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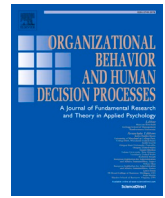
A gender gap in managerial span of control: Implications for the gender pay gap☆

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A B S T R A C T

In the current work, we examine a possible source of gender disparities in pay *even when* women manage to reach similar levels of the organizational ladder as men. We refer to the concept of "span of control," or the number of subordinates a leader oversees, and propose that in addition to differences in how high men and women climb up the organizational hierarchy, differences in managers' span of control can also contribute to the gender pay gap. We suggest that people hold gender stereotypes about managers' relational model tendencies, or how men and women interact with people they manage, and these stereotypes correspond with people's lay beliefs about relational models utilized in small and large spans of control: smaller groups are thought to operate based more on communal sharing principles while larger groups are thought to operate based more on authority ranking principles. Because span of control affects compensation, a gender difference in span of control can contribute to gender differences in pay. We found support for these hypotheses in an archival dataset of MBA alumni (*N* = 1838) and three additional experiments (*N* = 799).

Gender disparities in the workplace are among the key social issues of the modern era that policymakers, organizations, and researchers alike are eager to understand and amend. Disparity in pay has taken the spotlight as a simple but powerful indicator of the fact that something is amiss in how women and men fare in the workplace. A frequently mentioned statistic is that women are earning roughly 85% of what men are making in the United States (Graf & Brown, 2018), and research in a number of disciplines provides numerous insights into why women may be worse off. Understanding the underlying causes of gender disparities is the first step to finding the right solutions.

Of the many contributing factors, the low representation of women compared to men at higher levels of organizations, or what some researchers call the "gender position gap" (Liang, Lourie, & Nekrasov, 2020), has been identified as an area of improvement that can have substantial impact on improving gender inequality and the gender pay gap. The "Women in the Workplace" report put forth yearly by Lean In and McKinsey to track progress on gender diversity in the corporate workplace shows data supporting the gender position gap, with their

2018 report showing that the entry level consisted of 48% women, the senior manager/director level consisted of 34% women, and the C-suite level consisted of 22% women (Lean In, 2015, 2016, 2017; Thomas et al., 2018), showing a decrease in female representation as the vertical position increases. Because the pay levels are greater at higher levels of organizational hierarchies, organizations, policy makers, and researchers have advanced the view that getting more female representation at higher levels in organizations should increase women's compensation to close the gender gap.

However, the current work posits that gender disparities in outcomes may perpetuate *even when* organizations manage to have women reach similar levels of the organizational ladder as men. This may be the case if positions within the same hierarchical level differ systematically for men and women in some way that leads to differences in compensation. In this research, we propose that examining *span of control*, defined as the number of people managed by someone, provides further insight into the gender gap. The concept of span of control was introduced by early management scholars to discuss the appropriate number of subordinates

for efficient operating of organizations (Fayol, 1918(2016); Gulick, 1937; Urwick, 1956). Span of control can be a measure of vertical position when comparing across an organizational hierarchy, such that individuals higher up in organizations have higher spans of control (i.e., oversee more layers of the organization and therefore more subordinates) than individuals lower down in organizations. However, the current work proposes that span of control can also be a meaningful measure when comparing *within* a given level of vertical position, as a measure of intra-level differences in social power of hierarchically equivalent individuals (Magee & Galinsky, 2008).

We draw inspiration from Emerson's (1962) seminal paper on power which states, "…to say that 'X has power' is vacant, unless we specify 'over whom'" (p. 32) and points out a "recurrent flaw" in how social power is conceptualized as an attribute of a given individual, leading to persons being rank ordered by their position in the organizational hierarchy (without consideration of the number of people under their purview). As mentioned above, gender disparity in career attainment has been conceptualized in this way, where the focus has been on vertical position (e.g., Blau & Kahn, 2017; Cotter, Hermsen, Ovadia, & Vanneman, 2001; Fortin, Bell, & Böhm, 2017). Apart from vertical differences in career attainment, we propose that, even with the same vertical position in the organizational hierarchy, men and women may have substantive intra-level differences in span of control. Prior work has described social power relationships as "one in which [Person A] either reports directly to [Person B] or in which [Person B] has disproportionate power or control (or both) over [Person A]" (Gruenfeld, Inesi, Magee, & Galinsky, 2008; Schaerer, du Plessis, Yap, & Thau, 2018). The present work expands the concept of span of control to include this heretofore unexamined aspect of social power and examines its contribution to gender income inequality.

We begin with the idea that people hold gender stereotypes about managers' "relational model" tendencies, or differences in how men and women interact with people they manage, over and above more general gendered stereotypes of communality and agency (Eagly, Nater, Miller, Kaufmann, & Sczesny, 2020). Specifically, we hypothesize people hold stereotypes that male managers rely more on authority ranking principles while female managers rely more on communal sharing principles. Next, we draw from existing research on lay theories of groups that has shown that people intuitively have beliefs about the relational models used within groups (Lickel, Hamilton, & Sherman, 2001; Lickel et al., 2000; Lickel, Rutchick, Hamilton, & Sherman, 2006). We propose that people have lay theories about span of control, and that perceptions of communal sharing and authority ranking principles differ for smaller and larger spans of control, which can impact the type of leader seen as fit to lead. As a result, we suggest that men are more likely to be given larger spans of control than women, even within a given hierarchical level.

This proposed gender difference in span of control within the same vertical position can be consequential. Existing work has demonstrated that span of control has a positive effect on compensation, even within levels of the organization (Smeets & Warzynski, 2008). Therefore, while organizations may not intend to pay women less than men, the accrual of differing spans of control by men and women may result in a gender gap in compensation, even when women reach similar vertical heights within organizations as men.

Gender in the workplace is an extremely complex issue with many different microprocesses affecting decisions and treatment at many different levels, and the current work makes an important contribution by identifying a novel factor that may contribute to gender income inequality. While men's greater power reflected in their higher vertical position is widely understood, less is known about whether men and women differ in span of control above and beyond differences due to vertical position. Even with the best of intentions, if organizations and decision makers are not aware of the sources of disparity, they will not be able to correct their ways to promote equity between male and female leaders.

1. Intra-level differences in span of control between women and men

We begin with our proposition that gender stereotypes and lay theories about span of control pertaining to relational models enable men to have larger spans of control than women.

1.1. Gender stereotypes of relational models

We posit that people have stereotypes about how men and women will interact with the people they manage. Fiske and Haslam (2006) described relational models to be "the four basic social bonds" through which people coordinate social activity. Relationships based on the communal sharing principle are about generosity, collective belonging, and being a unit together. Equality matching is about balance, ensuring that everyone in the relationship is given an equal share. Authority ranking is defined by hierarchy and status differences between people, accompanied by uneven distribution. Finally, relationships based on market pricing are guided by calculative reasoning by each individual with the aim of maximizing individual outcomes.

Existing knowledge of gender stereotypes indicate that men are characterized as more agentic, as having an assertive, controlling, confident tendency, and described by words like "aggressive, ambitious, dominant, forceful, independent, daring, self-confident, and competitive" (Eagly & Johannesen-Schmidt, 2001, p. 783). Women are characterized as more communal, as concerned about other's welfare, and described by words like "affectionate, helpful, kind, sympathetic, interpersonally sensitive, nurturant, and gentle" (Eagly & Johannesen-Schmidt, 2001; p. 783). We predict that these existing stereotypical traits are related to beliefs regarding relational models. Men who are stereotypically more agentic may then be thought to interact with people utilizing more authority ranking principles, and women who are stereotypically more communal may be thought to interact with people utilizing more communal sharing principles. We emphasize that while we do anticipate positive correlations between communal and agentic stereotypes and communal sharing and authority ranking tendencies respectively, we believe the construct of relational models to be conceptually distinct from gendered stereotypes. While communal and agentic stereotypes address traits underlying behavior more generally, relational models are specific to describing patterns of behavior specifically pertaining to the coordination of social activity and behavior within social interactions. Therefore, we hypothesize:

Hypothesis 1 (H1): People hold stereotypes that male managers rely more on authority ranking principles in their dealings with people they manage while female managers rely more on communal sharing principles.

1.2. Span of control and relational models

In addition to gender stereotypes of relational models, we believe people have relational model beliefs about span of control. Recent work has suggested that people have intuitive theories about how groups of individuals organize and the principles that guide their interactions (Lickel et al., 2001; Lickel et al., 2000; Lickel et al., 2006). While social psychology and management scholars have been exploring groups and their interactions extensively over many decades (see Hackman & Katz, 2010 for review), the inquiry into lay beliefs about groups of individuals is a nascent area of research, with only a few papers to date. Lickel and colleagues (2000) were the first to suggest a lay theory of groups, beginning with work demonstrating that people differentiate between types of groups (their taxonomy of all possible types of groups included *intimacy groups* like a family, *task-oriented groups* like individuals working together, *social categories* like Americans, and *loose associations* like people who live in the same neighborhood). Lickel and colleagues (2006) extended their work by examining whether people have

intuitions about how individuals interact depending on the properties of the group, such as its size or duration. Utilizing the relational models framework (Fiske, 1991, 1992) which defines four basic relational principles that people use in social interactions (i.e., communal sharing, equality matching, authority ranking, and market pricing), Lickel et al. (2006) found that perceivers made inferences about relational principles used in different types of groups. For example, when given examples of *intimacy groups*, perceivers tended to attribute higher levels of communal sharing and equality matching, moderate levels of authority ranking, and lower levels of market pricing; while *task-related groups* are thought to have higher levels of authority ranking and market pricing and lower levels of communal sharing. This extant work establishes the general notion that people hold lay beliefs about the principles guiding interaction within groups of individuals (Lickel et al., 2001). We posit that span of control, the group of individuals managed by a given manager, is a type of social group that can be classified as a *task-related group* in Lickel et al. (2000)'s taxonomy, and therefore the notion that people hold lay beliefs about the relational principles that govern the interactions of a group applies to span of control.

More recently, La Macchia, Louis, Hornsey, & Leonardelli (2016) focused on one property of groups, group size, stating that "group size is one of the more easily recognizable qualities of a group" and "one of the basic components distinguishing perceptions of different groups types and categories." Their work demonstrated that people hold lay beliefs based only on group size, finding a "small = trustworthy" heuristic about groups, a belief that numerically smaller groups are more benevolent than numerically larger groups. Extending their work to our context, we posit that different sizes of span of control may be associated with different lay beliefs about how they interact.

Wellman (2017) suggested that organizational work group structures most commonly demonstrate communal sharing and authority ranking ideals. Lickel et al. (2006) showed a trend where the category with smallest size, *intimacy groups*, were believed to be higher on communal sharing principles, and *task-related groups* were believed to be higher on authority ranking principles. In addition, La Macchia et al. (2016) found that smaller groups evoked perceptions related to intimacy groups such as greater internal cohesion and being close-knit. Therefore, we hypothesize:

> **Hypothesis 2 (H2):** A smaller span of control will be perceived as utilizing more communal sharing principles than a larger span of control, while a larger span of control will be perceived as utilizing more authority ranking principles than a smaller span of control.

1.3. Manager gender and span of control

Decision makers make person-environment (P-E) fit assessments when making selection decisions (Kristof-Brown & Guay, 2011; Werbel & Gilliland, 1999). One form of person-environment fit is the extent to which the demands and requirements of the environment match the skills and abilities of the person (Edwards & Van Harrison, 1993). By combining lay beliefs about gender stereotypes and relational models with lay beliefs about span of control and relational models, we believe decision makers may make P-E fit judgments that lead to different levels of span of control for men and women. If male managers are stereotyped to be more authority ranking in their way of interacting with subordinates, and managerial positions with a larger span of control are believed to operate more with authority ranking principles, we hypothesize:

> Hypothesis 3a: Male managers are more likely to be assigned positions with a larger span of control than female managers.

Based on the logic presented above regarding P-E fit, if female managers are stereotyped to be more communal sharing in their way of interacting with subordinates, then in the case of positions with a smaller span of control which we hypothesize to be associated with more communal sharing principles, women should be more likely to be

assigned to them than male managers. However, due to the deeply ingrained "think manager, think male" heuristic, which works against women being placed in leadership roles (e.g., Agars, 2004; Eagly & Karau, 2002; Heilman, Block, Martell, & Simon, 1989; Schein, 1973; 1975), we conservatively hypothesize:

> **Hypothesis 3b:** Female managers will be selected more for positions with smaller span of control than positions with larger span of control, but they may not be selected over and above men for positions with smaller span of control as merely occupying a leadership position, regardless of span of control, is associated with masculinity.

2. Intra-level differences in span of control and compensation

Finally, we examine the existing empirical evidence underlying the notion that intra-level differences in span of control will lead to gender differences in compensation. Work on hierarchy within organizations, where the concept of span of control is traditionally found as a measure of hierarchical level, has established a positive relationship between compensation and span of control (Fox, 2009; Ortín-Ángel & Salas-Fumás, 2002; Rajan & Wulf, 2006; Smeets & Warzynski, 2008). These projects largely theorized and explored inter-level and inter-firm differences in compensation, seeking to understand wage differences between layers of organizations as well as differences between variously configured organizations (e.g., organizations that have fewer or more hierarchical levels, or organizations that vary in firm size). However, as mentioned, the current paper is interested in how span of control affects compensation *within* hierarchical levels. Fortunately, though not their main focus, some of the aforementioned work provide correlational evidence of intra-level differences in span of control. Namely, Smeets and Warzynski (2008) found that span of control was associated with compensation, even within levels of an organization, suggesting that organizations award higher pay for larger spans of control, beyond the effect of vertical position.

> **Hypothesis 4 (H4):** Managerial positions with larger spans of control will be rewarded with higher compensation than managerial positions with smaller spans of control, within the same hierarchical level.

As to why this occurs, we believe the reason for intra-level differences in span of control is similar to a reason explored for inter-firm differences. Fox (2009) suggests that wages increase as managers have influence and control over more workers. We believe this would be the case for intra-level differences in span of control as well. Decision makers examine job characteristics (e.g., tasks, duties, responsibilities, requirements, and working conditions) of a position and assess the value of the position to the organization when determining pay (Arvey, 1986; Schumann, Ahlburg, & Mahoney, 1994). The greater potential value or impact a job is likely to have for the organization, the higher the compensation is likely to be for that job (Gerhart & Milkovich, 1990). Along these lines, we posit that a position's span of control is a job characteristic that signals social power within the organization, warranting greater compensation.

In summary, we expect that, all else being equal, a position with a larger span of control is thought to deserve greater compensation than a position with a smaller span of control. This association in itself is intuitive and justifiable; greater potential power over an organization's outcomes should be compensated. However, if men are systematically more likely to be in positions with larger spans of control than women, even within the same hierarchical level, the end result may be gender differences in pay.

3. Overview of research

Fig. 1 depicts our conceptualized model. In our conceptualization,

we theorize the relationship between gender and span of control to go both ways, meaning that a man or woman would be assigned a certain span of control based on relational model stereotypes evoked by the person's gender and relational model beliefs about spans of control, or that a span of control would be assigned to a woman or man, again based on relational model beliefs about spans of control and relational model stereotypes evoked by gender. The set of studies presented in this paper examine both directions of the relationship. In Fig. 1, we have labelled our hypotheses as well as which paths are tested in each of the studies.

In Study 1, we began with real world data from a compensation survey conducted with a west-coast business school's student and alumni population to look for correlational evidence linking gender, span of control, and compensation (path marked by solid lines in Fig. 1). We establish that, even in this relatively homogeneous sample of graduates of the identical MBA program, span of control is positively related to compensation, and a gender difference in the span of control accounts for part of the gender pay gap, over and above gender differences in vertical position. The remaining three studies tested our hypotheses to establish the causal chain of our model. Study 2 sought to first establish that people hold gendered stereotypes of managers' use of two types of relational models—communal sharing and authority ranking—in their interactions with subordinates (path marked by dash-dotted line in Fig. 1). Then, Study 3 manipulated span of control, testing for differences in lay theories regarding relational model principles and whether these lay theories corresponded with expectations of manager gender, in accordance with the stereotypes found in Study 2 (mediation model marked by dotted lines in Fig. 1). Study 3 also tested for whether span of control led to differences in compensation estimates. Finally, Study 4 directly manipulated the relational model used by a manager (communal sharing or authority ranking) and tested its causal effect on span of control assignment (dashed line in Fig. 1), along with downstream compensation differences between spans of control.

Each study reports all participants recruited, all conditions, and all measures. The sample size for each study was determined before data collection began. Except for the archival data used in Study 1, a minimum of 100 participants was pre-determined for each condition, which exceeds the recommendations of Simmons, Nelson, and Simonsohn (2011). Materials, data, and code that can be shared have been uploaded to OSF (https://osf.io/zqfmc/?view_only=2d1fdff059ec44bdbdec1b0d9bed6d1f).

4. Study 1

Study 1 was an initial examination of whether there is a gender difference in span of control, above and beyond the effect of vertical position, and whether this difference explains a portion of the gender pay gap. The study used archival data from a survey conducted with alumni of a masters degree program in business administration (MBA) from a public, west-coast business school.

4.1. Method

4.1.1. Participants

The participants were 1838 (1392 men, 446 women, $M_{age} = 39.15$, $SD = 5.44$) alumni. The alumni graduated between 1994 and 2014 and were working full-time at the time at which the survey was conducted[3].

4.1.2. Survey materials

The surveys were administered online through a survey link sent via e-mail. The recruitment message stated that the school's administration, in partnership with select faculty, was gathering data to examine compensation and career trajectories of its MBA alumni and to identify any gaps in attainment between equally qualified individuals and groups. Participants were entered into a drawing for one of three prizes. As described below, the survey respondents provided information regarding their current job, their pre-MBA and post-MBA work characteristics, and personal characteristics.

4.1.3. Measures

A dummy variable (female) was coded 1 if the MBA alumnus was female and a 0 if the alumnus was male. The coefficient of the compensation measure is interpreted as the percentage difference between female and male respondents.

Our key variable of interest, span of control, was an item that asked respondents to indicate the "Number of people you manage (include those managed by your direct reports)." Based on existing work on span of control, this way of measurement was deemed appropriate for this sample. In their work, Smeets and Warzynski (2008) differentiate between direct and indirect span of control: they defined direct span of control as the number of subordinates who report directly to a manager and indirect span of control as the number of subordinates including workers who report through the direct reports. They used only the indirect span of control measure in their analyses stating the theoretical basis that the influence of a given manager spreads through the hierarchy. Because MBA graduates are likely to be in relatively higher vertical positions within organizations, measuring participants' indirect span of control would be appropriate thereby capturing a fuller picture of their social power. Participants responded using the following choices: 0, 1–2, 3–5, 6–10, 10–20, 20–50, 50 + . These responses were transformed into a continuous variable by using the midpoint of the range in each choice (e.g., 1–2 = 1.5; 20–50 = 35). Participants also provided their job title, our proxy for vertical position. Dummy variables stood for the following 10 categories for title: individual contributor, manager, senior manager, director, senior director, assistant vice president, vice president, senior vice president, CXO, and CEO/President.

Respondents provided the following information about their current compensation: annual base salary, bonus (target and achieved), long term incentives (stock shares and stock options—including number, price upon grant, and value), other incentives, and total compensation[4]. In keeping with prior research (Bowles, Babcock, & McGinn, 2005), the natural log of self-reported compensation for ease of interpretation, which allows for easier interpretation since the coefficients approximate percentage changes.

To control for other variables that contribute to gender differences in compensation, a total of 15 control variables representing pre-MBA factors, the effect of the MBA program, work history, job characteristics, organizational factors, and geographic region were included. Existing research on the gender pay gap has found that differences in pre-MBA salary and experience contribute to continued differences post-MBA (Bertrand, Goldin, & Katz, 2010). Therefore, the analysis also controlled for the number of years of work experience prior to the MBA (pre-years) and the total compensation received in the last full-time job prior to the MBA (pre-total). Additionally, Bertrand et al. (2010) also found that the types of courses and academic performance during the MBA contributed to the pay gap. A proxy for the effect of the MBA was a self-report measure asking respondents, "How useful was your MBA in
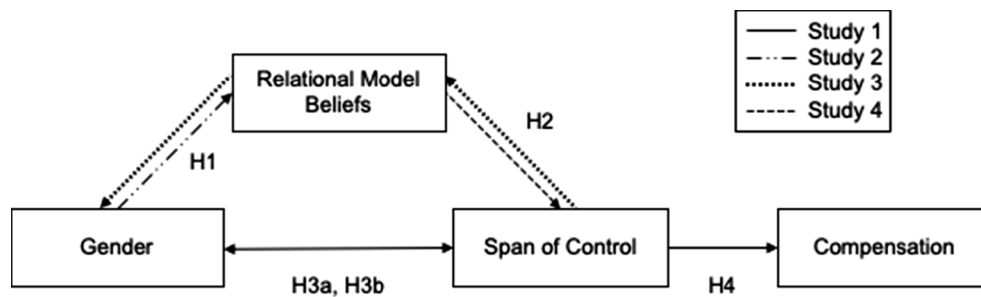

Fig. 1. Proposed Model Linking Managerial Gender to Compensation through Relational Model Stereotypes and Span of Control.

achieving your career goals?" on a scale of 1 (*not useful at all*) to 5 (*very useful*), as well as dummy variables for the different MBA programs (full-time, evening/weekend, executive, public health joint degree).

The number of years worked post-MBA accounted for respondents' work history. The job characteristics variables included time in current position (time), and function. The variable of time in current position captures the effect of experience or tenure in the organization on outcomes, and the variable of function captures the effect of different functions in the organization. Dummy variables controlled for the following 7 response bins for time: <1, 1, 2, 3, 4, 5–10, 10+ years; and for the following 8 job functions: corporate, finance, marketing, consulting, real estate, product management, engineering, and other. The following organizational factors were included: company size, annual company revenue, and industry. Dummy variables controlled for the 5 response bins for company size: 1–50, 51–200, 201–500, 501–1000, 1000 + employees; for the 4 bins for company revenue: $0–10 M, $10 M–100 M, $1000 M–500 M, $5000 M–1B; and for the following 9 industry categories: technology, finance, consulting, biotech/pharmaceuticals, retail/consumer products, real estate, energy, healthcare, and other. Finally, the analysis included controls for geographic location indicating whether the job was located in the Bay Area, within the US but outside the Bay Area, or outside the US.

4.2. Results

Table 1 displays descriptive statistics and comparisons by gender for span of control, vertical position, and compensation[5]. Importantly, our data correspond to existing figures of the gender pay gap. Both the pre-MBA total compensation (women earned 84.1% of what men earned) and the post-MBA total compensation (women earn 63.2% of what men earn) reflect a substantial gender pay gap. We believe the gender pay gap is of a much larger magnitude in the post-MBA compensation because the sample is from the high-end tail of the distribution of all possible earnings, where the pay gap is larger than in less highly remunerated jobs (Bertrand et al., 2010). The MBA program from which these alumni have graduated is ranked as one of the Top 10 programs in the United States according to the U.S. News & World Report rankings, and second, the average years after graduation is 7.30 years, ranging from a minimum of 2 years since graduation to a maximum of 18 years since graduation.

4.2.1. Span of control and compensation

First, we examined whether span of control is a significant predictor of compensation, over and above the effect of vertical position (see Table 2). The coefficient on span of control was positive and significant, $b = 0.02$, $p < .001$ (column 1), and remained significant even after including job and organizational controls.

4.2.2. Gender differences in span of control

We next examined whether men and women differ in span of control, controlling for vertical position. The effect of gender was significant, $b = -2.62$, $p = .001$, indicating that women reported a smaller span of control than men, controlling for vertical position (see Table 3). Additional control variables for individual-level and organizational-level factors that may impact span of control, including the number of years of post-MBA work experience, tenure in the current position, the size of the organization, and controls for job function were added to the analysis. The coefficient on the Female variable remained significant, $b = -2.01$, $p = .005$.

To further explore the pattern of this gender difference across the hierarchical spectrum, we re-ran the regression, treating the job title variable as a continuous measure of vertical position, and including the same control variables as above. Fig. 2 shows the predicted differences between men and women at different points of vertical position.

4.2.3. Examination of the gender pay gap

We ran regression analyses on the log of total compensation, progressively including control variables (see Table 4). The raw gap in mean log earnings between men and women was about 29 log points (column 1). Adding in pre-MBA characteristics and post-MBA characteristics (usefulness and MBA program) reduced the gender gap to 27 log points (column 2), and adding in controls about the job and organization reduced the gender gap to 18 log points. Finally, we added in span of control (column 4), which reduced the gap to 16 log points.

We tested the indirect effect of the gender difference in span of control on total compensation using generalized structural equation modelling with OLS regression. The bootstrap procedure was used to compute confidence intervals of the product of the coefficients and, in that way, to test the significant of the indirect effect. We tested the significance of the indirect effect by constructing bias-corrected confidence intervals of the products of the direct paths using the bootstrap method with 5000 resamples (Shrout & Bolger, 2002). We found a significant indirect effect, such that women's lower span of control was related to lower total compensation, $b = -0.02$, s.e. $= 0.0001$, 95 %CI [–0.03, –0.01].

4.3. Discussion

The purpose of this study was to establish with real world data, for the first time, that a gender gap in span of control, above the effect of vertical position, explains a part of the gender pay gap. The studies that follow delve deeper into the proposed causal chain, formally testing the hypothesized links between span of control to manager gender as well as confirming the causal impact of span of control on compensation.

5. Study 2

The results of Study 1 provide suggestive evidence that women and men have different spans of control, which partially accounts for the gender pay gap. However, because the results of the previous study are correlational, a series of experiments will test the causal links between

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[5] In the interest of protecting the identity of the business school and because the control variables were included only to reduce the potential for omitted variable bias, we do not report a full set of descriptive statistics, gender comparisons, or correlations for control variables.

Table 1
Study 1 Means, SD, Gender Comparisons for Key Variables.

	Total		Men		Women		Comparison
	M	*SD*	*M*	*SD*	*M*	*SD*	
Span of Control	10.18	14.90	11.20	15.75	7.03	11.31	Levene's test: F(1,1817) = 79.44, $p < .001$
							$t(1033) = 6.09, p < .001; d = 0.28$
Vertical Position	6% Ind. Contributor		5% Ind. Contributor		9% Ind. Contributor		$\chi^2(1) = 8.91, p = .003$; Cramer's $V = 0.07$
	2% Consultant		2% Consultant		2% Consultant		$\chi^2(1) = 0.0001, p = .993$; Cramer's $V = 0.0002$
	10% Manager		9% Manager		14% Manager		$\chi^2(1) = 10.56, p = .001$; Cramer's $V = 0.08$
	14% Sr. Manager		14% Sr. Manager		15% Sr. Manager		$\chi^2(1) = 0.144, p = .704$; Cramer's $V = 0.009$
	21% Director		20% Director		23% Director		$\chi^2(1) = 1.56, p = .212$; Cramer's $V = 0.03$
	9% Sr. Director		10% Sr. Director		6% Sr. Director		$\chi^2(1) = 5.07, p = .024$; Cramer's $V = 0.05$
	1% Asst. VP		1% Asst. VP		1% Asst. VP		$\chi^2(1) = 0.05, p = .828$; Cramer's $V = 0.005$
	13% VP		14% VP		11% VP		$\chi^2(1) = 2.80, p = .094$; Cramer's $V = 0.04$
	5% Sr. VP		5% Sr. VP		5% Sr. VP		$\chi^2(1) = 0.04, p = .842$; Cramer's $V = 0.005$
	3% CXO		3% CXO		2% CXO		$\chi^2(1) = 0.32, p = .574$; Cramer's $V = 0.01$
	6% CEO/President		7% CEO/Pres.		3% CEO/Pres.		$\chi^2(1) = 10.55, p = .001$; Cramer's $V = 0.08$
Total Compensation	$396,853	595,165	$435,737	666,017	$275,493	237,081	Levene's test: $F(1,1836) = 34.23, p < .001$
							$t(1819) = 7.60, p < .001, d = 0.27$

Note: Due to the uneven sampling of men and women, we conducted Levene's tests to check for equality of variances prior to comparing means. In cases where the Levene's test suggested unequal variances, we ran the t-tests with a Satterthwaite approximation of the standard errors.

Table 2
Study 1 Effect of Span of Control on Compensation.

	(1)		(2)	
log(Total Comp)	b	se	b	se
Span of Control	0.01***	(0.001)	0.01***	(0.001)
Tenure			–0.005	(0.005)
Dummy variables:				
Vertical Position	Y		Y	
Function	N		Y	
Organization Size	N		Y	
Organization Revenue	N		Y	
Industry	N		Y	
Region	N		Y	
Constant	12.71***	(0.05)	12.82***	(0.08)
Observations	1819		1818	
R-squared	0.20		0.30	

***p < 0.001, ** p < 0.01, * p < 0.05.

Table 3
Study 1 Gender Gap in Span of Control.

	(1) Gender		(2) Job Controls	
Span of Control	b	se	b	se
Female	–2.52***	(0.75)	–2.01**	(0.70)
Post-MBA Years			0.06	(0.08)
Tenure			0.68***	(0.10)
Dummy variables:				
Vertical Position	Y		Y	
Function	N		Y	
Organization Size	N		Y	
Organization Revenue	N		Y	
Industry	N		Y	
Region	N		Y	
Constant	10.12***	(1.08)	0.64	(1.69)
Observations	1819		1818	
R-squared	0.17		0.33	

*** p < 0.001, ** p < 0.01, * p < 0.05.

Study 1 Estimated Span of Control of Women and Men by Vertical Position
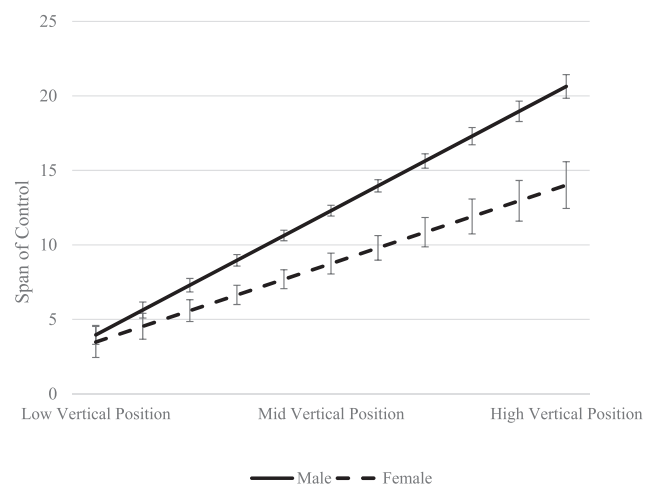

Fig. 2. Study 1 Estimated Span of Control of Women and Men by Vertical Position.

gender stereotypes about warmth, agency, and competence (Eagly et al., 2020)[6]. Also, because prior research has also suggested that men and women may differ in their power-related goals in the workplace (e.g., Gino, Wilmuth, & Brooks, 2015), we also measured beliefs about gender differences in power goals and aspirations to examine the effects of gender stereotypes about relational models, over and above any differences in these beliefs about gender differences in career aspirations.

This study was preregistered at: https://aspredicted.org/blind.php?

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[6] Conventional gender stereotypes regarding competence were that men are seen as more competent, and therefore perceptions of greater competence may underlie men's greater span of control. However, recent work has found that gender stereotypes on competence have changed, and people now believe men and women to be similar in competence, or even that women are more competent than men (Eagly et al., 2020). Nevertheless, we examine the relationship between competence and relational models.

gender, relational models, span of control and, ultimately, compensation.

To test our theory that the observed gender difference in span of control is due in part to stereotypes about relational models, this study began with a test of Hypothesis 1, that male managers are thought to use more authority ranking principles with subordinates than female managers, and female managers are thought to use more communal sharing principles.

We also tested whether these differences hold when controlling for

Table 4

Study 1 Gender Gap in Total Compensation.

log(Total Compensation)	(1) Gender Only		(2) Pre- and Post-MBA Controls		(3) Job Controls		(4) Add Span of Control	
	b	se	b	se	b	se	b	se
Female	−0.29***	(0.04)	−0.27***	(0.04)	−0.18***	(0.03)	−0.16***	(0.03)
Span of Control							0.01***	(0.001)
Pre-MBA Work Experience			−0.01	(0.01)	−0.01*	(0.01)	−0.01*	(0.01)
Pre-MBA Total Compensation			0.01***	(0.001)	0.01***	(0.001)	0.01***	(0.001)
MBA Useful			0.06***	(0.01)	0.03*	(0.01)	0.03*	(0.01)
Years Since Graduation			0.05***	(0.003)	0.03***	(0.003)	0.03***	(0.003)
Tenure					0.002	(0.004)	−0.003	(0.005)
Dummy variables:								
MBA Program	N		Y		Y		Y	
Vertical Position	N		N		Y		Y	
Function	N		N		Y		Y	
Organization Size	N		N		Y		Y	
Organization Revenue	N		N		Y		Y	
Industry	N		N		Y		Y	
Region	N		N		Y		Y	
Constant	12.63***	(0.02)	12.00***	(0.08)	12.51***	(0.11)	12.53***	(0.11)
Observations	1838		1792		1785		1772	
R-squared	0.03		0.18		0.33		0.36	

Standard errors in parentheses. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. Pre-MBA Total Compensation and Organization Size are in tens of thousands.

x=u8ct8f[7].

5.1. Method

5.1.1. Participants and design

The participants were 199 individuals on Prolific Academic. From this sample, 21 participants who did not correctly answer the attention check questions were excluded, resulting in a sample of 178 participants (89 men, 89 women; $M_{age} = 33.92$, $SD = 12.35$, $M_{working\ years} = 12.57$, $SD = 10.76$, 61.2% currently employed). We used a between-subjects design, with participants randomly assigned to be asked about either male managers ($n = 86$) or female managers ($n = 92$).

5.1.2. Procedure

Participants were told that the study concerns what people have learned from observing others. Specifically, participants were asked, based on their experiences in the workplace, how members of various social groups in managerial roles tend to interact with their subordinates. Participants were randomly assigned to condition, either being asked for their thoughts about male managers or female managers.

5.1.3. Measures

The measures are explained in the order participants responded to them[8].

5.1.3.1. Relational models measure.
Participants were given 10 items and asked to indicate the extent to which a typical male or female manager displayed each of the behaviors when managing their subordinates, using a 7-point scale (1 = Never, 7 = Always). Five items pertained to authority ranking principles ($\alpha = 0.54$) and 5 items to communal sharing principles ($\alpha = 0.70$). The items were borrowed and adapted from Haslam and Fiske (1999) (see Appendix A for items).

5.1.3.2. Trait ratings.
Participants were asked to rate the extent to which typical male or female managers exhibit 40 traits, which were taken from Eagly et al. (2020). These traits captured three categories of traits, including communal (e.g., ability to handle people well, affectionate, compassionate), agentic (e.g., ability to make decisions, aggressive, ambitious), and competent (e.g., ability to create or invent new things, creative, innovative) traits. All traits were rated using a 7-point scale (1 = Never true, 7 = Always true).

5.1.4. Power goals

Participants were given two statements pertaining to male or female managers' power goals and asked to indicate whether they agreed with the statements on a 7-point scale (1 = Strongly disagree, 7 = Strongly agree). The statements read, "As one of their core goals in life, male/female managers would like to have powerful positions in organizations" and "As one of their core goals in life, male/female managers would like to have power over others." The items were borrowed from Gino et al. (2015). This measure was included to examine the possibility that people's beliefs that male managers want more power in organizations may ultimately contribute to decision makers assigning larger spans of control to men than women.

5.1.5. Career aspirations

One other measure from Gino et al. (2015) was included in this study, where participants were provided with a picture of a ladder, explaining that it represented the hierarchy of professional advancement. At the top were the highest positions within an organization, such as the CEO, CFO or members of the board, and at the bottom were entry-level jobs. Participants were asked to indicate the highest position male or female managers would want to achieve in their careers. Similar to the power goals measure, this measure was included to examine the possibility that people's hold different beliefs about male and female managers' career aspirations which may ultimately contribute to span of control decisions.

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[7] Our pre-registered data analysis plan stated that an independent samples *t*-test would be conducted to examine a gender difference in authority ranking but did not specify a prediction about communal sharing. We deviated from the pre-registered plan and instead report mixed-model ANOVAs below including relational model type as a within-subject factor. Results for authority ranking are identical when examined independently.

[8] In this study, participants were asked to estimate male or female managers' direct and indirect spans of control at three levels of organizational hierarchy: highest level of professional advancement, senior-level managers, and mid-level managers. We did not find any significant differences in the estimates of men's and women's span of control. However, the main effect of organizational level was not significant either. The lack of difference in span of control across vertical positions of the hierarchy leads us to believe that this was a poor measure. The open-ended format used to ask this question resulted in substantial variance in these estimates. For this reason, we do not discuss this measure further.

5.2. Results

A sensitivity power analysis was conducted for a 2 (within-subject, relational model: communal sharing vs. authority ranking) × 2 (between-subject, manager gender: male vs. female) mixed model ANOVA using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007). The analysis indicated a minimum detectable effect size of $\eta^2 = 0.02$, assuming $\alpha = 0.05$, 1-$\beta = 0.80$, and a correlation of $r = 0.25$ between the repeated measures, corresponding to the actual correlation obtained in the study. The sample size was sufficient to power detection of small effect sizes.

5.2.1. Gender stereotypes

We examined beliefs about gender differences in each of the measures.

5.2.1.1. Relational models. We conducted a mixed model ANOVA, treating the type of relational model, communal sharing or authority ranking, as a within-participant factor and the gender of the manager as a between-participant factor. The interaction of the two factors was significant, $F(1, 176) = 50.48$, $p < .001$, $\eta_p^2 = 0.05$ (see Fig. 3). Simple effects analyses revealed that female managers ($M = 4.55$, $SD = 0.72$) were rated significantly higher on communal sharing principles than male managers ($M = 3.99$, $SD = 0.79$), $F(1, 176) = 24.44$, $p < .001$, $\eta_p^2 = 0.12$. Male managers ($M = 4.59$, $SD = 0.67$) were rated significantly higher on authority ranking principles than female managers ($M = 4.30$, $SD = 0.63$), $F(1, 176) = 8.95$, $p = .003$, $\eta_p^2 = 0.05$. Alternatively, ratings of female managers' use of communal sharing principles were significantly higher than authority ranking principles, $F(1, 176) = 9.26$, $p = .003$, $\eta_p^2 = 0.05$. For male managers, the ratings of authority ranking were significantly higher than the ratings of communal sharing, $F(1, 176) = 48.17$, $p < .001$, $\eta_p^2 = 0.22$.

5.2.1.2. Communal and agentic stereotypes. We again conducted a mixed ANOVA analysis, treating the type of stereotype, communal and agentic, as a within-participant factor and the gender of the manager as a between-participant factor. The interaction of the two factors was significant, $F(1, 176) = 96.22$, $p < .001$, $\eta_p^2 = 0.35$. Comparing first the gender of the manager, female managers ($M = 4.64$, $SD = 0.74$) were rated significantly higher on communal traits than male managers ($M = 3.67$, $SD = 0.69$), $F(1, 176) = 82.83$, $p < .001$, $\eta_p^2 = 0.32$. There was a nonsignificant trend of male managers ($M = 4.71$, $SD = 0.65$) having higher ratings on agentic traits compared to female managers ($M = 4.56$, $SD = 0.50$), $F(1, 176) = 3.20$, $p = .075$, $\eta_p^2 = 0.02$.

Comparing within the gender of the manager, female managers were rated similarly on communal and agentic traits, $F(1, 176) = 1.15$, $p = .285$, $\eta_p^2 = 0.01$. Male managers were rated lower on communal traits than agentic traits, $F(1, 176) = 158.96$, $p < .001$, $\eta_p^2 = 0.48$.

5.2.1.3. Competence stereotypes. Consistent with Eagly et al. (2020), participants rated female managers ($M = 5.00$, $SD = 0.84$) to be significantly more competent than male managers ($M = 4.33$, $SD = 0.90$), $t(176) = 5.14$, $p < .001$, $d = 0.87$.

5.2.1.4. Power goals. Male managers ($M = 5.70$, $SD = 1.06$) were rated higher in desire for power than female managers ($M = 4.99$, $SD = 0.94$), $t(176) = 4.75$, $p < .001$, $d = 1.00$.

5.2.1.5. Career aspirations. Male managers ($M = 8.51$, $SD = 1.82$) and female managers ($M = 8.83$, $SD = 1.43$) were thought to aspire to similar levels of the organizational hierarchy, $t(176) = 1.29$, $p = .201$, $d = 0.19$.

5.2.2. Relational model stereotypes with controls

We re-examined gender stereotypes about relational models controlling for other beliefs about gender differences. Given that there was no difference in the career aspirations measure, these analyses only included measures of communal, agentic, and competent stereotypes and the power goals measure as controls. The pre-registered analyses did not produce different results from those we report. The gender of the manager condition was coded 0 for a male manager and 1 for a female manager.

5.2.2.1. Communal sharing. Controlling for the other stereotypes, the effect of gender of the manager on communal sharing ratings was no longer significant, $b = 0.016$, $t(172) = 0.14$, p = .891. The effect of the covariates suggested that people's stereotypes regarding women's greater use of communal sharing principles closely tracks with their beliefs about women's greater communal traits, $b = 0.38$, $t(172) = 3.80$, $p < .001$, and their higher ratings of women's competence, $b = 0.27$, $t(172) = 2.97$, $p = .003$. Agentic trait ratings and power goals did not impact communal sharing ratings ($p > .493$).

5.2.2.2. Authority ranking. In contrast, for authority ranking the gender of the manager remained significant, $b = -0.29$, $t(172) = -2.73$, $p = .007$. The effect of agentic trait ratings was significant, $b = 0.28$, $t(172) = 2.91$, $p = .004$, as well as the effect of power goals , $b = 0.18$, $t(172) = 3.62$, $p < .001$. Communal trait ratings and competence trait ratings did not impact authority ranking ratings ($p > .109$).

5.3. Discussion

The results of Study 2 are consistent with Hypothesis 1, that people hold gendered lay beliefs regarding relational models. Female leaders were thought to behave more in accordance with communal sharing principles than male leaders, and male leaders were thought to behave more in accordance with authority ranking principles than female leaders. The authority ranking stereotype held over and above known gender stereotypes about warmth, agency, and competence, as well as perceived gender differences in desire for power. Interestingly, however, the effect of gender did not hold for the communal sharing stereotype when controlling for these other stereotypes, in particular ratings of communal traits.

A notable finding in these results is that while women and men are thought to have similar levels of career aspirations in terms of reaching similar levels of the organizational ladder, men are seen as wanting more power than women. This pattern of results aligns with the idea that women may reach similar vertical positions as men, but within those positions, women have less power through smaller spans of control. Finally, we note that, consistent with Eagly et al.'s (2020) evidence that gender stereotypes have changed, participants rated women as higher in competence than men, thus ruling out the possibility that men's greater span of control is due to perceptions that they are more competent than women.

6. Study 3

Study 3 used a controlled experiment to establish a causal link between span of control and compensation, as well as gender expectations of the manager. More specifically, we sought to test Hypothesis 2, whether a smaller span of control will be perceived as utilizing more communal sharing principles than a larger span of control, while a larger span of control will be perceived as utilizing more authority ranking principles than a smaller span of control. We also took a first look at Hypotheses 3a and 3b, examining gender expectations of managers of differing spans of control. Finally, we tested Hypothesis 4, whether there is a causal link between span of control and compensation. We also tested whether perceived power in the organization mediated the effect. As mentioned in the introduction, to the extent that this job characteristic of span of control signals greater control and influence, it should warrant greater compensation.

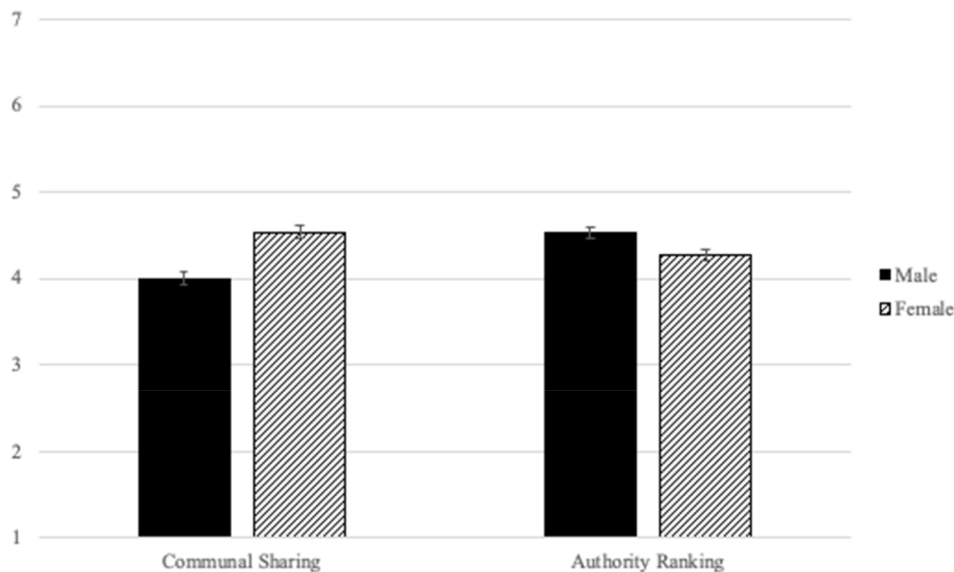This study manipulated span of control such that participants made

Fig. 3. Study 2 Relational Model Stereotypes of Male and Female Managers.

judgments regarding managers with both small and large spans of control. We also included a between-subjects manipulation of vertical position to both control for vertical position as well as to explore whether the effect of span of control differs somehow for lower and higher levels of vertical position. This study was preregistered at https://aspredicted.org/blind.php?x=uf7ut9.

6.1. Method

6.1.1. Participants and design

Participants were 270 undergraduate students (114 men, 151 women, 1 non-binary, 5 not reported; M_{age} = 21.29, SD = 2.79) at a large research university who were recruited to take part in a study through their introductory course in organizational behavior[9]. The design of the study was a 2 (span of control: small or large, within-subjects) × 2 (vertical position: manager or vice president) between-subjects design.

6.1.2. Procedure

Participants were told that the study was regarding perceptions and beliefs about people at work. They were told that they would be given information about two employees at a fictional company who were of the same organizational rank. Participants were shown a simplified organizational chart that indicated that this company had 10 levels, with "entry level" as the lowest level and "CEO" as the highest. Participants were told that the two employees they would be learning about were on the same organizational level. Depending on condition, either the 3rd rung of the chart, "Managers," or the 7th rung of the chart, "VPs," was highlighted as the vertical position of the employees.

Participants then learned about the two employees, one who had a small span of control and one who had a large span of control. The order in which participants saw the two employees and responded to questions about each employee was randomized. The depictions of span of control were created using Microsoft Word icons. The depictions were a grouping of person icons, described as the focal employee "with all the subordinates they manage" (see images in Appendix B).

6.1.3. Measures

Participants responded to all questions pertaining to each employee together. For example, a participant would see the employee with a small span of control and respond to all questions pertaining to that employee, and then the participant would see the employee with a large span of control and respond to all questions pertaining to that employee. The measures are listed below in the order in which participants responded to them[10].

6.1.3.1. Relational models measure.
Participants were then asked to rate how the manager works with their subordinates on characteristics associated with the communal sharing and authority ranking relational models. Specifically, we derived 5 bipolar questions based on the existing definitions of the two relational models (see Appendix A for all items). The questions were asked on a 7-point scale, with the left anchored on communal sharing descriptions and the right anchored on authority ranking descriptions (α_{small} = 0.89; α_{large} = 0.83). For example, one of the items had at the lowest endpoint, "Flat group structure" and on the highest endpoint, "Hierarchical group structure." Lower scores on this measure indicate more communal sharing, while higher scores indicate more authority ranking in how the employee is perceived to interact with their span of control.

6.1.3.2. Salary estimate.
Participants were asked to estimate the annual salary was for the employee. Participants were given a text box to fill in. Participants were not given any additional information about salary estimates in efforts to avoid signalling to participants that there would be any expectation of variation in salary between employees.

6.1.3.3. Bonus estimate.
Participants were then asked to imagine that they were the overseeing executive and wanted to award the employee a bonus for their performance. Participants were given further

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[9] The pre-registration indicated that participants who did not respond correctly to the attention check question would be excluded. Because the results did not differ with or without this exclusion, we report the analyses including all participants.

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[10] We also included a measure asking participants to estimate the number of hours worked per week for each employee. Gino et al. (2015) showed that women have a greater number of life goals outside of work and associate more negative consequences with positions of higher power, such as time constraints and trade-offs. If a large span of control is perceived to require more time or effort than a small span of control, people may be more likely to envision men in positions of larger spans of control. There were no significant differences in estimates of hours worked, neither between small and large spans of control, nor between vertical positions.

information that bonuses at the company range from $5000 to $50,000 depending on the accomplishment. Again, participants were given a text box for each to fill in an amount.

6.1.3.4. Employee gender.
To capture gender expectations, participants were prompted, "If you had to guess the gender of [this employee], what would you guess?" Participants were given the same picture and a choice between "male" and "female."

6.1.3.5. Power in the organization.
Participants were asked, "How much power would you say [this employee] has within the organization?" on a 7-point scale ranging from "none at all" to "extreme."

6.1.3.6. Span of control check.
Participants were given a brief definition of "span of control" and asked to describe the employee's span of control on a 7-point scale ranging from "very small" to "very large."

6.2. Results

We conducted two-way mixed model ANOVAs to test for the effects of span of control (within-subjects) and vertical position (between-subjects). A sensitivity power analysis was conducted using G*Power (Faul et al., 2007). The analysis indicated a minimum detectable effect size of $\eta^2 = 0.02$, assuming $\alpha = 0.05$, $1 - \beta = 0.80$, and tested with correlations of $r = 0.10$ and $r = 0.13$ between the repeated measures, corresponding to the actual correlations obtained in the study. The sample size was sufficient to power detection of small effect sizes.

6.2.1. Initial checks
We first present data of the check questions to confirm that our manipulations had the intended effects.

6.2.1.1. Span of control check.
There was a significant main effect of span of control, $F(1, 268) = 153.33$, $p < .001$, $\eta^2 = 0.36$, on employees' perceived span of control. The small span of control ($M_{small, manager} = 3.37$, $SD = 1.31$; $M_{small, VP} = 4.18$, $SD = 1.14$) was rated significantly smaller than the large span of control ($M_{large, manager} = 4.26$, $SD = 1.17$; $M_{large, VP} = 5.20$, $SD = 0.94$). There was also a significant main effect of vertical position, $F(1, 268) = 57.37$, $p < .001$, $\eta^2 = 0.18$, where the "manager" employees were rated lower in span of control than the "VP" employees. The interaction was not significant, $F(1, 268) = 0.84$, $p = .360$, $\eta_p^2 = 0.003$.

These results confirm that perceptions of span of control are influenced by both intra-level differences as well as differences due to vertical position[11].

6.2.1.2. Power in the organization.
This measure was highly correlated with the span of control manipulation check ($r = 0.67$), indicating span of control is a strong signal of organizational power. A significant main effect emerged for span of control on perceived power, $F(1, 268) = 58.66$, $p < .001$, $\eta^2 = 0.18$. The employee with a small span of control ($M_{small, manager} = 3.79$, $SD = 1.14$; $M_{small, VP} = 4.85$, $SD = 0.93$) was perceived to have significantly less power than the employee with a large span of control ($M_{large, manager} = 4.25$, $SD = 1.17$; $M_{large, VP} = 5.39$, $SD = 0.81$). There was also a significant main effect of vertical position, $F(1, 268) = 107.88$, $p < .001$, $\eta^2 = 0.29$, where the "manager" employees were rated lower in power than the "VP" employees. The interaction was

not significant, $F(1, 268) = 0.33$, $p = .567$, $\eta_p^2 = 0.001$, suggesting that the difference in power between the two managers was similar in magnitude to the difference between the two VPs.

6.2.2. Relational models and span of control
Next, we turn to examining lay beliefs about the relationships between relational models, span of control, and gender.

6.2.2.1. Relational models.
The only significant effect to emerge was a main effect of span of control, $F(1, 268) = 38.64$, $p < .001$, $\eta_p^2 = 0.13$. No other effects approached significance ($ps > 0.275$). Participants' ratings of the employee with a small span of control ($M = 3.65$, $SD = 1.44$) differed significantly in their expected relational model from their ratings of the employee with a large span of control ($M = 4.39$, $SD = 1.26$), which indicates that the manager with the large span of control was perceived to interact with their subordinates by utilizing more authority ranking principles than the manager with the small span of control. These results confirm Hypothesis 2.

6.2.2.2. Gender expectations.
We examined participants' expectations regarding the gender of managers as a function of their span of control and vertical position with a loglinear analysis. Significant effects emerged within both spans of control, with the employee assumed to be male more so than female (small span: $X^2(1) = 4.29$, $p = .038$, $\varphi = 0.12$; large span: $X^2(1) = 63.19$, $p < .001$, $\varphi = 0.48$). In contrast, the analysis revealed that the effect of vertical position was not significant, $X^2(1) = 0.06$, $p = .808$, $\varphi = 0.01$.

We broke down the gender expectations by each condition to further examine the pattern of results (see Fig. 4). For the "manager" and "VP" with a large span of control, the expectation that the employee was male was similarly strong. For the "manager" and "VP" with a small span of control, though on the aggregate the difference was significant, when broken down, the gender expectation between male or female for both was not significantly different from chance ($ps > 0.140$). Importantly, the male expectation was stronger for the large span of control, and these results therefore suggest that women, when given a span of control, are much more likely to be given a small span of control.

6.2.2.3. Mediating effect of relational models for the effect of span of control on gender expectations[12].
We tested for the indirect effect of the span of control manipulation on gender expectations through relational models using generalized structural equation modelling with OLS regression testing the direct path toward the continuous relational model variable and logistic regression testing the direct path toward the binary gender expectation, taking into account the within-participant nature of our design by clustering errors by participant. Vertical position was not included as a moderator in this analysis, given that it did not affect gender expectations. For this analysis, the span of control conditions were recoded into 0 (small span of control) and 1 (large span of control) and the gender expectation into 0 (male leader) and 1 (female leader). The bootstrap procedure with 5000 resamples was used to compute the confidence interval of the product of the coefficients and, in that way, test the significance of the indirect effect. The indirect effect was significant, $b = -0.24$, s.e. $= 0.066$, 95% CI [−0.37, −0.11], capturing a significant positive effect of larger span of control on the relational models measure (the greater on this measure, the more authority ranking principles), and a significant negative effect of the relational models measure on the likelihood of expecting a female leader for the employee.

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[11] We believe the main effect of vertical position reflects participants' assumptions regarding the indirect span of control of these two positions. In the study materials, there was no mention of whether the number of subordinates depicted were direct reports or the entirety of the employee's reach within the organization. Given the number of subordinates were relatively small in both the small and large span of control, participants likely inferred direct reports.

[12] This analysis was not part of our pre-registered data analysis plan. During our analyses of the data, however, we realized the opportunity to test for this relationship.
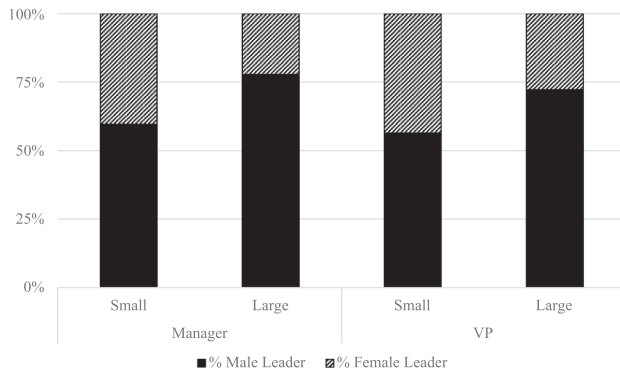
Fig. 4. Study 3 Gender Expectations by Span of Control and Vertical Position.

6.2.3. Compensation estimates

The salary and bonus estimates were combined for simplicity of presentation, but the patterns of results for each component were significant on their own as well. Responses from 9 participants were excluded, who gave salary estimates that were extreme outliers, defined as above 3 times the interquartile range. There was a significant main effect of span of control, $F(1, 259) = 69.89$, $p < .001$, $\eta_p^2 = 0.21$. The compensation estimate for the employee with a small span of control ($M = \$156,585.06$, $SD = 82,533.71$) was significantly lower than the estimate for the employee with a large span of control ($M = \$185,699.23$, $SD = 98,891.66$). There was also a significant main effect of vertical position, $F(1, 259) = 84.36$, $p < .001$, $\eta_p^2 = 0.25$, where the mean level of "manager" estimates was lower ($M = \$126,414.80$) than the mean level of "VP" estimates ($M = \$212,251.84$).

The interaction between span of control and vertical position was not significant, $F(1, 259) = 3.36$, $p = .068$, $\eta_p^2 = 0.013$.

6.3. Discussion

The findings of this study revealed that lay beliefs indeed exist regarding span of control: a large span of control was thought to entail more authority ranking principles (compared to communal sharing principles) than a small span of control. These lay beliefs linked span of control to gender expectations: While participants were equally likely to imagine a male or female leader for a small span of control, participants were less likely to imagine a female leader for a large span of control than a male leader. These results are consistent with the pattern of results on relational model stereotypes of men and women in Study 2. Controlling for gender stereotypes about communal, agentic, and competent traits, the gender difference in authority ranking principles was significant, with men higher on authority ranking principles, matching up to the expectation for a male leader for a large span of control. The gender difference in communal sharing principles was not significant, which matches up with the equal likelihood of expecting a male or female leader for a small span of control. Additionally, building on the findings from Study 1 and prior research, this study provides causal evidence that greater span of control leads to greater compensation.

This study was able to isolate the impact of intra-level span of control by manipulating vertical position. The manipulation checks in this study showed that intra-level differences in span of control and vertical position both contribute to overall perceptions of span of control, and each impact perceptions of power. Interestingly, however, vertical position did not moderate the effect of span of control on perceptions of relational models, suggesting that beliefs about how one manages a span of control is directly tied to the stated size of the span of control. This was also the case in the gender expectations, where the patterns of imagining a male or female leader were similar across vertical positions. This result

was somewhat surprising, given that we know women are less represented at higher organizational levels, and therefore we may have expected to see lower expectations of a female leader for a VP position.

7. Study 4

This final study tested whether individuals would make span of control decisions in line with our hypotheses. In this study design, we chose to keep the hypothetical employee gender ambiguous to mitigate socially desirable response biases, and instead manipulated the traits held by the employee, either in line with communal sharing principles or authority ranking principles, which the previous study showed is associated with female and male manager gender, respectively. Given the elevated social awareness around gender equality, manipulating gender in this task would potentially introduce many additional, unseen considerations made by our participants. Given our strong findings in Study 3 that people hold relational model stereotypes of men and women, manipulating these traits would allow clearer insight into how these relational model stereotypes affect span of control decisions for women and men.

In addition to testing our Hypotheses 3a and 3b, that person-environment fit considerations drive span of control assignments, this study also tested two additional possibilities. Though Study 2 showed that female managers were rated as more competent than male managers which suggests that assigning larger spans of control to men is not a decision based on competence, we still included a measure of competence in this study to test directly the possibility that perceived differences in competence between an employee with authority ranking tendencies and an employee with communal sharing tendencies contribute to the decision to assign a larger span of control. The second possibility this study examined is that perceived preference of the employee may drive span of control decisions. Decision makers may infer that employees who have authority ranking tendencies (e.g., men) prefer larger spans of control and that employees who have communal sharing tendencies (e.g., women) prefer smaller spans of control, and these inferred preferences drive decisions. We included a measure of perceived preference to examine this possibility.

This study was preregistered at: https://aspredicted.org/blind.php?x=iv57ye.

7.1. Method

An a priori power analysis was conducted for a paired samples t-test using G*Power (Faul et al., 2007). The analysis was conducted with assumptions of a two-tailed test with $\alpha = 0.05$ and $1 - \beta = 0.80$. The power analysis indicated a sample size of 199 would be needed to detect a small effect ($d = 0.20$). To account for possible exclusions (based on the criteria outlined our pre-registration), we decided on a target sample size of 400 participants.

7.1.1. Participants and design

The participants were 394 individuals on Prolific Academic. From this sample, 43 participants who did not pass the attention checks specified in our pre-registration were excluded, resulting in a sample of 351 participants (165 men, 186 women; $M_{age} = 32.81$, $SD = 10.75$, $M_{working\ years} = 11.70$, $SD = 10.22$, 71.5% currently employed). The design of the study was a between-subjects design where participants were given an employee profile who was described either as having a working style that was aligned with communal sharing principles ($n = 173$) or authority ranking principles ($n = 178$).

7.1.2. Procedure

Participants were told that they would take part in a personnel decision-making exercise. They were assigned the role of "Director" and first asked to review two vacant positions. The two positions were at the same level of the organizational hierarchy, both "manager" positions,

but differed in span of control, with one position (labelled "Position M3") overseeing 3 people (i.e., small span of control) and the other (labelled "Position M12") overseeing 12 people (i.e., large span of control). The placement of the two positions on the screen was counterbalanced. Participants were asked to share their beliefs about how managers differ in their leadership styles when they oversee 3 versus 12 subordinates. As the Director overseeing these positions, participants were told that they were also responsible for setting salary and bonus amounts for both positions before considering candidates.

After reviewing the positions, participants were then given information about an employee who was described as a high performing Senior Associate who they were interested in promoting. Participants saw a performance evaluation form of an employee named "P. Anderson" who received a rating of "5 – Regularly Exceeds Expectations," the highest rating possible. In the comment section of the form, participants saw a brief description about the employee. For the employee aligned with communal sharing principles, the comment section read, "collaborative work style, makes decisions by consensus, shares responsibilities and rewards, tends towards egalitarian work norms." For the employee aligned with authority ranking principles, the comment section read, "independent work style, makes decisions for the group, divides responsibilities and rewards individually, tends towards hierarchical work norms." Participants were asked to rate the employee's competence.

Given what they had found out about the employee, participants were asked to judge the employee's comparative fit for the two positions, and finally to decide which position they would offer to the employee. Participants were also asked about their beliefs on the employee's preference between the two positions.

7.1.3. Measures

Participants were asked about both a small and large span of control, and therefore the order in which participants responded to questions about each of them was counterbalanced. The measures are listed below in the order in which participants responded to them.

7.1.3.1. Relational models measure. The relational models measure was similar to that of Study 2 but modified slightly for the scenario in the study (see Appendix A for all items). Participants were asked to share their beliefs about how managers overseeing 3 subordinates lead and how managers overseeing 12 subordinates lead. For each span of control, participants were given 5 items on 7-point bipolar scales. The midpoint of the scale was labelled, "Acts in both ways equally," the leftmost response labelled "Behaves strictly this way" pointing to the communal sharing descriptions, and the rightmost response labelled "Behaves strictly thing way" pointing to the authority ranking descriptions (α_{small} = 0.82; α_{large} = 0.77).

7.1.3.2. Compensation estimates. Participants were asked to estimate the yearly salary and performance bonus for each of the two positions. Participants were asked to do their best in estimating the appropriate amounts. Like in Study 2, participants were not give any additional information about salary estimates. For the bonuses, participants were told that the maximum bonus allowed for any job offer at the company was $50,000. Participants were given text boxes to fill in these estimates.

7.1.3.3. Competence. Upon reviewing the evaluation form, participants were asked about the employee's competence through 2 items (α = 0.72) on a 7-point scale. The first question asked, "Based on the evaluation, how would you rate P. Anderson's competence?" and the second asked, "Based on the evaluation, how successful will P. Anderson be in the future?"

7.1.4. Position fit

Participants were asked to indicate whether the employee was a

good fit for the two positions. This measure was a single-item bipolar measure on a 7-point scale, with one end anchored at "Much better fit for M3" and the other at "Much better fit for M12." The mid-point of the scale was labelled, "Similarly fit for M3 and M12." The placement of the anchors was counterbalanced between participants.

7.1.4.1. Position offer decision. Participants were asked to choose one of the positions to offer P. Anderson, either Position M3 or Position M12. Participants' responses were recoded to 0 for the small span of control and 1 for the large span of control.

7.1.4.2. Perceived preference. Participants were asked to indicate whether they believed the employee had a preference between the two positions. This measure was a single-item bipolar measure on a 7-point scale, with one end anchored at "Strongly prefers M3" and the other at "Strongly prefers M12." The mid-point of the scale was labelled, "Feels similarly about the two positions."

7.2. Results

7.2.1. Relational models

A paired samples *t*-test showed that participants believed the small span of control (*M* = 3.56, *SD* = 1.22) differed from the large span of control (*M* = 3.96, *SD* = 1.17), *t*(350) = 3.86, *p* < .001, *d* = 0.21, in the use of communal sharing and authority ranking principles. Importantly, the large span of control was thought to use more authority ranking principles than the small span of control.

7.2.2. Compensation estimates

Like in Study 3, salary and bonus estimates were combined for simplicity of presentation, but the patterns of results for each component were significant on their own as well. These analyses included all participants who passed the attention checks[13]. The compensation estimate for the position with a small span of control (*M* = $88,974.92, *SD* 51,606.61) was significantly less than the estimate for the position with a large span of control (*M* = $108,551.42, *SD* = 74,612.33), *t*(349) = 5.44, *p* < .001, *d* = 0.29.

7.2.3. Position fit

An independent samples *t*-test showed that participants saw differences in candidates' fit for the two positions. The ratings for the communal sharing candidate (*M* = 4.19, *SD* = 1.99) significantly differed from the ratings for the authority ranking candidate (*M* = 4.92, *SD* = 1.83), *t*(349) = 3.56, *p* < .001, *d* = 0.38.

To further interpret these ratings, we conducted one-sample t-tests comparing the ratings to the midpoint of the scale separately for each of the candidates. The communal sharing candidate's ratings did not differ significantly from the midpoint of the scale, *t*(172) = 1.26, *p* = .209, *d* = 0.10, showing that participants considered the communal sharing candidate to be similarly suited for both positions. The authority ranking candidate's ratings significantly differed from the midpoint, *t*(177) = 6.68, *p* < .001, *d* = 0.50, indicating this candidate was thought to be a better fit for the large span of control.

7.2.4. Position offer decision

We conducted a chi-square test to examine whether the position offered to the communal sharing employee was different from the position offered to the authority ranking candidate. The chi-square test was significant, X^2(1) = 16.64, *p* < .001. For the communal sharing employee, 47.40% of participants offered the position with a small span

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[13] In the pre-registration, we stated that we would exclude from our analyses any outliers greater than two times the interquartile range above the third quartile for the salary figures and bonus amounts above the $50,000 limit stated in the instructions. Doing so did not change the results.

of control and 52.60% offered the position with a large span of control. For the authority ranking employee, 26.40% of participants offered the position with a small span of control while 73.60% offered the position with a large span of control. Put differently, the authority ranking employee was 2.47 more likely to be offered the position with a large span of control than the communal sharing employee.

7.2.5. Alternate explanations

We included measures for two possible alternate or simultaneous explanations in this study.

7.2.5.1. Competence. The communal sharing employee ($M = 6.73$, $SD = 0.47$) was rated as more competent than the authority ranking employee ($M = 6.52$, $SD = 0.61$), $t(349) = 3.60$, $p < .001$, $d = 0.55$. Therefore, perceptions of competence cannot explain the offer of a larger span of control to the authority ranking employee.

7.2.5.2. Perceived preference. We also tested whether decision makers' perceptions of what a communal sharing employee or an authority ranking employee preferred could explain the assignment of spans of control. Independent sample t-test showed that participants saw differences in the two candidates' interest in the positions with the two span of controls. The ratings for the communal sharing employee ($M = 4.34$, $SD = 1.52$) significantly differed from the ratings for the authority ranking employee ($M = 4.85$, $SD = 1.56$), $t(349) = 3.08$, $p = .002$, $d = 0.33$.

To further interpret these ratings, we conducted one-sample t-tests compared to the midpoint of the scale separately for each of the employees. The communal sharing employee's ratings differed significantly from the midpoint of the scale, $t(172) = 2.95$, $p = .004$, $d = 0.23$, showing that participants thought the communal sharing employee to prefer the large span of control over the small span of control. The authority ranking employee's ratings also differed significantly from the midpoint, $t(177) = 7.24$, $p < .001$, $d = 0.54$, where participants thought this employee to also prefer the large span of control over the small span of control, but to a greater extent compared to the communal sharing employee.

7.2.6. Mediation analysis

Using the PROCESS 3.0 Macro in SPSS (model 4), we tested for a mediation model depicted in Fig. 5. We included both perceptions of fit and perceived preference as mediators of the span of control decision for the two employees. For the purposes of the model, the employee condition was coded 0 for the communal sharing employee and 1 for the authority ranking candidate. The outcome variable was coded 0 for an offer of the position with the small span of control and 1 for an offer of the position with the large span of control, and a logistic regression analysis was appropriate for this binary outcome variable, with the coefficients expressing log-odds. We found a positive significant indirect effect of employee to the decision of position offered through perceptions of fit, $b = 2.22$, 5000 bootstrap resample 95% CI [1.04, 5.84]. The indirect effect through perceived interest was not significant, $b = 0.29$, 5000 bootstrap resample 95% CI [−0.02, 1.09].

7.3. Discussion

The results of this study show evidence of how lay beliefs regarding relational models operating in different spans of control affect the position offered to a given individual. Participants were significantly more likely to offer the position with a large span of control to the employee described as having authority ranking tendencies, while the employee with communal sharing tendencies was equally likely to be offered a small or large span of control. Importantly, these results suggest that comparatively speaking, the communal sharing employee is less likely to be assigned the position with a large span of control.

Interestingly, the communal sharing employee was rated higher on competence and also rated as equally a good fit for both positions. However, when the time came to decide which position to offer the communal sharing employee, decision makers did not necessarily offer the employee the higher paying position with a large span of control. Given what we know about people's associations between gender and relational models, these results suggest that women may end up with smaller spans of control than men even in situations where women are considered as competent (if not more than) as men and as capable of leading large spans of control due to decision makers' beliefs about the value of authority ranking principles in large spans of control.

8. General discussion

Through four studies, we mapped out how beliefs about the relational models operating in different spans of control can lead to a gender disparity in job compensation. In Study 1, we found evidence of a gender gap in span of control contributing to compensation differences in real world data from business school alumni. Study 2 confirmed that people hold gendered beliefs regarding relational model tendencies, with men perceived as having more authority ranking tendencies and women having more communal sharing tendencies. In Study 3, we established that people believe smaller and larger spans of control to operate on different amounts of authority ranking and communal sharing principles, namely that larger spans of control are more authority ranking (compared to communal sharing) than smaller spans of control. We found that these differences were related to expectations about the gender of the leader of smaller and larger spans of control, with men more likely to lead a larger span of control. Finally, in Study 4, despite higher competence ratings and qualification for both small and large spans of control, an employee with communal sharing tendencies, where women would stereotypically fall, were significantly less likely to be offered a large span of control than an employee with authority ranking tendencies, where men would stereotypically fall.

8.1. Theoretical and practical contributions

This research contributes to improving our understanding of the processes leading to gender disparity in workplace outcomes. Our findings add to the growing body of work that suggests that the causes of gender disparity are not always obvious and easily identifiable. For example, Chan and Anteby (2016) explored task segregation, or the

Study 4 Mediation Model
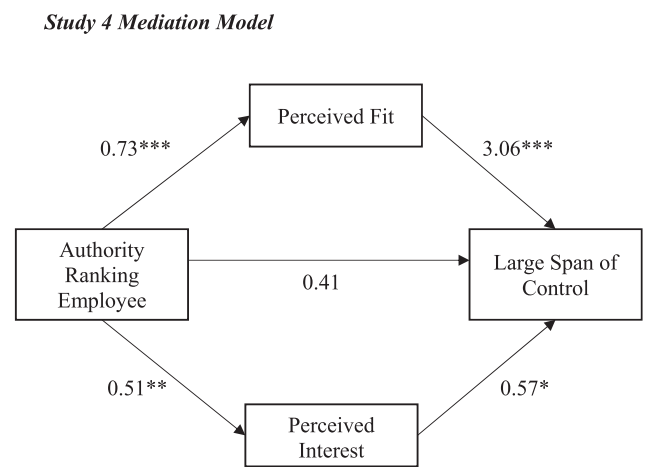
Indirect effect of Perceived Fit: $b = 2.22$, CI [1.04, 5.84]
Indirect effect of Perceived Interest: $b = 0.29$, CI [−0.02, 1.09]

Fig. 5. Study 4 Mediation Model.

disproportionate allocation of certain tasks to a given group of employees, as a mechanism contributing to within-job inequality in job quality between men and women. Women were assigned less-valued tasks which may contribute to worse promotion chances, pay, and satisfaction, and greater turnover. Similar to their findings, our work shows a parallel process that may operate without intention to increase gender disparity by assigning female managers to jobs with smaller spans of control, resulting in disparate compensation outcomes. Traditionally, gender disparity has been discussed in terms of vertical position, where women are not reaching the same levels of hierarchy in organizations. The current work emphasizes the idea that in addition to hierarchical position, power also involves control "over whom" and therefore it is important to examine the number of people, and relatedly the amount of resources, two individuals of similar rank are given power over.

For organizations interested in reducing gender disparities in pay, span of control as a source of gender disparity may not be readily apparent. As mentioned in the introduction, greater compensation for a larger span of control is justifiable—overseeing a greater number of people is likely to be seen as more responsibility, and greater pay for more responsibility is likely to be perceived as fair. Given the apparent fairness in rewarding greater responsibility with greater pay, unless particular attention is paid to the possibility that men have greater access to roles with larger spans of control, this process may not be recognized, thus allowing gender disparities to persist.

This work also adds to our understanding of people's lay beliefs about relational models pertaining to gender. People hold stereotypes about how male and female managers tend to interact with their subordinates. In the current work we examined how these gender stereotypes may influence span of control assignments, but these expectations may impact other decisions in the workplace, such as the types of tasks women and men are assigned to, or perhaps the kind of reward systems or type of group women and men are offered. Given recent research documenting differences in the language used in performance evaluations to evaluate male and female employees, with "taking charge" emerging as a more valued attribute for men than women (Correll, Weisshaar, Wynn, & Wehner, 2020), it is important to identify the exact components of gender stereotypes that produce these differences. The current research suggests gender stereotypes about relational models are a novel and important contributor to gender differences in career outcomes. We note that these stereotypes may in fact be picking up on actual differences between men and women, thus reflecting "a kernel of truth" (Jussim, Crawford, & Rubinstein, 2015; Koenig & Eagly, 2014; Swim, 1994). Nevertheless, understanding how these beliefs impact outcomes is important to understanding gender gaps.

More generally, this work highlights the importance for research on gender in organizations to examine how stereotypes shape the experiences of both women and men. Our results suggested that the gender disparity in span of control, and the related gap in compensation, stemmed from a preference for men for larger spans of control based on perceptions of men having more authority ranking tendencies than women, rather than a penalty against women for having more communal sharing tendencies than men.

8.2. Limitations and future directions

Through one archival dataset and three experiments, we examined lay beliefs about span of control and their consequences on gender disparity in pay. However, there are limitations in the current research, leaving promising areas for future inquiry. A strength of our work in the first study with MBA alumni data is that we examined our hypotheses with a population that has similar credentials, therefore minimizing variance due to additional human capital factors. At the same time, however, because the population is limited to a certain subsection of the general population, more work is needed to generalize beyond MBA graduates from an elite institution. Additionally, the dataset used in Study 1 was cross-sectional rather than longitudinal panel data, capturing differences in span of control across individuals rather than examining compensation changes within individual leaders as they move between jobs, controlling for idiosyncratic differences in skill sets. Another limitation of the dataset in Study 1 is that we did not have performance data or negotiation data to know whether those factors affected span of control and compensation. Finally, the self-report nature of the survey leaves open the possibility that the observed gender difference in span of control and compensation reflects differing tendencies to under- or over-report, although the convergence between the observed pay gap and frequently cited government data mitigates this concern to some degree. Future work can examine the impact of these additional factors on the gender gap in span of control.

Importantly, the current work focused on the demand-side of the equation, how decision makers' lay beliefs may impact their expectations and decisions. The supply-side perspective is also an important open area for research, examining women's and men's own preferences regarding span of control. One possibility is that women actually prefer smaller spans of control, perhaps due to different career goals, perhaps because their work style tendencies tend to be more effective in smaller spans of control, or possibly because smaller spans of control provide women more opportunities to pursue their valued goals. Gino et al. (2015) found that women have a greater number of life goals and a smaller proportion of goals related to achieving power at work. They also found that women view high-power positions as less desirable. Women also tend towards more participative and democratic tendencies in leadership (Eagly & Johannesen-Schmidt, 2001), and this style of leadership may be more effective with fewer people. Diekman, Joshi, and Benson-Greenwald (2020) discuss how individuals seek roles that allow them to fulfill their goals, and to the extent that women are motivated to pursue communal goals, if smaller spans of control allow women to do so, they may prefer them. Together, women may in fact prefer smaller spans of control. Another possibility is that women may incur greater backlash if they use authority ranking principles in exercising power (Rudman & Phelan, 2008) and therefore women may be less likely to want to take on jobs with larger spans of control. We hope that the current work on demand-side explanations inspires future research on supply-side explanations.

We note that in our three experiments, we limited the possible levels of span of control to two categories to conduct initial tests of our theory. However, span of control is theoretically a continuous construct, where managers can oversee any number of individuals. This methodological approach would allow for a better understanding of lay beliefs of span of control and their implications. We believe, however, that the effects we have found with a relatively small difference in span of control (3 vs. 12 members) will extend to larger spans of control. We anticipate that people's lay beliefs about a span of control of 30 or 50 will be even higher on authority ranking and therefore enhance the effect we have documented, resulting in greater hurdles to achieving gender parity in span of control.

Another aspect that was held constant in our studies was the gender ambiguity of the subordinates depicted in a given span of control. We did not provide any information regarding the gender composition of a span of control, but gender representation may be a moderating factor of manager selection given known links between numerical representation and stereotypical perceptions (Kanter, 1977). Managing more women or more men may suggest different relational models, or same-gender interactions may suggest different relational models than other-gender interactions. Organizations differ in their gender composition, and this may mean that men and women fare differently in span of control in organizations of different gender compositions. This is an important question for future research to address.

Finally, an open question is how to identify an intervention or solution that can remedy this effect of span of control on the gender pay gap. Ultimately, this work highlights the importance of women (and men) to pay attention to span of control in their leadership positions, but

from the perspective of the organization, finding a way to ensure that stereotypes are not mindlessly applied to drive decisions will be helpful to give women and men equal opportunities to lead whatever span of control they individually strive to achieve. In regard to span of control as a contributor to the gender pay gap, organizations can review whether span of control is indeed a meaningful measure of influence and control within an organization, and whether assigning higher compensation for larger spans of control is deserved. In one of our data collections, we found that participants did not estimate differences in hours worked between a small and a large span of control. Furthermore, in our final study, the perceived competence of an employee did not necessarily lead to assigning a larger span of control, and by association, greater compensation. Reviewing the accuracy of assumptions that underlie the link between span of control and compensation could get us closer to gender equality.

8.3. Conclusions

We presented and tested a model for how lay beliefs regarding relational models underlie a gender difference in span of control, which in turn, can result in a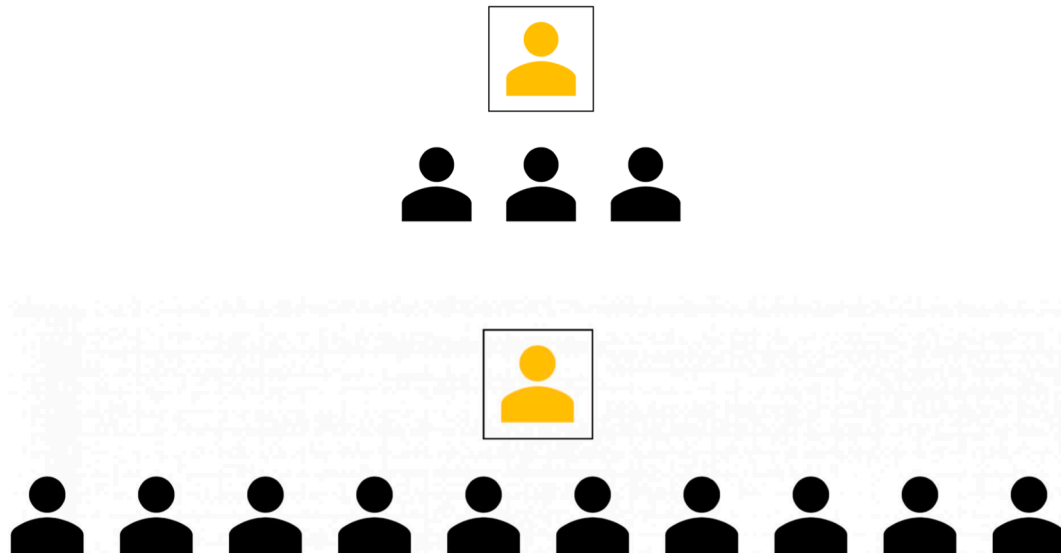 gender gap in compensation. We tested the link between gender, span of control, and compensation with an archival dataset from MBA alumni. We then unpacked the underlying processes in three experiments, showing that male managers are perceived to use authority ranking principles more and communal sharing principles less than female managers, and these beliefs lead to greater expectations of men holding managerial positions with larger spans of control than women. Given assumptions about span of control and organizational power, we find that span of control is an important factor in producing and reproducing the gender pay gap.

CRediT authorship contribution statement

Margaret Lee: Methodology, Formal analysis, Writing - original draft. **Laura J. Kray:** Conceptualization, Formal analysis, Writing - review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A

Relational models items in Study 2
Communal Sharing items
A typical [male/female] manager…

1. promotes sharing of responsibilities among [his/her] subordinates.
2. encourages a collaborative work style.
3. issues joint ownership of rewards and outcomes to [his/her] subordinates.
4. makes decisions by consensus.
5. prefers having a flat group structure with [his/her] subordinates.

Authority Ranking items
A typical [male/female] manager…

1. promotes strict division of labor among [his/her] subordinates.
2. encourages an independent work style.
3. issues individualized rewards and outcomes to [his/her] subordinates.
4. makes decisions independently.
5. having a hierarchical group structure with [his/her] subordinates.

Relational models items in Study 3

	Communal Sharing Endpoint (1)	Authority Ranking Endpoint (7)
1	Complete sharing of responsibilities	Strict division of labor
2	Collaborative work style	Independent work style
3	Joint rewards and outcomes	Individualized rewards and outcomes
4	Decisions by consensus	Decisions by leader
5	Flat group structure	Hierarchical group structure

Relational models items in Study 4

	Communal Sharing Endpoint (1)	Authority Ranking Endpoint (7)
1	Promotes sharing of responsibilities	Promotes strict division of labor
2	Encourages a collaborative work style	Encourages an independent work style
3	Issues joint ownership of rewards and outcomes	Issues individualized rewards and outcomes
4	Makes decisions by consensus	Makes decisions independently
5	Prefers a flat group structure	Prefers a hierarchical group structure

Appendix B

Span of control images used in Study 2

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