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## Interventions That Affect Gender Bias in Hiring: A Systematic Review

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### Abstract

**Purpose**—To systematically review experimental evidence for interventions mitigating gender bias in employment. Unconscious endorsement of gender stereotypes can undermine academic medicine's commitment to gender equity.

**Method**—The authors performed electronic and hand searches for randomized controlled studies since 1973 of interventions that affect gender differences in evaluation of job applicants. Twenty-seven studies met all inclusion criteria. Interventions fell into three categories: application information, applicant features, and rating conditions.

**Results**—The studies identified gender bias as the difference in ratings or perceptions of men and women with identical qualifications. Studies reaffirmed negative bias against women being evaluated for positions traditionally or predominantly held by men (male sex-typed jobs). The assessments of male and female raters rarely differed. Interventions that provided raters with clear evidence of job-relevant competencies were effective. However, clearly competent women were rated lower than equivalent men for male sex-typed jobs unless evidence of communal qualities was also provided. A commitment to the value of credentials before review of applicants and women's presence at above 25% of the applicant pool eliminated bias against women. Two studies found unconscious resistance to “antibias” training, which could be overcome with distraction or an intervening task. Explicit employment equity policies and an attractive appearance benefited men more than women, whereas

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repeated employment gaps were more detrimental to men. Masculine-scented perfume favored the hiring of both sexes. Negative bias occurred against women who expressed anger or who were perceived as self-promoting.

**Conclusions**—High-level evidence exists for strategies to mitigate gender bias in hiring.

The success of female physicians is recognized and celebrated both in popular television series such as “ER,” “Providence,” and “Strong Medicine” and by the National Library of Medicine.<sup>1</sup> Despite explicit support for gender equity in academic medicine, however, female physicians advance more slowly toward seniority than do male physicians, earn less than male physicians in similar positions, and have not entered the ranks of leadership at rates predicted by their proportional presence in academic medicine for the past 30 years.<sup>2–4</sup>

Physicians are committed to evidence-based practice.<sup>5</sup> Studies with random assignment of participants to an intervention or control group, in particular, provide high levels of evidence in informing physician decision making.<sup>5,6</sup> Decades of social cognitive research exists on how gender stereotypes lead to assumptions—both implicit (unconscious) and explicit (conscious)—that consistently impede women's advancement in historically male-dominant fields.<sup>7,8</sup> The success of a job applicant in obtaining a position is a major determinant of that person's ability to advance in any career. To facilitate the adoption of evidence-based employment practices in academic medicine, we performed a systematic review of studies with randomized controlled designs that investigated the impact of an intervention on the activation and application of gender bias in hiring settings.

## Method

### Study selection

The studies we selected met the following inclusion criteria: random assignment of participants to the intervention or control group, assumption by participants of the role of personnel decision makers evaluating applicants for employment, publication after 1972 (the year that Congress passed the Title IX Amendment<sup>1</sup> to the Civil Rights Act), blinding of participants to the intervention, the presence of both men and women in the contrived applicant pool and the participant (rater) groups, and comparison of the impact of an intervention on ratings of male and female applicants with identical qualifications. We excluded studies that assessed bias only by reaction time or accuracy in matching gender-linked stereotypic words or pictures, studies in which the participants were stated to be less than 18 years old, studies with only women in the applicant pool (e.g., pregnant and nonpregnant participants), and studies that did not specifically indicate random assignment of the intervention. We also excluded dissertations, letters, and abstracts. Although searches had no language restriction, all studies identified were in English. When the presence of an inclusion criterion was in doubt, the authors achieved resolution through consensus. This effort usually involved distinguishing between an intervention that had an impact on gender bias and one that simply documented gender bias in a different hiring setting (e.g., jobs supervising men or women<sup>9</sup>).

## Data sources and search strategy

The authors electronically searched the following sites from 1973 (when possible) to June 2008: PubMed, PsychINFO, Web of Science (including Social Science Citation Index), Cochrane Library, CINAHL, ProQuest, ABI/INFORM (U.S. and international articles on business and management), ERIC, and SocINDEX. Terms entered from the Medical Subject Headings (MeSH) of the National Library of Medicine were Human, Female, Prejudice, and Stereotype(s). Other terms entered individually or in combination were Gender, Women, Hire/hiring, Bias, Sex roles, Sex, Discrimination, and Research. The authors narrowed database searches using the term Experimental to identify studies with randomized controlled designs. Professional librarians performed supplemental searches of ProQuest, PubMed, and Women's Studies International. Additional reference mining included selected author searches, hand searches of bibliographies of retrieved studies and meta-analyses, and review of files of senior faculty who study gender and leadership. The search was considered saturated when relevant articles reappeared in multiple searches. The authors identified and reviewed abstracts from citations through each of the above searches (N = 1,920) and retrieved and examined articles that seemed to meet inclusion criteria (Figure 1). Because of the heterogeneity in interventions and outcomes, the data were not pooled.

## Data extraction

We three authors independently reviewed in detail 130 studies. One of us (B.L.), a statistician, evaluated articles for quality and effectiveness of controls, validity checks on interventions, and appropriateness of statistical tests. We scored articles for quality by using a modified Jadad numerical system of one to four points (a point was allowed for single blinding).<sup>10</sup> Inclusion required a score of at least 2. After verification of inclusion criteria, we extracted the following information: author, year, and country in which study was performed; intervention; outcome variables; study design; demographic information on study participants (i.e., gender and race-ethnicity); the construct measured; results; and the *P* values of statistical procedures.

When an article described more than one experiment, we included only those substudies that met our inclusion criteria. If more than one of the substudies in a given paper met the criteria, we reviewed each one but still counted the citation as one study. Twenty-seven studies met all inclusion criteria. See the Appendix (<http://links.lww.com/ACADMED/A1>).

The Jadad score was 3 for 4 of the studies<sup>11–14</sup> and 2 for the other 23 studies.

## Results

### Overview of selected studies

Participants in 18 of the 27 studies were college students. Other studies used business (MBA) or graduate students (3 studies and 1 substudy),<sup>15–18</sup> managers,<sup>12,19,20</sup> adult workers,<sup>21,22</sup> and members of human resource associations.<sup>14</sup> Twenty-three studies were conducted in the United States: 3 at specified universities,<sup>11,13,17</sup> 7 in identified regions,<sup>12,14,19–21,23,24</sup> and 13 at unspecified locations. Two studies were conducted in the Netherlands<sup>25,26</sup> and 2 in Germany.<sup>27,28</sup> Participants in all studies were categorized by gender; 11 had descriptors of age (means or ranges),<sup>13,14,17,19,21,23,27–31</sup> and 2 provided some description of race and

ethnicity.<sup>21,23</sup> Whites made up 72% to 90% of participants in these two studies. Studies established applicant gender visually by photograph<sup>19,28,29,32–36</sup> or video,<sup>13,21,37</sup> designation of sex on the application,<sup>18,24</sup> in-person interview,<sup>27,37</sup> and/or the use of gendered names and pronouns (modifications of the Goldberg paradigm<sup>38</sup>).<sup>11,12,14–18,22–32,34</sup> Twenty-four studies<sup>11–13,15,16,18–30,32,34–37,39</sup> examined gender bias in decision making with regard to applicants for “male sex-typed jobs,” the term applied in much of this research to positions historically or predominantly occupied by men and/or assumed to require stereotypically male traits. Such positions included mechanical engineer,<sup>11,24</sup> assistant vice president for financial affairs,<sup>18</sup> chair of a district’s association of physicians,<sup>25,26</sup> sales manager for a heavy-machinery company,<sup>12</sup> high-ranking chief executive officer,<sup>21</sup> and police officer.<sup>22,39</sup> Twelve studies<sup>12–14,17,21,24,27,30,33,34,36,39</sup> examined outcomes for female sex-typed jobs (e.g., nurse,<sup>39</sup> dental receptionist,<sup>12</sup> and day care worker<sup>24</sup>) or gender-neutral jobs (e.g., copy editor,<sup>24</sup> assistant trainee,<sup>21</sup> and compensation analyst<sup>14</sup>). One study<sup>13</sup> manipulated the sex-typing of a neutral job (computer lab manager) by emphasizing the requirement of either stereotypic male traits (i.e., technically skilled and able to work under pressure) or stereotypic female traits (i.e., helpfulness and sensitivity to coworkers). Studies confirmed job sex-typing with pretested scales<sup>11,22–24,26–29,35</sup> or previous studies<sup>12–17,19–22,25,27,28,30–34,36,37</sup> that used, for example, job sex-typing inventories.<sup>40–44</sup> Twenty-three studies used ANOVA,<sup>11–27,29,30,32–34,36,37</sup> MANOVA,<sup>14,16,19,35</sup> or ANCOVA<sup>28,36</sup> to compare main effects of the intervention and other independent variables and to test for interactions with gender on the dependent variables of interest. These comparisons were followed by individual comparisons of findings for male and female applicants with previously planned contrasts or appropriate post hoc tests. The remaining study used the chi-square test.<sup>31</sup>

All but one study<sup>24</sup> confirmed that male applicants are evaluated more positively than female applicants for employment in male sex-typed jobs. See the Appendix (<http://links.lww.com/ACADMED/A1>). It was easier for men than for women with identical qualifications to be recommended for advancement in the job-acquisition process, such as being granted an interview or being hired. Other than in a few comparisons within six studies,<sup>11,22,24,28,33,37</sup> male and female participants did not differ in their ratings. Interventions fell into one of three categories (List 1): varying the information provided to raters in the written application (12 studies); changing the behavior, scent, or appearance of the applicant (9 studies); or altering the conditions under which raters assessed applicants (10 studies). Four studies had interventions in two of the categories.<sup>13,28,32,33</sup>

### Information provided to raters in written applications

Six of the 12 studies in this group assessed the impact on bias against female applicants for a male sex-typed job of providing clear evidence of job-related competence (relevant educational or work background,<sup>16,17,24,33</sup> high scholastic standing,<sup>24,33</sup> job-congruent personality characteristics,<sup>30</sup> or designation as a “finalist in the job competition” by “a panel of experts”<sup>29</sup>). Such individuating information was effective in reducing<sup>24,30,33</sup> or eliminating<sup>16,17,29</sup> hiring bias. Other studies assessed the impact of matching gender-stereotypic, gender-counterstereotypic, or gender-neutral traits of applicants with job sex-type.<sup>12,13,16,30,33,34</sup> For example, Futoran and Wyer<sup>34</sup> selected traits shown to be gender-linked on the Bem Sex Role Inventory<sup>40</sup> (i.e., aggressive, competitive, industrious, and outgoing for

males, and appreciative, considerate, gentle, and helpful for females) to describe male, female, or gender-ambiguous candidates for jobs that normative occupational data studies have shown to be considered to require stereotypic male or female traits. Both an applicant's gender and traits influenced job suitability ratings. Heilman<sup>16</sup> found that including positive but job-irrelevant information about female applicants (e.g., having a biology/ political science degree rather than a business/economics degree when applying for a lower management position) resulted in lower ratings than did the absence of such information. Glick and colleagues<sup>12</sup> provided individuating information that established gender-counterstereotypic personality traits (e.g., men working in retail sales at a jewelry store and women working in grounds maintenance) but that was job-irrelevant; they found higher employability ratings for both male and female applicants with stereotypic masculine traits, although the preference of raters for a match between job sex-type and applicant gender remained. To measure the degree of gender stereotyping, the participants in the study by Heilman<sup>16</sup> assessed applicants by using five adjectival scales associated with gender-related work attributes (e.g., emotional–rational, ambitious–unambitious, tough–soft). Providing a high degree of job-relevant information about a female applicant eliminated the difference in gender stereotyping between male and female applicants seen with low job-relevant information or no information. Furthermore, when composites of these adjectival scores were covaried with applicant ratings, the perceptions of gender-related attributes rather than the applicant's actual gender accounted for assessments of hireability and of potential for advancement. Rudman and Glick<sup>13</sup> found that highly competent female applicants benefited from applications that included a written “life philosophy” endorsing communal (stereotypically female) rather than agentic (stereotypically male) values, particularly when they were applying for female sex-typed jobs.

Two studies examined the impact of including information on parental status in the application.<sup>18,23</sup> Male and female applicants without children received comparable ratings on all employment-relevant measures. Parenthood resulted in lower ratings for both male and female applicants, but women whose applications indicated that they had children were more disadvantaged. Although both female and male parents were rated as less committed and less dependable than nonparents, only female applicants with children were rated lower on measures of hiring and promotion.<sup>18,23</sup> One study included both marital and parental status information in the applications.<sup>17</sup> Marital status had little effect on applicant ratings, although married men with children and single women were ranked as the most suitable applicants for two neutral sex-typed positions. One study examined the impact of applications that contained discontinuities in employment and found that men were generally judged more harshly than women in such cases.<sup>14</sup>

One study compared the effect of gender ambiguity in the application.<sup>34</sup> When an applicant's gender was apparent from the application, women were disadvantaged; however, when applicants had gender-ambiguous names (e.g., Pat or Chris), job suitability was based solely on the applicants' qualifications (even if the inferred gender was female).

### **Applicant behavior, scent, or appearance**

Three studies assessed the impact of interview behavior on gender bias.<sup>13,21,37</sup> All found negative reactions to women who exhibited stereotypic male behaviors. Rudman<sup>37</sup> found that,

when applicants of either gender violated behavioral norms—men by being self-effacing and women by being self-promoting—both were rated lower than applicants who behaved in a more gender-congruent manner. In one of the few differences by participant gender, female raters judged self-promoting women more harshly than did male raters. Rudman and Glick<sup>13</sup> found that women who exhibited an agentic interview style were rated lower on social skills than were men, although this difference was eliminated when women's applications included a communal life philosophy statement. Brescoll and Uhlmann<sup>21</sup> found that the expression of anger by an applicant enhanced the evaluation of men and lowered the evaluation of women, particularly women applying for a high-status position. The existence of a specific external cause for anger mitigated but did not eliminate the negative bias toward women; external attribution for anger improved the status and salary ratings for women who expressed anger but had no impact on the lower rating of competence.

Sczesny and Stahlberg<sup>27</sup> and Sczesny and Kühnen<sup>28</sup> found that visual and olfactory cues can activate gender stereotypes independent of the actual biological sex of the applicant. Male and female applicants wearing a masculine-scented perfume or submitting paper applications to which such a scent was applied received more positive ratings than did identically qualified applicants who used a feminine scent.<sup>27</sup> This group also found that both men and women who looked more stereotypically masculine in photographs were favored for hiring into a leadership position.<sup>28</sup>

Five studies examined the impact of physical attractiveness and found that overall attractiveness is advantageous, but more so for men than women.<sup>19,28,32,33,36</sup> Highly attractive women can be disadvantaged in applying for male sex-typed jobs, and less attractive women can be disadvantaged in applying for female sex-typed and neutral jobs. Heilman and Saruwatari<sup>36</sup> found that attractiveness predicted ratings of stereotypic male or female traits among applicants and that, when these ratings were factored out, the impact of attractiveness was eliminated.

### Conditions under which raters assessed applicants

Five studies sought to manipulate automatic gender bias in hiring by informing raters of employment equity directives<sup>11,20,39</sup> or by prior training of raters with an exercise to decrease the response time to gender-counterstereotypic word associations.<sup>25,26</sup> In response to employment equity directives, Ng and Wiesner<sup>39</sup> found that men who were less qualified than women for a female sex-typed job (i.e., nurse) were more likely to be hired, but this positive bias for the underrepresented candidate did not hold true for women who were less qualified than male applicants for a male sex-typed job (i.e., police officer). In the study by Biernat and Fuegen,<sup>11</sup> raters with the expectancy of accountability for their hiring decisions were less likely to hire a female applicant. Rosen and Mericle<sup>20</sup> found that, even under strong employment equity directives, female applicants were recommended for lower salaries than were men with identical qualifications. Kawakami and colleagues<sup>25,26</sup> engaged raters in “antibias” training that successfully reduced response time in matching gender-counterstereotypic words that were displayed sequentially on a computer screen. However, this training did not reduce gender bias in a subsequent mock-hiring situation unless an intervening task or concurrent cognitive distraction prevented subjects from correcting against the perceived coercion of training.<sup>25</sup> If

participants were able to correct for perceived coercion on an initial task, the preference for male over female job candidates and the attribution of gender-stereotypic traits were eliminated.<sup>26</sup>

Two studies varied the order in which aspects of the hiring process occurred.<sup>22,32</sup> Uhlmann and Cohen<sup>22</sup> found that requiring raters to commit to the value of credentials before reviewing any applicants eliminated gender bias in hiring a police chief. Cann et al<sup>32</sup> found better correlation between applicant ratings and recommendations to hire when raters were forced to rate applicants' qualifications separately before, rather than after, providing summary employability judgments.

Heilman<sup>15</sup> found that, when women composed 25% or less (i.e., no more than two) of the applicants in a pool of eight, they were viewed as less qualified than male applicants for a managerial job and as being more stereotypically female on gender-related adjectival scales than when women made up at least 37.5% of the pool (three of eight applicants). Covariance analysis of gender-stereotypic and hireability ratings indicated that the impact of gender proportion in the applicant pool could be completely accounted for by the stronger attribution of female gender stereotypes to women when they made up 25% or less of the pool. In a study by Heilman and Martell,<sup>35</sup> priming raters with data that women are succeeding in a relevant male-dominated field eliminated bias against female applicants, although priming with information about a single successful woman did not.

Sczesny and Kühnen<sup>28</sup> found that rating applicants in the presence of a competing cognitive demand (i.e., memorizing a nine-digit number) enhanced the evaluation of male applicants for leadership competence and certainty of hiring. This effect was most pronounced in female raters.

## Discussion

This systematic review reaffirmed the ubiquity of unconscious stereotypes regarding the behaviors and traits associated with being male or female, the ease with which these stereotypes are activated, and the consequent negative bias against women applicants for jobs historically occupied by men. More important, however, this review documents the capability for mitigating the automatic activation and subsequent application of these biases.

Taken together, these studies indicate that, when ambiguity exists in an individual's qualifications or competence, evaluators will fill the void with assumptions drawn from gendered stereotypes. Providing individuating proof of competence and past performance excellence that are relevant to the employment opportunity seems to be effective in mitigating gender bias,<sup>16,17,24,29,30,33</sup> provided that raters do not feel coerced,<sup>25,26</sup> conditions enable raters to fully attend to the information provided,<sup>28</sup> and raters commit to the value of specific credentials both before the review<sup>22</sup> and before giving an overall rating.<sup>32</sup> Informing raters about research confirming women's competence in sex-typed male tasks is also effective.<sup>35</sup>

Given the large number of competent women physicians and scientists, this approach would seem to be a fairly straightforward way to ensure gender equity. The studies reviewed also indicate, however, that the issue is more complex than expected. Women who are clearly

competent in male sex-typed roles may engender negative reactions<sup>37</sup> and lower ratings simply because their competence violates the prescriptive norms for female behavior.<sup>31</sup> This outcome seems particularly likely for women who exhibit anger (a “male” emotion<sup>45</sup>) and for women who use self-promoting, powerful verbal and nonverbal status cues.<sup>37</sup> At the same time, men are penalized in evaluations for exhibiting communal or stereotypic female behaviors (e.g., parenthood or self-effacing speech).<sup>23,37</sup> Providing evidence that agentic, competent women also behave in gender-congruent communal ways helps mitigate this negative bias<sup>13,31,37</sup>; however, women must be careful not to seem overly communal by bringing attention to the fact that they are parents or by seeming too feminine in appearance or scent.<sup>18,23,27,28</sup> The potential benefit to a woman who is applying for a male sex-typed job of having a gender-ambiguous name<sup>34</sup> is worth noting.

Diversity training and employment equity policies would seem logical institutional initiatives to promote gender equity. Evidence from our review suggests, however, that these directives do not ensure gender equity in hiring.<sup>20,39</sup> Furthermore, if such directives result in women's presence as a small proportion of an applicant pool, individuating from the stereotypes of the social group that women occupy becomes more difficult, and they may be less likely to be hired.<sup>15</sup> Counterstereotype training was effective only under certain circumstances.<sup>25,26</sup>

This review covered more than 30 years of publications. More recent studies often built on previous work and tended to employ more sophisticated interventions and analyses, but there was no clear diminution of gender bias in the findings between earlier and more recent studies. Several studies did not meet all inclusion criteria but are worth mentioning. Bragger and colleagues<sup>46</sup> found that structured interviews with standardized, sequential questions that were relevant to the position eliminated the hiring bias against pregnant applicants found when the same information was obtained through haphazard conversation. Glick and colleagues<sup>47</sup> found “sexy” attire was a particular disadvantage, as compared with neutral dress, for women applying for a managerial position. Wiley and Eskilson<sup>48</sup> found that applicants with tentative speech patterns, regardless of gender, received lower ratings. The benefit of gender ambiguity was striking in a study comparing employer response to identical resumes with female names or initials.<sup>49</sup> Davies and colleagues<sup>50</sup> found that affirmation that both men and women are equally capable prevented female-stereotype priming from undermining women's subsequent leadership aspirations. McConnell and Fazio<sup>51</sup> found that use of the title “chairman” primed raters to give a position more stereotypic masculine ratings than did the use of “chairperson” or “chair.” Martell<sup>52</sup> found that gender bias in rating police officers was eliminated by the reducing time pressure and cognitive distraction during evaluation. Heilman and Okimoto<sup>31</sup> confirmed the importance for highly agentic women of providing evidence of communality, to prevent negative ratings. Hugenberg and colleagues<sup>53</sup> found less gender bias in selection when raters decided whom to include rather than whom to exclude from a list of individuals in a male sex-typed job.

This study had some limitations. Evidence-based recommendations are limited by the predominant use of college students as participants,<sup>54–56</sup> although gender bias in evaluation was also found in the six studies with adult nonstudent participants.<sup>12,14,19–22</sup> Furthermore, Marlowe and colleagues<sup>19</sup> found gender biases even in the evaluations of experienced managers. The absence of any study in an academic medicine setting is a limitation in the



capacity to generalize our findings to academic medicine. We also have little information on the ethnic-racial diversity of the participants, but, given the populations from which these studies drew participants, it is likely that nearly all were white. Finally, although the randomized controlled design of these studies is important for establishing a causal relationship between the intervention and the outcome, the success of these interventions in actual employment settings is unknown.

## Conclusions

This review identifies several institutional interventions with a high level of evidence promising the possibility of promoting gender equity in hiring (List 2). The limitations of the studies, in combination with the continual and rapid evolution of social norms, make us reluctant to dictate to individual female applicants behaviors that may enhance their hireability. Whereas we are mindful of these caveats, we also provide recommendations for individual applicants that are supported by the existing research evidence (List 2).

The National Institutes of Health Roadmap calls for scientists to move beyond the limits of their own discipline and explore new organizational models for interdisciplinary science.<sup>57</sup> Evidence-based practice has become a core value of academic medicine.<sup>5</sup> With this systematic review, we encourage those within the institution of academic medicine to apply evidence from social science research to the practice of personnel decision making.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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## Appendix

Appendix 1

Twenty-seven Reports of Randomized Controlled Trials, Published from 1973 to 2008, Assessing the Impact of an Intervention on Gender Bias in the Evaluation of Job Applicants\*

Study, year, reference no.	Intervention	Outcome variable	Study design	Study participants	No. of participants	Construct measured	Results	P value
Biernat and Fuegen, 2001 <sup>11</sup> (Substudy 2)	Presence or absence of requirement to justify hiring decision and sign evaluation form	Gender differences in short-list and hiring selections for applicants with identical resumes	2 × 2 × 2 × 2 Participant gender (M,F) by accountability (Y/N) by resume set (M,F) by decision (short list, hire)	College students told to short-list 3 applicants from 14 resumes (7 M, 7 F); then hire 1 of the 3 for mechanical engineering (male sex-typed) position based on recommendation letter	39 male (M) 25 female (F)	Effect of accountability expectation on choice of M or F candidate for male sex-typed job	<ul style="list-style-type: none"> <li>No difference in short-listing M or F</li> <li>F applicants more likely to be short-listed than hired</li> <li>F students less likely to hire a F applicant</li> <li>No effect of accountability on short listing</li> <li>Both M and F chose to hire fewer women when held accountable</li> </ul>	<p>NS</p> <p><math>P &lt; .05</math></p> <p><math>P &lt; .03</math></p> <p>NS</p> <p><math>P &lt; .06</math></p>
Brescoll and Uhlmann, 2008 <sup>21</sup>	Substudy 1: Expression of anger or sadness by job applicant in response to losing an account	Substudy 1: Composite measure of status, recommended salary, competence (1-11); external or internal attribution of emotion	Substudy 1: 2 × 2 Applicant gender (M,F) by emotion (anger, sadness)	Adults with workplace experience randomly assigned to view a videotaped job interview	Substudy 1: 39 M 30 F (85% white)	Effects of anger (a gender-incongruent emotion) on evaluation of multiple work-related attributes	Substudy 1: <ul style="list-style-type: none"> <li>Status, salary, and competence greater for angry vs sad M</li> <li>Angry F lowest in status and competence</li> <li>F anger attributed to internal factors</li> </ul>	<p><math>P &lt; .05</math></p> <p><math>P &lt; .05</math></p> <p><math>P &lt; .05</math></p>
	Substudy 2: Same as substudy 1 except no emotion rather than sadness for control and high (CEO) and low (assistant trainee) occupational ranks	Substudy 2: Same as in substudy 1 with measure of being "in control" or "out of control" added	Substudy 2: 2 × 2 × 2 Applicant gender (M,F) by emotion (anger, no emotion) by occupation (high vs low rank)		Substudy 2: 70 M 110 F		Substudy 2: <ul style="list-style-type: none"> <li>Status, salary, and competence all lower for angry F regardless of rank</li> <li>Angry high rank F less competent than all other targets</li> <li>Anger in F related to internal attribution of being out of control and this fully mediated relationship between anger and status</li> </ul>	<p><math>P &lt; .05</math></p> <p><math>P &lt; .05</math></p> <p><math>P &lt; .01</math></p>
	Substudy 3: As in substudy 2 but with no information on occupational rank	Substudy 3: Same as in substudy 1	Substudy 3: 2 × 3 Applicant gender (M,F) by emotion (unexplained)		Substudy 3: 51 M 82 F		Substudy 3: <ul style="list-style-type: none"> <li>Higher status and salary for angry M without external attribution vs M with</li> </ul>	<p><math>P &lt; .05</math></p> <p><math>P &lt; .05</math></p> <p>NS</p>

Study, year, reference no.	Intervention	Outcome variable	Study design	Study participants	No. of participants	Construct measured	Results	P value
	and added statement of external attribution for anger or none		anger, explained anger, no emotion)				no emotion or external attribution <ul style="list-style-type: none"> <li>Higher status and salary but not competence for angry F with vs without external attribution but still lower than F with no emotion</li> <li>Angry F with external attribution same as angry M in status, salary, and competence</li> </ul>	
Cann et al., 1981 <sup>32</sup>	Overall applicant rating or rating of separate qualifications varied in order; applicant physical attractiveness (pre-tested) also varied	Applicant qualifications (1-10), decision to hire (1-6); composite rating of 10 qualifications (each 1-10), self-assessment of applicant attractiveness on decisions	2 × 3 × 2 × 2 Applicant gender (M,F) by attractiveness (low, medium, high) by order of evaluation by participant gender (M,F)	College students randomly assigned to review 1 out of 24 job applicant with separate qualifications either first or second	96 M 148 F	Impact on summary judgments in hiring of forcing raters to attend to specific qualifications first	<ul style="list-style-type: none"> <li>No effect of applicant gender or attractiveness on overall ratings, but M and attractive applicants more likely to be hired</li> <li>Ratings of individual qualifications higher and more strongly correlated with hiring decision when made prior to overall rating</li> <li>Rating order affected hiring only for average attractive applicants: hiring more likely when overall ratings came first (no gender breakdown)</li> <li>Raters acknowledged influence of attractiveness</li> </ul>	NS (overall); <i>P</i> < .01 (hiring)  <i>P</i> < .01 (qualifications) ( <i>P</i> value not given for correlation)  <i>P</i> < .05  <i>P</i> < .0001
Dipboye et al., 1977 <sup>33</sup>	Physical attractiveness (pre-tested) and qualifications of applicants varied	Willingness to hire (1-7), salary, and top candidate; rating of traits on adjectival scales	2 × 3 × 2 × 2 × 3 Rater gender by rater attractiveness (low, moderate, high) by applicant qualifications (low, high) by applicant gender (M,F) by applicant attractiveness	College students reviewed 12 resumes; Two other college students viewed raters through a one-way mirror and rated their attractiveness	110 (white; no gender breakdown)	Impact of attractiveness on bias in hiring decisions	<ul style="list-style-type: none"> <li>Attractive, high qualified M most likely hired, highest salary, selected as top candidate</li> <li>M more likely than F to be hired in all conditions except M raters for low-qualified F applicants</li> </ul>	<i>P</i> < .05  <i>P</i> < .05  <i>P</i> < .05 NS  <i>P</i> < .05 NS

Study, year, reference no.	Intervention	Outcome variable	Study design	Study participants	No. of participants	Construct measured	Results	P value
Fuegen et al., 2004 <sup>23</sup>	Parental status of applicant varied	Ratings of applicant competence, job commitment, availability on job, gender ST behaviors; controls rated "ideal" workers	(low, moderate, high)  2 × 2 × 2 Applicant gender (M,F) by parental status (Y/N) by participant gender (M,F)	Two samples of college students randomly to review resume in 1 of 4 conditions; Midwest sample was 90% white, 3.8% Asian, 2.8% African American, 2.8% Hispanic; Eastern sample was 72.4% white, 8% African American, 4.6% Asian, 13.9% Hispanic, 1.1% West Indian	49 M 58 F (Midwestern sample); 21 M 66 F (Eastern sample)	The extent to which parenthood impacts employment standards for men and women	<ul style="list-style-type: none"> <li>Unattractive M rated higher than unattractive F</li> <li>No difference between moderately attractive M and F</li> <li>Attractiveness enhanced hiring only for highly qualified applicants</li> <li>Rater attractiveness had no effect</li> <li>Adjectival trait differences in M and F applicants aligned with gender stereotypes</li> <li>No difference in competence or intelligence M vs F</li> <li>Attractive applicants more favorable than unattractive on all traits except intelligence</li> </ul>	<p><math>P &lt; .05</math> NS</p> <p><math>P &lt; .05</math> (all traits); NS (intelligence)</p> <p>NS</p> <p><math>P &lt; .0001</math>; <math>P &lt; .02</math></p> <p><math>P &lt; .02</math> NS</p> <p><math>P &lt; .05</math> <math>P &lt; .03</math> <math>P = .06</math></p>

Study, year, reference no.	Intervention	Outcome variable	Study design	Study participants	No. of participants	Construct measured	Results	P value
Futoran and Weyer, 1986 <sup>34</sup>	Gender of applicant was explicit or left ambiguous with a nongendered name (Pat, Chris)	Rating (0-5) of applicant suitability of 9 occupations (3 M sex-typed, 3 F sex-typed, 3 neutral)	2 × 2 × 2 Applicant gender (M,F) by stereotype traits (masc, fem) by sex-typed job (M,F) 2 × 2 Stereotypic traits (masc, fem) by sex-typed job (M,F) for gender-ambiguous applicant	College students randomly assigned to 1 of 6 groups: job suitability for M, F; ambiguous applicant when traits match or do not match job type	134 M 114 F	Separate contribution of stereotypic gender traits and biological sex to ratings of job suitability	<ul style="list-style-type: none"> <li>Hiring and promotion lower for F but not M parent</li> <li>Required performance standards and time commitment for hire: nonparents same, but F parent held to higher standards and M parent held to lowest standards</li> <li>Inference of gender in ambiguous condition no different for applicants with stereotypic M or stereotypic F traits</li> <li>Applicant assumed to be the gender of the sex-typed job</li> <li>When gender was explicit, both gender and traits contributed independently to judgment of job suitability</li> <li>When gender was inferred, (ambiguous) it was irrelevant and judgment of job suitability was based solely on applicants' traits</li> </ul>	<p>NS</p> <p><math>P &lt; .03</math></p> <p><math>P &lt; .05</math></p> <p>NS</p>
Glick et al., 1988 <sup>12</sup>	Type of stereotypic or counter-stereotypic gender information (unrelated to job) about applicants varied in	Likelihood of interview for job rated 1-5; Personality trait	2 × 3 × 3 Applicant gender (M,F) by individuating Information (masc, fem, neut as indicated by summer job, work-study job, extracurricular activities) by job	Upper level managers and business professionals rated 1 of 6 possible	205 M	Ability of counterstereotypic individuating	<ul style="list-style-type: none"> <li>Individuating information matched personality inferences</li> <li>Applicants with masc traits more likely to be interviewed for all jobs</li> <li>Counterstereotypic information reduced trait rating bias, but bias favoring a</li> </ul>	<p><math>P &lt; .001</math></p> <p><math>P &lt; .05</math></p> <p><math>P &lt; .001</math></p>

Study, year, reference no.	Intervention	Outcome variable	Study design	Study participants	No. of participants	Construct measured	Results	P value
Heilman and Sanuwatari, 1979 <sup>36</sup>	otherwise identical resumes Physical attractiveness (pre-tested) of applicants for managerial and nonmanagerial jobs varied in otherwise identical resumes	inferences rated masc or fem 1-5 Ratings (1-9) for job qualifications, hiring likelihood, and gender-stereotypic adjectival scales; ranked preferences among applicants; salary	sex-type (masc, fem, neut) 2 × 2 × 2 Applicant appearance (attractive, unattractive) by applicant gender (M,F) by job type (managerial, nonmanagerial)	resumes, randomly assigned College students randomly assigned to managerial or nonmanagerial condition and evaluated applicants of both genders and levels of attractiveness	5 F (44% of those mailed surveys) 23 M 22 F	information to affect gender bias in hiring Impact of attractiveness on bias in hiring decisions	match of job and gender remained • Attractiveness benefited all applicants for all ratings except F applicants for a managerial position (e.g., unattractive F applicants recommended for higher pay than attractive applicants) • Attractive M judged more stereotypically masc and attractive F rated more stereotypically fem • When gender ratings were factored out, impact of attractiveness on all ratings for M and F were eliminated	$P < .05$ ( $P < .10$ for salary) $P < .001$ NS
Heilman, 1980 <sup>15</sup>	Proportion of women in an applicant pool varied	Target F applicant rated 1-9 on qualifications, hiring likelihood, advancement potential, and gender stereotypic adjectival scales	2 × 5 Rater gender (M,F) by gender pool proportion (Target F+0, 1, 2, 3, or 7 F)	MBA students rated target F in pool of 8 applicants for managerial job	50 M 50 F	Effect of gender proportion of applicant pool on application of bias in decision-making	• Target F qualifications rated lower when pool had <37.5% females • Likelihood of target F hire greater when pool > 25% female • Potential for target F advancement greater with more F in pool, 12.5% vs 37.5% and 100% • Composite adjectival gender score more fem for target F with pool <37.5% and greatest for 12.5% • Composite adjectival scale completely accounted for all effects of gender pool proportion	$P < .05$ $P < .05$ $P < .05$ $P < .05$ $P < .05$
Heilman, 1984 <sup>16</sup>	Information about applicant	Ratings (1-9) for interview, likely	2 × 3	MBA students (blocked by gender)	42 M 35 F	Ability of individuating	• No effect of information type on	NS

Study, year, reference no.	Intervention	Outcome variable	Study design	Study participants	No. of participants	Construct measured	Results	P value
	background varied	success if hired, and potential for advancement; composite gender score from 5 scales of gender-stereotypic adjectival scales	Applicant gender (M,F) by information type (high job relevance, low job relevance, no information)	randomly assigned to 1 of 6 conditions: target M or F with each information type for lower management position		information to affect gender bias in hiring	any job rating or gender score for M target <ul style="list-style-type: none"> <li>• F target rated lower on all measures with low, job-relevant information vs. no job-relevant information</li> <li>• With high job-relevant information, M and F rated same on all measures</li> <li>• Target F rated more stereotypically fem in low job-relevant &gt; no information &gt; high job-relevant information</li> <li>• M = F gender-stereotypic with high job-relevant information</li> <li>• Factoring out gender score removed effect of applicant gender for all measures</li> </ul>	$P < .01$ (for success and interview) NS $P < .05$ NS NS
Heilman and Martell, 1986 <sup>35</sup>	Exposure to a neutral story or story about high-performing women individually or as a group in a field related or unrelated to the job before reviewing applicants	Composite rating of applicant-job match (qualifications, recommend to interview, predicted success in job), salary projection, and gender-related attributes relevant for employment	$2 \times 2 \times 2$ Applicant gender (M,F) by information exposure by competence relevance (Y,N) (individual F, F as a group), plus neutral information control	College students randomly assigned to 1 of 10 conditions: read article with group or individual competency information about F in a related or unrelated occupation, or nonrelevant information; then evaluated M or F applicant for position	70 M 77 F	Effect of priming on applicant evaluation by exposure to relevant counterstereotypic information before hiring decision for F in a male sex-typed job	<ul style="list-style-type: none"> <li>• M applicants were rated more favorably than F</li> <li>• Gender-stereotypic attributions for M and F applicants differed in neutral information condition</li> <li>• High-performing related group (but not individual) information improved rating of F applicants and reduced gender stereotyping</li> </ul>	$P < .01$ $P < .001$ $P < .05$
Heilman et al., 1988 <sup>29</sup>	Information about applicant's performance	Composite ratings from several scales (1-9) of competence	$2 \times 2 \times 2$ Applicant gender (M,F) by job sex-type (extremely	College students reviewed work sample of M or F	60 M 181 F	Ability of counterstereotypic individuating	<ul style="list-style-type: none"> <li>• With unknown performance, M rated higher than F for competence and</li> </ul>	$P < .01$ $P < .001$ $P < .01$

Study, year, reference no.	Intervention	Outcome variable	Study design	Study participants	No. of participants	Construct measured	Results	P value
	ability provided or not	potential and stereotypic gender-related traits	M, moderately M) by performance ability (high, unknown)	applicant for M sex-type jobs		information to affect gender bias in hiring	potential for both sex-typed jobs <ul style="list-style-type: none"> <li>• With high performance, F = M for moderate M sex-typed job and F &gt; M for high M sex-typed job</li> <li>• Stereotypic gender traits lower with high performance information for F; greatest for extreme M sex-typed job</li> </ul>	
Heilman and Okimoto, 2008 <sup>18</sup>	Substudy 1: Information about being a parent or nonparent with children at home provided in application	Substudy 1: Composite ratings of commitment and anticipated competence, and recommendation for further consideration or not	Substudy 1: 2 x 2 Applicant gender (M,F) by parental status (no children, children)	Substudy 1: College students exposed to 4 conditions: 2 F and 2 M targets, one of each a parent	Substudy 1: 18 M 47 F	Effect of parental status on gender bias in employee evaluation	Substudy 1: <ul style="list-style-type: none"> <li>• F regardless of parental status rated less committed</li> <li>• Parents regardless of gender rated less committed</li> <li>• M without children most committed</li> <li>• F and M without children equally competent and recommended to advance</li> <li>• F with children least committed, and least competent, and least likely to be advanced</li> </ul>	<p>P &lt; .001</p> <p>P &lt; .001</p> <p>P &lt; .05 NS</p> <p>P &lt; .001</p>
	Substudy 2: Same as substudy 1	Substudy 2: Same as substudy 1 with addition of composite ratings for achievement striving, work dependability, and likelihood of agentic behaviors (e.g., be a leader, seek power)	Substudy 2: Same as substudy 1	Substudy 2: MBA students who were full-time employees (74% with experience in hiring decisions) randomly assigned to evaluate one target application	Substudy 2: 66 M 34 F		Substudy 2: <ul style="list-style-type: none"> <li>• Commitment and competence same as Study 1 (F and M without children comparable; F with children lower than M with children)</li> <li>• Parents also lower on achievement striving and dependability regardless of gender</li> <li>• Likely to engage in agentic behaviors: rated lower for F with vs F without children; no effect</li> </ul>	<p>NS (nonparents); P &lt; .05 (F vs M parents)</p> <p>P &lt; .05 (F); NS (M)</p> <p>P &lt; .001 (F); NS (M); NS (nonparents)</p>



Study, year, reference no.	Intervention	Outcome variable	Study design	Study participants	No. of participants	Construct measured	Results	P value
Hodgins and Kalin, 1985 <sup>30</sup>	Type of individuating information about applicants: sex-typed personality descriptors vs no information	Substudy 1 and 2: Suitability (1-9) of 3 M & 3 F student resumes for 8 sex-typed jobs  Substudy 2: Same as substudy 1 with masc, fem, or neut individuating information added to resumes	Substudy 1: 2 x 2 x 2 Rater gender (M,F) by applicant gender (M,F) by job sex-type (M,F)  Substudy 2: 2 x 2 x 2 x 3 Same as substudy 1 by individuating information (masc, fem, neut)	College students in mock role of guidance counselor rated resumes of 3 M & 3 F; Raters were scored for explicit gender bias Same as substudy 1	Substudy 1: 14 M 62 F  Substudy 2: 33 M 82 F	Effect of individuating information about applicant on gender and job sex-type match	of children on rating for M • Recommendation to advance: lower for F but not M with children; equal for M and F nonparents	<i>P</i> < .01; NS  <i>P</i> < .001  <i>P</i> < .005
Kawakami et al., 2005 <sup>25</sup>	Counterstereotype training with or without a filler task or no training before applicant evaluation	Best candidate for leadership position from 4 applications (2 M, 2 F)	2 x 4 Applicant gender (M,F) by training and task (No training or task, training only, training plus filler, training plus distraction)	College students read applications and letters of recommendation and selected best out of 4 under one of four randomly assigned conditions	19 M 33 F 18 unknown (Nether-lands)	Ability to manipulate correction processes against "anti-bias" training	• Training did reduce response time for counterstereotypic responses • Hiring favored M over F equivalently for no training and training-only conditions • Hiring bias against F eliminated with training plus filler or training plus distraction	<i>P</i> < .001  <i>P</i> < 0.01  NS (M vs F)
Kawakami et al., 2007 <sup>26</sup>	Counterstereotype training with applicant evaluation before	Best candidate for leadership position from 4 applications (2 M, 2 F)	2 x 2 x 2 Counterstereotype training (Y/N) by order of job hire	College students randomly assigned to one of 8 conditions rated 4	45 M 111 F (Nether-lands)	Ability to manipulate correction processes against "anti-bias" training	• Training did reduce response time for counterstereotypic responses	<i>P</i> < .001  <i>P</i> < .05 (M vs F)

Study, year, reference no.	Intervention	Outcome variable	Study design	Study participants	No. of participants	Construct measured	Results	P value
	or after ranking candidates on gender stereotypic traits and instruction to either select the best candidate or the best candidate specifically based on leadership qualities		task after training (1 <sup>st</sup> or 2 <sup>nd</sup> to trait rating task) by instruction (attend to leadership vs general impression)	resumes (2 M & 2 F) for male or female traits and job hire in varied order with or without leadership basis			<ul style="list-style-type: none"> <li>• More men chosen in no training or when job hire task immediately.</li> <li>• Hiring bias against women eliminated when job hire task 2<sup>nd</sup> after trait rating task</li> <li>• Trait rating aligned with applicant gender in no training</li> <li>• No effect of training when trait rating 1<sup>st</sup>; eliminated stereotypic rating when 2<sup>nd</sup> after job hire task</li> <li>• No effect of instruction to evaluate for leadership traits</li> </ul>	<p>NS (M vs F) P &lt; .001</p> <p>NS (1<sup>st</sup>); P &lt; .01 (2<sup>nd</sup>)</p> <p>NS</p>
Marlowe et al., 1996 <sup>19</sup>	Physical attractiveness (pre-tested) of applicant varied with identical, well-qualified applicants	Ratings (1-9) of suitability for hire and likelihood of advancement; ranking of applicants	2 x 2 Applicant gender (M,F) by applicant appearance (highly attractive, marginally attractive)	Managers in financial institutions assessed for experience evaluated 4 resumes varied for gender and attractiveness	46 M 66 F	Impact of applicant attractiveness on gender bias in hiring	<ul style="list-style-type: none"> <li>• Hire and advancement: highly attractive &gt; marginally attractive; M &gt; F</li> <li>• Managers with low or moderate but not high levels of experience had positive bias for highly attractive M</li> <li>• All managers had negative bias for likelihood of advancement of marginally attractive F</li> <li>• For all levels of experience, highly attractive applicants most likely to be ranked number 1 with no gender difference</li> </ul>	<p>P &lt; .001 (appearance); P &lt; .02 (M vs F)</p> <p>P &lt; .01 (low and moderate); NS (high) P &lt; .02</p> <p>P &lt; .02 (appearance), NS (M vs F)</p>
Muchinsky and Harris, 1977 <sup>24</sup>	Scholastic standing and academic major varied for applicants for M.	Rating (1-20) for hiring	2 x 2 x 3 x 3 Rater gender (M,F) by applicant gender (M,F), by scholastic standing (low,	College students rated 24 applicants in random order (3 packets of 6 experimental + 2 sham resumes)	50 M 50 F	Impact of qualifications on gender bias for sex-typed employment	<ul style="list-style-type: none"> <li>• M rated F applicants higher for F sex-typed job (day-care center worker); F gave higher ratings to F</li> </ul>	P < .025

Study, year, reference no.	Intervention	Outcome variable	Study design	Study participants	No. of participants	Construct measured	Results	P value
	F, and neut sex-typed jobs		average, high) by job sex-type (M, F, neutral)	grouped by major); explicit bias toward F supervisors measured			<p>applicants for M (mechanical engineer) and neutral (copy editor) sex-typed jobs and to M applicants for F sex-typed job</p> <ul style="list-style-type: none"> <li>• Higher ratings for F applicants applying for M sex-typed job</li> <li>• F applicants with average or low scholastic standing rated higher than M for F sex-typed job</li> <li>• M with average scholastic standing rated higher than F for neutral sex-typed job</li> </ul>	<p><math>P &lt; .025</math></p> <p><math>P &lt; .01</math></p> <p><math>P &lt; .01</math></p>
Ng and Weisner, 2007 <sup>31</sup>	Presence or absence of employment equity directives	Choice of hire for M or F as 1 of 3 applicants for job as nurse (sex-typed F job) or police officer (sex-typed M job)	2 × 3 × 2 Job (nurse, police) by qualifications of underrepresented gender (less, equal, more) by equity directive (low or high urgency)	Classes of college students randomly assigned to one of 6 conditions; students made two hiring decisions each: 1 for nurse, 1 for police officer	191 M 205 F	Effect of equity directives on gender bias in hiring	<ul style="list-style-type: none"> <li>• When underrepresented applicants less qualified, more M than F hired</li> <li>• When underrepresented applicants equally or more qualified, hiring for M = that for F</li> <li>• Basic and stronger equity statements increased hiring of less qualified M but not F</li> <li>• Equity directives and provision of employment equity information increased hiring of equally qualified M and F</li> </ul>	<p><math>P &lt; .05</math></p> <p>NS</p> <p><math>P &lt; .05, P &lt; .001</math></p> <p><math>P &lt; .05</math></p>
Renwick and Tosi, 1978 <sup>17</sup>	Marital status and job-relevant educational	Suitability (1–7) for each of two	5 × 2 × 2 × 2 × 5 Undergraduate major (5 choices) by graduate degree (MBA, MS) by job (traveling, home office) by applicant gender (M, F) by marital	Graduate students in Administration randomly assigned to review 10	64 M 16 F (39% single, 54% married, and	Effect of job-relevant education and marital	<ul style="list-style-type: none"> <li>• No gender differences for any measures or choice of most suitable candidate</li> <li>• Applicants more suitable with relevant majors or MBA</li> </ul>	<p>NS</p> <p><math>P &lt; .05</math></p> <p><math>P &lt; .01</math></p> <p><math>P &lt; .01</math></p> <p>NS</p>

Study, year, reference no.	Intervention	Outcome variable	Study design	Study participants	No. of participants	Construct measured	Results	P value
	background varied	positions; most and least suitable	status (married, single, divorced, married with 2 children, divorced with 2 children)	resumes for 2 job descriptions	7% divorced; 39% parents)	status on gender bias in hiring	<ul style="list-style-type: none"> <li>• Most suitable job applicant = married M with 2 children with business major and MBA vs. least desirable = divorced M with history major and MS</li> <li>• Most suitable F applicant = single, industrial sociology major and MBA vs least suitable F = single history major with MA</li> <li>• No difference in most and least suitable M and F</li> </ul>	
Rosen and Mericle, 1979 <sup>50</sup>	Presence of weak or strong employee equity directives (including expectation of accountability)	Hiring recommendation (14), salary	2 × 2 Applicant gender (M,F) by equity directive (weak, strong)	Municipal administrators in managerial positions randomly assigned to review one applicant	57 M 11 F	Effect of equity directives on gender bias in hiring	<ul style="list-style-type: none"> <li>• No gender difference in hiring recommendations for weak or strong equity policy</li> <li>• Lower salary recommended for F applicants with strong equity directives</li> </ul>	NS  $P < .025$
Rudman, 1998 <sup>37</sup> (Substudies 2 and 5)		Ratings of task aptitude, social attraction and hireability; composite social desirability scale; self-promotion index; gender typicality scale	Substudy 2: 2 × 2 × 2 × 2 Rater gender (M,F) by task goal (accuracy, outcome) by applicant gender (M,F) by style (self-promoting, self-effacing)	Substudy 2: College students randomly assigned to view videotaped "practice job interview" under conditions of accuracy or outcome	Substudy 2: 82 M 81 F	Impact of self-promoting or self-effacing behavior on evaluation of applicants	<ul style="list-style-type: none"> <li>Substudy 2:</li> <li>• Task aptitude and hireability: self-promoters &gt; self-effacers for accuracy goal</li> <li>• Self-effacing M &gt; F and self-promoting M = F for outcome goal</li> <li>• Social attraction: M raters gave F self-effacers higher scores for accuracy</li> </ul>	$P < .001$  $P < .04$ (effacers), NS (promoters)  $P < .01$  $P < .001$  $P < .01$ (F raters, outcome goal); NS (M raters, accuracy goal)

Study, year, reference no.	Intervention	Outcome variable	Study design	Study participants	No. of participants	Construct measured	Results	P value
	together (outcome)						goal and F self-promoters higher ratings for outcome goal • F raters gave F self-effacers higher ratings in both goal conditions • F raters and raters with outcome goal preferred self-promoting M but no difference for M raters or raters with accuracy goal • Self-promoting M more likable and hireable than the self-promoting F • Self-promoting M more likable and hireable than the self-effacing M • Self-effacing M more likeable than self-promoting F but latter was more hireable • Self-effacing M = F for hireability	P < .05 P < .05 P < .05 NS
	Substudy 3: Similar to study 2 but all F applicants were self-promoting (M were either self-promoting or self-effacing) and outcome goal was the only condition		Substudy 3: 2 × 2 × 2 Male applicant style (self-promoting, self-effacing) by rater gender (M, F) by target gender (M, F)	Substudy 3: Same as study 2 except all rated for outcome condition and interview was in person rather than video	Substudy 3: 19 M 21 F		Substudy 3: • Task aptitude and hireability: F but not M raters gave self-promoting M higher scores than self-promoting F • Self-effacing M lower than self-promoting F • Social attraction: F but not M raters preferred M over F applicants; no effect of style • Partner selection: self-effacing F over self-effacing M; self-promoting M > self-promoting F (for F raters only)	P < .05 (F raters); NS (M raters) P < .001 P < .05 (M vs F); NS (style) P < .01
Rudman and Glick, 2001 <sup>13</sup>	Applicant's agentic (e.g. "my	Composite scores of competence.	2 × 2 × 2 × 2	College students viewed videotaped	67 M 105 F	Potential for backlash against agentic	• Competence: agentic >	P < .01

Study, year, reference no.	Intervention	Outcome variable	Study design	Study participants	No. of participants	Construct measured	Results	P value
	goal is to be a "winner" or "androgenous". I (e.g. "life is about being connected to other people") life philosophy statement read before viewing and rating highly agentic applicant	social skills, and hireability	Applicant gender (M,F) by applicant attributes (agentic, androgynous) by job sex-typed (M,F) by rater gender (M,F)	interview of highly agentic applicant (responses in direct, self-confident manner); implicit bias and explicit gender bias assessed		women applying for F sex-typed jobs	androgynous regardless of gender <ul style="list-style-type: none"> <li>Social skills: agentic M &gt; F; androgynous M = F</li> <li>Hireability: androgynous M and F comparable; agentic M and F comparable for M sex-typed job but agentic F less hireable than M for F sex-typed job</li> <li>Raters with greater implicit (but not explicit) bias rated agentic F lower on social skills for F sex-typed job and rated agentic M as more hireable for M sex-typed job</li> </ul>	P = .05; NS  NS (androgynous); NS (M sex-typed); P < .05 (F sex-typed)  P < .05
Sczesny and Stahlberg, 2002 <sup>27</sup>	Substudy 1: Pre-tested masc, fem, or no perfume applied to applications before rating  Substudy 2: Same as substudy 1 but perfume on person rather than paper application	Substudy 1: Decision to hire (Y/N), certainty of decision (1-5), scent detected (Y/N) and how pleasant (1-5)  Substudy 2: Same as substudy 1	Substudy 1: 3 x 2 Scent (masc, fem, none) by applicant gender (M,F)  Substudy 2: 3 x 2 x 2 Scent (M,F, none) by applicant gender (M,F) by rater gender (M,F)	Substudy 1: College students acting as personnel managers randomly assigned to review one applicant  Substudy 2: College students randomly assigned to conduct a job interview for leadership position with scripted confederate	Substudy 1: 37 M 37 F  Substudy 2: 57 M 59 F	Ability of olfactory cues to activate gender bias in hiring	Substudy 1: <ul style="list-style-type: none"> <li>M and F applicants with masc scent hired with greater certainty than those with fem scent</li> <li>No perfume most likely to be hired</li> </ul> Substudy 2: <ul style="list-style-type: none"> <li>M and F applicants with masc scent hired with greater certainty than those with fem or no perfume</li> <li>Fem scent no different than no scent</li> </ul>	P = .003  P = .001  P < .05  NS
Sczesny and Kühnen, 2004 <sup>28</sup>	Rating of applicant with masc or fem appearance with or without concurrent attentional demand	Leadership competence on 10 items; certainty of decision to hire or not	2 x 2 x 2 x 2 Physical appearance (fem, masc) by applicant gender (M,F) by attentional demand (Y/N) by rater gender (M,F)	College students randomly assigned to evaluate leadership competence of 1/12 applicants (3 per condition)	72 M 72 F	Separate effects of gendered physical appearance and biological sex on attribution of leadership competence and hiring	<ul style="list-style-type: none"> <li>Leadership competence higher for M &amp; F applicants rated attractive</li> <li>Without distraction: leadership competence greater</li> </ul>	P < .01  P < .05 (competence); P < .01 (hiring)

Study, year, reference no.	Intervention	Outcome variable	Study design	Study participants	No. of participants	Construct measured	Results	P value
			(attractiveness and likeability as covariates)				for F; F (but not M) raters more certain to hire F <ul style="list-style-type: none"> <li>• With distraction: M = F for leadership competence; F (but not M) raters more certain in hiring M</li> <li>• Higher leadership competence for masc vs fem appearance (regardless of distraction or applicant gender)</li> </ul>	NS (competence); $P < .01$ (hiring)  $P < .001$
Smith et al., 2005 <sup>14</sup>	Presence or absence of employment discontinuities on resumes of prospective applicants	Recommend to interview (1–7) and further consideration (1–7); starting salary; summary scores for motivation and commitment; coded written commentary	2 × 3 Applicant gender (M,F) by employment gap (none, single 9 months; three 12 weeks) by	143 respondents out of 400 randomly selected members of human resource associations who were mailed one resume to review	54% F	Gender differences in the impact of discontinuous employment on hiring	<ul style="list-style-type: none"> <li>• No gap in employment: M &gt; F salary; M = F for interview and consideration.</li> <li>• Single gap: M = F</li> <li>• Multiple gaps: M = F salary; M &lt; F for interview and consideration</li> <li>• F rated more committed in all conditions</li> <li>• M applicants with multiple gaps rated least committed</li> <li>• M = F on motivation</li> </ul>	NS (salary); $P < .01$ (interview); $P < .001$ (consideration)  $P < .01$ $P < .01$ NS
Uhlman and Cohen, 2005 (Study 3) <sup>22</sup>	Presence or absence of commitment to value of applicant qualifications	Ratings (1–11) of strength of streetwise or educated characteristics of applicant and importance of characteristic to	2 × 2 × 2 Rater gender (M,F) by applicant gender (M,F) by	Visitors to local beach and town fair randomly assigned to evaluate either a	63 M 51 F	Tendency to revise the value of applicant qualifications to justify hire in way that	<ul style="list-style-type: none"> <li>• M and F applicants rated as similarly streetwise and educated</li> <li>• No-commitment group rated education less important when applicant was M</li> </ul>	Qualitative  NS $P = .04$ $P = .009$ NS

Study, year, reference no.	Intervention	Outcome variable	Study design	Study participants	No. of participants	Construct measured	Results	P value
	before assessment of applicant	success as police chief	prior commitment (Y/N)	M or F candidate for police chief	3 unknown	appears to be without gender bias	<ul style="list-style-type: none"> <li>• No-commitment M (but not F) raters favored M applicant</li> <li>• Prior commitment eliminated gender discrimination</li> </ul>	

\* M, male; F, female; masc, masculine; fem, feminine; neut, neutral; MBA, Master in Business Administration.

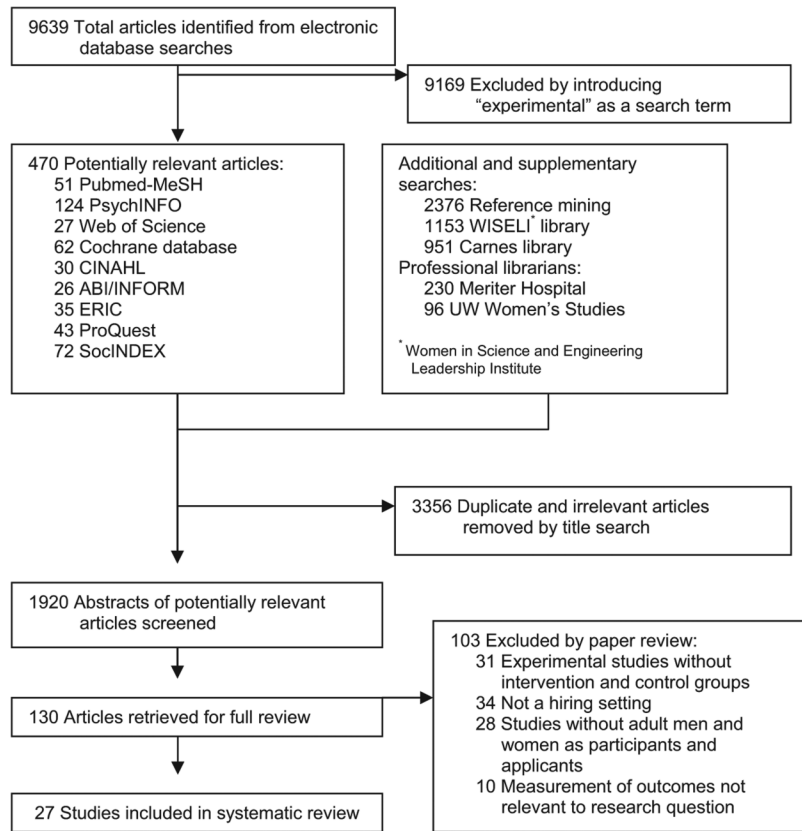


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**Figure 1.** Search strategy and final selection of studies for inclusion in systematic review. UW, University of Wisconsin; WISELI, Women in Science and Engineering Leadership Institute.

### List 1

Three categories of interventions on gender bias in hiring settings as found in a review of 27 published reports from 1973 to 2008\*

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*Information provided to raters in application*

- Job-relevant individuating information (educational background,<sup>16,17,24</sup> past work experience,<sup>33</sup> scholastic standing,<sup>24,33</sup> personality,<sup>30</sup> performance ability<sup>29</sup>)
- Gender stereotypic, counterstereotypic, or neutral individuating information<sup>12,13,16,30,33,34</sup>
- Parental status<sup>17,18,23</sup>
- Ambiguous or explicit gender<sup>34</sup>
- Marital status<sup>17</sup>
- Life philosophy statements<sup>13</sup>
- Employment discontinuities<sup>14</sup>

*Applicant behavior, scent, or appearance*

- Physical attractiveness<sup>19,28,32,33,36</sup>
- Interview style (self-promoting or self-effacing speech and mannerisms<sup>37</sup>; direct, self-confident [agentic] interview style<sup>13</sup>)
- Masculine or feminine appearance<sup>28</sup>
- Masculine, feminine, or no perfume<sup>27</sup>
- Expression of anger<sup>21</sup>

*Conditions under which raters assessed applicants*

- Threat of accountability<sup>11</sup>
  - Order of rating separate qualifications and providing summary judgments<sup>32</sup>
  - Priming with counterstereotypic information<sup>35</sup>
  - Proportion of women in the applicant pool<sup>15</sup>
  - Evaluation after counterstereotype training, with or without distraction or filler task<sup>25</sup>
  - Evaluation after counterstereotype training, before or after trait rating task<sup>26</sup>
  - Employment equity directives<sup>20,39</sup>
  - Attentional demand during evaluation<sup>28</sup>
  - Commitment to value of credentials before or after reviewing applicants<sup>22</sup>
- 

\* The categories were (1) varying the information provided to raters in the application (n = 12), (2) changing the behavior, scent, or appearance of the applicant (n = 9), and (3) altering the conditions under which raters assessed applicants (n = 10).

## List 2

### Evidence-based recommendations to reduce the application of bias that could disadvantage women applicants in hiring settings\*

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#### *Recommendations for Institutions*

- Design process to allow applicants to provide individuating evidence of job-relevant competency<sup>16,17,24,30,33</sup>
- Visibly display research evidence that men and women are equivalently successful in male sex-typed roles<sup>35,50<sup>†</sup></sup>
- Work hard to ensure that women comprise at least 25% of an applicant pool<sup>15</sup>
- Insist that raters commit to the value of specific credentials before seeing actual applicants<sup>22</sup>
- Rate specific qualifications before making summary judgments about applicant<sup>32</sup>
- Design equity directives and antibias training so that raters do not feel coerced during evaluation<sup>11,20,25,26,39</sup>
- Do not ask about parenthood status in the application<sup>18,23</sup>
- Encourage raters to spend adequate time and avoid cognitive distractions during evaluation<sup>28,52<sup>‡</sup>,58<sup>§</sup></sup>
- Use structured rather than unstructured Interviews<sup>46<sup>¶</sup></sup>
- Do not use man-suffix in job titles (e.g., use “chair” or “chairperson” as opposed to “chairman”)<sup>51<sup>‡</sup></sup>
- Implement training workshops for personnel decision makers that include examples of common hiring biases and group problem solving for overcoming such biases<sup>59<sup>§</sup>,60<sup>‡†</sup></sup>
- Encourage raters to use an inclusion rather than an exclusion selection strategy in constructing a final list of applicants<sup>53<sup>‡</sup></sup>

#### *Recommendations for female applicants*

- Provide some evidence of communal job-relevant behaviors (e.g., being *helpful* and *sensitive* to the needs of subordinates)<sup>13,18</sup>
- Indicate clear evidence of competency (e.g., resume, third-party endorsements) but avoid appearing self-promoting in an interview<sup>12,16,29,30,37</sup>
- Do not show anger or discuss previous job-related situations that made you angry<sup>21</sup>
- Best to avoid feminine-scented perfume, but wearing masculine-scented perfume may be beneficial (although you would need to pretest the scent to ensure that it is considered “masculine”)<sup>27</sup>
- Avoid revealing parenthood status until job and salary are secured<sup>18,23</sup>
- In your initial application, if you have a female-gendered first name, consider using initials only, and if you have a gender-ambiguous name, consider removing gender-identifying information<sup>34,49<sup>¶</sup></sup>
- Strive for an “attractive” but neutral appearance for interviews or application photographs. Avoid interviewing in overly feminine clothing (more masculine clothing and facial features may be beneficial)<sup>28,32,36,47<sup>¶</sup>,61<sup>¶</sup>,62<sup>‡†</sup></sup>
- If you are visibly pregnant, it might be wise to obscure it with your clothing<sup>42<sup>¶</sup></sup>
- Avoid tentative speech patterns (e.g., use of intensifiers such as “really” and “definitely,” hedges such as “I guess” or “sort of,” and hesitations such as “well” or “let’s see”)<sup>37,48<sup>‡†</sup></sup>

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\* All studies cited in this table, except those with superscript symbols, met inclusion criteria for the systematic review. The studies with superscripts are all experimental, controlled studies, but they were excluded from the systematic review for the reasons listed below. We include the citations in this table because the studies support the recommendation.

<sup>†</sup> Self-selection of a leadership role by women.

<sup>‡</sup> Intervention involved a personnel evaluation or a selection decision but was not in a hiring setting.

<sup>§</sup> Intervention and assessment of hiring bias, but ratings of applicants not broken down by gender.

<sup>¶</sup> No men in the applicant pool.

<sup>††</sup> Intervention appeared to be randomly assigned, but this was not specifically stated.

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