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ON MEASURING THE VOCATIONAL INTERESTS OF WOMEN

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ABSTRACT

Analyses both of the interrelationships of scales on common interest inventories and of the interest patterns of women selecting various occupations support the similarity of the structure of women's interests to the structure previously found for men. It is recommended that this information be used to provide women with information about more and more diverse career options than now commonly available.

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Nancy S. Cole

The application of civil rights laws to discrimination against women in hiring practices and in salary levels, the public attention gained by the women's liberation movement, and the increasing number of women who enter the work force each year seem to be combining to produce a large number of women with access to a greatly increasing variety of careers. Vocational interest inventories which have often been constructed primarily for use with men are commonly used to assist women in making career decisions. However, the investigation of such uses has necessarily been limited to concern with those occupations which women have entered in great numbers, traditional women's occupations. Therefore, it is increasingly important that the appropriateness of present inventories for use with women with access to the whole range of occupations be carefully examined.

Much research has suggested that present inventories yield several types of meaningful information about women's vocational interests. A number of studies have reported similar types of differences between career-oriented and home-oriented women (Astin, 1968; Gysbers, Johnston, & Gust, 1968; Harmon, 1970; Hoyt & Kennedy, 1958; Rand, 1968; Schissel, 1968; Surette, 1967; Wagman, 1966; and others). Astin (1968) and Harmon (1970) have studied the development of vocational interests in women using standard inventories, and Harmon (1969) examined the long-term stability of interest measures for women. Many occupational scales for women have been successfully validated (e.g., Campbell & Soliman, 1968; Darley & Hagenah, 1955; Harmon & Campbell, 1968; Strong, 1943). Thus, several types of useful information about women's vocational interests are provided by present inventories.

However, a number of questions remain about the use of present inventories with women considering vocations not traditionally associated with women. When the results of inventories center around women's occupational scales which have necessarily been limited to traditional women's occupations, the result may be to limit consideration to the occupations presented although, in fact, the options may be much broader. If there are similarities in the patterns and interrelationships of women's interests to those found for men, it may be possible to make inferences from data for women to the entire range of men's occupations, thus eliminating the limiting effect of using only the traditional women's vocations. It is the purpose of this paper to consider this possibility by examining the structure of women's interests, in terms of inventory scales and occupational groups, to compare this structure with that found for men, and finally to suggest what inferences, if any, can be made from women's interests to the entire career spectrum.

Study 1: The Structure of Women's Interests

In a recent paper, Cole and Hanson (1971) examined the structure of vocational interests of men in several interest inventories. Their results indicated a common structure (or pattern of interrelationships) of interests across all the inventories considered. The common structure followed the two-dimensional circular arrangement of scales proposed by Roe (1956) and Holland, Whitney, Cole, and Richards (1969). In Holland's terms the circular arrangement is from Realistic to Intellectual to Artistic to Social to Enterprising to Conventional and back to Realistic.

Cole and Hanson (1971) suggested that knowledge of such a circular arrangement could assist in the interpretation of the inventories, particularly with occupations for which no specific scales exist. In the case of women, interpretation in the absence of particular occupational scales could be especially useful in this time of vocational transition. Therefore, the purpose of Study 1 was to examine the structure of women's interests in the Strong Vocational Interest Blank, the Kuder Occupational Interest Survey, Holland's Vocational Preference Inventory, and the ACT Vocational Interest Profile to discover if a common structure existed and, if so, to explore how it compared with that found for men.

Method

The analysis of spatial configuration. Following Cole and Hanson (1971), an analysis of spatial configuration (Cole & Cole, 1970) was used to examine the relationship of scales for women in the four inventories, the Strong, the Kuder, Holland's inventory, and the ACT instrument. The analysis gave (1) the degree to which the variation on the scales can be accounted for by a two-dimensional configuration of the scales, and (2) the particular configuration of the interest scales when plotted on a two-dimensional surface.

Data. Separate correlation matrices of the scales in each of the interest inventories were submitted to the analysis described. The intercorrelations of 27 Strong occupational scales for 300 women were given in Strong (1959), and those for 19 Strong basic scales for women were taken from Campbell (1971, p. 168). The *Kuder Occupational Interest Survey Manual* (Kuder, 1966, pp. 56-57) gave intercorrelations of 21 core scales for 280 women. The intercorrelations of the 6 Holland scales for 2,433 women were reported in the *ACT Guidance Profile Manual* (The American College Testing Program, 1968, p. 29), and those for the 8 scales of the ACT inventory for 655 women were given in the *Handbook for the ACT Career Planning Program* (The American College Testing Program, 1972).

The Kuder inventory posed a special problem as the 21 core scales on which data were reported for women included 14 scales constructed on men but scored for women along with 7 scales constructed on women. In addition, of the 14 men's scales, 9 were occupational groups and 5 groups of educational majors while 2 of the 7 women's scales were also educational majors. Also, the 7 women's scales were traditional women's occupational areas primarily of the social type which would be expected to give only a small segment of the Holland circle. Because of this unusual mix of scales and because comparisons across scales derived on different sex groups is not recommended on the Kuder, only the 9 male-constructed occupational scales were analyzed. This group of scales seemed most likely to show any whole circle configuration which might exist.

Results

Goodness of fit of the two dimensions. The goodness of fit of a planar surface to the points representing scales of an inventory was measured by the percentage of the trace given by the first two dimensions in the analysis of spatial configuration. The percentage of the trace may be interpreted as the proportion of the variance of the scale points accounted for by two dimensions.

Table 1 gives the results for the fit of the plane for each of the five analyses. The results were comparable to those found with men by Cole and Hanson (1971) in each case. Four of the five analyses indicated a good fit of the scale configuration to the plane with percentages of the trace near 60%. The Strong basic scales gave much poorer fit (as occurred with men) as was expected since the scales were constructed to be as independent as possible.

The planar configurations. The scale points were projected onto the best-fitting planar surface for

TABLE 1

Goodness of Fit of the Planes

Number of scales	Inventory	Percentage trace
27	Strong Occupational Scales	59.0
19	Strong Basic Scales	34.3
9	Kuder Occupational Scales	61.7
6	Holland's VPI Scales	59.7
8	ACT VIP Scales	59.5

each of the inventories, and the configurations were oriented in the same general way for visual comparisons. Figure 1 gives the configuration of Holland's six scales. The configuration corresponded to that reported by Holland et al. (1969) and Edwards and Whitney (1971) and showed the circular ordering from Realistic to Intellectual to Artistic to Social to Enterprising to Conventional.

The configurations of the 27 Strong occupational scales, the 19 Strong basic scales, the 9 Kuder scales, and the 8 ACT scales are given in Figures 2, 3, 4, and 5, respectively. In each case the configurations tended to follow the Holland ordering and were, in addition, similar to the comparable configurations for men reported in Cole and Hanson (1971). For example, of the Strong occupational scales in Figure 2, math-science teacher, dentist, physician, psychologist, author, life insurance salesman, and office worker were located in very similar positions to the corresponding scales for men (Cole & Hanson, 1971, p. 481), and in both cases the scales conformed to the Holland circular ordering. For each inventory examined, the Realistic-Intellectual scales tended to be found in the upper left quadrant, the Artistic scales to the upper right, and the Social-Enterprising-Conventional scales from right to left in the lower half of the configuration.

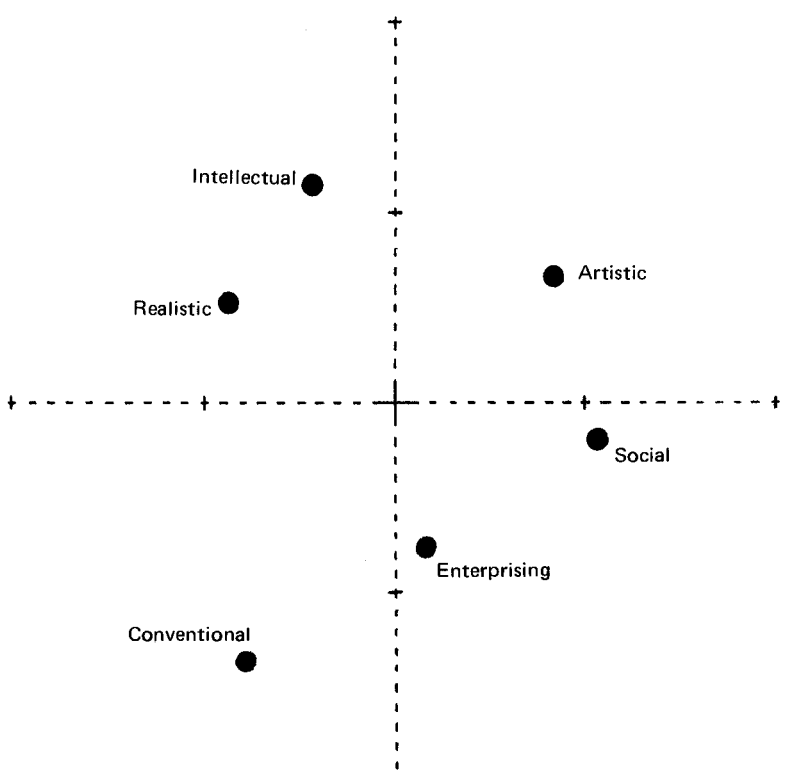

Fig. 1. Spatial configuration for women of Holland's six Vocational Preference Inventory scales.

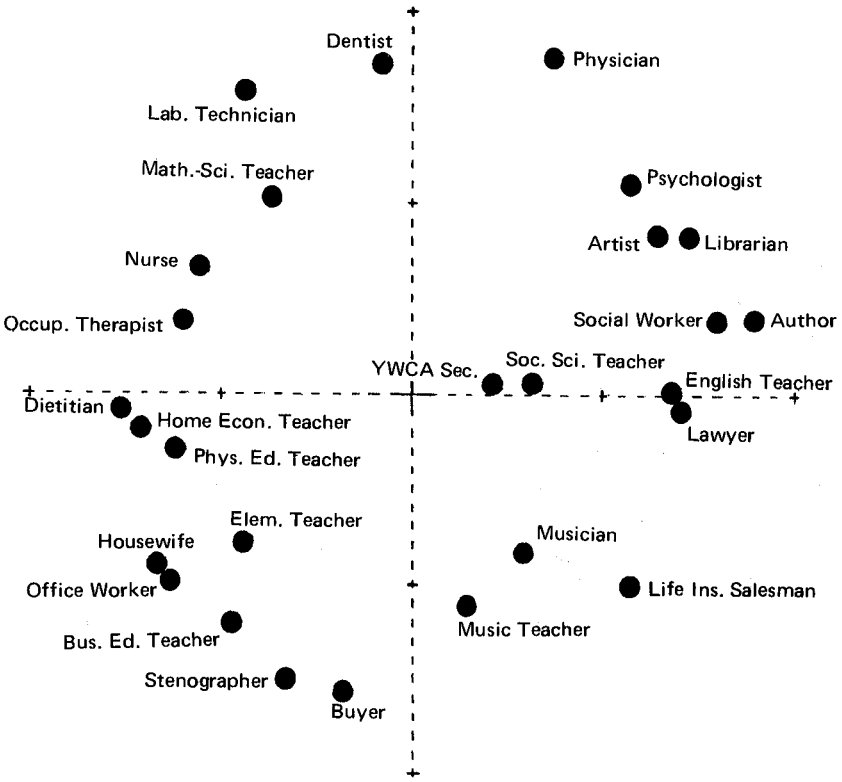

Fig. 2. Spatial configuration for women of 27 Strong Vocational Interest Blank occupational scales.

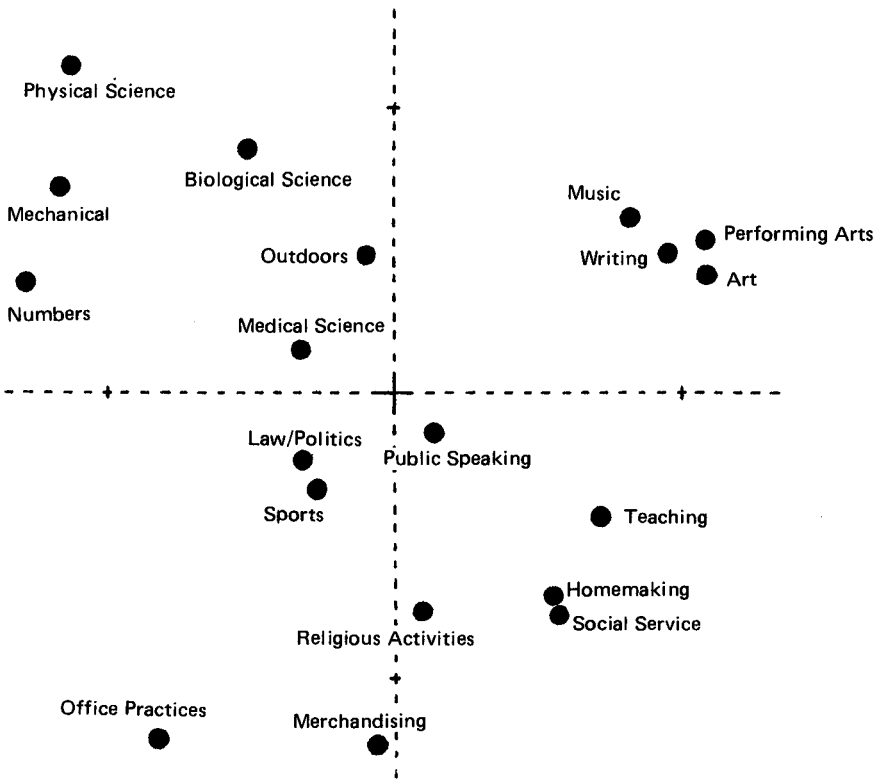

Fig. 3. Spatial configuration for women of 19 Strong Vocational Interest Blank Basic scales.

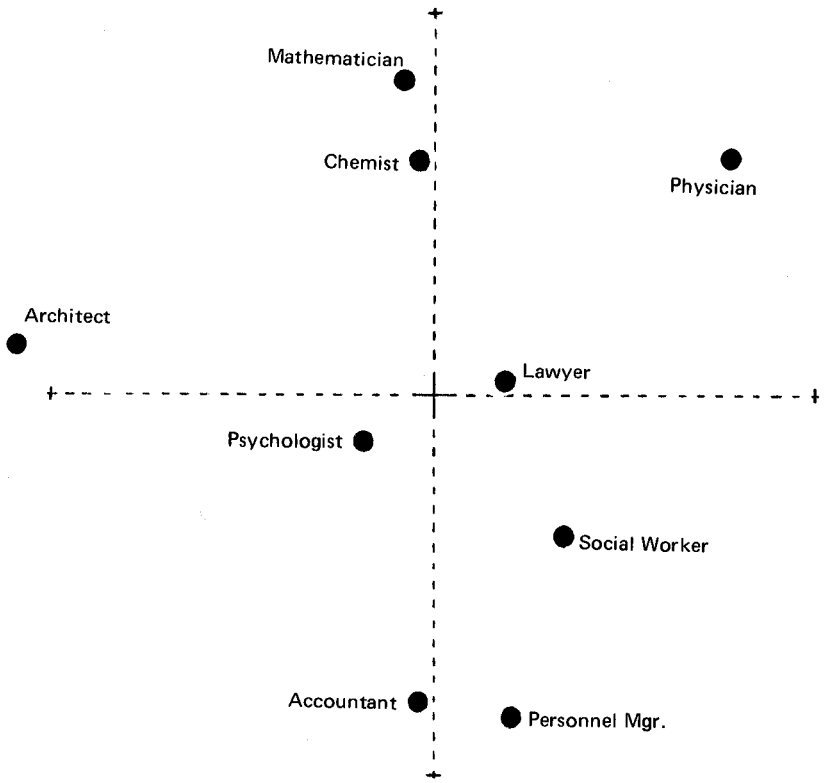

Fig. 4. Spatial configuration for women of 9 Kuder Occupational Interest Survey scales.

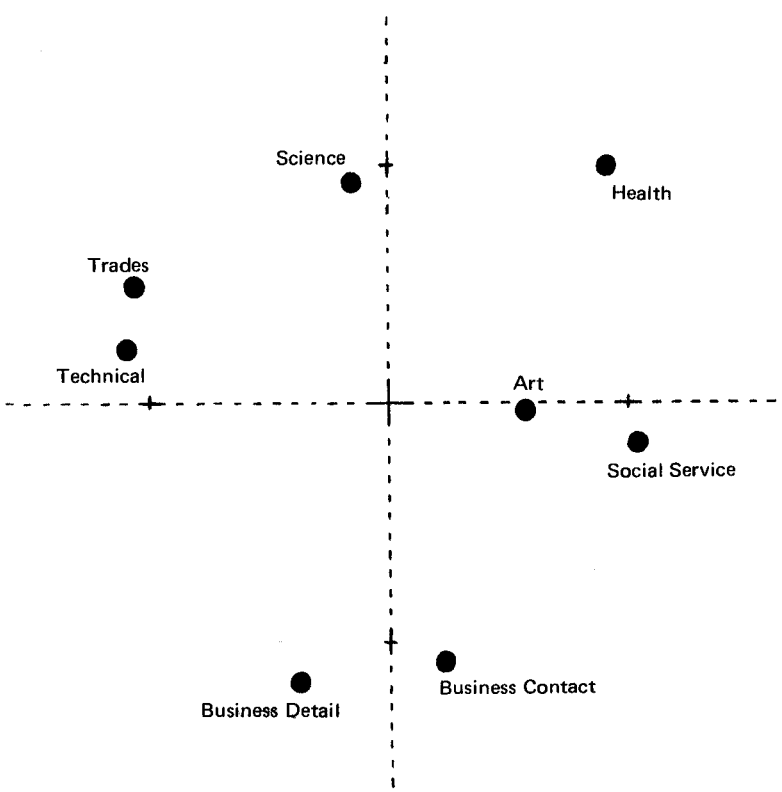

Fig. 5. Spatial configuration for women of 8 ACT Vocational Interest Profile scales.

Discussion

In this study we have found that women's interests can be represented in a two-dimensional configuration and that the configurations generally conform to those reported by Cole and Hanson (1971) for men. The existence of a structure in the interests of women similar to that found for men could be valuable in interpreting women's interests, especially in cases where specific scales for women in careers dominated by men are unavailable.

In the next study we examined interest inventory scores of women selecting particular vocations to get further information about the pervasiveness of the Holland configuration in the vocational interests of women.

Study 2: Occupational Configurations

Additional information about the interest patterns of women in a variety of occupations can be obtained by constructing occupational configurations. Cole, Whitney, and Holland (1971) used the analysis of spatial configuration to construct a configuration of occupations for men based on Holland's VPI. The results both confirmed and supplemented the analyses of Cole and Hanson (1971). In this study we constructed two occupational configurations for women, one based on Holland's VPI and one based on the ACT VIP, in order to compare the occupational configurations with the inventory scale configurations and to gain additional information about occupational groups for which no scales are available.

Method

Data. The data for one of the occupational configurations were scores on the six scales of Holland's VPI and expressed vocational choice of 6,143 female college freshmen in a sample described by Abe, Holland, Lutz, and Richards (1965). Expressed vocational choice was obtained by asking the students to select from a list of over 70 occupations "the occupation you plan to enter." Mean VPI scores were computed for all students selecting each of 22 occupations with adequate frequency of selection and expected diversity in the configuration.

For the second occupational configuration, the data were scores on the eight scales of the ACT VIP and expressed vocational choice for women entering 2-year colleges. The students selected their vocational choices from a list of over 150 occupations. Mean ACT VIP scores were computed for students selecting each of 13 occupations.

Analysis. Cole and Cole (1970) described a procedure for projecting group means onto the space of the variables produced from the analysis of spatial configuration described in Study 1. The analysis yields a projection matrix with which the occupational group means can be plotted on the same surface as the scale configuration. The result is then a configuration of occupational groups. This procedure was used by Cole et al. (1971) to obtain an occupational configuration for men based on scores on Holland's VPI. In this study the analysis was applied to data for women from Holland's inventory and from the ACT VIP to obtain two occupational configurations for women.

Results

Figure 6 gives the occupational map for 22 women's vocational choice groups based on Holland's VPI. The map in Figure 6 can be superimposed on that of the Holland scales in Figure 1 to relate the inventory scales and the occupational groups. The configuration in Figure 6 was clearly compatible with the scale configuration in Figure 1—that is, social-type occupations such as social worker, elementary school teacher, history teacher, and counselor fell in the same area as the Social scale. In addition, the configuration of occupations was quite similar to that found for men by Cole et al. (1971).

In Figure 7 the configuration is given for 13 occupational choice groups based on the ACT VIP scores of a sample of women entering 2-year colleges. No scientific occupations were available on this group and therefore the upper left quadrant is vacant. However, even on this different sample of women, the occupations again conformed to the scale configuration in Figure 4 and to the general Holland circular ordering.

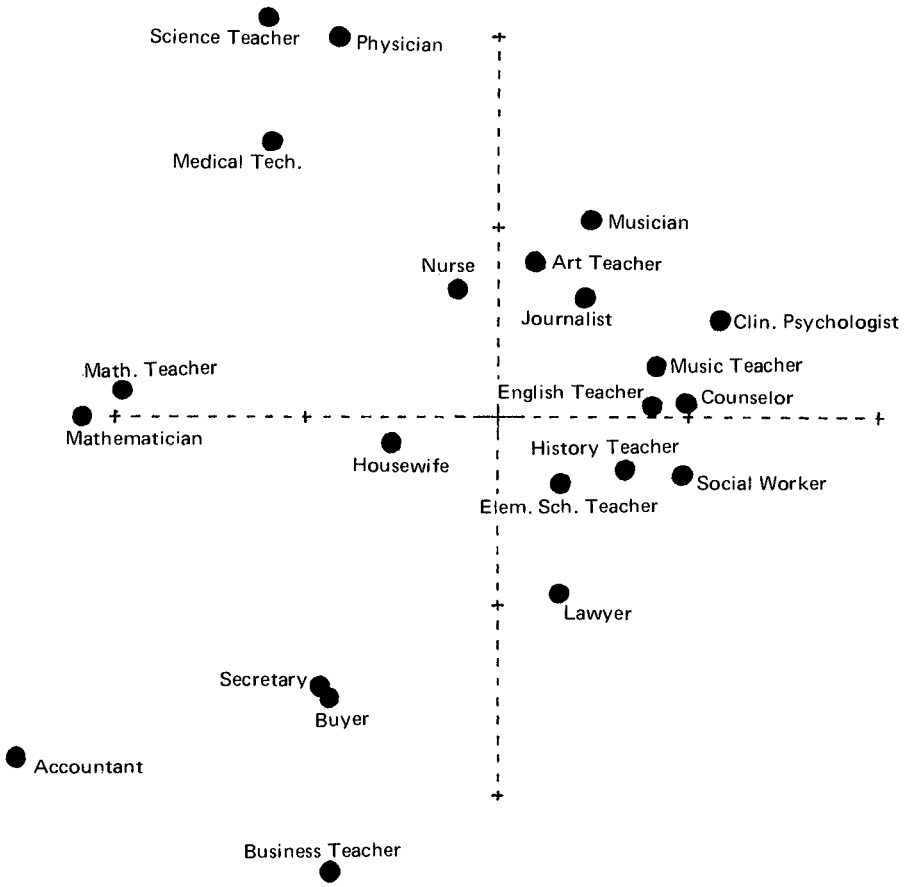

Fig. 6. Spatial configuration of occupations based on women's responses to Holland's Vocational Preference Inventory. The number in each occupational group is given below.

Accountant—174
Art Teacher—93
Business Teacher—89
Buyer—55
Clin. Psychologist—48
Counselor—76
Elem. Sch. Teacher—1497
English Teacher—306
History Teacher—154
Housewife—122
Journalist—57
Lawyer—32
Mathematician—54
Math. Teacher—114
Medical Tech.—111
Musician—43
Music Teacher—74
Nurse—301
Physician—79
Science Teacher—45
Secretary—267
Social Worker—140

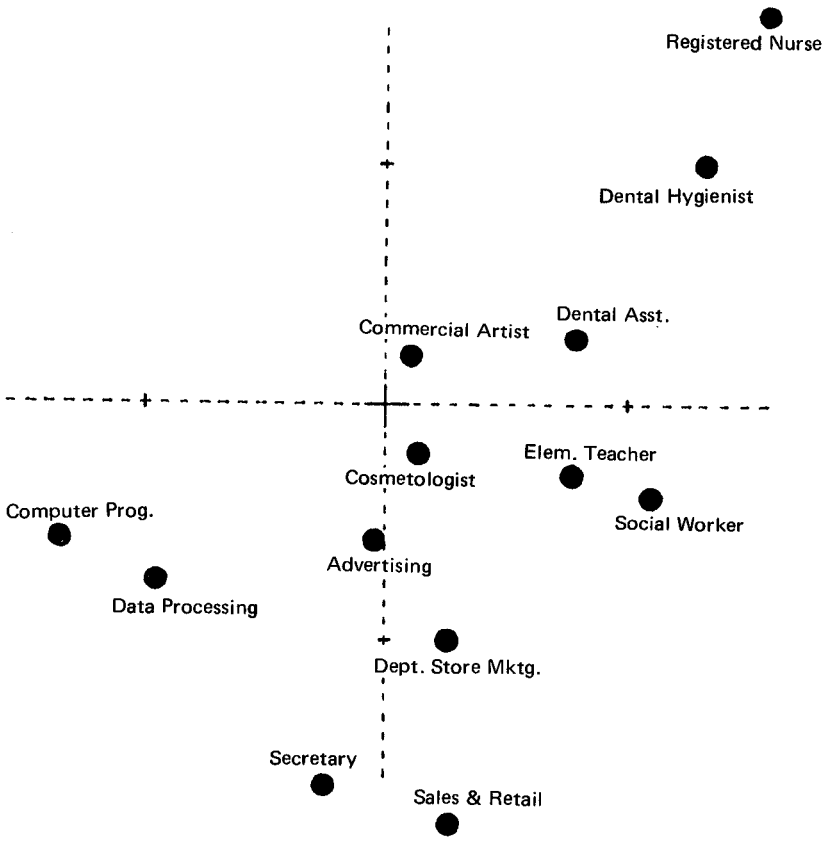

Fig. 7. Spatial configuration of occupations based on women's responses to the ACT Vocational Interest Profile. The number in each occupational group is given below.

Advertising—20
Commercial Artist—38
Computer Prog.—178
Cosmetologist—158
Data Processing—231
Dental Assistant—313
Dental Hygienist—129
Dept. Store Mktg.—22
Elem. Teacher—89
Registered Nurse—843
Sales & Retail—79
Secretary—988
Social Worker—58

Discussion

The similarities of the occupational configurations based on two samples of women (one sample of 4-year college students and another of 2-year college students) and two different inventories lend further support for the pervasiveness of the Holland circular ordering in the vocational interests of women.

Implications and Conclusions

The primary concern of this paper has been how interest inventories can be used with women in order to provide useful information about the full range of careers currently being opened to them. As was noted earlier, the use of traditional women's occupational scales may have a severely limiting effect on the careers women consider. Yet at this time of transition, the only data available are those on traditional women's occupations. In this section we examine the implications of the

studies presented here for a different kind of use of present interest inventories with women with newly increased career options.

The two studies in this paper indicated that when women's interests were compared with those of other women, the resulting structure of interests was essentially the same as that found for men. In addition, when there were occupations which both men and women pursue, these occupations tended to fit in similar positions within the structure for both men and women. These results suggested that by locating a women's interests within the observed circular structure, one could indicate similarities not only with the locations of women's occupations but also with men's occupations at a corresponding location in the structure for men.

The Holland VPI and the ACT VIP are well suited to this approach since they contain scales which refer to areas of the circular structure and are identical for men and women. Thus, on these two inventories one need only identify the scales on which a woman's scores are relatively high when compared with scores of other women and refer her to both the men's and women's occupations which relate to those scales.

The same type of information is also available in the Strong and the Kuder, although in a less direct way. For these two inventories, the present scales should be used *only* to locate a woman's interests on the circular structure or in the primary categories of the structure. Then lists of both men's and women's occupations which relate to that location should be provided. On the Strong, either the women's occupational scales, the women's basic scales, or the more ideally suited new Strong-Holland scales could be used at the initial step. The women's occupational scales on the Kuder are so limited that the male-derived scales are probably better-suited for the purpose of locating women's interests on the circular structure.

There are two additional implications which should be mentioned. First, the procedures suggested here are different from the tradition of empirical group comparison common to both the Strong and the Kuder (although not inconsistent with the more recent work on the more general Strong basic scales). We argue not necessarily against the empirical approach but just that the lack of available data should not be used to limit women's career options, especially when a viable alternative exists. A second point deserving notice is that the results of the studies presented here do not imply that women's and men's interests do not differ. In fact, evidence is abundant that there are distinct differences presently in this society. The results imply instead that the interrelationships of interests do not differ and, for example, that a woman whose interests are relatively more scientific than those of other women may look more like a scientist in her interest pattern even though she may still have the high social interests of most women.

In summary, while present interest inventories sometimes include traditional women's occupational scales which could limit women's career options, the present inventories show a common structure of women's interests which parallels that found for men. By using this structure, women may be given information about how their interests relate to the full spectrum of occupations, including those associated traditionally with either men or women.

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