

## Moderators of the effect of weight on job-related outcomes: a meta-analysis of experimental studies

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### Abstract

This study provides the first meta-analytic testing of (1) several proposed moderators of the relationship between employee weight and job-related outcomes (e.g., target gender, target qualifications, and rater gender); and (2) the effect of specific design features on the variation in results obtained across relevant experimental studies (e.g., weight manipulation and amount of job-relevant information). The results indicate that there are important moderators of the relationship between people's weight and job-related outcomes. However, design feature may significantly influence the obtained results. In particular, inconsistent experimental findings regarding the hypothesized moderating role of target sex appear to be explained by limitations in the way in which target weight was manipulated in some studies. Directions for future research are identified.

The issue of weight discrimination is a topic of growing concern among employers, organizational researchers, policy makers, and overweight employees themselves. Several factors appear to be contributing to this development, including an expanding view of "diversity" in the workplace and the importance of effectively managing it (e.g., Roberson & Park, 2007; Van de Ven, Rogers, Bechara, & Sun, 2009), the rising incidence of obesity in the United States and many Western countries, increased employer concern about health care costs (Shepherd, 2009), an increase in the prevalence of perceived weight discrimination (Andreyeva, Puhl, & Brownell, 2008), and calls for new laws providing employees greater legal protection against weight discrimination (e.g., Kubilis, 2008).

Research results suggest that there is good reason for concern about the nature and extent of weight-based employment discrimination in the American workplace. Field research provides evidence of widespread perceived weight-based employment discrimination among obese adults (Roehling, Roehling, & Pichler, 2007), and a negative association between worker weight and employment outcomes such as wages and occupational attainment (e.g., Morris, 2006; Norton & Han, 2008). Although existing field research reflects the benefit of collecting real-world data in research settings with clear generalizability to the workplace, it is limited in its ability to attribute the negative association between worker weight and employment outcomes to weight discrimination because of alternative explanations that are

not examined systematically or controlled for (e.g., non-random selection into certain jobs, the possibility that obese workers actually demonstrate different behaviors or possess different levels of job-relevant characteristics that are not fully accounted for in typical field studies).

To address some of the limitations inherent in field research, a growing number of studies have investigated weight bias in experimental settings involving simulated employment decisions. Although the samples and settings can be less compelling than those found in field settings, these laboratory studies carry the enormous benefit of being conducted with random assignment of subjects to more controlled and standardized conditions, where experimental results can be directly attributed to differences between different research conditions and not to other unknown factors. The results of experimental studies appear to provide relatively consistent evidence of a general bias against overweight job applicants and employees at virtually every stage of the employ cycle (e.g., selection, Swami, Chan, Wong, Furnham, & Tovee, 2008; placement, Bellizzi & Hasty, 1998; compensation, Kutcher & Bragger, 2004; promotion, Bordieri, Drehermer, & Taylor, 1997; and discipline, Klassen, Jasper, & Harris, 1993). However, the results have not been uniform in all significant areas. For example, although it is frequently observed that overweight women appear to be judged more harshly than overweight men (e.g., Fikkan & Rothblum, 2005; Roehling, 2002), experimental studies investigating weight

bias in simulated employment decisions have yielded very mixed results (discussed later).

The present study advances the literature on weight discrimination in employment in several significant ways. First, it provides the first meta-analytic testing of several moderators of the relationship between employee weight and job-related outcomes (target sex, target qualifications, rater race, and rater sex). Second, it begins to address the suggestion that co-workers may be a greater source of weight discrimination than employers (Falkner et al., 1999) by providing the first meta-analytic investigation of the influence of an individual's weight on assessments of their desirability as a co-worker. Third, it identifies methodological threats to the validity of experimental findings relating to weight discrimination in employment, and empirically examines the extent to which those threats are influencing findings across studies (e.g., moderating effects of the type of sample and amount of job-relevant information). Most notably, we examine whether the lack of consistent support for the hypothesis that female overweight targets will be evaluated more negatively than their male counterparts, found among the present primary studies and in experimental studies of weight discrimination in the broader literature (Swami, Furnham et al., 2008), is explained by limitations associated with the manipulation of target weight in many studies. Finally, drawing on our meta-analytic finding and the broader (not limited to employment settings) weight discrimination literature, we provide an assessment of the future research needs that will identify gaps in the literature as well as provide practical guidance for addressing critical methodological issues associated with studies investigating weight discrimination in experimental settings.

## Definitions of overweight, obesity, and non-overweight

The terms *overweight* and *obesity* are used somewhat interchangeably in the meta-analyzed studies and in the broader literature addressing issues related to body weight (Friedman & Brownell, 1995; Roehling, 1999). In this article, the term *overweight* is generally used, and it refers to various forms of excess weight and body fat (Friedman & Brownell, 1994; Roehling, 1999). This definition includes all forms of obesity and weight levels that exceed reported normative standards even though the level may not meet the higher threshold standard for obesity (e.g., "merely overweight").

## Hypotheses and research questions

### Main effect of weight on job-related outcomes

A substantial body of empirical research conducted in the United States and other Western societies establishes that overweight individuals are evaluated more negatively than

non-overweight individuals on a wide range of dimensions (e.g., Brownell, Puhl, Schwartz, & Rudd, 2005; Roehling, 1999). This observation was supported by Rudolph, Wells, Weller, and Baltes' (2009) meta-analysis of 25 experimental studies that focused narrowly on the main effect of weight on job outcomes and the role of job type as a moderator. They found a significant overall effect size ( $d = -.52$ ). This body of empirical evidence, and Roehling's (1999) conceptual model of the effect of employee weight on job outcomes, is the basis for predicting that as a result of negative weight-based stereotypes, negative affective reactions, and perceived costs, decision makers will tend to judge overweight job applicants and employees more negatively than non-overweight individuals. Thus, we attempt to replicate the main effect finding of Rudolph, Wells, Weller, and Baltes (2009) by testing the following hypothesis, using data from a larger sample of primary studies ( $n = 31$ ):

*Hypothesis 1.* Across studies, overweight individuals will tend to be evaluated and treated more negatively with regard to job-related outcomes than will their non-overweight counterparts.

## Target characteristics

### Sex of the target

Research indicates that overweight women tend to be evaluated more negatively than overweight men in Western societies (e.g., Fikkan & Rothblum, 2005; Pingitore, Dugoni, Tindale, & Spring 1994; Puhl & Brownell, 2001; Roehling, 2002). For example, Harris, Harris, and Bochner (1982) found that obese women were assigned attributes significantly more negative than those assigned to obese men, and Greenleaf, Starks, Gomez, Chambliss, and Martin (2004) found that the label of being "overweight" is applied more liberally to women than to men. Research also indicates that excess body weight has a stronger negative impact on the perceived attractiveness of overweight women than it does on the perceived attractiveness of their male counterparts (Weeden & Sabini, 2005). These research-based examples of how excess body weight has a different, more negative meaning for women provide reason to expect that overweight women will experience greater weight-based discrimination in employment settings than their male counterparts. Thus, although a qualitative review of the relevant experimental studies suggests inconsistent support for this expectation (discussed further later), we tested the following hypothesis:

*Hypothesis 2.* Across studies, target weight will interact with the sex of the target in affecting job-related outcomes. In particular, the negative relationship between weight and job-related outcomes will be greater for women than for men.

### Target objective qualifications

Stereotyping might be reduced, if not overcome, by providing individuating information about a target, causing the target to be evaluated based on available information rather than on a stereotype (Davison & Burke, 2000; Jussim, Coleman, & Lerch, 1987). For example, Heilman, Block, and Strathatos (1997) found that unequivocally clear information about successful performance may overcome the negative stigma of being an affirmative action hire. This suggests that when an information regarding an overweight job applicant's qualifications to successfully perform the job in question is clear-cut and positive, common weight-based stereotypes might be superceded. Conversely, when information regarding the overweight applicant's qualifications is missing, or ambiguous information is provided, judgments will be more open to interpretation and thus potentially open to bias (Finkelstein, DeMuth, & Sweeney, 2007). Based on these considerations, we predict that:

*Hypothesis 3.* Across studies, target weight will interact with the objective qualifications of the target in affecting job-related outcomes. The negative relationship between weight and job-related outcomes will be weaker for targets who are objectively more qualified.

### Rater characteristics

#### Rater sex

While some research from the broader literature indicates that women generally show less anti-fat bias than that shown by men (e.g., Graziano, Bruce, Sheese, & Tobin, 2007), across studies, the findings are mixed (Puhl & Latner, 2007). Similarly, studies investigating whether male or female raters are more likely to discriminate against overweight individuals in employment contexts present a mixed picture. For example, Jasper and Klassen (1990) found that only men rated obese female salespeople as less desirable to work with, Decker (1987) found that women judged overweight female managers as less desirable to have as a supervisor than male raters, and McKee and Smouse (1983) did not find a significant difference in how male and female clients rated overweight counselors. These mixed findings preclude any firm conclusions about the relationship between rater sex and weight bias based on a qualitative review of the literature. Using meta-analysis, we investigate the following research question:

*Research Question 1.* Does the magnitude of the effect of weight on various employment outcomes differ depending on whether women or men operate in the role of organizational decision makers?

#### Rater race

Researchers have suggested that race- or ethnicity-based subcultural differences play an important but under examined role in weight bias (Crandall et al., 2001; Friedman & Brownell, 1995). Subcultural differences in the incidence of obesity, and in norms regarding ideal body types, may lead to greater (or less) stigmatization of obesity among some groups (Altabe, 1998; Douchis, Hayden, & Wilfley, 2001; Hebl & Turchin, 2005). As a result, African-Americans and Hispanic-Americans may be more accepting, and less likely to discriminate against, obese job applicants and employees. These considerations support the proposition that weight bias will be more strongly manifested among whites people. However, studies investigating the role of rater race in moderating the effect of weight on job-related outcomes have yielded mixed results (e.g., Hebl & Turchin, 2005, finding a weight  $\times$  rater race interaction; Finkelstein et al., 2007, failing to find such an interaction). Therefore, we test the following meta-analytic hypothesis:

*Hypothesis 4.* Target weight will interact with rater race (white vs. nonwhite) in affecting job-related outcomes. The affect of target weight will be stronger among White participants operating in the role of organizational decision makers.

### Type of job-related outcomes

The meta-analyzed studies examined the effect of target weight across a variety of criteria or "job-related outcomes" (e.g., hiring recommendations, salary decisions, and promotability ratings). Hosoda, Stone-Romero, and Coats (2003) meta-analysis of experimental studies examining the attractiveness bias effect in employment decisions found that the magnitude of the attractiveness bias effect varied as a function of the type of job-related outcome. The largest effect was found when the criterion was choice of business partner, and the smallest effect when the criterion was performance evaluation. Rudolph et al.'s (2009) meta-analysis of experimental studies examining weight bias in employment decisions also found that the bias effect varied across type of job-related outcome. The largest effect was found when the criterion was a hiring decision and the smallest effect when the criterion related to promotion decisions.

Puhl, Moss-Racusin, Schwartz, and Brownell's (2008) qualitative study of the subjective experiences of overweight and obese women and men found that personal relationships (e.g., friends, spouses) were the most common source of participants' worst stigmatizing experiences, and other research suggests that many people in Western societies have a negative affective response to obese individuals and are reluctant to interact with them (Brochu & Morrison, 2007). Consistent with these findings from the broader weight discrimination

literature, survey findings suggest that coworkers may be a greater source of weight discrimination than employers (Falkner et al., 1999). Meta-analytic evidence suggesting that coworkers may be a primary source of weight-based employment discrimination, if not the greatest source, has important implications for both the design of field research and the practical interventions aimed at addressing weight discrimination in the workplace. Therefore, we extend Rudolph et al.'s study by including "desirability as a coworker" as a criterion that was coded in the primary studies and included in our analyses. Because the job-related outcomes employed as criteria in the primary studies do not fall along a single, theory-based continuum, we adopt the exploratory approach reflected in Hosoda et al. (2003) in investigating the following general research question.

*Research Question 2.* Does the magnitude of the weight bias effect vary across the various job-related outcomes?

## Research design issues

### *Within- versus between-subjects research designs*

It has been argued that the exposure of raters to multiple individuals of differing levels of an observable characteristic (e.g., target weight) is likely to increase the salience of the characteristic and to induce a perceptual contrast effect that leads to more extreme judgments based on the observable characteristic. As a result, the effect of observable target characteristics will be stronger in within-subject designs than in between-subject designs because of a contrast effect. Support for this argument is provided by studies demonstrating stronger attractiveness effects (Eagly et al., 1991; Hosoda et al., 2003), and stronger sex discrimination effects (Olian, Schwab, & Haberfield, 1988) for within-subject designs than for between-subject designs. The foregoing reasoning and empirical support provides the basis for the following prediction:

*Hypothesis 5.* Across studies, the effect of target weight on various job-related outcomes will be stronger for experimental research using within-subject designs versus between-subjects designs.

### *Amount of job-relevant information*

Studies investigating weight discrimination in simulated employment decisions vary significantly in the amount of information they provide about the job in question and targets' relevant qualifications. For example, among the studies that do not manipulate target qualifications, some studies provide a relatively terse description on the job (e.g., a job title) and the target's job-related qualifications (e.g., a brief statement indicating that the person is qualified), while

other studies provide relatively detailed job descriptions and extensive information regarding job qualifications (e.g., work history, education, and answers to structured interview questions). Meta-analyses performed by Tosi and Einbender (1985) and Davison and Burke (2000) supported their respective predictions that when more job-relevant information is provided to decision makers, there would be less reliance on stereotypes. The foregoing logic and findings lead to the following hypothesis:

*Hypothesis 6.* Across studies, the effects of excess body weight on various job-related outcomes will tend to be stronger when individuals acting as decision makers (or raters) are provided less job-relevant information about the target and job in question.

### *Undergraduate raters*

The potential effect of researchers' use of undergraduate students versus more experienced participants on the findings of studies involving simulated employment decisions is a frequently raised issue by journal reviewers, practitioners, and readers alike (e.g., Luxen & Van De Vijver, 2006; Walker, Field, Giles, Bernerth, & Jones-Famer, 2006). It might be argued that, compared with decision makers with more work experience who are likely to have a deeper understanding of the requirements for successful performance in work settings, the typical undergraduate student may be more likely to focus on salient applicant characteristics brought to light in the experiment, and as a result, be more likely to rely on weight-based stereotypes. On the other hand, Finkelstein et al. (2007) found that within a sample of undergraduate participants, those students who had experience participating in "real-world" hiring decisions rated hypothetical overweight applicants somewhat lower than students without the experience, leading the authors to observe "perhaps more real-world experience only served to increase participants' trepidation about overweight workers" (p. 220). Given these competing views of the possible effect of the use of undergraduate students on study results (suggested earlier), we investigated the following research question:

*Research Question 3.* Does the magnitude of the effect of weight on various job-related outcomes differ depending on whether undergraduate students operate in the role of organizational decision makers?

### *Effect of weight manipulation on predicted role of target sex as a moderator*

Although the broader literature provides a strong basis for predicting that the negative relationship between weight and job-related outcomes will be greater for women than for men (Hypothesis 2), our qualitative review revealed that the vast majority of relevant experimental studies failed to support

this prediction (Bellizzi & Hasty, 1998, 2000, 2001; Bellizzi & Norvell, 1991; Benson, Severs, Tatgenhorst, & Loddengaard, 1980; Brink, 1988; Larkin & Pines, 1979; Polinko & Popovich, 2001; Sartore & Cunningham, 2007; Stearns, Borna, & Sundaram, 2001). We identified only two reported studies that found that overweight women are evaluated more negatively in simulated employment settings (Bellizzi, Klassen, & Belonax, 1989; Pingitore, Dugoni, Tindale, & Spring, 1994).

Mixed findings regarding the hypothesized role of target sex as a moderator have also been found in experimental studies not involving simulated employment decisions, and it has been suggested that the inconsistent findings may be due to the stimuli used in some studies (Swami, Furnham, et al., 2008). A qualitative analysis of the studies included in the present meta-analysis that purport to test the role of target sex as a moderator identified three limitations in the way that target weight is manipulated (the stimuli) that could obscure target sex effects and, as a result, explain the lack of consistent support for the hypothesis that female overweight targets will be evaluated more negatively than their male counterparts. First, inexplicably, some studies have used smaller female targets in the overweight/obese condition. For example, Bellizzi and Norvell (1991) described the male target in the overweight condition as 5'9" and weighing 250 pounds (body mass index [BMI] = 36.9), and the female target in the overweight condition as 5'3" and 165 pounds (BMI = 29.2).

Second, rather than contrasting normal weight targets with overweight or obese targets, some studies compare below average weight or "thin" targets with overweight/obese target (e.g., Sartore & Cunningham, 2007; Cates, 1999). This may obscure sex differences given relatively consistent evidence suggesting that underweight men, but not underweight women, experience negative employment outcomes due to their "thinness" (e.g., Baum & Ford, 2004; Cawley, 2004; Saporta & Halpern, 2002). Specifically, when below average weight targets are used, differences between assessments of the higher and lower male targets may be due to a bias against heavier males, a bias against underweight males, or some combination of both. In short, there is reason to believe that research designs that compare underweight targets with overweight targets do not provide a fair test of whether overweight women experience more weight bias than overweight men.

Third, manipulation check data reported in several studies provides evidence that the weight manipulation was differentially effective across target sex; in each case, the manipulation was more effective in creating the desired perceived weight for male targets. For example, the manipulation check conducted in Stearns et al. (2001) found that while the male "ideal weight target" was never rated more than 5% above or below ideal weight, the female "ideal weight target" was rated between ideal and 20% above ideal. Also, manipulation check data reported in Sype (1993) reveals that not only was the

male target in the normal weight condition viewed significantly lower in weight than the female target in that condition, the difference in the perceived weight of normal versus overweight male targets was greater than the difference between the perceived weight of normal versus overweight female targets. The potential for these three limitations in the way that target weight is manipulated in some studies to systematically influence findings and obscure the predicted role of target sex led us to empirically investigate the following research question:

*Research Question 4.* Do differences in the way that target weight is manipulated in the primary studies ('effective' versus 'ineffective') affect the predicted moderating role of target sex?

An "effective" weight manipulation *for the purpose of investigating the role of target sex* is defined as one that does not involve any of the three previously identified limitations; weight manipulations that involve one or more of the identified limitation are characterized as "ineffective" manipulations *for the purpose of investigating the role of target sex*.

## Method

### Literature search

We conducted an extensive search for articles that reported an effect size between target weight and ratings on employment outcomes. We first conducted electronic database searches using various combinations of the following keywords: obesity, obese, overweight, fat, discrimination, bias, stigma, and prejudice. We searched the following databases for articles published through 2008: American Psychological Association's PsycINFO, ProQuest, ERIC, and Social Science Abstracts. We also searched for relevant dissertations using the Dissertation Abstracts International and WorldCatDissertations databases, and we solicited and included papers from the Society for Industrial-Organizational Psychology conferences between 2000 and 2008. Although there were several Academy of Management conference papers addressing weight discrimination during the relevant period, none met the criteria for inclusion in the present study. Finally, we consulted the reference sections of recent articles addressing weight discrimination in employment and other settings to ensure the inclusiveness of our search process. This thorough search process yielded a total of 36 independent samples with adequate effect size information for inclusion in the meta-analysis. Those studies in the reference list marked with an asterisk were included in the meta-analysis. Appendix A lists all of the studies and independent samples included in the overall database. Appendix B details which independent samples were included in each of the meta-analyses and meta-analytic tests.

## Inclusion criteria

Studies that reported an effect size between target weight and a job-related outcome variable were included in our database. Outcome variables in these studies include hiring recommendations, qualification/suitability ratings, disciplinary decisions, salary assignments, placement decisions, as well as ratings about the target's desirability as a coworker. Only experimental studies that involved simulated employment decisions were included in this dataset.

## Study coding

Two trained graduate students independently coded data for relevant moderators (e.g., job type and extent of job-related information). Coded data were examined for consistency and agreement, treated as number of agreements out of total number of codes, between coders was greater than 97%. The few instances of disagreement were resolved through discussion. Many of the studies in our database reported effect sizes for more than one job-related dependent variable ( $k = 17$ ). For an overall estimate of the relationship between body weight and job-related outcomes, we averaged dependent effect sizes for the individual job-related outcomes (e.g., hiring recommendation and prediction of success) using an average, as recommended by Hunter & Schmidt (1990), as well as the study sample size (instead of the product of the sample sizes) for our analysis. We were unable to use alternative procedures that take into account the correlational structure of the data, such as those outlined by Rosenthal and Rubin (1986) and Hedges and Olkin (1985) because inter-correlations between dependent variables were unreported in the primary studies in our dataset.

## Coding of focal variables

### Target characteristics

With few exceptions, studies in the database manipulated normal two levels of *target weight*, normal versus some level of excess weight. Due to the limited number of studies manipulating more than two levels of weight, and consistent with the approach used in Rudolph et al.'s (2009) meta-analysis, we coded two levels of weight in our investigation of the main effect of target weight: normal versus overweight.

As previously discussed, we sought to test whether or not *target sex* and *target objective qualifications* moderated the relationship between body weight and employment decisions. When studies manipulated these variables and reported effect size information (i.e., group means and standard deviations for dependent variables across cells), we were able to compare job-related outcomes based on these characteristics. Unfortunately, this information was often missing from research reports that manipulated target sex.

## Rater demographics

We coded *rater race* and *rater sex* in terms of the proportion of the sample that was white and female, respectively. We conducted moderator analyses for these continuous variables using ordinary least squares (OLS) regression according to the procedures outlined by Lipsey and Wilson (2001).

## Research design

We conducted study-level, categorical moderator tests (Hedges & Olkin, 1985) to determine if there were differences between studies in cumulative effect sizes based on the following potential design-related moderators: *design type* (within- vs. between-subjects); *amount of job-related information* (high vs. low levels); *sample type* (undergraduate students vs. professional/working subjects); and *effectiveness of weight manipulation for the purpose of investigating the role of target sex* (effective vs. ineffective). Eight studies provided sufficient data to be included in the analyses; four involved weight manipulations that suffered from one or more of the limitations that were identified as likely to obscure sex differences (Cates, 1999; Sartore & Cunningham, 2007; Stearns et al., 2001; Sype, 1993), and four studies did not have any such limitations (Bellizzi & Hasty, 2001; Bellizzi et al., 1989; McKee & Smouse, 1983; Pingitore et al., 1994).

## Statistics reported

Statistics reported include  $k$  (number of studies in a particular analysis),  $N$  (number of participants in a particular analysis), mean  $d$  (sample weighted mean effect size), a 95% confidence interval (CI) for each analysis,  $Q$  (effect size heterogeneity), and  $Q_{\text{between}}$  (between-groups heterogeneity) in cases where moderator effects are being tested. The studies in our database varied in the number of subjects they employed as well as the manner in which effect sizes were reported. Given that we were interested in how overweight targets were rated as compared with non-overweight-weight targets, we chose to report sample-weighted mean effect sizes using Cohen's  $d$ , or the difference between group means expressed in standard deviation units.

Where studies reported means, standard deviations, and sample sizes for the dependent variable(s) of interest according to weight status, then the calculation of  $d$  was straightforward. However, many studies did not report these statistics. When this was the case, we attempted to use other reported statistics (e.g.,  $F$ - and  $t$ -statistics) and sample size information to calculate an effect size. When studies did not report the descriptive statistics necessary to calculate  $d$ , we used an effect size calculator associated with the meta-analysis text written by Lipsey and Wilson (2001). We were unable to correct these effect sizes for unreliability given that none of the studies in our database reported reliability information for relevant measured variables.

## Results

### The effect of weight on job-related outcomes

Table 1 provides results pertaining to the effect of body weight on specific job-related outcomes, as well as an overall estimate of the relationship between weight- and job-related outcomes. Overweight targets are generally given lower ratings or job-related outcomes than are non-overweight-weight targets ( $d = .36, p < .05; k = 36; n = 15,564$ ). The CI did not include zero (CI = .33–.39). This moderately large effect size indicates that weight has a substantial effect on job-related outcomes, supporting Hypothesis 1. In other words, these results indicate that overweight targets are more than one third of one standard deviation less likely than normal-weight targets to be favorably for various job-related outcomes. The  $Q$  statistic was statistically significant ( $\chi^2(35) = 570.77$ ), indicating that the variance is greater than what would be expected based on sampling error, and that further moderator analyses were warranted.

### Moderating effects of target sex

Categorical moderator analysis was used to investigate the potential moderating effects of target characteristics (Hedges & Olkin, 1985); the results are reported in Table 2. Hypothesis 2's prediction that the effect of weight on job-related outcomes would be most severe for overweight women was not supported. Results of this moderator analysis indicate that the effect size for women ( $d = .27, p < .05; k = 8, N = 2,101$ ) was not significantly different from the effect size for men ( $d = .39, p < .05, k = 8, n = 1,890$ ; difference test of  $\chi^2(1) = 3.74$ , not significant [ns]).

### Moderating effects of rater characteristics

OLS regression was used to investigate the potential moderating effects of rater characteristics (Lipsey & Wilson, 2001); the results are reported in Table 3. Research question 1 asked whether or not rater sex would interact with target weight to affect job-related outcomes. Results indicate that the relationship between weight and job-related outcomes was not moderated by rater sex ( $B = .11, ns$ ). Hypothesis 4 predicted

**Table 1** Meta-Analysis Results of Outcomes of Obesity in Employment Settings

	<i>N</i>	<i>k</i>	Mean <i>d</i>	Lower 95%CI	Upper 95%CI	<i>Q</i>
Overall effect size	15,564	36	.36*	.33	.39	570.77*
Effect sizes for dependent variables						
Desirability as a coworker	1,389	7	.53*	.43	.64	57.10*
Hiring recommendation	4,746	18	.36*	.31	.41	312.84*
Prediction of success	1,989	8	.51*	.42	.59	124.92*
Promotability	558	2	.01	-.15	.18	n/a
Salary/raise	1,414	5	.20*	.10	.20	8.42*
Suitability	3,986	14	.38*	.31	.44	161.19*

Note. *N* = total sample size; *k* = number of effect studies; Mean *d* = sample-weighted mean of effect sizes; *Q* = homogeneity of Mean *d*. \* $p < .05$ . CI = confidence interval.

**Table 2** Moderator Analyses of Target Characteristics

Q between	<i>N</i>	<i>k</i>	Mean <i>d</i>	Lower 95% CI	Upper 95% CI	<i>N</i>	<i>k</i>	Mean <i>d</i>	Lower 95% CI	Upper 95% CI
Target sex										
3.74	Women 2,101	8	.27*	.18	.35	Men 1,890	8	.39*	.30	.48
Target sex (effective manipulation)										
16.61*	Women 475	4	1.00*	.82	1.18	Men 475	4	.47*	.29	.65
Target sex (ineffective manipulation)										
17.88*	Women 1,626	4	.05	-.04	.15	Men 1,415	4	.36*	.26	.47

Note. *N* = total sample size; *k* = number of studies; Mean *d* = sample-weighted mean of effect sizes; *Q* = between-group homogeneity. \* $p < .05$ . CI = confidence interval.

**Table 3** Moderator Analyses of Rater Demographics

Demographic	k	B	se	Lower 95%CI	Upper 95%CI	Mean d	R <sup>2</sup>	Q
Race (% White)	13	.16	.17	-.17	.50	.45	.00	.94
Sex (% female)	30	.11	.08	-.06	.28	.37	.00	.21

Note. k = number of studies; B = regression coefficient; se = standard error; Mean d = sample-weighted mean of effect sizes; Q = homogeneity of Mean d. \**p* < .05. CI = confidence interval.

**Table 4** Moderator Analyses of Study-Level Variables

Q between	N	k	Mean d	Lower 95% CI	Upper 95% CI	N	k	Mean d	Lower 95% CI	Upper 95% CI
Job type										
	Low public contact					High public contact				
4.655*	1,837	5	.42*	.33	.51	5,092	18	.56*	.50	.61
Sample type										
	Undergraduate students					Others				
1.54	9,953	28	.35*	.31	.39	5,611	8	.38*	.31	.42
Job-relevant information										
	Low					High				
201.33*	2,152	14	.93*	.85	1.02	13,412	22	.27*	.24	.31
Research design										
	Within/mixed					Between				
5.34*	1,556	6	.48*	.38	.58	14,008	30	.35*	.32	.38

Note. N = total sample size; k = number of effect studies; Mean d = sample-weighted mean of effect sizes; Q = between-group homogeneity. \**p* < .05. Two studies were not coded due to a lack of information about facial control. CI = confidence interval.

that rater race (white vs. nonwhite) would moderate the relationship between weight and job-related outcomes. Results indicate that rater race was not a significant moderator (*B* = .16, *ns*).

### Job-related outcomes

The results of our analyses investigating research question 2, reported in Table 1, indicated that the magnitude of the weight bias effect does vary across various job-related outcomes. At one extreme, the weight bias effect was greatest when participants were asked to assess how desirable the target would be as a coworker (*d* = .53, 95% CI = .43–.64). At the other extreme, the weight effect for ratings of the target's promotability was not significant (*d* = .01).

### Moderating effects of research design characteristics

The remaining moderator analyses are also reported in Table 4, except the analysis related to target sex, which is presented in Table 2. Hypothesis 5 predicted that the relationship between weight and job-related outcomes would be stronger when researchers employ within-subjects research designs. The effect size was indeed larger for within-subjects designs (*d* = .48, 95% CI = .38–.58) than between-subjects

designs (*d* = .35, 95% CI = .32–.38), and this difference was significant  $\chi^2(1) = 5.34, p < .05$ .

Hypothesis 6 predicted that job-relevant information would attenuate the relationship between weight and job-related outcomes, which was supported  $\chi^2(1) = 201.33, p < .05$ . When raters were provided with a relatively large amount of job-relevant information, the relationship between weight and job-related outcomes was less severe (*d* = .27, 95% CI = .24–.31) as compared with when little job-relevant information was provided (*d* = .93, 95% CI = .85–1.02).

Research question 3 asked whether or not ratings would differ across student and professional raters. Results indicate that rater type did not moderate the relationship between weight and job-related outcomes; effect sizes were similar across student (*d* = .35) and professional (*d* = .38) raters.

Finally, research question 4 asked whether differences in the way target weight is manipulated in the primary studies ("effective" vs. "ineffective") affect the predicted moderating role of target sex. Results indicate that when the target sex manipulation was effective, women (*d* = 1.00, 95% CI = .82–1.18) were rated significantly worse ( $\chi^2(1) = 16.61, p < .05$ ) than men (*d* = .47, 95% CI = .29 to .65). When the manipulation was ineffective, men (*d* = .36, 95% CI = .26 to .47) were rated significantly worse ( $\chi^2(1) = 17.88, p < .05$ ) than women (*d* = .05, 95% CI = -.04 to .15).

## Discussion

The study provides the first meta-analytic testing of several moderators of the relationship between employee weight and job outcomes (target sex, target qualifications, rater sex, and rater race), and the first meta-analytic investigation of the influence of an individual's weight on assessments of their desirability as a co-worker. In addition, we identified methodological threats to the validity of experimental findings related to weight discrimination in employment and empirically examined the extent to which those threats are influencing findings across studies. In this section, we discuss the study's most significant findings and its limitations. We also provide an assessment of future research needs.

### Sex differences in weight discrimination in simulated employment settings

Despite what would appear to be strong reasoning supporting the prediction that overweight women will be evaluated more harshly than overweight men in Western societies, experimental research has failed to consistently find that target sex plays a moderating role. Our qualitative review of experimental studies involving simulated employment decisions indicated that in the vast majority of individual studies, overweight female targets were *not* evaluated more negatively than overweight male targets. Mixed support for the predicted moderating role of target sex has also been observed in experimental studies reported in the broader literature (not limited to employment settings; Swami, Furnham et al., 2008).

The present study directly addresses these mixed findings, and based on our review, it is the first meta-analysis of sex differences in the experience of weight discrimination in any setting (work or nonwork). Our initial analyses failed to support our prediction that female overweight targets would be evaluated more negatively than their male counterparts. We then examined whether the way in which target weight is manipulated in experimental studies might influence results and obscuring sex differences, as suggested by Swami, Furnham et al. (2008).<sup>1</sup> Among those studies that did not involve any of the weight manipulation limitations that were identified as likely to obscure the effect of target ("effective manipulations" for the purpose of investigating the influence of target sex), the effect of target weight is greater for *women* than men. However, among those studies that involve target weight manipulations that suffer from one or more of the identified limitations ("ineffective manipulations" for the purpose of investigating the influence of target sex), the effect of target weight is greater for *men*. It appears, quite dramatically, that limitations in the way that target weight is manipulated in many studies are systematically biasing study results.

In summary, our meta-analytic results indicate that when limitations in the way that target weight is manipulated in many studies are taken into account, the results support Hypothesis 2's prediction that the negative effect of target weight will be greater for women than men. This finding provides an explanation for the mixed results observed in the present primary studies and the broader literature (Swami, Furnham et al., 2008). Given the significant challenges associated with eliminating potential confounding influences (e.g., potential differences between overweight women and overweight men in work-related behaviors or attitudes) and being able to attribute sex differences in observed relationships to discriminatory treatment versus other factors in field research, as a result of the greater control provided by their designs, the experimental studies that were meta-analyzed arguably provide the strongest evidence of sex differences in the causal relationship between worker weight and discriminatory treatment in employment settings.

Additional research investigating sex differences in the experience of weight discrimination is needed to further test the above conclusion, and to address other limitations in the way in which the role of sex has been examined in experimental studies. In particular, although there is theoretical and empirical support for the distinction between formal or overt discrimination and more subtle forms of discrimination (e.g., King, Shapiro, Hebl, Singletary, & Turner, 2006), and recent research suggests that women may be more likely than men to experience verbal harassment, rudeness, and other forms of subtle discrimination (briefly summarized in King, 2006), the experimental studies available for meta-analysis focused on the more formal forms of workplace discrimination (e.g., refusal to hire, disciplining more harshly). Do overweight women report experiencing more informal forms of weight discrimination in the workplace than overweight men? If so, experimental studies could be constructed to provide opportunities for informal weight-based discrimination to be manifested (e.g., engaging participants in a team task that involves an obese teammate who is a confederate), and the possibility that the target sex  $\times$  target weight interaction is even stronger when the focus is informal or subtle weight discrimination could be tested.

Also, although field research indicates that women begin experiencing weight discrimination at lower weight levels than men (e.g., among women who are merely overweight; Maranto & Stenoien, 2000; Morris, 2006), with few exceptions (e.g., Swami, Chan et al., 2008), the meta-analyzed studies contrast non-overweight targets with only one other weight level, typically an obese or very obese target. Future research should address this limitation by manipulating a wider range of weight levels (e.g., non-overweight, overweight, obese, and very obese) and by assessing interactions with target sex across these levels.

<sup>1</sup>We would like to thank an anonymous reviewer for this suggestion.

There is a clear need for greater attention to be paid to the way in which target weight is manipulated in the research design and review processes. However, evidence that the label of being “overweight” is applied more liberally to women than to men, and that there is greater variability in assessments of the weight of female target weight (Greenleaf et al., 2004; Stearns et al., 2001) suggests developing weight manipulations that are equally reliable and valid for female and male targets (in terms of eliciting the desire categorization of the target) will be a considerable challenge. At a minimum, potential sex difference in the effectiveness of weight manipulations need to be examined in reported manipulation check data, and when there is evidence of differential effectiveness, the implications for interpreting the study’s findings explicitly addressed.

Finally, we encourage researchers to extend the investigation of the cause(s) of sex differences in the experience of weight discrimination by including participants’ subjective perceptions of target weight as a focus of investigation. Existing research indicates that the greater weight bias experienced by women is due, at least in part, to more the liberal labeling of women as overweight (Greenleaf et al., 2004; Stearns et al., 2001; Sypes, 1993). However, we were unable to identify research testing whether among women and men who are *subjectively* placed in the same weight category (based on cultural norms or individual standards), women experience greater bias. Do individually assessed subjective perceptions of target weight interact with target sex in predicting weight bias? A significant interaction would provide evidence that in addition to being more readily categorized as “overweight,” once placed in that weight category, women are evaluated more negatively than similarly subjectively categorized men.

### Effects of rater characteristics

As discussed previously, individual studies provide mixed findings and differing conclusions regarding the role of rater sex in moderating the effect of target weight. Our meta-analytic results indicate that across studies, the relationship between weight and job-related outcomes was not moderated by rater sex or by rater race. It is possible that the effect of rater characteristics may depend on more complex interactions with both target weight and other target characteristics (Graziano et al., 2007; Hebl & Turchin, 2005).

### Type of job-related outcome: bias against personal interaction with overweight individuals

We found that the magnitude of the weight bias effect varied as a function of the type of job-related outcome or criterion. Interestingly, the largest effect was found when participants were asked to assess the target’s desirability as a co-worker, a criterion that was not included in Rudolph et al.’s (2009)

study. Similar to the present finding, Hosoda et al.’s (2003) meta-analysis found the largest attractiveness bias effect when the criterion was desirability as a “business partner,” a type of coworker. It appears that biases based on appearance may exert their greatest effect when individuals are asked to assess the desirability of interacting personally with the target in the context of a relationship with repeated contact. This interpretation is consistent with research indicating that in Western societies, many people have a negative affective response to obese individuals and are reluctant to interact with them (Brochu & Morrison, 2007). It is also consistent with a survey finding that twice as many respondents reported being mistreated by coworkers than by their employer because of their weight (Falkner et al., 1999), and more recently, with Puhl et al.’s (2008) finding that individual’s reported that their worst experiences of weight stigma were with friends and family.

The finding that the negative of effect of target weight is greatest when participants were asked to assess the target’s desirability as a coworker highlights the need for research examining expressions of weight bias in interpersonal relationships that exist within employment settings. How does coworker weight bias (vs. biased decisions by employers) contribute to the total experience of weight discrimination in the workplace, and negative job outcomes for obese workers? Are there aspects of the work environment that encourage or inhibit interpersonal expressions of weight bias? In addition to contributing to our understanding of the nature of weight bias, the answers to these and related questions have important practical implications for employers seeking to promote inclusive work environments, and avoid potential legal liability for co-worker-created hostile work environments.

### Other methodological issues

The meta-analytic findings estimating how specific design features influence variation in results across studies, together with our qualitative review of the broader weight discrimination literature, suggest a number of significant methodological issues that should be addressed by researchers investigating weight discrimination in simulated employment decisions. In addition to revealing how limitations in the way target weight is manipulated can significantly impact findings (discussed earlier), our results also indicate that when raters were provided with a relatively large amount of job-relevant information (e.g., a detailed job description), the relationship between weight and job-related outcomes was not as strong as when compared with little job-relevant information being provided (e.g., a job title and/or a one sentence description of the job). This finding strongly suggests that care should be taken to provide participants a realistic amount of information about the job(s) in question so that the salience of weight is not overemphasized and unrealistic.

Consistent with prior research (e.g., Hosoda et al., 2003), our results showed that the effect of weight may be especially pronounced when using within-subject designs that require participants to observe and evaluate several individuals who differ in terms of weight. Research using within-subject designs arguably more closely reflects what occurs in the “real world” (Hosoda et al., 2003) than research using between-subject designs, and the use of within-subject designs may be particularly important in studies attempting to examine the differential bias associated with more subtle differences in weight level (e.g., overweight vs. obese).

Our finding that rater type (undergraduate students vs. more experienced raters) did not moderate the relationship between weight and job-related outcomes suggests that while the use of undergraduate students as participants in experimental studies of weight discrimination may continue to raise legitimate concerns, it should not be assumed that their use necessarily significantly limits the generalizability of study findings.

Finally, the meta-analytic findings estimating how specific design features influence variation in results across studies, and in particular, the finding indicating that limitations in the way in which target weight is manipulated in many studies is obscuring sex differences, highlight the need for researchers to give serious consideration to the potential influence of research design features in meta-analytic studies. Investigations of the influence of design features appear to be relatively uncommon in published meta-analyses, leading us to wonder how often reported results may be systematically and significantly influenced by characteristics of the primary studies?

### Additional limitations and research needs

Although our meta-analytic findings quantitatively weigh and summarize the systematic findings across the constituent experimental studies, they also reflect limitations, both random and systematic. Also, there were only a relatively small number of effects available for several of the relationships that were examined. Most notably, while seven identified studies included a manipulation of target objective qualifications, only two reported sufficient information for the meta-analysis. We made several earnest attempts to contact authors for additional study information that would allow us to cumulate as many effects for our meta-analyses as possible. More research aimed at testing these relationships, together with more complete reporting of results, is needed to provide the data for future meta-analytic testing. Until then, the present results that are based on a relatively small number of effects should be interpreted with caution.

Although there is an obvious need for field research assessing the generalizability of findings based on existing experimental studies, there are still many important issues that can and should be investigated in experimental settings. In addition

to the future research suggested previously, theoretical arguments and limited empirical evidence (Crandall & Eshleman, 2003; King et al., 2006) point to the need for research investigating contextual factors that may influence the suppression or expression of weight bias in employment settings. For example, what is the effect of the weight-related practices being adopted by an increasing number of employers in response to concerns about rising health costs (e.g., employer-sponsored weight loss programs) on the expression of weight discrimination in employment decisions? Do formal employer policies relating to diversity and equal opportunity that explicitly address weight discrimination tend to suppress actual weight discrimination in employment decisions?

Future research could extend Hebl and Mannix's (2003) finding that average weight male job applicants were evaluated more negatively simply by being viewed in close proximity to an overweight woman, as it appears to be an important and robust phenomenon. Even among a group of children as young as 5 years of age, average weight children who were merely viewed in close proximity with other overweight children were evaluated as less desirable playmates (Penny & Haddock, 2007). To what extent does the mere proximity effect operate in employment settings other than the job-application process? For example, can the image of a company in the eyes of investors or job seekers also be negatively affected by its association with an obese leader, as suggested by an article recommending “Do not invest in companies run by fat men” (*Forbes*, 1974, p. 28)?

Finally, there is an important role for experimental and quasi-experimental research in developing training programs aimed at reducing weight bias and its expression. Can negative weight-based stereotypes be reduced by providing empirical evidence tending to refute those stereotypes (e.g., Roehling, Roehling, & Odland, 2008)? To date, the relatively little research addressing this important issue generally reports success in changing beliefs about the controllability of weight, some success in changing negative stereotypes, and very little or no success in changing trainees' attitudes or behaviors (Angesbury & Tiggeman, 2000; Bell & Morgan, 2000; Teachman, Gapinski, Brownell, Rawlins, & Jeyaram, 2003). Existing research suggests that effective weight-bias reduction training will need to take into account more subtle forms of discrimination as well as explicit prejudice (Bessenoff & Sherman, 2000; Teachman et al., 2003). Beyond changing negative stereotypes, can training engage evaluative and other cognitive processes that inhibit an automatic activation of an individual's negative evaluation of obese individuals?

### Conclusion

Our meta-analysis of results from experimental studies clearly indicates that weight affects workplace interactions,

evaluations, and outcomes. But, just as clearly, there are important moderators of the relationship between people's weight and job outcomes that are not to be ignored. The present study points to important research needs, including the need for future studies investigating weight bias in both simulated employment settings and field settings to attend to several key theoretical elements and research design issues.

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## Appendices

### Appendix A

#### List of Studies and Unique Samples Included in Meta-Analysis

1	Alfonso, I. (1995). <i>Discrimination against the overweight in the job hiring decision</i> . (Masters thesis, Florida State University).
2	Alfonso, I. (1997). <i>The effects of weight on employment decisions in a variety of job settings</i> . (Doctoral dissertation, Florida State University).
3	Bellizzi, J. A., & Hasty, R. W. (1998). Territory assignment decisions and supervising unethical selling behavior: The effects of obesity and sex as moderated by job-related factors. <i>The Journal of Personal Selling and Sales Management</i> , 18, 35–49.
4	Bellizzi, J. A., & Hasty, R. W. (2000). Does successful work experience mitigate weight- and gender-based employment discrimination in face-to-face industrial selling? <i>Journal of Business &amp; Industrial Marketing</i> , 15, 384–398.
5	Bellizzi, J. A., & Hasty, R. W. (2001). The effects of a stated organizational policy on inconsistent disciplinary action based on salesperson gender and weight. <i>The Journal of Personal Selling &amp; Sales Management</i> , 21, 189–198.
6	Bellizzi, J. A., Klassen, M. L., & Belonax, J. J. (1989). Stereotypical beliefs about overweight and smoking and decision-making in assignments to sales territories. <i>Development and Motor Skills</i> , 69, 419–429.
7	Benson, P. L., Severs, D., Tatgenhorst, J., & Loddengaard, N. (1980). The social costs of obesity: A non-reactive field study. <i>Social Behavior and Personality</i> , 8, 91–96.
	Bessenoff, G. R., & Sherman, J. W. (2000). Automatic and controlled components of prejudice.
8, 9	*Brink, T. L. (1988). Obesity and job discrimination: Mediation via personality stereotypes. <i>Perceptual and Motor Skills</i> , 66, 494.
10	Cates, S. V. (1999). Do human resource professionals practice the self-fulfilling prophecy: An examination of the influence of applicant gender and applicant weight in the context of an employment selection decision. <i>Dissertation Abstracts International</i> . (UMI No. 9933302)
11	Contreras, D. J. (2005). <i>Weight-based bias: Employment screening of female job applicants</i> . (Masters thesis, Stephen F. Austin State University).
12	Decker, W. H. (1987). Attributions based on managers' self presentation, sex, and weight. <i>Psychological Reports</i> , 61, 175–181.
13	Fikelstein, L. M., Frautschy-Demuth, R. L., & Sweeney, D. L. (2007). Bias against overweight job applicants: Further explorations of when and why. <i>Human Resource Management</i> , 46 (2), 203–222.
14	Homz, B. J. (1996). <i>Bias against obese female and job applicants in a simulated employment interview</i> . (Doctoral dissertation, University of Wisconsin Oshkosh).
15	Jasper, C. R., & Klassen, M. L. (1990). Perceptions of salespersons' appearance and evaluation of job performance. <i>Perceptual and Motor Skills</i> , 71, 563–566.
16	Klesges, R. C., Klem, M. L., Hanson, C. L., Eck, L. H., Ernst, J., O'Laughlin, D., Garrot, A., & Rife, R. (1990). The effects of applicant's health status and qualifications on simulated hiring decisions. <i>International Journal of Obesity</i> , 14, 527–535.
17, 18	*Kutcher, E. J., Bragger, J. D. (2004). Selection interviews of overweight job applicants: Can structure reduce the bias? <i>Journal of Applied Social Psychology</i> , 34, 1993–2022.
19	Larkin, J. C., & Pines, H. A. (1979). No fat persons need apply: Experimental studies of the overweight stereotype and hiring preference. <i>Sociology of Work and Occupations</i> , 6, 312–327.
20	Larwood, L. (1995). Attributional effects of equal employment opportunity: Theory development at the intersection of EEO policy and management practice. <i>Group and Organization Management</i> , 20, 391–408.
21	Lennon, S. (1992). Categorization as a function of body type. <i>Clothing and Textiles Research Journal</i> , 10, 18–23.
22	McKee, K., Smouse, A. D. (1983). Clients' perceptions of counselor expertness, attractiveness, and trustworthiness: Initial impact of counselor status and weight. <i>Journal of Counseling Psychology</i> , 30, 332–338.
23	Melville, D. S., Cardinal, B. J. (1997). Are overweight physical educators at a disadvantage in the labor market?: A random survey of hiring personnel. <i>The Physical Educator</i> , 54, 216–221.
24	Mirch-Kretschmann, S. E. (2004). <i>Framing messages aimed at reducing discrimination and increasing diversity: The role of certainty, affect and stigma</i> . (Doctoral dissertation, Yale University).
25	Niehaus, J. C. (1985). <i>The stigma hypothesis: The effects of obese and nonobese interviewers and the sex variable on reactions to an interview situation</i> . (Doctoral dissertation, University of Northern Iowa).
26	Pingitore, R., Dugoni, B. L., Tindale, R. S., & Spring, B. (1994). Bias against overweight job applicants in a simulated employment interview. <i>Journal of Applied Psychology</i> , 79, 909–917.
27	Polinko, N. K., & Popovich, P. M. (2001). Evil thoughts but angelic actions: Responses to overweight job applicants. <i>Journal of Applied Social Psychology</i> , 31, 905–924.
28	Rooth, D. O. (2007). Experimental evidence of discrimination in hiring against obese applications. Working Manuscript #2007-01-20.
29, 30, 31	*Sartore, M. L., & Cunningham, G. B. (2007). Weight discrimination, hiring recommendations, person-job fit, and attributions: Fitness-industry implications. <i>Journal of Sport Management</i> , 21, 172–193.
32	Shapiro, J. R., King, E. B., & Quiñones, M. A. (2007). Expectations of obese trainees: How stigmatized trainee characteristics influence training effectiveness. <i>The Journal of Applied Psychology</i> , 92, 239–249.
33	Stearns, J. M., Borna, S., & Sundaram, S. (2001). The effects of obesity, gender and specialty on perceptions of physicians' social influence. <i>Journal of Services Marketing</i> , 15, 240–250.
34	Sype, G. E. (1993). <i>An examination of the influence of applicant weight and applicant gender in the context of a selection decision</i> . (Doctoral dissertation, Michigan State University).
35	Wade, T. J., & DiMaria C. (2003). Weight halo effects: Individual differences in perceived life success as a function of women's race and weight. <i>Sex Roles</i> , 48, 461–465.
36	White, M. A. (1998). The influence of applicant weight on resume evaluations. <i>Masters thesis, James Madison University</i> .

\*This study contributed more than 1 unique effect size from more than 1 independent sample; accordingly, each unique sample is assigned a unique study number.

## Appendix B

### Studies Included in Meta-Analyses

Analysis	K	Studies included
Table 1: target body weight and rater evaluations		
Overall meta-analysis	36	All studies in database
Desirability as a coworker	7	10, 12, 15, 21, 24, 25, 34
Hiring recommendation	18	1, 7, 13, 14, 16, 19, 20, 23, 26, 27, 29, 30, 31, 34, 36
Prediction of success	8	10, 13, 15, 20, 24, 32, 34, 35
Promotability	2	1, 9
Salary/raise	5	1, 2, 10, 18, 19
Suitability	15	3, 4, 6, 8, 16, 17, 18, 21, 22, 25, 29, 30, 31, 33
Table 2: target moderator analyses		
Target sex	8	4, 5, 10, 22, 26, 31, 33, 34
Target sex—strong situation	4	4, 5, 22, 26
Target sex—weak manipulation	4	10, 31, 33, 34
Table 3: Rater Moderator Analyses		
Rater race	13	3, 4, 11, 13, 15, 20, 24, 27, 29, 30, 31, 34, 35
Rater sex	30	1, 2, 3, 4, 5, 6, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 29, 30, 31, 32, 34, 35, 36
Table 4: study characteristics moderator analyses		
Target job type	23	3, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 19, 21, 22, 23, 24, 25, 29, 30, 31, 32
Sample type	36	All studies in dataset
Job-relevant information	36	All studies in dataset
Research Design	36	All studies in dataset

Note. Study numbers correspond to those associated with each unique sample in Appendix A.