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OCCUPATIONAL GENDER BIAS REVISITED: METHODOLOGICAL IMPROVEMENTS

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Abstract

To investigate counsellor bias in occupational choice for female students, six short fictitious case studies were employed that could describe either a male or a female subject. One hundred fourteen randomly selected high-school counsellors chose occupations that paid less and required more supervision for female than for male case study subjects. The design and statistical analyses are presented and discussed in response to criticisms of research reported in counselling journals. The methodology used in the present study is suggested as being appropriate for investigations of responses to case studies where designated gender is the stimulus variable.

Résumé

Six brèves descriptions de cas fictifs pouvant s'appliquer tout autant à un sujet de genre masculin que féminin servent d'instrument pour étudier les biais des conseillers en rapport avec le choix vocationnel des étudiantes. Cent quatorze conseillers du niveau secondaire sont sélectionnés de façon aléatoire. Les résultats démontrent que, pour les cas fictifs de genre féminin, ils ont choisi des professions moins rémunératrices et comportant plus de supervision. La présentation et la discussion du devis expérimental et des analyses statistiques sont faites en fonction des critiques rapportées dans les revues spécialisées en counselling. Les auteurs suggèrent que leur méthodologie est appropriée à l'investigation des réponses à des études de cas dont le genre constitue la variable indépendante.

A number of researchers have suggested that counsellors in junior and senior high schools believe certain occupations to be inappropriate for women, that these counsellors react negatively to women who are interested in non-traditional occupations, and that counsellors encourage young women to follow stereotypic vocational paths (Ahrons, 1976; Bingham & House, 1973; Donahue & Costar; Medvene & Collins, 1976; Pietrofesa & Schlossberg, 1970; Stevens, 1971; Thomas & Stewart, 1971). Recent research at The University of British Columbia (Schroeder, 1979) explored counsellor bias in occupational choice for female students. The study largely replicated that of Donahue (1976) who reported that secondary school counsellors in Michigan, U.S.A. assigned occupations with lower salaries, more supervision, and less prerequisite education to female case study subjects.

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The purpose of Schroeder's study was to determine whether high-school counsellors in British Columbia would select a similar range of occupational choices for females as for males. Speciafically, it was hypothesized that, for female case study subjects, high-school counsellors would select lower paying occupations requiring less educational perparation and more supervision than occupations selected for identical male case study subjects.

Schroeder's main conclusions were similar to those of Donahue but her methodology was significantly different. The design and statistical analyses suggested by Donahue and Costar (1977) have been criticized by Smith (1979) as well as by Nygren and Widamin (1979). It would appear that Schroeder's design and analyses overcame a number of the objections raised and are therefore offered as an appropriate methodology for this type of investigation. Schroeder's methodology and major results are reviewed followed by a discussion in which Schroeder's and Donahue's approaches are compared. Modified excerpts from Schroeder's unpublished master's thesis have been included with her permission.

Method

The population for the study included all secondary school counsellors (N=490) who were registered members of the British Columbia School Counsellor Association in 1978-79. The sample consisted of 200 counsellors randomly selected from this membership list. Of this number, 138 counsellors (69%) returned questionnaires and 114 (57%) completed questionnaires in such a way that they could be used for data analysis. Of the 24 forms not useable, 10 were returned unopened while 14 involved either incomplete information, objections to the study, or the respondent stating that he or she was not a high-school counsellor.

Instrument

The stimulus portion of the instrument used in the study was developed by Donahue (1976). It includes six fictitious case studies constructed in such a way that each case subject could be designated either male or female. Data presented in the case studies included the subject's name, a measure of ability, socio-economic background, values, personality traits, measures of achievement and interest, as well as social pressures that might influence career choice.

Example:

> Rita is a better than average student whose best high-school grades have been in biology, history and art. She is good in abstract reasoning and spatial relations. Vocational interest survey indicates that she prefers to work with data rather than people or things. (Form A, Case 3)

Two forms of the questionnaire were developed by Donahue. On Form A the gender designation of the subjects was male for Cases 1, 4 and 6; female for Cases 2, 3 and 5. Form B used the same case studies as Form A, but in each case the subjects were given the opposite gender designation from those in Form A. All of the information in the case studies on Forms A and B was identical. Only the same of the case study subject and the gender of the pronouns were changed.

The 200 randomly selected counsellors were randomly divided into two groups and the two Forms – A and B – were randomly assigned, one to each group. The appropriate form was then mailed to each counsellor and the counsellor directed to read each of the six case studies in turn, selecting, for each case study subject, three appropriate occupations. The response selections were made from a list of 28 occupations that were carefully chosen to reflect the current work environment in Birtish Columbia.

These 28 occupations had been selected to provide an approximate uniform distribution of representative occupations on each of three variables – salary, level of prerequisite education, and level of supervision involved. Each of the 28 occupations was rated on a 7- point ordinal scale (Table 1) for each of the three variables. Local employment experts assisted in the development of each scale.

The final list of 28 occupations represented an average of four occupations at each of the seven ordinal scale levels on each of the three variables. After the returned questionnaires were received, the occupations chosen were assigned their ordinal scale values (coefficients) on each dependent variables.

Table 1

Criteria Used for Assigning Rank to Occupational Choices

Coefficient	Annual Salary	Education	Supervision
1	Below 10,000	No education required	Completely supervised
2	10,000–14,999	Less than high school	Closely supervised
3	15,000–19,999	High school diploma	Loosely supervised
4	20,000–24,999	Diploma or special training	Semi-autonomous
5	25,000–29,999	Apprenticeship	Partially supervisory
6	30,000–34,999	Bachelor's degree	Primarily supervisory
7	35,000 and above	Graduate degree required	Completely supervisory

Analysis

The assigned salary coefficients for the three occupations chosen by each counsellor for each case study sybject were averaged and this arithmetic mean taken as a measure for the salary variable. This was repeated for the prerequisite education variables as well as the supervision variable.

The resultant means, for each variable separately, were combined for both Forms A (n=57) and B (= 57) and all 114 means ranked. The Mann-Whitney U Test for ranked data was then applied to determine the equivalence of Forms A and B for each of the three variables. The same test was then used to compare results, case by case, across the equivalent forms.

Example: Counsellor 1 (Form A, Case 1)

Variable	Occupations Selected	Assigned Coefficients	Arithmetic Mean
Salary	a. Registered nurse	3	
	b. School administrator	6	5.33
	c. Corporation executive	7	
Education	a. Chartered accountant	6	
	b. Computer programmer	4	5.67
	c. School administrator	7	
Supervision	a. Architect	4	
	b. Mayor	7	6.00
	c. Corporation executive	7	

Results

For the purposes of this study, equivalence of forms was considered very important. If Form A resulted in significantly higher or lower scores than Form B, a comparison of scores (ranks) across forms, case by case, would not be valid. Again, each dependent variable – salary, education, supervision – was treated separately.

Each counsellor had selected three occupations per variable for each of six case study subjects. This resulted in a total of 18 selections per variable for each counsellor. For the purpose of determining the equivalence of forms, these 18 occupational selections per counsellor were assigned the appropriate ordinal coefficients and the arithmetic mean

calculated. As stated earlier, these means (n=114) were then combined and ranked. The Mann-Whitney U Test was applied to determine the statistical significance of any difference in mean ranks. Table 2 reveals that there was no statistically significant difference in mean rank between Form A and Form B on any of the three dependent variables. The forms were thus considered equivalent and any differences between "identical" cases (across forms) could be attributed to gender designation and not form differences.

Table 2

Mean Ranks Across Forms:
Remuneration Education and Supervision (All Cases)*

Mean Rank:	N	Remuneration	Education	Supervision
Form A	57	57.96	57.99	58.61
Form B	57	57.04	57.01	56.39
p		0.883	0.874	0.719

* Mann-Whitney U Test

The six case study subjects were then examined individually by ranking the combined arithmetic means (n=114) for Case 1 of Form A and Form B, for each variable – remuneration, education, and supervision. This test was repeated for each of the remaining five cases. Cases 1, 2, and 5, on the variables of remuneration and supervision were ranked significantly higher for "identical" male case study subjects than for female subjects (Table 3). Cases 3 and 6 showed no significant differences in mean ranks for males and females for the two variables. There was no mean rank difference for the education variable on any case except Case 4 where the average male rank was significantly higher than the female.

Table 3

Mean Rank of Remuneration, Education and Supervision
Across Form A and Form B for Each Case Separately*

	1	2	3	4	5	6
Case Sex						
Form A	M	F	F	M	F	M
Form B	F	M	M	F	M	F
Remuneration						
Form A	72.26	46.00	57.31	74.18	49.01	57.92
Form B	42.74	69.00	57.69	40.82	65.99	57.08
p	0.001	0.001	0.950	0.001	0.006	0.890
Education						
Form A	58.36	54.50	59.76	66.58	53.50	58.61
Form B	56.64	60.50	55.24	48.42	61.50	56.39
p	0.780	0.330	0.445	0.003	0.193	0.713
Supervision:						
Form A	71.55	47.75	54.23	67.65	50.68	58.77
Form B	43.45	67.25	60.77	47.35	64.32	56.23
p	0.001	0.002	0.277	0.001	0.027	0.677

*Mann-Whitney U Test

Discussion

A discussion of these results and their implications for counsellor training programs are presented elsewhere (Kahn & Schroeder, 1980). As stated above, the purposes of this paper are to present Schroeder's main results and to compare Schroeder's methodology with that of Donahue. Five methodological improvements are discernible and are discussed in turn.

Measurement Reliability

Donahue (1976) required each school counsellor to select one occupation suitable for each case study subject whereas Schroeder required three choices. Measurement theory suggests that a person's "true" score is the arithmetic mean of repeated measures (Stanley & Hopkins, 1972). The average of three measures is therefore a more reliable measure of occupational choice than one measure.

If reliability is taken to be a necessary condition for validity, the results of Schroeder's study are more 'believable' and likely to truly reflect gender bias. Differences in results for the 'education' variable between the two studies may be partly due to the measurement technique employed here.

Measurement Scales

Donahue's and Schroeder's three dependent variables were occupational remuneration, prerequisite education, and level of supervision. A 7-point scale was used for each variable to assign a numeral from 1 through 7 to each occupation. The scale appears to be ordinal in nature. As Nygren and Widamin (1979) point out, all three measures represent rating scales with "at best only ordinal properties" (p. 273). Donahue chose to use parametric statistical methods (ANOVA, MANOVA, t-test) to analyse his data, whereas Schroeder used the non-parametric Mann-Whitney U Test in her analysis.

Gardner (1975) has argued that the underlying assumptions associated with parametric tests are not greatly violated if the scale is at least quasi-interval. Donahue, no doubt, claimed this quasi-interval quality for the three variables and, therefore may be justified in using parametric statistical techniques. Glass, Peckham and Sanders (1972) have suggested that parametric statistics may be used even though some of the assumptions underlying ANOVA are not met exactly. The fact that Donahue's results are similar to Schroeder's appears to support the fact that the data generated could be analyzed using either parametric or non-parametric tests. The use of a non-parametric statistical test, however, is clearly appropirate for either ordinal or quasi-interval data.

Method of Comparison

Donahue used different scores in his comparisons and statistical analyses. The sum of the scores for the three female cases on each form was subtracted from the sum of the scores for the three male cases. As Donahue and Costar (1977) wrote, "Positive scores indicated a tendency to choose higher status jobs for male case study subjects... A negative score indicated a tendancy to choose higher status jobs for female case study subjects..." (p. 482).

Thus, Donahue compared sex differences within forms. Comparing within each form assumes equivalence of the three male cases and the three female cases. This was not established by Donahue. It is also germaine to note that difference scores compound the unrelability of each score used separately (Cronbach & Furby, 1970).

Schroeder, however, compared sex differences across forms. Case 1, as was true for all six cases, on Form A, was identical to Case 1 on Form B except for gender designation. It was therefore appropriate to compare across forms, not within each form. Comparing across equivalent forms promoted a comparison of identical case study descriptions, case by case. Thus, Schroeder compared each case across forms, avoiding the problems involved with using difference scores and using within form comparaisons.

Form Equivalence

Donahue found Form A and Form B not to be equivalent – one form resulting in higher overall scores than the other. He attempted to make them equivalent mathematically by adding the mean of the differences. This procedure led Smith (1979) to point out that, "...form effects, case effects, and the interactions among sex, form, and case are all confounded in this design" (p. 270).

Schroeder established the equivalence of the two forms using an appropriate statistical technique and then, based on form equivalence, compared case by case across forms. Since the counsellors were randomly and independently

chosen to complete either of the two forms, one can assume each group to be representative of the population of B.C. high school counsellors. The overall response to all six cases on Form A should be equivalent to the overall response on Form B. The result shown in Talbe 2 confirmed the equivalence of the two forms.

Gender Differences

Equivalent forms, in turn, made it possible for Schroeder to compare each case on Form A with its opposite gender "identical" case on Form B and to attribute any difference in mean rank to the gender-designation difference. thus avoiding the confounding problem referred to by Smith (1979).

Conclusion

Schroeder's (1979) results generally supported the main conclusions of Donahue (1976) in terms of high-school counsellor bias in selecting occupations for female case study subjects. Counsellors tended to choose occupations that were lower paying and required more supervision than for identical male case study subjects.

Donahue's results have been challenged by Smith (1979) as well as Nygren and Widamin (1979). They have criticized Donahue's design and statistical analysis.

Schroeder began with Donahue's general approach but made several significant changes. She achieved greater score reliability, used a non-parametric statistical test appropriate to the use of an ordinal measurement scale, established form equivalence and then made valid comparisons of gender differences of "identical" cases across forms. Her methodology is presented here as being suitable for this type of investigation and as one that overcomes the problems raised by Smith and Nygren and Widamin.

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