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VALIDITY OF THE ACT INTEREST INVENTORY FOR MINORITY GROUP MEMBERS

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ABSTRACT

How appropriate is the ACT Interest Inventory for use with minority group members? Data from 2,280 college seniors (1,237 males and 1,043 females) representing black, native American, oriental American, Spanish-surnamed American, and white ethnic groups were analyzed to determine whether the ACT Interest Inventory could classify minority group students as accurately as white students into appropriate educational major groups. In addition, the structure of measured interests, as indicated by the intercorrelations of the six ACT Interest Inventory scales, was compared across the white and minority samples. For most minority groups, the percentage of clean hits was as high as or higher than the percentage for the white sample. With one exception, native American males, the interest structure was also highly similar for white and minority samples. These data suggest the ACT Interest Inventory is appropriate for use with minority group members.

VALIDITY OF THE ACT INTEREST INVENTORY FOR MINORITY GROUP MEMBERS

Richard R. Lamb[1]

Minority youth seeking higher education are among those who might profit from the use of interest inventories. Compared with their white peers, they are less likely to have had significant exposure to adults in professional level occupations. Their secondary school background is less likely to have emphasized planning for careers which require college training. Thus, the self-awareness and career suggestions gained from inventory results could be particularly important to these young persons.

It is not clear, however, that interest inventories yield useful results for minority groups. Inventories currently in use have been developed and validated using samples composed primarily of white, middle-class Americans. Conceivably, interest inventory results for individuals with different cultural and socioeconomic backgrounds may not have the same meaning. Thus, one may logically question the appropriateness of using interest inventories with minority groups.

Unfortunately, in contrast to the voluminous research on the appropriateness of using aptitude measures with minority groups, there has been little research on this topic. The few available studies typically focus on black males. Early research reported by E. K. Strong (1943, 1952, 1955) provided preliminary support for the usefulness of interest inventories with black populations. The interests of black college students in nursing and medicine and of black lawyers and life insurance agents were found to be similar to those of their white counterparts. Black and white male physicians did not have similar interests, however. Recent research with black males supports Strong's findings. Borgen and Harper (1973) compared the predictive validity of the SVIB for a sample of 79 black National Achievement Scholarship winners and 780 white National Merit Scholarship winners. These college seniors had taken the SVIB as entering freshmen. The ability of the SVIB to predict career choice was compared for the black and white samples. Little difference in criterion-related validity was found for the two samples.

Similar findings were reported by Whetstone and Hayles (1975). Concurrent validity of the SVIB was compared for 69 black and 123 white college men by comparing the appropriateness of the interest profile with selected college major. Judgments of consistency were made for the occupational and basic scales, using primary patterns only, and primary and secondary patterns combined. Differences between the black and white samples were small.

Previous research has usually involved criterion-related evidence for only one or two minority groups, usually black males. One limitation of this type of research is that evaluation is dependent upon the particular minority groups and occupational fields studied. Interest measures may be inaccurate for certain groups or fields, but such inaccuracies may not be detected if these fields or groups are not included in the analysis. Determination of the structure of measured interests for various cultural groups is an alternative approach to establishing the appropriate uses and interpretations of interest scores. Additionally, the results from such an analysis should generalize more readily to other inventories. That is, if the structure of in-

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terests is different for a certain minority, then one could question the appropriateness of assessing similar interest dimensions with other interest inventories.

The purpose of this study was to obtain additional evidence on the validity of interest inventories for minority group members. Two analyses were conducted. First, criterion-related validities were compared for white college seniors and college seniors in each of four minority groups: black, native American, Spanish-surnamed American, and oriental American. Second, the interest structures, as indicated by scale intercorrelations, were compared for whites and the four minority groups. Both analyses were conducted separately by sex.

Method

Instrument

The instrument used was the ACT Interest Inventory, which is part of the ACT Assessment Program (Hanson, 1974). The ACT Interest Inventory provides scores on six basic interest scales which correspond closely to the six-scale format developed by Holland (1966; 1973). These scales (and the corresponding Holland types) are: Technical (Realistic), Science (Investigative), Creative Arts (Artistic), Social Service (Social), Business Contact (Enterprising), and Business Detail (Conventional).

In addition to the actual scores on these six scales, an individual's score report includes the coordinates of his or her profile point on an interest map showing point locations, or centroids, for college seniors in 24 different academic majors. The locations of the 24 majors in the validation sample were determined by multiple discriminate analysis; the first two discriminant functions form the x and y axes (Hanson, 1974).

Sample

The sample consisted of college seniors surveyed in the spring of 1973 in conjunction with the validation of the ACT Interest Inventory (Hanson, 1974). The students in the mail survey were majoring in 24 preselected areas at 32 colleges and universities selected as representative nationally with respect to geographic region, size, and type of control (public vs. private). The ACT Interest Inventory and a questionnaire which included items on race, sex, and college major were available for each student.

As part of the ACT Interest Inventory validation procedure, the sample was divided into two subsamples—a validation sample (N = 12,109) and a cross-validation sample (N = 1,534). Details are provided by Hanson (1974). Data for white students in these comparisons were obtained from the cross-validation sample. Data for minority students were selected from the validation sample, however, because there were not enough minority students in the cross-validation sample to perform the analysis. Although it clearly would have been inappropriate to have selected white students from the validation sample, because the formula for predicting college major (Hanson, 1974) was derived using essentially the same students, use of minority data from this sample can be defended. Each of the minority groups constituted but a very small proportion of the validation sample. Of the 12,109 students in the validation sample, 365 were black, 65 were native American, 310 were Spanish-surnamed, and 203 were oriental American. Hence, the influence of data from any minority group on the prediction formula was negligible.

Procedure

Criterion-related validity comparisons. The first step in the procedure was to compute for each subject the distance between each of the 24 college majors and the student's own location on the two interest dimensions that best differentiated the groups. By listing majors in order of least to greatest distance, a ranking of majors from greatest to least similarity to the subject's location was obtained.

Next, each of the majors in this ordered list, and the subject's reported major, were converted to one of four fields of study: business, science, humanities, or fine arts. Academic major was converted to field of study according to the classification format in Table 1. An academic major was included in a

TABLE 1

Classification of Academic Majors as to Field of Study

Field	Majors Included	
Business	Accounting Business Business Education	Marketing Agriculture Economics
Science	Mathematics Engineering Physical Sciences	Biological Sciences Health Fields
Humanities	Home Economics Foreign Language Political Science Psychology Elementary Education	Philosophy & Religion History Sociology Social Sciences
Fine Arts	English & Literature Music Education	Art Education Art

field of study based on: (1) closeness of the academic major centroids as plotted on the two interest dimensions, (2) the formation of educationally meaningful categories, (3) the achievement of adequate sample sizes in the categories selected.

Ability of the ACT Interest Inventory to classify each student correctly as to field of study was then determined. If a student's own field was the field predicted by the ACT Interest Inventory, classification was termed a hit. If the actual field of study was the last field in the ordered list of those four predicted by the ACT Interest Inventory, classification was termed a clean miss. Finally, the proportions of hits and of clean misses for each of the minority groups were compared with those for the white students in the cross-validation sample. These comparisons were made separately by sex, both within each field of study and for the total samples.

Comparisons of interest structure. In the second method of analysis, the interest structures, as indicated by the intercorrelation matrices of the six ACT Interest Inventory scales assessing Holland types, were compared for white students and students in each of the five minority groups. Validation sample data were used for all minority group analyses. Validation and cross-validation data were used for analyses on white samples. If one or more of the ACT Interest Inventory scales have a different meaning for a minority group, then a different scale structure may be expected. Similar scale structure across groups would suggest similar meaning.

The analysis of spatial configuration developed by Cole and Cole (1970) was used to portray intercorrelations in order to facilitate meaningful comparisons. This analysis provides a two-dimensional representation of any intercorrelation matrix and has been used as a method of analysis of the structure of vocational interests among various white populations (Cole & Hanson, 1971; Cole, Whitney, & Holland, 1971; Cole, 1973; Hanson, Lamb, & English, 1974). When Holland-type scales are used, this analysis has generally demonstated a circular ordering of the scale points consistent with the ordered relationship suggested by Holland in

his theory of vocational choice (Holland, 1973). This order, in Holland terminology, is as follows: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional; Realistic completes the circular order. The analysis of spatial configuration was also performed for white subjects in the cross-validation sample, thereby providing a comparison with white subjects in the validation sample.

Results

Criterion-related Validity Comparisons

Comparisons of the white and minority male samples by field of study on percentages of hits and clean misses are presented in Table 2. In general, the percentage of hits for the minority samples did not differ by more than a few percentage points from the percentage for the white sample for any field of study. The only striking exception was in the fine arts field for black and Spanish-surnamed students, in which 25% and 23% were correctly classified, compared with 53% of the white subjects. Similarly, the percentage of clean misses for minority samples was not more than a few points different from that for the white samples, with the exception of blacks in science and the Spanish-

TABLE 2

Comparison of White and Minority Males on Percentage of Hits and Percentage of Clean Misses by Field of Study

	White	Black	Native American	Spanish Surnamed	Oriental American
Business					
% hits	62	79	64	75	70
% clean misses	8	7	14	4	15
N	195	29	14	24	20
Science					
% hits	68	53	54	60	73
% clean misses	5	19	8	8	2
N	196	36	13	48	48
Humanities					
% hits	24	31	23	27	26
% clean misses	0	0	0	0	0
N	265	68	13	96	27
Fine Arts					
% hits	53	25	--	23	--
% clean misses	13	17	--	36	--
N	103	12	--	22	--
Total					
% hits	49	46	45	41	56
% clean misses	5	8	10	7	5
N	759	145	42	190	101

Note. Data based on fewer than 10 subjects are not shown.

surnamed in fine arts. There were insufficient numbers of native American and oriental American males in fine arts to provide meaningful comparisons.

The overall percentages of hits and clean misses for each male minority group are provided at the bottom of Table 2. This summary comparison also suggests only minor differences between the minority and white samples on criterion-related validity. The overall percentage of hits was lowest for the Spanish-surnamed sample (41%), but only eight percentage points below the white sample (49%). The percentage of clean misses ranged from 10% for the native American males to 5% for oriental American and white males.

The pattern was similar for the females, as indicated in Table 3. Differences in the two indices of validity for minority and white samples within each field were small. Overall, the percentage of hits was actually lowest in the white sample, at 44%; minority sample values for this index ranged from 48% to 61%. The percentage of clean misses ranged from 2% to 5%.

The hit rates for the four fields may be affected to some degree by the base rates for these four areas. Since the proportion of subjects in each field was somewhat different for each sample, the expected chance percentage of hits in each field was somewhat different from sample to sample. Similarly, the hit rate for the total sample values was influenced somewhat by the distribution of subjects within the four fields. Idealy, a correction for chance levels of

TABLE 3

Comparison of White and Minority Females on Percentage of Hits and Percentage of Clean Misses by Field of Study

	White	Black	Native American	Spanish Surnamed	Oriental American
Business					
% hits	75	87	--	57	68
% clean misses	5	2	--	14	0
N	61	55	--	14	19
Science					
% hits	68	63	--	75	79
% clean misses	7	5	--	3	9
N	109	43	--	32	34
Humanities					
% hits	25	26	--	30	29
% clean misses	0	0	--	0	0
N	302	109	--	66	45
Fine Arts					
% hits	56	54	--	--	--
% clean misses	19	15	--	--	--
N	106	13	--	--	--
Total					
% hits	44	50	61	48	53
% clean misses	5	2	0	4	3
N	578	220	23	120	102

Note. Data based on fewer than 10 subjects are not shown.

predictions should be applied to the data in Tables 2 and 3, and improvement over chance level of prediction compared between samples. However, an appreciable correction would not have resulted, because the distribution of subjects by field of study was not grossly dissimilar across samples. The simple presentation of data in Tables 2 and 3 thus may be considered to provide reasonably complete comparisons of ACT Interest Inventory criterion-related validity across the samples.

Interest Structure Comparisons

The results of the analysis of spatial configuration are shown in Figure 1 for the males and in Figure 2 for the females. Scale points representing each of the six Holland categories are labeled only with the first letter of the corresponding Holland category (e.g., "R" for realistic).

The extent to which each plot is representative of its corresponding intercorrelation matrix is noted on the plot as "percentage of trace." This value can be interpreted as the percentage of the variance of the scale loadings in n-dimensional multivariate space accounted for by the two dimensions plotted (Cole & Cole, 1970, p. 3). The range for percent trace for the plots in Figures 1 and 2 was from 54% to 68%, which is comparable to values reported in previous research using this procedure. Thus, the two-dimensional plots in Figures 1 and 2 can be considered reasonably complete pictures of the intercorrelation matrices they represent.

The configurations for both white males and white females in the validation and cross-validation samples followed the expected circular pattern of scale points according to Holland's model. Within each sex, placement of the scale points was almost identical for the validation and cross-validation samples and thus supported the assumption of equivalency between these samples. With one exception—the native American male sample—the basic interest structure for each of the minority samples generally corresponded to the configuration for the white sample of the same sex. With this one exception, then, the results of this analysis indicate that no minority group differences in scale structure are evident.

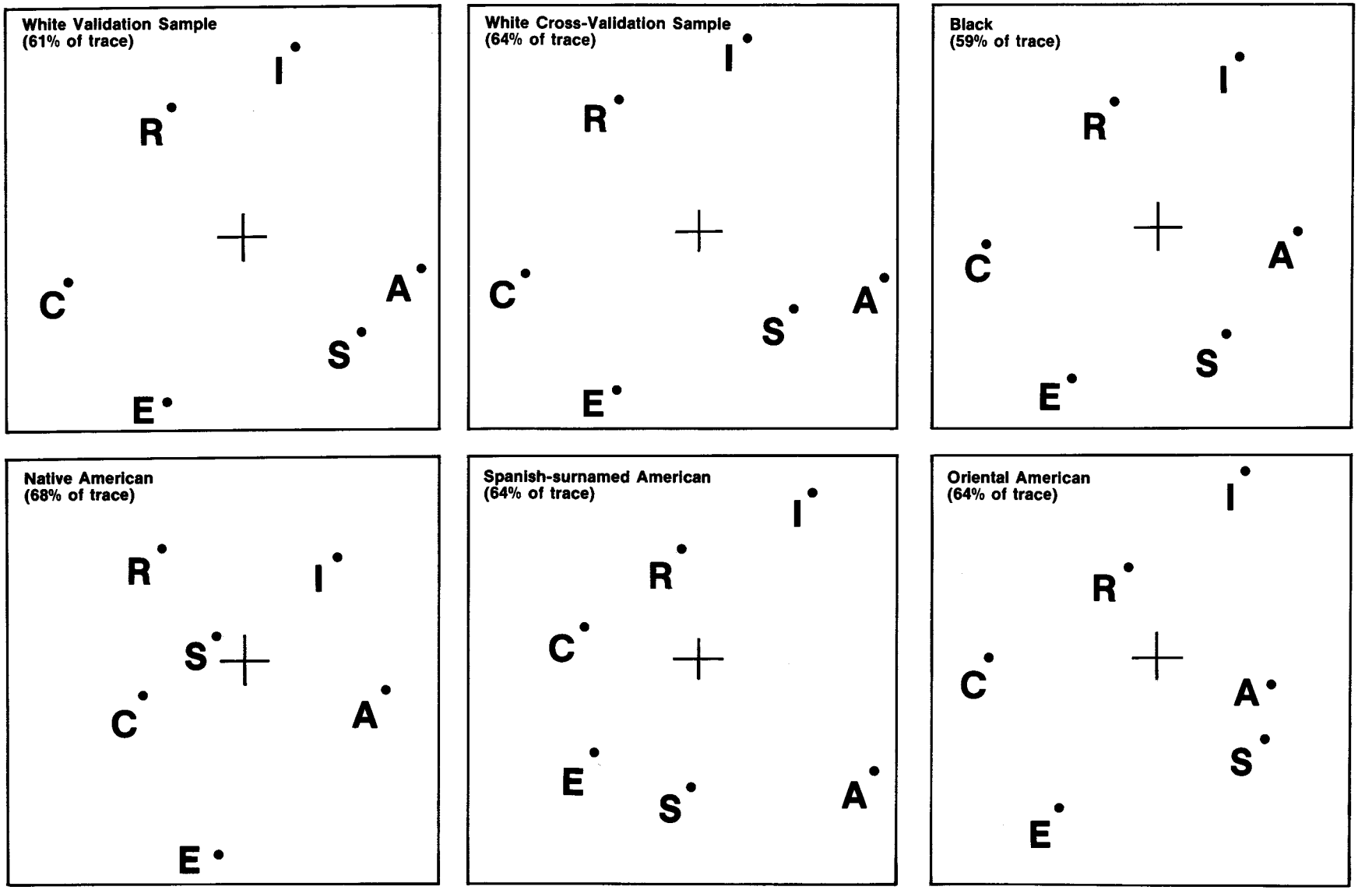
The spatial configuration for the native American male sample, based on 42 subjects, differed from the configuration for the white male sample in that the Social scale point was located on the opposite side of the circle, near the center. The position of the Social scale point for this sample reflected a high correlation (.62) between the Realistic and Social scales, compared with a correlation of only .12 between these same scales for white males in the validation sample. A high correlation between the Social and Realistic scales is inconsistent with the Holland model, as these scales represent highly divergent personality types. However, these findings for native American males should be regarded with caution because of the limited number of native American males included in this study.

Discussion

The data provide only two suggestions that the ACT Interest Inventory may not be appropriate for use with some minority groups. The first is for black and Spanish-surnamed males in the fine arts, based on the low percentage of hits for these individuals. Possibly, because of the small number of minority group males in the fine arts, the low hit rate was simply the result of sampling error. Another possibility, reinforced by the finding that the structure of interests for these minority group males was similar to that for white males, is that some males inappropriately chose majors in fine arts, despite their strong interests in other fields. Such a factor would result in a lowered hit rate but would not affect the structure of interests. Whatever the cause of the low percentage of hits, however, the ACT Interest Inventory remains a useful inventory in light of the limited sample size, the higher criterion-related validity in the remaining three fields, and the contradictory findings from the analysis of the structure of interests for these minority groups.

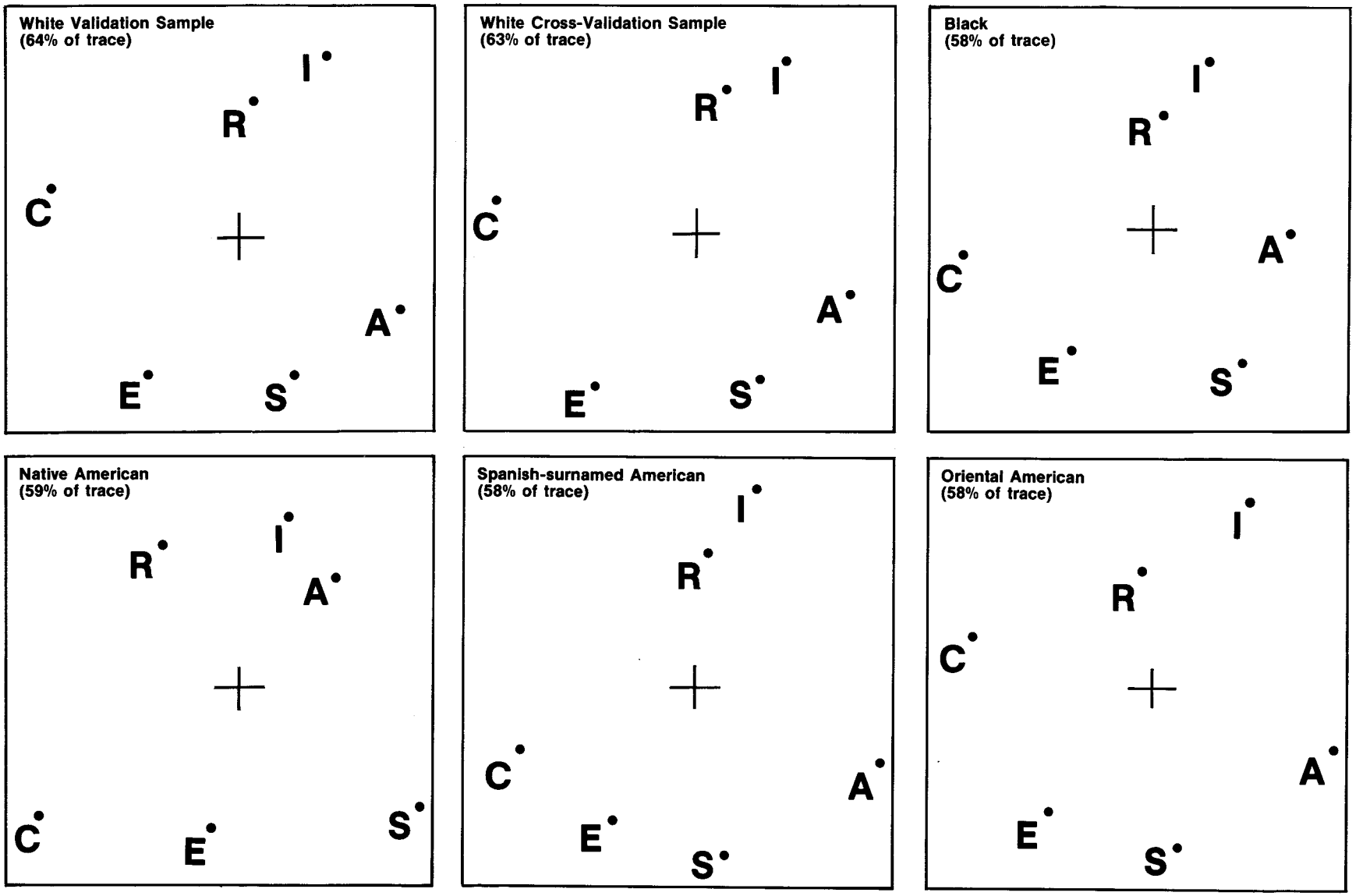
The second suggestion of cultural differences in interests is for the native American males, based on the finding that the Social Service (Social) and Technical (Realistic) scales were highly related. However, the sample was small and overall percentages of hits and clean misses compared favorably with those for the white males.

These findings suggest similar levels of criterion-related validity and similar interest structures for both minority and white college seniors. However,



(Male)

Figure 1. Spatial configuration of scales for male samples.



(Female)

Figure 2. Spatial configuration of scales for female samples.

because the ACT Interest Inventory is but one of many inventories in common use, and because interest measurement is most useful prior to the student's final year of college, the question of generalization of these findings to other inventories and to younger minority populations must be considered.

Generalization of these findings to other interest inventories seems reasonable. Item content of the ACT Interest Inventory is similar to that of other inventories; items include preferences for occupations, school subjects, work tasks, and vocational activities. In addition, it has been documented through considerable research that the six-scale Holland format used in the ACT Interest Inventory provides a useful representation of the basic structure of inventoried interests. As noted by Hanson (1974), numerous factor analytic studies have provided support for the concept of a few basic interest factors consistent with the categories proposed by Holland. The results of this study indicate that with the possible exception of native Americans, this basic structure is similar for white and minority college seniors.

Generalization of these findings to younger minority populations is less certain. In comparison to younger students, college seniors have had greater exposure to persons outside their own culture. They have had the opportunity for varied social and recreational activities and have been able to read and to pursue academic interests in depth. Thus, failure to find evidence of large cultural differences in the ACT Interest Inventory for college seniors does not provide conclusive evidence that such differences do not exist for younger minority students.

Subsequent research may provide evidence that interest inventories are not appropriate for use with younger members of certain minority groups. Yet, the implication for counseling practitioners of the findings of this study is that minority group membership, in itself, does not contraindicate the use of an interest inventory, or the usual procedures and precautions applied to the interpretation of results.

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