INTRODUCTION

In February 1996, President Richard L. McCormick requested that Vice Provost Steven G. Olswang and Assistant Provost for Equal Opportunity Helen Remick initiate a campus-wide salary study. The purpose was to "focus on determining whether there are individual faculty members, based on their race or sex, who are being inappropriately paid because of factors other than performance." (Appendix A). Vice Provost Olswang and Assistant Provost Remick held consultations with Acting Provost David Thorud, the Board of Deans, the Faculty Senate Special Committee on Minority Affairs and the Faculty Senate Special Committee on Faculty Women, and the Faculty Senate Committee on Planning and Budget in order to determine the nature of the study. These discussions resulted in a design for the study which included those faculty members on the payroll in October 1995 in all schools and colleges except the School of Medicine. The focus was to be on ascertaining any overall patterns of sex and race differences, in large part because individual salary determinations include factors for which there were no ready measures.

An Advisory Committee to the Faculty Salary Study was appointed by Acting Provost Thorud under the leadership of Assistant Provost Remick. Membership included: Research Scientist Kevin Cain, Department of Biostatistics and School of Nursing; Professor Ana Mari Cauce, Department of Psychology and Chair, Faculty Senate Special Committee on Minority Affairs; Associate Professor Loveday Conquest, College of Ocean and Fishery Sciences (after June 1996); Professor Paula Diehr, Departments of Biostatistics and Health Services; Dean G. Ross Heath, College of Ocean and Fishery Sciences (until June 1996); Dean Sue Hegyvary, School of Nursing; Assistant Professor Marieka Klawitter, Graduate School of Public Affairs and member, Faculty Senate Special Committee on Faculty Women; Professor Shelly Lundberg, Department of Economics; Professor James Morishima, Department of American Ethnic Studies and College of Education; Associate Professor Ellen Olshansky, Department of Family and Child Nursing and Chair, Faculty Senate Special Committee on Faculty Women (until June 1996); and Vice Provost Steven Olswang. Staff support included: Ms. I-Yu Chiu, graduate student in Biostatistics; Mary Gistarb, Equal Opportunity Office; Mr. Philip Hoffman, Planning and Analytical Studies; and Ms. Ellen Morley, Equal Opportunity Office. Professor Diehr directed the statistical analyses, and Ms. Chiu performed them.

This report is in the form of a summary of the findings. Persons wishing to look at the actual regression results may request a copy of them from the Equal Opportunity Office, Box 354560, University of Washington, 4045 Brooklyn Avenue N.E., Seattle, WA 98105-6261, email EOO@u.washington.edu.
METHODS

The intent of the study was to address whether within the faculty as a whole there are inappropriate salary differentials between male and female or among race and ethnic groups. A conclusive answer to this question would require extensive information on the performance of individual faculty members, including measures of research or creative output and its significance, teaching performance, and service to the University and the community. In the absence of these data and of a consensus as to how to measure them, we have used a limited number of available characteristics which are believed to be related to performance and market factors that, in turn, are valid determinants of compensation. It should be noted that these variables are, at best, partial indicators of appropriate compensation, accounting in this study for three quarters of the variance but leaving a quarter of the variance unexplained.

Faculty included in study

The study was based on the October 1995 payroll of 3069 full-time faculty on at least 9 month appointments in the job titles in the Ladder and Research Faculty. The following decisions were made to determine the final group of faculty to be included in the study. Faculty in the School of Medicine were excluded. Only faculty paid by the University of Washington were included. Three top administrators were not included (President McCormick, Acting Provost Thorud, and Vice President Johnson). The Bothell and Tacoma campuses were excluded. 1820 faculty remained in the cases selected for further study.

Dependent Variables

The dependent variable was monthly salary. Faculty included in this study have base 9 and 12 month appointments. Those on 12 month appointments receive 11 months of salary paid over 12 months. It is therefore necessary to convert the monthly salaries of those paid over 12 months by a factor of 12/11 in order to make the monthly salaries comparable. All further references to salary will be to this converted monthly amount. Most of the analyses are based on the logarithm (base 10) of salary, for two reasons. First, the distribution of log salary is more normally distributed or “bell-shaped” than the distribution of salary, making various statistical tests more appropriate. Second, analysis on the logarithmic scale allows us to assess gender or race differences in salary as percentages rather than as absolute dollar amounts. Since raises tend to be given as percentages, we feel that the percentage interpretation is to be preferred.

Adjustment Variables

Decisions on variables were guided by availability of data, results of salary studies conducted by other universities, and published research on salary studies of faculty. As in other equity studies, the effect of sex and race on salaries was measured indirectly by accounting for other factors related to salary. This is obviously not a totally satisfactory approach. For example, faculty and administrators of the University of Washington conceptualize its salary structure as
based primarily on market forces and merit/productivity, yet direct measures of these variables do not exist. Interpretation of the findings are therefore limited by the available variables.

For purposes of this study, the committee defined five general factors that could explain aspects of salary: Degree, Years of Experience, School factors, Other factors, and Job title (later referred to as D, Y, S O and J, respectively). These are all factors known or expected to affect a person's salary. We attempted to operationalize each factor using available data. Following is a brief explanation of the adjustment variables.

Degree is measured as the person's highest academic degree. Years is measured by three related variables: years since highest degree, years at the UW, and FTE years (e.g., a person employed half-time for 10 years would have 5 FTE years). FTE years are known only since 1975. These measures will not necessarily reflect non-academic experience or experience outside the UW.

School is meant to acknowledge the fact that some groups of faculty members can command higher salaries than others because in the academic and sometimes larger job market their fields are more highly compensated. We used University of Washington academic units (colleges and schools, with the College of Arts and Sciences divided into four subunits) to represent these factors. Analyses that include the school factors thus compare each faculty member's salary to the average salary of his or her school. The committee looked as well at analyses using department instead of school; however, this variation made no difference on the gender or race findings and involved considering a much larger number of variables, so we report only the adjustments by school.

Other factors may play a role in determining salary. Data were available on the kind of teaching done in 1995 (lower division, upper division and graduate); honors such as teaching awards or endowed chairs; salary increases in response to competitive offers and preemptive salary adjustments; and research money and amount of support for students received in 1995. These measures can only partially describe faculty productivity and performance but nonetheless comprise a much longer list of factors than usually included in studies of this type. Other important direct measures of productivity were not available. For example, publications are often used as a measure of productivity and peer evaluation of quality of work. It is also the case that publications and other forms of productivity take very different forms across disciplines, making definition and comparison a challenge. (A data file does exist on campus purporting to report the number of citations of published articles of University of Washington faculty in peer review journals. However, it was not possible to relate stated authorship to specific individuals. In addition, the particular edition (1993) of the database available to the committee appeared to be significantly abbreviated in its coverage. These data were therefore not included in the study.)

Finally, we considered Job title, which included rank, tenure track versus WOT versus research, administrative titles and previous administrative rank.
Analytic Strategy

The strategy of this study was, first, to document average salary differentials among groups and, second, to examine how much of this differential can be “explained” by sets of observable characteristics that we expect to be correlated with compensation. The remaining “unexplained” differential may be due to inequitable treatment of female and minority faculty or may reflect unmeasured differences in individual merit or market demand. Differences among groups may also originate from societal factors which, for example, influence which field of study individuals choose or in the past determined which field some groups were allowed to enter. Unadjusted findings for the University will reflect the effect of these factors on salary; adjusted results may attribute this effect to the influence of school. Other factors may arise at the University itself, so, for example, variables reflecting rank were included in the salary model on the last step in case minority and/or female faculty are promoted at different rates than similarly situated Caucasian male faculty members.

There are many determinants of faculty salaries for which data exist and which can be considered before assessing differences by gender or race. For example, salary is related to the length of time the faculty member has been employed, and on average, women at UW have fewer years of experience than men (average years since highest degree: 14.79 versus 21.62, and average years at UW 11.90 versus 17.20). This difference in experience would cause women to have lower average salaries than men, even if all people with the same amount of experience were paid at the exact same rate. Therefore an appropriate analysis must estimate what each person’s salary would be as a function of his or her experience (and other appropriate variables), and then examine the differences between his or her observed and “expected” salaries.

The study variables of interest are gender and race. Preliminary analyses were done to determine which race/ethnic groups were large enough to permit analysis of race and sex simultaneously. Asian and Caucasian groups were large enough to permit separation by sex; the other groups were not. This approach resulted in the analysis shown here in which Caucasian males were compared with Asian males, Asian females and Caucasian females, and with Blacks, Hispanics and American Indians not differentiated by gender.

The overall strategy was to present several hierarchical comparisons of salary by race and gender, with each comparison adjusting for more and more factors, and with the order of entry of the factors determined in part by perceived quality and completeness of the data and in part by potential for these variables to have been influenced by historical discrimination. This approach resulted in six regression models to predict salary and log salary. The first is unadjusted salaries and log salaries by gender and race. We then adjusted the salaries for Degree and Years, two variables relatively easy to measure and with reliable data. School was then added as a factor. We next adjusted for Other measures, which were added late on the hierarchy because of the limitations in the completeness and quality of the data. Finally, we adjusted for Job type. This factor was added last because of the possibility that it may reflect past discrimination.
FINDINGS

Dependent Variables

Average monthly salary was first calculated absent any adjustments. Table 1 presents the average salary for the different gender and race groups used in the analysis. The differences in average salary indicate the need for further exploration and explanation. As one looks at the findings, it is important to keep in mind that the numbers of people in the minority groups are relatively small.

TABLE 1

Average Monthly Salary

<table>
<thead>
<tr>
<th></th>
<th>Caucasian Male</th>
<th>Asian Male</th>
<th>Asian Female</th>
<th>Black</th>
<th>American Indian</th>
<th>Hispanic</th>
<th>Caucasian Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Salary</td>
<td>$6886</td>
<td>$6561</td>
<td>$4966</td>
<td>$6620</td>
<td>$5103</td>
<td>$5556</td>
<td>$5514</td>
</tr>
<tr>
<td>N</td>
<td>1207</td>
<td>89</td>
<td>22</td>
<td>43</td>
<td>8</td>
<td>28</td>
<td>423</td>
</tr>
</tbody>
</table>

To explore the factors behind the differences, regressions were run on salary and log salary, with and without the race/gender groups and adding adjustment variables. The results for regressions on salary are summarized in Table 2A. Column 1 shows the model used. The next 6 columns display the difference between salaries of Caucasian males and the individual groups. A minus sign indicates that the adjusted salary for a particular group is lower than the adjusted salary for Caucasian males, and a positive value indicates that the adjusted salary is higher. Asterisks indicate differences that are statistically significant. For example, we see in column one that Asian males average $325 per month less than Caucasian males with no adjustments and $241 less after adjustment for all factors (DYSOJ model). The 95% confidence interval for this difference means that we are 95% sure that Asian males have adjusted monthly salaries that are between $3 and $485 less than those of Caucasian males. The difference is statistically significant, as denoted by the asterisk. Looking at the first row, all groups have lower mean salaries than do Caucasian males; looking at the results of the DYSOJ model which adjusts for all of the variables, we see that all groups but Blacks have lower adjusted salaries than do Caucasian males, and the differences are statistically significant for Asian males, Asian females and Caucasian females. The last three models show fairly comparable salary differences, demonstrating that the potential problems with the Other and Job variables did not affect the results shown here. The last two columns show the value of $R^2$ with and without the race/gender variables.
### TABLE 2A

Summary of Analysis of Significant Combined Race and Sex Variables
As Dollar Difference from Caucasian Males
Adjusted Monthly Salary

<table>
<thead>
<tr>
<th>Model</th>
<th>Asian Male</th>
<th>Asian Female</th>
<th>Black</th>
<th>American Indian</th>
<th>Hispanic</th>
<th>Caucasian Female</th>
<th>R^2 without race/gender variables</th>
<th>R^2 with race/gender variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>none</td>
<td>-$325</td>
<td>-$1920*</td>
<td>-$2664</td>
<td>-$1783*</td>
<td>-$1331*</td>
<td>-$1372*</td>
<td>0.085</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>-$290</td>
<td>-$1850*</td>
<td>-$194</td>
<td>-$1144</td>
<td>-$1263*</td>
<td>-$1236*</td>
<td>0.073</td>
<td>0.141</td>
</tr>
<tr>
<td>DY</td>
<td>+$34</td>
<td>-$962*</td>
<td>+$300</td>
<td>-$366</td>
<td>-$870*</td>
<td>-$596*</td>
<td>0.334</td>
<td>0.352</td>
</tr>
<tr>
<td>Dys</td>
<td>-$239</td>
<td>-$663*</td>
<td>+$269</td>
<td>-$209</td>
<td>-$384</td>
<td>-$335*</td>
<td>0.484</td>
<td>0.489</td>
</tr>
<tr>
<td>DysO</td>
<td>-$330*</td>
<td>-$659*</td>
<td>+$311</td>
<td>-$96</td>
<td>-$445</td>
<td>-$357*</td>
<td>0.577</td>
<td>0.584</td>
</tr>
<tr>
<td>DysOj</td>
<td>-$241*</td>
<td>-$488*</td>
<td>+$170</td>
<td>-$408</td>
<td>-$254</td>
<td>-$271*</td>
<td>0.738</td>
<td>0.741</td>
</tr>
</tbody>
</table>

Confid Interval
- $3 to - $485
- $8 to - $968

DYSOJ

N 89 22 43 8 28 423

* Adjusted monthly salary is significantly different from Caucasian males (p<.05, 2 tailed).

**VARIABLES IN MODEL**

D: Degree as measured by highest degree.
Y: Years as measured by time since degree, time at UW and FTE time at UW.
S: School or college or division in Arts and Sciences.
J: Job factors such as current job category (e.g., tenured professor, assistant professor WOT, or research associate professor), current or past administrative appointments at three levels (dean or equivalent, chair or equivalent, and other).
Table 2B shows per cent differences between the race/gender groups and Caucasian males and is based on the log salary regressions. With no adjustments, the salaries of Asian females, American Indians, Hispanics and Caucasian Females are significantly lower than those of Caucasian males. After adjusting for all of the factors, all groups but Blacks had adjusted salaries less than those of Caucasian males, and the differences were statistically significant for Asian males, Asian females and Caucasian females.

[Table 2B here]

CONCLUSIONS AND RECOMMENDATIONS

Summary and Discussion

After adjusting for all of the available adjustment factor, the preceding analysis detected small but statistically significant differences in salary for Asian males (-$241 or -3.3% for DYSOJ), Asian females (-$488 or -7.7% DYSOJ), and Caucasian females (-$271 or -4.0% DYSOJ) from Caucasian males. For Hispanics and American Indians, there were consistent negative differences with statistical significance only at initial levels of adjustment; it is difficult to tell if these differences represent an over-all trend because the number of faculty in these categories is small. Differences in salaries between Caucasian males and Blacks were not significant and changed sign of the difference depending on the level of analysis.

Highest degree and years of experience alone explain about a third of the variance in salaries. When school is added, about half the variance is explained. Including job and other available factors still leaves one-fourth of the variance unexplained. Attention is drawn to the unexplained variance because of the paucity of data in this study on the performance measures associated with the traditional academic values of teaching, research and service. It should also be kept in mind that the study describes overall trends and not individual salaries. Differences in unmeasured factors may justify observed salaries—or may not. Review of individual records is necessary to draw conclusions about individual salaries.

Recommendations.

We have found small but statistically significant differences between Caucasian men and other race/gender categories which persisted after we controlled for a substantial number of factors. We recommend that each school review the salaries of its individual faculty members. It is important that a review focus on all faculty in the groups, since it is as much of a problem if high performing members of these groups are not compensated as well as high performing members of other groups as it is if average performers are not compensated at a similar rate.
### TABLE 2B

**Summary of Analysis of Significant Combined Race and Sex Variables**  
**As Per Cent Difference from Caucasian Males**

<table>
<thead>
<tr>
<th>Model</th>
<th>Asian Male</th>
<th>Asian Female</th>
<th>Black</th>
<th>American Indian</th>
<th>Hispanic</th>
<th>Cauca. Female</th>
<th>( R^2 ) without race/gender variables</th>
<th>( R^2 ) with race/gender variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>none</td>
<td>-4.8%</td>
<td>-27.1%*</td>
<td>-4.7%</td>
<td>-24.1%*</td>
<td>-17.7%*</td>
<td>-18.9%*</td>
<td>-</td>
<td>.095</td>
</tr>
<tr>
<td>D</td>
<td>-4.4%</td>
<td>-25.3%*</td>
<td>-3.6%</td>
<td>-16.2%</td>
<td>-16.9%*</td>
<td>-17.0%*</td>
<td>.078</td>
<td>.152</td>
</tr>
<tr>
<td>DY</td>
<td>+0.5%</td>
<td>-14.4%*</td>
<td>-4.2%</td>
<td>-5.5%</td>
<td>-11.7%*</td>
<td>-8.6%*</td>
<td>.357</td>
<td>.376</td>
</tr>
<tr>
<td>DYS</td>
<td>-3.6%</td>
<td>-10.5%*</td>
<td>+3.9%</td>
<td>-3.0%</td>
<td>-5.1%</td>
<td>-5.0%*</td>
<td>.515</td>
<td>.521</td>
</tr>
<tr>
<td>DYSO</td>
<td>-4.7%*</td>
<td>-10.6%*</td>
<td>+4.5%</td>
<td>-1.6%</td>
<td>-5.8%</td>
<td>-5.4%*</td>
<td>.603</td>
<td>.611</td>
</tr>
<tr>
<td>DYSOJ</td>
<td>-3.3%*</td>
<td>-7.7%*</td>
<td>+3.2%</td>
<td>-4.6%</td>
<td>-3.1%</td>
<td>-4.0%*</td>
<td>.769</td>
<td>.772</td>
</tr>
<tr>
<td><strong>Confid</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-2.1% to</td>
<td>-5.8% to</td>
</tr>
<tr>
<td><strong>Interval</strong></td>
<td>-0.1 to</td>
<td>-1.6% to</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DYSOJ</strong></td>
<td>-6.4%</td>
<td>-13.4%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| N | 89 | 22 | 43 | 8 | 28 | 423 |

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a 10^x(coefficient of variable) in log salary regression equations.  
* Adjusted log monthly salary is significantly different from Caucasian males (p<.05, 2 tailed).

### VARIABLES IN MODEL

D: **Degree** as measured by highest degree.  
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J: **Job** factors such as current job category (e.g., tenured professor, assistant professor WOT, or research associate professor), current or past administrative appointments at three levels (dean or equivalent, chair or equivalent, and other).