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Article *in* Journal of Vocational Behavior · February 2009

DOI: 10.1016/j.jvb.2008.09.008

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A meta-analysis of empirical studies of weight-based bias in the workplace ☆

Cort W. Rudolph *, Charles L. Wells, Marcus D. Weller, Boris B. Baltes

Department of Psychology, Wayne State University, 5057 Woodward Avenue, 7th Floor, Detroit, MI 48230, USA

ARTICLE INFO

Article history:
Received 25 July 2008
Available online 8 October 2008

Keywords:
Weight-based bias
Bodyweight
Evaluative workplace outcomes

ABSTRACT

For nearly 30 years researchers have investigated how bodyweight affects evaluative workplace outcomes, such as hiring decisions and performance appraisals. Despite this, no meta-analytic review has been undertaken to quantify the negative impact that bodyweight has on such outcomes. The results of this meta-analytic study suggest that in relation to non-overweight individuals in the workplace, overweight individuals may be disadvantaged across evaluative workplace outcomes ($d = -.52$). Further, differences in magnitude of the effects of weight-based bias were found for hiring ($d = -.70$) and performance ($d = -.23$) outcomes.

1. Introduction

In terms of organizational research, bias is often operationalized as a significant main effect difference between the evaluations of two target individuals who, all else being equal, vary only by some stigmatized quality or characteristic extraneous to their qualifications or job performance. This operationalization is commonly used in experimental studies in which some stigmatized quality or characteristic of individuals is varied, while performance or job qualifications are held constant. In such a paradigm, any differences between the evaluations or judgments of target individuals are said to exist as a function of the effects of a systematic bias related to the particular stigma under investigation. This main effect operationalization of bias should not be confused with more recent studies in which attitudes or stereotypes related to a particular stigma are used to infer bias (e.g. Baltes, Bauer, & Frensch, 2007; Bauer & Baltes, 2002). Research concerning bias operationalized as main effect differences has investigated these effects by varying different qualities of target individuals, such as race (e.g., Greenhaus, Parasuraman, & Wormley, 1990; Landau, 1995; Landy & Farr, 1980; Schmidt & Lappin, 1980), and gender (e.g., Arvey, 1979; Davison and Burke; 2000; Deaux & Taynor, 1973).

Along these lines, a number of primary studies have demonstrated main effect evidence for bias against overweight individuals in the workplace (e.g., Bellizzi, Klassen, & Bellonax, 1989; Boridieri, Drehmer & Taylor, 1997; Klesges, et al., 1990; Zhdanova et al., 2007). Indeed, recent qualitative reviews, (e.g., Puhl & Brownell, 2001; Roehling, 1999; Roehling, 2002), have suggested that a negative relationship exists between peoples' bodyweight and a wide range of evaluative workplace outcomes, citing that overweight individuals are systematically denigrated in comparison to their non-overweight coworkers. For example, Roehling's (1999) review of weight-based discrimination in employment settings concluded that evidence for discrimination against overweight individuals can be found at virtually every stage of the employment process, including selection (e.g., Klesges et al., 1990), placement (e.g., Bellizzi et al., 1989), compensation (e.g., Register & Williams, 1990), pro-

☆ Portions of this paper were presented at the 23rd annual meeting of the Society for Industrial and Organizational Psychology, San Franscisco, CA. The authors would like to gratefully acknowledge the suggestions of Lucy Zhdanova and Malissa Clark on earlier drafts of this manuscript.

* Corresponding author. Fax: +1 313 720 7082.
E-mail address: Cort.Rudolph@wayne.edu (C.W. Rudolph).

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doi:10.1016/j.jvb.2008.09.008

motion (e.g., Boridieri, Drehmer, & Taylor, 1997), discipline (e.g., Bellizzi & Norvell, 1991), and termination (e.g., Kennedy & Homant, 1984).

Further research concerning negative attitudes toward overweight people in the workplace has suggested that such individuals are seen by their coworkers and supervisors as lacking self-discipline and self-control (e.g., Bellizzi & Norvell, 1991; Klassen, Jasper, & Harris, 1993; Klesges et al., 1990; Larkin & Pines, 1979; Rothblum, Miller, & Garbutt, 1988), being lazy and not trying as hard as others at work (e.g. Bellizzi & Norvell, 1991; Klassen et al., 1993; Larkin & Pines, 1979; Larwood, 1995), possessing poor work habits, and having less conscientiousness, competency, skill, and ability than individuals of "average" weight (e.g., Klesges et al., 1990; Larkin & Pines, 1979; Larwood, 1995). Moreover, overweight individuals in the workplace are also viewed as more likely to be absent from work (e.g., Klesges et al., 1990), and less likely to get along with, and be accepted by their coworkers and subordinates (e.g., Bordieri et al., 1997; Klesges et al., 1990). These issues associated with the impact of bodyweight in the workplace are particularly relevant given recent epidemiological research that suggests that the rate of obesity among adults in the United States has been increasing over the last 20 years (CDC., 2007). Further, Puhl and Brownell (2001) called for more research to be conducted investigating discrimination against overweight individuals across a variety of evaluative workplace outcomes.

With regard to the impact of weight-based bias at a societal level, Allon (1982) suggests that a strong "anti-fat" sentiment exists in the United States. Indeed, researchers in several domains have investigated the nature of prejudice against overweight individuals. For example, several studies (e.g., Crandal, 1994) have focused on identifying the negative characteristics that people associate with overweight individuals. Research of this type suggests that overweight people are seen as unattractive (Harris, Harris, & Bochner, 1982), aesthetically displeasing (Wooley & Wooley, 1979), morally and emotionally impaired (Keys, 1955), alienated from their sexuality (Millman, 1980), of a lower socio–economic status (Sobal & Stunkard, 1989), and generally unhappy with themselves as people (Maddox, Back, & Liederman, 1968).

1.1. The present study

While several qualitative reviews have examined the effects of bias against overweight individuals in the workplace (e.g., Puhl & Brownell, 2001; Roehling, 1999; Roehling, 2002), and nearly 30 years of empirical research has been conducted investigating this phenomenon (e.g., Bellizzi et al., 1989; Larkin & Pines, 1979; Pingitore, Dugoni, Tindale, & Spring, 1994; Zhdanova et al., 2007), no quantitative meta-analytic review has been undertaken to assess the magnitude of the effect of weight-based bias in empirical investigations. Thus, the present study aims to accomplish two goals.

The first goal of the current study is to conduct a meta-analysis of the extant literature concerning the effects of weight-based bias across various evaluative workplace outcomes. The results of such a meta-analysis will allow for the integration of past research with more recent research (e.g., Sartore & Cunningham, 2007; Shapiro, King, & Quinones, 2007) that has investigated these effects. The second goal of the current study is to test moderators of the weight-based bias—evaluative workplace outcome relationship. Specifically, this investigation will attempt to determine if job type moderates this relationship as suggested by Pingitore et al., 1994, and if the effects of weight-based bias vary as a function of outcome type (e.g., hiring decision, performance evaluation, and promotion decisions). With these goals in mind, we now turn to a discussion of our hypotheses.

1.1.1. Overall effect

As suggested above, Roehling (1999) concludes that evidence for discrimination against overweight individuals can be found at virtually every stage of the employment process. Thus, we would expect an overall negative effect of weight-based bias across evaluative workplace outcomes. Consistent with this conclusion, the following hypothesis was tested:

Hypothesis 1. There is an overall negative effect of weight-based bias across evaluative workplace outcomes.

1.1.2. Moderation by job type

Several studies have examined whether the effects of weight-based bias are different for different job types, but with varying results (e.g., Pingitore et al., 1994; Rothblum et al., 1988). For example, Rothblum et al. (1988), present evidence that the effects of weight-based bias are stronger for jobs that require extensive public contact, such as sales positions. Further, Pingitore et al. (1994) suggest that this effect may be due to a desire among organizations to maintain the physical appearance of their employees who hold jobs with high public contact, such as sales positions, and that this effect should not be found for positions with less public contact, such as managerial positions. However, Pingitore et al. did not detect a significant interaction between bodyweight and job type to support this hypothesis. Despite this, we believe that using more stable meta-analytic estimates may capture a better picture of this relationship. Thus, in line with other studies that have looked at this relationship (e.g., Rothblum et al., 1988) it should be expected that jobs that require less extensive public contact, such as managerial positions, would experience the effects of weight-based bias less so than sales positions. It should be noted here that for consistency, the distinction between "high public contact" and "low public contact" positions as "managerial," and "sales" respectively, are based of the on the operationalization of this phenomenon by Pingitore et al. (1994). Thus, we hypothesized:

Hypothesis 2. Job type moderates the effects of weight-based bias on evaluative workplace outcomes, such that the effects of weight-based bias are stronger for sales positions than for managerial positions.

1.1.3. Moderation by evaluative workplace outcome

Conceptually, if an overall negative relationship is found for weight-based bias across evaluative workplace outcomes (as suggested by hypothesis 1), it makes sense to test whether or not the type of evaluative workplace outcome under investigation may affect the impact of bias on a given type of evaluation. While we do not make any a priori hypotheses about the pattern of this moderation, we can infer some clues of this relationship from past research. Specifically, research in organizational and social psychology has long demonstrated that the amount of job relevant information that is available to decision makers when making an evaluative workplace decision can have a profound impact on the accuracy of that decision (e.g., Randal & Owens, 1988; Tosi & Einbender, 1985). Research in this area suggests that the effects of bias are less profound as more job-relevant or performance related information is made available to decision makers. Further, research has consistently shown that stereotypes influence judgments most when limited information about target individuals is available to raters (e.g., Locksley, Borgida, Brekke, & Hepburn, 1980; Locksley, Hepburn, & Ortiz, 1982). In addition, research has indicated that individuals place less emphasis on stereotypes when specific information that is relevant to the judgments they are making is made available (Fiske & Taylor, 1991).

Without going too far to infer the amount of performance relevant information available to raters, one can still infer that you would expect weight-based bias to impact evaluative workplace outcomes that are associated with lower amounts of specific performance relevant information (i.e., hiring decisions) more so than evaluative outcomes that may be associated with more access to performance relevant information (i.e., performance evaluations or promotion decisions). Thus, for the current investigation, because no explicit hypotheses are made about this relationship, the following research question was investigated.

Research question 1. Does the type of evaluative workplace outcome investigated moderate the strength of the weight-based bias-evaluative workplace outcome relationship? Specifically, are there differences in the effect of weight-based bias for hiring outcomes, performance outcomes, or promotion outcomes?

2. Method

2.1. Sample of studies

Two procedures were used to gather data for the current meta-analysis. First, a series of searches were conducted in the following digital databases for the periods noted: PsychINFO (Psychological Abstracts; 1967–2007), Proquest (Interdisciplinary Dissertations and Theses; all dates) and ERIC (Educational Resources Information Center; 1966–2007). These searches were conducted using the keywords *obese*, *obesity*, *overweight*, and *fat*, combined with such keywords as *selection*, *evaluation*, *promotion*, *workplace*, *managerial*, *applicant*, and *performance evaluation*. Second, a "snowballing" technique was used, which identified relevant articles in the reference lists of primary studies and review articles concerning bodyweight in the workplace. A total of 59 studies were identified for potential inclusion in this meta-analysis by using both these search methods.

2.2. Inclusion criteria

Two decision rules were used in order for studies to be included in this meta-analysis: (a) information about the weight of the target had to be a manipulated variable where there was at least one overweight target and a comparison group of non-overweight targets; and (b) at least one or more of the dependent variables used had to be a rating of the target on an evaluative workplace outcome (e.g., hiring decision, promotion decision, predicted success, suitability, or performance evaluation). Applying these criteria, several primary studies that had been initially considered were excluded from further analysis (e.g., Frieze, Olson, & Good, 1990). Further, studies that focused on other workplace outcomes such as wage differences (e.g., Maranto & Stenoien, 2000) were eliminated, because they did not fit with the present conception of evaluative workplace outcomes. As a result of using the aforementioned selection criteria, the initial pool of 59 primary studies was reduced to 25.

2.3. Coding procedure

For each primary study, the type of evaluative workplace outcome (i.e., hiring decision, promotion decision, predicted success, suitability, or performance evaluation) and job type (managerial, sales, or other) was coded. It should be noted that initially all job types were coded, but due to a lack of studies examining similar job types, this variable had to be collapsed to include an "other" category. Outcomes that involved a decision regarding selecting potential employees for hiring were classified as hiring decisions. Similarly, outcomes that involved a decision regarding whether or not to promote a target individual were classified as promotion decisions. Outcomes that involved a decision regarding a target's potential for success in a particular position were classified as predicted success, whereas outcomes in which people were asked to make an

evaluation of a target individual's appropriateness or aptitude for a position were classified as suitability outcomes. Finally, outcomes in which people were asked to evaluate the job performance of a target individual were classified as performance evaluations.

In order to calculate the reliability of coder accuracy, all authors coded each study separately. An intra-class correlation coefficient was calculated for both the outcome type variable and job type variable that were coded, to serve as an index of inter-rater agreement. Coders showed high agreement, evidenced by a high inter-rater reliability estimate for both the outcome type (r_{icc} = .94), and job type (r_{icc} = .89) variables. In the event of disagreement, a resolution was reached via discussion. It should be noted here that while moderation by outcome type and job type were tested by the present study, other potential moderators were identified during the initial coding process (i.e., target sex, target BMI). Analysis of these potential moderating variables was not possible because few studies provided the information needed to test such moderators.

2.4. Computation of effect size estimates

The meta-analytic strategy employed by the current study was that of Hedges and Olkin (1985). Although other meta-analytic methods exist (e.g., Hunter & Schmidt, 1990) Hedges and Olkin's was specifically chosen because among the experimental studies included in the current analysis, there were few potential issues associated with predictor unreliability. It should be noted, however, that issues associated with criterion unreliability (i.e., the measurement of the particular evaluative workplace outcome) could present an issue. It should be noted that only three studies included in the present meta-analysis reported reliability information for the evaluative workplace outcomes measured (Klesges et al., 1990; Sartore & Cunningham, 2007; Shapiro et al., 2007). Further, many studies included in the current study relied on one-item measures to assess evaluative workplace outcomes, such as hiring decisions (e.g., Pingitore et al., 1994). Thus, for the purposes of this study, applying corrections for criterion unreliability was not feasible. Further, there was no reason to believe that range restriction was attenuating any of the relationships that were coded for in this meta-analysis. Thus, applying corrections for statistical artifacts, as outlined by Hunter and Schmidt (1990) was not possible for a majority of cases, and indeed probably not necessary for the current meta-analysis.

As a first step, all statistics reported in the studies were converted into a common statistic using Johnson's (1993) DSTAT computer program. The next step was to compute *g*, a standardized effect size estimate (Hedges & Olkin, 1985). For this study, *g* is the standardized mean difference between the overweight targets and average-weight targets on the evaluative workplace outcome of interest. These differences were then divided by the relevant denominator used to calculate the effect size estimate. For any given primary study, this denominator was either (a) the standard deviation of the differences when bodyweight was a within-subjects variable, or (b) the pooled standard deviation when bodyweight was a between-subjects variable. The sign of the difference between means was negative when non-overweight targets were favored over overweight targets and positive when overweight targets were favored over non-overweight targets on the specified evaluative workplace outcome.

Hedges and Olkin (1985) suggest that the *g* index tends to overestimate the magnitude of the population effect size, especially when samples are small. To avoid this, the effect size estimates that were extracted from the primary studies were *d*-statistics. These *d*-statistics were then combined to estimate both an unweighted mean effect size, and sample size weighted mean effect sizes. In addition, *Q*, a homogeneity statistic (Hedges & Olkin, 1985), was calculated in order to determine whether each set of *d*-statistics shared a common population effect size, which indicates whether or not the effect size estimates are homogeneous across the studies. The *Q*-statistic has a distribution that approximates that of a chi-square, with $(k-1)$ degrees of freedom, where k is the number of effect size estimates (Hedges & Olkin, 1985).

In order to interpret the results, the magnitude of the effect sizes (*d*) was based on the suggestions of Cohen (1988). Specifically, effect sizes (*d*) of .20 or less were considered small (corresponding to a weighted uncorrected *r* of .10), .50 were considered to be a medium effect size (corresponding to a weighted uncorrected *r* of .25), and .80 or higher were considered a large effect size (corresponding to a weighted uncorrected *r* of .40).

An effort was made to extract as much information as possible from each primary study. However, not all of the studies initially identified for inclusion reported the statistics needed to calculate effect size estimates. Therefore, from the 25 empirical studies, 33 unique samples were identified, and 42 effect size estimates were computed.

3. Results

3.1. Evaluative workplace outcomes

The 42 effect size estimates that were derived from the 25 studies used in this meta-analysis are listed in Table 1. The overall weighted mean effect size was $d = -.52$ (see Table 2). Since the 95% confidence interval (−.56 to −.48) that surrounds this value does not include the value of 0.00, the overall effect size is significant for weight-based bias across all relevant evaluative workplace outcomes. Based on this, Hypothesis 1 was supported, indicating a significant overall negative effect of weight-based bias across evaluative workplace outcomes. The *Q*-statistic based on the 42 effect size estimates was

Table 1
Study characteristics and effect sizes for weight-based bias and evaluative workplace outcomes.

Study	Year	d_i for Evaluative workplace outcome					95% C.I. for d_i		
		HD	PR	PS	ST	PE	Lower	Upper	r
Larkin & Pines	1979	−0.38					−0.74	−0.02	−0.19*
Polinko & Popovich	2001	0.16					−0.10	0.42	0.08
Ding & Stillman	2005				0.30		0.04	0.56	0.15*
Bellizzi & Hasty	2001					−0.18	−0.38	0.02	−0.09
Bellizzi & Hasty	1998				−0.73		−0.88	−0.58	−0.34****
Bellizzi & Norvell	1991					−0.21	−0.34	−0.08	0.10**
Bellizzi, Klassen, & Belonax	1989				−0.59		−0.90	−0.27	−0.28***
Bellizzi & Hasty	2000				−0.88		−1.09	−0.67	−0.40****
Pingitore et al.	1994	−1.44					−1.69	−1.20	−0.59****
Rothblum, Miller, & Garbutt	1988	−0.29					−0.68	0.10	−0.14
Lennon	1992				−0.28		−0.52	−0.03	−0.14*
Bordieri, Drehmer, & Taylor	1997		−0.51				−1.12	0.11	−0.25
Bordieri, Drehmer, & Taylor	1997					−0.47	−1.09	0.14	−0.23
Bordieri, Drehmer, & Taylor	1997	−0.42					−1.03	0.19	−0.21
Jasper & Klassen	1990a				−0.59		−0.94	−0.25	−0.28***
Brink	1988		−0.86				−1.31	−0.41	−0.40***
Brink	1988				−0.79		−1.15	−0.42	−0.37****
Benson et al.	1980	−1.35					−2.32	−0.38	−0.57**
Benson et al.	1980				−1.25		−2.21	−0.29	−0.54**
Klesges et al.	1990			−0.18			−0.41	0.04	−0.09
Klesges et al.	1990	−0.26					−0.49	−0.03	−0.13*
Sartore & Cunningham	2007	−1.46					−1.84	−1.08	−0.59****
Sartore & Cunningham	2007				−1.48		−1.86	−1.10	−0.60****
Sartore & Cunningham	2007	−1.13					−1.52	−0.74	−0.49****
Sartore & Cunningham	2007				−1.24		−1.77	−0.97	−0.57****
Sartore & Cunningham	2007	−1.24					−1.68	−0.80	−0.53****
Sartore & Cunningham	2007				−1.05		−1.48	−0.62	−0.47****
Shapiro et al.	2007			−0.70			−1.30	−0.10	−0.34*
Shapiro et al.	2007					−1.43	−2.08	−0.77	−0.59****
Kutcher & Bragger	2004	−0.40					−0.74	−0.05	−0.20*
Kutcher & Bragger	2004	−0.63					−1.13	−0.14	−0.31*
Kutcher & Bragger	2004	−1.11					−1.47	−0.75	−0.49****
Mirch-Kretschmann	2004				−1.81		−2.19	−1.44	−0.67****
Alfonso	1997	−1.53					−1.72	−1.33	−0.61****
Alfonso	1997		−0.01				−0.18	0.16	−0.01
Alfonso	1997		0.01				−0.16	0.18	0.01
Bevins	2003	−0.43					−0.80	−0.08	−0.21*
Bevins	2003			−0.08			−0.45	0.29	−0.04
Banta	2004	−0.85					−1.11	−0.60	−0.39****
Cates	1999				−0.42		−0.60	−0.24	−0.21****
Cates	1999				−0.48		−0.68	−0.29	−0.24****
Hebl	1997	0.38					0.06	0.70	0.19*

Year, year of publication; HD, hiring decision; PR, promotion; PS, predicted success; ST, suitability; PE, performance evaluation; d_i, the mean weighted effect size estimate; C.I., confidence interval; r, correlation between evaluative workplace outcome and weight-based bias.
* $p < .05$.
** $p < .01$.
*** $p < .001$.
**** $p < .0001$.

Table 2
Overall effect size estimate (d) across evaluative workplace outcomes.

	95% C.I. for d_i					
	k	d_i	Lower	Upper	r	Q_b
Overall	42	−0.52	−0.56	−0.48	−0.25	575.93****

k, the number of effect size estimates in each evaluative workplace outcome type; C.I., confidence interval; d_i, the mean weighted effect size estimate; r, correlation between evaluative workplace outcome and weight-based bias.
* $p < .05$.
** $p < .01$.
*** $p < .001$.
**** $p < .0001$.

significant, $Q_b(41) = 575.93$, $p < .01$, indicating that these estimates are not homogenous, which suggests the presence of moderators.

3.2. Moderation by job type

Hypothesis 2 suggested that job type would moderate the effects of weight-based bias on evaluative workplace outcomes. Because only a small number of studies reported job type for performance outcomes, the effect of job type could only be tested for hiring outcomes. For hiring outcomes, job type did not significantly moderate the effects of weight-based bias, $Q_b(1) = 2.43$, n.s., (see Table 3), suggesting that there was no significant differences between managerial ($d = -.62$), and sales ($d = -.72$) job types, in terms of hiring outcomes.

3.3. Moderation by evaluative workplace outcome

Research question #1 asked whether or not the effect of weight-based bias would vary for hiring outcomes, performance outcomes, or promotion outcomes. In order to explore this question, we tested for moderation by outcome type. Table 4 shows the effect of weight-based bias by evaluative workplace outcome. The effect of weight-based bias on hiring outcomes ($d = -.76$) was not significantly different than the effect of weight-based bias on suitability outcomes ($d = -.65$). Likewise, the effect for predicted success outcomes ($d = -.26$) was not significantly different than for performance evaluation out-

Table 3
Job type between class effects (Q_b).

Attributes	Outcome	Level	95% C.I. for d_i						
			k	d_i	Lower	Upper	r	Q_w	Q_b
Job type									
	Hiring								2.43
		Managerial	7	−0.62	−0.72	−0.53	−0.30	147.85****	
		Sales	10	−0.72	−0.81	−0.64	−0.34	54.02****	

k, the number of effect size estimates in each evaluative workplace outcome type; d_i, the mean weighted effect size estimate; C.I., confidence interval; r, correlation between evaluative workplace outcome and weight-based bias; Q_w, within class effects: significance indicates effects rejection of hypothesis of homogeneity; Q_b, between class effects: significance indicates effects differ as a function of outcome type.
*$p < .05$.
**$p < .01$.
***$p < .001$.
****$p < .0001$.

Table 4
Effect size estimates (d) by evaluative workplace outcomes.

Outcome	95% C.I. for d_i					
	k	d_i	Lower	Upper	r	Q_w
Hiring decision	17	−0.76	−0.84	−0.68	−0.35	248.47****
Promotion	4	−0.07	−0.19	0.04	−0.04	15.21**
Predicted success	3	−0.21	−0.39	−0.02	−0.10	3.10
Suitability	14	−0.65	−0.72	−0.58	−0.31	146.41****
Performance evaluation	4	−0.24	−0.35	−0.13	−0.12	12.82**
Model Q_b (5) = 144.03****						

k, the number of effect size estimates in each evaluative workplace outcome type; C.I., confidence interval; d_i, the mean weighted effect size estimate; r, correlation between evaluative workplace outcome and weight-based bias.
*$p < .05$.
**$p < .01$.
***$p < .001$.
****$p < .0001$.

Table 5
Overall effect size estimate (d) for collapsed evaluative workplace outcome.

Outcome	95% C.I. for d_i					
	k	d_i	Lower	Upper	r	Q_w
Hiring	31	−0.70	−0.75	−0.64	−0.33	399.25****
Performance	7	−0.23	−0.32	−0.14	−0.12	61.66*
Overall	38	−0.58	−0.63	−0.54	−0.28	489.87****
Model Q_b (1) = 73.61****						

k, the number of effect size estimates in each evaluative workplace outcome type; d_i, the mean weighted effect size estimate; C.I., confidence interval; r, correlation between evaluative workplace outcome and weight-based bias.
*$p < .05$.
**$p < .01$.
***$p < .001$.
****$p < .0001$.

Table 6
Moderation by evaluative workplace outcome.

Outcome	95% C.I. for d_i					
	k	d_i	Lower	Upper	r	Q_w
Hiring	31	−0.70	−0.75	−0.64	−0.33	399.25****
Performance	7	−0.23	−0.32	−0.14	−0.12	17.00*
Promotion	4	−0.07	−0.19	0.04	−0.04	15.21**
Overall	42	−0.47	−0.504	−0.4283	−0.230	624.04****
Model Q_b (5) = 173.66****						

k, the number of effect size estimates in each evaluative workplace outcome type; C.I., Confidence Interval; d_i, the mean weighted effect size estimate; r, correlation between evaluative workplace outcome and weight-based bias.
*$p < .05$.
**$p < .01$.
***$p < .001$.
****$p < .0001$.

comes ($d = -.24$). Further, the effect size estimate calculated for promotion outcomes was not significant ($d = -.07$). Because hiring and suitability outcomes were not significantly or qualitatively different from each other, and neither were predicted success and performance evaluation outcomes, and because both hiring and suitability outcomes were significantly and qualitatively different from predicted success and performance evaluation outcomes (see Table 4), these four groups were collapsed into two new outcomes which were labeled hiring outcomes, and performance outcomes (see Table 5).

Interestingly, there were significant differences between hiring outcomes ($d = -.70$) and performance outcomes ($d = -.23$), with the effect of weight based bias on hiring outcomes being significantly stronger than the effect on performance outcomes (see Table 6).

4. Discussion

The primary purpose of this study was to conduct a meta-analytic review of experimental studies that have examined the relationship between weight-based bias and evaluative workplace outcomes. Based on Cohen's (1988) effect size classification, the magnitudes of the effect sizes calculated here vary by outcome type. For instance, the overall effect for bodyweight across workplace outcome was medium (see Table 2). However, more variability was found with hiring and performance outcomes whose effect sizes were large and small, respectively (see Table 4). Based on these estimates, it is clear that there is an overall medium effect of weight-based bias across the evaluative workplace outcomes studied to date. This finding supports Roehling's (1999) review, which suggests that bodyweight has negative implications across a variety of evaluative workplace outcomes, including hiring, performance, and promotion decisions.

The findings presented here add to the literature on weight-based bias in the workplace by successfully addressing the previously stated goals: (1) to conduct a meta-analysis of the extant literature concerning the effects of weight-based bias across various evaluative workplace outcomes, (2) to test moderators of the weight-based bias—evaluative workplace outcome relationship.

4.1. Evaluative workplace outcomes

Hypothesis one was supported (See Table 2), indicating a significant overall negative effect of weight-based bias across evaluative workplace outcomes. These results, consistent with previous qualitative reviews (e.g., Puhl & Brownell, 2001; Roehling, 1999; Roehling, 2002), indicate that overweight individuals are systematically denigrated in relation to their non-overweight coworkers across evaluative workplace outcomes.

4.2. Moderation by job type

Hypothesis two, that job type would moderate the effects of weight-based bias on evaluative workplace outcomes, was not supported. There were no significant differences in the level of weight-based bias between managerial and sales positions for hiring outcomes. These results are contrary to those of prior studies, (e.g., Rothblum et al., 1988) which have suggested that differences exist in the amount of weight-based bias experienced by high public contact versus low public contact positions. However, these results are similar to those of Pingitore et al. (1994) who also did not find differences in hiring outcomes between managerial and sales positions for overweight applicants. It should be noted, however, that there appears to be a trend that supports this hypothesis, specifically that the effects of weight-based bias on hiring were stronger for sales positions ($d = -.72$) than for managerial positions ($d = -.62$), even though these differences were not statistically significant. Perhaps with further primary investigation into the relationship between job type and level of weight-based bias, this question could be answered more definitively. Indeed, this highlights a discrepancy in the literature that Puhl and Brownell (2001) have also identified, specifically that more research needs to be conducted regarding the differences in how overweight individuals are treated in the workplace. Such research may be conducted by varying job types and levels of public contact for overweight and average weight targets, and identifying differences between these two target groups.

4.3. Moderation by evaluative workplace outcome

Investigating research question #1 led to some interesting conclusions, namely that the effect of weight-based bias was found to be strongest for hiring outcomes, less so for performance outcomes, and least for promotion outcomes. These results may suggest a diminishing impact of weight-based bias across such outcomes. However, while these results are compelling, more research is needed to establish the parameters under which this diminishing impact may occurs, specifically these results are based on meta-analytic estimate.

4.4. Limitations

One limitation of the current investigation is that the results were based on only 25 studies. Every attempt was made to identify all published and unpublished experimental studies meeting the pre-established criteria for inclusion, and to contact authors and experts in this area of study for additional data. While seemingly limited, the 25 studies used in this meta-analysis represent a very representative picture of the extant literature concerning the effects of weight-based bias on evaluative workplace outcomes.

Another potential limitation of this study is that the studies included in the meta-analysis were all laboratory based, experimental designs. Indeed, the rationale behind conducting a meta-analysis of such experimental studies was based partially on the fact that only a handful of field studies have been conducted examining the relationships under investigation here. However, it is interesting to note that the many of field studies that have been conducted (e.g., Falkner et al., 1999; Harris, Waschull, & Walters, 1990; Rothblum, Brand, Miller, & Oetjen, 1990) seem to align with the conclusions of the current study; overweight individuals are systematically disadvantages in the workplace, across a variety of evaluative outcomes. Indeed, it would be interesting to see whether results from a meta-analysis using field or non-experimental studies would demonstrate similar results. Indeed, future research should attempt to quantify the extant non-experimental literature that has investigated the effects of weight-based bias on workplace outcomes. However, it should be noted that this is not a limitation if one is generalizing the results of this meta-analysis to future laboratory based, experimental investigations.

It is fair to assume that the participants used for the studies on which these results are based were not making critical decisions, and were thus not accountable for the outcomes of their decisions. Research has indicated that decision-making can be impacted if people are held accountable for their decisions (e.g., Simonson & Nye, 1992). Because participants in the studies used for this meta-analysis were primarily from laboratory studies, one could argue that their actions are governed by a different set of demand characteristics than participants in field studies, who may be held more accountable for their actions and decisions.

Along these same lines, an additional potential limitation of this study is that a majority of participants in the studies included in this meta-analysis did not have contact with those whom they evaluated. Indeed the contrived nature of laboratory research concerning evaluative workplace outcomes makes it difficult to determine whether or not these effects would have similar magnitude and directionality in actual workplace settings, or if they are artificially affected by the nature of the laboratory environment. Perhaps in actual workplace settings, where individuals interact, the effects of weight-based bias would be differently affected by such contact. Although it would be interesting to see whether the results of this meta-analysis would be different if more studies used organizational samples, the scope of the literature at this point in time prevents such an analysis. Indeed, future research efforts should attempt to address the issue of weight-based bias in applied workplace settings to determine if the strength of the relationships reported here would transfer to an organizational setting.

Despite the limitations noted above, the present effort represents the best attempt to date to quantitatively synthesize the extant literature concerning the effects of weight-based bias on evaluative workplace outcomes. This paper stands to demonstrate, at its best, an aggregated estimate of the average effect of weight-based bias across evaluative workplace outcomes, suggesting that weight-based bias is likely to occur across a variety of evaluative decision making scenarios, particularly for hiring and performance decisions. By no means should this investigation be considered the final word concerning this relationship. Indeed, the results presented here should be viewed as a call for more careful and directed research investigating the nature of the relationship between weight-based bias and evaluative workplace outcomes.

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