penalty. Since masculine gender role was not a significant predictor of wages, only feminine gender role will be tested. For both analyses biological sex served as the independent variable, the log of wages as the dependent variable, and the personal and job characteristics as the additional controls. The average log of wages and femininity are shown in Table 27 for both male and female dominated industries. While the wage gap in the male dominated industries actually suggests a slightly higher average for females than for males, this difference is not significant based on a t-test with equal variances not assumed, $t(62.01) = -0.04$, $p = .972$. Additionally, while the average male wages are higher than females for female dominated industries, this was also not significant, $t(89.76) = 1.60$, $p = .11$.

Table 27: Mean wages and number of respondents by type of industry and sex.

Type of Industry		Standardized Mean Wage
Female Dominated	Female	$50,462.81 (n = 114)
	Male	$58,642.23 (n = 48)
Male Dominated	Female	$50,632.23 (n = 39)
	Male	$50,443.71 (n = 149)

A linear regression with the log of wages as the dependent variable was performed for female dominated industries. Job characteristics and employee characteristics were used as controls. The overall model was significant and explained 32% of the variation ($R^2 = .32$, $F(11,161) = 6.33$, $p < .001$). Sex was not a significant predictor of the log of wages at the $p < .05$ level ($\beta = -0.11$, $p = .14$) nor was the feminine gender role ($\beta = 0.03$, $p = .73$). This indicates that, for female dominated industries, the

feminine gender role is not a significant predictor of the log of wages and the hypothesis is not supported. The control variables for Hispanic (Hispanic or Hispanic or Latinx) and Black or African American were also not significant, unlike previous analyses. However, education ($\beta = 0.40$, $p < .001$) and time in industry ($\beta = 0.36$, $p < .01$) were both significant. A unique element of this analysis was that age ($\beta = -0.22$, $p < .05$) was a significant, negative predictor. The results are shown in Table 28.

Table 28: Multiple Linear Regression with feminine gender role as a mediator in the relationship between biological sex and log of wages, for respondents in female-dominated industries only.

Variable	B	SE B	β	t
Biological Sex	-0.05	0.04	-0.11	-1.50
Feminine Gender role	0.01	0.03	0.03	0.35
Personal Characteristics				
Age	-0.00	0.00	-0.22	-2.31*
Race = White	Reference group			
Race = Asian	0.01	0.06	0.02	0.26
Race = Black or African American	-0.03	0.04	-0.07	-0.91
Race = Hispanic	-0.06	0.06	-0.07	-1.02
Race = Other	0.09	0.08	0.08	1.12
Education	0.04	0.01	0.40	5.65***
Job Characteristics				
Time in Position	-0.00	0.00	-0.04	-0.32
Time with Employer (Tenure)	0.01	0.00	0.15	1.22
Time in Industry	0.01	0.00	0.36	3.18**
Constant	4.49	0.12		34.56***

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, † $p < 0.10$
Note: Analysis performed on matched sample.

In the second linear regression, only respondents in male dominated industries were included. The overall model was significant and explained 19% of the variation ($R^2 = .19$, $F(11, 187) = 3.77$, $p < .001$). This model has the lowest effect size of all the models

in the analyses. Sex (β = -0.02) and feminine gender role (β = 0.03) were both not a significant predictor of the log of wages. The only significant control variables were education (β = 0.34, p < .001) and Asian identity (β = -0.15, p < .05). The lack of additional significant control variables was unique to this analysis. This final hypothesis, that the effect would be greater in sex typed industries was not supported. The results for male dominated industries are shown in Table 29, below.

Table 29: Multiple Linear Regression with feminine gender role as a mediator in the relationship between biological sex and log of wages, for respondents in male-dominated industries only.

Variable	B	SE B	β	t
Biological Sex	-0.01	0.04	-0.02	-0.21
Feminine Gender role	0.02	0.03	0.03	0.49
Personal Characteristics				
Age	0.00	0.00	0.05	0.58
Race = White	Reference Group			
Race = Asian	-0.17	0.08	-0.15	-2.17*
Race = Black or African American	-0.04	0.04	-0.08	-1.09
Race = Hispanic	-0.08	0.06	-0.11	-1.42
Race = Other	-0.03	0.08	-0.03	-0.39
Education	0.03	0.01	0.34	4.83***
Job Characteristics				
Time in Position	-0.00	0.01	-0.04	-0.30
Time with Employer (Tenure)	-0.00	0.01	-0.04	-0.31
Time in Industry	0.01	0.00	0.21	1.74
Constant	4.11	0.12		33.71***

* p < 0.05, ** p < 0.01, *** p < 0.001, † p < 0.10
Note: Analysis performed on matched sample.

Summary

Overall, femininity did appear to mediate at least some of the relationship between sex and wages (H_4). The impact appears to be from both discrimination in favor of males as well as against females (H_5). However, this does not seem to be the case for either the public sector or heavily sex typed industries (H_6 and H_7). For the sample as a whole as well as for the private sector, feminine gender role may be an important factor to consider. This indicates that, while there may be some validity to the overall model of the relationship between sex, feminine gender role, and pay, there are some conditions under which the mediation hypothesis does not apply. In the following chapter a brief overview of the results, a discussion of the findings, and possible future research will be discussed.

V. Discussion and Conclusion

The overarching goal of this research was to better understand the relationship between gender role and pay. It was hypothesized that gender role acts as a mediator in the relationship, where congruence between sex and gender role would be rewarded and a penalty would be seen for incongruity. This final section aims to provide a synthesis of the results, a discussion of the results as they relate to the research goal, and explore opportunities for future research directions. This chapter will proceed through each of the seven hypotheses, provide a brief synopsis of why the hypothesis was important to the research goal, a summary of the results, and a discussion. The collection of findings, taken as a whole, will be discussed at the end of the chapter.

Discussion of Hypotheses 1 and 2: Males are more likely to exhibit the masculine gender role than females and Females are more likely to exhibit the feminine gender role than males.

The first set of hypotheses were exploratory in nature. Since this research used the Bem Gender role Inventory (BSRI) tool, there was an inherent assumption that males in the sample would exhibit more masculine gender role characteristics and females more feminine gender role characteristics. However, since the BSRI was originally conceived in the 1970s and since more recent literature has highlighted the slow change to gender roles occurring in the United States context (Donnelly & Twenge, 2017), it was imperative to test these assumptions for the sample prior to moving forward. The purpose of this portion of analysis was not to re-validate the tool itself, but merely to confirm a relationship was present in the data.

The data did show a relationship between gender role and sex. However, it was only present for the feminine gender role, supporting the second hypothesis. Thus, the first hypothesis, there will be a relationship between males and masculine gender role was not supported. There was not a significant difference between males and females in terms of their masculine gender role qualities as measured with the BSRI. Some of the masculine qualities may have developed a more negative connotation since the initial BSRI was developed, which could lead to individuals not wanting to self-identify as expressing this quality. For example, the masculine characteristic with the lowest average response was "aggressive." Respondents may not want to self-identify with this quality, although many may still see it as traditionally masculine. This supports prior research which noted a rise in the masculine gender role among female respondents (Donnelly & Twenge, 2017). A corresponding rise in males exhibiting the feminine gender role was not seen.

This finding fits well with past literature but points to the need for an update to the BSRI. The gender roles that characterized the United States in the 1970s are changing over time. Future research would benefit from an exploration of what characteristics or qualities included in the BSRI remain relevant, which do not, and identify those qualities that are now associated with the male and female gender roles and could be added to the inventory. Ultimately, since the masculine gender role assumption was not met, the corresponding hypothesis which tests masculine gender role as a mediator is not expected to provide significant results. However, the significance of the feminine gender role remains an important finding of this research.

Discussion of Hypothesis 3: Males earn significantly more than females

The third hypothesis was intended to explore if there is a difference between males and females in terms of wages among the respondents. Prior literature has clearly documented that there exists a pay gap between males and females in the United States (World Economic Forum, 2019). Thus, it was hypothesized that males in the sample earn more than females in the sample. A Welch's t-test was performed to test this hypothesis and the hypothesis was supported. Males in the matched sample did have significantly higher wages compared to females. Based on this finding, the research assumptions are met and gender role as a mediating variable was explored next.

Discussion of Hypothesis 4: Gender role is a mediator in the relationship between biological sex and the log of wages

The fourth hypothesis tested the two gender role variables individually. The feminine gender role was tested to determine if there was a mediating impact and the masculine gender role was tested to determine if there was a mediating impact. While both the feminine gender role and masculine gender role were tested, only the feminine gender role was significant. The lack of significant result for the masculine gender role as a mediator was consistent with results from H_1, in which there was not a relationship between sex and the masculine gender role. As a result, masculinity was not tested in the subsequent tests (H_5-H_7).

The pay gap between males and females in the matched sample after the wage standardization procedure had been performed was $4,824.60 (males average wages were

$53,232.14; females average wages were $48,407.54). As a ratio, females in the sample earn 90.9% of what males in the sample earned. This is the comparison of base wages and would likely be further exaggerated if additional compensation factors were considered (e.g., underemployment, gaps in employment, bonuses, benefits, and overtime, etc.). The feminine gender role accounts for about 2.3% of this pay gap, with individuals exhibiting the feminine gender role expected to earn approximately 2.3% less than those who do not (B = .0229 from Model 3 in testing feminine gender role as a mediator). Based on average annual earnings of $50,000, this would be about a $1,150 less per year. In addition, many benefits, such as retirement benefits and social security, would also be impacted by the lower earnings. Further, this would not be isolated to a single year of earnings but be additive over the course of one's career. One additional factor, not explored here as it would require longitudinal data, is whether the feminine gender role also impacts ability to promote. If so, this would also hamper earnings. As a comparison, biological sex as well as education each account for approximately 3.4% difference in pay and tenure accounted for approximately 0.7%. Additionally, Black or African American (-3.8%) and Hispanic (-6.5%) had the largest impact on pay (each indicating less pay than the white reference group.

As noted by past research (Donnelly & Twenge, 2017; Holt & Ellis, 1998; Twenge, 1997), the gap between males and females on the BSRI has been closing over time. In particular, this seems to be the case for in this sample as well. This is a trend that could be further explored in future research to determine how the masculine gender role is shifting over time. A better understanding of how the gap between males and females

is closing for masculinity would potentially lead to a more updated BSRI instrument. In addition, understanding why this trend is happening could be helpful for moving the body of research related to gender role forward along with changes in society. An updated understanding of the masculine gender role would potentially lead to a more nuanced understanding of the relationship between gender role and wages.

The feminine gender role, on the other hand, was marginally significant ($p = .051$) and was negatively associated with pay. This supports the general theory proposed in this work, namely that gender role acts as a mediator in the relationship between sex and pay. However, the support is relatively weak. This may, in part, be due to the same challenge faced by the masculine gender role. While the BSRI is a validated and reliable tool, its usefulness may continue to decrease over time as gender roles in society change. Further, the data was self-reported. Respondents were unaware that the characteristics they identified on the survey were sex-typed qualities in order to reduce the bias. However, a future study in which respondents are observed, rather than relying on self-report, may help alleviate this issue.

Discussion of Hypothesis 5: There will be higher wages where gender role is congruent with one's biological sex as well as a wage penalty for incongruent roles.

The fifth hypothesis is intended to provide greater insight into the mediating role of feminine gender role. In the decomposed model, the difference between the log of wages for males and females (difference = .03) in terms of the explained and unexplained portion of the difference was examined. As expected, due to the matching procedure applied, very little of the remaining difference in the log of wages was due to the

explained portion of the model. Education, Black or African American, Hispanic, and time in industry were all significant predictors. Education was the strongest of the control variables and females tended to have slightly higher education than males in the sample. These factors demonstrate that education and overall experience (time in industry) remain important factors to consider when examining pay inequity (Blau & Kahn, 2017; Choi, 2018; Lips, 2013). As suggested by much previous research, Black or African American as well as Hispanic individuals face greater barriers to achieving equitable wages (National Research Council, 1989; World Economic Forum, 2019). This was again confirmed by this research, which also indicated that these racial groups had significantly lower pay compared to the White reference group. Feminine gender role was also a significant factor in the decomposed model.

The unexplained portion of the model was further broken down by each of the model factors. For each factor, the difference in the log of wages is decomposed into the portion in favor of males and the portion attributed to a wage penalty for females. The pooled coefficient results for the unexplained portion of the feminine gender role showed that the gap appears to be both the result of discrimination in favor of males as well as against females. There is greater discrimination against females as a result of the feminine gender role, which makes sense given that females are also more likely to exhibit the feminine gender role. Additionally, the feminine gender role was negatively associated with wages for both males and females.

While femininity may be a mediator in the relationship, it appears to be negatively associated with wages for both males and females. While the hypothesis was built upon

the idea of gender role congruency, this framing potentially failed to properly account for role congruity in terms of the workplace. One future hypothesis to explore based on these results may be that the workplace is coded masculine to begin with due to the historical development of work systems in the United States, which largely excluded females from the labor force (Peck, 1996). Thus, it is feasible that the masculine gender role was coded onto these places of work and became congruent with places of work. Thus, for both males and females, incongruence with this workplace role would exist for those exhibiting the feminine gender role, rather than the masculine gender role. Importantly, the feminine gender role is associated with lower wages for both males and females. This indicates that there is a penalty, in terms of wages, associated with the feminine gender role, regardless of whether or not the feminine gender role is congruent with one's biological sex. However, the negative impact seems to be even greater for females based on the coefficients of the decomposed model. This finding may be due to both the incongruence of sex and gender role with the, theoretically, masculine workplace. The relationship of role congruity and environment, e.g., workplace, could be explored further in future research.

Discussion of Hypothesis 6: The impact of gender role as a mediator will be reduced for employees working in the public sector

The remaining hypotheses build upon the idea of a mediating role for feminine gender role. For the first of these, the sixth hypothesis, it was suggested that gender role would have different impact among private and public sector respondents. This hypothesis was based on past research which suggested the public sector tends to have

less wage inequality due to the high presence of unionization as well as the difference in the way pay is determined with more systematized classification and compensation systems compared to the private sector (Choi, 2018; Katz and Krueger, 1992, Stanley & Jarrell, 1998). This hypothesis was supported and among public sector employees, gender role was not a mediating variable. By contrast, the feminine gender role remained significant among private sector employees ($p < .05$). This supports the hypothesis that a more systematic pay structure, as seen in the public sector (Katz and Krueger, 1992), may reduce the impact of pay inequities. Another unique finding for the public sector was the lack of significant findings for race, both Black or African American and Hispanic. Again, this suggests that the more systematic pay structures may reduce inequity.

The body of literature that directly compares pay equity in the public versus private sectors is not particularly robust. However, there is clear documentation that many of the structures that are in place in the public sector to make pay more transparent and limit pay variation are aimed at reducing the level of pay inequity in these organizations (Katz and Krueger, 1992; see also United States Office of Personnel Management, 2020). The results of this literature support this understanding of pay in the public sector further. As pay equity laws become increasingly more common and forceful both at the state level as well as across the globe, the tools that are in place in public organizations which aim to reduce unnecessary pay variation may be similarly useful tools for other entities to employ as well. Although examination of the public sector was an important aspect of this particular research, more work could be done in this area in the future.

Discussion of Hypothesis 7: The impact of gender role as a mediator will increase in highly sex typed industries

The final hypothesis examined the effect of highly sex-typed industries, defined as being occupied by more than 70% of one sex. This hypothesis was based on the role congruity literature and suggested that where jobs are highly sex-typed, there would be a penalty for not being congruent with one's roles, both professional role and gender role. However, as discussed above, this relationship may not work as previously hypothesized. It was originally expected that masculine males would receive significantly higher wages because they are both male, which has been well supported in past literature as being associated with higher wages, and congruent with their role, the masculine gender role. Feminine males, would receive a wage penalty due to the role incongruity. This was supported, the feminine gender role was negatively associated with wages among males. Additionally, it was hypothesized that feminine females would be rewarded for their role congruency. The hypothesis was somewhat uncertain in regard to masculine females since the roles would be incongruent. However, it was also considered that masculinity is potentially more congruent with the workplace. Thus, there would be role congruence between the masculine gender role and the workplace.

In hypothesis four, it was discussed that the feminine gender role was negatively associated with wages for both males and females. Thus, the role congruence of the masculine gender role and the more masculine coded workplace appears to be a more promising proposition for future research. In other words, females did not appear to have a penalty for the gender role incongruity, perhaps because the workplace is coded

masculine and so there is just a general penalty for femininity regardless of sex. The final hypothesis in this literature was based on the concept that congruency with biological sex would have more of an impact than the generally masculine coded workplace. Thus, in female dominated industries or male dominated industries, it was originally expected that the impact of incongruence with biological sex would have an even greater impact. However, given the set of previous findings, it would no longer hold that biological sex would be the primary role congruency consideration. Instead, the congruency with the workplace, in which there appears to be a negative association with wages for both males and females who exhibit the feminine gender role would be expected to be more impactful.

Based on this reframing, it is not surprising that this final hypothesis was not fully supported by the data. This finding may be due to the lower overall sex and gender role variations among these industries. Within female-dominated industries, feminine gender role was not significant. Similarly, feminine gender role was also not significant for male-dominated industries. This bears exploring further as it would be expected that in male dominated industries the negative impact of feminine gender role on wages would be present. However, it should also be noted that, as one would expect, there were proportionally less respondents in the male-dominated industries that identified with the feminine gender role. This makes intuitive sense due to the fact that the feminine gender role is more highly associated with females. Thus, in male-dominated industries, there are both less females and less respondents exhibiting the feminine gender role. As a result,

for this particular analysis, the sample may be inappropriate as females would have to be oversampled in these industries to examine this hypothesis fully.

Conclusions

Pay is routinely demonstrated to be inequitable based on sex, with males around the globe earning higher wages (World Economic Forum, 2019, pp. 17-19) . This remains the case where relevant control variables have been included, such as FTE and education (Blau & Kahn, 2017; Choi, 2018; Juhn, Murphy, & Pierce, 1993; National Research Council, 1989; Stanley & Jarrell, 1998). This research sought to extend the pay equity literature by looking at a potential additional variable – gender role. The theory proposed suggested that male wage earners would receive a reward for masculine behavior and a penalty for feminine behavior. On the other hand female wage earners would receive a penalty for masculine behavior, although this may be abated to some degree due to the historical association between high wage earners and masculine characteristics. Additionally, females would receive an advantage for feminine characteristics, although this may be similarly diminished by the historical association of feminine traits with lower wage jobs. This research specifically expanded the pay equity literature by testing gender role as a mediator in the relationship between biological sex and wages.

Based on the results, discussed above, this theory is somewhat supported. Masculinity did not behave as anticipated in the models. The hypothesis that masculinity was not a mediator for the relationship between biological sex and wages was rejected. However, the hypothesis that the feminine gender role would be a mediator in the

relationship was supported. Those respondents who exhibited the feminine gender role were found to have significantly lower wages compared to their non-feminine counterparts, regardless of biological sex. The Oaxaca Blinder analysis suggested that the penalty for femininity both worked to the advantage of males, who tend to exhibit the feminine gender role characteristics less frequently, and discriminated against females, who more frequently exhibited this quality. The wage penalty for exhibiting the feminine gender role was stronger for females than for males, which follows based on the higher frequency of this quality among females. So, ultimately, while there was not support for the portion of the hypothesis that suggested there would be a reward for role congruity, there was support that incongruent roles do have a penalty in terms of wages.

This suggests that a revision to the proposed understanding of role congruity as it relates to pay may be warranted. Taking the matrix developed in the Literature Review Chapter, some revisions are required. The revised role congruency matrix is included in Table 30. There were a number of updates made to this table from its initial conception. First, in the prior development of this table, the type of occupation was important to thinking about role congruity (the example used was specifically leadership positions). However, on the aggregate, the sex-typed industries hypothesis was not supported. Thus, the matrix has been updated to simply include males and females in the workforce, rather than a specific occupation. Second, in the box which indicates masculine gender role and male in the workforce (box number 1), these roles are still viewed as congruent and none of the findings would suggest otherwise. However, what was not supported was the idea of a social reward (increased pay) for this group. Instead, this seems to be the baseline

from which penalties are imposed. Third, in the box which denotes masculine gender role and female in the workforce (box number 3), biological sex remains salient and there is a significant difference based on sex. However, when looking at the role congruity aspect, there seems to be a neutral result (neither penalty nor reward). It is unclear what the mechanism of this is - there was no finding that the gender role incongruity reduced pay for this group. However, it is possible that this is offset by the reward for occupational role congruity. Females would still be expected to earn less than males, based on biological sex, but the mediating impact of gender role was not supported.

In the box which is the intersection of feminine gender role and male in the workforce (box number 2), the results do support the mediating influence of feminine gender role resulting in a pay penalty for males with a feminine gender role. This indicates that among males there is a penalty for incongruity with their gender role as well as, potentially, the violation of the occupational role congruity (if workplaces do have a more agentic role associated). Finally, also with females (box number 4), there was a penalty for the feminine gender role, which is incongruent with the occupational role. This may suggest that confirming the agentic nature of the workplace may be critical to understanding the mediating effects of the feminine gender role. Thus, the sum of these findings indicate a need to investigate further the impact of different environments (e.g., is the workplace generally coded as more masculine, regardless of the type of specific occupation?).

Table 30: Updated matrix of congruency between occupational role and gender role.

	Masculine Gender Role (agentic role expectations)	**Feminine Gender Role** (communal role expectations)
Male individual in workforce (workforce has agentic role expectations, theoretical)	1. Congruent – Baseline (no reward or penalty)	2. Incongruent – Social penalty (violates occupational and gender role expectations)
Female individual in workforce (workforce has agentic role expectations, theoretical)	3. Incongruent – Occupational Incongruence (violates gender role expectations; but supports occupational role expectations)	4. Incongruent – Social penalty (violates occupational role expectations)

Originally, it was proposed that the masculine males and females would receive a reward in terms of wages for their masculinity. However, there was no clear evidence that the masculine gender role was a mediator and this gender role was not significantly more common among male respondents. This may suggest a changing gender role specifically among Americans in large cities, where data was collected for this research. Additionally, it is possible that the workplace is already coded in a masculine manner, thus there is no additional reward for congruence with this role, only a penalty for incongruence. The lack of finding may also be related to the limitations of self-reported data. The masculine gender role aspect of the proposed theoretical model was not supported overall and further explorations into how data can be gathered as well as the changing nature of gender roles in the United States context would be a potential direction of future research in this area.

On the other hand, the theoretical model suggested that femininity is also a mediator of the relationship between biological sex and wages. After controlling for sex, femininity was marginally associated with lower wages, for both males and females. This suggests that for the feminine males and feminine females there is a penalty in terms of wages. It was proposed that the penalty would be stronger for males due to the lack of gender role congruity with their biological sex. However, this was not found to be the case. The penalty was actually found to be stronger for females than for males. The theoretical model must be adjusted to reflect this finding. One way of adjusting the model would be to propose that, in the U.S. context, the workplace is coded as more masculine and this is more salient in regard to pay than biological sex as it relates to gender roles. This adaptation of the theory would suggest that the workplace is coded as non-feminine and there is a penalty, regardless of biological sex, for incongruence with this workplace norm. Further, since more females tend to exhibit the feminine gender role, and females tend to be paid lower in general, the wage penalty is greater for females.

This approach would also bring the element of power to the fore. Why would females become more masculine over time, but males not become more feminine? Why is there a penalty for both males and females, in terms of pay, for the feminine gender role? One answer to these questions could be that the masculine gender role is associated with greater social power. As such, there would be perhaps a greater social reward, including pay, for engaging in a more masculine gender role. This may also be reinforced through social interaction. There would be additional research required to address this hypothesis.

Limitations and Possible Future Research

There are a number of important limitations to consider when reviewing this research. First, the definitions themselves could be problematic. Sex was categorized in a binary way, male and female. Prior research has clearly shown that this binary classification system may be insufficient to replicate the diversity present in humans. This omits people who may identify as intersexed from the analysis. Additionally, gender role was defined in terms of two scales, masculine and feminine. There may be additional gender roles that were not present in this study and fails to account for the changing gender roles that are being documented in the United States context. The instrument used to measure gender roles, the BSRI, has been revalidated many times since its introduction in the 1970s and although it remains a valid instrument, for now, that may change in the future as it is already weakening (Donnelly & Twenge, 2017; Holt & Ellis, 1998; Twenge, 1997). Additionally, this research could benefit from observational data rather than self-reported behaviors and traits. This would reduce the error of self-reported information.

Related to the definition of gender role is the fact that the data was collected via self-reporting. This is problematic for all of the data, but particularly for the construct of gender role and wages. Generally, people are able to answer with relative accuracy their level of education. There may be individuals who do not report the information accurately, but there is assumed a relatively high degree of familiarity with the education scale among respondents. Respondents were expected to know if they completed high school or a four year college degree, and those terms “high school” and “four-year

college degree" are relatively common. So, while there may be some inaccurate data, respondents were expected to be able to answer relatively easily. However, when trying to rate oneself in terms of aggressiveness, for example, it may have been more difficult for respondents to have a shared understanding of the scale. While the scale was described in the survey, this is a clear limitation of the study.

The BSRI tool has been validated many times in many different contexts across the United States (Auster & Ohm, 2000; Geldenhuys & Bosch, 2019). For this reason, it was the preferred choice for this research. However, if a tool were available to more accurately measure gender role in US context which did not rely as heavily on self-report data and were updated based on today's gender roles, that tool would certainly be important to employ for future research. Importantly, the BSRI measures masculinity and femininity as two distinct scales. As such, the research examined each scale to determine if it is a mediator. However, it is possible that there is some benefit to looking at the scales in tandem. For this research, the scales were treated independently but there may be some additional detail that could be elicited by examining them together. Further, this study conceptualized sex as a binary categorization system. Since this study was interested in the social structures which have historically been based on this binary system in the United States, this was the structure that was examined. However, in future studies, it would be prudent to examine a broader understanding of sex to reflect the increased awareness of sex as non-binary.

Another important challenge with the self-reported data collection is that while respondents were given the option to provide their base pay in terms of annual salary or

hourly wage, there is likely some degree of error in this field, ranging from mis-typing their salary to reluctance to provide accurate information to rounding to the nearest thousand or five thousand. Additionally, this analysis is based on the respondent's base pay in their primary full-time job. Respondents may be earning additional income from special pay premiums, overtime, a second job, etc. Additionally, there may be a difference among respondents in terms of the benefits they receive. Respondents who were not full time employees were excluded from analysis. Also, respondents who are not employed or were self-employed were also excluded. These groups of individuals, people who are not full time and self-employed individuals, may have different results than those presented here. The exploration of other work conditions may be a rich area of study, particularly given that under employment is more likely to affect females (Livingstone & Pollock, 2004).

Particularly challenging in terms of wages, is the fact that the data were collected using a non-random approach. While a number of attempts were made to reduce this impact, it cannot be overlooked. Respondents were paid by a research organization to complete the survey. This resulted in a group of respondents who agreed to participate in this activity. There may be some bias in terms of the group of individuals who would agree to participate. Of particular concern, individuals with lower incomes may have been more likely to participate. However, this bias would be equally present for both the male and female respondents. In order to mitigate this risk, respondents from a range of recruitment sources were utilized and propensity score matching was employed to further

ensure the groups of male and female respondents were similar in terms of their job and personal characteristics.

The data collection was also limited to people in four major US cities – New York, Los Angeles, Chicago, and Houston. While these are somewhat geographically dispersed, they are all large urban areas. This reduces the generalizability to other areas of the United States. Future research may expand upon these initial findings to explore the relationship between femininity and masculinity in other areas of the United States. There may be impacts related to education, rural versus urban experiences, geographic region, and political affiliation, that this research could be expanded to address. Further, all four cities were in the United States and the BSRI instrument was developed for the United States context. Thus, it would be difficult to extend this research to other international contexts. However, given the widespread nature of the pay gap between males and females and the documentation of the validity of gender roles in other cultures, it may be an avenue worth pursuing in the future.

The research also had intended to examine the difference in highly sex-typed industries. However, since this was not the primary hypothesis, the data was not collected in the most appropriate manner for this analysis. Due to the nature of highly sex-typed industries, the likelihood of a male respondent in a highly female dominated industry is low. By definition in this analysis, there were less than 30% males in female dominated industries. Perhaps a more appropriate approach to this aspect of the research would be limiting the sample to historically female dominated industries, based on the census or some external measure of female-dominance, and then collecting data from individuals in

that industry and oversampling the smaller group. This would allow for the stratification of the sample by sex so there could be less skew in terms of sex in the final data. This approach of oversampling small groups may also be fruitful to examine in the future, including a more in-depth exploration the gender spectrum, sexual orientation, and immigration status for example.

Additionally, given the complexity of the systems which impact pay, the collection of additional variables could yield additional results. As with all research related to pay equity, there are a number of missing variables from this analysis. Given the complexity of the issue at hand and its intersection with so many other social constructs, it would be difficult to include all relevant variables. The control variables for this research were chosen based on the body of literature repeatedly validating them as explaining a significant portion of the pay gap in the broad US context. Parental wealth, urban or rural workplace, and specific job or employer, are all examples of variables that may impact the relationship but were not controlled for in this analysis. However, there is some concern that with the addition of too many or highly related variables, the error in the model would grow.

Finally, the research was conducted at a single point in time. It would be beneficial for future research to follow individuals over the course of their career. This would allow for more nuanced analysis of how these impacts are showing up over time. The inclusion of a time element would be beneficial to more closely examine if there are certain points in one's career where this differentiation between the feminine and non-feminine gender role are occurring. Additionally, this would help account for changes to

earnings over time. This would also allow for those characteristics that are unchanging over time to be held constant, while also seeing how the other characteristics are changing over time and impacting pay. If the same respondents were followed over time and the responses are not anonymous there may also be opportunities to better check for errors by following-up with individuals if it appears that a response was submitted with erroneous information, ask questions if a person had a significant change from one year to the next, and establish a more shared understanding of the scales being utilized.

Overall, this research supports role congruity having a mediating impact on wages for the feminine gender role, with those exhibiting a feminine gender role earning less wages for both males and females. Overall, this results in higher wages among males since they are significantly less likely to exhibit the feminine gender role. However, the penalty for femininity has a relatively small impact on wages. This does not mean these results should be dismissed. As stated in the introduction, small differences in pay should not exist from an equity standpoint and from an economic standpoint small difference can have a large impact on individual's lifetime earnings. For example, the total un-controlled gap between males and females is sixteen cents per dollar, meaning for every dollar earned by a male, females earn an average of sixteen cents less. This may not seem like a lot, less than a quarter. However, this is hundreds of dollars a year and thousands over the course of a career. Taken together with females being more likely to take time away from the workforce, female overall earnings are substantially lower than males on average. This impacts their pay while they are working but since our retirement systems are

largely based on earnings or savings during the working years, this has impacts into retirement.

If feminine males and females are both paid lower, even slightly, this will have accumulating impact over the course of a lifetime. Since females are more likely to be feminine, this impact is more likely to be felt by females. This highlights another aspect of the pay equity challenge. This research suggests that the gender role individuals occupy, particularly the feminine gender role, should also be paid attention. This can have implications for job choice, perception of role congruity for positions that are traditionally seen as masculine, and at other critical points in the career progression of individuals in the United States. This research supports bringing to bear the role congruency and role theory literature to the pay equity discussion may be warranted. At this point, the pay gap is not expected to close for hundreds of years. Understanding more of the variables that impact pay can help reduce this time frame.

As pay equity continues persists, organizations have a responsibility to examine their own practices that may be leading to inequities. Awareness of the biases that may be present related to gender role may help address some of these inequities, although addressing the challenge of lower pay associated with femininity will by no means eliminate pay inequity alone. One potential source of learning could lie in the public sector. The negative impact of the femininity gender role were not found in the public sector, which is more heavily unionized and tends to have a more rigorous classification and compensation systems. This research supports previous findings that pay inequity tends to be more limited in the public sector. The model used in the public sector would

be difficult to superimpose upon private sector industry, but may have some practices that could further reduce the wage gap.

This research does not support the possible conclusion that people should try to behave in a masculine manner in order to earn more. The impact of femininity on pay is not because of the underlying difference, rather the inequity is rooted in the different valuing of the feminine gender role. In other words, it is not one's gender role that would need to be changed in order to address the inequity. Rather, it is the social implication that femininity is less valued, in terms of wages. This is obviously highly complex and challenging to address due to the requirement for social change as well as the continued social policing of appropriate gender role congruity. Legal interventions, such as pay equity laws, are one approach to further highlight this inequity, but are blunt tools for actually making the changes necessary to see the ultimate goal of pay equity achieved. This issue is extremely complex and touches on myriad other U.S. systems and social norms that are outside the direct pay equity legislative acts.

In conclusion, the general theory of gender role as a mediator of the relationship between sex and wages was supported for the feminine gender role. Feminine individuals earned significantly less after controlling for sex, job characteristics, and personal characteristics. This finding is more likely to negatively impact female wages since females are more likely to exhibit the feminine characteristics. This has important implications for pay equity research moving forward as we try to eliminate the wage gap in the United States. Sex has historically been treated as a rather isolated characteristic in the pay equity literature, however the literature pertaining to social roles and role

congruity suggests that sex does not operate independently. There are a number of other social constructs that are related to sex, including gender role. This research supports looking at the way in which sex and gender role show up in the workplace in order to better understand the dynamics present and impacting wages. As outlined in the Limitations and Future Directions Section of this chapter, there is no shortage of ways to extend this research further.

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Appendix A: Survey Tool

The Portland State University Consent to Participate in Research Gendered behavior as a factor in pay equity

Introduction

You are being asked to participate in a research study that is being done by Masami Nishishiba, who is the Principal Investigator and Jillian Girard who is completing the research as part of her doctoral research, from the Department of Public Administration, at Portland State University in Portland, Oregon. This research is studying the relationship between behavior and pay in the public sector.

You are being asked to participate in this study because you are a employed in a large US city.

Participation in this study will take approximately 15 minutes.

You will fill out the following survey. The data will be held and owned by Portland State University. Results will only be reported in aggregate and no individual responses will be published. Participation in the survey will have no effect on your employment, positive or negative. You will be compensated the amount you agreed upon before you entered the survey.

Your participation in this study is completely voluntary. You have the right to choose not to participate or to withdraw your participation at any point in this study.

What are the risks or side effects of being in this study?

There are no known risks in this study, but some individuals may experience discomfort when answering questions. All data will be kept for years in a locked file for three years and then destroyed.

The Portland State University Institutional Review Board (IRB) that oversees human subject research and/or other entities may be permitted to access your records, and there may be times when we are required by law to share your information. It is the investigator's legal obligation to report child abuse, child neglect, elder abuse, harm to self or others or any life-threatening situation to the appropriate authorities, and; therefore, your confidentiality will not be maintained.

Whom can I contact with questions or complaints about this study?

If you have any questions, concerns or complaints at any time about the research study, Jillian Girard, or her associates will be glad to answer them at jgirard@pdx.edu.

Whom can I call with questions about my rights as a research participant?

If you have questions regarding your rights as a research participant, you may call the PSU Office for Research Integrity at (503) 725-2227 or 1(877) 480-4400. The ORI is the office that supports the PSU Institutional Review Board (IRB). The IRB is a group of people from PSU and the community who provide independent oversight of safety and ethical issues related to research involving human participants. For more information, you may also access the IRB website at https://sites.google.com/a/pdx.edu/research/integrity.

CONSENT

By completing this survey/returning this survey, you will be agreeing to participate in the above described research study.

Thank you for your consideration.

In which city do you work?

- ○ Chicago, IL
- ○ Houston, TX
- ○ Los Angeles, CA
- ○ New York, NY
- ○ Other
- ○ Not Applicable

How many hours per week do you work at your primary job? Answer zero hours (0) if you are primarily self-employed or do not work for an employer.

_____

What sector do you work in?

- ○ Government or Non-Profit Sector
- ○ Private Sector

End of Block: Screener Questions

Start of Block: Behavior

Thank you for taking the time to complete this survey. Your experience is valuable and your honest response to the following questions is appreciated. Instructions: The following questions ask about the frequency you exhibit particular behaviors or characteristics. It is important that you provide the response you believe to be most truthful based on your behavior and characteristics in the workplace. This survey is completely voluntary. If you do not understand or do not

wish to answer a particular question, please skip that question. You may stop participation at any time. For each item identified below, click the number to the right that best describes the frequency you exhibit that behavior or characteristic in the workplace.

On a scale of 1 (never or almost never) to 7 (always or almost always), how often do you exhibit the following behaviors or qualities?

	1 - Never or Almost Never	2	3	4	5	6	7 - Always or Almost Always
Adaptable	○	○	○	○	○	○	○
Affectionate	○	○	○	○	○	○	○
Aggressive	○	○	○	○	○	○	○
Assertive	○	○	○	○	○	○	○
Compassionate	○	○	○	○	○	○	○
Conceited	○	○	○	○	○	○	○
Conscientious	○	○	○	○	○	○	○
Conventional	○	○	○	○	○	○	○
Defends own beliefs	○	○	○	○	○	○	○
Dominant	○	○	○	○	○	○	○

On a scale of 1 (never or almost never) to 7 (always or almost always), how often do you exhibit the following behaviors or qualities?

	1 - Never or Almost Never	2	3	4	5	6	7 - Always or Almost Always
Eager to soothe hurt feelings	○	○	○	○	○	○	○
Gentle	○	○	○	○	○	○	○
Has leader abilities	○	○	○	○	○	○	○
Independent	○	○	○	○	○	○	○
Jealous	○	○	○	○	○	○	○
Loves children	○	○	○	○	○	○	○
Reliable	○	○	○	○	○	○	○
Secretive	○	○	○	○	○	○	○
Self-sufficient	○	○	○	○	○	○	○
Sensitive to needs of others	○	○	○	○	○	○	○

On a scale of 1 (never or almost never) to 7 (always or almost always), how often do you exhibit the following behaviors or qualities?

	1 - Never or Almost Never	2	3	4	5	6	7 - Always or Almost Always
Sincere	○	○	○	○	○	○	○
Strong personality	○	○	○	○	○	○	○
Sympathetic	○	○	○	○	○	○	○
Tactful	○	○	○	○	○	○	○
Tender	○	○	○	○	○	○	○
Understanding	○	○	○	○	○	○	○
Unpredictable	○	○	○	○	○	○	○
Warm	○	○	○	○	○	○	○
Willing to take a stand	○	○	○	○	○	○	○
Willing to take risk	○	○	○	○	○	○	○

End of Block: Behavior

Start of Block: Demographics

Thank you for your continued participation. Please provide some additional information about yourself.

What is your year of birth?

_____

What is the highest level of school you have completed or the highest degree you have received?

- ○ Less than high school degree
- ○ High school graduate (high school diploma or equivalent including GED)
- ○ Some college but no degree
- ○ 2-year degree (Associate degree or similar)
- ○ 4-year degree (Bachelor's degree or similar)
- ○ Master's degree
- ○ Doctoral degree
- ○ Professional degree (JD, MD)

Are you Spanish, Hispanic, or Latino or none of these?

- ○ Yes
- ○ None of these

With what race do you most closely identify:

- ○ White
- ○ Black or African American
- ○ American Indian or Alaska Native
- ○ Asian
- ○ Native Hawaiian or Pacific Islander
- ○ Other

What is your sex?

- ○ Male
- ○ Female

On the following page, you will be asked to provide basic wage information. How are you currently paid?

- ○ Hourly
- ○ Annually

End of Block: Demographics

Start of Block: Work Demographics - Hourly

Employment Section: Thinking about your primary job, please answer the following questions as accurately as possible.

What is your **hourly** wage in US dollars? (Do not include a dollar sign or comma)

_____

In which sector do you currently work?

- ○ Private Sector
- ○ Government Sector
- ○ Non-Profit Sector

Is your current position represented by a union?

- ○ Yes
- ○ No
- ○ Not Sure

For how many years have you worked in your **current position**?

▼ Less than 1 year ... 30 or more years

For how many years have you worked for your **current employer**?

▼ Less than 1 year ... 30 or more years

For how many years have you worked in your **current industry**?

▼ Less than 1 year ... 30 or more years

Which of the following industries most closely matches the one in which you are employed?

- ○ Forestry, fishing, hunting or agriculture support
- ○ Real estate or rental and leasing
- ○ Mining
- ○ Professional, scientific or technical services
- ○ Utilities
- ○ Management of companies or enterprises (including public organizations)
- ○ Construction
- ○ Administration or support
- ○ Manufacturing
- ○ Educational services
- ○ Wholesale trade
- ○ Health care or social assistance
- ○ Retail trade
- ○ Arts, entertainment or recreation
- ○ Transportation or warehousing
- ○ Accommodation or food services
- ○ Information
- ○ Finance or Insurance

○ Other

End of Block: Work Demographics - Hourly

Start of Block: Work Demographics - Annual

Employment Section: Thinking about your primary job, please answer the following questions as accurately as possible.

What is your **annual** wage in US dollars? (Do not include a dollar sign or comma)

_____

In which sector do you currently work?

- ○ Private Sector
- ○ Government Sector
- ○ Non-Profit Sector

Is your current position represented by a union?

- ○ Yes
- ○ No
- ○ Not Sure

For how many years have you worked in your **current position**?

▼ Less than 1 year ... 30 or more years

For how many years have you worked for your **current employer**?

▼ Less than 1 year ... 30 or more years

For how many years have you worked in your **current industry**?

▼ Less than 1 year ... 30 or more years

Which of the following industries most closely matches the one in which you are employed?

- ○ Forestry, fishing, hunting or agriculture support
- ○ Real estate or rental and leasing
- ○ Mining
- ○ Professional, scientific or technical services
- ○ Utilities
- ○ Management of companies or enterprises (including public organizations)
- ○ Construction
- ○ Administration or support
- ○ Manufacturing
- ○ Educational services
- ○ Wholesale trade
- ○ Health care or social assistance
- ○ Retail trade
- ○ Arts, entertainment or recreation
- ○ Transportation or warehousing
- ○ Accommodation or food services
- ○ Information
- ○ Finance or Insurance

○ Other

End of Block: Work Demographics - Annual

Appendix B: Analyses with Alternate Definitions

In an effort to explore additional definitions than the ones proposed in the primary research, the education and sex role variables were redefined in alternate ways. First, education was redefined as a binary variable. Second, the masculine and feminine gender role variables were defined as a continuous variable.

Education

According to the U.S. Census (2019), 38% of the U.S. population has a high school diploma or less, 16% has some college education, 10% an Associate's degree, 23% a Bachelor's degree, and 13% a Master's degree or higher (U.S. Census Bureau, 2019). Thus, the most frequent educational attainment level among Census respondents is high school or less. By contrast, the most frequent response among survey respondents was a Bachelor's degree (30.8%), followed by some college education (22.8%) and Master's degree (16.8%). This higher level of educational attainment among survey respondents may be a result of bias, surveying only those who work full time, or a result of the inclusion criteria of surveying only people working in large cities. When examining the sample, it was clear that the level of education among respondents was higher than the United States population as a whole.

In the primary research document, education was defined as a scale variable. Education was entered into the model as years of education. For example, a high school degree or equivalent was counted as twelve years of education whereas a Bachelor's degree was entered as sixteen years. An alternate definition could be identifying those

that have an Associate's degree or higher compared to those with less than an Associate's degree. This functionally creates a dummy variable indicating which respondents have a college level degree versus those who do not.

After the binary variable was created 63% of respondents were identified as having a college degree (defined as Associate's degree or higher). The distribution was relatively similar between males (60.5% with college degree) and females (65.5% with college degree), χ^2 (1, n = 1114) = 3.02, n.s. In order to examine the impact of this alternate definition of education, the fourth hypothesis was re-tested. As with the primary research, three regression analyses were performed and the results were standardized in order to assess the mediating impact (Iacobucci, 2012). After running the three analyses, the results are aligned with what was seen with the scale variable. The standardized z-score value for masculinity was 0.18 (n.s.) and for femininity was 1.86 ($p < .10$). These values were slightly higher than those seen in the original analysis (0.13 for masculinity; 1.78 for femininity). However, the overall findings were aligned with what was previously seen.

Further exploration of education could be a productive avenue for future research. Specifically, a more representative sample in terms of education could be helpful in terms of generalizing results to the larger U.S. population. Additionally, although the z-scores increased, the R-squared value decreased. In the original analysis the R^2 value was .27 with masculinity included and .28 with femininity included; whereas with the revised education definition included the overall model R^2 decreased to .24 for both masculinity

(23.8% variation explained) and femininity (24.1% variation explained), explaining slightly less variability than the original models.

Redefining Masculinity and Femininity

In the primary research, the median split method was utilized for defining masculinity and femininity (Bem, 1977, p. 197). This method is relative to the sample to account for differences in these variables across different populations. However, an alternate definition could be to make the variable continuous, either a mean value for each respondent or a median value for each respondent. In order to review the impact of both options, regressions were performed with each of these definitions. These alternate methods produced similar results to what was seen in the primary analyses for control variables, however masculinity was more significant ($p < .10$) and femininity was less significant (n.s.).

The first analysis included masculinity as a *mean* value for all respondents. The overall model was significant and explained 28% of the variation ($R^2 = .28$, $F(11,1113) = 38.21$, $p < .001$). Sex was a significant predictor of the log of wages ($\beta = -0.08$, $p < .01$) with males predicted to earn more than females, while masculinity ($\beta = 0.01$, $p = .053$) was not significant at the .05 level, but given the complexity of these relationships, the low p-value may warrant further investigation in the future. Masculinity showed a slightly positive relationship with the log of wages. Additionally, the control variables for Hispanic ($\beta = -0.08$, $p < .01$) and Black or African American ($\beta = -0.07$, $p < .01$) were also significant, with both earning less than the White reference group. Education ($\beta =$

.36) and time in industry (β = .26) were both positively significantly related to wages at the $p < .001$ level.

The second analysis included femininity as a *mean* value for all respondents. The overall model was significant and explained 27% of the variation ($R^2 = .27$, $F(11,1113) = 37.82$, $p < .001$). Sex was a significant predictor of the log of wages (β = -0.08, $p < .01$) with males predicted to earn more than females, while femininity (β = -0.02, $p = .431$) was not significant. Additionally, the control variables for Hispanic (β = -0.08, $p < .01$) and Black or African American (β = -0.07, $p < .05$) were also significant, with both earning less than the White reference group. Education (β = .36) and time in industry (β = .27) were both positively significantly related to wages at the $p < .001$ level.

The third analysis included masculinity as a *median* value for all respondents. The overall model was significant and explained 28% of the variation ($R^2 = .28$, $F(11,1113) = 38.09$, $p < .001$). Sex was a significant predictor of the log of wages (β = -0.08, $p < .01$) with males predicted to earn more than females, while masculinity (β = 0.04, $p = .096$) was not significant. Additionally, the control variables for Hispanic (β = -0.08, $p < .01$) and Black or African American (β = -0.07, $p < .01$) were also significant, with both earning less than the White reference group. Education (β = .36) and time in industry (β = .26) were both positively significantly related to wages at the $p < .001$ level.

The fourth and final analysis included femininity as a *median* value for all respondents. The overall model was significant and explained 27% of the variation ($R^2 = .27$, $F(11,1113) = 37.83$, $p < .001$). Sex was a significant predictor of the log of wages (β = -0.07, $p < .01$) with males predicted to earn more than females, while femininity (β = -

0.02, p = .39) was not significant. Additionally, the control variables for Hispanic (β = -0.08, p < .01) and Black or African American (β = -0.07, p < .05) were also significant, with both earning less than the White reference group. Education (β = .36) and time in industry (β = .27) were both positively significantly related to wages at the p < .001 level.

Overall, the various definitions of masculinity and femininity continue to suggest that gender role is worth pursuing for further research. However, the greater significance for masculinity and less significance for femininity highlight the importance of how these variables are defined. While the median split method appears to lead to greater significance for femininity, the scale approach may favor masculinity. Although the definitions seem to differ from the findings in the primary document, the results actually lend further support to the argument. Where masculinity was close to significant (p < .10) in these analyses the results suggested a positive relationship with wage; on the other hand, where femininity was close to significant (p < .10) in the previous analyses the results suggest a negative relationship with pay. Together, these results support the overall finding that respondents with a feminine gender role earn less than those with a masculine gender role. Additionally, the importance of how gender role is measured is further highlighted in these analyses. Going further, future research may not only explore alternative definitions but also different ways of measuring gender role (e.g., observational data).

Appendix C: Demographic Detail by City and Occupational Code

The demographics by city (after matching) and by occupational code (after matching), are shown below. For each city, the race demographics from the U.S. Census are also provided.

Table C.1 Demographic information by city with U.S. Census comparison for race and ethnicity.

	Chicago, IL	Houston, TX	Los Angeles, CA	New York, NY
Public Sector	**42.0%**	**48.0%**	**49.7%**	**49.2%**
Private Sector	**58.0%**	**52.0%**	**50.3%**	**50.8%**
Female	**58.80%**	**54.91%**	**50.65%**	**41.27%**
Male	**41.17%**	**45.09%**	**49.35%**	**58.70%**
American Indian or Alaska Native	**0.39%**	**2.31%**	**2.60%**	**0.26%**
(Census Comparison)	0.30%	0.30%	0.70%	0.40%
Asian	**5.88%**	**1.16%**	**10.71%**	**9.79%**
(Census Comparison)	6.40%	6.90%	11.60%	13.90%
Black or African American	**18.04%**	**28.32%**	**18.18%**	**21.69%**
(Census Comparison)	30.10%	22.50%	8.90%	24.30%
Hispanic or Latino	**15.70%**	**19.70%**	**37.70%**	**21.20%**
(Census Comparison)	29.00%	44.80%	48.60%	29.10%
Other	**8.24%**	**6.36%**	**15.26%**	**9.26%**
(Census Comparison)	2.70%	2.80%	3.60%	3.50%
Pacific Islander or Native Hawaiian	**0.39%**	**2.31%**	**1.30%**	**0.00%**
(Census Comparison)	0.00%	0.10%	0.20%	0.10%
White	**67.06%**	**59.54%**	**51.95%**	**58.99%**
(Census Comparison)	49.40%	57.60%	52.40%	42.70%
Age (Mean)	**37.27**	**38.39**	**37.35**	**38.09**
Years of Education (Mean)	**15.22**	**14.47**	**14.95**	**15.44**
Years in Position (Mean)	**6.03**	**7.31**	**6.37**	**7.15**

Tenure (Mean)	**6.52**	**6.45**	**6.86**	**7.32**
Years in Industry (Mean)	**9.22**	**10.93**	**9.61**	**10.41**

***Census Data from US Census Bureau, QuickFacts Table (V2019) https://www.census.gov/quickfacts/fact/table/US/PST045219. Note: The census had a category for two or more races which is grouped into "Other" in the table above.**

Table C.2: Demographics by female, male, and neutral dominated industries.

	Female Dominated	Male Dominated	Not Sex Dominant
Public Sector	54.8%	34.5%	45.0%
Private Sector	45.2%	65.5%	55.0%
Female	72.60%	20.52%	52.70%
Male	27.40%	79.47%	47.30%
American Indian or Alaska Native	1.83%	2.18%	0.75%
Asian	7.31%	6.99%	8.26%
Black or African American	28.31%	20.96%	18.47%
Hispanic or Latino	7.76%	9.61%	7.06%
Other	1.83%	0.87%	3.30%
Pacific Islander or Native Hawaiian	0.91%	0.44%	0.90%
White	52.05%	58.95%	61.26%
Age (Mean)	39.16	38.17	37.13
Years of Education (Mean)	15.21	14.53	15.26
Years in Position (Mean)	7.18	6.81	6.51
Tenure (Mean)	7.28	6.98	6.71
Years in Industry (Mean)	10.30	9.69	10.01