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ABSTRACT

Differences in instructional workload between men and women college faculty were studied at a large, land-grant university. The following variables were investigated: number of weighted student credit hours, number of sections taught, number of different courses taught, and didactic hours by level of course. Because the faculty members varied in their full-time-equivalent instructional effort, it was necessary to normalize the data. Fall 1979 data were considered for full-time assistant professors in the academic colleges. Weighted student credit hours, derived in part from a state budget formula, were applied to credit hour production by student level. Didactic hours, which were an estimate of the amount of effort required for an instructional activity, were based on the type of course taught. For classroom only, the course credits were considered. For nonclassroom instruction, the number of didactic hours taught were considered in terms of student credit hours. When male and female faculty were compared for equity of instructional activity taking their college into consideration, there was no significant difference by sex or from the interaction of college with sex. When a balancing technique was used to review male and female faculty by departments, no significant differences were found in the pattern of instructional activity within the group of departments being compared. Based on the variables considered using multiple regression, an equity of treatment for men and women on teaching assignments was found. (SW)

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Equity in Instructional Workload

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This paper was presented at the Twenty-Second Annual Forum of the Association for Institutional Research held at the Denver Hilton Hotel in Denver, Colorado, May 16-19, 1982. This paper was reviewed by the AIR Forum Publications Committee and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC Collection of Forum papers.

D. R. Coleman, Chairman
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Equity in Instructional Workload

Abstract

In recent years salary equity has been the focus of studies dealing with equity. This paper extends the concept of equity to include faculty instructional activities or workload. In an effort to determine to what extent instructional efforts differed between men and women at a large, land-grant university, the following variables were investigated: number of weighted student credit hours, number of sections taught, number of different courses taught, and didactic hours by level of course. Because the faculty members varied in their full-time-equivalent instructional effort, it was necessary to normalize the data. When men and women were compared for equity of instructional activity (MANOVA) taking their college into consideration, there was no significant difference by sex or from the interaction of college with sex. When a balancing technique was used to review men and women by departments, again no significant differences were found in the pattern of instructional activity within the group of departments being compared.

Equity in Instructional Workload

In recent years there has been a dramatic increase in concern over the equity of treatment for faculty in terms of salaries, promotion, and tenure decisions. Many of the studies have been conducted not only because of the philosophical and moral implications of equity, but also because of federal and state legislation, affirmative action programs, and court cases involving discrimination. A review of the literature reveals that the major focus has been on salary equity (Hengstler, Muffo, and Hengstler, 1982; Simpson and Rosenthal, 1982; Braskamp, Muffo, and Langston, 1978; Pezzullo and Brittingham, 1979; and McCabe and Anderson, 1978). The paper by Hengstler and associates (1982) has given a full overview of studies in salary equity; the purpose of this paper is to extend the concept of equity to include faculty instructional activities or "workload." The contribution of this approach is twofold. First it presents a statistical analysis to survey activity in the personnel area within the institution. Second and more importantly, it extends current techniques in handling a multivariate criterion. Salary, promotion, and tenure have been expressed as single measures using univariate statistical techniques; however, workload is currently best represented as a profile of activities requiring the use of techniques different from those previously applied to the question of equity, that is, multivariate procedures.

One major difficulty in determining equity has been and continues to be determining comparability of individuals, for the problem of comparability appears to be critical to salaries and to workload with numerous studies showing that both differ by discipline area (see Braskamp et al., 1978).

There are several statistical approaches that can be used to compare the differences between two groups of individuals. The chief criterion for selecting one procedure over another is to allow a clear analysis of the facts and understanding of the results. Generally, the simplest technique is preferred, but sophistication is often required when the situation and the data do not meet the assumptions of a simpler procedure. Simpson and Rosenthal (1982) give a current and useful critique on the problems faced when presenting statistical evidence and the need for procedures which will differentiate.

One frequent difficulty when comparing two intact groups occurs when the measure of interest is confounded with one or more extraneous variables. In this study which reviews instructional workload, the confounding variables include curriculum, teaching experience, and years toward tenure. The appropriate statistical response to this problem, we argue, is to include the confounding variable or variables in the model used to explain the measure of interest. The unexplained variation of the observations from the scores explained by the model becomes the yardstick to evaluate the statistical significance between the scores of the two intact groups. When the groups are balanced on the confounding factor, the difference in means on the variable of interest gives an appropriate measure of the difference. If the groups are not balanced, the appropriate difference must be obtained by a more complicated procedure known as "Least Squares Means" (SAS, 1979); therefore, to avoid this complexity we selected a procedure to obtain balanced group sizes.

Several major procedures are suitable for analyzing data which include the primary confounding factor, which in this analysis is curriculum. The two which are widely used are multiple regression and two-factor analysis of variance.

The use of multiple regression implies the comparison of two equations to explain the criterion; one equation with a measure of curriculum and a second equation with both a measure of curriculum and of sex. The decrease in the unexplained variation between the two models is compared to the unexplained variation in the second model to determine if the independent variable (in this case sex) significantly improves the ability to explain the criterion, given all other factors are held constant. This is somewhat analogous to testing the difference in the average criterion score of men versus women after correcting for differences due to curriculum. The problem with this procedure is that it makes no provision for the nonlinear interactions of sex and curriculum, an interaction which might exist and hence influence the conclusions of the analysis.

The interaction of sex with curricula can be determined by using an analysis of variance, a procedure more appropriate for this study. In analysis of variance statistical significance is evaluated based on the unique variation accounted for by a factor (e.g., sex or curriculum). If it is assumed that the full set of curricula are included (e.g., curriculum is a fixed factor), an appropriate conclusion can be made <u>if</u> all cells (sex by curricula) have at least one observation. If some of the cells are vacant, however, a difficulty arises when interpreting the results of the main effects, for the component of the interaction attributable to the vacant cells is confounded with the main effects. If one wishes to consider the categories of curricula to be a random sample (say, in order to generalize the results to a much broader group of curricula), then this requires the use of the interaction term to test the significance of difference due to sex. When one has unequal cell sizes, standard procedures of computing an F ratio will not produce exact results, for in fact, the sum of squares do not follow a chi square distribution because of the unequal cell sizes.

In general, the two administrative measures available to identify curricula are college and department. This research used analysis of variance (ANOVA) in order to consider curriculum a random factor and it used the interaction term to test the significance of sex in explaining workload. As might be anticipated some departments had vacant cells, and the data for these departments were removed from the analysis. Removing these data caused 92 men and 5 women to be dropped, but the study retained 76% of the original sample and 94% of the women in the sample. The reduction left 30 departments with both men and women.

The workloads of the same-sex faculty within a given department were averaged, and this average was used as the unit of analysis. This aggregation step allowed for analyses which considered only one main effect, that of sex. The next step in the procedure was to compute for each department the difference in workload between men and women. The third step was to compare statistically the differences between men and women against the null hypothesis of zero, that is, no significant difference exists in workload between men and women. The variation in these differences is analogous to the variance attributable to the interaction term in a two-factor ANOVA. Our procedure of counterparting also produced proportional (equal) cell sizes without excluding a large number of observations.[1] The

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[1]If one were to have created proportional cells (i.e., equal number of men and women by department) another 154 observations would have been excluded (including 8 more females). The result would have been an analysis on about one-third of the original sample.

difficulty with this procedure, however, was the potential for unequal variances of observations, for the observations were means with an average of 7.4 men and 2.8 women for each department.

After considering major alternative techniques, we elected to use results from the analysis of average workload of same-sex faculty by department in order to determine comparability of workload for men and women. In addition, the importance of years of experience was investigated by using it as a covariate in another analysis.

A second difficulty in determining equity is quantifying faculty activities. There is no accepted manner to equate the myriad of committee assignments, instructional activities, service activities, creative scholarship, or professional endeavors in which faculty members engage. Such activities and others not mentioned contribute to a faculty member's workload, but even attempting to analyze total effort, given current data bases, is to ensure disaster. In this study we focused on assigned instructional load to study workload and equity. The rationale for this approach stems from the fact that instructional load represents the major responsibility assigned to many instructional faculty. While a definitive procedure does not appear to exist to combine instructional-type endeavors into a score proclaimed to be "instructional workload," two dimensions of instructional workload which can be quantified and which are typically found in higher education are faculty contact hours and student credit hours generated. At the institution in this study, faculty contact hours are measured as Didactic Hours, a weighted combination of contact hours where different weights are applied to the course credit hour value for different types of classes (lecture, laboratory, research); student credit hour generation is measured as Weighted Student Credit Hours (WSCH) where different weights are applied to the credit hours taught students at different levels, for example sophomore versus junior levels. The weights for these measures are discussed later in this paper. In addition to including these two overall measures of activity in this study, the number of different courses and sections taught were also used to represent instructional activity.

With workload defined, therefore, as number of didactic hours and weighted student credit hours taught plus the number of different courses and total sections taught, the evaluation of equity was made by comparing the profile of instructional activity for a sample of women and a comparable sample of men. We used Hotelling's T^2 for paired data (Clyde, 1969) for this comparison. A difference in profile is a necessary but not sufficient condition to establish inequity, since being high on one factor, say WSCH, may be offset by being low on another, say different courses. In the final analysis equity rests in the judgment of the collegium.

Procedure

Using faculty data for fall 1979, the full-time assistant professors in the academic colleges were identified. Department heads, faculty on leave, and faculty in the College of Veterinary Medicine were excluded. Only those assistant professors with some instructional funding in each of the three quarters of the 1979-80 academic year were included in the study. Finally, the investigators excluded from the present analysis the faculty with tenure, leaving a sample[2] of 314 men and 88 women at the rank of assistant professor who had had not received tenure.

The following variables were investigated to determine to what extent instructional efforts differed: weighted student credit hours, number of sections taught, number of different courses taught, and didactic (contact) hours by level and type of course. Since the FTE instructional effort differed among faculty members, it was necessary to normalize any part-time effort to obtain comparability for all faculty. For example, if a faculty member had a 0.50 FTE instructional effort for the academic year and taught 450 weighted student credit hours, the normalized value would be 900 weighted student credit hours (450 divided by 0.50) for that individual. As a consequence of normalizing, a faculty member whose teaching assignments had been reduced to 50 percent with the other part of effort devoted to a research project had this 50 percent changed to reflect an equivalent value of activity.

Weighted Student Credit Hours

Weighted student credit hours (WSCH), derived in part from a state budget formula, were applied to credit hour production by student level. The weights by student level were as follows:

Lower Division	1.00
Upper Division	1.67
First-Year Graduate	2.50
Advanced Graduate	3.13

[2] We believe the term "sample" as used in this context is appropriate to imply the generalization of results over similar years of operations at the institution in this study.

A three-hour course with 10 lower-division students and 10 upper-division students would result in 80.10 WSCH:

$$(10 \text{ LD} \times 3 \text{ SCH} \times 1.00) + (10 \text{ UD} \times 3 \text{ SCH} \times 1.67) = 80.10 \text{ WSCH}$$

The average normalized weighted student credit hour load for an academic year is presented in Table 1 by men and women. The average load was lower for the women who taught 901 WSCH compared with 957 WSCH for the men.[3]

Didactic Hours

Didactic hours, which are an estimate of the amount of effort required for an instructional activity, are based on the type of course taught. For classroom activity (lecture, laboratory, and recitation), only the course credits are considered:

1 Lecture Credit	= 1	Didactic Hour
1 Laboratory Credit	= 1.8	Didactic Hour*
1 Recitation Credit	= 1	Didactic Hour

*For the College of Architecture and for the Art Department, 1 Laboratory Credit = 1 Didactic Hour.

For nonclassroom instruction, the number of didactic hours taught is considered in terms of student credit hours (SCH):

1 Research SCH	= 0.12	Didactic Hour
1 Independent Study SCH	= 0.12	Didactic Hour
1 Practicum SCH	= 0.06	Didactic Hour
1 Unsupervised Activity SCH	= 0.06	Didactic Hour
1 Tutorial SCH	= 0.50	Didactic Hour

The average normalized didactic hour load by men and women is given in Table 1. The women had a slightly heavier average load with 26.84 didactic hours compared with 24.31 didactic hours for the men.

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[3]The reader is reminded of the methodology being employed and cautioned not to interpret these initial numbers as showing an inequity in workload between men and women.

Sections and Courses Taught

The number of sections and courses taught during the academic year was obtained from teaching load data. Certain research and special courses were deleted from the totals in order to obtain a better value for the number of different course preparations.

The section and course data were normalized also. For example, if a faculty member had a teaching effort of 0.50 FTE and taught 5 sections, the normalized value would be 10 sections. The average number of sections taught by women was 8.89 compared with 8.68 for the men. The average number of different courses taught by women was 5.28 compared to 4.82 for the men (Table 1).

Didactic Hour Load by Level of Course

The didactic hour load by level and type of course was analyzed to see if any differences existed between the two groups of nontenured assistant professors. In reviewing the average load by course level, slight differences were found. Table 2 gives the average didactic hour load by level of course and by men and women.

Table 1

Average Values of the Variables[a]

VARIABLE	MEN	WOMEN	COMBINED
Years of Credit Toward Tenure	2.30	2.25	2.29
FTE Instructional Effort	0.86	0.90	0.87
Weighted Student Credit Hours	956.55	900.52	944.29
Didactic Hours	24.31	26.84	24.86
Sections Taught	8.68	8.89	8.73
Courses Taught	4.82	5.28	4.92
Didactic Hours by Level of Course			
Lower Division Lecture	5.50	7.55	5.95
Lower Division Laboratory	1.09	1.07	1.08
Lower Division Research	0.09	0.05	0.09
Upper Division Lecture	8.80	7.45	8.51
Upper Division Laboratory	1.89	1.49	1.80
Upper Division Research	1.19	3.71	1.74
Graduate Lecture	3.42	2.93	3.31
Graduate Laboratory	0.25	0.02	0.20
Graduate Research	2.08	2.57	2.19

Table 2

Normalized Average Didactic Hour Load by Level of Course

COURSE LEVEL	MEN	WOMEN	COMBINED
Lower Division	6.68	8.67	7.12
Upper Division	11.88	12.64	12.05
Graduate	5.75	5.53	5.70

[a]Values are given on an academic-year basis.

As shown in Table 1, differences emerged in the patterns of instructional activity between the men and women nontenured assistant professors. For example, men on the average had higher WSCH loads, but women taught more didactic hours.

Before yielding to the temptation to compare the instructional workload of men versus women, it is necessary to test the relevance of discipline in determining the profile of instructional activity; after all, if a difference of instructional activity exists among the colleges, then a difference would be expected regardless of who conducted the instruction. Using college as a measure of discipline, we found that different disciplines had different instructional traditions. This difference occurred when using the MANOVA for the four overall measures of WSCH, didactic hours, number of courses, and number of sections ($F = 4.31$, $p < .0001$, $df = 24/1562$) and when reviewing the didactic hours by level and type of course ($F = 6.36$, $p < .0001$, $df = 54/2312$). In addition, the univariate tests showed significant differences ($p < .05$) for all variables with the exception of didactic hours (contact hours) for lower division research courses. Based on these results, discipline does make a difference and needs to be considered in any analysis which compares the workload of men and women.

Table 3 illustrates this point by displaying by college the means for men and women. Inspection suggests that workload differences among the colleges may be greater than the differences between men and women. In order to correct for the influence of curricula (or college) on the pattern of instructional activity, we used two statistical procedures. The first procedure was to consider college as a factor along with sex through use of a two-factor analysis of variance. This statistical technique, as noted previously, allowed for testing differences due to college, to sex, and to the interaction of sex and college.[4]

The second procedure was to develop and analyze a summary data base balanced by sex and department, a procedure similar to that discussed by Braskamp et. al., 1978. This analysis which used Hotelling's T^2 for paired data, is the multivariate analogue to a "t" test, paired by department. A summary of the results appears in the Appendix, Part II.

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[4]Probabilities for these tests are contained in the Appendix to this report, Part I.

Table 3

Average Values of the Variables by College

VARIABLE	STANDARD ERROR	COLLEGE I	II	III	IV	V	VI	VII
Years of Credit Toward Tenure								
MEN		2.33	2.67	2.68	1.62	2.50	1.65	3.25
WOMEN		2.50	3.43	2.03	2.00	1.75	3.00	3.00
FTE Instructional Effort								
MEN		0.56	0.97	0.96	1.00	0.64	0.86	0.93
WOMEN		0.30	0.90	0.97	0.98	0.82	1.00	0.82
Weighted Student Credit Hours	556							
MEN		1128.87	837.58	900.34	980.11	860.47	965.38	902.35
WOMEN		1584.30	609.82	784.41	927.67	842.87	1047.59	1355.77
Didactic Hours	12.7							
MEN		29.17	23.48	21.90	17.73	33.50	27.70	21.31
WOMEN		36.11	19.27	24.37	16.75	28.48	23.44	38.80
Sections Taught	5.16							
MEN		10.71	8.47	7.93	5.76	11.01	9.97	9.01
WOMEN		12.29	7.03	8.01	5.30	8.84	9.50	13.35
Courses Taught	2.97							
MEN		5.48	4.87	4.46	3.24	7.69	5.34	4.27
WOMEN		8.86	4.66	5.08	3.27	6.15	5.00	5.15
Didactic Hours by Level of Course								
Lower Division	9.21							
MEN		4.99	3.83	9.41	0.29	5.33	8.65	1.25
WOMEN		9.77	6.00	12.67	1.87	3.06	12.95	8.50
Upper Division	11.07							
MEN		13.56	12.85	8.77	13.81	19.60	12.99	15.00
WOMEN		11.79	7.37	10.13	10.47	18.36	10.49	15.51
Graduate	8.53							
MEN		10.61	6.81	3.72	3.64	8.57	6.06	5.06
WOMEN		14.55	5.90	1.56	4.40	7.05	0.00	14.79
Number of Nontenured Assistant Professors								
MEN		55	15	128	42	18	52	4
WOMEN		2	7	39	5	20	2	13
K		1.39	2.19	5.47	2.11	3.52	1.39	1.75

NOTE: K is computed as $\sqrt{N_1N_2/(N_1+N_2)}$ where N_1 and N_2 are the number of males and females in the college. K is multiplied by the difference in means and divided by the standard error to consider the implications of the differences in mean scores of men versus women. This results in a "t" statistic. (See the Appendix, Part III, for further discussion and example of this procedure.)

Findings

When analyzed in a manner to compare teaching load of men and women after correcting for college differences, there were neither significant differences between the teaching loads based on sex nor was there a significant interaction of sex and college. The colleges, apparently, have different expectations of their faculty members, and, as a consequence, the differences between men and women which initially appeared to exist were not significant when college was considered.

While an analysis of men and women by college is more appropriate than a simple comparison based on sex, a second analysis, which is even more sensitive, was performed. In order to undertake this second statistical analysis, an aggregated data base of average activity levels for all nontenured men and women in each department was created. In other words a single record was created for all the sampled same-sex faculty in a given department by summing the activities of individuals for each index and dividing by the number of individuals. Data were retained where there were both men and women in a department (i.e., there were two typical records developed: one for men and one for women). This approach implied that the two typical faculty for a department were comparable on all relevant characteristics, while at the same time it allowed the researchers to retain a much larger proportion of the data than one-to-one matching would permit.

In terms of individual observations, this counterparting procedure produced an average of 7.4 men and 2.8 women for each of the thirty departments. In terms of the statistical efficiency of this procedure, the drop from 402 individual observations to the 60 aggregated records was substantially offset by the reduction of variation in the items due to the averaging over observations. This procedure balanced sex within department and thereby diminished the need to include a measure of curricula in the design.[5]

The results of this counterbalancing analysis showed that over these 30 departments there were no significant differences in patterns of teaching activity (as measured in this study) between the pattern of teaching activity of the typical men and typical women, $p > .1$ (specific results are shown as Part II of the Appendix to this report). Additional analyses using a square root transformation on the measures of instructional activity (to reduce the skewness of the distributions) and using years of experience as a covariate also failed to show any significant differences based on sex.

Conclusions

When reviewing the profile for nontenured men and women, differences in workload, as defined in this study, were not found to be significant when the different teaching practices or assignments of the various colleges were considered. In addition, there were no significant differences between the sexes in a department by department balancing based on the typical same-sex faculty in each department. While there are always differences in individual cases on any criterion, these differences did not emerge as

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[5] While it is possible that an interaction of sex and department exists, it cannot be tested since there is only one observation per cell and therefore no residual error term exists. However, differences between men and women were computed for each department and the mean difference across departments was compared against zero. This represents a multivariate analogue to a paired "t" test. Such a procedure showed no difference in work activities of men and women.

significant when considering the variations attributable to discipline for the same-sex faculty. Based on the variables compared for men and women in this study, we found, after considering the unique discipline practices, an equity of treatment for men and women on teaching assignments.

Implications

Institutional researchers are the focal point of knowledge needed and developed to evaluate the equity of personnel practices for faculty. Over the last several years institutional researchers have moved to enhance the knowledge concerning salary equity using multiple regression. In this paper the definition of equity has been expanded beyond the univariate domain of salary to the multivariate profile of instructional workload. The use of multivariate techniques can expand our ability to answer increasingly complex questions about equity.

Appendix

Part I

Statistical Results

College x Sex Analysis (MANOVA)

Overall measures, probability of a larger F under the null hypothesis

Variables	College	Factors Sex	College x Sex
WSCH	.0051	.5416	.5250
Didactic Hours	.0001	.5226	.1538
Sections Taught	.0001	.7595	.6290
Courses Taught	.0001	.5988	.3828
Overall MANOVA (Wilk's λ)	.0002	.8824	.6538

Specific Types and Levels of Didactic Hours (Probability of obtaining a larger F value under the null hypothesis.)

Variables	College	Factors Sex	College x Sex
Lower Lecture	.0001	.0117[a]	.7999
Lower Laboratory	.0247	.6668	.7528
Lower Research	.6785	.3219	.0301[a]
Upper Lecture	.0001	.0714	.8108
Upper Laboratory	.0001	.5201	.0694
Upper Research	.0029	.0094[a]	.6832
Graduate Lecture	.0672	.2580	.3681
Graduate Laboratory	.0001	.5169	.8810
Graduate Research	.0001	.8718	.5434
Overall MANOVA (Wilk's λ)	.0001	.2206	.4099

[a] Since the overall test showed no significant difference, we must assume that these variations occurred by chance.

Part II

MANOVA on analysis of aggregated data (balanced by Department by sex)

Overall measures, probability of a larger F under null hypothesis: Men vs. Women

Variables	Probability
WSCH	.394
Didactic Hours	.993
Sections Taught	.141
Courses Taught	.881
Overall MANOVA (Wilk's λ)	.202

Specific Types and Levels of Didactic Hours (Probability of a larger F under null hypothesis: Men vs. Women)

	Lecture	Laboratory	Research
Lower	.094	.881	.560
Upper	.354	.367	.164
Graduate	.099	.198	.641

Overall MANOVA (Wilk's λ): .304

Part III

Statistical Notes

In order to obtain a statistical sense of the relevance of the difference between two averages, it is useful to view the difference on the measure relative to the unexplained variation. In determining probability it is necessary to consider the number of observations on which the averages are computed. The following discussion is provided for those who want additional information on the various groups shown in Table 3. The reader should bear in mind that the interaction of college and sex is not statistically significant. While some of the computations for specific comparisons may have large ratios, the overall test of interaction confirms that the interaction is not significant.

The measure of unexplained variation is the within, or error, standard deviation. In order to evaluate the significance of a difference, this value, which is shown in Table 3 as the Standard Error, is divided into the difference between two group means and the result is multiplied by a function of the group sizes. These factors for comparisons of men versus women are shown in the row called "K" in Table 3. Because of the large number of observations, the resulting number is compared to a normal distribution table to establish the statistical significance. For example, the Standard Error for WSCH is 556. To compare men versus women, for example in College I, the difference (1128.87 - 1584.3 = -455.43) is divided by 556, and the result is multiplied by the value of K for College I (1.39) giving the Statistic -1.14. A "z" with an absolute value this large or larger will occur about one time in four in cases where there is, in fact, no difference in the population. The results indicate that the difference of men versus women is not too surprising, given the variability of WSCH within the subgroups and the number of individuals included in the comparison.

The reader is encouraged to make any comparisons desired bearing in mind that some of the specific comparisons are going to yield high numbers by chance alone.

References

Braskamp, L. A., Muffo, J. A., and Langston, III, I. W. Determining salary equity: policies, procedures, and problems. Journal of Higher Education, 1978, Vol. 49, No. 3.

Clyde, D. J. Multivariate analysis of variance on large computers. Miami, FL.: Clyde Computing Service, 1969.

Hengstler, D. D., Muffo, J. A., and Hengstler, G. A. Salary equity studies: the state of the art. Paper presented at the annual meeting of the Association for the Study of Higher Education, Washington, D. C., March 3, 1982.

McCabe, G. P., and Anderson, V. L. Sex discrimination in faculty salaries: a method for detection and correction. Proceedings of the American Statistical Association, 1978, 589-592.

Pezzullo, T. R., and Brittingham, B. E. Salary equity. Lexington, MA.: Lexington Books, 1979.

Simpson, W. A., and Rosenthal, W. H. The role of the institutional researcher in a sex discrimination suit. Research in Higher Education, 1982, Vol. 16, No. 1.

Statistical Analysis System. Documentation: SAS user's guide, 1979 edition. Raleigh, North Carolina: SAS Institute Inc., 1979.