Reducing Gender Bias in the Evaluation and Selection of Future Leaders: The Role of

Decision Makers' Mindsets about the Universality of Leadership Potential

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Abstract

Extensive research has documented organizational decision makers' preference for men over women when they evaluate and select candidates for leadership positions. We conceptualize a novel construct—mindsets about the universality of leadership potential—that can help reduce this bias. People can believe either that only some individuals have high leadership potential (i.e., a *nonuniversal mindset*) or that most individuals have high leadership potential (i.e., a *universal mindset*). Five studies investigated the relationship between these mindsets and decision makers' gender biases in leader evaluation and selection decisions. The more senior government officials in China held a universal mindset, the less they showed gender bias when rating their subordinates' leadership capability (Study 1). Working adults in the UK who held a more universal mindset exhibited less gender bias when evaluating and selecting job candidates for a leadership position (Study 2). In an experiment, Singaporean students exposed to a universal mindset exhibited less gender bias when evaluating and selecting candidates than those exposed to a nonuniversal mindset (Study 3). Another experiment with working adults in China replicated this pattern and added a control condition to confirm the directionality of the effect (Study 4). Finally, Study 5 showed that a more universal mindset was associated with less gender bias, particularly among decision makers with stronger gender stereotypes in the domain of leadership. This research demonstrates that, although they are seemingly unrelated to gender, mindsets about the universality of leadership potential can influence the extent to which people express gender bias in the leadership context.

Keywords: gender bias, leadership, universal-nonuniversal, mindsets, stereotypes

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Despite the increased representation of women in leadership positions over recent decades (Georgeac & Rattan, 2019; Hoyt, 2010), people continue to be biased against women in leadership contexts (Eagly et al., 2020; Koenig et al., 2011). For example, compared with equally qualified women, men are more likely to be evaluated as having greater leadership capability (Bouland-van Dam et al., 2021), competence (Koenig et al., 2011; Sczesny et al., 2019), and agency (Cuddy et al., 2008; Fiske et al., 2002; Foschi, 2000). We refer to these well-established effects, collectively, as gender bias in leader evaluation. Gender bias is also evident in leader selection—even when candidates are equally qualified, people prefer men over women candidates (Carrier et al., 2014; Fiske et al., 2002; Oldmeadow & Fiske, 2010). Gender bias in leader evaluation and selection is fundamentally at odds with the core organizational values of equity, fairness, and meritocracy (Beugre, 1998), and has thus drawn the attention of scholars and practitioners.

Past research has identified numerous antecedents of gender bias, including structural factors (e.g., masculine defaults at multiple levels of organizational culture; Cheryan & Markus, 2020), social factors (e.g., socialized sex differences; Ely & Meyerson, 2000), and individual factors (e.g., perceived social identity threat; Hoyt & Murphy, 2016). Past research has also investigated potential solutions for reducing gender bias. Ironically, although gender biases in leader evaluation and selection arise from perceiver-side dynamics, much of this work has focused on target-side approaches. For example, scholars have encouraged women to increase their openness to confronting bias directly (Brands & Rattan, 2020; Rattan & Dweck, 2018), to affirm their personal values (Kinias & Sim, 2016), to express pride in their achievements (Brosi et al., 2016), and to simultaneously display communal and agentic qualities (Carli, 2010; Rosette & Tost, 2010; Rudman & Glick, 2001). Although effective, these approaches are limited because they put the responsibility for reducing gender bias on women, who are already fighting

numerous challenges in the workplace, while leaving perceivers' bias intact.

This is an understandable emphasis given the relative stability of people's gender stereotypes (Charlesworth & Banaji, 2021; Epitropaki & Martin, 2004; Offermann & Coats, 2018), and given that attempts to reduce gender bias through awareness-raising techniques are effective for only a limited time, if at all (Chang et al., 2019), and can potentially reinforce the bias (Ridgeway, 1997). Interventions in organizations have focused on diversity training and implicit bias training. Although widely used, the effectiveness of such training programs varies widely, and any positive outcomes appear to be contingent on the integration of these programs with other initiatives (Bezrukova et al., 2016; Carter et al., 2020; Paluck et al., 2021). Thus, neither theory nor practice provides clear answers about how we can intervene to reduce decision makers' gender bias in leader evaluation and selection.

Our research is designed to address this pressing question. By integrating multiple theoretical perspectives, we propose a novel approach to counteract gender biases in leader evaluation and selection. Specifically, we examine the mindsets that underlie decision makers' gender biases. Whereas past research has sought to directly attack, undermine, or address gender biases, we investigate whether it is possible to indirectly influence these biases by considering people's foundational assumptions about the domain of leadership itself. Specifically, we conceptualize a new construct: mindsets about the universality of leadership potential, that is, the belief that either only some people have high leadership potential (i.e., a *nonuniversal mindset*) or that nearly everyone has high leadership potential (i.e., a *universal mindset*).

We theorize that a universal mindset about leadership potential can reduce gender biases in leader evaluation and selection because this mindset inhibits people from applying the gender stereotypes that underlie these biases. Gender stereotypes in leadership are captured succinctly by the quote, "*think manager-think male*" (Schein, 1973); they are defined by a cognitive association between leadership and men rather than women. Given the reality that

leadership is a highly gender-stereotyped domain (Koenig et al., 2011), we take it as given that people across the universal-nonuniversal mindset continuum are aware of this stereotype. Stereotype *knowledge* is distinct from stereotype *application*, however (Greenwald et al., 2003; Higgins, 1996). That is, people can know the content of a stereotype but differ in the extent to which they apply that stereotype to specific decisions they make. We posit that if a decision maker has a nonuniversal mindset, that is, they believe that only some people have high leadership potential, then they can readily apply the stereotype because there is no inconsistency between their mindset and the stereotype. But if a decision maker has a universal mindset, that is, they believe that nearly everyone has high leadership potential, then they would have a hard time applying the knowledge of this stereotype to their decisions because their mindset is inconsistent with the stereotype. Thus, we theorize that people with a universal mindset would express weaker gender biases in leader evaluation and selection compared with those with a nonuniversal mindset.

Although virtually all people are aware of the "think manager-think male" stereotype, the strength of the stereotype is likely to vary across individuals; some people have a stronger association between leaders and men, and others, a weaker association. We predict that when people hold stronger stereotypes, the predicted effect of universal-nonuniversal mindsets will emerge: those with a nonuniversal mindset would apply this stereotype in their leader evaluation and selection decisions and thus exhibit higher levels of gender bias; in contrast, those with a universal mindset would apply these stereotypes less and thus exhibit lower levels of gender bias. However, when people hold weaker stereotypes, the logical inconsistency that our conceptualization refers to is less relevant, so universal-nonuniversal mindsets are unlikely to influence their degree of gender biases. We tested this prediction by assessing whether stereotype strength moderates the effect of universal-nonuniversal mindsets on the extent of people's gender biases in leader evaluation and selection decisions.

This research makes several theoretical and practical contributions. First, our work

contributes to the burgeoning literature on mindsets in organizations (Rattan & Ozgumus, 2019). Specifically, we go beyond past research that has focused either on fixed-growth mindsets about various human characteristics (Burnette et al., 2020; Canning et al., 2020; Heslin et al., 2005) or on universal-nonuniversal mindsets about intelligence in the context of education (Rattan et al., 2012, 2018; Savani et al., 2017) by conceptualizing a new mindset that is highly relevant to organizational contexts: people's beliefs in the universality of leadership potential. Second, we contribute to the extensive literature on gender bias in leader evaluation and selection by identifying a novel construct that can undercut a longstanding and pernicious challenge in organizations—by investigating how we can reduce the extent to which decision makers express gender bias, instead of focusing on what targets of bias can do to reduce the extent of bias they experience. We further contribute to managerial practice by identifying a potential intervention that can nudge managers to act in a less biased manner. Overall, our work contributes to the scholarship on diversity in organizations by illustrating an indirect approach to undermining biases that does not mention gender, diversity, or related constructs; this intervention could be implemented alongside the more direct diversity-training and bias-confrontation efforts that many organizations have already adopted.

Theoretical Background

Mindsets

Mindsets (also known as *lay theories* or *implicit theories*) are people's naive assumptions about the nature of human characteristics (Dweck, 2006). They serve important psychological functions, as suggested by the various labels referring to mindsets, such as schemas (Heider, 1958; Ross, 1989), templates (Kelly, 1955), explanatory frameworks (Hong et al., 2004), knowledge structures (Dweck et al., 1995a, 1995b), and meaning systems (Chiu et al., 1997; Dweck & Leggett, 1988; McGarty et al., 2002). Mindsets help simplify the social reality, reduce epistemic uncertainty, structure perceptions and inferences, justify judgments and choices, and provide people with a lens to interpret their everyday experiences (Levy et al., 2006).

Past research on mindsets has predominantly focused on people's beliefs about the fixedness or malleability of human attributes (Dweck, 2012). Some people believe that human attributes are fixed and stable over time (the *fixed mindset* or the *entity theory*), whereas others believe that these attributes are dynamic, malleable, and can be cultivated (the *growth mindset* or the *incremental theory*; see Dweck, 1999). Researchers have examined fixed versus growth mindsets in various domains, including intelligence, personality, and morality (for reviews, see Dweck & Leggett, 1988; Heslin & Vandewalle, 2008; Molden & Dweck, 2006; Rattan & Ozgumus, 2019). However, a nascent body of research suggests that individuals also have mindsets about the *distribution* of these attributes across the population. For example, some people believe that only some individuals have high intellectual potential (i.e., the *nonuniversal mindset*), whereas others believe that nearly everyone has high intellectual potential (i.e., the *universal mindset*; Rattan et al., 2012). Past research has documented variations in people's mindsets about the distribution of human attributes in several domains, including intellectual potential (Savani et al., 2017), potential in science, technology, engineering, and math (STEM) fields (Rattan et al., 2018), and potential to achieve ideal body weight (Li et al., 2020).

Universal-nonuniversal mindsets are conceptually distinct from fixed-growth mindsets. Fixed-growth mindsets assess malleability over time (e.g., "Can a person improve his or her leadership ability?"), whereas universal-nonuniversal mindsets evaluate the distribution of potential across the population (e.g., "Does everyone have high leadership potential?"). These two dimensions of mindsets have been shown to be empirically distinct; although they are weakly positively correlated, each dimension predicts unique outcomes (Li et al., 2020; Rattan et al., 2012; Savani et al., 2017).

Universal-Nonuniversal Mindsets about Leadership Potential

Our research conceptualizes universal-nonuniversal mindsets in a novel domain: leadership potential. We propose that people differ in the degree to which they believe leadership potential is widely distributed across the population. Some individuals may believe that *most people* have

high leadership potential (the *universal* mindset). From this perspective, although different people may realize their potential to different extents, depending on their life circumstances (e.g., their educational background, social network, the mentorship they received, and the career progression opportunities they encountered), most people have high leadership potential. Others may believe that *only some people* have high leadership potential (the *nonuniversal* mindset). From this perspective, even if everyone receives good mentorship, career progression opportunities, and so on, only some have the potential to become effective leaders; others, no matter how hard they try or what opportunities they receive, simply lack the potential to be effective leaders. In line with mindset scholarship, universal versus nonuniversal mindsets do not represent two categories but instead two ends of a single continuum.

We focus on mindsets about leadership potential because leadership potential is a nebulous yet organizationally relevant construct. Leadership potential refers to an individual's capacity to serve as an effective leader when given the opportunity (Luria et al., 2019; Silzer & Borman, 2017). Organizations routinely seek to identify, coach, and promote employees with high leadership potential (e.g., through "high-potential programs;" Bouland-van Dam et al., 2021; Player et al., 2019). This is a practical challenge because potential is a broad construct, and its indicators are neither clearly defined nor precisely measured (Finkelstein et al., 2017; Silzer et al., 2016). The manifestation of leadership potential is contingent on the context (Fiedler, 1966; Luria et al., 2019; Osborn et al., 2002) and for those who are not yet leaders, it can only be realized in the future (Finkelstein et al., 2017). Although organizations have been trying to develop systematic and objective criteria to assess leadership potential separately from past performance (Balzer & Sulsky, 1992; Dries & Pepermans, 2012), the selection of future leaders is still largely driven by subjective evaluations of candidates' leadership potential (Hirschfeld & Thomas, 2011). Given the lack of clarity about how to objectively define and measure leadership potential, we submit that there is room for decision makers' mindsets about leadership potential to influence their evaluations of leader candidates.

Implications for Gender Bias

We theorize that decision makers' universal-nonuniversal mindsets about leadership potential underlie the degree to which they exhibit gender bias against women when making leadership evaluation and selection decisions. We develop this prediction based on past research which has found that mindsets influence social information processing (Levy et al., 2006; Plaks et al., 2009). For example, fixed-growth mindsets influence selective attention to stereotype-consistent and inconsistent information (Burnette et al., 2013; Levy et al., 1998, 2005; Mangels et al., 2006; Morris et al., 2001; Plaks et al., 2001).

We hypothesize that universal-nonuniversal mindsets about leadership potential shape the extent to which people exhibit gender biases in leader evaluation and selection decisions because of the conceptual overlap between these mindsets and gender stereotypes about leadership. Gender stereotypes about leadership state that compared to women, men are more agentic (Cuddy et al., 2008; Fiske et al., 2002; Foschi, 2000), competent (Eagly & Karau, 2002; Koenig et al., 2011; Sczesny et al., 2019), and capable (Bouland-van Dam et al., 2021). Consistent with past work documenting the prevalence of these stereotypes, we submit that virtually all decision makers are aware of or have knowledge about gendered leadership stereotypes (Eyal & Epley, 2017). However, just because people are aware of these stereotypes does not mean that they need to apply them in their decision making (Greenwald et al., 2003; Higgins, 1996; Macrae & Bodenhausen, 2000). Our key idea is that universal-nonuniversal mindsets about leadership potential shape the extent to which people apply gender stereotypes when making leader evaluation and selection decisions.

The universal mindset, defined as the belief that high leadership potential is widely distributed across the population, is logically inconsistent with the core content of leadership stereotypes, which state that there exist group-based differences in natural leadership ability (i.e., some groups lack leadership potential). Thus, we predicted that decision makers with a more universal mindset would apply gender stereotypes less when making leadership-related

evaluation and selection decisions (Festinger, 1957; Gawronski, 2012). In contrast, there is no inconsistency between a nonuniversal leadership potential mindset and gender stereotype content: if high leadership potential is distributed among only a small segment of the population, then it is possible that some groups may have more natural leadership ability and other groups have less. Thus, we theorize that the nonuniversal leadership potential mindset allows decision makers to apply traditional gender stereotypes in leader evaluation and selection.

We test our prediction that the universal-nonuniversal mindset about leadership potential shapes the degree of gender bias in the context of multiple outcome variables that are well-established in the organizational and leadership literatures, which we call *evaluations of leader candidates*. Across studies, this construct includes perceptions of leadership capability, competence, and agency. Leadership capability indicates the extent to which an individual has the skills and abilities needed to be an effective leader given a set of job and role requirements (Bouland-van Dam et al., 2021). Relatedly, competence versus warmth (Cuddy et al., 2008; Fiske et al., 2002; Foschi, 2000) and agency versus communion (Eagly & Karau, 2002; Koenig et al., 2011; Sczesny et al., 2019) are fundamental dimensions of person perception. Competence refers to qualities such as skill and intelligence that are necessary for effectively executing relevant work tasks (Cuddy et al., 2008). Agency is a broader concept that involves not only competence but also assertiveness (Abele et al., 2016) and other constructs such as ambition, dominance, diligence, and independence (Ma et al., 2022). Both perceived competence and perceived agency are core components of gender stereotypes in the workplace; specifically, women are stereotyped to be less competent and less agentic than men (Eagly et al., 1992, 1995, 2020; Koenig et al., 2011). Perceptions of leadership capability, competence, and agency typically feed into leader selection decisions. That is, when selecting candidates for leader positions, decision makers prefer those that they believe have high leadership capability and are competent and agentic (Carrier et al., 2014; Fiske et al., 2002; Oldmeadow & Fiske, 2010). Thus, we predict that if the universal mindset reduces gender bias

in perceptions of leadership capability, competence, and agency, then it should indirectly reduce gender bias in leader selection decisions.

In addition to testing these predictions, we evaluated one further implication of our theorizing. Even among people who have knowledge of a stereotype, the strength of the stereotype can vary—some people hold a stronger association between men and leadership, whereas others hold a weaker association (Dasgupta & Asgari, 2004). If people hold stronger stereotypes, then universal-nonuniversal mindsets should have a more pronounced effect on the degree of gender bias they exhibit. Specifically, people with a more nonuniversal mindset would apply their stronger stereotypes and thus exhibit higher levels of gender bias in leader evaluation and selection. In contrast, those with a more universal mindset would refrain from applying their stronger stereotypes because of the logical inconsistency between the mindset and the stereotypes, and thus exhibit lower levels of gender bias. If people hold weaker stereotypes, then the universal mindset is likely to have a minimal effect on the degree of people's gender bias application as the logical inconsistency that our conceptualization refers to is less relevant. Stereotype strength thus serves as a potential moderator that can help test a key assumption of our conceptualization. We tested this proposition by assessing whether decision makers' stereotype strength moderates the effect of universal-nonuniversal mindsets on the extent of gender bias in leader evaluation and selection.

In sum, we hypothesized:

Hypothesis 1: A more universal mindset about leadership potential would be associated with weaker bias against women in evaluations of leader candidates.

Hypothesis 2: A more universal mindset about leadership potential would be associated with weaker bias against women in leader selection.

Hypothesis 3: Bias against women in evaluations of leader candidates would mediate the effect of universal-nonuniversal mindsets about leadership potential on bias against women in leader selection.

Hypothesis 4: The strength of gender stereotypes about leadership moderates the effect of universal-nonuniversal mindsets on bias against women in evaluations of leader candidates and leader selection, such that the effect is more pronounced when people hold stronger gender stereotypes about leadership.

Overview of Studies

We tested our hypotheses in five studies with diverse samples and methods. Consistent with our conceptualization, we operationalized gender bias in evaluations of leader candidates by subtracting the mean rating of women employees or candidates from the mean rating of men employees or candidates for each of the three dimensions we measured (i.e., leadership capability, competence, and agency). We operationalized gender bias in leader selection in two ways. Decision makers were asked to either rate their likelihood of selecting each candidate or select a certain number of candidates. In the former case, we subtracted the mean likelihood rating of women candidates from that of men candidates. In the latter, when participants made selections, we counted the number of men among the selected candidates, which naturally indexed gender bias as participants selected from a fixed pool of men and women candidates.

Study 1 (a correlational study) tested whether senior government officials with a more universal mindset exhibited less gender bias when evaluating the leadership capability of their actual men and women subordinates (Hypothesis 1). Study 2 (a correlational study) tested the relationship between universal-nonuniversal mindsets and the extent of gender bias in evaluations of leadership capability and competence and, consequently, in the selection of leader candidates (Hypotheses 1–3). Study 3 (an experiment) tested the causal effect of universal-nonuniversal mindsets on the degree of gender bias in competence evaluations, and, consequently, in leader selection. Study 4 (an experiment) and Study 5 (a correlational study) tested the mediating effects of gender biases in evaluations of leadership capability, competence, and agency on the relationship between mindsets and gender bias in leader selection. Study 5 measured gender stereotypes about leadership to assess the moderating

effect of stereotype strength (Hypothesis 4).

We included fixed-growth mindsets and participant gender as control variables in all correlational studies (Studies 1, 2, and 5), and reported results both with and without these covariates. We controlled for fixed-growth mindsets because they are a more established construct with a longer history in management (Heslin & Vandewalle, 2008), and because they are weakly to moderately correlated with universal-nonuniversal mindsets (Rattan et al., 2012; Savani et al., 2017). We controlled for participant gender because past research has found gender differences in the extent to which people exhibit gender bias (Duguid, 2011; Eagly et al., 1992; Faniko et al., 2016, 2017; Koch et al., 2015; Koenig et al., 2011; Ng & Chiu, 2001).

The correlational studies used field-standard measures adapted to our question of interest. Both experimental studies used the news article paradigm, which is a well-established and widely used method for manipulating mindsets (e.g., universal-nonuniversal mindsets about intelligence; Savani et al., 2017), and were accompanied by external manipulation checks. In Studies 2–5, we created resumes for fictional candidates and pretested the resumes to be similar on perceived competence. Furthermore, past research has documented the intersectionality between gender and race in leadership perceptions (Livingston et al., 2012; Rosette et al., 2016; Rosette & Livingston, 2012; Sanchez-Hucles & Davis, 2010). Therefore, we used stereotypical male and female names associated with the ethnic majority group in the respective culture in which the study was conducted, and ensured that participants perceived the gender and race of all names as intended. The pretests are reported in Supplementary Materials, Sections A–C.

Transparency and Openness

We describe our sampling plan, all data exclusions, all manipulations, and all measures in the studies. We adhered to the journal's methodological checklist. All research materials, data, and analysis code are available at https://osf.io/tw42u/?view_only=c9646f049d2846b49a8e610f58256da6. Data were analyzed

using SPSS, version 20 and version 26, and the PROCESS macro, version 4

(https://www.processmacro.org/download.html). Study 4's design, sample size, and analysis

were pre-registered at https://osf.io/7j9e5/?view_only=184e47d729c2456bbde9d981bd538f7f.

Study 1 was conducted as part of a training program and thus did not require approval from the

university's Institutional Review Board. Studies 2 to 5 were approved by the Institutional Review

Board of the university at which they were conducted, including Nanyang Technological

University's IRB protocol IRB-2015-07-018 titled "Role of implicit processes in cultural learning,"

Guanghua School of Management's IRB protocol 2021-27 titled "Implicit theories about

leadership potential and gender bias in leadership evaluation and leader selection," and London

Business School's IRB protocol REC230 titled "Studies of Beliefs about Ability." Information

about the achieved power and sensitivity analysis for all studies are available in the

Supplementary Materials (Section D).

Study 1

Study 1 tested Hypothesis 1. Specifically, we tested whether leaders with a more universal

mindset about leadership potential exhibit less gender bias when evaluating their subordinates'

leadership capability.

Method

Participants. We recruited participants from four batches of government officials attending a

training program at a top business school in China. The officials were invited to stay for a few

minutes after class to participate in a study on leadership, whose results would be discussed in

later classes. We assured participants of their anonymity as the officials were quite sensitive

about information disclosure. Paper-and-pencil questionnaires were distributed to officials who

agreed to participate.

Among the 146 officials who participated, 16 were excluded because they did not provide

complete information about their subordinates or failed to complete the mindset measures. The

final sample included 130 officials (age: $M = 46.24$ years, $SD = 5.58$; current position tenure: M

= 4.96 years, *SD* = 3.80; 19 women, 111 men; 96 with a bachelor's or higher degree; all ethnic Chinese). The majority (82.30%) of the officials were at the fourth level of the 10-level government leader hierarchy in China (*M* = 3.95, *SD* = 0.47). They were serving in positions such as Secretary or Chief Executive of the Communist Party of China in the county or the district government.

Procedure. Participants first completed the measures of universal-nonuniversal mindsets and fixed-growth mindsets. They then wrote down the nicknames of a maximum of 20 subordinates who directly reported to them, indicated each subordinate's gender, and rated the subordinate's leadership capability. We chose the number 20 based on our consultation with an official who was in charge of the training, evaluation, and promotion of officials in the province. Finally, participants provided demographic information.

Universal-nonuniversal mindsets about leadership potential. We adapted Rattan et al.'s (2012) eight-item scale measuring universal-nonuniversal mindsets about intellectual potential by changing "intellectual potential" to "leadership potential" and modifying the wording to fit the leader context. A sample item is, "Even in the right environment, not everyone can be an effective leader," which was adapted from Rattan et al.'s (2012) item, "Even in the right environment, not everyone can become highly intelligent;" see Appendix A for the full universal-nonuniversal mindsets about leadership potential scale). The response scale ranged from 1 = *strongly agree* to 6 = *strongly disagree*. We computed participants' mean agreement across all items (α = .78). Higher scores indicated a stronger universal mindset, and the observed scale range was from 1 to 3.75.

Subordinate gender. Participants were asked to tick either "male" (coded as 0) or "female" (coded as 1) to indicate the gender of each subordinate.

Gender bias in leadership capability evaluations. As the government officials had to rate multiple subordinates, it was important to avoid survey fatigue and prevent attrition, so we used a single item to measure the extent to which they thought each subordinate was capable of

being a good leader (1 = *not at all* to 6 = *very much*; the observed scale range was 1 to 6). We averaged each official's ratings for their female and male subordinates separately. We then calculated the difference score by subtracting the average score for female subordinates from the average score for male subordinates, with higher numbers indicating greater gender bias against women. Although difference scores have some drawbacks (Thomas & Zumbo, 2012), we used this approach because it accurately captures our focal construct, *gender bias* (e.g., evaluations of men as having more leadership capability than women).

Control variables. We adapted Dweck's (1999) three-item scale measuring fixed-growth mindsets about intelligence by changing intelligence to leadership ability. A sample item is, "People's leadership ability is something about them that they can't change very much," which was adapted from Dweck's (1999) item, "People's intelligence is something about them that they can't change very much;" see Appendix B for the full fixed-growth mindsets about leadership potential scale). The response scale ranged from 1 = *strongly agree* to 6 = *strongly disagree*. We computed participants' mean agreement across all items (α = .85). Higher scores indicated a stronger growth mindset, and the observed scale range was from 1 to 6.

For the universal-nonuniversal mindsets scale and the fixed-growth mindsets scale, we followed Brislin's (1980) procedure of translation and back-translation. Two graduate students proficient in English and Chinese independently translated the English items into Chinese, discussed their discrepancies, and finalized the Chinese version of the scale. A third graduate student and the first author translated the Chinese items back into English and finalized an improved Chinese version based on their discussion about discrepancies.

Results

Table 1 presents the means, standard deviations, bivariate correlations, and reliabilities for

the variables.

<Insert Table 1 about here>

We conducted regressions to test Hypothesis 1 (see Table 2).[1] Government officials who held a more universal mindset about leadership potential exhibited smaller gender bias when evaluating their subordinates' leadership capability (Model 2: $B = -.84$, $SE = .35$, 95% CI [-1.52, $-.15$], $t(126) = -2.41$, $p = .017$), controlling for officials' fixed-growth mindset and gender (0 = male, 1 = female).

To illustrate the nature of the gender bias, we ran a repeated-measures Analysis of Covariance (ANCOVA), which tests the difference between the repeated measures (i.e., ratings of male versus female subordinates' leadership capability) at lower (-1 SD) and higher ($+1$ SD) levels of the continuous predictor (i.e., universal-nonuniversal mindset), with the same control variables. The main effect of universal-nonuniversal mindsets was not significant, $F(1, 126) = 1.37$, $p = .244$, $\eta_p^2 = .01$, and neither was the main effect of subordinate gender, $F(1, 126) = 3.71$, $p = .056$, $\eta_p^2 = .03$. As expected, the interaction was significant, $F(1, 126) = 5.82$, $p = .017$, $\eta_p^2 = .04$. As graphed in Figure 1, officials who held a more nonuniversal mindset (-1 SD) evaluated their male subordinates as having significantly greater leadership capability ($M = 4.30$, $SE = .18$, 95% CI [3.94, 4.65]) than their female subordinates ($M = 2.88$, $SE = .22$, 95% CI [2.43, 3.32]; $F(1, 126) = 24.32$, $p < .001$, $\eta_p^2 = .16$, 95% CI for the difference score [.85, 1.99]), consistent with the classic pattern of gender bias against women in the leadership context. In contrast, officials who had a more universal mindset evaluated their male subordinates ($M = 3.55$, $SE = .18$, 95% CI [3.20, 3.91]) and female subordinates ($M = 3.14$, $SE = .22$, 95% CI [2.69, 3.58]) as having similar levels of leadership capability, $F(1, 126) = 2.08$, $p = .152$, $\eta_p^2 = $

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[1] Given the nested structure of the data, we also conducted multilevel analysis and found a marginally significant effect of universal-nonuniversal mindsets on gender bias in leadership capability evaluation (see Supplementary Materials, Section E).

.02, 95% CI for the difference score [–.16, .99], suggesting an absence of bias.

<Insert Table 2 and Figure 1 about here>

Discussion

Study 1 found that the more the governmental officials in important leadership positions believed that leadership potential is universal, the less they exhibited a classic gender bias when evaluating their subordinates' leadership capability. These findings offer initial support for Hypothesis 1 and are consistent with our conceptualization that the universal mindset about leadership potential is associated with reduced gender bias in evaluations of leadership capability. Study 1 also confirmed that universal-nonuniversal mindsets about leadership potential predicted gender bias above and beyond fixed-growth mindsets about leadership ability, which were unrelated to gender bias. Importantly, these government officials were in a position to recommend their subordinates for important openings or to promote their subordinates once they themselves moved on to higher positions. Thus, these government officials' mindsets about the universality of leadership potential can affect their subordinates' future career trajectories and therefore, the representation of women officials in local governments.

Study 2

Study 2 tested Hypotheses 1–3 in a Western culture. Specifically, we tested whether a more universal mindset about leadership potential would be associated with less gender bias in evaluations of candidates' competence and leadership capability, and consequently, in leader selection.

Method

Participants. We recruited 258 London residents for a lab study from the subject pool of a leading business school. After excluding four participants who failed to finish the study, our final sample consisted of 254 participants (age: $M = 30.78$ years, $SD = 12.42$; 143 women, 111 men; work tenure: $M = 5.55$ years, $SD = 9.26$; 184 with a bachelor's or higher degree; 46 with leader

experience; 51 self-identified as White British, 52 as having other White backgrounds, 30 as

Black, 67 as South Asian, 32 as East Asian, 4 as Middle Eastern, and 21 as having other or

mixed ethnic backgrounds).

Procedure and measures. Participants first completed measures of universal-nonuniversal

mindsets about leadership potential and fixed-growth mindsets about leadership ability. They

were then asked to imagine that they were a manager at a consulting firm and looking for a

team leader for a new project. We provided participants with web links to resumes of eight

candidates, presented in random order, who all had an MBA degree from a top business school

in Europe and had been hired by the firm as summer associates. After viewing each resume,

participants evaluated the candidate's competence and leadership capability, and indicated their

likelihood of selecting the candidate for the leadership role. At the end, they provided

demographic information.[2] We conducted pretests to ensure that the resumes were similar in

competence and leadership capability and that there was no ambiguity in the gender and race

of the names used in the resumes (see Supplementary Materials, Section A for details).

Universal-nonuniversal mindsets about leadership potential. We used the 8-item scale

that was used in Study 1 (α = .89; 1 = *strongly disagree* to 7 = *strongly agree*; the observed

scale range was 1 to 7). We reverse-scored the responses and took the mean of the scores

such that higher scores indicated a stronger universal mindset.

Gender bias in competence evaluations. Participants evaluated each candidate's

competence on six items adopted from Cuddy et al. (2008) and Fiske et al. (2002) (i.e.,

capable[3], efficient, competent, confident, intelligent, skillful; 1 = *not at all* to 5 = *extremely*). For

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[2] We also asked participants to rank order the eight candidates in terms of their suitability for the leader position. However, as rank measures are not normally distributed and cannot be analyzed using regressions and ANOVAs, we did not analyze this measure.

[3] *Competence* refers to employees' abilities to fulfil the general job requirements. *Leadership capability* refers to employees' capacity to fulfil the requirements for a leadership role. The competence scale that

each candidate, we first averaged participants' responses to all the scale items (.91 < α's < .93 for the eight candidates; the observed scale range was 1 to 5). We then calculated the mean competence score for the four female candidates (α = .77) and the four male candidates (α = .78). We calculated gender bias against women by subtracting the average score for female candidates from the average score for male candidates.

    Gender bias in leadership capability evaluations. Participants evaluated each candidate's leadership capability on three items (i.e., "How much does this applicant overall seem to have the capacity for a leadership role?" "How much does this applicant overall seem to have leadership potential?" and "How much does this applicant overall seem likely to become a good leader?"; 1 = *not at all* to 5 = *extremely*). For each candidate, we first averaged participants' responses to all the scale items (.90 < α's < 94 for the eight candidates; the observed scale range was 1 to 5). We then calculated the mean score for the four female candidates (α = .69) and the four male candidates (α = .66). We calculated gender bias against women by subtracting the average score for female candidates from the average score for male candidates.

    Gender bias in leader selection. Participants indicated their likelihood of selecting each candidate for the team leader position by moving a bar along a scale ranging from 0% to 100%. We calculated participants' mean likelihoods of selecting the four female candidates (α = .75; the observed range was 0% to 100%) and the four male candidates (α = .77; the observed range was 0% to 100%), and calculated gender bias against women by subtracting the average

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we used included the item "capable," which raises concerns about whether the two measures are distinct. To assess whether this is the case, for each of the eight candidates, we conducted confirmatory factor analyses (CFA) and found the two-factor model (with *competence* and *leadership capability* as distinct factors) fit the data better than the one-factor model (with *competence* and *leadership capability* as a single factor). Detailed CFA results can be found in the document "CFA Results" available at https://osf.io/tw42u/?view_only=c9646f049d2846b49a8e610f58256da6.

score for female candidates from the average score for male candidates.

Control variables. We measured participants' fixed-growth mindsets about leadership ability using the three-item scale we used in Study 1 (α = .86; 1 = *strongly disagree* to 7 = *strongly agree*; α = .78; the observed scale range was 1 to 7). We reverse-scored the responses and took the mean of the items such that higher scores indicated a stronger growth mindset.

Results

Table 3 presents the means, standard deviations, bivariate correlations, and reliabilities for the variables in this study.

<center><Insert Table 3 around here></center>

We first conducted regressions to test Hypotheses 1–3 (Table 4). As in Study 1, to illustrate the nature of the gender bias, we further conducted a repeated-measures ANCOVA, which allowed us to test the difference between the repeated outcome measures (i.e., ratings of male versus female candidates) at different levels of the continuous predictor covariate (i.e., universal-nonuniversal mindsets), while controlling for participants' fixed-growth mindset and gender (0 = male, 1 = female).

Gender bias in competence evaluations. A regression found a negative relationship between the universal mindset and gender bias in competence evaluations (Model 2: B = –.06, SE = .02, 95% CI [–.09, –.02], $t(250)$ = –3.24, p = .001). The follow-up ANCOVA did not find a significant main effect of universal-nonuniversal mindsets, $F(1, 250)$ = .40, p = .528, η_p^2 = .00, or candidate gender, $F(1, 250)$ = .85, p = .358, η_p^2 = .00, but the expected interaction was significant, $F(1, 250)$ = 10.52, p = .001, η_p^2 = .04. As illustrated in Figure 2A, participants with a more nonuniversal mindset (–1 SD) evaluated male candidates as more competent (M = 4.21, SE = .05, 95% CI [4.11, 4.30]) than female candidates (M = 4.11, SE = .05, 95% CI [4.02, 4.21]; $F(1, 250)$ = 10.96, p = .001, η_p^2 = .04, 95% CI for the difference score [.04, .15]), suggesting

gender bias. In contrast, participants with a more universal mindset (+1 *SD*) did not rate male (*M* = 4.18, *SE* = .05, 95% CI [4.09, 4.28]) and female candidates differently (*M* = 4.23, *SE* = .05, 95% CI [4.13, 4.32]; *F*(1, 250) = 2.30, *p* = .131, η_p^2 = .01, 95% CI for the difference score [–.10, .01]), suggesting absence of gender bias. Hence, Hypothesis 1 was supported with reference to competence evaluations.

Gender bias in leadership capability evaluations. A regression found a negative relationship between the universal mindset and gender bias in leadership capability evaluations (Model 4: *B* = –.08, *SE* = .03, 95% CI [–.14, –.03], *t*(250) = –3.09, *p* = .002). The follow-up ANCOVA did not find significant main effects of either universal-nonuniversal mindsets, *F*(1, 250) = .93, *p* = .337, η_p^2 = .00, or candidate gender, *F*(1, 250) = 2.78, *p* = .097, η_p^2 = .01. As expected, the interaction was significant, *F*(1, 250) = 9.56, *p* = .002, η_p^2 = .04. As illustrated in Figure 2B, participants with a more nonuniversal mindset (–1 *SD*) evaluated male candidates as having more leadership capability (*M* = 4.01, *SE* = .05, 95% CI [3.91, 4.11]) than female candidates (*M* = 3.84, *SE* = .06, 95% CI [3.73, 3.95]; *F*(1, 250) = 15.26, *p* < .001, η_p^2 = .06, 95% CI for the difference score [.08, .25]), suggesting gender bias. In contrast, participants with a more universal mindset (+1 *SD*) did not rate male candidates (*M* = 3.98, *SE* = .05, 95% CI [3.88, 4.09]) and female candidates differently (*M* = 4.01, *SE* = .06, 95% CI [3.90, 4.12]; *F*(1, 250) = .48, *p* = .488, η_p^2 = .00, 95% CI for the difference score [–.12, .06]), suggesting absence of gender bias. Hence, Hypothesis 1 was supported with reference to leadership capability evaluations.

Gender bias in leader selection. A regression found a negative relationship between the universal mindset and gender bias in leader selection (Model 6: *B* = –2.23, *SE* = .67, 95% CI [–3.55, –.91], *t*(250) = –3.33, *p* = .001). The follow-up ANCOVA did not find a significant main effect of universal-nonuniversal mindsets, *F*(1, 250) = .51, *p* = .476, η_p^2 = .00, but found a significant main effect of candidate gender, *F*(1, 250) = 4.02, *p* = .046, η_p^2 = .02. As expected, the interaction was significant, *F*(1, 250) = 11.12, *p* = .001, η_p^2 = .04. As illustrated in Figure 2C, participants with a more nonuniversal mindset (–1 *SD*) were more likely to select male

candidates (M = 74.01%, SE = 1.42, 95% CI [71.22, 76.80]) than female candidates (M = 70.68%, SE = 1.37, 95% CI [67.99, 73.37]; F(1, 250) = 9.95, p = .002, η_p^2 = .04, 95% CI for the difference score [1.25, 5.42]), suggesting gender bias. In contrast, those with a more universal mindset (+1 SD) were equally likely to select male (M = 72.75%, SE = 1.42, 95% CI [69.97, 75.54]) and female candidates (M = 74.66%, SE = 1.37, 95% CI [71.97, 77.35]; F(1, 250) = 3.26, p = .072, η_p^2 = .01, 95% CI for the difference score [–3.99, .17]), suggesting absence of gender bias. Hence, Hypothesis 2 was supported.

<center><Insert Table 4 and Figure 2 about here></center>

Indirect effects. We employed the bootstrapping approach suggested by Preacher and Hayes (2008) and used Model 4 of the PROCESS macro in SPSS (with 10,000 iterations). As shown in Table 5, the indirect effect of universal-nonuniversal mindsets on gender bias in leader selection was supported (i.e., the 95% confidence intervals do not cross zero) via both gender bias in competence evaluations and gender bias in leadership capability evaluations. Hence, Hypothesis 3 was supported.

<center><Insert Table 5 about here></center>

Discussion

Study 2 established that universal-nonuniversal mindsets were associated with reduced gender bias in leader selection through reduced gender bias in evaluations of candidates' competence and leadership capability. Decision makers with a more nonuniversal mindset rated male candidates as more competent and having greater leadership capability than similarly qualified female candidates, and thus were more likely to select men over women for the leadership role. However, decision makers with a more universal mindset showed no gender bias in their evaluations of male and female candidates' competence and leadership capability, and thus did not discriminate against women when making hiring decisions.

<center>**Study 3**</center>

Study 3, an experiment, sought to establish the causal effect of universal-nonuniversal

mindsets about leadership potential on gender bias. We expected that compared to participants in the nonuniversal mindset condition, those in the universal mindset condition would exhibit less gender bias in competence evaluations (Hypothesis 1), and consequently, in leader selection (Hypotheses 2 and 3).

Method

Participants. We recruited 160 students from a business school in Singapore for a lab study. After excluding one participant who failed the attention check, our sample had 159 participants (age: $M = 20.38$ years, $SD = 1.57$; 84 women, 71 men, 4 not reported; 149 self-identified as Chinese, 4 as Indian, 2 as Malay, 2 as having other ethnic backgrounds, and 2 not reported).

Design and procedure. We used a 2 (mindset; between-participant) × 2 (candidate gender; within-participant) mixed design. Participants were randomly assigned to either the nonuniversal mindset condition ($N = 78$) or the universal mindset condition ($N = 81$). First, they read the mock scientific article that we developed to manipulate the mindset (see Appendix C). They were then asked to imagine being a manager at an investment bank. They were asked to open a folder on their table and to review printed resumes of eight candidates for a team leader position. All candidates had an MBA degree from a business school in Singapore. Four had female names and four had male names. Participants were asked to evaluate each candidate's competence and then select four candidates for the next round of review for the leader position.[4] Finally, participants provided demographic information. We conducted pretests to ensure the effectiveness of the manipulation, similarity of the resumes in competence when nameless, and no ambiguity in the gender and race of the names used in the resumes (see Supplementary

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[4] We also asked participants to rank order the eight candidates in terms of their suitability for the leader position. However, as rank measures are not normally distributed and cannot be analyzed using regressions and ANOVAs, we did not analyze this measure.

Materials, Section B). These pretests allowed us to test whether people exhibited gender bias when gendered names were applied to the resumes.

 __Manipulation of universal-nonuniversal mindsets__. Participants first read an article claiming that leadership potential is either universal or nonuniversal. We asked them to briefly summarize the article in two or three sentences. To identify those who did not read the article carefully, we asked participants to choose the title of the article they just read from a list of three titles, including the titles of both articles and a new title.

 __Gender bias in competence evaluations.__ After they viewed each resume, participants were asked to evaluate the competence of the candidate on a three-item scale (1 = *extremely incompetent* to 7 = *extremely competent*; 1 = *extremely inexperienced* to 7 = *extremely experienced*; 1 = *extremely unintelligent* to 7 = *extremely intelligent*). We first averaged participants' ratings for the three items for each candidate (.71 < α's < .80 for the eight candidates; the observed range was 1.67 to 7), and then calculated the mean competence scores for the four female candidates (α = .78) and the four male candidates (α = .76). We calculated gender bias against women in competence evaluation by subtracting the average score for female candidates from the average score for male candidates.

 __Gender bias in leader selection__. We provided participants with a list of the eight names in a random order and asked them to select four candidates to interview. The number of male candidates selected served as an indicator of gender bias against women in leader selection.

Results

 Table 6 presents the means, standard deviations, bivariate correlations, and reliabilities for the variables in this study.

<div align="center"><Insert Table 6 about here></div>

 Gender bias in competence evaluations. An independent samples *t*-test found that participants in the nonuniversal condition (*M* = .12, *SD* = .43, 95% CI [.03, .22]) showed

significantly greater gender bias than participants in the universal condition ($M = -.03$, $SD = .42$, 95% CI [$-.12$, $.06$]; $t(157) = 2.25$, $p = .026$, $d = .357$, 95% CI for the difference score [$.02$, $.28$]).

To uncover the nature of the bias, we conducted a 2 (mindset; between-participant) × 2 (candidate gender; within-participant) repeated-measures ANOVA. Neither the main effect of condition, $F(1, 157) = .88$, $p = .350$, $\eta_p^2 = .01$, nor the main effect of candidate gender $F(1, 157) = 1.86$, $p = .174$, $\eta_p^2 = .01$, was significant. As predicted, the interaction was significant, $F(1, 157) = 5.07$, $p = .026$, $\eta_p^2 = .03$. Planned contrasts (see Figure 3) indicated that participants in the nonuniversal mindset condition evaluated male candidates ($M = 6.05$, $SE = .06$, 95% CI [5.93, 6.16]) as significantly more competent than female candidates ($M = 5.92$, $SE = .06$, 95% CI [5.81, 6.04]; $F(1, 157) = 6.42$, $p = .012$, $\eta_p^2 = .04$, 95% CI for the difference score [$.03$, $.22$]), in line with traditional gender bias against women. In contrast, those in the universal mindset condition evaluated male candidates ($M = 5.90$, $SE = .06$, 95% CI [5.79, 6.01]) and female candidates ($M = 5.93$, $SE = .06$, 95% CI [5.81, 6.04]) as similarly competent, $F(1, 157) = .40$, $p = .528$, $\eta_p^2 = .00$, 95% CI for the difference score [$-.12$, $.06$], suggesting absence of gender bias. Hence, Hypothesis 1 was supported in terms of competence evaluations.

<Insert Figure 3 about here>

Gender bias in leader selection. An independent samples t-test[5] found no difference

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[5] We used independent-samples t-tests for two reasons. First, the count data did not follow the Poisson distribution. The mean/variance ratio was 3.01, which is greater than 1, and Pearson Chi-Square value/df = .33, which is smaller than 1, indicating that the assumption of equidispersion was violated. Second, the count variable took values from 0 (indicating that no man was selected) to 4 (indicating that four men were selected). Thus, we treated the variable as being measured along a five-point scale, which has equal intervals with each unit change having the same effect. We next conducted tests of normality and found that the Kolmogorov-Smirnov and Shapiro-Wilk statistics were .25 ($p < .001$) and .88 ($p < .001$), respectively, which rejected the null hypothesis of a normal distribution. Although violations of normality are not ideal, statisticians have argued that in many cases, they are not particularly problematic. For example, Schmidt and Finan (2018, p. 146) stated, "in large sample sizes (e.g., where the number of observations per variable is >10) violations of this normality assumption often do not noticeably impact results," and based on simulations, Knief and Forstmeier (2021, p. 1) concluded, "We find that Gaussian models are robust to non-normality over a wide range of conditions, meaning that p values remain fairly reliable except for data with influential outliers judged at strict alpha levels."

between the nonuniversal condition (*M* = 2.13, *SD* = .87, 95% CI [1.94, 2.32]) and the universal condition (*M* = 2.07, *SD* = .80, 95% CI [1.89, 2.26]; *t*(157) = .41, *p* = .684, *d* = .072, 95% CI for the difference score [–.21, .32]) in the number of male candidates selected. Hence, Hypothesis 2 was not supported.

Indirect effects. Although the main effect of condition was not significant on gender bias in leader selection, we proceeded with testing a potential indirect effect using the bootstrapping approach suggested by Preacher and Hayes (2008). This analysis allows us to test the indirect effect of the independent variable on the dependent variable via a mediator even in the absence of a direct effect. We used Model 4 in the PROCESS macro in SPSS (10,000 iterations). The indirect effect was supported (*estimate* = –.14, *SE* = .06, 95% CI [–.25, –.02]), suggesting that participants in the universal mindset condition showed less gender bias in competence evaluation than those in the nonuniversal mindset condition, which was associated with less gender bias in leader selection. Hence, Hypothesis 3 was supported.

Discussion

Study 3 provided causal evidence for our hypotheses. Participants randomly assigned to read an article claiming that only some people have leadership potential (i.e., the nonuniversal mindset) exhibited greater gender bias by rating men as significantly more competent than women, even though the resumes of men and women were rated as equivalent on competence when nameless. This difference was associated with a greater likelihood of selecting men for a leadership position. However, this gender bias was eliminated among participants exposed to the idea that nearly everyone has high leadership potential (i.e., the universal mindset). This finding supports our theorizing that the universal mindset about leadership potential is inconsistent with gender stereotypes (i.e., the stereotype that women are less competent than men, especially when leadership is concerned) and can thus reduce gender bias.

Study 4

Study 4 sought to provide further evidence for the causal role of universal-nonuniversal

mindsets in a pre-registered experiment. We also included a control condition to test whether the degree of gender bias would be reduced in the universal mindset condition or increased in the nonuniversal mindset condition compared to the control condition. It also included another theoretically relevant mediator, agency, which is an important leadership trait that forms a key component of gender stereotypes. Moreover, we counterbalanced whether a given resume was associated with a male or female name. As this experiment was conducted in China, unlike Study 3, which was conducted in Singapore, we piloted the manipulation articles, the resumes, and the candidate names in Chinese in two separate samples (see Supplementary Materials, Section C).

Method

Participants. In the previous experiment (Study 3), we found an effect size of Cohen's d = 0.357 for the gender gap in perceived competence across the universal vs. nonuniversal mindset conditions. A power analysis based on this effect size and α = .05 (one-tailed), power = 80% indicated that we needed 98 participants per condition, meaning 294 in total as we had three conditions. We posted a survey seeking 300 working adults via Credamo, an online questionnaire design and participant recruitment platform in China (Gong et al., 2020; Xu et al., 2022). The platform often oversamples participants to ensure that we receive sufficient valid participants. We received responses from 383 participants. Of these, 57 failed the attention checks we embedded in the middle and the end of the study and thus we did not access their data. Our final sample consisted of 326 participants (age: M = 34.07 years, SD = 8.69; 147 women, 179 men; work tenure: M = 10.30 years, SD = 8.77; current job tenure: M = 6.06 years, SD = 5.52; 280 with a bachelor's or higher degree; 272 with leadership experience).

Design and procedure. We used a 3 (mindset; between-participant) × 2 (candidate gender; within-participant) × 2 (resume names in counterbalanced order; between-participant) mixed design. Participants were randomly assigned to the nonuniversal mindset (N = 107), the universal mindset (N = 109), or the control condition (N = 110). Participants in the two

experimental conditions read the relevant articles. Participants in the control condition did not read anything. They were then asked to imagine being the department head at an investment bank and to review the resumes of eight candidates (presented in a random order) for a project leader position. They rated each candidate on competence, agency, leadership capability, and likelihood of selection.

Manipulation of universal-nonuniversal mindsets. We used the articles that we had pretested. We asked two questions to identify participants who did not read the article carefully. One question asked participants whether the article described the universality, non-universality, or a third irrelevant option of leadership potential. The other question asked participants whether the article described the fixedness, malleability, or a third irrelevant option about leadership ability. Then, participants were asked to briefly summarize the article in two or three complete sentences.

Measures. Participants rated four measures along a 7-point scale (1 = *not at all* to 7 = *very much*). We measured competence with the three-item scale (.73 < α's < .80 for the eight candidates; the observed scale range was 2 to 7) used in Study 3. We measured agency with five items (aggressive, assertive, dominant, forceful, and strong personality; .86 < α's < .88 for the eight candidates; the observed scale range was 1.4 to 7) adapted from the scale by Conway et al. (1996). We measured leadership capability with the three-item scale (.89 < α's < .92 for the eight candidates; the observed scale range was 1 to 7) and likelihood of selection (in percentage; the observed scale range was 2% to 100%) as in Study 2. We followed the translation and back-translation procedures described in Study 1.

We calculated mean scores for the four female candidates and the four male candidates separately on competence evaluation (α_{female} = .78, α_{male} = .80), agency (α_{female} = .84, α_{male} = .84), leadership capability (α_{female} = .73, α_{male} = .77), and selection likelihood (α_{female} = .82, α_{male} = .84). We then calculated the difference score for each of the four measures by subtracting the

average score for female candidates from the average score for male candidates, which yielded an indicator of gender bias against women on each measure.

Results

Table 7 presents the means, standard deviations, bivariate correlations, and reliabilities for the variables in this study.[6]

<Insert Table 7 around here>

To test the hypotheses, we conducted one-way ANOVAs to examine the effect of condition on gender biases in evaluations of competence, agency, and leadership capability, and in leader selection. To further understand the nature of the bias, we conducted 3 (condition; between-participant) × 2 (candidate gender; within-participant) repeated-measures ANOVAs with simple effect tests using LMATRIX and MMATRIX to examine the differences in the ratings of male and female candidates.[7]

Gender bias in competence evaluations. The effect of condition was significant, $F(2, 323)$ = 15.16, $p < .001$, $\eta_p^2 = .09$. Gender bias was significantly greater in the nonuniversal condition ($M = .13$, $SE = .04$, 95% CI [.04, .22]) than in the control condition ($M = -.04$, $SE = .04$, 95% CI [−.13, .04]; $F(1, 323) = 7.68$, $p = .006$, $d = .381$, $\eta_p^2 = .02$, 95% CI for the difference score [.05, .30]) and the universal condition ($M = -.22$, $SE = .04$, 95% CI [−.30, −.13]; $F(1, 323) =$ 30.31, $p < .001$, $d = .753$, $\eta_p^2 = .09$, 95% CI for the difference score [.22, .47]). Gender bias was

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[6] Given the high correlations between our measures of agency and competence ($r = .82$ for male) and between competence and leadership capability ($r = .80$ for male), we conducted CFAs to test the distinctiveness of these measures. We found that for each of the eight candidates, a three-factor model (which treats competence, agency, and leadership capability as separate constructs) fit the data better than a two-factor model (which combines competence and agency), another two-factor model (which combines competence and leadership capability), and a one factor model (which combines all three constructs). Detailed results of CFA can be found in the document "CFA Results" available at https://osf.io/tw42u/?view_only=c9646f049d2846b49a8e610f58256da6

[7] When counterbalance order was included in the analysis, it did not show any main effect or interaction effect with other variables on any of the four dependent measures, as expected. It was thus dropped from the analysis.

significantly weaker in the universal condition than in the control condition, $F(1, 323) = 7.62$, p = .006, d = .367, η_p^2 = .02, 95% CI for the difference score [.05, .29]. As illustrated in Figure 4A, participants in the control condition evaluated male (M = 5.56, SE = .06, 95% CI [5.44, 5.68]) and female candidates (M = 5.60, SE = .06, 95% CI [5.49, 5.72]) as similarly competent, $F(1, 323) = 1.01$, p = .315, η_p^2 = .00, 95% CI for the difference score [–.13, .04]. Participants in the nonuniversal condition evaluated male candidates (M = 5.65, SE = .06, 95% CI [5.52, 5.77]) as more competent than female candidates (M = 5.52, SE = .06, 95% CI [5.40, 5.64]; $F(1, 323) = 8.42$, p = .004, η_p^2 = .03, 95% CI for the difference score [.04, .22]), suggesting gender bias. In contrast, participants in the universal condition evaluated female candidates (M = 5.73, SE = .06, 95% CI [5.62, 5.85]) as more competent than male candidates (M = 5.52, SE = .06, 95% CI [5.40, 5.64]; $F(1, 323) = 23.96$, p < .001, η_p^2 = .07, 95% CI for the difference score [.13, .30]), unexpectedly. Hence, Hypothesis 1 was supported in terms of competence evaluations.

Gender bias in agency evaluations. The effect of condition was significant, $F(2, 323) = 9.80$, p < .001, η_p^2 = .06. Gender bias was significantly greater in the nonuniversal condition (M = .08, SE = .04, 95% CI [.00, .17]) than in the universal condition (M = –.18, SE = .04, 95% CI [–.27, –.10]; $F(1, 323) = 19.48$, p < .001, d = .596, η_p^2 = .06, 95% CI for the difference score [.15, .38]), but did not differ from the control condition (M = –.03, SE = .04, 95% CI [–.12, .05]; $F(1, 323) = 3.74$, p = .054, d = .270, η_p^2 = .01, 95% CI for the difference score [–.00, .23]). Gender bias was significantly weaker in the universal condition than in the control condition, $F(1, 323) = 6.26$, p = .013, d = .333, η_p^2 = .02, 95% CI for the difference score [.03, .27]. As illustrated in Figure 4B, participants in the control condition evaluated male (M = 5.35, SE = .07, 95% CI [5.22, 5.48]) and female candidates (M = 5.38, SE = .07, 95% CI [5.25, 5.52]) as similarly agentic, $F(1, 323) = .59$, p = .444, η_p^2 = .00, 95% CI for the difference score [–.12, .05]. Participants in the nonuniversal condition evaluated male candidates (M = 5.41, SE = .07, 95% CI [5.28, 5.55]) as more agentic than female candidates (M = 5.33, SE = .08, 95% CI [5.20, 5.47]; $F(1, 323) = 3.84$, p = .051, η_p^2 = .01, 95% CI for the difference score [–.00, .17]). Although

the p-value is just above the .05 criterion and the lower bound of the 95% CI of the difference

score is at zero, the weight of the evidence from the 95% CI suggests the presence of gender

bias (Cumming, 2014). In contrast, those in the universal condition evaluated female candidates

(M = 5.44, SE = .07, 95% CI [5.31, 5.57]) as more agentic than male candidates (M = 5.26, SE

= .07, 95% CI [5.13, 5.39]; F(1, 323) = 18.44, p < .001, η_p^2 = .05, 95% CI for the difference score

[.10, .27]), unexpectedly. Nevertheless, Hypothesis 1 was generally supported in terms of

agency evaluations.

Gender bias in leadership capability evaluations. The effect of condition was significant,

F(2, 323) = 11.02, p < .001, η_p^2 = .06. Gender bias was significantly greater in the nonuniversal

condition (M = .15, SE = .06, 95% CI [.03, .27]) than in the control condition (M = −.05, SE = .06,

95% CI [−.17, .07]; F(1, 323) = 5.29, p = .022, d = .315, η_p^2 = .02, 95% CI for the difference

score [.03, .37]) and the universal condition (M = −.26, SE = .06, 95% CI [−.38, −.14]; F(1, 323)

= 22.03, p < .001, d = .637, η_p^2 = .06, 95% CI for the difference score [.23, .57]). Gender bias

was significantly weaker in the universal condition than in the control condition, F(1, 323) = 5.84,

p = .016, d = .325, η_p^2 = .02, 95% CI for the difference score [.04, .37]. As illustrated in Figure

4C, participants in the control condition perceived male (M = 5.15, SE = .08, 95% CI [5.00, 5.30])

and female candidates (M = 5.20, SE = .08, 95% CI [5.05, 5.36]) to have similar leadership

capability, F(1, 323) = .73, p = .393, η_p^2 = .00, 95% CI for the difference score [−.17, .07].

Participants in the nonuniversal condition evaluated male candidates (M = 5.27, SE = .08, 95%

CI [5.11, 5.42]) as having more leadership capability than female candidates (M = 5.12, SE

= .08, 95% CI [4.97, 5.28]; F(1, 323) = 5.69, p = .018, η_p^2 = .02, 95% CI for the difference score

[.03, .27]), suggesting gender bias. In contrast, participants in the universal condition evaluated

female candidates (M = 5.41, SE = .08, 95% CI [5.26, 5.57]) as having more leadership

capability than male candidates (M = 5.16, SE = .08, 95% CI [5.00, 5.31]; F(1, 323) = 18.15, p

< .001, η_p^2 = .05, 95% CI for the difference score [.14, .38]), unexpectedly. Nevertheless,

Hypothesis 1 was supported in terms of leader capability evaluations.

Gender bias in leader selection. The effect of condition was significant, $F(2, 323) = 7.77$, p = .001, η_p^2 = .05. Gender bias was significantly greater in the nonuniversal condition (M = 1.91, SE = .96, 95% CI [.02, 3.81]) than in the universal condition (M = –3.44, SE = .96, 95% CI [–5.31, –1.56]; $F(1, 323) = 15.54$, $p < .001$, d = .548, η_p^2 = .05, 95% CI for the difference score [2.68, 8.02]), but did not differ from the control condition (M = –.71, SE = .95, 95% CI [–2.57, 1.17]; $F(1, 323) = 3.74$, p = .054, d = .265, η_p^2 = .01, 95% CI for the difference score [–.05, 5.28]). Gender bias was significantly weaker in the universal condition than in the control condition, $F(1, 323) = 4.11$, p = .043, d = .266, η_p^2 = .01, 95% CI for the difference score [.08, 5.38]. As illustrated in Figure 4D, participants in the control condition were equally likely to select male (M = 65.46%, SE = 1.47, 95% CI [62.56, 68.36]) and female candidates (M = 66.17%, SE = 1.51, 95% CI [63.20, 69.13]; $F(1, 323) = .55$, p = .459, η_p^2 = .00, 95% CI for the difference score [–2.57, 1.17]). Participants in the nonuniversal condition were more likely to select male candidates (M = 68.18%, SE = 1.50, 95% CI [65.24, 71.12]) than female candidates (M = 66.27%, SE = 1.53, 95% CI [63.27, 69.27]; $F(1, 323) = 3.93$, p = .048, η_p^2 = .01, 95% CI for the difference score [.02, 3.81]), suggesting gender bias against women. In contrast, participants in the universal condition were more likely to select female candidates (M = 70.29%, SE = 1.51, 95% CI [67.31, 73.27]) than male candidates (M = 66.85%, SE = 1.48, 95% CI [63.94, 69.77]; $F(1, 323) = 12.95$, $p < .001$, η_p^2 = .04, 95% CI for the difference score [1.56, 5.31]), unexpectedly. Nevertheless, Hypothesis 2 was supported.

<Insert Figure 4 and Table 8 about here>

Indirect effects. To test Hypothesis 3, we used Preacher and Hayes's (2008) PROCESS macro in SPSS, which tests the indirect effect of a multi-categorical independent variable via multiple mediators simultaneously and estimates the relative indirect effects for pairwise categories of the independent variable (Hayes & Preacher, 2014). We used Model 4 (with 10,000 iterations) by specifying condition as the independent variable, gender bias in leader selection as the dependent variable, and gender biases in evaluations of competence, agency,

and leadership capability as parallel mediators. As shown in Table 8, the indirect effects of condition on gender bias in leader selection via all the three mediators were supported (i.e., the 95% confidence intervals did not cross zero) for the control vs. universal conditions and for the nonuniversal vs. universal conditions. The indirect effects via evaluations of competence and leadership capability but not agency were supported for the control vs. nonuniversal conditions.

Discussion

Study 4 provides additional causal evidence that universal-nonuniversal mindsets reduce gender bias in leader evaluations and leader selection. In the control condition, in which people's mindsets about leadership potential were naturally varying, participants generally rated women and men similarly. When led to adopt the nonuniversal mindset, participants evaluated men as relatively more competent, more agentic, and having more leadership capability than women, and consequently, were more willing to select men for the leader role. In contrast, when led to adopt the universal mindset, participants did not exhibit the traditional gender bias but instead evaluated women more favorably than men and were more willing to select women for the leader role. It is possible that this gender bias in favor of women arose because participants who were informed about the universality of leadership potential over-corrected the societal stereotype associating men rather than women with leadership and thus treated women more favorably than men. However, we are hesitant to over-interpret these findings as the bias in favor of women was not observed in Study 3.

Study 5

As noted, our theorizing about the relationship between universal-nonuniversal mindsets and gender bias assumes that people across the mindset continuum possess knowledge of gender stereotypes. However, people vary in the strength of the stereotypes they hold—some hold a strong association between managers and men, while others, a weak association. Our final study assessed whether stereotype strength moderates the effect of the universal-nonuniversal mindsets. Specifically, we tested whether the effect of universal-nonuniversal

mindsets on gender bias is more pronounced when decision makers have stronger stereotypes.

Method

Participants. We recruited 202 students from a business school in Singapore to participate in a lab study (M = 21.47 years, SD = 1.79; 93 women, 109 men; 160 self-identified as Chinese, 20 as Indian, 6 as Malay, 5 as having other ethnic backgrounds, and 11 not reported).

Procedure and measures. Participants first completed measures of universal-nonuniversal mindsets about leadership potential and fixed-growth mindsets about leadership ability. Next, they answered questions for other researchers' studies, which were unrelated to our research. These lasted for about 20 minutes and introduced a gap between the predictors and the outcome variables. Then, we asked participants to imagine that they were a manager at an investment bank. We asked them to review eight resumes (four men, four women) for a team leader position from printed documents in a folder on their table. The gender of the names assigned to the resumes was counterbalanced across participants. We used the same pretested resumes used in Study 3. Participants evaluated each candidate's competency, agency, and leadership capability, and indicated their likelihood of selecting the candidate. Thereafter, we measured the strength of their gender stereotypes about leadership. All measures were rated on a 7-point scale.

Universal-nonuniversal mindsets about leadership potential. We measured universal-nonuniversal mindsets (α = .86; the observed scale range was 1 to 5.88) using the scale from Study 2. Higher mean scores indicated a stronger universal mindset.

Leadership evaluations and leader selection. We used the scales from Study 4 to measure competence (3 items, .77 < α's < .85 for the eight candidates; the observed scale range was 1 to 5.88), agency (5 items, .91 < α's < .93 for the eight candidates; the observed scale range was 1 to 7), leadership capability (3 items, .95 < α's < .97 for the eight candidates; the observed scale range was 1 to 7), and likelihood of selection (in percentage; the observed

range was 0% to 100%). We then calculated the mean scores for the four female candidates and the four male candidates separately on competence (α_{female} = .77, α_{male} = .76), agency (α_{female} = .83, α_{male} = .79), leadership capability (α_{female} = .72, α_{male} = .67), and selection (α_{female} = .73, α_{male} = .68). We also calculated the indicators of gender bias in each of the four measures by subtracting the female score from the male score.

Strength of gender stereotypes about leadership (moderator). We used a field-standard measure of explicit gender stereotypes (Stout et al., 2011), which we adapted to refer to leaders. The scale included three questions: "When I think of people who are very good at leadership, I am ...." (1 = *extremely more likely to think of men than women*, 4 = *equally likely to think of men and women*, 7 = *extremely more likely to think of women than men*); "When it comes to leadership, I believe that on average …" (1 = *men are extremely better than women*, 4 = *men and women are equally good*, 7 = *women are extremely better than men*); and "When I think of people who are leaders, I am …" (1 = *extremely more likely to imagine men than women*, 4 = *equally likely to imagine men and women*, 7 = *extremely more likely to imagine women than men*). We reverse-coded the mean scores such that higher scores indicated a stronger association between men and leadership, and averaged the items (α = .85; the observed scale range was 3 to 7).

Control variables. We measured fixed-growth mindsets with the scale used in Study 2 (α = .93; the observed scale range was 1 to 7). Higher mean scores indicated a stronger growth mindset.

Results

Table 9 presents the means, standard deviations, bivariate correlations, and reliabilities for

the variables in this study. [8]

<center><Insert Table 9 around here></center>

We conducted regressions to test the hypotheses (Table 10). As in Studies 1 and 2, to illustrate the nature of gender bias, we further conducted a repeated-measures ANCOVA, which allowed us to test the difference between the repeated measures (i.e., ratings of male versus female candidates) at different levels of the continuous predictor (i.e., universal-nonuniversal mindsets), controlling for the effects of fixed-growth mindsets and participant gender (0 = male, 1 = female).

Gender bias in competence evaluations. A regression analysis found that a more universal mindset was associated with less gender bias in competence evaluations (Model 2: B = $-.08$, SE = .03, 95% CI [$-.15$, $-.02$], $t(198)$ = -2.63, p = .009). The follow-up ANCOVA indicated that the main effect of universal-nonuniversal mindset was nonsignificant, $F(1, 198)$ = 1.86, p = .175, η_p^2 = .01, but the main effect of candidate gender was significant, $F(1, 198)$ = 4.71, p = .031, η_p^2 = .02. As predicted, the interaction was also significant, $F(1, 198)$ = 6.92, p = .009, η_p^2 = .03. As illustrated in Figure 5A, participants with a more nonuniversal mindset (-1 SD) evaluated male candidates as being more competent (M = 6.04, SE = .06, 95% CI [5.92, 6.16]) than female candidates (M = 5.91, SE = .06, 95% CI [5.79, 6.03]; $F(1, 198)$ = 8.99, p = .003, η_p^2 = .04, 95% CI for the difference score [.05, .22]), suggesting gender bias. In contrast, participants with a more universal mindset (+1 SD) did not rate male (M = 5.84, SE = .06, 95%

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[8] Although the correlations among our measures of agency, competence, and leadership capability were not high, we followed the practice in Studies 3 and 4 and conducted CFAs to test the distinctiveness of these measures. We found that for each of the eight candidates, a three-factor model (which treats competence, agency, and leadership capability as separate constructs) fit the data better than a two-factor model (which combines competence and agency), another two-factor model (which combines competence and leadership capability), and a one factor model (which combines all three constructs). Detailed results of CFA can be found in the document "CFA Results" available at https://osf.io/tw42u/?view_only=c9646f049d2846b49a8e610f58256da6

CI [5.72, 5.96]) and female candidates differently (*M* = 5.88, *SE* = .06, 95% CI [5.76, 6.00]; *F*(1,

198) = .90, *p* = .344, η_p^2 = .01, 95% CI for the difference score [–.13, .05]), suggesting absence

of gender bias. Hence, Hypothesis 1 was supported in terms of competence evaluation.

Gender bias in agency evaluations. A regression analysis found that a more universal

mindset was associated with less gender bias in leader capability evaluation (Model 5: *B* = –.11,

SE = .05, 95% CI [–.21, –.01], *t*(198) = –2.09, *p* = .038). The ANCOVA indicated that the main

effect of universal-nonuniversal mindsets was significant, *F*(1, 198) = 7.94, *p* = .005, η_p^2 = .04,

but the main effect of candidate gender was nonsignificant, *F*(1, 198) = 2.59, *p* = .109, η_p^2 = .01.

As predicted, the interaction was significant, *F*(1, 198) = 4.37, *p* = .038, η_p^2 = .02. As illustrated

in Figure 5B, participants with a more nonuniversal mindset (–1 *SD*) evaluated male candidates

as being more agentic (*M* = 4.38, *SE* = .11, 95% CI [4.18, 4.59]) than female candidates (*M* =

4.07, *SE* = .10, 95% CI [3.87, 4.27]; *F*(1, 198) = 18.33, *p* < .001, η_p^2 = .09, 95% CI for the

difference score [.17, .45]), suggesting gender bias. In contrast, participants with a more

universal mindset (+1 *SD*) did not rate male (*M* = 3.86, *SE* = .11, 95% CI [3.65, 4.06]) and

female candidates differently (*M* = 3.78, *SE* = .10, 95% CI [3.57, 3.98]; *F*(1, 198) = 1.31, *p*

= .254, η_p^2 = .01, 95% CI for the difference score [–.06, .23]). Hence, Hypothesis 1 was

supported in terms of agency evaluation.

Gender bias in leadership capability evaluations. A regression analysis found no

relationship between universal-nonuniversal mindsets and gender bias in leader capability

evaluations (Model 8: *B* = –.05, *SE* = .06, 95% CI [–.17, .06], *t*(198) = –.92, *p* = .360). Hence,

Hypothesis 1 was not supported in terms of leadership capability evaluations.

Gender bias in leader selection. A regression analysis found no relationship between

universal-nonuniversal mindsets and gender bias in leader selection (Model 11: *B* = –.73, *SE*

= .78, 95% CI [–2.27, .82], *t*(198) = –.93, *p* = .355). Hence, Hypothesis 2 was not supported.

<Insert Table 10, Table 11, and Figure 5 about here>

Indirect effects. Although the effect of universal-nonuniversal mindsets on gender bias in

leader selection was not significant, we tested Hypothesis 3 using Model 4 of the PROCESS

macro in SPSS (with 10,000 iterations), which allows an evaluation of indirect effects of multiple

mediators simultaneously (Preacher & Hayes, 2008) even in the absence of a direct effect. As

shown in Table 11, the indirect effect of universal-nonuniversal mindsets on gender bias in

leader selection via gender bias in competence evaluations was supported (i.e., CI did not cross

zero), whereas the indirect effect via gender bias in agency evaluations or via leadership

capability evaluations was not supported (i.e., CIs crossed zero). Hence, Hypothesis 3 was

supported by gender bias in competence evaluations as the mediator.

Moderating effect of gender stereotypes about leadership. Hypothesis 4 proposed that

the effect of universal-nonuniversal mindsets on gender bias would be more pronounced when

people hold stronger gender stereotypes about leadership. To test this hypothesis, we added

the main effect of leader stereotypes and its interaction with universal-nonuniversal mindsets to

the above-mentioned regressions. The interaction effect was significant for gender bias in

competence evaluations (Model 3: $B = -.11$, $SE = .04$, 95% CI [$-.19$, $-.03$], $t(196) = -2.63$, p

$= .009$), agency evaluations (Model 6: $B = -.16$, $SE = .07$, 95% CI [$-.29$, $-.03$], $t(196) = -2.39$, p

$= .018$), leadership capability evaluations (Model 9: $B = -.26$, $SE = .07$, 95% CI [$-.41$, $-.12$],

$t(196) = -3.57$, $p < .001$), and selection likelihood (Model 12: $B = -3.26$, $SE = 1.02$, 95% CI [$-

5.27$, -1.25], $t(196) = -3.20$, $p = .002$). To understand the moderating effect of gender

stereotypes, we conducted simple slopes analyses. For people with weaker gender stereotypes

about leadership (-1 SD), universal-nonuniversal mindsets did not predict gender bias in

evaluations of competence ($B = -.00$, $SE = .04$, 95% CI [$-.09$, $.08$], $t(1, 196) = -.08$, $p = .934$),

agency ($B = .02$, $SE = .07$, 95% CI [$-.12$, $.16$], $t(1, 196) = .31$, $p = .754$), leadership capability ($B

= .15$, $SE = .08$, 95% CI [$-.01$, $.30$], $t(1, 196) = 1.90$, $p = .059$), and leader selection ($B = 1.64$,

$SE = 1.07$, 95% CI [$-.47$, 3.75], $t(1, 196) = 1.53$, $p = .128$). However, for people with stronger

stereotypes ($+1$ SD), a more universal mindset was associated with less gender bias in

evaluations of competence ($B = -.16$, $SE = .04$, 95% CI [$-.25$, $-.08$], $t(1, 196) = -3.72$, $p < .001$),

agency (B = –.21, SE = .07, 95% CI [–.35, –.07], t(1, 196) = –2.98, p = .003), leadership

capability (B = –.23, SE = .08, 95% CI [–.38, –.08], t(1, 196) = –3.03, p = .003), and leader

selection (B = –3.07, SE = 1.07, 95% CI [–5.17, –.97], t(1, 196) = –2.89, p = .004). As we

observed gender bias on all four measures only when participants held stronger stereotypes,

Hypothesis 4 was supported.[9]

Discussion

Study 5 largely supported Hypothesis 1: people with a more universal mindset exhibited

weaker gender bias in evaluations of candidates' competence and agency, though this pattern

did not emerge in evaluations of candidates' leadership capability. Hypothesis 2, which

predicted an effect of universal-nonuniversal mindsets on gender bias in leader selection, was

not supported. Theoretically, there is no reason to expect that the findings would work for some

measures and not for others. The handful of non-significant effects possibly reflect the "dance of

the p-values," that is, the seemingly random variation in p-values that is to be expected with

multiple comparisons (Cumming, 2014, p. 7). Hypothesis 3, which predicts the indirect effect of

universal-nonuniversal mindsets on gender bias in leader selection, was supported for gender

bias in competence evaluation as the mediator. Perhaps most importantly from a theoretical

perspective, Study 5 supported Hypothesis 4, that the effect of mindsets on gender bias is more

pronounced when people hold stronger gender stereotypes about leadership. Among

participants who strongly associated men with leadership, a more universal mindset was

associated with less gender bias across all four measures.

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[9] To uncover the nature of gender bias, we compared ratings of male candidates and ratings of female candidates on all measures at higher/lower levels of universal-nonuniversal mindsets (+/–1 SD) and higher and lower levels of leader stereotypes (+/–1 SD). A key finding was that participants with a more nonuniversal mindset (–1 SD) and higher on gender stereotypes about leadership showed gender bias on all four measures. That is, participants who believed that leadership potential was nonuniversal and held stronger gender stereotypes about leadership treated male candidates significantly more favorably than female candidates in their evaluations of competence, agency, and leadership capability, and in leader selection. Detailed results are reported in the Supplementary Materials, Section F.

General Discussion

The current research conceptualized a new construct, universal-nonuniversal mindsets about leadership potential, which refers to people's beliefs about whether most individuals or only some individuals have high leadership potential. Five studies found that the universal mindset was associated with less bias against women in evaluations of competence, agency, and leadership capability, and consequently, in leader selection. The effects emerged both when mindsets were measured (Studies 1, 2, and 5) and manipulated (Studies 3 and 4); among governmental officials (Study 1), working adults (Studies 2 and 4), and business school students (Studies 3 and 5); in evaluations of actual subordinates (Study 1) and fictional candidates (Studies 2–5); and in a Western culture (i.e., the UK) and two Asian cultures (i.e., China and Singapore). The effects persisted even after controlling for fixed-growth mindsets about leadership ability, which did not consistently predict gender bias. The universal mindset was particularly associated with less gender bias when people held stronger gender stereotypes about leadership. Together, these findings suggest that the belief that most people have leadership potential can undermine the persistent gender bias in evaluations, and thus selection, of potential leaders, and therefore has the potential to improve workplace gender equality.

Theoretical Contributions

Our research makes several important contributions. First, we contribute to the literature on mindsets within management and social psychology by conceptualizing a new mindset that influences outcomes important to both management and society. Our work adds to the emerging body of research that has studied mindsets about the *distribution* of potential across the population (Li et al., 2020; Rattan et al., 2012, 2018; Savani et al., 2017) as a psychological variable that predicts important outcomes through mechanisms that are different from the more intensively studied mindsets about the *malleability* of a human trait. We found that when decision makers believed that most people have high leadership potential, a group that is

negatively stereotyped in leadership was judged more fairly. Our findings further advance the study of diversity and gender bias in organizations through a focus on perceivers who exhibit bias in the workplace. These findings extend recent research focusing on the perspective of the targets of bias, which found that the universal mindset can counteract the social identity threat that women and racial minorities experience in STEM fields, thereby increasing their feelings of belonging to STEM (Rattan et al., 2018). Our findings, along with previous research, establish that mindsets about the distribution of human potential may be a critical psychological variable that can help rectify inequality in workplaces and society.

Our research also advances the literature on gender and leadership. Extensive research has demonstrated the obstacles experienced by women in attaining access to positions of status and authority in political, business, and other spheres of society (see meta-analyses by Eagly et al., 1992, 1995; Koenig et al., 2011; Paustian-Underdahl et al., 2014). Gender bias against women is driven by the perception that leadership roles, which are stereotyped to be agentic (e.g., dominant, aggressive, competitive, and independent), are more appropriate for men than for women, who are stereotyped to be communal (e.g., supportive, collaborative, nurturing, and relation-oriented; Eagly & Karau, 2002; Schein, 1973, 2007). Although the universal mindset about leadership potential is not necessarily inconsistent with people's prototypes of leadership, it is fundamentally inconsistent with the application of the stereotype that only men possess natural leadership ability. As we theorized, the universal mindset reduces gender bias in evaluations of leadership capability, competence, and agency as well as leader selection.

The current research highlights the long-understood distinction between stereotype knowledge, which is widespread and may be harder to change, and stereotype application, which is the degree to which people act on their stereotypes when making evaluations and decisions (Greenwald et al., 2003; Higgins, 1996; Macrae & Bodenhausen, 2000). Research on implicit bias training often seeks to reduce prejudice by directly targeting stereotype knowledge

(Paluck et al., 2021). In contrast, our research suggests interventions that target stereotype application as an alternative approach because people are constantly bombarded with stereotype knowledge in everyday life (Weisbuch & Ambady, 2009; Weisbuch et al., 2009), and thus may have a hard time eliminating stereotype knowledge. Of note, the universal mindset reduced stereotype application particularly when people had stronger stereotypes, indicating that eliminating stereotype knowledge is not the only route to reducing prejudice—blocking the application of these stereotypes can serve a similar function.

Our research contributes to scholarship by identifying factors that can attenuate the disadvantage encountered by women in leadership, especially from the decision maker's perspective (c.f., Rosette & Tost, 2010). Researchers have investigated measures that women can take to overcome their disadvantage, such as expressing pride in their achievements (Brosi et al., 2016), and measures that organizations can take, such as diversity training (Carter et al., 2020). However, managers are the proximal agents whose actions drive everyday workplace fairness or inequity. Unfortunately, relatively little research has focused on manager-side interventions that can reduce gender bias (but see Bowen et al., 2000; Koch et al., 2015, for meta-analyses on rater effects). Scholars have tried to directly intervene to reduce gender bias through diversity training, but this work found greater effectiveness when diversity training was complemented by other initiatives, which were unfortunately absent in most programs (Bezrukova et al., 2012, 2016; Chang et al., 2019; for a review see Carter et al., 2020). Building on the experimental materials from our Studies 3 and 4, future research can investigate whether a diversity training that is infused with a universal leadership potential mindset can reduce the gender gap in the workplace more effectively. Alternatively, future research could compare a universal mindset training against a diversity training. Training in the universal mindset is unlikely to generate the same reaction and backlash from decision makers as diversity training often does, because the universal mindset makes no direct mention of sensitive topics such as gender, race, diversity, and inequality.

Limitations and Future Research

Although our findings are robust and consistent, this research has some limitations. Past research has found that gender bias is more likely to emerge in male-dominated jobs (Koch et al., 2015). For instance, government jobs and finance[10] are often male-dominated, and men are perceived as more effective than women in such jobs (Paustian-Underdahl et al., 2014). Consistent with this idea, 85% of the government officials in Study 1 were men. Future research can examine whether the effect of universal-nonuniversal mindsets on gender bias generalizes to jobs with more equal representations of women and men. Future research can also assess whether the universal mindset can reduce bias against men in women-dominated industries (e.g., nursing, teaching).

Although we focused on gender bias in leader-related evaluations and selection, our theorizing generalizes beyond this domain—it predicts that the universal mindset would undercut bias in a wide range of decisions typically influenced by stereotypes, including stereotypes about race, age, sexual orientation, social class, and disability. Future research can also investigate whether the universal mindset reduces bias against groups at the intersection of multiple negative stereotypes (e.g., Black women; Cole, 2009; Livingston et al., 2012; Rosette et al., 2016; Rosette & Livingston, 2012; Sanchez-Hucles & Davis, 2010). Future research can further test whether the current findings generalize to men who hold a negatively stereotyped identity (e.g., men from racial or sexual orientation minority groups) as well as further investigate these effects across the full spectrum of gender identities. In addition, the implicit vs. explicit nature of the bias might play a role. For example, people's disability-related biases tend to be

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[10] Studies 3-5 asked participants to imagine they worked in an investment bank. Given that people hold a strong association between finance and men, in Study 5 we also measured gender stereotypes about finance and examined its moderating effect on the relationship between universal-nonuniversal mindsets and gender bias. Results showed that when people had stronger gender stereotypes about finance, a more universal mindset was associated with weaker gender bias in evaluations and selection of leader candidates. Detailed results are reported in Supplementary Materials, Section G.

more explicit. Future research can examine whether the universal mindset is similarly effective against overtly endorsed biases that have not yet received as much scrutiny in society. It is possible that in cases where it is societally acceptable to act on strong negative stereotypes about a group, the stereotypes might trump the universal mindset, suggesting a boundary condition for the mechanism outlined in the present research.

Past research has found that men are more likely to prefer other men in leadership roles than women (Eagly et al., 1992; Koch et al., 2015; Koenig et al., 2011), possibly because men are more motivated to perpetuate male dominance in high-status roles (Koch et al., 2015). However, we did not find any effect of participant gender across Studies 2–5 (Supplementary Materials, Section H). Another possibility is that men are more likely to hold the nonuniversal mindset than women because this belief advantages them and thus is in line with their self-interest, but the correlations in Tables 1, 3, and 9 do not support this possibility.

In our studies, evaluations and selection decisions were performed at the same time point. We used this approach because it matches real-life hiring decisions, in which managers simultaneously evaluate a group of candidates and then select a few candidates for interviewing or hiring. Separating these two types of measures would have less ecological validity. Although the two experiments helped establish the causal effect of mindsets on gender bias in these measures, we did not directly test the causal effect of the meditators on leader selection given the logic that people select leaders who they see as competent, agentic, and having leadership capability. Future work may reconsider directly manipulating the mediator-outcome relationships.

Although our studies consistently found gender bias against women among people with a nonuniversal mindset and the absence of gender bias among people with a universal mindset, it is not clear whether this difference in gender bias was driven by their ratings of men, women, or both. Relevant analyses did not find consistent results across studies (Supplementary Materials, Section I), suggesting that the gender gap is fundamentally relative, just as gender stereotypes are relative by their very definition. That is, those holding strong gender stereotypes sometimes

perceive men more positively, sometimes perceive women more negatively, and sometimes both.

Overall, the effect size of the relationship between universal-nonuniversal mindsets and gender bias was relatively small in the correlational studies, with r's < .20. However, the experiments found moderate effects (e.g., Cohen's d = .36 in Study 3 for the competence measure). Rather than considering any single effect size, a more reliable way of assessing effect size is through an internal meta-analysis that estimates the effect size for each outcome variable across all of the studies that measured it. For leadership capability, an internal meta-analysis of Studies 1, 2, 4, and 5 indicates Md = −.26, SE = .05, p < .001. For competence, an internal meta-analysis of Studies 2–5 indicates Md = −.25, SE = .06, p < .001. For agency, an internal meta-analysis of Studies 4–5 indicates Md = −.27, SE = .08, p < .001. For leader selection, an internal meta-analysis of Studies 2, 4, and 5 indicates Md = −.19, SE = .06, p < .01. Thus, we document small but meaningful effects consistently and reliably across all measures. A recent review on effect sizes in social psychology concluded, "Smaller effect sizes are not merely worth taking seriously. They are also more believable" (Funder & Ozer, 2019, p. 166). In our case, we believe that identifying an underlying psychological construct that either contributes to or undermines persistent gender bias is undoubtedly meaningful. Indeed, past work has found gender bias to be prevalent globally (Koenig et al., 2011) and relatively consistent over time (Eagly et al., 2020), suggesting even small improvements should be considered valuable, both to science and society.

Finally, we acknowledge that the reader might wonder whether the universal mindset or nonuniversal mindset about leadership potential is more true. We submit that the science of leadership is not in a position to argue either way because potential is something that is invisible, that might or might not be attained. Even if some people fail to attain a high leadership position, it does not mean that they lack leadership potential—maybe they did not have the right incentives, maybe they faced bias, or maybe they lacked opportunities, and so on. Thus, the

scientific question of whether leadership potential is universal or nonuniversal is one that cannot be readily answered. In this case, we are simply left with our beliefs. Importantly, our research shows that one belief (i.e., the universal belief) helps address a long-standing inequality and bias, whereas the other belief leaves this bias intact.

Conclusion

The current research proposes a new construct: universal-nonuniversal mindsets about leadership potential. Five studies found that the belief that most people have high leadership potential (the universal mindset) can undermine the persistent gender bias in people's evaluations of potential leaders and thus improve equity in who is selected for leadership opportunities. Our research contributes to the developing literature on mindsets in organizations, to scholarship on organizational diversity, and to the study of evaluator decision-making, while also supporting the goal of promoting meritocracy in organizations.

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Table 1 Means, Standard Deviations, Correlations, and Reliabilities (Study 1)

Variables	Mean	SD	1	2	3	4	5	6	7	8	9
1. Participant gender	0.15	0.36									
2. Age	46.24	5.58	−.01								
3. Education	3.03	1.09	.03	−.28**							
4. Hierarchy	3.95	0.47	−.05	.42***	−.22*						
5. Position tenure	4.96	3.80	−.02	.40***	−.02	.03					
6. Fixed-growth mindsets	3.83	0.98	.13	.01	.01	−.02	−.11	(.85)			
7. Universal-nonuniversal mindsets	2.12	0.60	−.01	−.16	−.08	−.00	−.15	.29**	(.78)		
8. Male leadership capability evaluation	3.93	1.44	−.03	−.01	−.08	.14	−.07	−.06	−.25**		
9. Female leadership capability evaluation	3.01	1.76	.03	.01	.05	.09	.00	−.09	.04	−.02	
10. Gender bias in leadership capability evaluation	0.92	2.30	−.04	−.01	−.09	.02	−.05	.04	−.19*	.64***	−.78***

Note. N = 130. Cronbach's alphas are in parentheses on the diagonal.
Participant gender was coded as 0 = male, 1 = female. Education was coded from 1= primary school or below to 7 = doctoral degree or above. Hierarchy was coded from 1 to 10 according to the 10-level government leader hierarchy in China.
* $p < .05.$ ** $p < .01.$ *** $p < .001.$

Table 2 Regression Analyses on Gender Bias against Women (Study 1)

	Model 1	Model 2
(Constant)	2.45** (.73)	2.14 (1.11)
Universal-nonuniversal mindsets	−.72* (.33)	−.84* (.35)
Fixed-growth mindsets		.24 (.22)
Participant gender		−.33 (.57)
R^2	.04	.05
ΔR^2	.04*	.01
F	4.74*	2.06

Note. N = 130. Numbers in parentheses are standard errors of the unstandardized coefficients.
Participant gender was coded as 0 = male, 1 = female.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3 Means, Standard Deviations, Correlations, and Reliabilities (Study 2)

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Participant gender	0.56	0.50															
2. Age	30.78	12.42	−.15*														
3. Education	4.73	1.32	.07	.15*													
4. Work tenure	5.55	9.26	−.13*	.58***	−.03												
5. Leader experience	1.31	0.71	−.13*	.22***	.10	.40**											
6. Fixed-growth mindsets	4.48	1.43	−.08	−.12	−.10	−.14*	−.08	(.86)									
7. Universal-nonuniversal mindsets	3.00	1.18	.03	−.21**	−.06	−.16*	−.14*	.43***	(.89)								
8. Male competence evaluation	4.19	0.53	.06	−.13*	−.14*	−.07	−.04	.18**	.06	(.78)							
9. Female competence evaluation	4.17	0.51	.10	−.16**	−.09	−.10	−.06	.15*	.16*	.82***	(.77)						
10. Male leadership capability evaluation	4.00	0.57	.10	−.08	−.15*	.03	−.00	.18**	.07	.79***	.67***	(.66)					
11. Female leadership capability evaluation	3.93	0.60	.08	−.11	−.11	.03	−.00	.18**	.20**	.62***	.80***	.69***	(.69)				
12. Male leader selection	73.38	15.21	.07	−.01	−.09	.06	.01	.15*	.03	.64***	.50***	.64***	.47***	(.77)			
13. Female leader selection	72.67	14.89	.11	−.05	−.06	.06	.02	.17**	.19**	.53***	.68***	.50***	.72***	.71***	(.75)		
14. Gender bias in competence evaluation	0.03	0.31	−.06	.05	−.09	.04	.04	.06	−.16*	.34***	−.25***	.23***	−.26***	.28***	−.23***		
15. Gender bias in leadership capability evaluation	0.07	0.47	.03	.04	−.04	.00	.00	−.01	−.18**	.17**	−.20*	.35**	−.44***	.19**	−.32***	.62***	
16. Gender bias in leader selection	0.71	11.46	−.05	.05	−.04	.01	−.01	−.02	−.20**	.57**	−.23***	.20**	−.32***	.40**	−.36***	.66***	.66***

Note. N = 254. Cronbach's alphas are in parentheses on the diagonal.
Gender was coded as 0 = male, 1 = female. Education was coded from 1= less than high school to 7 = Doctoral degree (Ph.D., JD, MD). Leader experience was coded from 1 = no leader experience to 5 = executive.
* $p < .05.$ ** $p < .01.$ *** $p < .001.$

Table 4 Regression Analyses on Gender Biases against Women (Study 2)

	Gender bias in competence evaluation		Gender bias in leader capability evaluation		Gender bias in leader selection				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
(Constant)	.15** (.05)	.07 (.07)	.28*** (.08)	.18 (.11)	6.53** (1.94)	5.35* (2.67)	3.76 (2.04)	2.45 (2.04)	2.55 (1.86)
Universal-nonuniversal mindsets	−.04* (.02)	−.06** (.02)	−.07** (.03)	−.08** (.03)	−1.94** (.60)	−2.23** (.67)	−.83 (.52)	−.88 (.52)	−.52 (.48)
Fixed-growth mindsets		.03* (.02)		.03 (.02)		.57 (.55)	−.23 (.43)	.15 (.42)	−.19 (.39)
Participant gender		−.03 (.04)		.04 (.06)		−.92 (1.43)	−.24 (1.10)	−1.53 (1.09)	−.89 (1.00)
Gender bias in competence evaluation							24.00*** (1.79)		14.65*** (2.06)
Gender bias in leader capability evaluation								16.02*** (1.18)	10.08*** (1.36)
R^2	.03	.05	.03	.04	.04	.05	.45	.45	.55
ΔR^2	.03*	.02	.03**	.01	.04**	.01	.40***a	.41***a	.10***b/.09***c
F	6.34*	4.16**	8.12**	3.27*	10.40**	4.01**	49.91***	51.46***	59.51***

Note. N = 254. Numbers in parentheses are standard errors of the unstandardized coefficients.
Gender was coded as 0 = male, 1 = female.
[a] Compared with Model 6. [b] Compared with Model 7. [c] Compared with Model 8.
* p < .05. ** p < .01. *** p < .001.

Table 5 Indirect Effects of Universal-nonuniversal Mindsets on Gender Bias in Leader Selection via Gender Biases in Competence and Leadership Capability Evaluations (Study 2)

	Effect	Boot SE	95% Boot CI
Direct effect:	−.52	.48	[−1.46, .41]
Indirect effects:	−1.71	.50	[−2.70, −.75]
Mindsets → Gender bias in competence evaluation → gender bias in leader selection	−.86	.32	**[−1.55, −.28]**
Mindsets → Gender bias in leadership capability evaluation → Gender bias in leader selection	−.85	.31	**[−1.51, −.31]**
Total effect:	−2.23	.67	[−3.55, −.91]

Note. Bold type indicates significant indirect effects.

Table 6 Means, Standard Deviations, Correlations, and Reliabilities (Study 3)

	Mean	SD	1	2	3	4	5	6
1. Participant gender	0.54	0.50						
2. Age	20.38	1.57	−.62***					
3. Condition	−	−	−.05	.12				
4. Male competence evaluation	5.97	0.51	.18*	−.22**	−.14	(.76)		
5. Female competence evaluation	5.93	0.52	.06	−.06	.01	.65***	(.78)	
6. Gender bias in competence evaluation	0.04	0.43	.14	−.19*	−.18*	.39***	−.45**	
7. Gender bias in leader selection (number of male candidates selected)	2.11	0.84	.07	−.03	−.03	.21**	−.17*	.46**

Note. $N = 159$. Cronbach's alphas are in parentheses on the diagonal.
Gender was coded as 0 = male, 1 = female. Condition was coded as 1 = nonuniversal mindset, 2 = universal mindset. Male leader selection ranged from 0 to 4; female leader selection was not shown due to its redundancy to male leader selection.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 7 Means, Standard Deviations, Correlations, and Reliabilities (Study 4)

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Participant gender	0.45	0.50																	
2. Age	34.07	8.69	.05																
3. Education	5.03	0.81	.06	−.33***															
4. Work tenure	10.30	8.77	.07	.95***	−.39***														
5. Leader experience	0.83	0.37	−.06	.01	.16**	.03													
6. Condition	−	−	−.04	−.07	.10	−.06	.04												
7. Male competence evaluation	5.57	0.64	−.08	−.04	.01	−.05	.00	−.08	(.80)										
8. Female competence evaluation	5.62	0.63	−.09	−.11	.09	−.11*	.02	.14*	.72***	(.78)									
9. Male agency evaluation	5.34	0.70	−.08	−.08	.03	−.09	−.01	−.09	.82***	.61***	(.84)								
10. Female agency evaluation	5.38	0.71	−.08	−.12*	.06	−.13*	−.01	.06	.63***	.78***	.79***	(.84)							
11. Male leadership capability evaluation	5.19	0.81	−.12*	−.03	.03	−.04	.01	−.06	.80***	.56***	.84***	.62***	(.77)						
12. Female leadership capability evaluation	5.25	0.82	−.10	−.07	.05	−.09	−.00	.15**	.56***	.76***	.60***	.81***	.68***	(.73)					
13. Male leader selection	66.82	15.45	−.17**	.02	−.02	−.02	.06	−.04	.64***	.46***	.66***	.50***	.78***	.58***	(.84)				
14. Female leader selection	67.58	15.86	−.16**	−.02	.01	−.05	.03	.10	.43***	.60***	.47***	.65***	.54***	.80***	.79***	(.82)			
15. Gender bias in competence evaluation	−0.04	0.48	.01	.08	−.09	.08	−.02	−.29***	.40***	−.35***	.30***	−.18*	.34***	−.25***	.26***	−.21***			
16. Gender bias in agency evaluation	−0.04	0.45	−.01	.07	−.05	.06	−.00	−.24***	.28***	−.27***	.31***	−.34***	.32***	−.33***	.23***	−.28***	.73***		
17. Gender bias in leadership capability evaluation	−0.06	0.65	−.03	.05	−.03	.05	.02	−.25***	.29***	−.27***	.28***	−.25***	.38***	−.42***	.23***	−.34***	.74***	.82***	
18. Gender bias in leader selection	−0.76	10.17	−.00	.05	−.05	.04	.05	−.21***	.30***	−.24***	.26***	−.24***	.33***	−.37***	.29***	−.36***	.72***	.78***	.88***

Note. N = 326. Cronbach's alphas are in parentheses on the diagonal.
Gender was coded as 0 = male, 1 = female. Education was coded from 1= primary school and below to 7 = doctoral degree or above.
Leader experience was coded as 0 = no, 1 = yes. Condition was coded as 1 = nonuniversal mindset, 2 = control, and 3 = universal mindset.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 8 Indirect Effects of Condition on Gender Bias in Leader Selection via Gender Bias in Competence, Agency, and Leadership Capability Evaluations (Study 4)

	Condition (Control vs. Nonuniversal)			Condition (Control vs. Universal)			Condition (Nonuniversal vs. Universal)		
	Effect	Boot SE	95% Boot CI	Effect	Boot SE	95% Boot CI	Effect	Boot SE	95% Boot CI
Relative direct effect:	−.27	.65	[−1.56, 1.01]	.36	.65	[−.93, 1.64]	−.63	.68	[−.70, 1.97]
Relative indirect effect:									
Condition → Gender bias in competence evaluation → Gender bias in leader selection	.42	.25	**[.01, .97]**	−.42	.28	**[−1.08, −.00]**	−.84	.45	**[−1.78, −.02]**
Condition → Gender bias in agency evaluation → Gender bias in leader selection	.36	.27	[−.03, 1.01]	−.47	.28	**[−1.10, −.01]**	−.83	.43	**[−1.76, −.08]**
Condition → Gender bias in leadership capability evaluation → Gender bias in leader selection	2.10	.94	**[.35, 4.07]**	−2.20	.94	**[−4.11, −.42]**	−4.30	1.05	**[−6.51, −2.37]**
Relative total effect:	2.62	1.35	[−.05, 5.28]	−2.73	1.35	[−5.38, −.08]	−5.35	1.36	[−8.02, −2.68]

Note. Bold type indicates significant indirect effects.

Table 9 Means, Standard Deviations, Correlations, and Reliabilities (Study 5)

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Participant gender	0.46	0.50																
2. Age	21.47	1.79	−.45***															
3. Fixed-growth mindsets	4.75	1.42	.13	−.12	(.93)													
4. Universal-nonuniversal mindsets	3.03	1.05	−.06	−.07	.45***	(.86)												
5. Gender stereotype about leadership	4.46	0.72	−.15*	.13	−.13	−.15*	(.85)											
6. Male competence evaluation	5.94	0.58	.01	−.04	.18*	−.05	−.03	(.76)										
7. Female competence evaluation	5.89	0.59	−.03	−.02	.22**	.10	−.05	.74***	(.77)									
8. Male agency evaluation	4.12	1.04	−.26***	.13	−.00	.17*	.15*	.15*	.11	(.79)								
9. Female agency evaluation	3.92	0.98	−.21**	.13	−.03	.11	.03	−.03	.15*	.77***	(.83)							
10. Male leadership capability evaluation	5.22	0.88	−.07	−.02	.16*	−.08	.04	.56***	.41***	.46***	.27***	(.67)						
11. Female leadership capability evaluation	5.17	0.85	−.07	.01	.17*	−.03	−.05	.38***	.60***	.24**	.37***	.63***	(.72)					
12. Male leader selection	66.72	13.86	−.07	.01	.07	−.06	−.02	.57***	.37***	.29***	.15*	.76***	.46***	(.68)				
13. Female leader selection	65.15	13.51	−.09	.01	.03	−.03	−.01	.36***	.51***	.21**	.32***	.49***	.74***	.72***	(.73)			
14. Gender bias in competence evaluation	0.05	0.43	.05	−.03	−.06	−.20**	.03	.36***	−.37***	.06	−.26***	.22**	−.31***	.27***	−.21**			
15. Gender bias in agency evaluation	0.20	0.69	−.09	.01	.04	−.10	.18*	.28***	−.06	.41***	−.27***	.31***	−.16*	.22**	−.15*	.47***		
16. Gender bias in leadership capability evaluation	0.06	0.75	.00	−.04	−.01	−.06	.09	.23**	−.21**	.26***	−.11	.46***	−.40***	.37***	−.26***	.61***	.55***	
17. Gender bias in leader selection	1.58	10.25	.03	.00	.06	−.04	−.00	.30***	−.17*	.12	−.22**	.38***	−.35***	.40***	−.35***	.64***	.49***	.85***

Note. N = 202. Cronbach's alphas are in parentheses on the diagonal.
Gender was coded as 0 = male, 1 = female.
* p < .05. ** p < .01. *** p < .001.

Table 10 Regression Analyses on Gender Biases against Women (Study 5)

	Gender Bias in competence evaluation			Gender Bias in agency evaluation			Gender Bias in leadership capability evaluation			Gender Bias in leader selection				
	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14
(Constant)	.29** (.09)	.25* (.12)	−1.06* (.54)	.39** (.15)	.30 (.19)	−2.33** (.86)	.19 (.16)	.16 (.21)	−3.35** (.95)	2.63 (2.21)	.64 (2.81)	−37.07** (13.11)	−2.18 (1.46)	1.66 (7.04)
Independent variable:														
Universal-nonuniversal mindsets	−.08** (.03)	−.08** (.03)	.41* (.19)	−.06 (.05)	−.11* (.05)	.62* (.30)	−.04 (.05)	−.05 (.06)	1.13** (.33)	−.35 (.69)	−.73 (.78)	13.82** (4.61)	.23 (.41)	.54 (2.46)
Control variables:														
Fixed-growth mindsets		.01 (.02)	.02 (.02)		.06 (.04)	.08* (.04)		.01 (.04)	.04 (.04)		.63 (.58)	.91 (.58)	.45 (.30)	.42 (.30)
Participant gender		.03 (.06)	.03 (.06)		−.16 (.10)	−.14 (.10)		−.01 (.11)	−.01 (.11)		.33 (1.48)	.11 (1.47)	.26 (.77)	.08 (.77)
Moderator and interaction:														
Gender stereotypes about leadership			.28* (.11)			.55** (.18)			.75*** (.20)			8.09** (2.73)		−.77 (1.47)
Universal-nonuniversal mindsets × Gender stereotypes about leadership			−.11** (.04)			−.16* (.07)			−.26*** (.07)			−3.26** (1.02)		−.09 (.55)
Mediators:														
Gender bias in competence evaluation													5.23*** (1.14)	5.05*** (1.14)
Gender bias in agency evaluation													−.01 (.67)	.18 (.68)
Gender bias in leader capability evaluation													9.82*** (.68)	9.85*** (.68)
R^2	.04	.04	.07	.01	.03	.09	.00	.00	.07	.00	.01	.06	.75	.75
ΔR^2	.04	.00	.03*	.01	.02	.05**	.00	.00	.07**	.00	.01	.05**	.74***a	.01
F	8.16**	2.85*	3.15**	1.96	2.23	3.62**	.76	.29	3.06*	.26	.54	2.39*	94.93***	72.17***

Note. $N = 202$. Numbers in parentheses are standard errors of the unstandardized coefficients.

Gender was coded as 0 = male, 1 = female.

"M" in M1–M14 stands for Model.

[a] Compared with Model 11.

[*] $p < .05$. [**] $p < .01$. [***] $p < .001$.

Table 11 Indirect Effects of Universal-nonuniversal Mindsets on Gender Bias in Leader Selection via Gender Biases in Competence, Agency, and Leadership Capability Evaluations (Study 5)

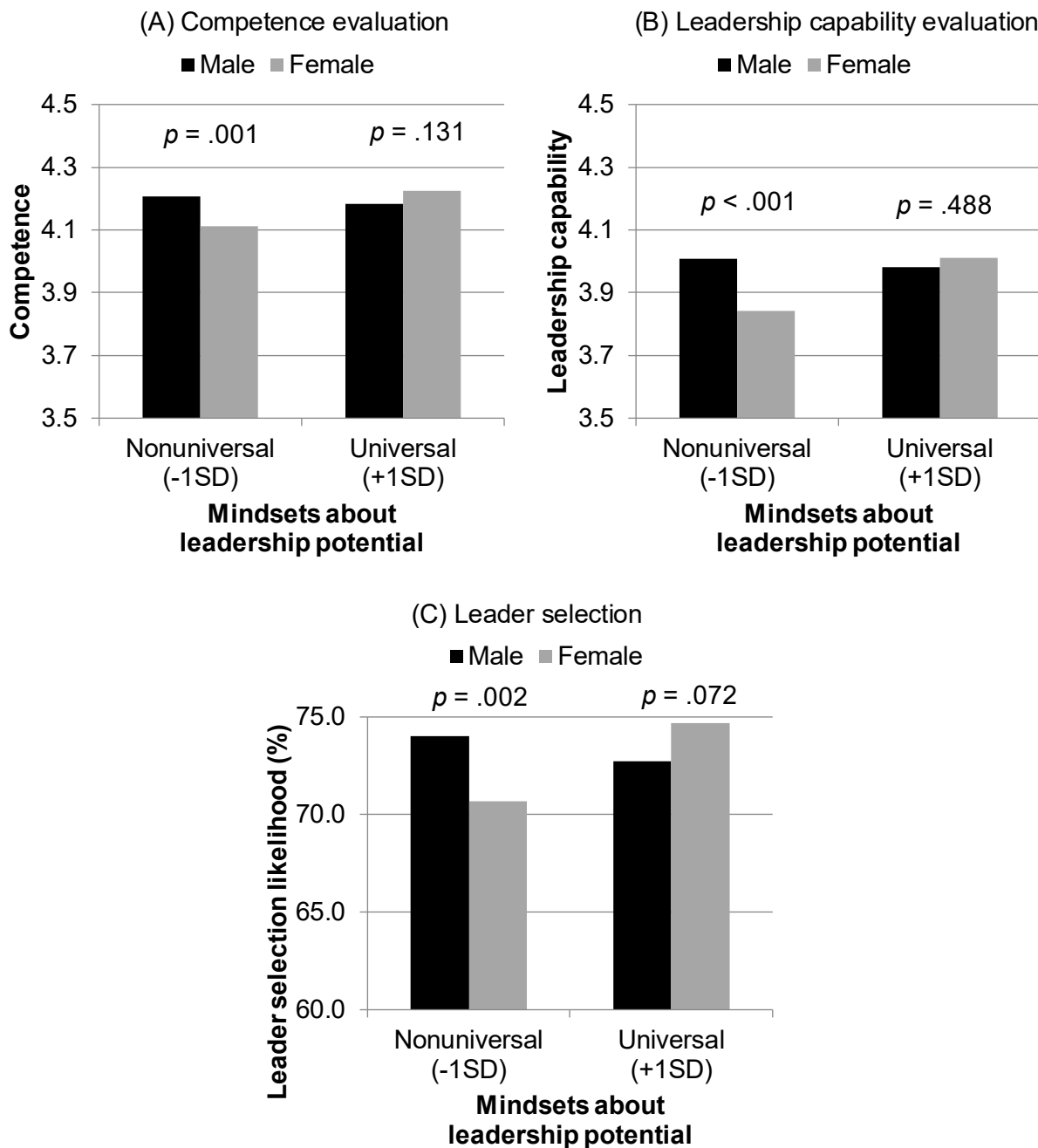|	Effect	Boot SE	95% Boot CI
Direct effect:	.23	.41	[−.58, 1.04]
Indirect effects:	−.95	.59	[−2.13, .20]
Mindsets → Gender bias in competence evaluation → gender bias in leader selection	−.44	.20	**[−.92, −.11]**
Mindsets → Gender bias in agency evaluation → gender bias in leader selection	.00	.10	[−.20, .23]
Mindsets → Gender bias in leadership capability evaluation → Gender bias in leader selection	−.52	.51	[−1.52, .49]
Total effect:	−.73	.78	[−2.27, .82]

Note. Bold type indicates significant indirect effects.

Figure 1 Interaction Effect Between Decision Makers' Universal-Nonuniversal Mindsets and Subordinate Gender on Leadership Capability Evaluation (Study 1)
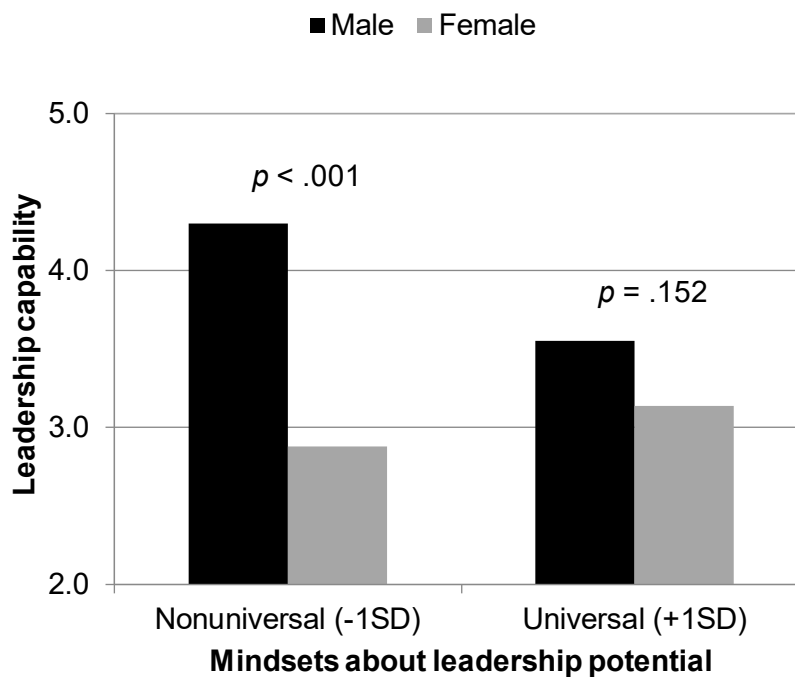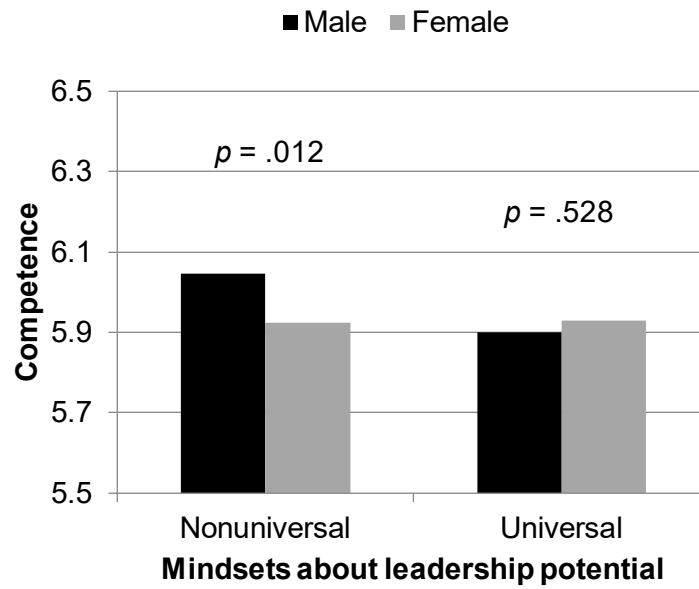

Note. The y-axis was defined along a 6-point scale (1 = *not at all* to 6 = *very much*). "Nonuniversal" and "Universal" represent the values at one standard deviation below the mean (1.52) and above the mean (2.72) of mindsets about leadership potential, respectively.

Figure 2 Interaction Effect Between Universal-Nonuniversal Mindsets and Candidate Gender on Competence Evaluation, Leadership Capability Evaluation, and Leader Selection (Study 2)


(A) Competence evaluation

■ Male ■ Female

p = .001   *p* = .131

(B) Leadership capability evaluation

■ Male ■ Female

p < .001   *p* = .488

(C) Leader selection

■ Male ■ Female

p = .002   *p* = .072

Note. The y-axis in Figures 2(A) and (B) was defined along a 5-point scale (1 = *not at all* to 5 = *extremely*). "Nonuniversal" and "Universal" represent the values at one standard deviation below the mean (1.82) and above the mean (4.17) of mindsets about leadership potential, respectively.

Figure 3 Interaction Effect Between Experimental Condition and Candidate Gender on Competence Evaluation (Study 3)
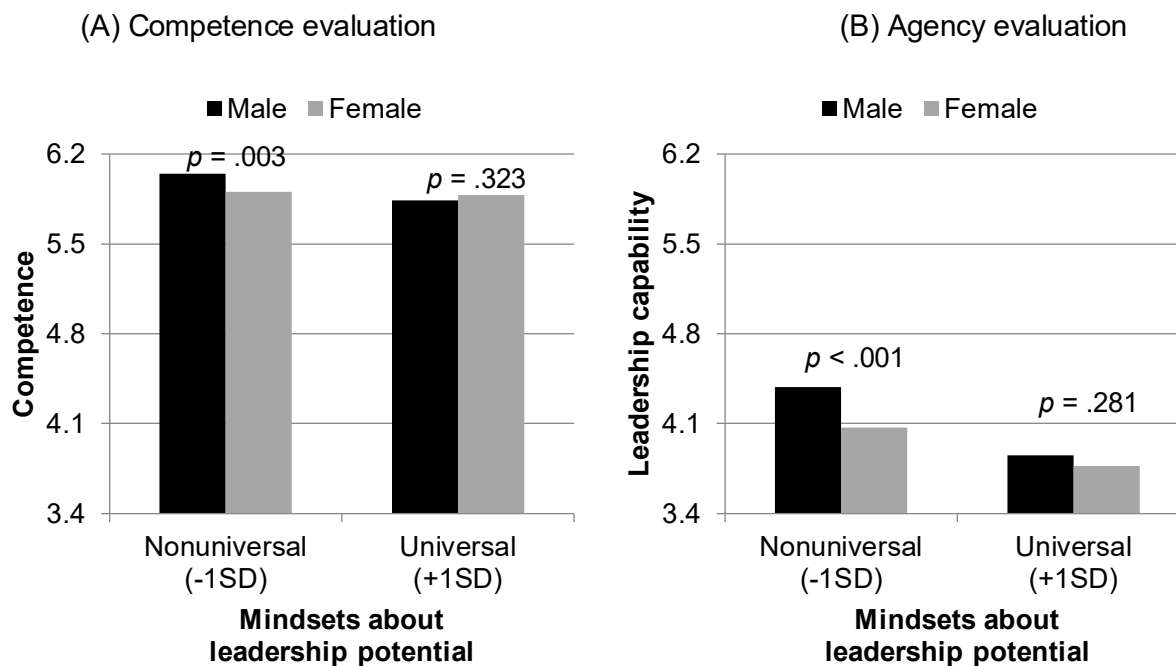

Note. The y-axis was defined along a 7-point scale (1 = *extremely incompetent* to 7 = *extremely competent*). "Nonuniversal" and "Universal" represent the two experimental conditions.

Figure 4 Interaction Effect Between Experimental Condition and Candidate Gender on Evaluations of Competence, Agency, Leadership Capability, and Leader Selection (Study 4)

(A) Competence evaluation

(B) Agency evaluation

(C) Leadership capability evaluation

(D) Leader selection
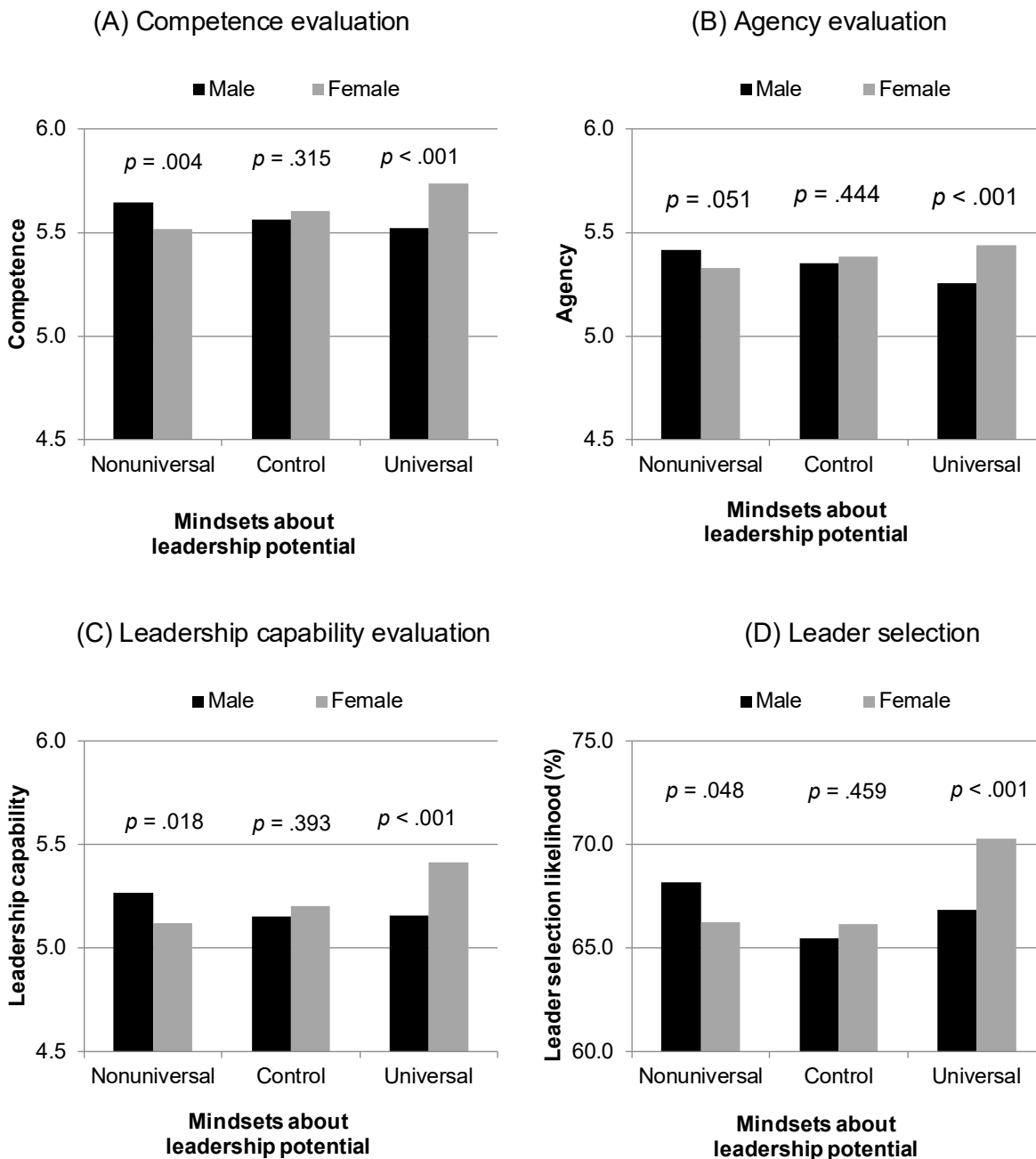
Note. The y-axis was defined along a 7-point scale (1 = *not at all* to 7 = *very much*). "Nonuniversal," "Control," and "Universal" represent the three experimental conditions.

Figure 5 Interaction Effect Between Universal-Nonuniversal Mindsets and Candidate Gender on Evaluations of Competence and Agency (Study 5)

(A) Competence evaluation

(B) Agency evaluation

Note. The y-axis was defined along a 7-point scale (1 = *not at all* to 7 = *very much*). "Nonuniversal" and "Universal" represent the values at one standard deviation below the mean (1.98) and above the mean (4.10) on mindsets about leadership potential, respectively.

Appendix A: Universal-Nonuniversal Mindsets about Leadership Potential Scale

1. Even in the right environment, not everyone can be an effective leader.
2. Some people just don't have high leadership potential no matter how hard they try to be a good leader.
3. Only some people have the inborn potential to be effective leaders.
4. Even if they have access to a good education, some people just don't have the capacity to be effective leaders.
5. There are limits to how effective a leader someone can be, despite the opportunities, support, and endurance they have.
6. There are people who just can't be good leaders even if they get a chance to.
7. To be honest, not everyone has high leadership potential.
8. All people cannot be a good leader; there will always be individuals who just cannot lead effectively.

Note. All items communicated the nonuniversal mindset.

Appendix B: Fixed-Growth Mindsets about Leadership Ability Scale

1. People's leadership ability is something about them that they can't change very much.
2. People have a certain amount of leadership ability, and they really can't do much to change it.
3. You can learn new things, but you can't really change your basic leadership ability.

Note. All items communicated the fixed mindset.

Appendix C: Articles to Manipulate Mindsets

Nonuniversal mindset condition	Universal mindset condition
New Research Confirms: ONLY SOME People Have High Leadership Potential by Nina Trentmann | 5 October 2016 - 11:26 a.m.	**New Research Confirms: NEARLY EVERYONE Has High Leadership Potential** by Nina Trentmann | 5 October 2015 - 11:26 a.m.
Have you ever wondered—are some people just born with high leadership potential, while others are not? Now, science has given us an answer. New research confirms that only some people have the highest leadership potential. What is leadership potential? *Leadership potential* refers to people's capacity to act as a successful leader at some point in their life.	Have you ever wondered—are some people just born with high leadership potential, while others are not? Now, science has given us an answer. New research confirms that everyone has the highest leadership potential. What is leadership potential? *Leadership potential* refers to people's capacity to act as a successful leader at some point in their life.
Scientists in the fields of psychology and management have spent many years studying leadership potential. Research shows that some people simply do not have the potential to become highly effective leaders no matter how much leadership experience they receive, how many leadership opportunities they have, and how much they desire to be a leader. Others are gifted—the potential is in them to become highly effective leaders; they just have to express it.	Scientists in the fields of psychology and management have spent many years studying leadership potential. Research shows that nearly everyone has the potential to become a highly effective leader, provided that they receive some leadership experience, have leadership opportunities, and strongly desire to become a leader. Everyone is gifted—the potential is in all of us to become highly effective leaders; we just have to express it.
How did scientists conclude that only a few people have the highest leadership potential? This conclusion came from research conducted by the Leadership and Management Lab (LMLab) at XXX University. In collaboration with 362 companies across various industries, the researchers randomly selected 1000 rank-and-file employees to participate in a five-year program on leadership. Over five years, the researchers measured each employee's leadership ability using a standard questionnaire that employees, their peers, their supervisors, and their subordinates had to complete. The questionnaire gave the researchers a holistic assessment of each employee's leadership ability from multiple sources.	How did scientists conclude that everyone has the highest leadership potential? This conclusion came from research conducted by the Leadership and Management Lab (LMLab) at XXX University. In collaboration with 362 companies across various industries, the researchers randomly selected 1000 rank-and-file employees to participate in a five-year program on leadership. Over five years, the researchers measured each employee's leadership ability using a standard questionnaire that employees, their peers, their supervisors, and their subordinates had to complete. The questionnaire gave the researchers a holistic assessment of each employee's leadership ability from multiple sources.
A surprising finding was that over the five	

years, half the employees' leadership abilities did not change, whereas the leadership abilities of the other half increased. Thus, it is unclear whether leadership ability is fixed or can be changed. Dr. Marie Sandberg, the Principal Investigator of the study, said, "Based on these mixed findings, we cannot say whether leadership ability is fixed or can be changed."

In addition, the researchers also measured people's leadership potential. That is, when an employee is given an opportunity to serve as a leader, how successful are they? The findings were sobering: only 11% of all employees showed high leadership potential. When given opportunities to serve as a leader, these employees acted as excellent leaders. The remaining 89% of the people did not have leadership potential—when given opportunities to serve as a leader, these employees were mediocre or bad leaders. Thus, leadership potential is very rare.

You might wonder—why are there so few leaders? This is because only some people have high leadership potential, so only they receive an opportunity to become leaders. The large majority of people without leadership potential cannot end up as successful leaders.

Similar conclusions were drawn by Dr. Paul Medin at the National Institute of Business, based on decades of research on leadership. Dr. Medin noted in a recent research article published in the respected journal *Leadership Quarterly*, "Individuals who rise to become great leaders, like George Washington, Bill Gates, and Andrew Carnegie, are the rare individuals with high leadership potential—their leadership potential is evident in early childhood and during their school years. Other children with the same interests, opportunities, experiences, and circumstances simply cannot turn out the same way because they do not have the same leadership potential."

As summarized by another leading researcher

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In addition, the researchers also measured people's leadership potential. That is, when an employee is given an opportunity to serve as a leader, how successful are they? The findings were sobering: a full 89% of all employees showed high leadership potential. When given opportunities to serve as a leader, these employees acted as excellent leaders. Only the remaining 11% of the people did not have leadership potential—when given opportunities to serve as a leader, these employees were mediocre or bad leaders. Thus, leadership potential is widespread.

You might wonder—if nearly everyone has high leadership potential, why are there so few leaders? This is because society simply does not have the opportunities for everyone to express their leadership potential. Although nearly everyone has high leadership potential, only some of them get an opportunity to express it.

Similar conclusions were drawn by Dr. Paul Medin at the National Institute of Business, based on decades of research on leadership. Dr. Medin noted in a recent research article published in the respected journal *Leadership Quarterly*, "Individuals who rise to become great leaders, like George Washington, Bill Gates, and Andrew Carnegie, are no different from other people in terms of their leadership potential—it is simply impossible to tell apart great leaders from non-leaders. Anyone with the same interests, opportunities, experiences, and circumstances can turn out to become a great leader because everyone has the same high leadership potential."

on leadership, Dr. Johannes Spitzmuller, "We don't know whether leadership potential is inborn and fixed or whether it is malleable and can be developed. However, we know for sure from extensive research that not everyone has high leadership potential—only some people have the potential to become great leaders."	As summarized by another leading researcher on leadership, Dr. Johannes Spitzmuller, "We don't know whether leadership potential is inborn and fixed or whether it is malleable and can be developed. However, we know for sure from extensive research that nearly everyone has high leadership potential—everyone has the potential to become a great leader."