

November 1995

FEDERAL JOB CLASSIFICATION

Comparison of Job Content With Grades Assigned in Selected Occupations



General Government Division

B-217675

November 6, 1995

The Honorable John Glenn
Ranking Minority Member
Committee on Governmental Affairs
United States Senate

The Honorable William L. Clay
House of Representatives

The Honorable Eleanor Holmes Norton
House of Representatives

The Honorable Vic Fazio
House of Representatives

The Honorable Steny H. Hoyer
House of Representatives

Over the years, many studies have suggested that women and minorities are paid less than men and nonminorities who work in comparable positions. These observations have raised questions about whether the federal government's classification systems result in lower grades being assigned to positions in occupations having large numbers of female or minority incumbents than to other comparable occupations. This report responds to your request that we determine whether the relationship between job content and grades assigned using the Factor Evaluation System (FES) varied on the basis of the proportions of women and minorities in occupations.¹

Background

Position classification systems are formal methods for determining the relative worth of positions in an organization. The Office of Personnel Management (OPM) has responsibility and authority for federal position classification, except for certain positions in agencies exempted by law. OPM develops and issues classification standards and policies for the federal personnel system. Federal agencies then use these standards and policies to assign grades to positions.

The General Schedule (GS) is a 15-grade pay system that covers 442 white-collar occupations and approximately 1.5 million full-time

¹FES, which covers almost one-third of the federal full-time permanent white-collar workforce, is a point-factor system for determining grades and is considered to be more orderly or rigorous than other federal classification systems.

permanent employees in the federal white-collar workforce. Agencies classify most of these positions using either narrative or FES point-factor classification standards.² The FES primary standard serves as the framework for individual classification standards written for each occupation. When we began our study, FES standards were in effect for 77 occupations covering approximately 441,000 full-time permanent nonsupervisory employees.

Under FES, positions are assigned grades on the basis of the duties, responsibilities, and the qualifications required in terms of the following nine factors:

- **knowledge required by the position** includes the skills needed to apply that knowledge;
- **supervisory controls** entail the control exercised by the incumbent's supervisor (not the incumbent's span of control over subordinates);
- **guidelines** provide reference data or impose certain constraints on the incumbent's use of knowledge; include desk manuals, established procedures and policies, traditional practices, and materials such as dictionaries, etc.; and vary by specificity, applicability, and availability;
- **complexity** consists of the nature, variety, and intricacy of tasks and the difficulty and originality involved in performing the work;
- **scope and effect** encompass the relationship between the breadth and depth of the work and the effect of work products and services within and outside the organization;
- **personal contacts** refer to contacts with persons not in the supervisory chain;
- **purpose of contacts** ranges from factual exchanges of information to situations involving significant or controversial issues and differing viewpoints, goals, or objectives;
- **physical demands** include physical characteristics such as agility, dexterity, and physical exertion—such as climbing, lifting, pushing, etc.; and
- **work environment** pertains to the risks and discomforts in the employee's physical surroundings or work assigned.

As shown in table 1, each factor is broken down into graduated levels. Factors are composed of from three to nine levels with most having four

²The point-factor system involves assigning a point value or weight to each compensable factor and totaling the points assigned to obtain a job worth score that measures the relative importance of each position to an organization. Narrative standards use fewer factors to describe the important characteristics of the work, and the GS grade is determined through nonquantitative analysis.

to six levels. One factor—knowledge required by the position—has the largest range of points, from 50 for level 1 to 1,850 for level 9.

Table 1: FES Factors and Points by Factor Levels

Factor	Level ^a								
	1	2	3	4	5	6	7	8	9
Knowledge required by the position	50	200	350	550	750	950	1,250	1,550	1,850
Supervisory controls	25	125	275	450	650				
Guidelines	25	125	275	450	650				
Complexity	25	75	150	225	325	450			
Scope and effect	25	75	150	225	325	450			
Personal contacts	10	25	60	110					
Purpose of contacts	20	50	120	220					
Physical demands	5	20	50						
Work environment	5	20	50						

^aThe blank spaces in columns indicate that no further levels exist for the corresponding factor.

Source: FES Primary Standard.

To determine a position’s GS grade, the agency typically compares either the position description or information gathered through a “desk audit” with the nine FES factors described in the classification standard.³ After all nine factors are evaluated, the points for all factors are totaled, and the total for each position is converted to a GS grade by using a conversion table (see table 2).

³Desk audits typically consist of a trained classifier’s face-to-face interviews with the incumbent and supervisor and observations of the work operations, sometimes including an examination of work products.

Table 2: FES GS Grade Conversion Table

GS grade	Point range
GS-1	190 - 250
GS-2	255 - 450
GS-3	455 - 650
GS-4	655 - 850
GS-5	855 - 1,100
GS-6	1,105 - 1,350
GS-7	1,355 - 1,600
GS-8	1,605 - 1,850
GS-9	1,855 - 2,100
GS-10	2,105 - 2,350
GS-11	2,355 - 2,750
GS-12	2,755 - 3,150
GS-13	3,155 - 3,600
GS-14	3,605 - 4,050
GS-15	4,055 - up

Source: FES Primary Standard.

Approach

A contractor, with our supervision, developed a job content questionnaire on the basis of the FES primary standard. The contractor distributed it to a stratified random sample of 2,060 pairs of incumbents and their supervisors and received responses from 1,639 incumbent/supervisor pairs, which represents an overall response rate of about 80 percent. Because individual federal positions are classified through labor-intensive desk audits, it was not practical for us to study the majority of FES occupations using traditional classification methods.

The contractor did, however, do desk audits of 78 judgmentally selected positions and compared the audit results with the related questionnaire responses. These comparisons indicated a fairly high correlation across occupations. The validity coefficient between the GS grades resulting from the desk audits and those from the questionnaires was .80 when the incumbent and supervisor questionnaire responses were averaged.⁴ We considered this correlation to be sufficiently high to validate the use of the

⁴A validity coefficient measures the consistency between two data sets.

job content questionnaire results for comparing groups of occupations.⁵ However, we cannot attest to the questionnaire's validity when used across GS grades within occupations, for specific occupations, or for individual positions. Further, our study was not designed to determine whether, and if so why, the job content reflected by the questionnaires differed from that contained in the official job descriptions, which are the bases for the actual GS grades.

We used an OPM database to identify a representative segment of incumbents and their supervisors in occupations with high, medium, or low representations of women or minorities. We defined occupations with high, medium, and low female representation as those in which women represented 70 percent or more, 31 to 69 percent, and 30 percent or less of incumbents, respectively. We considered occupations in which minorities represented more than 41 percent, 23 to 41 percent, or less than 23 percent of incumbents as those with high, medium, and low minority representation, respectively. Examples of occupations with high female representation included secretary, dental hygienist, medical clerk, dental assistant, and occupational therapist. Examples of occupations with high minority representation included border patrol agent and computer and equal employment opportunity specialists.

We selected our sample of incumbents and their supervisors from a total of 58 occupations, which collectively represented about 90 percent of the full-time permanent nonsupervisory employees covered by FES when we designed our study. Because preliminary analyses indicated that more variation in undergrading and overgrading existed among occupations with similar gender and minority representation than between groups of occupations with different gender and minority representations, we did our analyses on the 37 occupations for which we had received completed questionnaires from at least 10 or more incumbent/supervisor pairs, for a total of 1,358 pairs or positions. These 37 occupations represented almost one-quarter of the federal white-collar workforce, or about 79 percent of the employees covered by FES, and the results of our study are generalizable only to this population.⁶

⁵Psychological testing standards traditionally required validity coefficients of at least .70 for all tests, and on that basis, we conclude that our result is sufficiently valid. However, psychologists have acknowledged that coefficients as low as .30 can be of practical value. This is the only classification study we are aware of in which desk audits were used to demonstrate that the questionnaire results were similar to those which would be attained in an actual position classification.

⁶Because we could not obtain reliable estimates of the odds of overgrading and undergrading for occupations with small numbers of respondents, we deleted those 21 occupations with fewer than 10 incumbent/supervisor pairs.

On the basis of the average total factor level points derived from the questionnaires completed by the incumbent and the supervisor, we determined the GS grade for each position using the FES conversion table (see table 2). We compared the questionnaire grade with the incumbent's actual GS grade and considered the position to be aptly, or appropriately, graded if the questionnaire grade and the actual grade were the same. Otherwise, we considered positions to be overgraded if the actual grade was higher than the questionnaire grade and undergraded if the actual grade was lower than the questionnaire grade.

Our study was not designed to permit us to

- approximate the number of positions that appeared to be overgraded, undergraded, or aptly graded for the portion of the federal workforce to which the results of our study are generalizable;
- identify the causes of any overgrading or undergrading resulting from either (1) our use of the primary rather than the occupation-specific classification standards, (2) the agencies' application of classification standards to individual positions, or (3) management decisions regarding the work incumbents were actually assigned versus their job descriptions;
- determine whether any difference on the basis of gender or minority status was inherent in the design of FES, as a product either of the factors that constitute FES or the allocation of weight or the point range assigned to each factor; or
- calculate what pay adjustments, if any, should be made.

Appendix I contains a more detailed discussion of the job content questionnaire development and validation, sample selection, and response rate calculation.

To determine the effects of female or minority representation on relative overgrading and undergrading, we used odds and odds ratios. We calculated the odds of occupations being undergraded rather than aptly graded by dividing the number of positions undergraded by the number aptly graded for groups of occupations. To determine how much more likely one group of occupations was to be undergraded than another group, we divided the odds of being undergraded for one group of occupations by the odds for the other group to form an odds ratio. We used the same procedures for overgrading.

We used loglinear analysis to determine how the odds of occupations being overgraded or undergraded versus aptly graded varied (1) across the

range of GS grades and (2) when the female or minority representation of the occupation was high, medium, or low. The strength of this particular statistical approach is that multiple variables can be analyzed simultaneously. Appendix II provides more detailed information on the calculation of odds and odds ratios and loglinear models tested and the results obtained.

To gain historical perspective, we reviewed previous studies of federal classification issues. We also conferred with federal classification experts to obtain additional insights about possible explanations for specific findings.

This study should not be referred to as a “pay equity” study because we examined only the relationship between job content and GS grades assigned through the use of FES and whether that relationship varied with the proportion of women or minorities in occupations.

We obtained comments from OPM that are discussed on pages 11 through 12 and presented in appendix III. We did our study from January 1990 to September 1995 in accordance with generally accepted government auditing standards.

Results in Brief

For the nonsupervisory positions in the 37 occupations we studied, our analyses suggest that the difference between the actual GS grades and those we determined using a job content questionnaire was directly related to the female and minority representation of the occupations we examined.⁷ If the actual grade was higher than the questionnaire-derived grade, we considered the position to be overgraded; if the actual grade was lower than the questionnaire grade, we considered the position to be undergraded.

The likelihood of a position being overgraded, rather than aptly graded, increased as the incumbents’ GS grades increased. However, the incumbents’ grades had virtually no effect on the likelihood that a position was undergraded versus aptly graded. After statistically eliminating this effect of the incumbents’ GS grades, we found that the occupations we

⁷We developed our job content questionnaire on the basis of the FES primary standard that serves as the framework for individual classification standards written for each occupation. The actual GS grades were assigned using these occupation-specific standards. Further, the questionnaire was designed and validated to achieve our review objectives relative to comparing groups of occupations. It was not designed as and is not a valid substitute for traditional classification methods. Therefore, the questionnaire should not be used to draw definitive conclusions regarding overgrading or undergrading of individual positions.

studied with high female representation were more likely to be undergraded rather than aptly graded compared with the occupations having medium or low female representation. As mentioned above, we defined occupations with high female representation as those in which 70 percent or more of the incumbents were women. This definition was used on the basis of the current literature when we designed our study.

The literature contained no consistent basis on which to define minority representation. On the basis of our past work, we initially adopted a standard of more than 48 percent to define high minority representation.⁸ However, we found it necessary to adjust our definition for high minority representation to occupations in which more than 41 percent of the incumbents were minorities in order to include at least two occupations with each possible mix of gender and minority representation (e.g., low female, high minority representation).

We would have preferred that our original definition had provided a sufficient mix of occupations in our sample. And it is important to note that about half of the incumbents in the total population of the occupations defined by our study as having a high minority representation were in fact nonminorities. Within these parameters, after eliminating the effects of the incumbents' GS grades, we found that occupations with high minority representation were more likely to be overgraded rather than aptly graded in comparison with the occupations having medium or low minority representation.

The National Performance Review has contended that the current federal classification systems have too many occupations and grades and has recommended that a more flexible "broad-banded" system be adopted. OPM is currently, within the existing statutory framework, planning to revise the classification standards and increase classification oversight. Our study suggests any new system should be closely monitored to ensure that unintended disparities are identified and addressed.

⁸When we designed our study, minorities comprised approximately 32 percent of the workforce covered by FES. We initially defined occupations with high minority representation as those in which more than 48 percent (150 percent of the 32 percent minority workforce representation) of the incumbents were minorities.

Effects of Female and Minority Representation on Relative Overgrading and Undergrading

To evaluate whether gender or minority representation had an effect on the variation between the actual grades and the questionnaire grades, we statistically eliminated the effect of the incumbents' GS grades.⁹ Analysis of the remaining variation showed that occupations with high female representation were 1.77 times more likely to be undergraded rather than aptly graded compared with occupations having a low or medium female representation. Occupations with high minority representation were 2.18 times more likely to be overgraded rather than aptly graded compared with occupations having a low or medium minority representation.¹⁰

Classification experts with whom we consulted about our results and the available literature offered a few occupation-specific hypotheses about possible causes. For example, key occupations with high minority representation that appeared to be overgraded included (1) border patrol agents, (2) equal employment opportunity and compliance specialists, and (3) computer specialists. Previous studies of federal classification issues maintained that FES was ineffective for specialists such as law enforcement related occupations because physical demands and work environment are not highly valued FES factors but are considered significant in these occupations.

Although empirical data are lacking, the classification experts we consulted suggested that when equal employment opportunity occupations were established in the 1970s, they involved a heavy workload of cases and, even though not recognized by FES, the GS grades of these occupations may have been increased on that basis. Furthermore, private sector wages may have resulted in overgrading positions in computer-related occupations. Explanations are somewhat less evident regarding occupations with high female representation, which appear more likely to be undergraded.

⁹The likelihood or odds of a position being overgraded increased as the GS grade increased; that is, as the grade increased by one GS grade, the odds that a position was overgraded versus aptly graded increased by a factor of 1.64. For example, the odds of positions being overgraded in occupations with an average grade of GS-9 were approximately 5 to 1 (i.e., five positions were overgraded for every one that was aptly graded), while the odds of positions being overgraded in occupations with an average grade of GS-10 were about 8.2 to 1. The factor of 1.64 ($8.2 / 5 = 1.64$) indicates that positions in the higher graded occupations were 1.64 times more likely than those in the lower graded occupations to be overgraded. At the 95 percent level of confidence, as the grade increased by one GS grade, the odds that a position was overgraded versus aptly graded increased by a factor ranging from 1.53 to 1.77.

The GS grade had no significant effect on the odds that a position was undergraded versus aptly graded.

¹⁰At the 95 percent level of confidence, occupations with high female representation were from 1.33 to 2.35 times more likely to be undergraded than occupations with medium or low female representation, and occupations with high minority representation were from 1.62 to 2.94 times more likely to be overgraded than those with medium or low representation.

Current Efforts to Revamp Classification Standards and Systems

Critics of the federal classification system, including reports from the National Academy of Public Administration and the National Performance Review, have argued that the classification system is overly complex, with too many occupations and GS grades, and that a less rigid system would be more effective. They have recommended fewer occupations and more flexible broad-banded grade structures.

OPM officials told us recently that, within the existing statutory framework, OPM plans to revise the classification standards and increase its oversight of various processes including classification. A current proposal for rewriting classification standards would reduce the inventory of 442 white-collar classification standards to about 74. Rather than individual occupations, the new standards would focus on the 22 “job families” of related occupations with separate standards, as applicable, for professional, administrative, technical, and clerical positions.¹¹

OPM has also established a new oversight office, which, among other things, is planning various governmentwide policy studies. OPM has tentatively allocated about 145 staff years to this effort; most of these resources are located in field offices rather than at headquarters. One of the highest priorities will be a governmentwide classification study, with particular emphasis on determining the accuracy of “border grades”—those grades most likely to be placed at the lower and upper limits of any newly created grade bands. A team is examining options for doing this study, and work on the study is scheduled to begin early in fiscal year 1996.

Conclusions

Although FES is considered a more orderly or rigorous method than other federal classification systems, our study identified differences in the grading of positions in occupations with high representations of women or minorities. The National Performance Review and other studies suggest that the current classification systems should be abandoned in favor of more flexible, broad-banded systems. The results of our study indicate that it is important that policymakers closely monitor any new systems to ensure that (1) unintended disparities are identified so that they can be corrected and (2) the national policy underlying the current classification system—that jobs be classified so that pay is equal for substantially equal work—is being satisfactorily achieved. Since OPM is in the process of

¹¹“Job families” consist of related occupations that are grouped together such as the General Administrative, Clerical, and Office Service Group; the Accounting and Budget Group; the Physical Science Group; etc.

substantially revising the classification and oversight systems, we are making no recommendations in this report.

Agency Comments and Our Evaluation

OPM provided written comments on a draft of this report. (See app. III.) OPM took issue with our methodology, saying that it was insufficient to support our findings. OPM also discussed its plans to further explore job classification accuracy issues.

OPM took exception with our methodology in two respects. First, it believes we inappropriately used the primary classification standard rather than occupation-specific standards as the basis for our job content questionnaire. OPM said that the primary standard was designed to be used as an overall outline wherein more specific standards would be developed, not as a basis for evaluating individual positions. Although we used the primary standard rather than the occupation-specific standards in the development of our methodology, we examined the specific standard for several occupations in our sample to see if we could identify any ways in which the use of the occupation-specific standard might have led to a different result. We did not identify any such effect. We also asked OPM's classification experts to identify occupations in our sample for which the specific standards were, in their view, sufficiently different from the primary standard that our results would have been affected in identifiable ways. They did not identify any such occupations. Thus we continue to believe that our use of the primary standard was appropriate and that our methodology produced useful results.

OPM's second exception with our methodology was our use of a job content questionnaire rather than traditional desk audits to assign grades to positions. OPM said that our use of a questionnaire resulted in employees and supervisors, unfamiliar with FES ground rules, being asked to select generic phrases that were not in context and that this in turn resulted in the grades we assigned being less credible than those derived by federal agencies. We acknowledge in our text that actual GS grades are assigned on the basis of occupation-specific standards and that the desk audit is a typical way to assign a grade to a position. As noted in the text, desk audits are labor-intensive, and it was not practical for us to study the majority of FES occupations using traditional classification methods. Because of this, we took care to validate our results. First, we had a contractor do desk audits on positions in a number of occupations in our sample. Next, we compared the results of those desk audits with the questionnaire results for those positions. This comparison showed a fairly

high correlation between the GS grades resulting from desk audits and those from the questionnaire. Thus, we believe that our methodology is appropriate to identify patterns of overgrading and undergrading among groups of occupations with different representations of women or minorities.

OPM also questioned our study results by comparing them with other studies. More specifically, OPM said that other agencies' studies and OPM's classification appeals data indicated lower levels of misclassification than our study. We are unaware of any recent studies or appeals data in which a direct comparison with our study could be meaningful. Although OPM's most recent report on the overall federal white-collar position classification accuracy indicated a lower level of misclassification than our study, it was published in 1983. We acknowledge that classification appeals also indicate a lower level of misclassification than our study. However, classification experts with whom we consulted said that appeals data are unlikely to represent those federal employees whose positions may be overgraded. As indicated by the Merit System Protection Board (MSPB), almost no one files a classification appeal.¹²

Finally, OPM said that it shares with us the need to ensure that the federal government's classification systems and their applications are fair and unbiased. OPM said that to this end, its newly designed oversight program will have a major focus on ensuring that current and new classifications systems advance the merit principles of equal pay and the efficient and effective use of the federal workforce. OPM said that it expects to decide on the classification review design by the end of fiscal year 1995 and begin work on the review in early fiscal year 1996.

We are sending copies of this report to interested Members of Congress and congressional committees that have responsibilities for public sector employment issues, the Director of the Office of Personnel Management, and other interested parties. Copies will also be made available to others upon request.

¹²According to MSPB only 240 of the government's 2.1 million civilian nonpostal employees filed an appeal in 1988, or about one one-hundredth of 1 percent.

Major contributors to this report are listed in appendix IV. If you have any questions about the report, please call me at (202) 512-7824.

A handwritten signature in black ink that reads "Nancy R. Kingsbury". The signature is written in a cursive style with a large, prominent 'N' and 'K'.

Nancy Kingsbury
Director
Planning and Reporting

Contents

Letter		1
Appendix I		18
Questionnaire	Questionnaire Development and GS Grade Estimation	19
Development, Sample	Sample Selection	24
Selection, Response	Response Rate Calculation	33
Rate Calculation, and	Occupations Included in the Study Analyses	34
Validation	Questionnaire Validation	35
Methodology		
Appendix II		39
Loglinear	Data Analysis Approach	39
Methodology and	Occupations Included in Our Study	39
Analysis Results	Relationship Between Overgrading/Undergrading and Female or Minority Representation Without Controlling for GS Grade	45
	Relationship Between Overgrading/Undergrading Versus GS Grade and Female and Minority Representation	50
Appendix III		63
Comments From the Office of Personnel Management		
Appendix IV		68
Major Contributors to This Report		
Bibliography		69
Related GAO Products		144
Tables	Table 1: FES Factors and Points by Factor Levels	3
	Table 2: FES GS Grade Conversion Table	4
	Table I.1: FES Factors and Points by Factor Levels	20
	Table I.2: Conversion of FES Points to GS Grade	23

Table I.3: Example of GS Grade Estimation Based on Incumbent and Supervisor Questionnaire Responses	24
Table I.4: Distribution of the 77 FES Occupations	25
Table I.5: Female and Minority Representation, PATCO Category, and Number of Incumbents for the 77 Occupations Covered by FES	27
Table I.6: Distribution of the 58 Occupations Included in the Sample	30
Table I.7: Distribution of the 2,233 Incumbents by Female and Minority Representation and Strata	32
Table I.8: Disposition of Incumbent/Supervisor Pairs in the Sample	33
Table I.9: Female and Minority Representation of the 37 Occupations Included in the Study	35
Table I.10: Distribution of Desk Audits Completed According to Female and Minority Representation for the 37 Occupations Included in the Study	36
Table I.11: Validity Coefficients for Grades Estimated on the Basis of the 78 Desk Audits Versus the Questionnaire Responses for Incumbent/Supervisor Pairs, Supervisors Only, and Incumbents Only	38
Table II.1: Female and Minority Representation, Average GS Grades, Observed Sample Frequencies, and Odds of Being Overgraded and Undergraded Versus Aptly Graded for 37 Occupations Without Controlling for GS Grade	42
Table II.2: Relationship Between the Observed Sample Frequencies and Female Representation Without Controlling for GS Grade	46
Table II.3: Hierarchical Models Tested to Examine Relationships Between Observed Sample Frequencies and Female and Minority Representation	47
Table II.4: Relationship Between the Expected Frequencies and Female Representation Without Controlling for GS Grade	48
Table II.5: Relationship Between the Observed Sample Frequencies and Minority Representation Without Controlling for GS Grade	49
Table II.6: Relationship Between the Expected Frequencies and Minority Representation Without Controlling for GS Grade	50
Table II.7: Loglinear Models Tested to Examine the Relationship Between the Frequencies, the GS Grade, and Female and Minority Representation	54

Contents

Table II.8: Female and Minority Representation, Average GS Grades, Expected Frequencies, and Odds of Overgraded and Undergraded Versus Aptly Graded for 37 Occupations	58
Table II.9: Coefficients and Odds Ratios Describing the Effects of the Average GS Grade and High Female and Minority Representation on Overgrading and Undergrading	62

Figures

Figure I.1: Excerpt from the FES Primary Standard	21
Figure I.2: Excerpt from the Job Content Questionnaire	22
Figure II.1: Odds of Overgrading by Average GS Grade Across 37 Occupations	51
Figure II.2: Odds of Undergrading by Average GS Grade Across 37 Occupations	52

Abbreviations

CPDF	Central Personnel Data File
FES	Factor Evaluation System
GS	General Schedule
MSPB	Merit System Protection Board
OPM	Office of Personnel Management
PATCO	Professional, Administrative, Technical, Clerical, Other

Questionnaire Development, Sample Selection, Response Rate Calculation, and Validation Methodology

Using the competitive bid process, we contracted with a national management consultant—Barrett & Associates, Inc., of Akron, Ohio—to (1) develop a job content questionnaire that enabled the contractor to estimate GS grades for positions in our nationwide sample using input from the incumbents and their supervisors, (2) distribute the questionnaire to a sample of incumbent/supervisor pairs attaining at least an 80 percent response rate, (3) develop a semistructured interview guide for completing desk audits, (4) validate the questionnaire through the use of desk audits, and (5) analyze the questionnaire responses.¹ The analyses were done to determine whether a link existed between the GS grades assigned to positions through the use of the Factor Evaluation System (FES) and the number of women or minorities in occupations that we included in our study.

We selected the sample of incumbent/supervisor pairs and worked closely with the contractor providing supervision throughout the process. Because the preliminary analyses showed that more variation existed within groups of occupations rather than between those groups, we refined the analyses of the questionnaire responses as described in appendix II.

In addition to working with the contractor, we consulted periodically with an *ad hoc* panel of experts that provided technical guidance during the early design phase of our study. Our panel consisted of

- Ms. Ruth Rogers, former Chief, Standards Division, Department of Personnel, Government of the District of Columbia, who provided staff assistance to the District's pay equity study;²
- Dr. Donald Schwab, Professor of Business Research and Industrial Relations, University of Wisconsin-Madison, who has written extensively on the issue of comparable worth; and
- Dr. Ronnie Steinberg, Professor of Sociology and Women's Studies, Temple University, who has considerable experience with pay equity issues and job content questionnaires.

¹Desk audits consist of face-to-face interviews between trained classifiers and the incumbent and supervisor to identify and observe work operations and products. The validation was done to determine whether our questionnaire could be used to estimate GS grades similar to those that would be attained in actual desk audits. When we designed our study, we set a goal of achieving a .80 validity coefficient, which measures the consistency between two data sets.

²According to a District of Columbia official, in July 1990, the District contracted with a consulting firm to do a pay equity study, and in April 1994, the contractor provided a final report with recommendations.

We also consulted with Dr. David Rindskopf, Professor, Graduate School and University Center, City University of New York, for assistance with our sample selection methodology.

After we completed our analyses, we shared our results with and obtained informal comments from five federal officials with classification experience. In addition to a representative from OPM and GAO's personnel office, we selected three of these experts from a list of recommended candidates provided at our request by the Classification and Compensation Society, a professional organization of federal classifiers and other personnel specialists. The classification experts included a mix of male, female, minority, and nonminority individuals who worked in OPM's then Personnel Systems and Oversight Group and in the personnel offices of the Federal Aviation Administration, the Department of Defense, the Library of Congress, and the General Accounting Office.

Questionnaire Development and GS Grade Estimation

We developed a job content questionnaire that enabled us to estimate GS grades for positions covered by FES, a point factor position classification system the federal government used to classify 77 of the 455 white-collar occupations when we designed our study.³ On the basis of the factor descriptions in the FES primary standard, we constructed questions that allowed us to determine the appropriate level for each factor.⁴ Table I.1 shows the points associated with each factor level.

³A point factor position classification system uses a set of factors and factor weights to order positions hierarchically in terms of their value to an employer. FES uses the following nine factors to describe the duties and responsibilities of a position: knowledge required by the position, supervisory controls, guidelines, complexity, scope and effect, personal contacts, purpose of contacts, physical demands, and work environment. Each factor is broken down into graduated levels. Factors are composed of from three to nine levels.

⁴The FES primary standard serves as the framework for individual classification standards written for each occupation. We compared the occupation-specific standards with the primary standard for four occupational series—computer operations, border patrol agent, equal employment opportunity, and equal opportunity compliance—and determined that these occupation-specific standards appeared to be within the framework of the primary standard.

**Appendix I
Questionnaire Development, Sample
Selection, Response Rate Calculation, and
Validation Methodology**

**Table I.1: FES Factors and Points by
Factor Levels**

Factor	Level ^a								
	1	2	3	4	5	6	7	8	9
Knowledge required by the position	50	200	350	550	750	950	1,250	1,550	1,850
Supervisory controls	25	125	275	450	650				
Guidelines	25	125	275	450	650				
Complexity	25	75	150	225	325	450			
Scope and effect	25	75	150	225	325	450			
Personal contacts	10	25	60	110					
Purpose of contacts	20	50	120	220					
Physical demands	5	20	50						
Work environment	5	20	50						


^aThe blank spaces in columns indicate that no further levels exist for the corresponding factor.

Source: FES Primary Standard.

Figures I.1 and I.2 show an excerpt from the FES primary standard and the resulting question that we included in our job content questionnaire, respectively.

**Appendix I
Questionnaire Development, Sample
Selection, Response Rate Calculation, and
Validation Methodology**

**Figure I.1: Excerpt From the FES
Primary Standard**

FACTOR 1. KNOWLEDGE REQUIRED BY THE POSITION	
<p>Factor 1 measures the nature and extent of information or facts which the workers must understand to do acceptable work (e.g., steps, procedures, practices, rules, policies, theories, principles, and concepts) and the nature and extent of the skills needed to apply those knowledges. To be used as a basis for selecting a level under this factor, a knowledge must be required and applied.</p>	
<i>Level 1-1</i>	<i>50 points</i>
<p>Knowledge of simple, routine, or repetitive tasks or operations which typically includes following step-by-step instructions and requires little or no previous training or experience;</p>	
<i>Level 1-2</i>	<i>200 points</i>
<p>Knowledge of basic or commonly-used rules, procedures, or operations which typically requires some previous training or experience;</p>	
	
<i>Level 1-8</i>	<i>1550 points</i>
<p>Mastery of a professional or administrative field to:</p> <ul style="list-style-type: none">- Apply experimental theories and new developments to problems not susceptible to treatment by accepted methods;	
<i>Level 1-9</i>	<i>1850 points</i>
<p>Mastery of a professional field to generate and develop new hypotheses and theories;</p>	

**Appendix I
Questionnaire Development, Sample
Selection, Response Rate Calculation, and
Validation Methodology**

**Figure I.2: Excerpt From the Job
Content Questionnaire**

13. To perform your job in a satisfactory manner, what level of knowledge and skill is needed? (*Check one.*)

1. Tasks or operations involving specific step-by-step instructions requiring little or no previous training or experience

2. A few basic or commonly used rules, procedures, or operations plus some previous or on-the-job training or experience

8. Mastery of a professional, technical or administrative field to the point where one can apply new hypotheses, theories, or applications to applied problems

9. Mastery of a professional, technical or administrative field to the point where one can generate and develop new hypotheses and theories

The GS grade is determined by totaling the points assigned to each of the nine factors and using the grade conversion table shown in table I.2.

**Appendix I
Questionnaire Development, Sample
Selection, Response Rate Calculation, and
Validation Methodology**

**Table I.2: Conversion of FES Points to
GS Grade**

GS grade	Point range
GS-1	190 - 250
GS-2	255 - 450
GS-3	455 - 650
GS-4	655 - 850
GS-5	855 - 1,100
GS-6	1,105 - 1,350
GS-7	1,355 - 1,600
GS-8	1,605 - 1,850
GS-9	1,855 - 2,100
GS-10	2,105 - 2,350
GS-11	2,355 - 2,750
GS-12	2,755 - 3,150
GS-13	3,155 - 3,600
GS-14	3,605 - 4,050
GS-15	4,055 - up

Source: FES Primary Standard.

To determine whether incumbents could readily understand the questionnaire and complete it within a reasonable time period, we completed three sets of pretests. In total, we selected about 30 incumbents and supervisors who were located in the Cleveland metropolitan area and who represented a range of GS grades and occupations covered by FES. After observing them as they completed the questionnaire, we interviewed each incumbent or supervisor to identify how the questionnaire could be improved; we rewrote or edited most of the questions on the basis of the information they provided. During the initial pretest, we also revised our semistructured interview guide for use in completing subsequent desk audits.

On the basis of questionnaire responses received from incumbents and their supervisors, we estimated the appropriate GS grade for each position in our sample by (1) determining the appropriate level (and corresponding points) for each of the nine factors, (2) averaging the total points computed separately for the incumbent and the supervisor, and (3) using the FES points-to-grade conversion table to assign a GS grade to the position. We decided to average the input from the incumbent and the supervisor to balance the views of those who would place more reliance

**Appendix I
Questionnaire Development, Sample
Selection, Response Rate Calculation, and
Validation Methodology**

on the input of incumbents versus that of supervisors. Table I.3 shows an example of how we estimated the GS grade for one position in our sample.

Table I.3: Example of GS Grade Estimation Based on Incumbent and Supervisor Questionnaire Responses

Factor	Incumbent		Supervisor		Average total points
	Factor level	Points	Factor level	Points	
Knowledge required by the position	4	550	3	350	
Supervisory controls	2	125	2	125	
Guidelines	2	125	1	25	
Complexity	3	150	1	25	
Scope and effect	2	75	4	225	
Personal contacts	3	60	1	10	
Purpose of contacts	1	20	1	20	
Physical demands	2	20	1	5	
Work environment	1	5	2	20	
Total points		1,130		805	967
Estimated GS grade					GS-5

Note: The blank spaces in columns indicate that we estimated GS grades by averaging the total points on the basis of input from the incumbent and the supervisor rather than the points assigned to each factor.

Sample Selection

We selected our nationwide sample from the full-time permanent nonsupervisory incumbents in the 77 occupations for which an FES standard had been in existence for at least 1 year when we completed our study design in May 1992. Because of limited resources, we excluded incumbents who (1) were stationed outside of the continental United States or (2) worked for agencies with less than 500 employees. Each of the 77 occupations included from 35 to 91,769 incumbents for a total of 441,189 full-time permanent nonsupervisory incumbents. Women constituted about 61 percent of the total workforce covered by FES and minorities, approximately 32 percent. We used OPM's Central Personnel Data File (CPDF), updated as of June 1992, to select our sample. These were the most recent data available when we designed our study. We did not independently verify the accuracy of this database.

We defined each of the 77 occupations covered by FES as having a high, medium, or low representation of women or minorities. On the basis of the current literature, we defined occupations with high, medium, and low

**Appendix I
Questionnaire Development, Sample
Selection, Response Rate Calculation, and
Validation Methodology**

female representation as those in which women represented 70 percent or more, 31 to 69 percent, and 30 percent or less of the incumbents, respectively. The literature contained no consistent basis on which to define minority representation; therefore, on the basis of our past work, we initially adopted a standard of more than 48 percent (150 percent of the 32 percent minority workforce representation) to define high minority representation; less than 16 percent (50 percent of 32 percent), low minority representation; and 16 to 48 percent, medium minority representation. However, in order to include in our sample at least two occupations with each possible mix of gender and minority representation (e.g., low female, high minority representation), we found it necessary to adjust our definitions for occupations with high, medium, and low minority representation to those in which minorities represented more than 41 percent, 23 to 41 percent, and less than 23 percent of incumbents, respectively. Table I.4 shows the distribution of the 77 occupations in a nine-cell matrix configured according to female and minority representation.

Table I.4: Distribution of the 77 FES Occupations

Female representation	Minority representation			Total
	High	Medium	Low	
High	6	14	2	22
Medium	12	10	5	27
Low	3	3	22	28
Total	21	27	29	77

Source: GAO analysis of data obtained from OPM.

From the 77 occupations covered by FES, we selected 58 on the basis of four characteristics—number of incumbents, PATCO (professional,

Appendix I
Questionnaire Development, Sample
Selection, Response Rate Calculation, and
Validation Methodology

administrative, technical, clerical, and other) category,⁵ job family,⁶ and GS grade distribution. First, we chose occupations in each matrix cell with the largest number of incumbents. Second, we examined the PATCO category of the occupations selected within each cell and chose additional occupations to include all categories. Third, we reviewed the job families represented by the occupations already selected and chose additional occupations increasing the number of families included in our study to 17 out of a total of 22. Finally, we examined the GS grade distributions of the occupations selected and chose occupations that included grades not previously selected within each row and column of the matrix. Table I.5 shows the female and minority representation, PATCO category, and number of full-time permanent nonsupervisory incumbents for each of the 77 occupations covered by FES when we selected our sample as well as the 58 occupations selected for inclusion in our sample.

⁵OPM assigns a PATCO category to each white-collar occupation on the basis of the general subject matter of work, level of difficulty or responsibility, and educational requirements.

Professional occupations require incumbents to use discretion and judgment to apply knowledge acquired through education or training equivalent to a bachelor's degree in a specialized field.

Administrative occupations involve the exercise of analytical ability and personal responsibility to apply concepts and practices—typically learned through a general college education or progressively responsible work—to one or more fields of management.

Technical occupations consist of nonroutine work that is learned on-the-job or from specialized training less than that represented by college graduation to support professional or administrative fields.

Clerical occupations require incumbents to do structured work according to established policies, which are learned through training or work experience, to support office operations.

Other occupations include those miscellaneous occupations that are not included in one of the four other categories.

⁶Job families consist of related occupations that are numbered using the same multiple of 100. For example, GS-300, the general administration, clerical, and office services group includes the mail and file (GS-305), computer operation (GS-332), and telecommunications (GS-391) occupations.

**Appendix I
Questionnaire Development, Sample
Selection, Response Rate Calculation, and
Validation Methodology**

Table I.5: Female and Minority Representation, PATCO Category, and Number of Incumbents for the 77 Occupations Covered by FES

Occupational series ^a	Representation			PATCO ^b	Full-time permanent nonsupervisory incumbents
	Female	Minority			
318	Secretary	High	Medium	C	91,769
334	Computer specialist	Medium	Medium	A	43,958
1102	Contracting	Medium	Medium	P	25,355
525	Accounting technician	High	Medium	C,T ^c	18,081
621	Nursing assistant	Medium	High	T	14,984
305	Mail and file	Medium	High	C	14,630
592	Tax examining	High	Medium	C,T ^d	13,271
1910	Quality assurance	Low	Low	A	12,163
203	Personnel clerical and assistance	High	High	C,T ^d	11,640
511	Auditing	Medium	Low	P	11,413
560	Budget analysis	High	Medium	A	11,099
830	Mechanical engineering	Low	Low	P	10,726
679	Medical clerk	High	High	C	10,697
510	Accounting	Medium	Medium	P	8,838
335	Computer clerk and assistant	High	Medium	C,T ^e	8,353
332	Computer operation	Medium	High	T	6,833
610	Nurse	High	Medium	P	5,746
1320	Chemistry	Low	Low	P	5,347
83	Police	Low	Medium	O	5,096
80	Security administration	Medium	Medium	A	4,616
391	Telecommunications	Low	Low	A	4,568
644	Medical technologist	Medium	Medium	P	4,491
457	Soil conservation	Low	Low	P	4,027
540	Voucher examining	High	Medium	C	3,978
(561)	(Budget clerical and assistance)	(High)	(Medium)	(C,T ^d)	(3,937)
85	Security guard	Low	High	O	3,882
(1370)	(Cartography)	(Low)	(Low)	(P)	(3,817)
460	Forestry	Low	Low	P	3,764
(544)	(Civilian pay)	(High)	(Medium)	(C,T ^e)	(3,524)
(819)	(Environmental engineering)	(Low)	(Low)	(P)	(3,461)
950	Paralegal specialist	High	Medium	A	3,460
18	Safety and occupational health management	Low	Low	A	3,420
1035	Public affairs	Medium	Low	A	3,202
1896	Border patrol agent	Low	High	O	3,176

(continued)

**Appendix I
Questionnaire Development, Sample
Selection, Response Rate Calculation, and
Validation Methodology**

Occupational series ^a		Representation			Full-time permanent nonsupervisory incumbents
		Female	Minority	PATCO ^b	
475	Agricultural management	Low	Low	P	3,088
1311	Physical science technician	Low	Low	T	2,987
(545)	(Military pay)	(High)	(Medium)	(C, T ^e)	(2,935)
(840)	(Nuclear engineering)	(Low)	(Low)	(P)	(2,873)
681	Dental assistant	High	High	T	2,660
620	Practical nurse	High	High	T	2,563
647	Diagnostic radiologic technologist	Medium	Medium	T	2,433
2134	Shipment clerical and assistance	High	Medium	C	2,070
622	Medical supply aide and technician	Medium	High	T	1,986
260	Equal employment opportunity	Medium	High	A	1,907
(486)	(Wildlife biology)	(Low)	(Low)	(P)	(1,850)
1173	Housing management	Medium	Medium	A	1,841
(458)	(Soil conservation technician)	(Medium)	(Low)	(T)	(1,835)
649	Medical instrument technician	Medium	High	T	1,819
350	Equipment operator	Medium	High	C	1,779
808	Architecture	Low	Medium	P	1,686
360	Equal opportunity compliance	Medium	High	A	1,526
(1980)	(Agricultural commodity grading)	(Low)	(Low)	(T)	(1,438)
1371	Cartographic technician	Medium	Low	T	1,358
(482)	(Fishery biology)	(Low)	(Low)	(P)	(1,358)
690	Industrial hygiene	Medium	Low	P	1,247
1822	Mine safety and health	Low	Low	T	1,190
1889	Import specialist	Medium	Medium	A	1,159
630	Dietician and nutritionist	High	Medium	P	1,111
436	Plant protection and quarantine	Low	Medium	P	1,097
701	Veterinary medical science	Low	Low	P	834
188	Recreation specialist	Medium	Medium	A	805
1040	Language specialist	Medium	High	A	585
(651)	(Respiratory therapist)	(Medium)	(High)	(T)	(496)
361	Equal opportunity assistance	High	High	T	486
270	Federal retirement benefits	Medium	Medium	A	416
1720	Education program	Medium	High	P	369
(485)	(Wildlife refuge management)	(Low)	(Low)	(P)	(365)
682	Dental hygiene	High	Low	T	335
(2121)	(Railroad safety)	(Low)	(Low)	(A)	(322)
309	Correspondence clerk	High	High	C	310
(2123)	(Motor carrier safety)	(Low)	(Low)	(A)	(284)

(continued)

**Appendix I
Questionnaire Development, Sample
Selection, Response Rate Calculation, and
Validation Methodology**

Occupational series ^a		Representation			Full-time permanent nonsupervisory incumbents
		Female	Minority	PATCO ^b	
(669)	(Medical records administration)	(High)	(Medium)	(A)	(170)
(1161)	(Crop insurance administration)	(Low)	(Low)	(A)	(109)
(1162)	(Crop insurance underwriting)	(Low)	(Low)	(A)	(54)
631	Occupational therapist	High	Low	P	49
(1884)	(Customs patrol officer)	(Low)	(High)	(O)	(47)
(160)	(Civil rights analysis)	(Medium)	(High)	(A)	(35)
Subtotal/included in study					412,279
Subtotal/not included in study					(28,910)
Total					441,189

Note: This table includes occupational series, or occupations, covered by FES that had been in existence for at least 1 year as of May 1992.

^aWe selected incumbents for our sample from the 58 occupational series not shown in parentheses.

^bThe PATCO category indicates the general characteristics of the work done within each federal white-collar occupation and is represented as Professional, Addministrative, Technical, Clerical, or Other.

^cThe PATCO category for this occupation is Clerical for GS grades 1 to 3 and Technical for grades 4 and above.

^dThe PATCO category for this occupation is Clerical for GS grades 1 to 5 and Technical for grades 6 and above.

^eThe PATCO category for this occupation is Clerical for GS grades 1 to 4 and Technical for grades 5 and above.

Source: GAO analysis of data obtained from OPM.

We selected no more than 11 occupations for each matrix cell because we planned to validate the job content questionnaire by completing two sets of 100 desk audits that would each (1) include at least one position from each occupation in our sample and (2) be evenly distributed among the 9 matrix cells. Table I.6 shows the distribution of the 58 occupations selected for inclusion in our sample by matrix cell.

**Appendix I
Questionnaire Development, Sample
Selection, Response Rate Calculation, and
Validation Methodology**

**Table I.6: Distribution of the 58
Occupations Included in the Sample**

Female representation	Minority representation			Total
	High	Medium	Low	
High	6	10	2	18
Medium	10	10	4	24
Low	2	3	11	16
Total	18	23	17	58

Source: GAO analysis of data obtained from OPM.

After selecting the 58 occupations, we completed a pilot test by distributing the job content questionnaire to 389 pairs of incumbents and their supervisors who were located in either the Cleveland, OH, or Washington, D.C. areas and who represented a range of GS grades and occupations included in our sample. Because the CPDF does not identify a specific address or supervisor for incumbents, we forwarded the questionnaires to the appropriate agency personnel offices for distribution. Pairs of trained job analysts composed of at least one female and one minority completed the first set of desk audits for 100 of the 257 positions for which the incumbent and the supervisor returned a questionnaire.⁷ Of the 100 positions, we included in our analyses the 84 positions for which the incumbent and the supervisor provided complete responses to all questionnaire items. To ensure the independence of the validation process, the contractor instructed the job analysts not to review the incumbent/supervisor responses to the questionnaire for any position before they completed a desk audit.

On the basis of the pilot test, we determined that (1) incumbents at higher GS grades tended to undervalue their positions when compared to the desk audit, while incumbents at lower grades tended to overvalue their positions and (2) the grades of incumbents included in our study were not evenly distributed across the matrix rows and columns. As a result, the validity coefficient between GS grades estimated on the basis of the desk audits versus incumbent/supervisor questionnaire responses was .74. Because the combination of the two effects threatened to distort the results of our planned statistical comparisons, we stratified our sample by classifying the incumbents of the 58 occupations into one of seven groups, or strata, on the basis of GS grade: grades 1 to 4, grade 5, grade 6, grades 7 to 8, grades 9 to 10, grade 11, and grades 12 to 15. We then determined the

⁷Although the majority of the job analysts had extensive desk audit experience, the contractor provided the analysts with comprehensive training that included writing job descriptions and classifying jobs through the use of FES.

Appendix I
Questionnaire Development, Sample
Selection, Response Rate Calculation, and
Validation Methodology

number of incumbent/supervisor pairs needed within each matrix cell using a complex balancing design to ensure that the row and column totals would be about equal. This stratified sampling strategy enabled us to balance the grade distribution of incumbents selected within each row and column of the matrix, and thus, eliminate any grade level effect in subsequent analyses.

We randomly selected our sample of full-time permanent nonsupervisory incumbents from the 58 occupations that met the criteria for each matrix cell and GS grade stratum and distributed the job content questionnaire to 2,233 incumbents and their supervisors. Because of the random selection process, we did not select incumbents from 3 of the 58 occupational series—import specialist, education program, and correspondence clerk. Table I.7 shows the distribution of the 2,233 incumbents in a matrix configured according to female and minority representation and strata.

**Appendix I
Questionnaire Development, Sample
Selection, Response Rate Calculation, and
Validation Methodology**

Table I.7: Distribution of the 2,233 Incumbents by Female and Minority Representation and Strata

Female representation	GS grade strata	Minority representation			Total
		High	Medium	Low	
High	GS-1 to 4	45	44	1	90
	GS-5	65	66	19	150
	GS-6	30	30	30	90
	GS-7 to 8	30	30	29	89
	GS-9 to 10	30	30	12	72
	GS-11	3	44	15	62
	GS-12 to 15	1	144	1	146
	Subtotal		204	388	107
Medium	GS-1 to 4	30	16	44	90
	GS-5	50	50	50	150
	GS-6	30	30	30	90
	GS-7 to 8	30	30	30	90
	GS-9 to 10	30	30	30	90
	GS-11	42	28	20	90
	GS-12 to 15	115	19	50	184
	Subtotal		327	203	254
Low	GS-1 to 4	15	30	45	90
	GS-5	35	34	81	150
	GS-6	30	30	30	90
	GS-7 to 8	30	30	30	90
	GS-9 to 10	30	30	30	90
	GS-11	45	18	27	90
	GS-12 to 15	34	19	97	150
	Subtotal		219	191	340
Total		750	782	701	2,233

Source: GAO analysis of data obtained from OPM.

In addition to the sample of 2,233 incumbent and supervisor pairs, we also selected a supplemental sample of 303 pairs to enable us to complete a second set of desk audits expeditiously. We selected the supplemental sample from those incumbents in the 58 occupations who were located in one of three geographical areas—Washington, D.C., Dayton/Cincinnati, OH, or Los Angeles, CA—to represent incumbents working in the eastern, central, and western United States. Because we did not randomly select the pairs in the supplemental sample from all incumbents working in the

58 occupations covered by FES, we did not include their questionnaire responses in our response rate calculation or analyses.

Response Rate Calculation

We forwarded the job content questionnaires to the appropriate agency personnel offices for distribution to each of the 2,233 incumbent/supervisor pairs. For 179 pairs, agency officials notified us that either the incumbent or the supervisor no longer held the position indicated by the CPDF or were located outside of the United States. As planned, we eliminated these pairs from our study. Of the remaining 2,054 pairs, we received questionnaires from 1,633 pairs of respondents, for a response rate of 80 percent. Table I.8 shows the disposition of each of the 2,233 incumbent/supervisor pairs in our sample.

Table I.8: Disposition of Incumbent/Supervisor Pairs in the Sample

Incumbent/supervisor pairs eliminated from the study	
Incumbent resigned or terminated	63
Incumbent transferred to another agency	48
Incumbent in different occupation than one identified by the CPDF	29
Incumbent or supervisor retired	26
Incumbent or supervisor outside the United States	3
Incumbent in position not covered by FES	9
Incumbent deceased	1
Subtotal	179^a
Incumbent/supervisor pairs in the study	
Respondents	1,633
Nonrespondents	421 ^b
Subtotal	2,054
Total incumbent/supervisor pairs in sample	2,233

^aOf the 179 incumbent/supervisor pairs, we eliminated 177 pairs from the study on the basis of factors relating to the incumbent. Two were eliminated on the basis of factors relating to the supervisor.

^bThe 421 pairs of nonrespondents consisted of (1) 349 pairs for which either the incumbent, the supervisor, or both did not respond to our questionnaire after three follow-up efforts and (2) 72 pairs for which we were unable to forward a questionnaire to either the incumbent, the supervisor, or both for reasons which did not eliminate the pairs from our study (e.g., either the incumbent or the supervisor was on extended leave).

Occupations Included in the Study Analyses

For 201 of the 1,633 pairs of respondents, either the incumbent, the supervisor, or both left some questionnaire items unanswered. Therefore, we included the remaining 1,432 pairs in our preliminary analyses. On the basis of the incumbent/supervisor questionnaire responses, we estimated the GS grade for each of the 1,432 positions and compared this grade with the position's actual grade. We considered positions to be appropriately graded when the actual grade equalled the questionnaire grade; otherwise, we considered the position to be overgraded if the actual grade was higher than the questionnaire grade; and undergraded if the actual grade was lower than the questionnaire grade.

When we designed this study, we planned to compare the overgrading and undergrading among groups of occupations with different gender and minority representations or among matrix rows and columns. However, preliminary analyses showed that more variation in overgrading and undergrading existed within the same row or column rather than between different rows or columns. For this reason, we analyzed the 37 occupations for which we had received completed questionnaires from at least 10 or more incumbent/supervisor pairs. We did not include the remaining 18 occupations in our analyses because we could not obtain reliable estimates of overgrading and undergrading for an occupation with less than 10 pairs of respondents.⁸ The 37 occupations included 1,358 incumbent/supervisor pairs and represented about 79 percent of the incumbents covered by FES. Table I.9 shows the gender and minority representation of the 37 occupations included in our study.

⁸The 18 occupational series for which we received completed questionnaires from less than 10 incumbent/supervisor pairs included tax examining, computer clerk and assistant, security administration, medical technologist, voucher examining, practical nurse, shipment clerical and assistance, medical supply aide and technician, medical instrument technician, equipment operator, architecture, mine safety and health, dietician and nutritionist, veterinary medical science, recreation specialist, language specialist, equal opportunity assistance, and federal retirement benefits.

**Appendix I
Questionnaire Development, Sample
Selection, Response Rate Calculation, and
Validation Methodology**

**Table I.9: Female and Minority
Representation of the 37 Occupations
Included in the Study**

Female representation	Minority representation		
	High	Medium	Low
High	Dental assistant	Accounting technician	Dental hygiene
	Medical clerk	Budget analysis	Occupational therapist
	Personnel clerical and assistance	Nurse	
		Paralegal specialist	
	Secretary		
Medium	Computer operation	Accounting	Auditing
	Equal employment opportunity	Computer specialist	Cartographic technician
	Equal opportunity compliance	Contracting	Industrial hygiene
	Mail and file	Diagnostic radiologic technologist	Public affairs
	Nursing assistant	Housing management	
Low	Border patrol agent	Plant protection and quarantine	Agricultural management
	Security guard	Police	Chemistry
			Forestry
			Mechanical engineering
			Quality assurance
			Physical science technician
			Safety and occupational health management
			Soil conservation
			Telecommunications

Source: GAO analysis of data obtained from OPM.

Questionnaire Validation

We validated our job content questionnaire by using a second set of desk audits. To simplify selecting positions that represented a broad range of grades, we combined our seven strata into three groups: high (GS-11 to 15), medium (GS-6 to 10), and low (GS-1 to 5). We then scheduled interviews with incumbent/supervisor pairs, which allowed us to complete desk

**Appendix I
Questionnaire Development, Sample
Selection, Response Rate Calculation, and
Validation Methodology**

audits that were distributed evenly across the three GS grade ranges, the three selected geographical locations, and the nine matrix cells. Again, to ensure the independence of the validation process, the contractor instructed the job analysts not to review the incumbent/supervisor responses to the questionnaire for any position before they completed a desk audit.

Although we completed 100 desk audits, we validated the questionnaire on the basis of the 78 positions that represented the 37 occupations included in our analyses and for which the incumbent and supervisor provided complete responses to the questionnaire. For the 78 positions, we completed 24 desk audits for high, 35 for medium, and 19 for low graded positions; and 37 desk audits in Washington, D.C.; 21 in Los Angeles, CA; and 20 in Dayton/Cincinnati, OH. Table I.10 shows the distribution of the 78 positions for which a desk audit was completed by occupation and matrix cell.

Table I.10: Distribution of Desk Audits Completed According to Female and Minority Representation for the 37 Occupations Included in the Study

Female representation	Minority representation					Total
	High	Medium	Low			
High	Dental assistant	0	Accounting technician	0	Dental hygiene	8
	Medical clerk	3	Budget analysis	2	Occupational therapist	1
	Personnel clerical and assistance	6	Nurse	0		
			Paralegal specialist	1		
			Secretary	3		
	Subtotal	9	Subtotal	6	Subtotal	9

(continued)

**Appendix I
Questionnaire Development, Sample
Selection, Response Rate Calculation, and
Validation Methodology**

Female representation	Minority representation					
	High	Medium		Low		Total
Medium	Computer operation	2	Accounting	2	Auditing	4
	Equal employment opportunity	2	Computer specialist	3	Cartographic technician	5
	Equal opportunity compliance	0	Contracting	3	Industrial hygiene	2
	Mail and file	2	Diagnostic radiologic technologist	1	Public affairs	4
	Nursing assistant	1	Housing management	1		
	Subtotal	7	Subtotal	10	Subtotal	15
Low	Border patrol agent	4	Plant protection and quarantine	0	Agricultural management	0
	Security guard	3	Police	6	Chemistry	3
					Forestry	0
					Mechanical engineering	3
					Quality assurance	0
					Physical science technician	2
					Safety and occupational health management	1
					Soil conservation	0
					Telecommunications	0
		Subtotal	7	Subtotal	6	Subtotal
Total		23		22		33
						78

The resulting validity coefficient between GS grades estimated on the basis of the 78 desk audits versus incumbent/supervisor questionnaire responses was .80, thus meeting the goal we set when we designed the study. This is the only classification study we are aware of in which desk audits were used to validate the questionnaire results. Table I.11 shows the validity coefficients between GS grades estimated on the basis of desk audits

**Appendix I
Questionnaire Development, Sample
Selection, Response Rate Calculation, and
Validation Methodology**

versus the questionnaire responses for incumbent/supervisor pairs, supervisors, and incumbents.

Table I.11: Validity Coefficients for Grades Estimated on the Basis of the 78 Desk Audits Versus the Questionnaire Responses for Incumbent/Supervisor Pairs, Supervisors Only, and Incumbents Only

Source of questionnaire responses	Validity coefficient
Incumbent/supervisor pairs	.80
Supervisors	.75
Incumbents	.73

Note: While we validated our questionnaire on the basis of the responses from incumbent/supervisor pairs, we reported the validity coefficients for supervisors only and incumbents only for the purpose of full disclosure.

For the 37 occupations included in our analyses, we used loglinear statistical techniques to analyze the odds of individual occupations being overgraded or undergraded versus appropriately graded (1) in relation to GS grades and (2) when the female or minority representation of an occupation was high, medium, or low. The strength of this particular statistical approach was that multiple variables could be analyzed simultaneously, thereby enabling us to examine complex relationships in the data. Appendix II provides more detailed information on our loglinear methodology, the loglinear models tested, and the results obtained.

Loglinear Methodology and Analysis Results

This appendix provides additional technical detail on our analytical approach. It contains a general description of loglinear methodology, describes the variables analyzed, and presents the loglinear models tested and the results obtained in each analysis.

Data Analysis Approach

We used loglinear analyses to examine the relationship between the likelihood of being overgraded or undergraded and (1) the average GS grade of the sampled incumbents by occupation and (2) female and minority representation.¹ We first looked at the relationship between the likelihood of being overgraded or undergraded and female or minority representation without taking the effect of the average GS grade into consideration. For each analysis, we considered the preferred model to be the simplest one that fit the data and could not be significantly improved by more complex models. The preferred model included those components that had statistically significant relationships with effects after we controlled for the influences of other factors. Hence, the estimates we obtained were net effects determined after the association of each variable with all other variables had been taken into account or statistically eliminated.

On the basis of the preferred model, we estimated the direction and magnitude of the relationships using odds and odds ratios. The odds indicated the likelihood that an outcome would occur given a particular factor or combination of factors, and the odds ratios indicated the size of the effect of the various factors on that likelihood. The more the odds ratio diverges from 1.0, the stronger the relationship.

Occupations Included in Our Study

All of our analyses were based on the 37 occupations shown in table II.1. The table also indicates by occupation whether the female or minority representation was high, medium, or low; the average GS grade of the incumbents in the sample; whether the incumbents were overgraded, aptly graded, or undergraded; and the odds of being either overgraded or

¹We opted to use loglinear models rather than logistic regression models because of the trichotomous nature (i.e., three characteristics as opposed to being of a continuous nature) of the dependent variable. Logistic regression models could have been used had we chosen to look separately at the two odds that we examined, i.e., the odds of overgrading versus aptly grading and the odds of undergrading versus aptly grading. This would have allowed us to control simultaneously for the average GS grade, gender, and minority status had we wanted to determine how the relationship between job content and GS grades assigned using FES varied on the basis of the gender and minority status of incumbents. Because our objective was to determine whether the relationship varied on the basis of the proportion of women and minorities in occupations, we chose the simpler modeling strategy.

undergraded versus aptly graded.² For each occupation or group of occupations, we derived the odds of being overgraded versus aptly graded by dividing the number of incumbents that were overgraded by the number aptly graded. The odds of being undergraded versus aptly graded were similarly calculated.

²We defined occupations with high, medium, and low female representation as those in which women represented 70 percent or more, 31 to 69 percent, and 30 percent or less of incumbents, respectively. We defined occupations with high, medium, and low minority representation as those in which minorities represented more than 41 percent, 22 to 41 percent, or less than 22 percent of incumbents, respectively.

On the basis of the average points derived from the questionnaires completed by the incumbent and the supervisor, we determined the GS grade for each position. We compared that questionnaire grade with the incumbent's actual GS grade and considered the position to be aptly, or appropriately, graded if the questionnaire grade and the actual grade were the same. Otherwise, we considered positions to be overgraded if the actual grade was higher than the questionnaire grade and undergraded if the actual grade was lower than the questionnaire grade.

Appendix II
Loglinear Methodology and Analysis Results

Appendix II
Loglinear Methodology and Analysis Results

Table II.1: Female and Minority Representation, Average GS Grades, Observed Sample Frequencies, and Odds of Being Overgraded and Undergraded Versus Aptly Graded for 37 Occupations Without Controlling for GS Grade

Representation					
Female			Minority		
High	Medium	Low	High	Medium	Low
X			X		
X			X		
X			X		
X				X	
X				X	
X				X	
X				X	
X				X	
X					X
X					X
Subtotal for occupations with high female representation					
	X		X		
	X		X		
	X		X		
	X		X		
	X		X		
	X			X	
	X			X	
	X			X	
	X			X	
	X				X
	X				X
	X				X
	X				X
Subtotal for occupations with medium female representation					
		X	X		
		X	X		
		X		X	

**Appendix II
Loglinear Methodology and Analysis Results**

GS occupational series	Average GS grade in sample	Observed frequencies			Total	Odds	
		Over graded	Aptly graded	Under graded		Over versus aptly ^a	Under versus aptly ^b
203 Personnel clerical and assistance	6.81	33	20	16	69	1.63	0.80
679 Medical clerk	4.45	4	3	15	22	1.29	4.43
681 Dental assistant	5.12	2	6	9	17	0.38	1.46
560 Budget analysis	11.98	84	1	1	86	56.33	1.00
318 Secretary	5.40	20	24	38	82	0.84	1.57
610 Nurse	11.20	16	2	2	20	6.60	1.00
950 Paralegal specialist	11.56	16	0	0	16	33.00	1.00
525 Accounting technician	5.62	6	2	5	13	2.60	2.20
682 Dental hygiene	6.56	2	9	48	59	0.26	5.11
631 Occupational therapist	10.50	3	1	8	12	2.33	5.67
		186	68	142	396	2.72	2.08
360 Equal opportunity compliance	11.86	46	3	0	49	13.29	0.14
260 Equal employment opportunity	12.26	41	0	1	42	83.00	3.00
332 Computer operations	7.93	36	3	2	41	10.43	0.71
621 Nursing assistant	4.90	8	8	13	29	1.00	1.59
305 Mail and file	4.20	2	5	3	10	0.45	0.64
647 Diagnostic radiologic technologist	5.94	5	6	23	34	0.85	3.62
334 Computer specialist	9.67	26	3	4	33	7.57	1.29
1102 Contracting	8.57	17	7	4	28	2.33	0.60
510 Accounting	9.20	10	2	3	15	4.20	1.40
1173 Housing management	5.45	1	5	5	11	0.27	1.00
1371 Cartographic technician	6.04	45	25	29	99	1.78	1.16
1035 Public affairs	10.38	41	5	7	53	7.55	1.36
511 Auditing	10.74	42	3	1	46	12.14	0.43
690 Industrial hygiene	9.74	16	4	7	27	3.67	1.67
		336	79	102	517	4.23	1.29
1896 Border patrol agent	10.75	85	4	3	92	19.00	0.78
85 Security guard	5.15	16	9	21	46	1.74	2.26
83 Police	5.34	4	16	38	58	0.27	2.33

(continued)

Appendix II
Loglinear Methodology and Analysis Results

	Representation				
	Female			Minority	
High	Medium	Low	High	Medium	Low
		X		X	
		X			X
		X			X
		X			X
		X			X
		X			X
		X			X
		X			X
		X			X
		X			X
		X			X
Subtotal for occupations with low female representation					
Total					

Appendix II
Loglinear Methodology and Analysis Results

GS occupational series	Average GS grade in sample	Observed frequencies			Total	Odds	
		Over graded	Aptly graded	Under graded		Over versus aptly ^a	Under versus aptly ^b
436 Plant protection and quarantine	9.13	14	2	0	16	5.80	0.20
1311 Physical science technician	5.55	31	30	19	80	1.03	0.64
830 Mechanical engineering	10.95	34	6	3	43	5.31	0.54
1910 Quality assurance	9.95	17	2	3	22	7.00	1.40
460 Forestry	8.25	6	5	9	20	1.18	1.73
1320 Chemistry	10.88	13	2	2	17	5.40	1.00
457 Soil conservation	8.75	10	3	3	16	3.00	1.00
475 Agricultural management	9.21	9	3	2	14	2.71	0.71
391 Telecommunications	10.64	8	0	3	11	17.00	7.00
18 Safety and occupational health management	11.90	9	1	0	10	6.33	0.33
		256	83	106	445	3.07	1.28
	8.29	778	230	350	1,358	3.38	1.52

Note: Odds were calculated after adding a small constant (0.5) to all cell frequencies so that cells with zeros could be included in the calculations.

^aThe odds of being overgraded versus aptly graded are equal to the number of overgraded incumbents divided by the number of aptly graded incumbents.

^bThe odds of being undergraded versus aptly graded are equal to the number of undergraded incumbents divided by the number of aptly graded incumbents.

Source: GAO analysis of questionnaire data.

Relationship Between Overgrading/Undergrading and Female or Minority Representation Without Controlling for GS Grade³

While we derived the study results from models fitted to table II.1, we first considered the relationship between incumbents being overgraded, aptly graded, or undergraded and female representation (see table II.2). It should be noted that the effect of the average GS grade was not statistically eliminated, or controlled for, in this comparison. For high, medium, and low female representation, overgraded and undergraded incumbents outnumbered those appropriately graded. We computed the odds as described above, and these odds indicated the extent to which overgraded or undergraded incumbents outnumbered aptly graded incumbents. We

³All of the results reported in this section are provided for illustrative purposes only.

computed ratios, sometimes referred to as odds ratios, by dividing the odds of overgrading or undergrading in one group of occupations by the corresponding odds in another group. For example, occupations with high female representation were about 1.62 times more likely to be undergraded rather than aptly graded when compared with occupations having medium female representation ($2.09 / 1.29 = 1.62$). The odds ratios shown in the table indicate sizable differences in overgrading and undergrading between occupations with high female representation and those with medium representation but only slight differences between those occupations with medium representation and those with low representation.

Table II.2: Relationship Between the Observed Sample Frequencies and Female Representation Without Controlling for GS Grade

Female representation	Observed frequencies				Odds of over versus aptly graded		Odds of under versus aptly graded	
	Overgraded	Aptly graded	Undergraded	Total		Ratios		Ratios
High	186	68	142	396	2.74	0.64	2.09	1.62
Medium	336	79	102	517	4.25	1.38	1.29	1.01
Low	256	83	106	445	3.08		1.28	
Total	778	230	350	1,358				

Note: The blank spaces in columns indicate that we did not compute odds or odds ratios.

Table II.2 indicates that all groups of occupations tended to be overgraded versus aptly or undergraded. The focus of our study was determining whether occupations with high female representation differed significantly from those with medium or low female representation. To determine whether the differences in the sample data shown in table II.2 reflected “real” differences in the population and not simply chance or sampling fluctuations, we fit the models shown in the top section of table II.3 to the data shown in table II.1.

On the basis of the likelihood ratio chi-square values and degrees of freedom associated with the different models we fit to the observed data, the preferred model was the third one in the upper and lower sections of the table.⁴ The third model in the upper section of the table indicated a pronounced tendency for incumbents of jobs with high female representation to be undergraded. The third model in the lower section of

⁴The likelihood ratio chi-square indicates the relative fit of the various models to the data in the tables.

the table indicated a pronounced tendency for the incumbents of occupations with high minority representation to be overgraded.

Table II.3: Hierarchical Models Tested to Examine Relationships Between Observed Sample Frequencies and Female and Minority Representation

Representation	Models tested		Degrees of freedom	Likelihood ratio chi-square	Probability	Pseudo-R ² ^a
	Model number					
Female	F1	{F} {D}	4	37.18	< 0.001	0.000
	F2	{F} {D} {F _H D}	2	5.63	0.06	0.849
	F3	{F} {D} {F _H D _U }	3	8.57	0.04	0.770
	F4	{F} {D} {FD}	0	0.00	1.00	1.000
Minority	M1	{M} {D}	4	18.23	< 0.001	0.000
	M2	{M} {D} {M _H D}	2	0.98	0.61	0.946
	M3	{M} {D} {M _H D _O }	3	1.57	0.67	0.914
	M4	{M} {D} {MD}	0	0.00	1.00	1.000

Legend

F = Female representation (high, medium, or low).

D = Difference between actual GS grade and questionnaire grade (overgraded, aptly, or undergraded).

M = Minority representation (high, medium, or low).

Note: The subscripts H, U, and O represent dummy variables, which contrast (1) high female or minority representation with medium and low, (2) undergraded with aptly and overgraded, and (3) overgraded with aptly and undergraded, respectively.

^aPseudo-R² is calculated, following Goodman (1978), by subtracting the L² for a given model from the L² for the baseline model of independence (e.g., (37.18 - 5.63) / 37.18 = 0.849).

The result indicates the proportion of the variation in the dependent variable (the change in GS grade or the odds of overgrading or undergrading) that is accounted for by the factor or set of factors included in the model.

Table II.4 shows the results of fitting the models in the upper section of table II.3 to the data in table II.2. The odds ratios we derived from the preferred model (F3) indicated that in the population from which we drew our sample, incumbents of occupations with high female representation were twice as likely (i.e., 2.02 times as likely as shown in the table) to be undergraded compared with either aptly or overgraded, as incumbents of occupations with low or medium female representation. Again, we emphasize that the effect of the average GS grade was not statistically eliminated, or controlled for, when making this comparison.

Appendix II
Loglinear Methodology and Analysis Results

Table II.4: Relationship Between the Expected Frequencies and Female Representation Without Controlling for GS Grade

Model	Female representation	Expected frequencies			Total	Odds of over versus aptly graded		Odds of under versus aptly graded	
		Overgraded	Aptly graded	Undergraded		Ratios	Ratios		
F1	High	226.87	67.07	102.06	396.00	3.38	1.00	1.52	1.00
	Medium	296.19	87.56	133.25	517.00	3.38	1.00	1.52	1.00
	Low	254.94	75.37	114.69	445.00	3.38		1.52	
	Total	778.00	230.00	350.00	1,358.00				
F2	High	186.00	68.00	142.00	396.00	2.74	0.75	2.09	1.63
	Medium	318.15	87.06	111.78	517.00	3.65	1.00	1.28	1.00
	Low	273.85	74.94	96.22	445.00	3.65		1.28	
	Total	778.00	230.00	350.00	1,358.00				
F3	High	196.04	57.96	142.00	396.00	3.38	1.00	2.45	2.02
	Medium	312.76	92.46	111.78	517.00	3.38	1.00	1.21	1.00
	Low	269.20	79.58	96.22	445.00	3.38		1.21	
	Total	778.00	230.00	350.00	1,358.00				

Note 1: The blank spaces in columns indicate that we did not compute odds or odds ratios.

Note 2: Due to rounding, expected frequencies do not always add to the total.

We also considered the relationship between incumbents being overgraded, aptly graded, or undergraded and minority representation (see table II.5). It should be noted that the effect of the average GS grade was not statistically eliminated, or controlled for, in this comparison. For high, medium, and low minority representation, the number of overgraded and undergraded incumbents outnumbered those appropriately graded. The odds shown in the table indicate the extent to which overgraded or undergraded incumbents outnumbered aptly graded incumbents. Occupations with high minority representation were 1.43 times more likely to be overgraded rather than aptly graded when compared with occupations having medium minority representation ($4.48 / 3.13 = 1.43$). The odds ratios shown in table II.5 indicate pronounced differences in overgrading and undergrading between occupations with high minority representation and those with medium representation but only slight differences between those occupations with medium representation and those with low representation.

Appendix II
Loglinear Methodology and Analysis Results

Table II.5: Relationship Between the Observed Sample Frequencies and Minority Representation Without Controlling for GS Grade

Minority representation	Observed frequencies				Total	Odds of over versus aptly graded		Odds of under versus aptly graded	
	Overgraded	Aptly graded	Undergraded			Ratios		Ratios	
High	273	61	83	417	4.48	1.43	1.36	0.77	
Medium	219	70	123	412	3.13	1.08	1.76	1.21	
Low	286	99	144	529	2.89		1.45		
Total	778	230	350	1,358					

Note: The blank spaces in columns indicate where we did not compute odds or odds ratios.

Table II.5 indicates that all groups of occupations tend to be overgraded versus aptly or undergraded. The focus of our study was determining whether occupations with high minority representation differed significantly from those with medium or low minority representation.

Table II.6 shows the results of fitting the models in the lower section of table II.3 to the data in table II.5. The odds ratios we derived from the expected frequencies indicate the extent of the differences that existed in the population. As previously noted, the preferred model selected was model M3, which indicated that in the population, incumbents of occupations with high minority representation were 1.64 times more likely to be overgraded rather than either aptly or undergraded. The effect of the average GS grade was not statistically eliminated, or controlled for, in this comparison.

Appendix II
Loglinear Methodology and Analysis Results

Table II.6: Relationship Between the Expected Frequencies and Minority Representation Without Controlling for GS Grade

Model	Minority representation	Expected frequencies			Total	Odds of over versus aptly graded		Odds of under versus aptly graded	
		Overgraded	Aptly graded	Undergraded		Ratios	Ratios		
M1	High	238.90	70.63	107.47	417.00	3.38	1.00	1.52	1.00
	Medium	236.04	69.78	106.19	412.00	3.38	1.00	1.52	1.00
	Low	303.06	89.59	136.34	529.00	3.38		1.52	
	Total	778.00	230.00	350.00	1,358.00				
M2	High	273.00	61.00	83.00	417.00	4.48	1.50	1.36	0.86
	Medium	221.11	73.99	116.90	412.00	2.99	1.00	1.58	1.00
	Low	283.89	95.01	150.10	529.00	2.99		1.58	
	Total	778.00	230.00	350.00	1,358.00				
M3	High	273.00	57.10	86.90	417.00	4.78	1.64	1.52	1.00
	Medium	221.11	75.70	115.20	412.00	2.92	1.00	1.52	1.00
	Low	283.89	97.20	147.91	529.00	2.92		1.52	
	Total	778.00	230.00	350.00	1,358.00				

Note 1: The blank spaces in columns indicate that we did not compute odds or odds ratios.

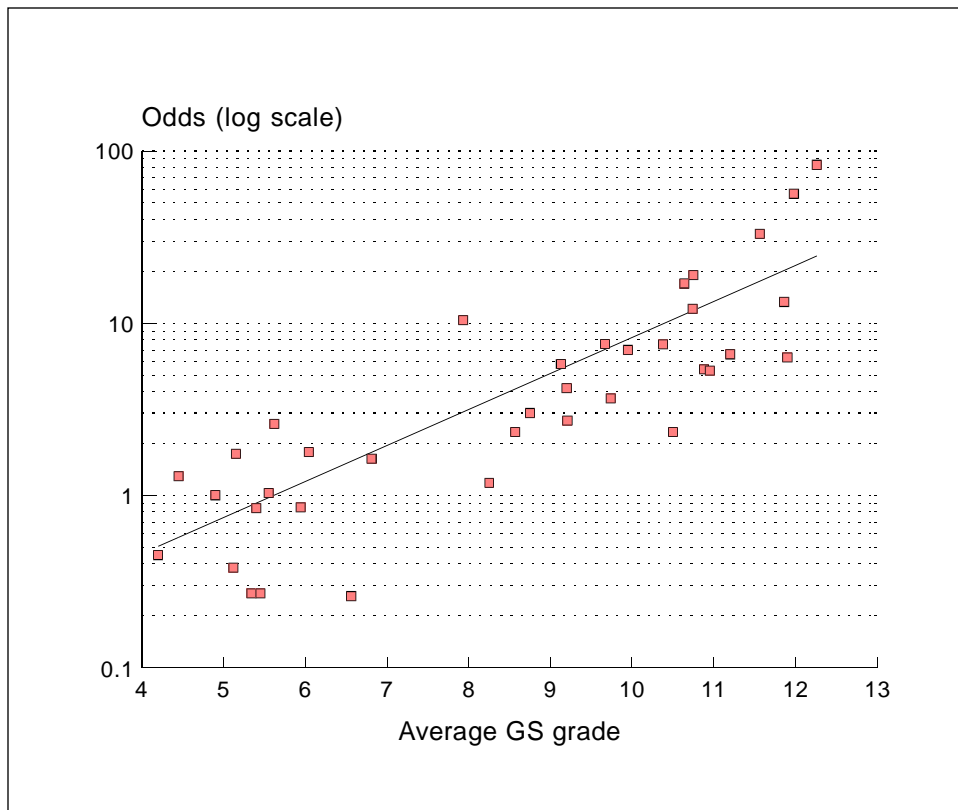
Note 2: Due to rounding, expected frequencies do not always add to the total.

Relationship Between Overgrading/Undergrading Versus GS Grade and Female and Minority Representation

As depicted in figures II.1 and II.2, we determined through preliminary analyses that as the average GS grade increased (1) the odds of overgrading increased significantly and (2) the odds of undergrading decreased slightly. The trend lines through the scatterplots of points, or occupations, shown in figures II.1 and II.2 were obtained from a loglinear model, which allowed the average GS grade to be linearly related to the odds of overgrading and undergrading.⁵

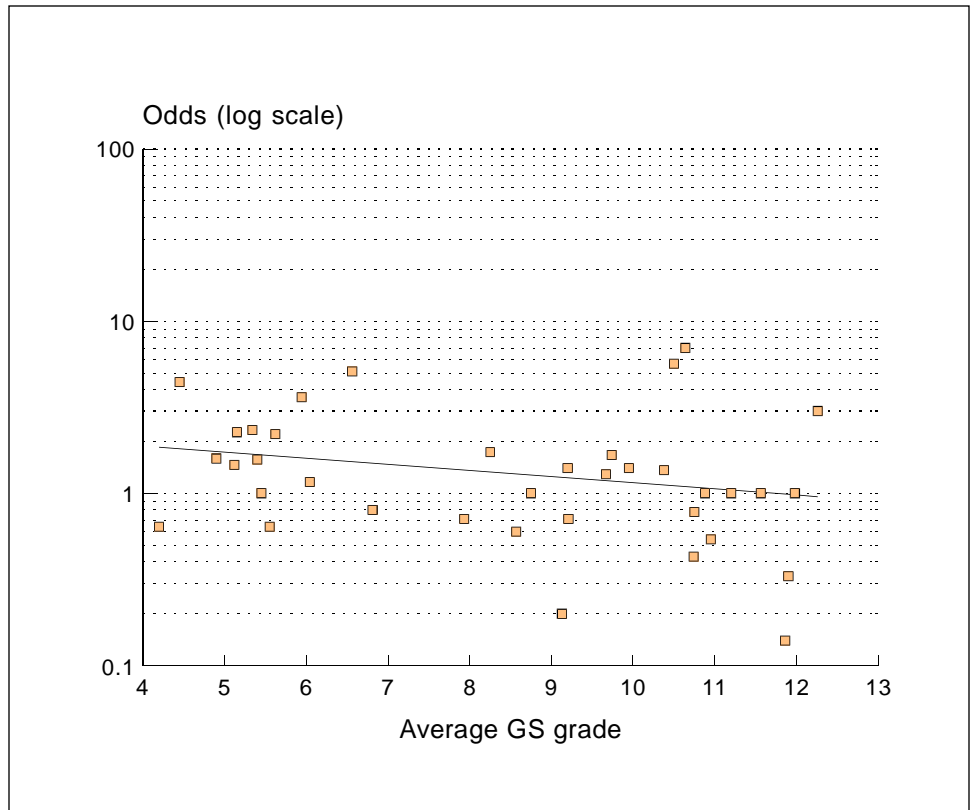
⁵We derived the estimated odds that define the trend lines in the figures from maximum likelihood estimation procedures rather than the more common generalized least squares procedures. These estimated odds that we plotted in the two figures take into consideration the number of sampled incumbents in each occupation.

Figure II.1: Odds of Overgrading by Average GS Grade Across 37 Occupations



Note: Each plotted point represents one of the 37 occupations in our study.

Figure II.2: Odds of Undergrading by Average GS Grade Across 37 Occupations



Note: Each plotted point represents one of the 37 occupations in our study.

Table II.7 shows the loglinear models fit to the data in table II.1 to arrive at the preferred model—model 11. The first model is the baseline and asserts that the odds of overgrading and undergrading do not vary across the 37 occupations. Model 2, which allows those odds to vary linearly by average GS grade, improved significantly upon model 1 and indicates that 67 percent of the variation between the actual GS grades and grades calculated on the basis of the questionnaire was attributable to the average GS grade.⁶ The difference between the pseudo-R² for model 11 and that for

⁶We determine whether one model significantly improves upon another by comparing values of L²—the likelihood ratio chi-square—which indicates the fit of the models to data or how well the expected frequencies resulting from the models correspond to the observed or sample frequencies. Since the difference in L² values between model 1 and 2 is highly significant given the difference in degrees of freedom between the two (i.e., 698.33 – 228.10 = 470.23 with 72 - 70 = 2 degrees of freedom), we would choose model 2 as the preferred model of the two and conclude that the linear effect of the GS grade (which is present in model 2 but not in model 1) is a significant effect or one that cannot be attributed to sampling fluctuations or chance. Comparisons between other models involve similar calculations and logic.

model 2 indicates that female and minority representation accounted for about 6 percent of the variation ($.731 - .673 = .058$).⁷ Therefore, model 11, the preferred model indicates that 73 percent of the variation between the actual GS grades and grades calculated on the basis of the questionnaire was attributable to a combination of average GS grade and female and minority representation. The remaining 27 percent of the variation was not explained by the variables in our study.

⁷The effects of the average GS grade and the female and minority representation operate largely independent of each other. The effect of female and minority representation would account for approximately 7 percent of the variation if introduced into the model before the GS grade.

Appendix II
Loglinear Methodology and Analysis Results

Table II.7: Loglinear Models Tested to Examine the Relationship Between the Frequencies, the GS Grade, and Female and Minority Representation

Model number	Models tested	Degrees of freedom	Likelihood ratio chi-square ^a	Pseudo-R ² ^b
1	{O} {D}	72	698.33	0.000
2	{O} {G _L D}	70	228.10	0.673
3	{O} {G _L D} {F _H D}	68	214.64	0.693
4	{O} {G _L D} {M _H D}	68	202.34	0.710
5	{O} {G _L D} {F _H D} {M _H D}	66	185.26	0.735
6	{O} {G _L D} {F _H D} {M _H D} {F _M D}	64	183.16	0.738
7	{O} {G _L D} {F _H D} {M _H D} {M _M D}	64	182.77	0.738
8	{O} {G _L D} {F _H D} {M _H D} {F _H M _H D}	64	181.36	0.740
9	{O} {G _L D} {F _H D} {M _H D} {F _H G _L D}	64	181.29	0.740
10	{O} {G _L D} {F _H D} {M _H D} {M _H G _L D}	64	180.04	0.742
11	{O} {G _L D} {F _H D _U } {M _H D _O }	68	188.11	0.731

Legend

O = Occupation (1 of 37 occupations covered by FES that were included in our study).
D = Difference between actual GS grade and questionnaire grade (overgraded, aptly, or undergraded).
G = Grade (GS-1 to 15).
F = Female representation (high, medium, or low).
M = Minority representation (high, medium, or low).

Subscript L indicates a linear constraint imposed upon the effect of the GS grade on overgrading or undergrading.

Subscripts H and M represent dummy variables which contrast high female or minority representation with medium and low representation, and medium female or minority representation with high and low representation, respectively.

Subscript U represents a dummy variable which contrasts undergraded with aptly and overgraded.

Subscript O indicates overgraded with aptly and undergraded.

^aThe likelihood ratio chi-square (L²) indicates the relative fit of the various models to the data in the table.

^bPseudo-R² is calculated, following Goodman (1978), by subtracting the L² for a given model from the L² for the baseline model of independence (e.g., (698.33 - 228.10) / 698.33 = 0.673). The result indicates the proportion of the variation in the dependent variable (the change in GS grade or the odds of overgrading or undergrading) that is accounted for by the factor or set of factors included in the model.

Table II.8 shows the expected frequencies under model 11 and the odds of overgrading and undergrading derived from them. Across the 37 occupations included in our study, of the total 1,358 positions in our sample, about 780 or 57 percent appeared to be overgraded, 352 or

26 percent appeared to be undergraded, and 232 or 17 percent appeared to be aptly graded.⁸

We recognize that, on the surface, these summary results could raise questions about the overall accuracy of the FES classification system. We believe that our results should be viewed with caution in this respect because we did not design our study to assess the overall accuracy of the classification system. Rather, our use of nontraditional methods, i.e., the use of the primary standard rather than occupation-specific standards on which to develop a job content questionnaire coupled with the use of the questionnaire rather than desk audits, and our sample selection methodology were designed to examine the relative assignment of grades among groups of occupations. That is, our study was designed to assess whether there were differences in the likelihood of overgrading or undergrading among groups of occupations that included higher or lower proportions of women and minorities.

We validated our design for achieving this objective; we did not validate our design for an objective of expressing an opinion on the overall accuracy of the classification system. Had we undertaken such an assessment, we would have utilized a more extensive strategy to validate the relationship between the questionnaire we developed and the results of more traditional classification tools such as desk audits, or indeed a heavier reliance directly on desk audits, which is how classification accuracy studies are usually conducted.

We also recognize that the overall extent of apparent overgrading or undergrading identified may involve some measurement error. However, we have no reason to believe that such error would be more pronounced for any particular group of occupations, for example, occupations with high female representation compared with those with medium or low representation. Thus, we do not believe that our estimates of the differences in odds of overgrading or undergrading for the groups of occupations included in our analysis have been affected by any possible measurement error. Also, the likelihood of a position being overgraded, rather than aptly graded increased as the incumbents' GS grades increased. However, the incumbents' grades had virtually no effect on the likelihood that a position was undergraded versus aptly graded. Accordingly, in measuring the odds of overgrading among those groups of occupations, we controlled for (statistically eliminated the effect of) the grade level

⁸Due to rounding, the frequency totals for overgraded, undergraded, and aptly graded positions do not add to 1,358.

Appendix II
Loglinear Methodology and Analysis Results

effect we observed. The remaining variation in the data indicated statistically significant differences among the groups of occupations, and we report on those results.

Appendix II
Loglinear Methodology and Analysis Results

Appendix II
Loglinear Methodology and Analysis Results

Table II.8: Female and Minority Representation, Average GS Grades, Expected Frequencies, and Odds of Overgraded and Undergraded Versus Aptly Graded for 37 Occupations

Representation					
Female			Minority		
High	Medium	Low	High	Medium	Low
X			X		
X			X		
X			X		
X				X	
X				X	
X				X	
X				X	
X					X
X					X
Subtotal for occupations with high female representation					
	X		X		
	X		X		
	X		X		
	X		X		
	X		X		
	X			X	
	X			X	
	X			X	
	X			X	
	X				X
	X				X
	X				X
	X				X
Subtotal for occupations with medium female representation					
		X	X		
		X	X		
		X		X	

**Appendix II
Loglinear Methodology and Analysis Results**

GS occupational series	Average GS grade in sample	Expected frequencies			Total	Odds	
		Over graded	Aptly graded	Under graded		Over versus aptly ^a	Under versus aptly ^b
203 Personnel clerical and assistance	6.81	33.93	11.04	24.17	69	3.07	2.19
679 Medical clerk	4.45	4.64	4.88	12.63	22	0.95	2.59
681 Dental assistant	5.12	4.75	3.57	8.83	17	1.33	2.47
560 Budget analysis	11.98	75.78	4.13	6.24	86	18.35	1.51
318 Secretary	5.40	13.94	19.94	48.27	82	0.70	2.42
610 Nurse	11.20	16.67	1.34	2.14	20	12.44	1.60
950 Paralegal specialist	11.56	13.78	0.92	1.44	16	14.98	1.57
525 Accounting technician	5.62	2.46	3.16	7.53	13	0.78	2.38
682 Dental hygiene	6.56	16.46	13.22	29.47	59	1.25	2.23
631 Occupational therapist	10.50	9.31	1.06	1.78	12	8.78	1.68
		191.72	63.26	142.50	396	3.04	2.27
360 Equal opportunity compliance	11.86	46.84	1.24	1.07	49	37.77	0.86
260 Equal employment opportunity	12.26	40.53	0.88	0.74	42	46.06	0.84
332 Computer operations	7.93	29.40	5.49	6.27	41	5.36	1.14
621 Nursing assistant	4.90	9.61	8.08	11.46	29	1.19	1.42
305 Mail and file	4.20	2.56	3.05	4.54	10	0.84	1.49
647 Diagnostic radiologic technologist	5.94	9.66	10.57	13.92	34	0.91	1.32
334 Computer specialist	9.67	24.66	4.23	4.27	33	5.83	1.01
1102 Contracting	8.57	17.38	5.15	5.62	28	3.37	1.09
510 Accounting	9.20	10.50	2.27	2.37	15	4.63	1.04
1173 Housing management	5.45	2.59	3.62	4.94	11	0.72	1.36
1371 Cartographic technician	6.04	29.15	30.33	39.67	99	0.96	1.31
1035 Public affairs	10.38	43.00	5.18	4.97	53	8.30	0.96
511 Auditing	10.74	38.62	3.89	3.64	46	9.93	0.94
690 Industrial hygiene	9.74	20.38	3.38	3.39	27	6.03	1.00
		324.88	87.36	106.87	517	3.72	1.22
1896 Border patrol agent	10.75	84.62	3.89	3.63	92	21.75	0.93
85 Security guard	5.15	16.62	12.34	17.19	46	1.35	1.39
83 Police	5.34	12.93	19.04	26.18	58	0.68	1.38

(continued)

Appendix II
Loglinear Methodology and Analysis Results

	Representation				
	Female			Minority	
High	Medium	Low	High	Medium	Low
		X		X	
		X			X
		X			X
		X			X
		X			X
		X			X
		X			X
		X			X
		X			X
		X			X
		X			X
		X			X
Subtotal for occupations with low female representation					
Total					

Appendix II
Loglinear Methodology and Analysis Results

GS occupational series	Average GS grade in sample	Expected frequencies			Total	Odds	
		Over graded	Aptly graded	Under graded		Over versus aptly ^a	Under versus aptly ^b
436 Plant protection and quarantine	9.13	11.07	2.48	2.60	16	4.46	1.05
1311 Physical science technician	5.55	19.43	25.79	34.93	80	0.75	1.35
830 Mechanical engineering	10.95	36.74	3.34	3.07	43	11.00	0.92
1910 Quality assurance	9.95	17.08	2.55	2.52	22	6.70	0.99
460 Forestry	8.25	11.62	4.03	4.50	20	2.88	1.12
1320 Chemistry	10.88	14.52	1.37	1.26	17	10.60	0.92
457 Soil conservation	8.75	10.34	2.80	3.02	16	3.69	1.08
475 Agricultural management	9.21	9.83	2.12	2.21	14	4.68	1.04
391 Telecommunications	10.64	9.25	0.98	0.92	11	9.44	0.94
18 Safety and occupational health management	11.90	9.18	0.52	0.45	10	17.65	0.87
		263.33	81.25	102.48	445	3.24	1.26
	8.29	779.93	231.87	351.85	1,358^c	3.37	1.52

^aThe odds of being overgraded versus aptly graded are equal to the number of overgraded incumbents divided by the number of aptly graded incumbents.

^bThe odds of being undergraded versus aptly graded are equal to the number of undergraded incumbents divided by the number of aptly graded incumbents.

^cDue to rounding, totals for overgraded, aptly graded, and undergraded do not add to 1,358.

Source: GAO analysis of questionnaire data.

Table II.9 provides coefficients that indicate the direction and magnitude of the different effects included in model 11. The table shows that the relationship between the average GS grades of occupations and high minority representation and the odds of incumbents being overgraded was statistically significant, while only high female representation was related in a significant way to the odds of incumbents being undergraded.

The odds ratio 1.64 tells us that as the average GS grade increased across occupations by one grade, the odds of incumbents being overgraded increased by a factor of 1.64; that is, the likelihood of being overgraded in an occupation in which the average grade of incumbents was GS-10 was

1.64 times as great as the likelihood of being overgraded in an occupation in which the average grade was GS-9. Independent of that, occupations with high minority representation were 2.18 times more likely to be overgraded than occupations with low or medium minority representation. Finally, occupations with high female representation were 1.77 times more likely to be undergraded as occupations with low or medium female representation. The coefficient for the GS grade effect on undergrading was not significantly different from 1.0 (which indicates no effect), and the z-value associated with it implies that the effect can reasonably be due to chance.⁹

Table II.9: Coefficients and Odds Ratios Describing the Effects of the Average GS Grade and High Female and Minority Representation on Overgrading and Undergrading

Factor	Coefficient ^a	Standard error	Z-value	Odds ratio ^b	Lower 95 percent confidence interval estimate	Upper 95 percent confidence interval estimate
Effect on overgrading						
GS grade	0.497	0.038	13.24	1.64	1.53	1.77
High minority representation	0.780	0.153	5.10	2.18	1.62	2.94
Effect on undergrading						
GS grade	- 0.071	0.043	- 1.65	0.93	0.86	1.01
High female representation	0.570	0.145	3.94	1.77	1.33	2.35

Note: Coefficients, standard errors, and z-values are taken from the Loglinear Program in SPSS.

^aCoefficients are logged coefficients and indicate how much the natural logarithm of the odds of overgrading or undergrading differ across GS grades or female and minority representation.

^bOdds ratios are derived directly from coefficients by taking antilogarithms. They are more readily interpretable than coefficients because they indicate how much the odds of overgrading or undergrading increase when GS grade increases or when occupations with high female or minority representation are compared with occupations having low or medium female or minority representation.

⁹Z-values are the ratios of coefficients to their standard errors. When z-values exceed + 1.96 or - 1.96, coefficients are statistically significant at the 95 percent level of confidence.

Comments From the Office of Personnel Management

Note: GAO comments supplementing those in the report text appear at the end of this appendix.



OFFICE OF THE DIRECTOR

**UNITED STATES
OFFICE OF PERSONNEL MANAGEMENT**

WASHINGTON, D.C. 20415

SEP 8

Ms. Nancy Kingsbury, Director
Federal Human Resource Management Issues
General Government Division
General Accounting Office
Washington, DC 20548

Dear Ms. Kingsbury:

This constitutes our comments on the General Accounting Office (GAO) report entitled Federal Job Classification: Comparison of Job Content to Grades Assigned in Selected Occupations which you provided to my staff August 25, 1995. In his letter of January 26, 1990, announcing the opening of this study, your predecessor, Mr. Bernard L. Ungar, stated that the Congress had asked the General Accounting Office "to determine if the federal job classification system is free of sex bias and meets current pay equity needs." He went on to say that GAO would "focus our work primarily on the design and development of the Factor Evaluation System." This study, conducted over the last 5 years, represents a significant effort to scrutinize the fairness of one of our classification systems.

We are pleased to see that your study finds no systemic bias in the Factor Evaluation System (FES). The GAO study concludes, however, that it has "identified differences in the grading of positions in occupations with high representations of women or minorities." At the same time, we note that the study contains numerous cautionary statements. For example:

- On page 8, the GAO study notes that it was not designed to "approximate the number of positions that appeared to be overgraded, undergraded, or aptly graded for the portion of the federal workforce to which the results of [GAO's] study are generalizable;"
- On page 10, a footnote states that the questionnaire used to gather data "was not designed as and is not a valid substitute for traditional classification methods. Therefore the questionnaire should not be used to draw definitive conclusions regarding overgrading or undergrading of individual positions."
- On page 60, it states that GAO feels that its "results should be viewed with caution in this respect because [GAO] did not design [its] study to assess the overall accuracy of the classification system."

At several points over the course of the study, OPM expressed its strong disagreement with the methodology used. We continue to believe the methodology is insufficient to support the study's findings. Our most immediate concerns include the following:

See pp. 7-9 and 61-62.

**Appendix III
Comments From the Office of Personnel
Management**

Ms. Nancy Kingsbury

2.

Use of the Primary Standard

The FES Primary Standard was never intended to be used as it was in this study. It was designed to be used as a “standard for standards,” an overall outline within which more specific standards would be developed, not as a basis for evaluating individual positions. Indeed, we do not permit agencies to use it unsupported by an occupation-specific standard. This use of the Primary Standard outside of its designed purpose inevitably introduces anomalies and uncertainties into the study and is not reliable in determining proper grades. We believe this translates into both overgradings and undergradings that are purely a result of the study methodology and human nature, not agency classification error or systemic problems.

Use of a less rigorous methodology to evaluate a more rigorous methodology

GAO used a less rigorous job evaluation methodology than the agencies used. The agency decisions on the grades of jobs the study used were arrived at using officially reviewed position descriptions evaluated with occupationally specific FES standards; these agency classification decisions were made by personnel specialists specifically familiar with the work of the agency and the analytical requirements of the FES format. This is a very focused process that applies specific measures to specific duties.

GAO used generic questionnaires based on the Primary Standard, from which employees and supervisors, unfamiliar with FES ground rules, selected generic phrases that were not in context. Given these differences between the methods used in the study and the methods used by the agencies, we must give greater credibility to the agency-derived grades.

These limitations of the study affect the credibility of its data and the manner in which the data can be used.

Disagreement between the study findings and other evidence

A number of the findings of the study, such as the extent of the undergradings found in some occupations, contradict our daily experience and evidence from other sources. We are aware of various agency studies, conducted over time and using dependable methods, that show considerably lower levels of misclassification. These studies and other less formal evidence appear to be highly inconsistent with the GAO study. For that matter, OPM itself uses essentially the same methodology used by the agencies in determining legally authoritative grades in its classification appeals program.

Significantly, our appeals data indicate much lower misclassification rates than the GAO study. Over the past 10 years, we have found that 9 percent of the positions appealed to OPM are undergraded and 85 percent are correctly graded. These are a special subset of positions, and it is not possible to extrapolate Governmentwide classification accuracy from this sample. Nevertheless, we find it unlikely that employees who believe strongly they are misclassified would be misclassified less often as a group than employees in general.

See p. 11.

See pp. 11-12.

See p. 12.

**Appendix III
Comments From the Office of Personnel
Management**

Ms. Nancy Kingsbury

3.

See comment 1.

In addition, some findings of the GAO study, such as unusual levels of over and undergrading within the same occupation, are left largely unexamined in the report and seem likely to be the result of anomalies in the study methodology rather than findings that would stand up under close examination.

See comment 2.

Statistical emphasis

The study's extensive statistical discussion gives an air of precision that is not supportable by the fundamental structure of the overall study design. There are several uninvestigated variables mentioned in the study, any one of which might account for some or all of the differences between the study results and the agency classification results. The report points out some of these (e.g., differences between the job content of agency position descriptions and the GAO questionnaire), but explanations for some are left unaddressed.

See pp. 8 and 10.

OPM plans to further explore the issue of classification accuracy

The report mentions the National Performance Review suggestion that the current classification system should be abandoned in favor of more flexible, broad banded systems. It then points out that policymakers should closely monitor any new systems to ensure that jobs are classified so that pay is equal for substantially equal work and that unintended disparities are guarded against. We note that the NPR recommendation focuses on ease of use and is not based on or directed at any findings of gender bias or what is referred to as "unintended disparities" in the report's conclusions.

See pp. 10 and 12.

Based on the NPR recommendation, the Administration is considering legislation that, among other things, will permit agencies to adopt alternative methods of position classification such as broad banding as well as continuing the current fifteen grade system. In anticipation of a Governmentwide broad banding authority, as well as in regard to current classification authority, OPM's newly designed oversight program will have a major focus on ensuring that current and new classification systems advance the merit principles of equal pay and the efficient and effective use of the federal workforce. In addition to conducting installation evaluations and leading a Governmentwide effort to improve internal human resources management accountability, this office will conduct several major policy reviews each year. For fiscal year 1996, one of our chief priorities is to conduct a classification review that would help facilitate the implementation of broad pay banding. For this reason, one of the options we are considering is the one you describe, a review of the accuracy of "border grades," which are those grades most likely to be placed at the lower and upper limits of any newly created pay bands. Our team is examining this and a number of other options for this review. We expect to decide on the classification review design by the end of fiscal year 1995 and begin work on the review in early fiscal year 1996.

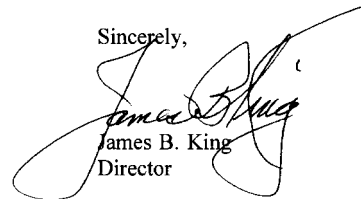
**Appendix III
Comments From the Office of Personnel
Management**

Ms. Nancy Kingsbury

4.

OPM shares with GAO the need to ensure that the federal government's classification systems and their applications are fair and unbiased. We appreciate the work GAO has done regarding this issue and thank you for this opportunity to comment on the report.

Sincerely,



James B. King
Director

See p. 12.

The following are GAO's supplemental comments on the Office of Personnel Management's letter dated September 8, 1995.

GAO Comments

1. OPM said that some findings in our study, such as the overgrading and undergrading within the same occupation, were left largely unexplained. As noted in the text, the job content questionnaire was designed and validated to achieve our review objective relative to comparing groups of occupations, and we cannot attest to the questionnaire's validity when used across GS grades within occupations, for specific occupations, or for individual positions.

2. OPM said that several uninvestigated variables were mentioned in our study, any one of which might account for some or all of the differences between the study results and the agency classification results. As noted in the text, we reported that 73 percent of the variation we found between actual GS grades and those we estimated on the basis of the questionnaire was attributable to the average GS grades and female or minority representation; the remaining 27 percent was not explained by the variables included in our study. Thus, we believe the variables in our study accounted for most of the variation.

Major Contributors to This Report

**General Government
Division, Washington,
D.C.**

Larry H. Endy, Assistant Director, Federal Management and
Workforce Issues

Brenda J. Bridges, Evaluator-in-Charge

Gregory H. Wilmoth, Senior Social Science Analyst

Douglas M. Sloane, Senior Social Science Analyst

Don D. Allison, Senior Evaluator

Jennifer S. Cruise, Senior Evaluator

Bibliography

Aaron, H.J., and C.M. Lougy. The Comparable Worth Controversy. Washington, D.C.: The Brookings Institute, 1986.

Acker, J. "Sex Bias in Job Evaluation: A Comparable Worth Issue," Ingredients for Women's Employment Policy. Albany: State University of New York Press, 1987.

Acker, J. Doing Comparable Worth: Gender, Class, and Pay Equity. Philadelphia: Temple University Press, 1989.

Agarwal, N.C. "Pay Discrimination: A Comparative Analysis of Research Evidence and Public Policy in Canada, the United States, and Britain." Columbia Journal of World Business, Vol. 18 (1983), pp. 28-38.

Agarwal, N.C. "Pay Equity in Canada: Current Developments." Labor Law Journal, Vol. 41 (1990), pp. 518-525.

Agassi, J.B. Women on the Job: The Attitudes of Women to Their Work. Lexington, MA: Lexington Books, 1979.

A Guide to Pay Equity in Local Government. State of Minnesota Department of Employee Relations. St. Paul, MN: 1990.

Aklin, M.T. Office Job Evaluation. Des Plaines, IL: Industrial Management Society, 1971.

Aldrich, M., and R. Buchele. The Economics of Comparable Worth. Cambridge, MA: Ballinger Publishing Company, 1986.

Alexander, R.A., and G.V. Barrett. "Equitable Salary Increase Judgments Based Upon Merit and Non-merit Considerations: A Cross-national Comparison." International Review of Applied Psychology, Vol. 31 (1982), pp. 443-454.

Algina, J. "Comments on Bartko's 'On Various Intraclass Correlation Reliability Coefficients.'" Psychological Bulletin, Vol. 85 (1978), pp. 135-138.

Allison, E.K. "Sex Linked Differentials in the Beauty Industry." The Journal of Human Resources, Vol. 11 (1976), pp. 383-390.

Almquist, E.M. Minorities, Gender, and Work. Lexington, MA: Lexington Books, 1979.

Anderson, C.H. and D.B. Corts. Development of a Framework for a Factor-ranking Benchmark System for Job Evaluation. U.S. Civil Service Commission, Personnel Research and Development Center, Project 6B132A. Washington, D.C.: 1973.

Andrews, I.R., and E.R. Valenzi. "Overpay Inequity or Self-Image as a Worker: A Critical Examination of an Experimental Induction Procedure." Organizational Behavior and Human Performance, Vol. 5 (1970), pp. 266-276.

A Job Evaluation Study of Selected Job Classes of the State and Counties of Hawaii. Arthur Young International. Honolulu, HA: 1987.

Arvey, R.D. "Sex Bias in Job Evaluation Procedures." Personnel Psychology, Vol. 39 (1986), pp. 315-335.

Arvey, R.D., and M. Begalla. "Analyzing the Homemaker Job Using the Position Analysis Questionnaire (PAQ)." Journal of Applied Psychology, Vol. 60 (1975), pp. 513-517.

Arvey, R.D., et al. "Potential Sources of Bias in Job Analytic Processes." Academy of Management Journal, Vol. 25 (1982), pp. 618-629.

Arvey, R.D., and J.A. Fossum. "Application of Personnel Assessment Concepts and Methods in Job Evaluation Procedures." Personnel Assessment Monographs, Vol. 1 (1986).

Arvey, R.D., and K.E. Holt. "Cost Impact of Alternative Comparable Worth Strategies." Presented at the 94th Annual Convention of the American Psychological Association, Washington, D.C.: 1986.

Arvey, R.D., S.E. Maxwell, and L.M. Abraham. "Reliability Artifacts in Comparable Worth Procedures." Journal of Applied Psychology, Vol. 70 (1985), pp. 695-705.

Arvey, R.D., E.M. Passino, and J.W. Lounsbury. "Job Analysis Results as Influenced by Sex of Incumbent and Sex of Analyst." Journal of Applied Psychology, Vol. 62 (1977), pp. 411-416.

Ash, P. "The Reliability of Job Evaluation Factors." Journal of Applied Psychology, Vol. 32 (1948), pp. 313-320.

Ash, P. "A Statistical Analysis of the Navy's Method of Position Evaluation." Public Personnel Review, Vol. 11 (1950), pp. 130-138.

Ash, R.A. "Empirical Validity Evidence for a Task-based Job-component Method of Job Analysis." Presented at the Annual Conference of the International Personnel Management Association Assessment Council, Orlando, FL: 1989.

Ashenfelter, O., and J.D. Mooney. "Graduate Education, Ability, and Earnings." Review of Economics and Statistics, Vol. 50 (1968), pp. 78-86.

Asher, M., and J. Popkin. "The Effect of Gender and Race Differentials on Public-private Wage Comparisons: A Study of Postal Workers." Industrial and Labor Relations Review, Vol. 38 (1984), pp. 16-25.

Astin, H.S., and A.E. Bayer. "Sex Discrimination in Academe." Educational Records, Vol. 53 (1972), pp. 101-118.

A Study of Comparable Worth Within the State of Maine Classification and Compensation System. William M. Mercer-Meidinger, Inc. New York: 1986.

Atchison, T., and W. French. "Pay Systems for Scientists and Engineers." Industrial Relations, Vol. 7 (1967), pp. 44-56.

Auster, E.R. "Task Characteristics as a Bridge Between Macro- and Microlevel Research on Salary Inequality Between Men and Women." Academy of Management Review, Vol. 14 (1989), pp. 173-193.

Avolio, B.J., K.G. Kroeck, and B.R. Nathan. "Category Accessibility, Ratings of Prototypicality, and Perceptions of Managerial Role Attributes." Psychological Reports, Vol. 62 (1988), pp. 195-210.

Azevedo, R.E., and L. Roth. "Canadian-United States Experience with Comparable Worth: The View From Minnesota." Labor Law Journal, Vol. 41 (1990), pp. 531-534.

Baer, J.A. The Chains of Protection. Westport, CT: Greenwood Press, 1978.

Bailey, W.R., and A.E. Schwenk. "Wage Rate Variation by Size of Establishment." Industrial Relations, Vol. 19 (1980), pp. 192-198.

Barnes, W.E., and F.B. Jones. "Differences in Male and Female Quitting." Journal of Human Resources, Vol. 9 (1974), pp. 439-451.

Barnett, E. "Comparable Worth and the Equal Pay Act: Proving Sex-based Wage Discrimination Claims after County of Washington v. Gunther." Wayne Law Review, Vol. 28 (1982), pp. 1669-1700.

Baron, J.M., A. Davis-Blake, and W.T. Bielby. "The Structure of Opportunity: How Promotion Ladders Vary Within and Among Organizations." Administrative Science Quarterly, Vol. 31 (1986), pp. 248-273.

Barrett, G.V. "Salary Increase Models: A Cross-national Comparison." Research Seminar on Comparative Managerial Behavior Research at the International Institute of Management, Berlin: 1971.

Barrett, G.V. "Job Evaluation as a Fair and Effective Technique for Establishing Pay." Presented at the Personnel/Human Resource Management Division, 1990 National Meeting of the Academy of Management, San Francisco, CA: 1990.

Barrett, G.V. "Comparison of Skill-based Pay with Traditional Job Evaluation Techniques." Human Resource Management Review, Vol. 1 (1991), pp. 97-105.

Barrett, G.V. "Task Design, Individual Attributes, Work Satisfaction, and Productivity." Work Organization Research: American and European Perspectives. Kent, OH: Kent State University Press, 1978.

Barrett, G.V., et al. "Frequently Encountered Problems in the Application of Regression Analysis to the Investigation of Sex Discrimination in Salaries." Public Personnel Management, Vol. 15 (1986), pp. 143-157.

Barrett, G.V., and B.M. Bass. "Cross-cultural Issues in Industrial and Organizational Psychology," Handbook of Industrial and Organizational Psychology. Chicago: Rand McNally College Publishing Co, 1976.

Barrett, G.V., F.H. Dambrot, and G.R. Smith. The Relationship Between Individual Attributes and Job Design: Review and Annotated Bibliography. University of Akron, Department of Psychology, Technical Report 6. Akron, OH: 1975.

Barrett, G.V., and D. Doverspike. "Fundamental Errors and Erroneous Beliefs in Using Regression Analysis as a Test for Sex Discrimination." Law and Psychology Review, Vol. 13 (1989), pp. 1-24.

Barrett, G.V., and D. Doverspike. "Another Defense of Point-factor Job Evaluation." Personnel, Vol. 66 (1989), pp. 33-36.

Barrett, G.V., and S.B. Morris. "The American Psychological Association's Amicus Curiae Brief in *Price Waterhouse v. Hopkins*: The Values of Science Versus the Values of the Law," Law and Human Behavior, Vol. 17 (1993), pp. 201-215.

Barrett, G.V., and D.M. Sansonetti. "Issues Concerning the Use of Regression Analysis in Salary Discrimination Cases." Personnel Psychology, Vol. 41 (1988), pp. 503-516.

Barrett, G.V., W.S. Whittaker, and R.A. Alexander. "Equitable Salary Increases: A Cross-national Comparison." Abstract Guide of 20th International Congress of Psychology, Tokyo: 1972.

Bar-tal, D., et al., eds. Stereotyping and Prejudice, New York: Springer-Verlag, 1989.

Basow, S.A. Gender Stereotypes: Traditions and Alternatives, 2nd ed. Pacific Grove, CA: Brooks/Cole Publishing Co., 1986.

Bass, B.M., and B.J. Avolio. The Transformational and Transactional Leadership Behavior of Management Men and Women as Described by the Men and Women Who Directly Report to Them. University of New York at Binghamton, Center for Leadership Studies/School of Management, Report 91-3. Binghamton, NY: 1991.

Beatty, R.W., and J.R. Beatty. "Job Evaluation and Discrimination: Legal, Economic, and Measurement Perspectives on Comparable Worth and Women's Pay," Women In The Workforce. New York: Praeger Publishers, 1982.

- Beatty, R.W., and J.R. Beatty. "Some Problems with Contemporary Job Evaluation Systems," Comparable Worth and Wage Discrimination: Technical Possibilities and Political Realities. Philadelphia: Temple University Press, 1984.
- Becker, M.E. "Comparable Worth in Antidiscrimination Legislation: A Reply to Freed and Polsby." University of Chicago Law Review, Vol. 51 (1984), pp. 1112-1134.
- Belcher, D.W. "Pay Equity or Pay Fairness?" Compensation Review, Vol. 11 (1979), pp. 31-37.
- Bellace, J.R. "The Impact of the American and British Equal Pay Guarantee on Job Evaluation." Applied Psychology An International Review, Vol. 36 (1987), pp. 9-24.
- Bellak, A.O., M.W. Bates, and D.M. Glasner. "Job Evaluation: Its Role in the Comparable Worth Debate." Public Personnel Management, Vol. 12 (1983), pp. 418-424.
- Bellar, A.H. "The Economics of Enforcement of an Antidiscrimination Law: Title VII of the Civil Rights Act of 1964." Journal of Law and Economics, Vol. 21 (1978), pp. 359-380.
- Bellows, R.M., and M.F. Estep. "Job Evaluation Simplified: The Utility of the Occupational Characteristics Checklist." Journal of Applied Psychology, Vol. 32 (1948), pp. 354-359.
- Benge, E.J. "Statistical Study of a Job Evaluation Point System." Modern Management, (1947), pp. 17-23.
- Benge, E.J., S.L.H. Burk, and E.N. Hay. Manual of Job Evaluation: Procedures of Job Analysis and Appraisal. New York and London: Harper and Brothers, 1941.
- Benson, P.G., and J.S. Hornsby. "The Politics of Pay: The Use of Influence Tactics in Job Evaluation Committees." Group and Organization Studies, Vol. 13 (1988), pp. 208-224.
- Benson, P.G., and J.S. Hornsby. "Job Evaluation Committees as Small Groups: Implications of Group Dynamics for Fairness in Pay." International Journal of Public Administration, Vol. 14 (1991), pp. 845-869.

Bibliography

- Berelson, B. Content Analysis in Communication Research. Glencoe, IL: Folcroft Press, 1970.
- Bergmann, B.R. The Economic Emergence of Women. New York: Basic Books, 1986.
- Berheide, C.W., et al. Minorities and Pay Equity in New York State. Center for Women in Government, Working Paper 17. Albany, NY: 1986.
- Berheide, C.W., et al. "A Pay Equity Analysis of Female-dominated and Disproportionately Minority New York State Job Titles." Humanity and Society, Vol. 11 (1987), pp. 465-485.
- Bertaux, N.E. "The Roots of Today's 'Women's Jobs' and 'Men's Jobs': Using the Index of Dissimilarity Segregation by Gender." Explorations in Economic History, Vol. 28 (1991), pp. 433-459.
- Betz, N.E., and G. Hackett. "The Relationship of Career-related Self-efficacy Expectations to Perceived Career Options in College Women and Men." Journal of Counseling Psychology, Vol. 28 (1981), pp. 399-410.
- Beuhring, T. "Designing a New Job Evaluation System Based on Employee Input." Presented at the 94th Annual American Psychological Association Conference, Washington, D.C.: 1986.
- Beuhring, T. "Incorporating Employee Values in Job Evaluation." Journal of Social Issues, Vol. 45 (1989), pp. 169-189.
- Beutell, N.J., and O.C. Brenner. "Sex Differences in Work Values." Journal of Vocational Behavior, Vol. 28 (1986), pp. 29-41.
- Bielby, W.T., and J.N. Baron. "Undoing Discrimination: Job Integration and Comparable Worth," Ingredients for Women's Employment Policy. Albany: State University of New York Press, 1987.
- Bigoness, W.J. "Sex Differences in Job Attribute Preferences." Journal of Organizational Behavior, Vol. 9 (1988), pp. 139-147.
- Birnbaum, M.H. "Procedures for the Detection and Correction of Salary Inequities," Salary Equity: Detecting Sex Bias in Salaries Among College and University Professors. Lexington, MA: Lexington Books, 1979.

Birnbaum, M.H. "Perceived Equity of Salary Policies." Journal of Applied Psychology, Vol. 68 (1983), pp. 49-59.

Birnbaum, M.H. "Relationships Among Models of Salary Bias." American Psychologist, Vol. 40 (1985), pp. 862-866.

Blau, F.D. Equal Pay in the Office. Lexington, MA: Lexington Books, 1977.

Blau, F.D., and L.M. Kahn. "Race and Sex Differences in Quits by Young Workers." Industrial and Labor Relations Review, Vol. 34 (1981), pp. 563-577.

Blaxall, M., and B. Reagan, eds. Women and the Workplace. Chicago: The University of Chicago Press, 1976.

Blinder, A.S., ed. Paying for Productivity. Washington, D.C.: The Brookings Institute, 1990.

Blood, M.R., W.K. Graham, and S. Zedeck. "Resolving Compensation Disputes With Three-party Job Evaluation." Applied Psychology: An International Review, Vol. 36 (1987), pp. 39-50.

Blum, L.M. "Possibilities and Limits of the Comparable Worth Movement." Gender and Society, Vol. 1 (1987), pp. 380-399.

Blum, L.M. Between Feminism and Labor: The Significance of the Comparable Worth Movement. Berkeley, CA: University of California Press, 1991.

Blumrosen, A.W. "The Group Interest Concept, Employment Discrimination, and Legislative Intent: The Fallacy of Connecticut v. Teal." Harvard Journal on Legislation, Vol. 20 (1983), pp. 99-135.

Blumrosen, R.G. "Wage Discrimination, Job Segregation, and Title VII of the Civil Rights Act of 1964." Journal of Law Reform, Vol. 12 (1979), pp. 399-502.

Blumrosen, R.G. "Wage Discrimination and Job Segregation: The Survival of a Theory." University of Michigan Journal of Law Reform, Vol. 14 (1980), pp. 1-14.

Bibliography

- Blumrosen, R.G. "Wage Discrimination, Job Segregation, and Women Workers." Employee Relations Law Journal, Vol. 6 (1980), pp. 77-136.
- BNA. "Changing Pay Practices: New Developments in Employee Compensation." Labor Relations Week, Vol. 2 (1988), pp. 1-220.
- Boardman, S.K., C.C. Harrington, and S.V. Horowitz. "Successful Women: A Psychological Investigation of Family Class and Education Origins," Women's Career Development. Newbury Park, CA: Sage, 1987.
- Booker, S., and L.C. Nuckolls. "Legal and Economic Aspects of Comparable Worth." Public Personnel Management, Vol. 15 (1986), pp. 189-206.
- Borjas, G.J. "Job Mobility and Earnings Over the Life Cycle." Industrial and Labor Relations Review, Vol. 34 (1981), pp. 365-376.
- Borjas, G.J. "The Measurement of Race and Gender Wage Differentials: Evidence From the Federal Sector." Industrial and Labor Relations Review, Vol. 37 (1983), pp. 79-91.
- Bose, C., and G. Spitze, eds. Ingredients for Women's Employment Policy. Albany, NY: State University of New York Press, 1987.
- Bowey, A.M., R. Thorpe, and P. Hellier. Payment Systems and Productivity. New York: St. Martin's Press, 1986.
- Brennan, E.J. "Comparable Worth: Employers Can No Longer Pass the Buck." Personnel Journal, Vol. 64 (1985), pp. 110-111.
- Brenner, O.C. "Relationship of Education to Sex, Managerial Status, and the Managerial Stereotype." Journal of Applied Psychology, Vol. 67 (1982), pp. 380-383.
- Brittingham, B.E., et al. "A Multiple Regression Model for Predicting Men's and Women's Salaries in Higher Education," Salary Equity: Detecting Sex Bias in Salaries Among College and University Professors. Lexington, MA: Lexington Books, 1979.
- Bronstein, P., et al., eds. "Stepping on the Academic Career Ladder: How Are Women Doing?" Women's Career Development. Newbury Park, CA: Sage, 1987.

Brooks, L. "Sexist Language in Occupational Information: Does It Make a Difference?" Journal of Vocational Behavior, Vol. 23 (1983), pp. 227-232.

Brown, H.P. The Inequality of Pay. Berkeley, CA: University of California Press, 1977.

Brown, K.A., and D.L. Huber. "Lowering Floors and Raising Ceilings: A Longitudinal Assessment of the Effects of an Earnings-at-risk Plan on Pay Satisfaction." Personnel Psychology, Vol. 45 (1992), pp. 279-311.

Browne, K.R. "Comparable Worth: An Impermissible Form of Affirmative Action?" Loyola of Los Angeles Law Review, Vol. 22 (1989), pp. 717-759.

Browne, M.N., and B. Powers. "Henry George and Comparable Worth: Hypothetical Markets as a Stimulus for Reforming the Labor Market." American Journal of Economics and Sociology, Vol. 47 (1988), pp. 461-471.

Buchele, R., and M. Aldrich. "How Much Difference Would Comparable Worth Make?" Industrial Relations, Vol. 24 (1985), pp. 222-233.

Buckley, J.E. "Pay Differences Between Men and Women in the Same Job." Monthly Labor Review, Vol. 94 (1971), pp. 36-39.

Buel, W.D. "A Simplification of Hay's Method of Recording Paired Comparisons." Journal of Applied Psychology, Vol. 44 (1960), pp. 347-348.

Buford, J.A., and D.R. Norris. "A Salary Equalization Model: Identifying and Correcting Sex-based Salary Differences." Employee Relations Law Journal, Vol. 6 (1981), pp. 406-421.

Bungel, J.H. "To Each According to Her Worth?" The Public Interest, Vol. 67 (1982), pp. 77-93.

Callahan-Levy, C.M. "Sex Differences in the Allocation of Pay." Journal of Personality and Social Psychology, Vol. 37 (1979), pp. 43-446.

Camden, C.T., and C.W. Kennedy. "Manager Communicative Style and Nurse Morale." Human Communication Research, Vol. 12 (1986), pp. 551-563.

Campion, M.A., and C.J. Berger. "Conceptual Integration and Empirical Test of Job Design and Compensation Relationships." Personnel Psychology, Vol. 43 (1990), pp. 525-553.

Campion, M.A., R.G. Lord, and E.D. Pursell. "Individual and Organizational Correlates of Promotion Refusal." Journal of Vocational Behavior, Vol. 19 (1981), pp. 42-49.

Cannings, K. "An Interdisciplinary Approach to Analyzing the Managerial Gender Gap." Human Relations, Vol. 44 (1991), pp. 679-695.

Cappelli, P., and W.F. Cascio. "Why Some Jobs Command Wage Premiums: A Test of Career Tournament and Internal Labor Market Hypotheses." Academy of Management Journal, Vol. 34 (1991), pp. 848-868.

Carey, J.F. "Participative Job Evaluation." Compensation Review, Vol. 9 (1977), pp. 29-38.

Carlisi, A.M. "The Influence of Sex Stereotyping and the Sex of the Job Evaluator on Job Evaluation Ratings." Ph.D. Dissertation, University of Akron, OH: 1984.

Carney, T.F. Content Analysis: A Technique for Systematic Inference From Communications. Winnipeg: University of Manitoba Press, 1972.

Carter, R.D., et al. "Multivariate Alternatives to Regression Analysis in the Evaluation of Salary Equity-parity." Research in Higher Education, Vol. 20 (1984), pp. 167-179.

Cascio, W.F. Applied Psychology in Personnel Management, 3rd ed. Englewood Cliffs, NJ: Prentice-Hall, Inc., 1987.

Cellar, D.F., et al. "The Effects of Rater Training, Job Analysis Format and Congruence of Training on Job Evaluation Ratings." Journal of Business and Psychology, Vol. 3 (1989), pp. 387-401.

Cellar, D.F., et al. "The Effect of Field Independence, Job Analysis Format, and Sex of Rater on the Accuracy of Job Evaluation Ratings." Journal of Applied Social Psychology, Vol. 19 (1989), pp. 363-376.

- Cellar, D.F., M.C. Kernan, and G.V. Barrett. "Conventional Wisdom and Ratings of Job Characteristics: Can Observers be Objective?" Journal of Management, Vol. 11 (1985), pp. 131-138.
- Centers, R., and D.E. Bugental. "Intrinsic and Extrinsic Job Motivations Among Different Segments of the Working Population." Journal of Applied Psychology, Vol. 50 (1966), pp. 193-197.
- Centra, J.A. Women, Men, and a Doctorate. Princeton, NJ: Educational Testing Service, 1974.
- Chacko, T.I. "Women and Equal Employment Opportunity: Some Unintended Effects." Journal of Applied Psychology, Vol. 67 (1982), pp. 119-123.
- Charles, A.W. "Installing Single-factor Job Evaluation." Compensation Review, Vol. 3 (1971), pp. 9-21.
- Chesler, D.J. "Reliability and Comparability of Different Job Evaluation Systems." Journal of Applied Psychology, Vol. 32 (1948), pp. 465-475.
- Chesler, D.J. "Reliability of Abbreviated Job Evaluation Scales." Journal of Applied Psychology, Vol. 32 (1948), pp. 622-628.
- Chesler, D.J. "Abbreviated Job Evaluation Scales Developed on the Basis of 'Internal' and 'External' Criteria." Journal of Applied Psychology, Vol. 33 (1949), pp. 151-157.
- Chewning, M.F., and W.E. Walker. "Sex-typing of Tasks and Occupations." Psychological Reports, Vol. 47 (1980), pp. 696-698.
- Chi, K.S. "Comparable Worth: Implications of the Washington Case." State Government, Vol. 57 (1984), pp. 34-45.
- Chiswick, B.R. "Immigrant Earnings Patterns by Sex, Race and Ethnic Groupings." Monthly Labor Review, Vol. 103 (1980), pp. 22-25.
- Clauss, C.A. "Comparable Worth—The Theory, Its Legal Foundation, and the Feasibility of Implementation." University of Michigan Journal of Law Reform, Vol. 20 (1986), pp. 7-97.

Cleveland, J.N., and G. Hollman. "The Effects of the Age-type of Tasks and Incumbent Age Composition on Job Perceptions." Journal of Vocational Behavior, Vol. 36 (1990), pp. 181-194.

Coch, J.V. "Student Choice of Undergraduate Major Field of Study and Private Internal Rates of Return." Industrial and Labor Relations Review, Vol. 26 (1972), pp. 680-685.

Cohen, L. "More Reliable Job Evaluation." Personnel Psychology, Vol. 4 (1948), pp. 457-464.

Cohen, M.S. "Sex Differences in Compensation." The Journal of Human Resources, Vol. 6 (1971), pp. 434-447.

Cole, J.R. Fair Science: Women in the Scientific Community. New York: Free Press, 1979.

Collett, M.J. "Comparable Worth: An Overview." Public Personnel Management, Vol. 12 (1983), pp. 325-331.

Collins, J.M., and P.M. Muchinsky. "An Assessment of the Construct Validity of Three Job Evaluation Methods: A Field Experiment." Academy of Management Journal, Vol. 36 (1993), pp. 895-904.

Collins, R. "Functional and Conflict Theories of Educational Stratification." American Sociological Review, Vol 36 (1971), pp. 1002-1019.

Comparable Worth: An Analysis and Recommendations. U.S. Commission on Civil Rights. Washington, D.C.: 1985.

Comparable Worth: A Symposium on the Issues and Alternatives. Equal Employment Advisory Council. Washington, D.C.: 1981.

Comparable Worth for Federal Jobs: A Wrong Turn Off the Road Toward Pay Equity and Women's Career Advancement. U.S. Office of Personnel Management. Washington D.C.: 1987.

Comparable Worth in Montana State Government: A Report to the 52nd Legislature. Montana State, State Personnel Division, Department of Administration. Helena, MT: 1991.

Comparable Worth: Issue for the 80s: A Consultation of the U.S. Commission on Civil Rights. U.S. Commission on Civil Rights. Washington, D.C.: 1984.

Converse, J.M., and S. Presser. Survey Questions: Handcrafting the Standardized Questionnaire. Beverly Hills, CA: Sage Publications, 1986.

Cooper, C.L., and M.J. Davidson. "The High Cost of Stress on Women Managers." Organizational Dynamics, Vol. 10 (1982), pp. 44-53.

Cooper, E.A., and G.V. Barrett. "Equal Pay and Gender: Implications of Court Cases for Personnel Practices." Academy of Management Review, Vol. 9 (1984), pp. 84-94.

Cooper, E.A., D. Doverspike, and G.V. Barrett. "Comparison of Different Methods of Determining the Sex Type of an Occupation." Psychological Reports, Vol. 57 (1985), pp. 747-750.

Cooper, E.A., et al. "Sex Bias in Job Evaluation: The Effect of Sex on Judgments of Factor and Level Weights." Educational and Psychological Measurement, Vol. 47 (1987), pp. 369-375.

Cooper, E.A., and R.W. Scholl. "Reliability of Job Evaluation: Differences Across Sex-typed Jobs." Journal of Business and Psychology, Vol. 4 (1989), pp. 155-165.

Cooper, H.M., J.M. Burger, and T.L. Good. "Gender Differences in the Academic Locus of Control Beliefs of Young Children." Journal of Personality and Social Psychology, Vol. 40 (1981), pp. 562-572.

Cortis, L.E. "Psychological Factors in Job Evaluation." South African Journal of Psychology, Vol. 2 (1972), pp. 55-66.

Craver, G. "Survey of Job Evaluation Practices in State and County Governments." Public Personnel Management, Vol. 6 (1977), pp. 121-131.

Cummings, L.L. "Compensation, Culture, and Motivation." Organizational Dynamics, Vol. 12 (1984), pp. 33-44.

Curry, E.W., and D. Walling. "Occupational Prestige: Exploration of a Theoretical Basis." Journal of Vocational Behavior, Vol. 25 (1984), pp. 124-138.

Dackawich, J., J. Best, and W. York. "Occupational and Educational Expectations: Sex and Ethnic Variations." Paper, California State University, 1978.

Dadoy, M. "Role et Place de l'Analyse du Travail Dans les Systemes d'Evaluation de la Qualification du Travail." Le Travail Humain, Vol. 54 (1991), pp. 97-112.

Daniels, H.W. "Winning Acceptance for the Job Evaluation Plan." Personnel, Vol. 30 (1953), pp. 30-32.

Danielson, J.L., and R. Smith. "The Application of Regression Analysis to Equality and Merit in Personnel Decisions." Public Personnel Management Journal, Vol. 10 (1981), pp. 126-131.

Darlington, R.B. "Multiple Regression in Psychological Research and Practice." Psychological Bulletin, Vol. 69 (1968), pp. 161-182.

Davies, M.W. Women's Place Is at the Typewriter: Office Work and Office Workers 1870-1930. Philadelphia: Temple University Press, 1982.

Davis, J.C., and C.M. Hubbard. "On the Measurement of Discrimination Against Women." American Journal of Economics and Sociology, Vol. 38 (1979), pp. 287-292.

Davis, K.R. and W.I. Sauser. "Effects of Alternative Weighting Methods in a Policy-capturing Approach to Job Evaluation: A Review and Empirical Investigation." Personnel Psychology, Vol. 44 (1991), pp. 85-127.

Davis, K.R., and W.I. Sauser. "A Comparison of Factor Weighting Methods in Job Evaluation: Implications for Compensation Systems." Public Personnel Management, Vol. 22 (1993), pp. 91-106.

Davis, M.K., and J. Tiffin. "Cross Validation of an Abbreviated Point Job Evaluation System." Journal of Applied Psychology, Vol. 34 (1950), pp. 225-228.

Dean, J.W., Jr., and D.J. Brass. "Social Interaction and the Perception of Job Characteristics in an Organization." Human Relations, Vol. 38 (1985), pp. 571-582.

De Corte, W. "Estimating Sex-related Bias in Job Evaluation." Journal of Occupational and Organizational Psychology, Vol. 66 (1993), pp. 83-96.

DeGooyer, J., and L. Westley. Women's Work: Undervalued, Underpaid. National Commission on Working Women. Washington, D.C.: 1984.

Delaney, H.D., R.D. Norman, and D.A. Miller. "An Exploration of the Verbal Encodability Hypothesis for Sex Differences in the Digit-symbol (Symbol-digit) Test." Intelligence, Vol. 5 (1981), pp. 199-208.

DeNisi, A.S., E.T. Cornelius, III., and A.G. Blencoe. "Further Investigation of Common Knowledge Effects on Job Analysis Ratings." Journal of Applied Psychology, Vol. 72 (1987), pp. 262-268.

Deremer, C., D.R. Quarles, and C.M. Temple. "The Success Rate of Personal Salary Negotiations: A Further Investigation of Academic Pay Differentials by Sex." Research in Higher Education, Vol. 16 (1986), pp. 139-154.

Dertien, M.G. "The Accuracy of Job Evaluation Plans." Personnel Journal, Vol. 60 (1981), pp. 566-570.

Desmond, R.E., and D.J. Weiss. "Worker Estimation of Ability Requirements of Their Jobs." Journal of Vocational Behavior, Vol. 7 (1975), pp. 23-27.

De Sola Pool, I., ed. Trends in Content Analysis. Urbana, IL: University of Illinois Press, 1959.

DeVader, C.L. "A Comparison of Three Category Types and Their Applicability to I/O Rating." Ph.D. Dissertation, University of Akron, 1986.

Diamond, E.E. "Theories of Career Development and the Reality of Women at Work," Women's Career Development. Newbury Park, CA: Sage, 1987.

Dick, A.H. "Job Evaluation's Role in Employee Relations." Personnel Journal, Vol. 53 (1974), pp. 176-179.

Dictionary of Occupational Titles, 4th ed. U.S. Department of Labor. Washington, D.C.: 1991.

Dillingham, A.E. "Sex Differences in Labor Market Injury Risk." Industrial Relations, Vol. 20 (1981), pp. 117-122.

Dolton, P.J. "Testing for Sex Discrimination in Maximum Likelihood Models." Applied Economics, Vol. 16 (1984), pp. 225-235.

Dornstein, M. "Perceptions Regarding Standards for Evaluating Pay Equity and Their Determinants." Journal of Occupational Psychology, Vol. 58 (1985), pp. 321-330.

Dornstein, M. "Pay Equity Evaluations of Occupations and Their Bases." Journal of Applied Social Psychology, Vol. 18 (1988), pp. 905-924.

Dornstein, M. "The Fairness Judgments of Received Pay and Their Determinants." Journal of Occupational Psychology, Vol. 62 (1989), pp. 287-299.

Doverspike, D. "A Statistical Analysis of Internal Sex Bias in a Job Evaluation Instrument (Doctoral dissertation, The University of Akron, 1983)." Dissertation Abstracts International, Vol. 43 (1983), p. 3063B.

Doverspike, D., and G.V. Barrett. "An Internal Bias Analysis of a Job Evaluation Instrument." Journal of Applied Psychology, Vol. 69 (1984), pp. 648-662.

Doverspike, D., et al. "Generalizability Analysis of a Point-method Job Evaluation Instrument." Journal of Applied Psychology, Vol. 68 (1983), pp. 476-483.

Doverspike, D., et al. "Sex Differences in Short-term Memory Processing." Perceptual and Motor Skills, Vol. 58 (1984), pp. 135-139.

Drazin, R. and E.R. Auster. "Wage Differences Between Men and Women: Performance Appraisal Ratings vs. Salary Allocation as the Locus of Bias." Human Resource Management, Vol. 26 (1987), pp. 157-168.

Driver, R.S. "A Case History in Merit Rating." Personnel, Vol. 13 (1939), pp. 262-269.

Driver, R.S. "The Validity and Reliability of Ratings." Personnel, Vol. 16 (1940), pp. 137-191.

Bibliography

Dunham, R.B. "Relationships of Perceived Job Design Characteristics to Job Ability Requirements and Job Value." Journal of Applied Psychology, Vol. 62 (1977), pp. 760-763.

Dunson, B.H. "Pay, Experience, and Productivity: The Government-Sector Case." The Journal of Human Resources, Vol. 20 (1985), pp. 153-160.

Durio, H.F., and C.A. Kidlow. "The Nonretention of Capable Women Engineering Students." Research in Higher Education, Vol. 13 (1980), pp. 61-71.

Dyer, L., D.P. Schwab, and R.D. Theriault. "Managerial Perceptions Regarding Salary Increase Criteria." Personnel Psychology, Vol. 29 (1976), pp. 233-242.

Egli, C.P. "Judicial Refinement of Statistical Evidence in Title VII Cases." Connecticut Law Review, Vol. 13 (1981), pp. 515-548.

Ehrenberg, R.G., ed. Do Compensation Policies Matter? Ithaca, NY: ILR Press, 1990.

Eldred, C. A Report of a Study of Women Training or Working in Outside Plant Craft Jobs in the Bell System. Westate, Inc., Rockville, MD: 1975.

Elizur, D. Job Evaluation: A Systematic Approach. Hants, England: Gower, 1980.

Elizur, D. Systematic Job Evaluation and Comparable Worth. Brooksville, VA: Gower Publishing Company, 1987.

Elizur, D. "Systematic Selection of Job Evaluation Items." Applied Psychology An International Review, Vol. 36 (1987), pp. 51-59.

Elizur, D. "The Scaling Method of Job Evaluation." Compensation Review, Vol. 10 (1978), pp. 34-46.

Elizur, D., and H. Thierry. "Job Evaluation, Comparable Worth, and Compensation: An Introduction." Applied Psychology: An International Review, Vol. 36 (1987), pp. 3-7.

Ellerman, D.A., and E.R. Smith. "Generalized and Individual Bias in the Evaluation of the Work of Women: Sexism in Australia." Australian Journal of Psychology, Vol. 35 (1983), pp. 71-79.

Employment Attributes of Recent Science and Engineering Graduates. National Science Foundation, Publication 80-311. Washington, D.C.: 1980.

England, P. Comparable worth: Theories and Evidence. New York: Aldine de Gruyter, 1992.

England, P., M. Chassie, and L. McCormack. "Skill Demands and Earnings in Female and Male Occupations." Sociology and Social Research, Vol. 66 (1982), pp. 147-168.

England, P., and D. Dunn. "Evaluating Work and Comparable Worth," Annual Review of Sociology. Palo Alto, CA: 1988.

England, P., et al. "Explaining Occupational Sex Segregation and Wages: Findings From a Model With Fixed Effects." American Sociological Review, Vol. 53 (1988), pp. 544-558.

England, P. and B.S. Kilbourne. "Using Job Evaluation to Achieve Pay Equity." International Journal of Public Administration, Vol. 14 (1991), pp. 823-843.

England, P., and S.D. McLaughlin. "Sex Segregation of Jobs and Male-female Income Differentials," Discrimination in Organizations: Using Social Indicators to Manage Social Change. San Francisco: Jossey-Bass, 1979.

Epperson, L.L. "The Dynamics of Factor Comparison/point Evaluation." Public Personnel Management, Vol. 4 (1975), pp. 38-48.

Equal Employment Opportunity Commission. "The Equal Pay Act: Interpretations." Federal Register, Vol. 46 (1991), pp. 43848-43852.

Ervin, D., B.J. Thomas, and Zey-Ferrell. "Sex Discrimination and Rewards in a Public Comprehensive University." Human Relations, Vol. 37 (1984), pp. 1005-1025.

Evans, S.M., and B.J. Nelson. Wage Justice: Comparable Worth and the Paradox of Technocratic Reform. Chicago: The University of Chicago Press, 1989.

Executive Summary of the Classification Modernization Study. State of Ohio, Ohio's Bureau of Employment Services, Women's Division. Columbus, OH: 1986.

Eyde, L.D. "Evaluating Job Evaluation: Emerging Research Issues for Comparable Worth Analysis." Public Personnel Management, Vol. 12 (1983), pp. 425-444.

Fagerlind, I. Formal Education and Adult Earnings: A Longitudinal Study on the Economic Benefits of Education. Stockholm, Sweden: Almquist and Wiksell International, 1975.

Farley, L. Sexual Shakedown: The Sexual Harassment of Women on the Job. New York: Warner Books, 1980.

Feldberg, R.L. "Comparable Worth: Toward Theory and Practice in the United States." Signs: Journal of Women in Culture and Society, Vol. 10 (1984), pp. 311-328.

Feldberg, R.L. "Comparable Worth: The Relationship of Method and Politics," Ingredients for Women's Employment Policy. Albany: State University of New York Press, 1987.

Feldstein, H.R. "Sex-based Wage Discrimination Claims After County of Washington v. Gunther." Columbia Law Review, Vol. 81 (1981), pp. 1333-1347.

Ferber, M.A., and B.G. Burnbaum. "Labor Force Participation Patterns and Earnings of Women Clerical Workers." The Journal of Human Resources, Vol. 16 (1981), pp. 416-426.

Ferber, M.A., and W.W. McMahon. "Women's Expected Earnings and Their Investment in Higher Education." The Journal of Human Resources, Vol. 14 (1979), pp. 405-520.

Ferraro, G.A. "Bridging the Wage Gap: Pay Equity and Job Evaluations." American Psychologist, Vol. 39 (1984), pp. 1166-1170.

Ferris, G.R., and D.C. Gilmore. "A Methodological Note on Job Complexity Indexes." Journal of Applied Psychology, Vol. 70 (1985), pp. 225-227.

FES, Factor Evaluation System, Position Classification Standards, General Introduction, Background, and Instructions, Section VII, Instruction for the Factor Evaluation System. U.S. Civil Service Commission, Transmittal Sheet 27. Washington, D.C.: 1977.

Filer, R.K. "Sexual Differences in Earnings: The Role of Individual Personalities and Tastes." Human Resources, Vol. 18 (1983), pp. 82-99.

Final Report and Recommendations of the Task Force on State Compensation and Classification Equity to the 63rd Legislative Assembly. Task Force on State Compensation and Classification Equity, State of Oregon. Salem, OR: 1985.

Final Report: PAQ Gender/race Analyses for Arlington County, VA. Jeanneret and Associates, Inc. Houston, TX: 1986.

Findley, S. "Making Sense of Pay Equity: Issues for a Feminist Political Practice," Just Wages: A Feminist Assessment of Pay Equity. Toronto: University of Toronto Press, 1991.

Finkelstein, J.A., and C.H. Hatch. "Job Evaluation: New Technology, New Role for HR Managers." Personnel, Vol. 64 (1987), pp. 5-10.

Fisher, G.D. "Salary Surveys—An Antitrust Prospective." Personnel Administrator, (1985) pp. 87-97, 154.

Fitzpatrick, B. "An Objective Test of Job Evaluation Validity." Personnel, Vol. 28 (1949), pp. 128-131.

Flammang, J.A. "Effective Implementation: The Case of the Comparable Worth in San Jose." Policy Studies Review, Vol. 5 (1986), pp. 815-837.

Flammang, J.A. "Women Made a Difference: Comparable Worth in San Jose," The Women's Movements of the United States and Western Europe. Philadelphia: Temple University Press, 1987.

Fleishman, E.A. Rating Scale Booklet F-JAS: Fleishman Job Analysis Survey. Palo Alto, CA: Consulting Psychologists Press, 1992.

- Fleishman, E.A., and M.D. Mumford. "Evaluating Classifications of Job Behavior: A Construct Validation of the Ability Requirement Scales." Personnel Psychology, Vol. 41 (1991), pp. 523-575.
- Fleishman, E.A., and M.E. Reilly. Administrator's Guide: Fleishman Job Analysis Survey. Palo Alto, CA: Consulting Psychologists Press, 1992.
- Fleishman, E.A., and M.E. Reilly. Handbook of Human Abilities: Definitions, Measurements, and Job Task Requirements. Palo Alto, CA: Consulting Psychologist Press, 1992.
- Forgionne, G.A., and V.E. Peeters. "Differences in Job Motivation and Satisfaction Among Female and Male Managers." Human Relations, Vol. 35 (1982), pp. 101-118.
- Fottler, M.D., and T. Bain. "Managerial Aspirations of High School Seniors: A Comparison of Males and Females." Journal of Vocational Behavior, Vol. 16 (1980), pp. 83-95.
- Fox, M.F. "Sex, Salary, and Achievement: Reward Dualism in Academia." Sociology of Education, Vol. 54 (1981), pp. 71-84.
- Fox, M.F. "Sex Segregation and Salary Structure in Academics." Sociology of Work and Occupations, Vol. 8 (1981), pp. 36-60.
- Frank, M.S. "Position Classification: A State-of-the-Art Review and Analysis." Public Personnel Management Journal, Vol. 11 (1982), pp. 239-247.
- Frank, R.H. "Are Workers Paid Their Marginal Products?" The American Economic Review, Vol. 74 (1984), pp. 549-571.
- Fraser, S.L., S.F. Cronshaw, and R.A. Alexander. "Generalizability Analysis of a Point Method Job Evaluation Instrument: A Field Study." Journal of Applied Psychology, Vol. 69 (1984), pp. 643-647.
- Frasher, J.M., R.S. Frasher, and F.B. Wims. "Sex-role Stereotyping in School Superintendents' Personnel Decisions." Sex Roles, Vol. 8 (1982), pp. 261-268.
- Freed, M.G., and D.D. Polsby. "Comparable Worth in the Equal Pay Act." University of Chicago Law Review, Vol. 51 (1984), pp. 1078-1111.

Freedman, S.M. "The Effects of Subordinate Sex, Pay Equity, and Strength of Demand on Compensation Decisions." Sex Roles, Vol. 5 (1979), pp. 649-658.

Freeman, R.B. "Overinvestment in College Training?" The Journal of Human Behavior, Vol. 10 (1975), pp. 287-311.

Friedman, L., and R.J. Harvey. "Can Raters With Reduced Job Descriptive Information Provide Accurate Position Analysis Questionnaire (PAQ) Ratings?" Personnel Psychology, Vol. 39 (1986), pp. 779-796.

Frug, M.J. Women and the Law. Westbury, NY: The Foundation Press, 1992.

Fuchs, V.R. Women's Quest for Economic Equality. Cambridge, MA: Harvard University Press, 1988.

Fudge, J., and P. McDermott, eds. Just Wages: A Feminist Assessment of Pay Equity. Toronto: University of Toronto Press, 1991.

Fulghum, J.B. "The Employer's Liabilities Under Comparable Worth." Personnel Journal, Vol. 62 (1983), pp. 400-412.

Fulghum, J.B. "The Newest Balancing Act: A Comparable Worth Study." Personnel Journal, Vol. 63 (1984), pp. 32-38.

Gasaway, L.N. "Comparable Worth: A Post-Gunther Overview." Georgetown Law Journal, Vol. 69 (1981), pp. 1123-1169.

Gaskell, J. "What Counts as Skill? Reflections on Pay Equity," Just Wages: A Feminist Assessment of Pay Equity. Toronto: University of Toronto Press, 1991.

Gaskell, J.S. "Conceptions of Skill and the Work of Women: Some Historical and Political Issues." The Politics of Diversity: Feminism, Marxism and Nationalism. London: Verso, 1986.

Gerbner, G., et al., eds. The Analysis of Communication Content: Developments in Scientific Theories and Computer Techniques. Huntington, NY: Robert E. Krieger Publishing Company, 1978.

Gerhart, B. "Gender Differences in Current and Starting Salaries: The Role of Performance, College Major, and Job Title." Industrial and Labor Relations Review, Vol. 43 (1990), pp. 418-433.

Gerhart, B. and N.E. Cheikh. "Earnings and Percentage Female: A Longitudinal Study." Industrial Relations, Vol. 30 (1991), pp. 62-78.

Gerhart, B.A., and G.T. Milkovich. "Salaries, Salary Growth, Promotions of Men and Women in a Large, Private Firm," Pay Equity: Empirical Inquiries. Washington, D.C.: National Academy Press, 1989.

Gethman, B.R. "The Job Market, Sex Bias, and Comparable Worth." Public Personnel Management, Vol. 16 (1987), pp. 173-180.

Ghiselli, E.E., J.P. Campbell, and S. Zedeck. Measurement Theory for the Behavioral Sciences. San Francisco: W.H. Freeman and Company, 1981.

Gibson, J.W., and E.P. Prien. "Validation of Minimum Qualifications." Public Personnel Management, Vol. 6 (1977), pp. 447-451.

Giese, S.L., R.A. Alexander, and G.V. Barrett. "Comparison of Students and Professionals as Subjects in Job Evaluation Research." Presented at the 4th annual conference of the Society for Industrial and Organizational Psychology, Boston: 1989.

Giles, B.A., and G.V. Barrett. "Utility of Merit Increases." Journal of Applied Psychology, Vol. 55 (1971), pp. 103-109.

Gilligan, C. "In a Different Voice: Women's Conceptions of Self and Morality." Harvard Educational Review, Vol. 47 (1977), pp. 481-517.

Goals and Techniques for a Merit Pay System: Information for State and Local Government. U.S. Office of Personnel Management, Office of Intergovernmental Personnel Programs. Washington, D.C.: 1981.

Gold, M.V. A Dialogue on Comparable Worth. Ithaca, NY: ILR Press, 1983.

Goldin, C. Understanding the Gender Gap: An Economic History of American Women. New York: Oxford University Press, 1990.

Gollob, H.F. "Detecting Sex Bias in Salaries." American Psychologist, Vol. 39 (1984), pp. 448-451.

Gomberg, W. "A Trade Unionist Looks at Job Evaluation." Journal of Applied Psychology, Vol. 35 (1951), pp. 1-7.

Gomez-Megia, L.R., ed. Compensation and Benefits. Washington, D.C.: Bureau of National Affairs Books, 1989.

Gomez-Megia, L.R., R.C. Page, and W.W. Tornow. "A Comparison of the Practical Utility of Traditional, Statistical, and Hybrid Job Evaluation Approaches." Academy of Management Journal, Vol. 25 (1982), pp. 790-809.

Gordon, M.E., and W.J. Fitzgibbons. "Empirical Test of the Validity of Seniority as a Factor in Staffing Decisions." Journal of Applied Psychology, Vol. 67 (1982), pp. 311-319.

Government of Canada Position Information Questionnaire. Canadian Human Rights Commission, Equal Pay for Work of Equal Value Study Joint Union/management Initiative. Ottawa: 1987.

Graddick, M.M., and J.L. Farr. "Professionals in Scientific Disciplines: Sex-related Differences in Working Life Commitments." Journal of Applied Psychology, Vol. 68 (1983), pp. 641-645.

Graham, M., and A.C. Hyde. "Comparable Worth in the United States: Legal and Administrative Developments in the 1980s." International Journal of Public Administration, Vol. 14 (1991), pp. 799-821.

Graham-Moore, B., and T.L. Roos. Gainsharing: Plans for Improving Performance. Washington, D.C.: The Bureau of National Affairs, 1990.

Grams, R., and D.P. Schwab. "An Investigation of Systematic Gender-related Error in Job Evaluation." Academy of Management Journal, Vol. 28 (1985), pp. 279-290.

Grant, D.L. "An Analysis of a Point Rating Job Evaluation Plan." Journal of Applied Psychology, Vol. 35 (1951), pp. 236-240.

Gray, J.S. "Custom Made Systems of Job Evaluations." Journal of Applied Psychology, Vol. 34 (1950), pp. 378-380.

Gray, J.S. "Adjusting Base Weights in Job Evaluation." Journal of Applied Psychology, Vol. 35 (1951), pp. 8-10.

Gray, J.S., and M.C. Jones. "Ready Made Versus Custom Made Systems of Job Evaluation." Journal of Applied Psychology, Vol. 35 (1951), pp. 11-14.

Gray, M.W. "Legal Perspectives on Sex Equity in Faculty Employment." Journal of Social Issues, Vol. 41 (1985), pp. 121-134.

Gray, M.W., and W.L. Scott. "A 'Statistical' Remedy for Statistically Identified Discrimination." Academe, Vol. 66 (1980), pp. 174-181.

Green, S.B., and T. Stutzman. "An Evaluation of Methods to Select Respondents for Structured Job-analysis Questionnaires." Personnel Psychology, Vol. 39 (1986), pp. 543-564.

Greenberger, E., and L.D. Steinberg. "Sex Differences in Early Labor Force Experience: Harbinger of Things to Come." Social Forces, Vol. 62 (1983), pp. 467-486.

Greig, J.J., P.F. Orazem, and J.P. Mattila. "Measurement Error in Comparable Worth Pay Analysis: Causes, Consequences, and Corrections." Journal of Social Issues, Vol. 45 (1989), pp. 135-151.

Grider, D., and L.A. Toombs. "Disproving Valuation Discrimination: A Study of Evaluator Gender Bias." ACA Journal, Vol. 2 (1993), pp. 24-33.

Gronau, R. "Sex-related Wage Differentials and Women's Interrupted Labor Careers—The Chicken or the Egg." Journal of Labor Economics, Vol. 6 (1988), pp. 277-301.

Gross, A.L., J. Faggen, and K. McCarthy. "The Differential Predictability of the College Performance of Males and Females." Educational and Psychological Measurement, Vol. 34 (1974), pp. 363-365.

Grubb, W.N., and R.H. Wilson. "Sources of Increasing Inequality in Wages and Salaries, 1960-1980." Monthly Labor Review, Vol. 112 (1989), pp. 3-13.

Grune, J.A., ed. Manual on Pay Equity: Raising Wages for Women's Work. Washington, D.C.: Committee on Pay Equity, 1979.

Grune, J.A., and N. Reder. "Pay Equity: An Innovative Public Policy Approach to Eliminating Sex-based Wage Discrimination." Public Personnel Management Journal, Vol. 12 (1984), pp. 70-80.

Grune, J.A., and N. Reder. "Addendum—Pay Equity: An Innovative Public Policy Approach to Eliminating Sex-based Wage Discrimination." Public Personnel Management Journal, Vol. 13 (1984), pp. 70-80.

Grusky, O. "Career Mobility and Organizational Commitment." Administrative Science Quarterly, Vol. 10 (1966), pp. 488-502.

Guion, R.H. "A Parametric Study of Comparable Worth: Social Judgment Theory and Latent Trait Theory Applied to Job Evaluation." Abstract, 1981.

Gunderson, M. "Probit and Logit Estimates of Labor Force Participation." Industrial Relations, Vol. 19 (1980), pp. 216-220.

Gupta, N., and G.D. Jenkins, Jr. "Practical Problems in Using Job Evaluation Systems to Determine Compensation." Human Resource Management Review, Vol. 1 (1991), pp. 133-144.

Gutek, B.A., and L. Larwood. "Introduction: Women's Careers Are Important and Different," Women's Career Development. Newbury Park, CA: Sage, 1987.

Haberfeld, Y. "Employment Discrimination: An Organizational Model." Academy of Management Journal, Vol. 35 (1992), pp. 161-180.

Hahn, D.C., and R.L. Dipboye. "Effects of Training and Information on the Accuracy and Reliability of Job Evaluations." Journal of Applied Psychology, Vol. 73 (1988), pp. 146-153.

Haignere, L.V., C.A. Chertos, and R.J. Steinberg. Managerial Promotion in the Public Sector: The Importance of Eligibility Requirements on Women and Minorities. Albany, NY Center for Women in Government, State University of New York. Albany: 1981.

Hall, J.K., and P.E. Spector. "Relationships of Work Stress Measures for Employees with the Same Job." Work and Stress, Vol. 5 (1991), pp. 29-35.

Hall, R., and G.V. Barrett. "Payday for Patients: Federal Guidelines or a Job-sample Approach?" American Psychologist, Vol. 46 (1977), pp. 586-588.

Hallard, A.H., and H.G. Schultz. "A Factor Analysis of a Salary Job Evaluation Plan." Journal of Applied Psychology, Vol. 35 (1952), pp. 243-246.

Handbook for Analyzing Jobs. U.S. Department of Labor. Washington, D.C.: 1972.

Handbook of Occupational Groups and Series. U.S. Office of Personnel Management, Washington, D.C.: 1990.

Hansen, R.D., and V.E. O'Leary. "Sex-Determined Attributions," Women, Gender, and Social Psychology. Hillsdale, NJ: Lawrence Erlbaum Associates, 1985.

Harding, F.D., J.M. Madden, and K. Colson. "Analysis of a Job Evaluation System." Journal of Applied Psychology, Vol. 44 (1960), pp. 354-357.

Harding, S. The Science Question in Feminism. Ithica, NY: Cornell University Press, 1986.

Harrel, M.S., et al. "Predicting Compensation Among MBA Graduates Five and Ten Years After Graduation." Journal of Applied Psychology, Vol. 62 (1971), pp. 636-640.

Hartenian, L.S., and N.B. Johnson. "Establishing the Reliability and Validity of Wage Surveys." Public Personnel Management, Vol. 20 (1991), pp. 367-383.

Hartman, A. "Comparable Worth." Harvard Women's Law Journal, Vol. 6 (1983), pp. 201-218.

Hartmann, H.I. "Capitalism, Patriarchy, and Job Segregation by Sex," Women and the Workplace. Chicago: University of Chicago Press, 1976.

Hartmann, H.I. "The Family as the Locus of Gender, Class, and Political Struggle: The Example of Housework." Journal of Women in Culture and Society, Vol. 6 (1981), pp. 366-394.

Hartmann, H.I. "Comparable Worth and Women's Economic Independence," Ingredients for Women's Employment Policy. Albany: State University of New York Press, 1987.

Hartmann, H.I., ed. Comparable Worth: New Directions for Research. Washington, D.C.: National Academy Press, 1985.

Hartmann, H.I., ed. Computer Chips and Paper Clips: Technology and Women's Employment Case Studies and Policy Perspectives, Vol. II. Washington, D.C.: National Academy Press, 1986.

Hartmann, H.I. "Internal Labor Markets and Gender: A Case Study of Promotions," Gender in the Workplace. Washington, D.C.: The Brookings Institution, 1987.

Hartmann, H.I. "Capitalism, Patriarchy, and Job Segregation by Sex," Women, Class, and the Feminist Imagination: A Socialist-Feminist Reader. Philadelphia: Temple University Press, 1990.

Hartmann, H.I., R.E. Krant, and L.A. Tilly, eds. Computer Chips and Paper Clips: Technology and Women's Employment, Vol. I. Washington, D.C.: National Academy Press, 1986.

Hartmann, H.I., and D.M. Pearce. High Skill and Low Pay: The Economics of Child Care at Work. Institute for Women's Policy Research. Washington, D.C.: 1989.

Hartmann, H., and R. Spalter-Roth. Women in Telecommunications: An Acception to the Rule. Institute for Women's Policy Research. Washington, D.C.: 1989.

Hartog, J. "On the Multicapability Theory of Income Distribution." European Economic Review, Vol. 19 (1977), pp. 157-171.

Hartog, J. "Earnings and Capability Requirements." Review of Economics and Statistics, Vol. 62 (1980), pp. 230-240.

Harvey, R.J. "Job Analysis." Handbook of Industrial and Organizational Psychology, 2nd ed., Vol. II. Palo Alto, CA: Consulting Psychologists Press, Inc., 1991.

Harvey, R.J., et al. "Dimensionality of the Job Element Inventory, a Simplified Worker-oriented Job Analysis Questionnaire." Journal of Applied Psychology, Vol. 73 (1988), pp. 639-646.

Hay, E.N. "Planning for Fair Salaries and Wages." Personnel Journal, Vol. 18 (1939), pp. 141-150.

Bibliography

- Hay, E.N. "Job Evaluation—A Discussion." Personnel Journal, Vol. 28 (1949), pp. 262-266.
- Hay, E.N. "Techniques of Securing Agreement in Job Evaluation Committees." Personnel, Vol. 26 (1950), pp. 307-312.
- Hay, E.N. "The Application of Weber's Law to Job Evaluation Estimates." Journal of Applied Psychology, Vol. 34 (1950), pp. 102-104.
- Hay, E.N. "The Attitude of the American Federation of Labor on Job Evaluation." Personnel Journal, Vol. 26, pp. 163-169.
- Hay, E.N. "What Kind of Job Evaluation?—A Reply." Public Personnel Review, Vol. 14 (1953), pp. 123-127.
- Hay, E.N., and D. Purves. "The Profile Method of High-level Job Evaluation." Personnel, Vol. 28 (1951), pp. 162-170.
- Hay, E.N., and D. Purves. "A New Method of Job Evaluation: A Guide Chart-profile Method." Personnel, Vol. 31 (1954), pp. 72-80.
- Hayes, R. "Gender Nontraditional or Sex Atypical or Gender Dominant or ... Research: Are We Measuring the Same Thing?" Journal of Vocational Behavior, Vol. 29 (1986), pp. 79-88.
- Hazel, J.T. "Reliability of Job Ratings as a Function of Time Spent on Evaluation." The Journal of Industrial Psychology, Vol. 4 (1966), pp. 16-19.
- Hazel, J.T., J.M. Madden, and E.E. Christal. "Agreement Between Worker-supervisor Descriptions of the Worker's Job." Journal of Industrial Psychology, Vol. 9 (1964), pp. 71-79.
- Hegtvedt, K.A. "Fairness Conceptualizations and Comparable Worth." Journal of Social Issues, Vol. 45 (1989), pp. 81-97.
- Heilman, M.E. "High School Students Occupational Interest as a Function of Projected Sex Ratios in Male Dominated Occupations." Journal of Applied Psychology, Vol. 64 (1979), pp. 275-279.
- Henderson, R. Compensation Management, 5th ed. Englewood Cliffs, NJ: Prentice Hall, 1989.

Henderson, R.I., and K.L. Clarke. "Job Pay for Job Worth: Designing and Managing an Equitable Job Classification and Pay System." Research Monograph 86, College of Business Administration. Atlanta: Georgia State University Business Publishing Division, 1981.

Hennig, M., and A. Jardim. The Managerial Woman. New York: Simon and Schuster, 1977.

Hermkens, P., and P. Van Wijngaarden. "Job Evaluation and Justification Criteria for Income Differentials." Applied Psychology: An International Review, Vol. 36 (1987), pp. 109-117.

Hersch, J. "Male-female Differences in Hourly Wages: The Role of Human Capital, Working Conditions and Housework." Industrial and Labor Relations Review, Vol. 44 (1991), pp. 746-759.

Hewitt, B.M., and R.D. Goldman. "Occam's Razor Slices Through the Myth That College Women Overachieve." Journal of Educational Psychology, Vol. 67 (1975), pp. 325-330.

Hill, M.A., and M.R. Killingsworth, eds. Comparable Worth: Analysis and Evidence. Ithaca, NY: ILR Press, 1989.

Hitt, M.A., and S.H. Barr. "Managerial Selection Decision Models: The Examination of Configural Cue Processing." Journal of Applied Psychology, Vol. 74 (1989), pp. 53-61.

Hoffmann, C.C., and K.P. Hoffmann. "Does Comparable Worth Obscure the Real Issues?" Personnel Journal, Vol. 66 (1987), pp. 83-95.

Hoffmann, C., and S.S. Reed. "Sex Discrimination?—The XYZ Affair." The Public Interest, Vol. 62 (1981), pp. 21-39.

Hogan, J.C., et al. "Reliability and Validity of Methods for Evaluating Perceived Physical Effort." Journal of Applied Psychology, Vol. 65 (1980), pp. 672-679.

Hollenbeck, J.R., et al. "Sex Differences in Occupational Choice, Pay, and Worth: A Supply-side Approach to Understanding the Male-female Wage Gap." Personnel Psychology, Vol. 40 (1987), pp. 715-743.

Bibliography

Holsti, O.R. Content Analysis for the Social Sciences and Humanities. Reading, MA: Addison-Wesley Publishing Company, 1969.

Hornsby, J.S., P.G. Benson, and B.N. Smith. "An Investigation of Gender Bias in the Job Evaluation Process." Journal of Business and Psychology, Vol. 2 (1987), pp. 150-159.

Horrigan, J., and A. Harriman. "Comparable Worth: Public Sector Unions and Employers Provide a Model for Implementing Pay Equity." Labor Law Journal, Vol. 39 (1988), pp. 704-711.

How to Write Position Descriptions. U.S. Civil Service Commission. Washington D.C.: 1978.

Huber, V.L. "Comparison of Supervisor-incumbent and Female-male Multidimensional Job Evaluation Ratings." The Journal of Applied Psychology, Vol. 76 (1991), pp. 115-121.

Hunt, T. "Futurism and Futurists in Personnel." Public Personnel Management, Vol. 13 (1984), pp. 511-520.

Hunter, L. "A Method for Monitoring University Faculty Salary Policies for Sex Bias," Salary Equity: Detecting Sex Bias in Salaries Among College and University Professors. Lexington, MA: Lexington Books, 1979.

Huseman, R.C., J.D. Hatfield, and E.W. Miles. "Test for Individual Perceptions of Job Equity: Some Preliminary Findings." Perceptual and Motor Skills, Vol. 61 (1985), pp. 1055-1064.

Hutner, F.C. Equal Pay for Comparable Worth: The Working Woman's Issue of the Eighties. New York: Praeger, 1986.

Instructions for the Factor Evaluation System. U.S. Civil Service Commission. Washington, D.C.: 1977.

Interpretative Bulletin of Code of Federal Regulations, Equal Pay for Equal Work, Under the Fair Labor Standards Act, Title 29 Part 800. U.S. Department of Labor, Employment Standards Administration, Wage and Hour Division. Washington, D.C.: 1971.

Introductory Guide for Use With the Position Analysis Questionnaire. PAQ Services, Inc. Logan, UT: 1991.

Bibliography

- Ivancevich, J.M., and S.M. Smith. "Job Difficulty as Interpreted by Incumbents: A Study of Nurses and Engineers." Human Relations, Vol. 35 (1982), pp. 391-412.
- Jackson, L.A. "Relative Deprivation and the Gender Wage Gap." Journal of Social Issues, Vol. 45 (1989), pp. 117-133.
- Jackson, L.A., and S.V. Grabski. "Perceptions of Fair Pay and the Gender Wage Gap." Journal of Applied Social Psychology, Vol. 18 (1988), pp. 606-625.
- Jacobs, J.A. Revolving Doors: Sex Segregation and Women's Careers. Stanford, CA: Stanford University Press, 1989.
- Jacques, E. Time-span Handbook. London: Heinemann, 1971.
- Jacques, E. "Taking Time Seriously in Evaluating Jobs." Harvard Business Review, Vol. 57 (1979), pp. 124-132.
- Jagacinski, C.M., W.K. LeBold, and K.W. Linden. "The Relative Career Advancement of Men and Women Engineers in the United States." Work and Stress, Vol. 1 (1987), pp. 235-247.
- James, L.R. "Aggregation Bias in Estimates of Perceptual Agreement." Journal of Applied Psychology, Vol. 67 (1982), pp. 219-229.
- Jaussaud, D.P. "Can Job Evaluation Systems Help Determine the Comparable Worth of Male and Female Occupations?" Journal of Economic Issues, Vol. 18 (1984), pp. 473-482.
- Jeanneret, P.R. "Equitable Job Evaluation and Classification With the Position Analysis Questionnaire." Compensation Review, Vol. 12 (1980), pp. 32-47.
- Jeanneret, P.R. "Affidavit of Paul Richard Jeanneret." Houston, TX: 1983.
- Job Evaluation: A Practical Guide. British Institute of Management. Southampton: 1961.
- Job Evaluation Handbook. State of Iowa. Des Moines.

Job Evaluation. International Labour Organization. Geneva, Switzerland: 1986.

Johnson, N.B. and R.A. Ash. "Integrating the Labor Market With Job Evaluation: Clearing the Cobwebs." Presented at the 1st Annual Society for Industrial and Organizational Psychology Conference. Chicago: 1986.

Jones, M.B., C.A. Braddick, and P.M. Shafer. "Will Broadband Replace Traditional Salary Structures?" Journal of Compensation and Benefits, Vol. 7 (1991), pp. 30-35.

Kahn, A., R.E. Nelson, and W.P. Gaeddert. "Sex of Subject and Sex Composition of the Group as Determinants of Reward Allocations." Journal of Personality and Social Psychology, Vol. 38 (1980), pp. 737-750.

Kahn, A., et al. "Equity and Equality: Male and Female Means to a Just End." Basic and Applied Social Psychology, Vol. 1 (1980), pp. 173-197.

Kahn, A.S., and W.P. Gaeddert. "From Theories of Equity to Theories of Justice: The Liberating Consequences of Studying Women," Women, Gender, and Social Psychology. Hillsdale, NJ: Lawrence Erlbaum Associates, 1985.

Kalin, R., and D.C. Hodgins. "Sex Bias in Judgements of Occupational Suitability." Canadian Journal of Behavior Science, Vol. 16 (1984), pp. 311-325.

Kandel, T. What Women Earn. New York: The Linden Press/Simon and Schuster, 1981.

Kandel, W.L. "Current Developments in EEO: Pregnancy Discrimination in Context." Employee Relations Law Journal, Vol. 5 (1979), pp. 258-268.

Kanter, R.M. Men and Women of the Corporation. New York: Basic Books, 1977.

Kanter, R.M. "The Impact of Hierarchical Structures on the Work Behavior of Women and Men." Social Problems, Vol. 23 (1978), pp. 415-430.

Kanter, R.M. "From Status to Contribution: Some Organizational Implications of the Changing Basis for Pay." Personnel, Vol. 64 (1987), pp. 12-37.

-
- Katzell, M.E., and W.C. Byham, eds. Women in the Work Force: Confrontation With Change. New York: Behavioral Publication Inc., 1972.
- Kauggman, B.E., ed. How Labor Markets Work. Lexington, MA: Lexington Books, 1988.
- Kaye, D. "Statistical Evidence of Discrimination." Journal of the American Statistical Association, Vol. 77 (1982), pp. 773-792.
- Keith, P.M. "Sex, Occupation, Year of Graduation and Perceptions of Job Factors." Journal of Employment Counseling, Vol. 15 (1980), pp. 180-186.
- Kelley, H.H. "The Processes of Causal Attribution." American Psychologist, Vol. 28 (1973), pp. 107-128.
- Kelly, R.M., and J. Bayes, eds. Comparable Worth, Pay Equity, and Public Policy. New York: Greenwood Press, 1989.
- Kerr, C., and L.H. Fisher. "Effect of Environment and Administration on Job Evaluation." Harvard Business Review, Vol. 28 (1950), pp. 77-96.
- Kessler-Harris, A. "The Debate Over Equality for Women in the Work Place: Recognizing Differences," Women and Work 1: An Annual Review. Beverly Hills, CA: Sage Publications, Inc., 1985.
- Kessler-Harris, A. "The Just Price, the Free Market, and the Value of Women." Feminist Studies, Vol. 14 (1988), pp. 235-250.
- Kessler-Harris, A. A Women's Wage: Historical Meanings and Social Consequences. Lexington, KY: The University Press of Kentucky, 1990.
- Kiesler, S., and T. Finholt. "The Mystery of RSI." American Psychologist, Vol. 43 (1988), pp. 1004-1015.
- Kilberg, W.J. "The Earnings Gap and Comparable Worth." Employee Relations Law Journal, Vol. 102 (1985), pp. 579-583.
- Killingsworth, M.R. "Comparable Worth in the Job Market: Estimating Its Effects." Monthly Labor Review, Vol. 108 (1985), pp. 39-41.
- Killingsworth, M.R. The Economics of Comparable Worth. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research, 1990.

Knapp, L., and R.R. Knapp. "Clustered Occupational Interest Measurement Based on Sex-balanced Inventory Items." Journal of Educational Measurement, Vol. 19 (1982), pp. 75-81.

Knepper, J.K. Attitudes Towards Wage-setting in the Private Sector: A Case Study. The National Commission on Working Women. Washington, D.C.

Komarovsky, M. "Female Freshman View Their Future: Career Salience and Its Correlates." Sex Roles, Vol. 8 (1982), pp. 299-314.

Kovach, K.A. "Implicit Stereotyping in Personnel Decisions." Personnel Journal, Vol. 60 (1981), pp. 716-722.

Kozlowski, S.W.J., and J.K. Ford. "Rater Information Acquisition Processes: Tracing the Effects of Prior Knowledge, Performance Level, Search Constraint, and Memory Demand." Organizational Behavior and Human Decision Processes, Vol. 49 (1991), pp. 282-301.

Krefting, L.A., P.K. Berger, and M.J. Wallace. "The Contribution of Sex Distribution, Job Content, and Occupational Classification to Job Sextyping: Two Studies." Journal of Vocational Behavior, Vol. 13 (1978), pp. 181-191.

Kress, A.L. "Sound Wage Payment Policies," The AMA Handbook of Wage and Salary Administration: Tested Compensation Methods for Factory, Office, and Managerial Personnel. New York: American Management Association, 1950.

Krippendorff, K. Content Analysis: An Introduction to Its Methodology. Newbury Park, CA: Sage, 1980.

Kurtz, M., and E.C. Hocking. "Nurses v. Tree-trimmers." Public Personnel Management Journal, Vol. 12 (1983), pp. 369-381.

Lacey, N. "Legislation Against Sex Discrimination: Questions From a Feminist Perspective." Journal of Law and Society, Vol. 14 (1987), pp. 411-421.

Laking, J., and R. Roark. Retailing Job Analysis and Job Evaluation. New York: National Retail Merchants Association, 1975.

Bibliography

Langstroth, L. "Job Evaluation Discussion." Personnel Journal, Vol. 29 (1950), pp. 180-182.

Langwell, K.M. "Real Returns to Career Decisions: The Physicians Specialty and Location Choices." The Journal of Human Resources, Vol. 15 (1980), pp. 278-86.

Lanham, E. "Job Evaluation in Municipalities." Public Personnel Review, Vol. 14 (1953), pp. 26-30.

Lanham, E. "Policies and Practices in Job Evaluation: A Survey." Personnel, Vol. 29 (1953), pp. 492-498.

Lanham, E. Job Evaluation. New York: McGraw-Hill Book Co, 1955.

Larwood, L., and U.E. Gattiker. "A Comparison of the Career Paths Used by Successful Women and Men," Women's Career Development. Newbury Park, CA: Sage, 1987.

Larwood, L., A.H. Stromberg, and B.A. Gutek, eds. Women and Work 1: An Annual Review. Beverly Hills, CA: Sage Publications, Inc., 1985.

Lawler, E.E., III. Pay and Organizational Effectiveness: A Psychological View. New York: McGraw-Hill, 1971.

Lawler, E.E., III. Pay and Organization Development. Reading, MA: Addison-Wesley Publishing Company, 1981.

Lawler, E.E., III. "What's Wrong With Point-factor Job Evaluation." Personnel, Vol. 64 (1987), pp. 38-44.

Lawler, E.E., III. Strategic Pay: Aligning Organizational Strategies and Pay Systems. San Francisco: Jossey-Bass, 1990.

Lawler, E.E., III, and J.R. Hackman. "Impact of Employee Participation in the Development of Pay Incentive Plans." Journal of Applied Psychology, Vol. 53 (1969), pp. 467-471.

Lawshe, C.H. "Studies in Job Evaluation: The Adequacy of Abbreviated Point Ratings for Hourly-paid Jobs in Three Industrial Plants." Journal of Applied Psychology, Vol. 29 (1945), pp. 177-184.

Lawshe, C.H. "Toward Simplified Job Evaluation." Personnel, Vol. 22 (1945), pp. 153-160.

Lawshe, C.H. "The Reliability of Two Job Evaluation Systems." American Psychologist, Vol. 2 (1947), pp. 339.

Lawshe, C.H., and S.L. Alessi. "Studies in Job Evaluation: Analysis of Another Point Rating Scale for Hourly-paid Jobs and the Adequacy of an Abbreviated Scale." Journal of Applied Psychology, Vol. 30 (1946), pp. 310-319.

Lawshe, C.H., and P.C. Fabro. "Studies in Job Evaluation: The Reliability of an Abbreviated Job Evaluation System." Journal of Applied Psychology, Vol. 43 (1949), pp. 158-166.

Lawshe, C.H., and A.A. Maleski. "Studies in Job Evaluation: An Analysis of Point Ratings for Salary Paid Jobs in an Industrial Plant." Journal of Applied Psychology, Vol. 30 (1946), pp. 117-128.

Lawshe, C.H., and E.J. McCormick. "What Do You Buy With the Wage or Salary Dollar?" Personnel, Vol. 24 (1947), pp. 102-106.

Lawshe, C.H., and G.A. Satter. "Studies in Job Evaluation: Factor Analyses of Point Ratings for Hourly-paid Jobs in Three Industrial plants." Journal of Applied Psychology, Vol. 28 (1944), pp. 189-198.

Lawshe, C.H., and R.F. Wilson "Studies in Job Evaluation: An Analysis of the Factor Comparison Systems as It Functions in a Paper Mill." Journal of Applied Psychology, Vol. 30 (1946), pp. 426-434.

Lawshe, C.H., and R. Wilson. "Studies in Job Evaluation: The Reliability of Two Point Rating Systems." Journal of Applied Psychology, Vol. 31 (1947), pp. 355-365.

Lee, B.A., D.W. Leslie, and S.G. Olswang. "Implications of Comparable Worth for Academe." Journal of Higher Education, Vol. 58 (1987), pp. 609-628.

Lee, Y.S. "Shaping Judicial Response to Gender Discrimination in Employment Compensation." Public Administration Review, Vol. 49 (1989), pp. 420-430.

Bibliography

Leonard, J.S. "Executive Pay and Firm Performance," Do Compensation Policies Matter? Ithaca, NY: ILR Press, 1990.

Lester, R.A. Reasoning About Discrimination: The Analysis of Professional and Executive Work in Federal Antidiscrimination Programs. Princeton, NJ: Princeton University Press, 1980.

Leuptow, L.B. "Sex-typing and Change in the Occupational Choices of High School Seniors: 1964-1975." Sociology of Education, Vol. 54 (1981), pp. 16-24.

Levin, M. "Comparable Worth: The Feminist Road to Socialism." Commentary, (1983), pp. 13-19.

Levine, E.L., M. Bennett, and R.A. Ash. "Evaluation and Use of Four Job Analysis Methods for Personnel Selection." Public Personnel Management, Vol. 8 (1979), pp. 146-151.

Lewis, C.T. "Assessing the Validity of Job Evaluation." Public Personnel Management, Vol. 18 (1989), pp. 45-63.

Lewis, C.T., and C.K. Stevens. "An Analysis of Job Evaluation Committee and Job Holder Gender Effects on Job Evaluation." Public Personnel Management, Vol. 19 (1990), pp. 271-278.

Lewis, G. "Sexual Segregation of Occupations and Earnings Differential in Federal Employment." Public Administration Quarterly, Vol. 9 (1985), pp. 274-290.

Lewis, G.B. "Clerical Work and Women's Earnings in the Federal Civil Service," Comparable Worth, Pay Equity, and Public Policy. New York: Greenwood Press, 1988.

Lindsay, C.M., and M.T. Maloney. "A Model and Some Evidence Concerning the Influence of Discrimination on Wages." Economic Inquiry, Vol. 26 (1988), pp. 645-660.

Linn, R.L. "Fair Test Use in Selection." Review of Educational Research, Vol. 43 (1973), pp. 139-161.

Livernash, E.R., ed. Comparable Worth: Issues and Alternatives. Equal Employment Advisory Council. Washington, D.C.: 1980.

Livernash, E.R., ed. Comparable Worth: Issues and Alternatives, 2nd ed. rev. Equal Employment Advisory Council. Washington, D.C.: 1984.

Livy, B. Job Evaluation: A Critical Review. New York: John Wiley and Sons, 1975.

Lloyd, C.B., and B.T. Niemi. The Economics of Sex Differentials. New York: Columbia University Press, 1979.

Lo Bosco, M. "Job Analysis, Job Evaluation, and Job Classification." Personnel, Vol. 62 (1985), pp. 70-74.

Locke, N. "Few Factors or Many?—An Analysis of a Point System of Classification." Personnel, Vol. 25 (1949), pp. 442-448.

Loeb, J.W., M.A. Ferber, and H.M. Lowry. "The Effectiveness of Affirmative Action for Women." Journal of Higher Education, Vol. 49 (1978), pp. 218-230.

London, M. "Employee Perceptions of the Job Reclassification Process." Personnel Psychology, Vol. 29 (1976), pp. 67-77.

Long, J.V. "The Idiosyncratic Determiners of Salary Differences," Salary Equity: Detecting Sex Bias in Salaries Among College and University Professors. Lexington, MA: Lexington Books, 1979.

Lorber, L.Z., et al. Sex and Salary: A Legal and Personnel Analysis of Comparable Worth. The American Society for Personnel Administration. Alexandria, VA: 1985.

Lott, M.R. Wage Scales and Job Evaluation: Scientific Determination of Wage Rates on the Basis of Services Rendered. New York: Ronald Press, 1926.

Lowe, R.H., and M.A. Wittig. "Comparable Worth: Individual, Interpersonal, and Structural Considerations." Journal of Social Issues, Vol. 45 (1989), pp. 223-246.

Lumpton, T., ed. Payment Systems: Selected Reading. Baltimore, MD: Penguin Books, 1972.

Lunneborg, P.W. "Service vs. Technical Interest—Biggest Sex Difference of All?" Vocational Guidance Quarterly, Vol. 28 (1979), pp. 146-153.

Lutes, D., and N. Rothchild. "Compensation: Pay Equity Loses to Chicken Little and Other Excuses." Personnel Journal, Vol. 65 (1986), pp. 124-130.

Lutz, L.D. "What Kind of Job Evaluation?" Public Personnel Review, Vol. 14 (1953), pp. 119-122.

Lynn, N.B., and R.E. Vaden. "Toward a Non-sexist Personnel Opportunity Structure: The Federal Executive Bureaucracy." Public Personnel Management, Vol. 8 (1979), pp. 209-215.

Lytle, C.W. Job Evaluation Methods. New York: The Ronald Press, 1946.

Maccoby, E.E. and C.N. Jacklin. The Psychology of Sex Differences. Stanford, CA: Stanford University Press, 1974.

MacDonald, N.E., and J.S. Hyde. "Fear of Success, Need Achievement, and Fear of Failure: A Factor Analytic Study." Sex Roles, Vol. 6 (1980), pp. 695-711.

Madden, J.M. The Methods and Foundations of Job Evaluation in the United States Air Force. Lackland Air Force Base, Personnel Laboratory, Aeronautical System Division, Air Force System Command, Technical Report ASD-TR-61-100. 1961.

Madden, J.M. "The Effect of Varying the Degree of Rater Familiarity in Job Evaluation." Personnel Administration, Vol. 25 (1962), pp. 42-46.

Madden, J.M. "A Further Note on the Familiarity Effect in Job Evaluation." Personnel Administration, Vol. 26 (1963), pp. 52-53.

Madden, J.M. "Policy-capturing Model for Analyzing Individual and Group Judgement in Job Evaluation." Journal of Industrial Psychology, Vol. 2 (1964), pp. 36-42.

Madden, J.M., and R.D. Bourdon. "Effects of Variations in Rating Scale Formats on Judgment." Journal of Applied Psychology, Vol. 48 (1964), pp. 147-151.

Madigan, R.M. "Comparable Worth Judgments: A Measurement Properties Analysis." Journal of Applied Psychology, Vol. 70 (1985), pp. 137-147.

Madigan, R.M., and F.S. Hills. "Job Evaluation and Pay Equity." Public Personnel Management, Vol. 17 (1988), pp. 323-330.

Madigan, R.M., and D.J. Hoover. "Effects of Alternative Job Evaluation Methods on Decisions Involving Pay Equity." Academy of Management Journal, Vol. 29 (1986), pp. 84-100.

Maggio, R. The Dictionary of Bias-free Usage: A Guide to Nondiscriminatory Language. Phoenix: Oryx Press, 1991.

Mahoney, T.A., ed. Compensation and Reward Perspectives. Homewood, IL: Richard D. Irwin, Inc., 1979.

Mahoney, T.A. "Organizational Hierarchy and Position Worth." Academy of Management Journal, Vol. 22 (1979), pp. 726-737.

Mahoney, T.A. "Approaches to the Definition of Comparable Worth." Academy of Management Review, Vol. 8 (1983), pp. 14-22.

Mahoney, T.A. "Understanding Comparable Worth: A Societal and Political Perspective." Research in Organizational Behavior, Vol. 9 (1987), pp. 209-245.

Mahoney, T.A. "The Symbolic Meaning of Pay Contingencies." Human Resource Management Review, Vol. 1 (1991), pp. 179-192.

Mahoney, T.A., and R.H. Blake. "Judgements of Appropriate Occupational Pay as Influenced by Occupational Characteristics and Sex Characterizations." Applied Psychology An International Review, Vol. 36 (1987), pp. 25-38.

Mahoney, T.A., B. Rosen, and S.L. Rynes. "Where Do Compensation Specialists Stand on Comparable Worth?" Compensation Review, Vol. 16 (1984), pp. 27-40.

Majeres, R.L. "Sex Differences in Symbol-digit Substitution and Speeded Matching." Intelligence, Vol. 7 (1983), pp. 313-327.

Major, B. "Gender Differences in Comparisons and Entitlement: Implications for Comparable Worth." Journal of Social Issues, Vol. 45 (1989), pp. 99-115.

Major, B., and B. Forcey. "Social Comparisons and Pay Evaluations: Preferences for Same-sex and Same-job Wage Comparisons." Journal of Experimental Social Psychology, Vol. 21 (1985), pp. 393-405.

Major, B., and E. Konar. "An Investigation of Sex Differences in Pay Expectations and Their Possible Causes." Academy of Management Journal, Vol. 27 (1984), pp. 777-792.

Makela, C.J. "From Equality to Equity: The Path to Comparable Worth." Educational Record, Vol. 66 (1985), pp. 14-18.

Manese, W.R. Occupational Job Evaluation: A Research-based Approach to Job Classification. New York: Quorum Books, 1988.

Mangum, S.L. "Comparable Worth and Pay Setting in the Public and Private Sectors." Journal of Collective Negotiations, Vol. 17 (1988), pp. 1-12.

Marini, M.M., and M.C. Brinton. "Sex Typing in Occupational Socialization," Sex Segregation in the Workplace: Trends, Explanations, Remedies. Washington, D.C.: National Academy Press, 1984.

Martin, J., et al. "Now That I Can Have It, I'm Not So Sure I Want It," Women's Career Development. Newbury Park, CA: Sage, 1987.

Martin, M.P., and J.D. Williams. "Effects of Statewide Salary Equity Provisions on Institutional Salary Policies: A Regression Analysis," Salary Equity: Detecting Sex Bias in Salaries Among College and University Professors. Lexington, MA: Lexington Books, 1979.

Mathews, J.J., W.E. Collins, and B.B. Cobb. "A Sex Comparison of Reasons for Attrition in Male-dominated Occupations." Personnel Psychology, Vol. 27 (1974), pp. 535-541.

Matlin, M.W. The Psychology of Women. New York: Holt, Reinhart, and Winston, 1987.

Matthews, M.D. "Comparison of Supervisors and Incumbents, Estimates of the Worth of Workers to their Organizations: A Brief Report." Perceptual and Motor Skills, Vol. 73 (1991), pp. 569-570.

Matzer, J., Jr., ed. Pay and Benefits: New Ideas for Local Government. International City Management Association. Washington, D.C.: 1988.

McArthur, L.Z. "Social Judgment Biases in Comparable Worth Analysis," Comparable Worth. Washington, D.C.: National Academy Press, 1985.

McArthur, L.Z., and S.W. Obrant. "Sex Biases in Comparable Worth Analyses." Journal of Applied Social Psychology, Vol. 16 (1986), pp. 757-770.

McConomy, S., and B. Ganschinietz. "Trends in Job Evaluation Practices of State Personnel Systems: 1981 Survey Findings." Public Personnel Management Journal, Vol. 12 (1981), pp. 1-12.

McCormick, E.J. "Job and Task Analysis," Handbook of Industrial/organizational Psychology, 1st ed. Chicago: Rand McNally College Publishing Company, 1976.

McCormick, E.J. Job Analyses: Methods and Applications. New York: Amacom, 1978.

McCormick, E.J., P.R. Jeanneret, and R.C. Mecham. Position Analysis Questionnaire. Purdue Research Foundation, Contract No. 4497 Form B, 8-79. West Lafayette, IN: 1969.

McCormick, E.J., P.R. Jeanneret, and R.C. Mecham. "A Study of Job Characteristics and Job Dimensions as Based on the Position Analysis Questionnaire (PAQ)." Journal of Applied Psychology Monograph, Vol. 56 (1972), pp. 347-368.

McDonough, P., R. Snider, and J.P. Kaufman. "Male-female and White-minority Pay Differentials in a Research Organization," Discrimination in Organizations: Using Social Indicators to Manage Social Change. San Francisco: Jossey-Bass, 1979.

McDowell, D.S. "An Analysis of the National Academy of Sciences Comparable Worth Study," Comparable Worth: Issues and Alternatives, 2nd ed. Washington, D.C.: Equal Employment Advisory Council, 1984.

McElrath, K. "Gender, Career Disruption, and Academic Rewards." Journal of Higher Education, Vol. 63 (1992), pp. 269-281.

McLaughlin, S.D. "Occupational Sex Identification and the Assessment of Male and Female Earnings in Equality." American Sociological Review, Vol. 43 (1978), pp. 909-921.

McMahon, W.W., and A.B. Wagner. "Expected Returns to Investment in Higher Education." The Journal of Human Resources, Vol. 16 (1981), pp. 274-285.

McNulty, D.J. "Differences in Pay Between Men and Women Workers." Monthly Labor Review, Vol. 90 (1967), pp. 40-43.

McShane, S.L. "Two Tests of Direct Gender Bias in Job Evaluation Ratings." Journal of Occupational Psychology, Vol. 63 (1990), pp. 129-140.

Medoff, J.L., and K.G. Abraham. "Experience, Performance, and Earnings." The Quarterly Journal of Economics, Vol. 95 (1980), pp. 703-736.

Medoff, J.L., and K.G. Abraham. "Are Those Paid More Really More Productive? The Case of Experience." The Journal of Human Resources, Vol. 16 (1981), pp. 186-216.

Meeker, S.E. "Equal Pay, Comparable Work, and Job Evaluation." The Yale Law Journal, Vol. 90 (1981), pp. 657-680.

Mellon, P.M., N. Schmitt, and C. Bylenga. "Differential Predictability of Females and Males." Sex Roles, Vol. 6 (1980), pp. 173-177.

Meng, G.J. "All the Parts of Comparable Worth." Personnel Journal, Vol. 69 (1990), pp. 99-104.

Messmer, D.J., and R.J. Solomon. "Differential Predictability in a Selection Model for Graduate Students: Implications for Validity Testing." Educational and Psychological Measurement, Vol. 39 (1979), pp. 859-866.

Meyer, H.H. "Comparison of Foreman and General Foreman Conceptions of the Foreman's Job Responsibilities." Personnel Psychology, Vol. 12 (1959), pp. 445-452.

Bibliography

Miceli, M.P. "Review of 'Comparable Worth: The Myth and the Movement.'" Personnel Psychology, Vol. 38 (1985), pp. 474-478.

Michael, R.T., and H.I. Hartmann. "Pay Equity: Assessing the Issues," Pay Equity: Empirical Inquiries. Washington, D.C.: National Academy Press, 1989.

Miles, M.C. "Studies in Job Evaluation: Validity of a Check List for Evaluating Office Jobs." Journal of Applied Psychology, Vol. 36 (1952), pp. 97-101.

Milkman, R. Gender at Work: The Dynamics of the Job Segregation by Sex During World War II. Urbana, IL: University of Illinois Press, 1987.

Milkovich, G.T. "The Emerging Debate," Comparable Worth: Issues and Alternatives, 2nd ed. Washington, D.C.: Equal Employment Advisory Council, 1984.

Milkovich, G.T., and J.M. Newman. Compensation, 4th ed. Homewood, IL: Irwin, 1993.

Milkovich, G.T., and A.K. Wigdor, eds. Pay for Performance: Evaluating Performance Appraisal and Merit Pay. Washington, D.C.: National Academy Press, 1991.

Millborn, S.L. A Secretary and a Cook: Challenging Women's Wages in the Courts of the United States and Great Britain. New York: ILR Press, 1989.

Miller, A.R., et al., eds. Work, Jobs, and Occupations: A Critical Review of the Dictionary of Occupational Titles. Washington, D.C.: National Academy Press, 1980.

Miller, M.M. Pay Equity in Ohio's State Agencies: A Preliminary Report. Ohio's Bureau of Employment Services, Women's Division. Columbus, OH: 1984.

Mincer, J. "The Distribution of Labor Incomes: A Survey With Special Reference to the Human Capital Approach." Journal of Economic Literature, Vol. 8 (1970), pp. 1-26.

Mincer, J., and S. Polachek. "Family Investments in Human Capital: Earnings of Women." Journal of Political Economy, Vol. 82 (1974), pp. S72-S108.

Miner, M.G. Job Evaluation Policies and Procedures. Bureau of National Affairs. Washington, D.C.: 1976.

Modernizing Federal Classification: An Opportunity for Excellence. National Academy of Public Administration. Washington, D.C.: 1991.

Montgomery, E., and W. Wascher. "Race and Gender Wage Inequality in Services and Manufacturing." Industrial Relations, Vol. 26 (1987), pp. 284-290.

Moore, W.J., D.K. Pearce, and R.M. Wilson. "The Regulation of Occupations and the Earnings of Women." The Journal of Human Resources, Vol. 16 (1981), pp. 366-383.

Moore, W.J. and J. Raisian. "Government Wage Differentials Revisited." Journal of Labor Research, Vol. 12 (1991), 13-33.

Moore, L.M., and A.U. Rickel. "Characteristics of Women in Traditional and Non-traditional Managerial Roles." Personnel Psychology, Vol. 33 (1980), pp. 317-333.

Moroney, J.R., ed. Income Inequality: Trends and International Comparisons. Lexington, MA: Lexington Books, 1979.

Morse, P.K. "Detection of Sex-related Salary Discrimination: A Demonstration Using Constructed Data," Salary Equity: Detecting Sex Bias in Salaries Among College and University Professors. Lexington, MA: Lexington Books, 1979.

Motowidlo, S.J. "Relationship Between Self-rated Performance and Pay Satisfaction Among Sales Representatives." Journal of Applied Psychology, Vol. 67 (1982), pp. 209-213.

Mount, M.K., and R.A. Ellis. "Investigation of Bias in Job Evaluation Ratings of Comparable Worth Study Participants." Personnel Psychology, Vol. 40 (1987), pp. 85-96.

- Mount, M.K., and R.A. Ellis. "Sources of Bias in Job Evaluation: A Review and Critique of Research." Journal of Social Issues, Vol. 45 (1989), pp. 153-167.
- Moyer, K.L. Sex Differences in Vocational Aspirations and Expectations of Pennsylvania 11th Grade Students. Pennsylvania Department of Education, 1978.
- Muffo, J.A., L. Braskamp, and I.W. Langston, IV. "Equal Pay for Equal Qualifications? A Model for Determining Race or Sex Discrimination in Salaries," Salary Equity: Detecting Sex Bias in Salaries Among College and University Professors. Lexington, MA: Lexington Books, 1979.
- Mulcahy, R.W., and J.E. Anderson. "The Bargaining Battleground Called Comparable Worth." Public Personnel Management, Vol. 15 (1986), pp. 233-247.
- Mullins, W.C., and W.W. Kimbrough. "Group Composition as a Determinant of Job Analysis Outcomes." Journal of Applied Psychology, Vol. 73 (1988), pp. 657-664.
- Mumford, M.D., et al. "Measuring Occupational Difficulty: A Construct Validation Against Training Criteria." Journal of Applied Psychology, Vol. 72 (1987), pp. 578-587.
- Murphy, K.R. "Difficulties in a Statistical Control of Halo." Journal of Applied Psychology, Vol. 67 (1982), pp. 161-164.
- Muson, H. "Hard-hat Women." Across the Board, Vol. 18 (1981), pp. 12-18.
- Myers, J.H. "An Experimental Investigation of "Point" Job Evaluation." Journal of Applied Psychology, Vol. 42 (1958), pp. 357-361.
- Myers, J.H. "Removing Halo from Job Evaluation Factor Structure." Journal of Applied Psychology, Vol. 49 (1965), pp. 217-221.
- Nash, A.N., and S.J. Carroll. The Management of Compensation. Monterey, CA: Brooks/Cole Publishing Company, 1975.
- National Survey of Professional, Administrative, Technical, and Clerical Pay. U.S. Department of Labor, Bulletin 2271. Washington, D.C.: 1986.

Naughton, T.J. "Effect of Female-linked Job Titles on Job Evaluation Ratings." Journal of Management, Vol. 14 (1988), pp. 567-578.

Neigenfind, J.L. "Position Accuracy Certification." Public Personnel Management Journal, Vol. 11 (1982), pp. 213-218.

Nelson, B.A., E.M. Opton, and T.E. Wilson. "Wage Discrimination and the "Comparable Worth" Theory in Perspective." University of Michigan Journal of Law Reform, Vol. 13 (1980), pp. 1-301.

Newman, W. "Pay Equity Emerges as a Top Labor Issue in the 1980s." Monthly Labor Review, Vol. 105 (1982), pp. 49-51.

Newman, W. "Statement to the Equal Pay Joint Committee." Public Personnel Management Journal, Vol. 12 (1983), pp. 382-389.

Niemi, A.W. "Discrimination Against Women Reconsidered." American Journal of Economics and Sociology, Vol. 38 (1979), pp. 291-292.

Nieva, V.F., and B.A. Gutek. "Sex Effects on Evaluation." Academy of Management Review, Vol. 5 (1980), pp. 267-276.

Note. "Equal Pay, Comparable Work, and Job Evaluation." The Yale Law Journal, Vol. 90 (1981), pp. 657-680.

Odel, D. "A Failed Experiment." The National Law Journal, Vol. 14 (1991), pp. 13-14.

Oldham, G.R., and H.E. Miller. "The Effect of Significant Others Job Complexity on Employee Reactions to Work." Human Relations, Vol. 32 (1979), pp. 247-260.

Olmstead, A.L., and S.M. Sheffrin. "The Medical School Admission Process: An Empirical Investigation." The Journal of Human Resources, Vol. 16 (1981), pp. 459-467.

Olney, P.B., Jr. "Meeting the Challenge of Comparable Worth: Part 1." Compensation and Benefits Review, Vol. 19 (1987), pp. 34-44.

Olson, C.A. "An Analysis of Wage Differentials Received by Workers on Dangerous Jobs." Journal of Human Resources, Vol. 16 (1981), pp. 167-185.

O'Neill, J. "Role Differentiation and the Gender Gap in Wage Rates," Women and Work 1: An Annual Review. Beverly Hills, CA: Sage Publications, Inc., 1985.

O'Neill, J., M. Brien, and J. Cunningham. "Effects of Comparable Worth Policy: Evidence from Washington State." American Economic Review, Vol. 79 (1989), pp. 305-309.

Oppenheimer, V. "The Sex Labeling of Jobs." Industrial Relations, Vol. 7 (1968), pp. 219-234.

Orazem, P.F., and J.P. Mattila. Comparable Worth and the Structure of Earnings: The Iowa Case. Iowa State University, 1987.

Orazem, P.F., J.P. Mattila, and C.Y. Ruoh. "An Index Number Approach to the Measurement of Wage Differentials by Sex." Journal of Human Resources, Vol. 25 (1990), pp. 125-136.

Orazem, P.F., J.P. Mattila, and S.K. Weikum. "Comparable Worth Plans and Factor Point Pay Analysis in State Government." Industrial Relations, Vol. 31 (1992), pp. 195-215.

O'Reilly, A.P. "Skill Requirements: Supervisor-subordinate Conflict." Personnel Psychology, Vol. 26 (1973), pp. 75-80.

Otis, J.L., and R.H. Leukart. Job Evaluation: A Basis for Sound Wage Administration. Englewood Cliffs, NJ: Prentice Hall, 1954.

Ott, M.D. "Retention of Men and Women Engineering Students." Research in Higher Education, Vol. 9 (1978), pp. 137-150.

Over, R. "Research Impact of Men and Women Social Psychologists." Personality and Social Psychology Bulletin, Vol. 7 (1981), pp. 596-599.

Paglin, M., and A.M. Rufolo. "Heterogeneous Human Capital, Occupational Choice, and Male-female Earnings Differences." Journal of Labor Economics, Vol. 8 (1990), pp. 123-144.

Paisner, A.M. "BLS Regional Offices: Contribution to Wage Programs." Monthly Labor Review, Vol. 115 (1992), pp. 30-34.

Palmer, P., and R.M. Spalter-Roth. Gender Practices and Employment: The Sears Case and the Issue of "Choice". Institute of Women's Policy Research. Washington, D.C.

Paterson, T.T. Job Evaluation Volume 1—A New Method. London: Business Books Unlimited, 1972.

Paterson, T.T. Job Evaluation Volume 2—A Manual for the Paterson Method. London: Business Books Unlimited, 1972.

Paterson, T.T., and T.M. Husband. "Decision-making Responsibility: Yardstick for Job Evaluation." Compensation Review, Vol. 2 (1970), pp. 21-31.

Patten, T.H. Fair Pay: The Managerial Challenge of Comparable Job Worth and Job Evaluation. San Francisco: Jossey-Bass, 1988.

Patton, J.A., C.L. Littlefield, and S.A. Self. Job Evaluation: Text and Cases, 3rd ed. Homewood, IL: Richard D. Irwin, 1964.

Paul, E.F. Equity and Gender: The Comparable Worth Debate. New Brunswick, NJ: Transaction Publishers, 1989.

Pay Equity in Ohio's State Agencies. State of Ohio, Ohio's Bureau of Employment Services, Women's Division. Columbus, OH: 1986.

Pay Equity: The Minnesota Experience. Commission on the Economic State of Women, 1989.

Penner, M. "How Job-based Classification Systems Promote Organizational Ineffectiveness." Public Personnel Management, Vol. 12 (1983), pp. 268-276.

Perrin, S.M. Comparable Worth and Public Policy: The Case of Pennsylvania. Philadelphia: Industrial Research Unit, The Wharton School, University of Pennsylvania, 1985.

Perrucci, C.C., and D.B. Targ. "Early Work Orientation and Later Situational Factors as Elements of Work Commitment Among Married Women College Graduates." The Sociological Quarterly, Vol. 19 (1978), pp. 266-280.

Personnel Research Bibliography on Job Evaluation. U.S. Office of Personnel Management. Washington, D.C.: 1990.

Perspectives on Working Women: A Data Book. U.S. Department of Labor, Bureau of Labor Statistics, Bulletin 2080. Washington, D.C.: 1980.

Peters, L.H., et al. "Sex Bias and Managerial Evaluations: A Replication and Extension." Journal of Applied Psychology, Vol. 69 (1984), pp. 349-352.

Peterson, J. "The Challenge of Comparable Worth: An Institutional View." Journal of Economic Issues, Vol. 24 (1990), pp. 605-612.

Pezzullo, T.R., and B.E. Brittingham, ed. Salary Equity: Detecting Sex Bias in Salaries Among College and University Professors. Lexington, MA: Lexington Books, 1979.

Pezzullo, T.R., and B.E. Brittingham. "The Assessment of Salary Equity: A Methodology, Alternatives, and a Dilemma," Salary Equity: Detecting Sex Bias in Salaries Among College and University Professors. Lexington, MA: Lexington Books, 1979.

Pfeffer, J., and J. Ross. "Union-nonunion Effects on Wage and Status Attainment." Industrial Relations, Vol. 19 (1980), pp. 140-151.

Pfeffer, J., and J. Ross. "The Effects of Marriage and a Working Wife on Occupational and Wage Attainment." Administrative Science Quarterly, Vol. 27 (1982), pp. 66-80.

Pfeffer, J., and J. Ross. "Gender-based Wage Differences: The Effects of Organizational Context." Work and Occupations, Vol. 17 (1990), pp. 55-78.

Phillips, A., and B. Taylor. "Sex and Skill: Notes Towards a Feminist Economics." Feminist Review, Vol. 6 (1980), pp. 79-88.

Phillips, M.D., and R.L. Pepper. "Shipboard Fire-fighting Performance of Females and Males." Human Factors, Vol. 24 (1982), pp. 277-283.

Piliavin, J.A., and R.K. Unger. "The Helpful but Helpless Female: Myth or Reality," Women, Gender, and Social Psychology. Hillsdale, NJ: Lawrence Erlbaum Associates, 1985.

Bibliography

Polachek, S.W. "Potential Biases in Measuring Male-female Discrimination." Journal of Human Resources, Vol. 10 (1975), pp. 205-229.
Polachek, S.W. "Sex Differences in College Major." Industrial and Labor Relations Review, Vol. 31 (1978), pp. 498-508.

Polachek, S.W. "Occupational Self-selection: A Human Capital Approach to Sex Differences in Occupational Structure." Review of Economics and Statistics, Vol. 63 (1981), pp. 60-69.

Pommerenke, P.L. "Comparable Worth: A Panacea for Discrimination Against Women in the Labor Market?" American Economist, Vol. 32 (1988), pp. 44-48.

Powers, T.N. "An Idea With a Long Way to Go." American Bar Association Journal, Vol. 70 (1984), pp. 16-21.

Pratt, L.J. "Local Government and Comparable Worth: A Case Study." Document, City of Chattanooga Study. Chattanooga, TN: 1988.

Pratt, L.J., S.A. Smullen, and B.L. Kyer. "The Macroeconomics of the Equal Pay Act." Journal of Macroeconomics, Vol. 12 (1990), pp. 675-689.

Prediger, D.J. "The Determination of Holland Types Characterizing Occupational Groups." Journal of Vocational Behavior, Vol. 16 (1980), pp. 33-42.

Prien, E.P., G.V. Barrett, and B. Svetlik. "Use of Questionnaires in Job Evaluation." Journal of Industrial Psychology, Vol. 3 (1965), pp. 91-94.

Prien, E.P., I.L. Goldstein, and W.H. Macey. "Multidomain Job Analysis: Procedures and Application." Training and Development Journal, Vol. 41 (1987), pp. 68-72.

Prien, E.P., and S.D. Saleh. "A Study of Bias in Job Analysis." Journal of Industrial Psychology, Vol. 22, pp. 113-117.

Primack, R.B., and V.E. O'Leary. "Research Productivity of Men and Women Ecologists: A Longitudinal Study of Former Graduate Students." The Ecological Society of America Bulletin, Vol. 70 (1989), pp. 7-21.

Ragan, J.F., and S.P. Smith. "The Impact of Differences in Turnover Rates on Male-female Pay Differentials." Journal of Human Resources, Vol. 16 (1981), pp. 343-365.

Ramsey, G.A. "A Generalized Multiple Regression Model for Predicting College Faculty Salaries and Estimating Sex Bias," Salary Equity: Detecting Sex Bias in Salaries Among College and University Professors. Lexington, MA: Lexington Books, 1979.

Ratner, R.S., ed. Equal Employment Policy for Women: Strategies for Implementation in United States, Canada, Western Europe. Philadelphia: Temple University Press, 1980.

Ray, J.M., and A.B. Rubin. "Pay Equity for Women in Academic Libraries: An Analysis of ARL Salary Surveys, 1976/77-1983/84." College and Research Libraries, Vol. 48 (1987), pp. 36-49.

Raymond, R.D., M.L. Sesnowitz, and D.R. Williams. "Does Sex Still Matter? New Evidence From the 1980s." Economic Inquiry, Vol. 26 (1988), pp. 43-58.

Rea, L.M., and R.A. Parker. Designing and Conducting Survey Research: A Comprehensive Guide. San Francisco: Jossey-Bass Publishers, 1992.

Reichenberg, N.E. "Pay Equity in Review." Public Personnel Management, Vol. 15 (1986), pp. 211-231.

Reis, H.T., and L.A. Jackson. "Sex Differences in Reward Allocation: Subjects, Partners, and Tasks." Journal of Personality and Social Psychology, Vol. 40 (1981), pp. 465-478.

Remick, H. "The Comparable Worth Controversy." Public Personnel Management, Vol. 10 (1981), pp. 371-383.

Remick, H. "An Update on Washington State." Public Personnel Management Journal, Vol. 12 (1983), pp. 390-394.

Remick, H. "Dilemmas of Implementation: The Case of Nursing," Comparable Worth and Wage Discrimination: Technical Possibilities and Political Realities. Philadelphia: Temple University Press, 1984.

Remick, H. "Major Issues in A Priori Applications," Comparable Worth and Wage Discrimination: Technical Possibilities and Political Realities. Philadelphia: Temple University Press, 1984.

Remick, H., ed. Comparable Worth and Wage Discrimination: Technical Possibilities and Political Realities. Philadelphia: Temple University Press, 1984.

Remick, H. "The Case of Comparable Worth in Washington State." Policy Studies Review, Vol. 5 (1986), pp. 838-848.

Remick, H., and R.J. Steinberg. "Technical Possibilities and Political Realities: Concluding Remarks," Comparable Worth and Wage Discrimination: Technical Possibilities and Political Realities. Philadelphia: Temple University Press, 1984.

Report of Wisconsin's Task Force on Comparable Worth. University of Wisconsin-Madison, Wisconsin Task Force on Comparable Worth. Madison, WI: 1986.

Research on Evaluator Bias. Organizational Research and Development, Inc. Columbus, OH.

Reskin, B.F., ed. Sex Segregation in the Workplace. Washington, D.C.: National Academy Press, 1984.

Reskin, B.F., and H.I. Hartmann, eds. Women's Work, Men's Work: Sex Segregation on the Job. Washington, D.C.: National Academy Press, 1986.

Reskin, B., et al. "Salary-setting Practices That Unfairly Disadvantage Women." Academe, Vol. 78 (1992), pp. 32-35.

Reskin, B.F., and P.A. Roos. Job Queues, Gender Queues: Explaining Women's Inroads Into Male Occupations. Philadelphia: Temple University Press, 1990.

Rhoads, S.E. Incomparable Worth: Pay Equity Meets the Market. Cambridge: Cambridge University Press, 1993.

Rhynes, S.L., D.P. Schwab, and H.G. Heneman, III. "The Role of Pay and Market Pay Variability in Job Application Decisions." Organizational Behavior and Human Performance, Vol. 31 (1983), pp. 353-364.

- Rice, R.W., D. Instone, and J. Adams. "Leader Sex, Leader Success, and Leadership Process: Two Field Studies." Journal of Applied Psychology, Vol. 69 (1984), pp. 12-31.
- Risher, H. "Job Evaluation: Problems and Prospects." Personnel, Vol. 61 (1984), pp. 53-66.
- Risher, H. and C. Fay. "Federal Pay Reform: A Response to an Emerging Crisis." Public Personnel Management, Vol. 20 (1991), pp. 385-395.
- Ritchie, R.J., and V.D. Beardsley. "A Market Research Approach to Determine Local Labor Market Availability for Non-management Jobs." Personnel Psychology, Vol. 31 (1978), pp. 449-459.
- Rizzo, A., and C. Mendez. The Integration of Women in Management: A Guide for Human Resources and Management Development Specialists. New York: Quorum Books, 1990.
- Roback, J. A Matter of Choice: A Critique of Comparable Worth by a Skeptical Feminist. New York: Priority Press Publication, 1986.
- Robertson, T.M. "Fundamental Strategies for Wage and Salary Administration." Personnel Journal, Vol. 65 (1986), pp. 120-132.
- Robinson, D.D., O.W. Wahlstrom, and R.C. Mecham. "Comparison of Job Evaluation Methods: A 'Policy-capturing' Approach Using the Position Analysis Questionnaire." Journal of Applied Psychology, Vol. 59 (1974), pp. 633-637.
- Robinson, M.D., and P.V. Wunnava. "Measuring Direct Discrimination in Labor Markets Using a Frontier Approach: Evidence from CPS Female Earnings Data." Southern Economic Journal, Vol. 56 (1989), pp. 212-218.
- Rock, M.L., ed. Handbook of Wage and Salary Administration, 2nd ed. New York: McGraw-Hill, 1984.
- Rock, M.L., and L.A. Berger, eds. A Compensation Handbook. New York: McGraw-Hill, 1991.
- Rogers, R.C. "Analysis of Two Point-rating Job Evaluation Plans." Personnel Psychology, Vol. 30 (1946), pp. 579-585.

Roos, P.A. "Sex Stratification in the Workplace: Male-female Difference in Economic Returns to Occupation." Social Science Research, Vol. 10 (1981), pp. 195-223.

Roose, J.E., and M.E. Doherty. "A Social Judgement Theoretic Approach to Sex Discrimination in Faculty Salaries." Organizational Behavior and Human Performance, Vol. 22 (1978), pp. 193-215.

Root, N. and J.R. Daley. "Are Women Safe Workers? A New Look at the Data." Monthly Labor Review, Vol. 103 (1980), pp. 3-10.

Rosenbaum, J.E. "Organizational Career Mobility: Promotion Chances in a Corporation During Periods of Growth and Contraction." American Journal of Sociology, Vol. 85 (1979), pp. 21-48.

Rosenbaum, J.E. "Tournament Mobility: Career Patterns in a Corporation." Administrative Science Quarterly, Vol. 24 (1979), pp. 220-241.

Rosenbaum, J.E. "Hierarchical and Individual Effects on Earnings." Industrial Relations, Vol. 19 (1980), pp. 1-14.

Rosengren, K.E., ed. Advances in Content Analysis. Beverly Hills, CA: Sage, 1981.

Rotter, N.G. "Perceived Commitment, Salary Recommendation, and Employees' Sex." Perceptual and Motor Skills, Vol. 64 (1987), pp. 651-658.

Rousseau, D.M. "Job Perceptions When Working With Data, People, and Things." Journal of Occupational Psychology, Vol. 55 (1982), pp. 43-52.

Ruderfer, E.D. "Sex-based Wage Discrimination Under Title VII: Equal Pay for Equal Work or Equal Pay for Comparable Work?" William and Mary Law Review, Vol. 22 (1981), pp. 421-485.

Rumberger, R.W. "The Changing Skill Requirements of Jobs in the U.S. Economy." Industrial and Labor Relations Review, Vol. 34 (1981), pp. 578-590.

Rush, C.H., and R.M. Bellows. "Job Evaluation for a Small Business." Personnel Psychology, Vol. 2 (1949), pp. 301-310.

Rynes, S.L., and G.T. Milkovich. "Wage Surveys: Dispelling Some Myths About the 'Market Wage.'" Personnel Psychology, Vol. 39 (1986), pp. 71-90.

Rynes, S.L., C.L. Weber, and G.T. Milkovich. "Effects of Market Survey Rates, Job Evaluation, and Job Gender on Job Pay." Journal of Applied Psychology, Vol. 74 (1989), pp. 114-123.

Rytina, N.F. "Occupational Segregation and Earnings Differences by Sex." Monthly Labor Review, Vol. 104 (1981), pp. 49-53.

Rytina, N.F. "Earnings of Men and Women: A Look at Specific Occupations." Monthly Labor Review, Vol. 105 (1982), pp. 25-31.

Rytina, N.F., and S.M. Bianchi. "Occupational Reclassification and Changes in Distribution by Gender." Monthly Labor Review, Vol. 107 (1984), pp. 11-17.

Sackett, P.R., E.T. Cornelius, and T.J. Carron. "A Comparison of Global Judgement vs. Task-oriented Approaches to Job Classification." Personnel Psychology, Vol. 34 (1981), pp. 791-804.

Sahl, R.J. "How to Install a Job-evaluation." Personnel, Vol. 66 (1989), pp. 38-42.

Sanborn, H. "Paid Differences Between Men and Women." Industrial and Labor Relations Review, Vol. 17 (1964), pp. 534-550.

Sanchez, J.I., and S.L. Fraser. "On the Choice of Scales for Task Analysis." Journal of Applied Psychology, Vol. 77 (1992), pp. 545-553.

Sanchez, J.I., and E.L. Levine. "Determining Important Tasks Within Jobs: A Policy Capturing Approach." Journal of Applied Psychology, Vol. 78 (1989), pp. 336-342.

Sandy, P.R. Female Power and Male Dominance: On the Origins of Sexual Inequality. New York: Cambridge University Press, 1981.

Sape, G.P. "Coping with Comparable Worth." Harvard Business Review, Vol. 63 (1985), pp. 145-152.

Bibliography

- Satter, G.A. "Method of Paired Comparisons and a Specification Scoring Key in the Evaluation of Jobs." Journal of Applied Psychology, Vol. 33 (1949), pp. 212-221.
- Sauer, R.L. "Measuring Relative Worth of Managerial Positions." Compensation Review, Vol. 4, pp. 9-18.
- Sayles, L.R. "Worker Values in Job Evaluation: Impact of Job Evaluation on Worker Attitudes." Personnel, Vol. 30 (1954), pp. 266-274.
- Scanlan, J.P. "Illusions of Job Segregation." Public Interest, Vol. 39 (1988), pp. 54-69.
- Schein, V.E. "Relationships Between Sex Role Stereotypes and Requisite Management Characteristics Among Female Managers." Journal of Applied Psychology, Vol. 60 (1975), pp. 340-344.
- Schleifer, L.M., and O.G. Okogbaa. "System Response Time and Method of Pay: Cardiovascular Stress Effects in Computer-based Tasks." Ergonomics, Vol. 33 (1990), pp. 1495-1509.
- Schmitt, N., B.W. Coyle, and P.M. Mellon. "Subgroup Differences in Predictor and Criterion Variances and Differential Validity." Journal of Applied Psychology, Vol. 63 (1978), pp. 667-672.
- Scholl, R.W., and E.A. Cooper. "The Use of Job Evaluation to Eliminate Gender Based Pay Differentials." Public Personnel Management, Vol. 20 (1991), pp. 1-18.
- Schonberger, R., and H. Hennessey, Jr. "Is Equal Pay for Comparable Work Fair?" Personnel Journal, Vol. 60 (1981), pp. 964-968.
- Schroeder, P., and C. Horner. "Comparable Worth: A Wrong Turn." The Bureaucrat, Vol. 16 (1987/88), pp. 4-9.
- Schuster, J. "How to Control Job Evaluation Inflation." Personnel Administrator, Vol. 30, pp. 167-172.
- Schuster, M. "The Scanlon Plan: A Longitudinal Analysis." Journal of Applied Behavioral Science, Vol. 20 (1984), pp. 23-38.

Schwab, D.P. "Job Evaluation and Pay Setting: Concepts and Practices," Comparable Worth: Issues and Alternatives, 2nd ed. Washington, D.C.: Equal Employment Advisory Council, 1984.

Schwab, D.P. "Job Evaluation Research and Research Needs," Comparable Worth: New Directions for Research. Washington, D.C.: National Academy Press, 1985.

Schwab, D.P. "Contextual Variables in Employee Performance-turnover Relationships." Academy of Management Journal, Vol. 34 (1991), pp. 966-975.

Schwab, D.P., and R. Grams. "Sex-related Errors in Job Evaluation: A 'Real-world' Test." Journal of Applied Psychology, Vol. 70 (1985), pp. 533-539.

Schwab, D.P., and H.G. Heneman. "Assessment of a Consensus-based Multiple Information Source Job Evaluation System." Journal of Applied Psychology, Vol. 71 (1986), pp. 354-356.

Schwab, D., and C. Olson. "Merit Pay Practices," Do Compensation Practices Matter? Ithaca, NY: ILR Press, 1990.

Schwab, D.P., and D.W. Wichern. "Systematic Bias in Job Evaluation and Market Wages: Implications for the Comparable Worth Debate." Journal of Applied Psychology, Vol. 68 (1983), pp. 60-69.

Scott, J.A., and R. Zickefoose. "Achieving Comparable Worth in a Non-union Municipal Government Setting: The Chemistry's Right in Colorado Springs." Presented at the American Society for Public Administration Conference, 1983.

Scozzaro, P.P., L.M. Subich. "Gender and Occupational Sex-type Differences in Job Outcome Factor Perceptions." Journal of Vocational Behavior, Vol. 36 (1990), pp. 109-119.

Seaman, F., and A. Lorimer. Winning at Work: A Book for Women. Philadelphia: Running Press, 1979.

Seashore, H.G. "Women are More Predictable Than Men." Journal of Counseling Psychology, Vol. 9 (1962), pp. 261-270.

Shaffer, L.J., and R.M. Wilson. "Racial Discrimination in Occupational Choice." Industrial Relations, Vol. 19 (1980), pp. 199-205.

Shaw, K.L. "The Income Effects of Occupational Change and the Investment in Occupational Skills." Ph.D. Thesis, Harvard University, 1981.

Shimmin, S. "Job Evaluation and Equal Pay for Work of Equal Value." Applied Psychology—An International Review, Vol. 36 (1987), pp. 61-70.

Sibson, R.E. Compensation, 5th ed. New York: American Management Association, 1990.

Sigelman, L., H.B. Milward, and J.M. Shepard. "The Salary Differential Between Male and Female Administrators: Equal Pay for Equal Work?" Academy of Management Journal, Vol. 25 (1982), pp. 664-671.

Sinnott, P.A. "The Comparable Worth Controversy." Journal of Career Planning and Employment, Vol. 45 (1985), pp. 46-51.

Smith, B.N., et al. "What Is In a Name: The Impact of Job Titles on Job Evaluation Results." Journal of Business and Psychology, Vol. 3 (1989), pp. 341-351.

Smith, B.N., P.G. Benson, and J.S. Hornsby. "The Effects of Job Description Content on Job Evaluation Judgements." Journal of Applied Psychology, Vol. 75 (1990), pp. 301-309.

Smith, F.S. "Compensating Wage Differentials and Public Policy: A Review." Industrial and Labor Relations Review, Vol. 32 (1979), pp. 339-352.

Smith, J. "Comparable Worth, Gender, and Human Capital Theory," Ingredients for Women's Employment Policy. Albany: State University of New York Press, 1987.

Smith, J.E., and M.D. Hakel. "Convergence Among Data Sources, Response Bias, and Reliability and Validity of a Structured Job Analysis Questionnaire." Personnel Psychology, Vol. 32 (1979), pp. 677-691.

Smyth, R.C. "How to Rank and Price Management Jobs." Factory Management and Maintenance, Vol. 108 (1950), pp. 116-117.

Snelgar, R.J. "The Comparability of Job Evaluation Methods in Supplying Approximately Similar Classifications in Rating One Job Series." Personnel Psychology, Vol. 36 (1983), pp. 371-380.

Solomon, R.J. "Determining the Fairness of Salary in Public Employment." Public Personnel Management Journal, Vol. 8 (1980), pp. 154-159.

Sorenson, E. (1989). "Measuring the Pay Disparity Between Typically Female Occupations and Other Jobs: A Bivariate Selectivity Approach." Industrial and Labor Relations Review, Vol. 42, pp. 624-639.

Spalter-Roth, R., and H. Hartmann. Raises and Recognition: Secretaries, Clerical Workers and the Union Wage Premium. Institute for Women's Policy Research. Washington, D.C.: 1990.

Spang, S.D. "Pay Equity by Committee: A Labor-management Case Study." Cupa Journal, Vol. 41 (1990), pp. 21-34.

Spangler, E., M.A. Gordon, and R.M. Pipkin. "Token Women: An Empirical Test of Kantor's Hypothesis." American Journal of Sociology, Vol. 84 (1978), pp. 160-170.

Sparks, C.P. "Job Analysis," Personnel Management. Boston: Allyn and Bacon, 1982.

Spelfogel, E.J. "Equal Pay for Work of Comparable Value: A New Concept." Labor Law Review, Vol. 32 (1981), pp. 30-39.

Spence, J.T. and L.L. Sawin. "Images of Masculinity and Femininity: A Reconceptualization," Women, Gender, and Social Psychology. Hillsdale, NJ: Lawrence Erlbaum Associates, 1985.

Spiegel, W.R., and E. Lanham. "Job Evaluation in Department Stores." Journal of Retailing, Vol. 27 (1951), pp. 79-85.

Stanley, J.C., and A.C. Porter. "Correlation of Scholastic Aptitude Test Score With College Grades for Negroes Versus Whites." Journal of Educational Measurement, Vol. 4 (1967), pp. 199-218.

Steel, B.S., and N.P. Lovrich. "Comparable Worth: The Problematic Politicization of a Public Personnel Issue." Public Personnel Management, Vol. 16 (1987), pp. 23-36.

Steiger, Fink, and Kosecoff, Inc. Literature and Secondary Data Review of the Vocational Education Equity Study—Final Report. American Institutes for Research. Palo Alto, CA: 1979.

Steinberg, R. “‘A Want of Harmony’: Perspectives on Wage Discrimination and Comparable Worth,” Comparable Worth and Wage Discrimination: Technical Possibilities and Political Realities. Philadelphia: Temple University Press, 1984.

Steinberg, R.J. “Identifying Wage Discrimination and Implementing Pay Equity Adjustments,” Comparable Worth: Issues for the 80s. U.S. Commission on Civil Rights, ed. Washington, D.C.: 1984.

Steinberg, R.J. “Evaluating Jobs.” Society, Vol. 22 (1985), pp. 44-54.

Steinberg, R. “The Debate on Comparable Worth.” New Politics, Vol. 1 (1986), pp. 108-126.

Steinberg, R. “Radical Challenges in a Liberal World: The Mixed Success of Comparable Worth.” Gender and Society, Vol. 1 (1987), pp. 466-475.

Steinberg, R.J. “Social Construction of Skill: Gender, Power, and Comparable Worth.” Work and Occupations, Vol. 17 (1990), pp. 449-482.

Steinberg, R., and L. Haignere. “Equitable Compensation: Methodological Criteria for Comparable Worth,” Ingredients for Women’s Employment Policy. Albany, NY: State University of New York Press, 1987.

Steinberg, R., et al. The New York Pay Equity Study: A Research Report. Center for Women in Government, State University of New York at Albany, Albany, NY: 1986.

Steinberg, R., and S. Shapiro. “Sex Differences in Personality Traits of Female and Male Master of Business Administration Students.” Journal of Applied Psychology, Vol. 67 (1982), pp. 306-310.

Stewart, D.A. “Improving Job Evaluation Results.” Personnel, Vol. 25 (1949), pp. 356-365.

Stigers, M.F., and E.G. Reed. The Theory and Practice of Job Rating. New York: McGraw-Hill, 1942.

Bibliography

Stockard, J., et al. Sex Equity in Education. New York: Academic Press, 1980.

Stokey, N.L. "Job Differentiation and Wages." The Quarterly Journal of Economics, Vol. 95 (1980), pp. 431-449.

Stroh, L.K., J.M. Brett, and A.H. Reilly. "All the Right Stuff: A Comparison of Female and Male Managers' Career Progression." Journal of Applied Psychology, Vol. 77 (1992), pp. 251-260.

Study on Setting Salaries in the Classified Service. State of Nevada, Department of Personnel. Carson City, NV: 1985.

Stutz, R.L. and H.E. Smalley. "Management, Union Join in Job Evaluation." Personnel Journal, Vol. 34 (1950), pp. 412-416.

Subich, L.M., et al. "Occupational Perceptions of Males and Females as a Function of Sex Ratios, Salary, and Availability." Journal of Vocational Behavior, Vol. 28 (1986), pp. 123-134.

Suits, D.B. "Dummy Variables: Mechanics v. Interpretation." Review of Economics and Statistics, Vol. 66 (1984), pp. 177-180.

Sullivan, J.F. "Comparable Worth and the Statistical Audit of Pay Programs for Illegal Systemic Discrimination." Personnel Administrator, Vol. 30 (1985), pp. 102-111.

Summers, T.P. "Examination of Sex Differences in Expectations of Pay and Perceptions of Equity in Pay." Psychological Reports, Vol. 62 (1988), pp. 491-496.

Summers, T.P., and W.H. Hendrix. "Modeling the Role of Pay Equity Perceptions: A Field Study." Journal of Occupational Psychology, Vol. 64 (1991), pp. 145-157.

Svetlik, B., E. Prien, and G. Barrett. "Relationships Between Job Difficulty, Employee's Attitude Toward His Job, and Supervisory Ratings of the Employee Effectiveness." Journal of Applied Psychology, Vol. 48 (1964), pp. 320-324.

Szmania, J.M., and D. Doverspike. "A Test of the Differential Investment Hypothesis Applied to the Exploration of Gender Differences in Reactions to Pay." Journal of Vocational Behavior, Vol. 37 (1990), pp. 239-250.

Szwajkowski, E., and L. Larwood. "Rational Decision Processes and Sex Discrimination: Testing 'Rational' Bias Theory." Journal of Organizational Behavior, Vol. 12 (1991), pp. 507-527.

Taber, T.D., T.A. Beehr, and J.T. Walsh. "Relationships Between Job Evaluation Ratings and Self-ratings of Job Characteristics." Organizational Behavior and Human Decision Processes, Vol. 35 (1985), pp. 27-45.

Taber, T.D., and T.D. Peters. "Assessing the Completeness of a Job Analysis Procedure." Journal of Organizational Behavior, Vol. 12 (1991), pp. 581-593.

Taeuber, C. Statistical Handbook on Women in America. Phoenix, AZ: Oryx Press, 1991.

Task Force Findings, Conclusions and Recommendations. Employees Pay Equity/Comparable Worth Task Force. Davis, CA: 1985.

Taubman, P.J., and T.J. Wales. "Higher Education, Mental Ability, and Screening." Journal of Political Economy, Vol. 81 (1973), pp. 28-55.

Taylor, D.E. "Absences From Work Among Full-time Employees." Monthly Labor Review, Vol. 104 (1981), pp. 68-70.

Taylor, P.A. "Income Inequality in the Federal Civilian Government." American Sociological Review, Vol. 44 (1979), pp. 468-479.

Taylor, S.H. "The Case for Comparable Worth." Journal of Social Issues, Vol. 45 (1989), pp. 23-37.

The Factor Evaluation System of Position Classification Introduction. U.S. Civil Service Commission, Bureau of Standards of Policies. Washington, D.C.: 1976.

Thomas, C. "Pay Equity and Comparable Worth." Labor and Law Journal, Vol. 34 (1983), pp. 3-12.

Bibliography

Thomas, P.J. "Appraising the Performance of Women: Gender and the Naval Office," Women's Career Development. Newbury Park, CA: Sage, 1987.

Thompkins, J. "Sources of Measurement Error and Gender Bias in Job Evaluation." Review of Public Personnel Administration, Vol. 9 (1988), pp. 1-16.

Thompson, B.W. National Longitudinal Study of the High School Class of 1977. U.S. Government Printing Office. Washington, D.C.: 1974.

Thomsen, D.J. "Eliminating Pay Discrimination Caused by Job Evaluation." Personnel, Vol. 55 (1978), pp. 11-22.

Thomsen, D.J. "Compensation and Benefits." Personnel Journal, Vol. 62 (1983), p. 38.

Thorndike, E.L. Prediction of Vocational Success. The Commonwealth Fund. New York: 1934.

Thurow, L.C. Generating Inequality: Mechanisms of Distribution in the U.S. Economy. New York: Basic Books, 1975.

Tienda, M., and V. Ortiz. "Intraindustry Occupational Recomposition and Gender Inequality in Earnings," Ingredients for Women's Employment Policy. Albany: State University of New York Press, 1987.

Tompkins, J., J. Brown, and J.H. McEwen. "Designing a Comparable Worth Based Job Evaluation System: Failure of an A Priori Approach." Public Personnel Management, Vol. 19 (1990), pp. 31-42.

Toops, H.A. "Some Concepts of Job Families and Their Importance in Placement." Educational and Psychological Measurement, Vol. 5 (1945), pp. 195-216.

Tornow, W.W. and P.R. Pinto. "The Development of a Managerial Job Taxonomy: A System for Describing, Classifying, and Evaluating Executive Positions." Journal of Applied Psychology, Vol. 61 (1976), pp. 410-418.

Tosi, H.L., R.J. House, and M.D. Dunnette, eds. Managerial Motivation and Compensation. Board of Trustees of Michigan State University. East Lansing, MI: 1972.

Touthey, J.C. "Effects of Additional Women Professionals on Ratings of Occupational Prestige and Desirability." Journal of Personality and Social Psychology, Vol. 29 (1974), pp. 86-89.

Treiman, D.J. Job Evaluation: An Analytic Review. National Academy of Sciences. Washington, D.C.: 1979.

Treiman, D.J. "Effect of Choice of Factors and Factor Weights in Job Evaluation," Comparable Worth and Wage Discrimination: Technical Possibilities and Political Realities. Philadelphia: Temple University Press, 1984.

Treiman, D.J., and H.I. Hartmann, eds. Women, Work, and Wages: Equal Pay for Jobs of Equal Value. Washington, D.C.: National Academy Press, 1981.

Treiman, D.J., and K. Terrell. "Women, Work, and Wages—Trends in the Female Occupation Structure," Social Indicator Models. Russell Sage Foundation. New York: 1975.

Trusheim, D., and J. Crouse. "Affects of College Prestige on Men's Occupational Status and Income." Research in Higher Education, Vol. 14 (1981), pp. 283-304.

Tuckman, B.H. "Salary Differences Among University Faculty and Their Implications for the Future," Salary Equity: Detecting Sex Bias in Salaries Among College and University Professors. Lexington, MA: Lexington Books, 1979.

Turner, W.D. "The Mathematical Basis of the Percent Method of Job Evaluation." Personnel, Vol. 25 (1948), pp. 154-160.

Turner, W.D. "Some Precautions in the Use of the Percent Method of Job Evaluation." Journal of Applied Psychology, Vol. 33 (1949), pp. 547-552.

Twenhafel, D. 1991 U.S. Senate Employment Practices: A Study of Staff Salary, Tenure, Demographics and Benefits. Congressional Management Foundation. Washington, D.C.: 1991.

20 Facts on Women Workers. U.S. Department of Labor, Office of the Secretary, Women's Bureau. Washington, D.C.: 1980.

Ulrich, C. "Why Companies are Looking at Omnibus Pay Programs." Journal of Compensation and Benefits, Vol. 7 (1991), pp. 30-34.

Ungson, G.R., and R.M. Steers. "Motivation and Politics in Executive Compensation." Academy of Management Review, Vol. 9 (1984), pp. 313-323.

Valdez, R.L., and B.A. Gutek. "Family Roles: A Help or a Hindrance for Working Women?" Women's Career Development. Newbury Park, CA: Sage, 1987.

van der Burg, R., and N. Schoemaker. "Scoring Women on Their Labor Chances." Women's Studies International Forum, Vol. 8 (1985), pp. 273-278.

van DeVoort, D.M., J.J. McHenry, and N.E. Fried. "A Policy Capturing Approach to the Valuing of Managerial Jobs: Developing a Standardized, Computerized Job Grading System." Presented at the 43rd Annual National Meeting of the Academy of Management, Dallas, TX, 1983.

Vladeck, J.P. "Equal Access Is Not Enough." American Bar Association Journal, Vol. 70 (1984), pp. 16-21.

Viscusi, W.K. "Sex Differences in Worker Quitting." Review of Economics and Statistics, Vol. 62 (1980), pp. 388-398.

Viteles, M.S. "A Psychologist Looks at Job Evaluation." Personnel, Vol. 17 (1941), pp. 165-176.

Von Frank, J.A. "Equal Pay for Comparable Work." Harvard Civil Rights Civil Liberties Law Review, Vol. 15 (1980), pp. 475-506.

Walker, C.T. "The Use of Job Evaluation Plans in Salary Administration." Personnel, Vol. 41 (1987), pp. 28-31.

Wall, R.E. "Salary Inequities and Differences: One College's Attempt at Identification and Adjustment," Salary Equity Detecting Sex Bias in Salaries Among College and University Professors. Lexington MA: Lexington Books, 1979.

Bibliography

Wallace, M.J. "Methodology, Research Practice, and Progress in Personnel and Industrial Relations." Academy of Management Review, Vol. 8 (1983), pp. 6-13.

Wallace, M.J., and C.H. Fay. Compensation Theory and Practice, 2nd ed. Boston: Pws-Kent Publishing Company, 1988.

Wallace, P.A., ed. Equal Employment Opportunity and the AT&T Case. Cambridge, MA: The MIT Press, 1976.

Wallace, P.A., and A.M. LaMond, eds. Women, Minorities, and Employment Discrimination. Lexington, MA: Lexington Books, 1977.

Wallston, B.S., and K.E. Grady. "Integrating the Feminist Critique and the Crisis in Social Psychology: Another Look at Research Methods," Women, Gender, and Social Psychology. Hillsdale, NJ: Lawrence Erlbaum Associates, 1985.

Ward, K.B., and C.W. Mueller. "Sex Differences in Earnings: The Influence of Industrial Sector Authority Hierarchy, and Human Capital Variables." Work and Occupations, Vol. 12 (1985), pp. 437-463.

Warr, P., and G. Parry. "Paid Employment and Women's Psychological Well-being." Psychological Bulletin, Vol. 91 (1982), pp. 498-516.

Wasem, M.R. "The Comparable Worth Theory, a Critical Analysis." Baylor Law Review, Vol. 32 (1980), pp. 629-638.

Webb, N.M., et al. "Generalizability of General Education Development Ratings of Jobs in the United States." Journal of Applied Psychology, Vol. 66 (1981), pp. 188-192.

Weber, R.P. Basic Content Analysis. Newbury Park, CA: Sage, 1990.

Werwie, D.M. Sex and Pay in the Federal Government: Using Job Evaluation Systems to Implement Comparable Worth. New York: Greenwood Press, 1987.

Wesman, E.C. "Unions and Comparable Worth: Progress in the Public Sector." Journal of Collective Negotiations, Vol. 17 (1988), pp. 13-26.

White, M.C., M.D. Crims, and G.L. Desanctis. "Ratings of Prestige and Desirability: Effects of Additional Women Entering Selected Business Occupations." Personality and Social Psychology Bulletin, Vol. 7 (1981), pp. 588-592.

White, P.E. Women and Minorities in Science and Engineering: An Update. National Science Foundation, Report 303. Washington, D.C.: 1992.

Whyte, W.F. Money and Motivation. New York: Harper and Row, 1955.

Wilcox, A.C. A Method of Determining Equitable Pay. PAQ Services Research Bulletin 0001-384-120181. 1982.

Wilcox, A.C. A Method of Determining Exemption Status. PAQ Services Research Bulletin 0002-001-062382. 1982.

Willborn, S.L. A Secretary and a Cook: Challenging Women's Wage in the Courts of the United States and Great Britain. Ithica, NY: ILR Press, 1989.

Willborn, S.C. A Comparable Worth Primer. Lexington, MA: Lexington Books, 1986.

Williams, C.L. Gender Differences at Work: Women and Men in Nontraditional Occupations. Berkeley, CA: University of California Press, 1989.

Williams, D.R. and C.A. Register. "Regional Variations in Earnings and the Gender Composition of Employment: Is 'Women's Work' Undervalued?" Journal of Economic Issues, Vol. 20 (1986), pp. 1121-1134.

Williams, M.L., and G.F. Dreher. "Compensation System Attributes and Applicant Pool Characteristics." Academy of Management Journal, Vol. 35 (1992), pp. 571-595.

Williams, R.E., and L.L. Kessler. A Closer Look at Comparable Worth: A Study of the Basic Questions to be Addressed in Approaching Pay Equity. National Foundation for the Study of Equal Employment Policy. Washington, D.C.: 1984.

Willis, N.D. Comparable Worth Study: State of Washington. Norman D. Willis and Associates. 1974.

Wilson, M.A., and R.J. Harvey. "The Value of Relative-time-spent Ratings in Task-oriented Job Analysis." Journal of Business and Psychology, Vol. 4 (1990), pp. 453-461.

Wilson, M.A., R.J. Harvey, and B.A. Macy. "Repeating Items to Estimate the Test-retest Reliability of Task Inventory Ratings." Journal of Applied Psychology, Vol. 75 (1990), pp. 158-163.

Wise, D.A. "Academic Achievement and Job Performance." American Economic Review, Vol. 65 (1975), pp. 350-366.

Wisniewski, S.C. "Achieving Equal Pay for Comparable Worth Through Arbitration." Employee Relations Law Journal, Vol. 8 (1982), pp. 236-255.

Wittig, M.A., and S.L. Berman. "A Set of Validity Criteria for Modeling Job-based Compensation Systems." Human Resource Management Review, Vol. 1 (1991), pp. 107-118.

Wittig, M.A., and R.H. Lowe. "Comparable Worth Theory and Policy." Journal of Social Issues, Vol. 45 (1989), pp. 1-21.

Wolf, W.Z., and N.D. Fligstein. "Sex and Authority in the Work Place: The Causes of Sexual Inequality." American Psychologist, Vol. 44 (1979), pp. 235-252.

Wolins, L. "Bias in Rating, Unit of Analysis Mistake and Editorial Decisions." Manuscript, Iowa State University, 1991.

Women and Minorities in Science and Engineering. National Science Foundation. Washington, D.C.: 1982.

Women in Management. U.S. Department of Labor, Women's Bureau. Washington, D.C.: 1980.

Wong, M.G., and C. Hirschman. "Labor Force Participation and Socioeconomic Attainment of Asian-American Women." Sociological Perspectives, Vol. 26 (1983), pp. 423-446.

Yanico, B.J., and S.I. Hardin. "Sex-role Self-concept and Persistence in a Traditional vs. Nontraditional College Major for Women." Journal of Vocational Behavior, Vol. 18 (1981), pp. 219-227.

Bibliography

Zabalza, A. and Z. Tzannatos. Women and Equal Pay: The Effects of Legislation on Female Employment and Wages in Britain. Cambridge: Cambridge University Press, 1985.

Zanna, M.P., F. Crosby, and G. Loewenstein. "Male Reference Groups and Discontent Among Female Professionals," Women's Career Development. Newbury Park, CA: Sage, 1987.

Zedeck, S., and K.L. Mosier. "Work in the Family and Employing Organization." American Psychologist, Vol. 45 (1990), pp. 240-251.

Ziering, B.A. and N.S. Raju. "Development and Validation of a Job Family Specific Position Analysis Questionnaire." Journal of Business and Psychology, Vol. 2 (1988), pp. 228-238.

Zippo, M. "Equal Pay for Comparable Work." Personnel, Vol. 58 (1981), pp. 4-10.

Zuckerman, H., J.R. Cole, and J.T. Bruer, eds. The Outer Circle: Women in the Scientific Community. New York: W.W. Norton and Company, 1991.

Bibliography

Bibliography

Bibliography

Related GAO Products

Pay Equity: Experiences of Canada and the Province of Ontario
(GAO/GGD-94-27BR, Nov. 2, 1993).

Pay Equity: Washington State's Efforts to Address Comparable Worth
(GAO/GGD-92-87BR, July 1, 1992).

Federal Pay: Comparisons With the Private Sector by Job and Locality
(GAO/GGD-90-81FS, May 15, 1990).

State Department: Minorities and Women are Underrepresented in the Foreign Service (GAO/NSIAD-89-146, June 26, 1989).

Pay Equity: Status of State Activities (GAO/GGD-86-141BR, Sept. 19, 1986).

Description of Selected Nonfederal Job Evaluation Systems (GAO/GGD-85-57, July 31, 1985).

Comments on Report on Comparable Worth by the United States Commission on Civil Rights (GAO/GGD-85-59, June 14, 1985).

Options for Conducting a Pay Equity Study of Federal Pay and Classification (GAO/GGD-85-37, Mar. 1, 1985).

Distribution of Male and Female Employees in Four Federal Classification Systems (GAO/GGD-85-20, Nov. 27, 1984).

Description of Selected Systems for Classifying Federal Civilian Positions and Personnel (GAO/GGD-84-90, July 13, 1984).

Classification of Federal White-Collar Jobs Should Be Better Controlled
(GAO/FPCD-75-173, Dec. 4, 1975).

Ordering Information

The first copy of each GAO report and testimony is free. Additional copies are \$2 each. Orders should be sent to the following address, accompanied by a check or money order made out to the Superintendent of Documents, when necessary. Orders for 100 or more copies to be mailed to a single address are discounted 25 percent.

Orders by mail:

U.S. General Accounting Office
P.O. Box 6015
Gaithersburg, MD 20884-6015

or visit:

Room 1100
700 4th St. NW (corner of 4th and G Sts. NW)
U.S. General Accounting Office
Washington, DC

Orders may also be placed by calling (202) 512-6000 or by using fax number (301) 258-4066, or TDD (301) 413-0006.

Each day, GAO issues a list of newly available reports and testimony. To receive facsimile copies of the daily list or any list from the past 30 days, please call (202) 512-6000 using a touchtone phone. A recorded menu will provide information on how to obtain these lists.

For information on how to access GAO reports on the INTERNET, send an e-mail message with "info" in the body to:

info@www.gao.gov

**United States
General Accounting Office
Washington, D.C. 20548-0001**

**Bulk Rate
Postage & Fees Paid
GAO
Permit No. G100**

**Official Business
Penalty for Private Use \$300**

Address Correction Requested

