From time to time, I-O psychologists may find themselves involved in a project involving pay discrimination. Surprisingly little, however, has been written in I-O psychology outlets over the last decade or so regarding this topic. The focus of this column is on two ways in which your organization’s pay practices may be questioned. Specifically, we cover fundamentals in an OFCCP compensation audit and several issues that may arise in a compensation discrimination lawsuit. In the remainder of this column, we address the use of multiple regression analysis in examining pay discrimination and offer suggestions for I-O psychologists who must either apply this technique or wish to understand challenges to the use of this statistical analysis.

**OFCCP Challenge**

Large organizations that are federal contractors must be concerned with the possibility of an OFCCP audit. If your organization undergoes a compensation audit by the Office of Federal Contract Compliance Programs (OFCCP; www.dol.gov/esa/ofccp), the issue of equal pay for women and minorities will be reviewed.

In a typical OFCCP audit, the agency is checking to see that women and minorities are not paid less than men and nonminorities. As an I-O psychologist, you can help by ensuring that the organization properly analyzes the data using both the OFCCP methodology and advanced statistics. It is also important to encourage the organization and the OFCCP to utilize advanced statistics such as multiple regression and to consider the concept of statistical significance. Apparent differences between men and women or minorities may simply not be statistically significant. Explaining what statistical significance is and how it applies may be an important contribution to the organization.

The OFCCP’s method of compensation analysis is often referred to as the “DuBray method” as Joseph DuBray of the OFCCP’s Philadelphia office developed the method. Using this approach, the agency looks at pay for indi-
viduals in the same job title or in the same job grade. The typical method of analysis used by the OFCCP is a comparison of means or medians. In this approach, the mean or median salaries of women and men and minorities and nonminorities are reviewed to see if there is a difference. The agency also looks at the mean or median results for relevant factors such as periods of service and performance ratings. On their Web site, the OFCCP has suggestions on how to sort the data on a PC and also how to look at the distribution of data to determine if pay disparities exist.

If the OFCCP finds differences, they conclude that a pay disparity exists. It is then up to the organization to prove otherwise. In that case, and ideally before, an I-O psychologist can encourage the organization to analyze the data using statistical techniques such as multiple regression analysis to determine if any factors account for the differences. Multiple regression analysis will allow one to introduce the standard of statistical significance to determine which factors, if any, are having a significant impact on pay.

If the analysis examines the data by job grade, one would expect that some of the differences could be due to the combinations of different jobs within that job grade and that possibility should be carefully considered using the appropriate statistics.

(For information on the OFCCP’s approach to compensation analysis, please see their Web site: www.dol.gov/esa/regs/compliance/ofccp/compdata.htm. It may also be helpful to see EEOC’s document on compensation discrimination: www.eeoc.gov/docs/compensation.html).

**Recommendations for I-O Psychologists to Share With Organizations Regarding An OFCCP Compensation Audit**

1. Don’t allow yourself to be convinced that there are differences in pay unless all relevant factors are taken into account and advanced statistics such as multiple regression are used.

2. Encourage all relevant parties to understand the importance of statistical significance. Be prepared to explain what statistical significance means and why it is important.

3. Analyze data by job title and not solely by job grade. Make sure that the job titles or job grades being analyzed contain relevant comparisons.

4. Conduct the analysis by both the OFCCP methodology and by tests of statistical significance including multiple regression analysis. Be prepared to help the organization articulate where you do and do not see situations of pay disparity and why.

5. Do an internal analysis of compensation prior to an OFCCP audit. This will help ensure that you know how your compensation structure fares in terms of possible pay disparities and to eliminate any practices that might lead to pay disparities. The OFCCP strongly encourages federal contractors
to conduct analyses of compensation. This is viewed as a key responsibility as part of the self-audit requirements of Executive Order 11246.

**Court Challenges**

Statistics have played a prominent role in many large pay discrimination cases. In this section, we review some examples of cases where multiple regression analysis has been used and comment on how the courts looked at these statistics.

In a recent case, *Morgan v. UPS* (2000 U.S. Dist. LEXIS 21327), the plaintiffs’ experts used multiple regression analyses to argue that black center managers earned less than white managers. One of the two experts concluded that the average pay difference ranged between $1,275 to $2,200 per year. The defendants criticized the analyses for two major reasons. One of the criticisms was that the plaintiff’s expert converted the 6-point rating scale to a 2-point rating scale, thereby obscuring performance differences. Another significant criticism was that this expert used a database that had a major error in it (i.e., a Hispanic manager who was mistakenly coded as having a salary of $642 million).

The other plaintiffs’ expert argued that the pay difference varied between $562 to $852 per year. The defendant argued that this estimate failed to take into account a number of potentially important factors, including time the center managers spent as union members, previous positions held by the center managers, and related factors. The company also argued that his analysis only considered the last 2 years of performance ratings.

To counter the plaintiffs’ experts, the company introduced regression analyses performed by their expert. Using all available performance ratings over a number of years, the defendant’s expert demonstrated that the difference between black center managers and white center managers disappeared when such factors were entered into the analysis.

The plaintiffs critiqued the company’s expert on two grounds. First, the plaintiffs took issue with the defendant’s expert for excluding all employees for whom there was any missing data. Indeed, it should be noted that there is rapidly growing literature on missing data in psychological research and this is an issue that is likely to arise again. Second, plaintiffs critiqued the analyses presented by the company on the grounds that performance ratings are subject to discrimination. However, the court concluded that there was insufficient evidence to support the argument that the performance ratings were biased and decided that the defendant’s expert’s analyses were more acceptable.

In *Reid v. Lockheed Martin* (2001 U.S. Dist. LEXIS 11685), the plaintiffs also challenged the company on a number of issues, including pay levels. In examining pay levels of hourly employees from 43 pay grades across a number of years, as well as within job groups, the plaintiffs’ expert found that blacks were paid significantly less in only some of the comparisons. Use of
multiple regression analysis, in which pay grade was controlled, revealed similar results. The court critiqued the plaintiff’s expert on the fact that there were large amounts of missing data for some of the analyses, and he acknowledged that the missing data might have influenced his confidence in his results. Analyses for salaried employees revealed similar issues, and even larger proportions of data (as much as 40% in one of the facilities examined) were missing. The expert agreed that having the missing data could change his conclusions. The court determined that the finding that not all job groups or grades revealed race differences in pay argued against the class certification that the plaintiffs sought.

In *Fields and Walker v. Abbott Laboratories* (2001 U.S. Dist. LEXIS 2869), plaintiffs requested class certification in regards to compensation discrimination. In seeking class certification, the plaintiffs’ expert introduced multiple regression analyses. In his initial report, the plaintiffs’ expert reported that African Americans received significantly lower pay in five of Abbott’s divisions, which was attributed to a pay policy that allowed for too much subjectivity. The defendant’s expert criticized this report, arguing that each division should have been analyzed separately, that grades and years not included in the lawsuit were included in his analyses, that certain relevant factors were not included in the analyses, and that the analyses only examined current salaries and not salary increases. The defendant’s analyses incorporating these criticisms revealed a lack of race differences in pay.

In his subsequent report, the plaintiffs’ expert continued to analyze overall pay, rather than pay increases. Based on his analyses, he found that race differences occurred in only two of the five divisions. Even in those two divisions, there were no significant differences in 1998. The court, however, challenged the subsequent report, arguing that their statistical evidence did not support discrimination in promotions, and there was no evidence that merit raises were based on discrimination either. Hence, the court argued that the only remaining source of discrimination in pay would have been at the entry point into the organization, but again the plaintiffs had failed to produce any evidence to support that position.

Multiple regression analysis was used in a more successful fashion in *Barbara Lavin-Mceleney v. Marist College* (1999 U.S. Dist. LEXIS 22499). That case, which was tried and subsequently appealed by the defendant, concerned a pay discrimination complaint filed by a female professor. Alleging that the pay increases were discriminatory, both the plaintiff’s and the defendant’s expert used multiple regression analysis. In addition, Marist College introduced evidence from a professor employed in the organization. All three of these experts performed similar analyses, in which five factors (rank, seniority, division [i.e., Social/Behavioral Sciences], tenure status, and degrees earned), plus gender, were used as predictors. Apparently, gender remained statistically significant, but the plaintiff’s expert attributed that to discrimina-
tion, while the defendant’s expert attributed it to chance. The third expert, employed by the college, proceeded to use what she called a “content analysis,” and concluded that rather than discrimination, the gender differences were due to women choosing disciplines (e.g., criminal justice) that were paid less in the national labor market. At the trial, the jury decided in favor of the plaintiff, and the court’s opinion dealt little with the regression analyses performed by the experts. In upholding this decision, the appellate court addressed the regression analyses in more detail. That is, the defendant argued that the plaintiff needed to identify a specific male to whom she could legitimately be compared. Because the regression analyses are akin to identifying a “statistical composite of male faculty members,” the defendant argued that such analyses should not be considered. The appellate court rejected this argument on several grounds and concluded that regression analysis provided a scientifically valid method for identifying discrimination.

Finally, although Gerlib v. R. R. Donnelley and Sons (2002 U.S. Dist. LEXIS 10023) did not involve pay discrimination, multiple regression analysis was used to determine the presence of age discrimination in retention and layoffs. Specifically, the plaintiffs’ expert introduced evidence of discrimination using a variety of statistical analyses, including multiple regression analysis. These analyses were critiqued by the defendant for a number of reasons, including the use of the wrong statistical model (i.e., ordinary least squares analysis), the omission of certain predictor variables, and other data issues (e.g., why certain time periods were used, but not others), and on that basis, the defendant sought to have the plaintiff’s expert barred from testifying. In dismissing the defendant’s arguments to bar his testimony, the court highlighted the fact that the plaintiff’s expert had anticipated their objections and had explained the reasoning behind his decisions in his report.

**Recommendations for I-O Psychologists Dealing With a Court Challenge**

1. Carefully consider challenges to your analyses (e.g., which statistical model to use) and prepare explanations for why you have made those choices.

2. If you have missing data, be prepared to cite supporting literature for the approach you take in analyzing the data.

3. If there is evidence that performance ratings account for salary differences, and you wish to attack the pay system, be ready to provide strong evidence that discrimination really has an effect on those ratings. Merely stating that “discrimination affects performance ratings” is not likely to be accepted by the courts.

4. Lumping all employees together across different divisions or geographic locations may not be sufficient in supporting class certification; separately analyzing pay differences by division or unit may reveal that discrimination is not pervasive throughout an organization.
Summary

In sum, statistics can be used to either attack or support the fairness of an organization’s pay system. At the very least, I-O psychologists should become familiar with the use of multiple regression analysis as well as other statistical techniques for examining discrimination issues in regards to pay. We also recommend that I-O psychologists become familiar with the factors that go into an organization’s compensation system and how compensation decisions are made. It is also beneficial to be aware of how government agencies audit compensation and what trends are occurring in court cases dealing with compensation. This will allow one to incorporate an I-O psychologist’s understanding of statistics and determining significance with the realities organizations face today in the area of compensation.

Please feel free to contact either Michael M. Harris (mharris@umsl.edu) or Mary Suszko (mksuszko@aol.com) with any comments, reactions, experiences or questions regarding pay discrimination and statistical analyses.