

ABCDEFGHIJKLMNOPQRSTUVWXYZ  
 abcdefghijklmnopqrstuvwxyz1234567890

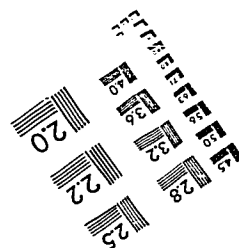
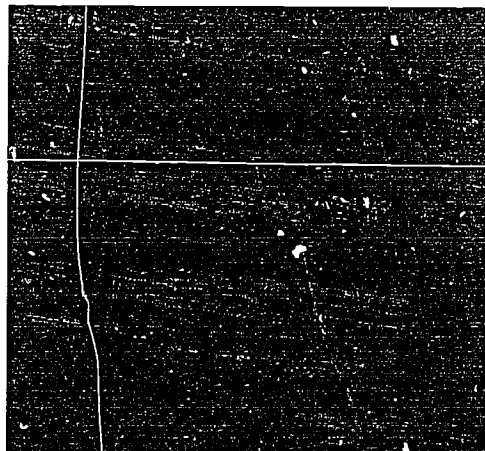
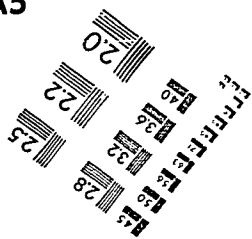
ABCDEFGHIJKLMNOPQRSTUVWXYZ  
 abcdefghijklmnopqrstuvwxyz1234567890

1.0 mm

1.5 mm

2.0 mm

A5



DOCUMENT RESUME

ED 283 061

CG 019 950

**AUTHOR** Raphael, Karen G.  
**TITLE** Subjective Occupational Structure and Holland's Theoretical Hexagon.  
**SPONS AGENCY** Sigma XI, The Scientific Research Society.  
**PUB DATE** Aug 86  
**NOTE** 27p.; Paper presented at the Annual Convention of the American Psychological Association (94th, Washington, DC, August 22-26, 1986).  
**PUB TYPE** Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

**EDRS PRICE** MF01/PC02 Plus Postage.  
**DESCRIPTORS** \*Career Choice; College Students; \*Congruence (Psychology); \*Females; Higher Education; \*Models; Multidimensional Scaling; Rating Scales; \*Vocational Interests; \*Work Attitudes  
**IDENTIFIERS** \*Hollands Theory of Occupational Choice

**ABSTRACT**

Although Holland's theory of vocational choice has received widespread attention since its formulation in 1959, there has been little research examining how well Holland's two-dimensional hexagon explains an individual's subjective occupational structure of the work world. A study was conducted to examine the degree to which judgments of similarities/dissimilarities among Holland's six occupational themes correspond to a hexagonal model. Female college students (N=94) completed the Strong-Campbell Interest Inventory, a background questionnaire including projected occupational choice, and a similarity rating scale among occupational themes. The rating scale contained all possible pairs among the six Holland themes which subjects rated as similar or dissimilar. Similarity ratings were submitted to three multidimensional scaling analyses: nonmetric simple Euclidian model, nonmetric individual differences model and Procrustes fit of similarity ratings to a fixed two-dimensional hexagonal configuration. The results provided some support for the view that female college students' perceptions of the world of work are consistent with Holland's hexagonal model. (Two data tables, five figures, and references are included.) (NB)

\*\*\*\*\*  
 \* Reproductions supplied by EDRS are the best that can be made \*  
 \* from the original document. \*  
 \*\*\*\*\*

ED283061

Subjective Occupational Structure and Holland's  
Theoretical Hexagon

Karen G. Raphael

Columbia University

School of Public Health

CG 019950

U.S. DEPARTMENT OF EDUCATION  
Office of Educational Research and Improvement  
EDUCATIONAL RESOURCES INFORMATION  
CENTER (ERIC)

This document has been reproduced as  
received from the person or organization  
originating it.  
 Minor changes have been made to improve  
reproduction quality.

• Points of view or opinions stated in this docu-  
ment do not necessarily represent official  
OERI position or policy.

"PERMISSION TO REPRODUCE THIS  
MATERIAL HAS BEEN GRANTED BY  
*Karen Raphael*

TO THE EDUCATIONAL RESOURCES  
INFORMATION CENTER (ERIC)."

Presented at 94th Annual Convention of  
the American Psychological Association at Washington, D.C.,  
August 1986



Subjective Occupational Structure and Holland's  
Theoretical Hexagon

Since its original formulation more than 25 years ago (Holland, 1959), Holland's theory of vocational choice has received widespread attention in the professional literature. Holland's theory states that both occupational environments and personality types can be summarized according to six themes or combinations of themes. These themes are: Realistic (R) (e.g., plumber, mechanical engineer), Investigative (I) (e.g., lab assistant, physicist), Artistic (A) (e.g., editor, garment designer), Social (S) (e.g., minister, teacher), Enterprising (E) (e.g., lawyer, salesperson), and Conventional (C) (e.g., accountant, secretary). Holland represents the relationships among the six themes on a hexagon, where similar themes are placed closest together and dissimilar themes are placed further apart.

Holland's occupational theory also assumes that people are most satisfied, productive and stable in work environments that are congruent with their personality themes. Congruence is typically assessed by examining the match between an individual's personality profile on an occupational interest inventory and themes associated with the individual's occupational choice.

Since the early 1970s, there have been a number of studies which investigate the extent which a hexagon can summarize the relationships among the six occupational themes. Prediger (1976) has emphasized that the hexagon is a two-dimensional figure, suggesting that Holland has posited the existence of two basic dimensions or factor on which occupations may differ. These dimensions might be labeled as Things vs. People and Data vs. Ideas (see Figure 1). Thus, research on Holland's hexagon emphasizes the extent to which the six Holland themes fall on two interpretable dimensions.

-----  
Insert Figure 1 about here  
-----

Several studies have used factor analysis or related techniques to decompose items or scales of occupational interest inventories into underlying dimensions. Cole, Whitney and Holland (1971) concluded that a 2-dimensional hexagon provided approximate fit to factors underlying the Strong Vocational Interest Blank (SVIB), Vocational Preference Inventory (VPI), and the Kuder Occupational Interest Survey (KOIS). Edwards and Whitney's (1972) factor analysis of the Self-Directed Search (SDS) suggested that a two-dimensional solution was inadequate. Prediger's (1982) analyses of the VPI, SDS, SVIB, the Strong-Campbell Interest Inventory (SCII), and the Unisex Edition of the ACT Interest Inventory (UNIACT) revealed that a similar structure was

underlying nearly all the inventories, and that a two-dimensional plotting of the Holland types closely approximated a hexagon.

There is a paucity of research examining how well Holland's two-dimensional hexagon explains an individual's subjective occupational structure of the work world. It has been noted (Crowley, 1979) that occupational environment classification schemes such as Holland's focus almost exclusively on intrinsic interests dealing with actual job activities rather than on interests which are extrinsic to job activities such as financial reward or working conditions. Studies by Burton (1972) Reeb (1959) and Grunes (1957) all suggest that, when individuals are asked to judge similarities among a list or pile of occupations, occupational perceptions do not correspond to Holland's theoretical hexagon. Prestige and required training or skill may play a larger role in forming subjective occupational structures.

The following study examined the degree to which judgments of similarities/dissimilarities among Holland's six occupational themes correspond to a hexagonal model.

#### METHOD

Ninety-four college women completed the Strong-Campbell Interest Inventory (SCII; Campbell & Hanson, 1981), a background questionnaire including projected occupational choice, and a similarity rating scale among occupational

themes. The rating scale consisted of a description of each theme, adapted from Holland (1973, pp.29-33). All possible pairs (n=15) among the six themes were randomly presented. Subjects rated each pair as similar or dissimilar on a nine-point scale (where 1=extremely similar and 9=extremely dissimilar).

#### Data treatment and results

Similarity ratings were submitted to three multidimensional scaling analyses using the ALSCAL program (Takane, Young, & Deleeuw, 1977; Young, Takane, & Lewycky, 1978): nonmetric simple Euclidian model, nonmetric individual differences model, and Procrustes fit of similarity ratings to a fixed two-dimensional hexagonal configuration. A summary of results from the three analyses is presented in Table 1.

-----  
Insert Table 1 about here  
-----

Results from the simple Euclidian model revealed that a two-dimensional solution accounted for a sizable amount of the variance (57%). Orthogonal rotation of the derived configuration (see Figure 2) shows that the data approximate a mirror image of Holland's hexagonal configuration. A reflection of the derived configuration, then, would closely resemble Holland's hypothesized configuration.

-----  
Insert Figure 2 about here  
-----

A nonmetric individual differences model (see Figure 3) explained a similar percentage of the variance (59%) and suggests that Dimension 1 is similar to the Data/Ideas Dimension, while Dimension 2 is similar to the Things/People dimension. A plot of subject weights (see Figure 4) suggests, however, that there is considerable variability in the degree to which the two-dimensional model accounts for individual data. Notable scatter is revealed. For example, in the lower right corner of the Figure are points representing subjects who did not fit the model well; both dimensions received low weightings. The cluster of points in the central region of the figure represents subjects who gave approximately equal weightings to Dimensions 1 and 2 and whose perceptions fit the hexagonal model well.

-----  
Insert Figure 3 about here  
-----

-----  
Insert Figure 4 about here  
-----

In the Procrustes solution, the hexagonal configuration accounted for more than 50% of the variance in individual subject data. However, while the average  $R^2$  for individual



data was .50, there was considerable variation in the degree to which individual perceptions fit the two-dimensional hexagon ( $SD = .20$ ; minimum  $r^2 = .03$ ; maximum  $r^2 = .95$ ). As shown in Figure 5, a subject weight plot suggests that most of the women gave similar weightings to both dimensions.

-----  
Insert Figure 5 about here  
-----

Individual subject weights from the Procrustes ALSCAL solution were correlated with congruence scores. Congruence scores were derived from the general three-level method suggested by Holland (1972), by comparing each respondent's General Occupational Theme (GOT) profile from the SCII to the profile corresponding to their occupational choice. The correlation analysis determined whether any systematic shrinking or stretching of either dimension (e.g., along Data/Ideas or People/Things dimensions) occurred as a function of congruence. Results showed that congruence did not correlate significantly with weighting of Dimension 1 (Things/People) ( $r(92) = .08$ ,  $p > .05$ ) or Dimension 2 (Data/Ideas) ( $r(92) = .08$ ,  $p > .05$ ). This suggests that women whose stated occupational choices matched their SCII profiles were no more likely to separate the occupational themes in terms of Data/Ideas and Things/People dimensions than women whose occupational choices and GOT profiles showed poorer match.

Finally, selected demographic variables were correlated with Dimensional weights from the Procrustes ALSCAL solution, to explore systematic differences in subjective occupational structure as a function of background. As shown in Table 2, a small but statistically significant relationship was found between parent's income and weighting of Dimension 2 ( $r(88) = .21$ ,  $p = .05$ ). This suggests that women who came from more affluent backgrounds made discriminations among the six themes that more closely fit Holland's conception of how these themes require involvement with data vs. ideas.

-----  
Insert Table 2 about here  
-----

### Discussion

The current study has provided some support for the notion that college women's perceptions of the world of work are consistent with Holland's hexagonal model. The chance probability of obtaining the ordering among the six types consistent with Holland's hexagon is low ( $p = .01$ ). A Procrustes fit to a perfect hexagon provided moderately good fit to respondent data on perceived dissimilarities among the six themes. The other scaling solutions provided support for a somewhat distorted hexagon.

Systematic distortions in the nonmetric Euclidian and individual differences models suggest that respondents

viewed Investigative versus Realistic and Social versus Enterprising occupations as somewhat more similar than a perfect hexagon would allow. A similar pattern was reported by Rounds, Davison, and Dawis (1979) who scaled actual correlations among the GOT subscales of the SCII.

In the current study, only six original stimuli were submitted to multidimensional scaling analyses. According to recommended variable-to-dimension ratios, between 13 (Kruskal & Wish, 1978) and 18 (Schiffman, Reynolds, & Young, 1981) stimuli would be needed to derive a stable three-dimensional solution. Thus, the current data would not have been able to provide a solution of more than two-dimensions. Consequently, the stability of the current two-dimensional structure must be questioned.

The use of six occupational stimuli presents a second problem. Perhaps these six types do not represent an adequate explication of the perceived "world of work." Future research on subjective occupational structure might employ a greater number of occupational types, perhaps using the 25-category "job family list" presented by the American College Testing Service (Prediger, 1981) or by taking a random sample of the base titles listed in the Dictionary of Occupational Titles (U.S. Department of Labor, 1977).

In sum, the current study suggests that women, given the six occupational themes, generally perceive relationships among them similar to relationships stated in Holland's model. This suggests that Holland's model has some

common-sense appeal and, therefore, increased utility. It would be premature to suggest, however, that a two-dimensional model is the "real" model of the world of work, or that the hexagonal model is the best theoretical framework within which to understand the basis of occupational choice.

## References

- Burton, M. (1972). Semantic dimensions of occupational names. In A.K. Romney, R.N. Shepard, & S.B. Nerlove (Eds.), Multidimensional scaling: Theory and applications in the behavioral sciences. (Vol. 2). New York: Seminar Press.
- Campbell, D.P. & Hansen, J.C. (1981). Manual for the SVIB-SCII. Stanford, Calif.: Stanford University Press.
- Cole, N.S., Whitney, D.R., & Holland, J.L. (1971). A spatial configuration of occupations. Journal of Vocational Behavior, 1, 1-9.
- Crowley, A.D. (1979) Work environment preference and self-concepts: An investigation of Holland's theory. British Journal of Guidance and Counseling, 7, 57-63.
- Edwards, K.J., & Whitney, D.R. (1972). Structural analysis of Holland's personality types using factor and configural analysis. Journal of Counseling Psychology, 19, 136-145.
- Grunes, W.F. (1957). Looking at occupations. Journal of Abnormal and Social Psychology, 54, 86-89.
- Holland, J.L. (1959). A theory of vocational choice. Journal of Counseling Psychology, 6, 35-45.
- Holland, J.L. (1972). Professional manual for the Self-Directed Search. Palo Alto, Calif.: Consulting Psychologists Press.

- Holland, J.L. (1973). Making vocational choices: A theory of careers. Englewood Cliffs, N.J.: Prentice-Hall.
- Kruskal, J.B., & Wish, M. (1978). Multidimensional scaling. Beverly Hills, Calif.: Sage Publications.
- Prediger, D.J. (1976). A world of work map for career exploration. Vocational Guidance Quarterly, 24, 198-208.
- Prediger, D.J. (1981). Job family list. Mimeo, Iowa City, Iowa: American College Testing Service, R & D Division.
- Prediger, D.J. (1982). Dimensions underlying Holland's hexagon: Missing link between interests and occupations? Journal of Vocational Behavior, 21, 259-287.
- Reeb, M. (1959). How people see jobs: A multidimensional analysis. Occupational Psychology, 33, 1-17.
- Rounds, J.B., Davison, M.L., & Dawis, R.V. (1979). The fit between Strong-Campbell Interest Inventory General Occupational Themes and Holland's hexagonal model. Journal of Vocational Behavior, 15, 303-315.
- Schiffman, S.S., Reynolds, M.L., & Young, F.W. (1981). Introduction to multidimensional scaling: Theory, methods, and applications. New York: Academic Press.
- Takane, Y., Young, F.W., & DeLeeuw, J. (1977). Nonmetric individual differences multidimensional scaling: An alternating least squares method with optimal scaling features. Psychometrika, 42, 7-67.
- U.S. Department of Labor (1977). Dictionary of occupational titles (4th ed.). Washington, D.C.: U.S. Government Printing Office.

Young, F.W., Takane, Y., & Lewycky, R. (1978). Three notes on ALSCAL. Psychometrika, 43, 433-435.

Author Notes

This paper is based in part on the author's doctoral dissertation in psychology completed at Hofstra University under the direction of Bernard S. Gorman. The research was supported in part by a Grant-in-Aid of Research to the author from Sigma Xi, the Scientific Research Society.

Correspondence concerning this paper should be addressed to Karen Raphael who is now at Columbia University, Psychiatric Epidemiology Training Program, 100 Haven Avenue, Tower 3-20E, New York, NY 10032.



Table 1

ALSCAL Model Comparison Under a Two-Dimensional Solution

	Nonmetric Simple Euclidian Model	Nonmetric Indiv. Diff. Model	Procrustes Indiv. Diff. Model
Stress	.20	.23	.20
Avg. R <sup>2</sup>	.57	.59	.50
Avg. Subject Wts. (Dimension 1)	NA	.56	.49
Avg. Subject Wts. (Dimension 2)	NA	.47	.48

Table 2

Bivariate Correlations of Procrustes Dimensional Weights  
with Selected Biographical Variables

	Procrustes Wt. Dimension 1	Procrustes Wt. Dimension 2
Respondent Age	.07	.14
Academic Year	-.04	.13
<sup>a</sup> Age when Mother Worked	-.11	-.02
Parental Income	.04	*.21
Mother's Education	.02	.07

Note.  $n = 94$

\* $p = .05$

<sup>a</sup>Item states, "Which of the following best describes your mother's work schedule?" "She started working before I was six years old;" "She started working when I was between 6 and 11 years old;" etc.

Figure 1. Distances among Holland themes according to a Hexagonal model.

data

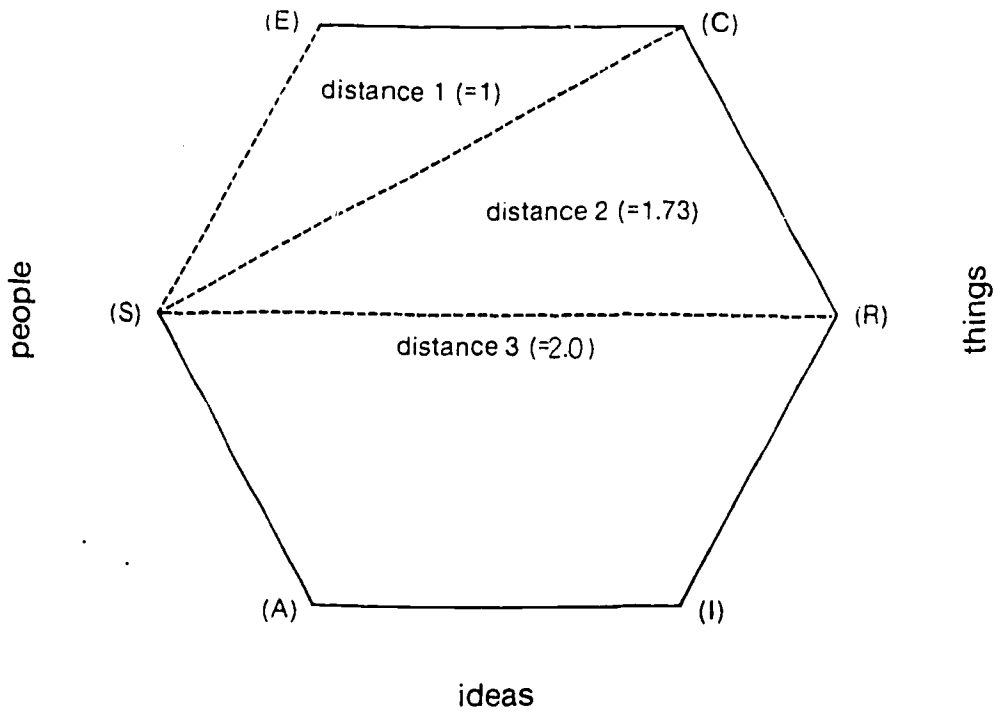
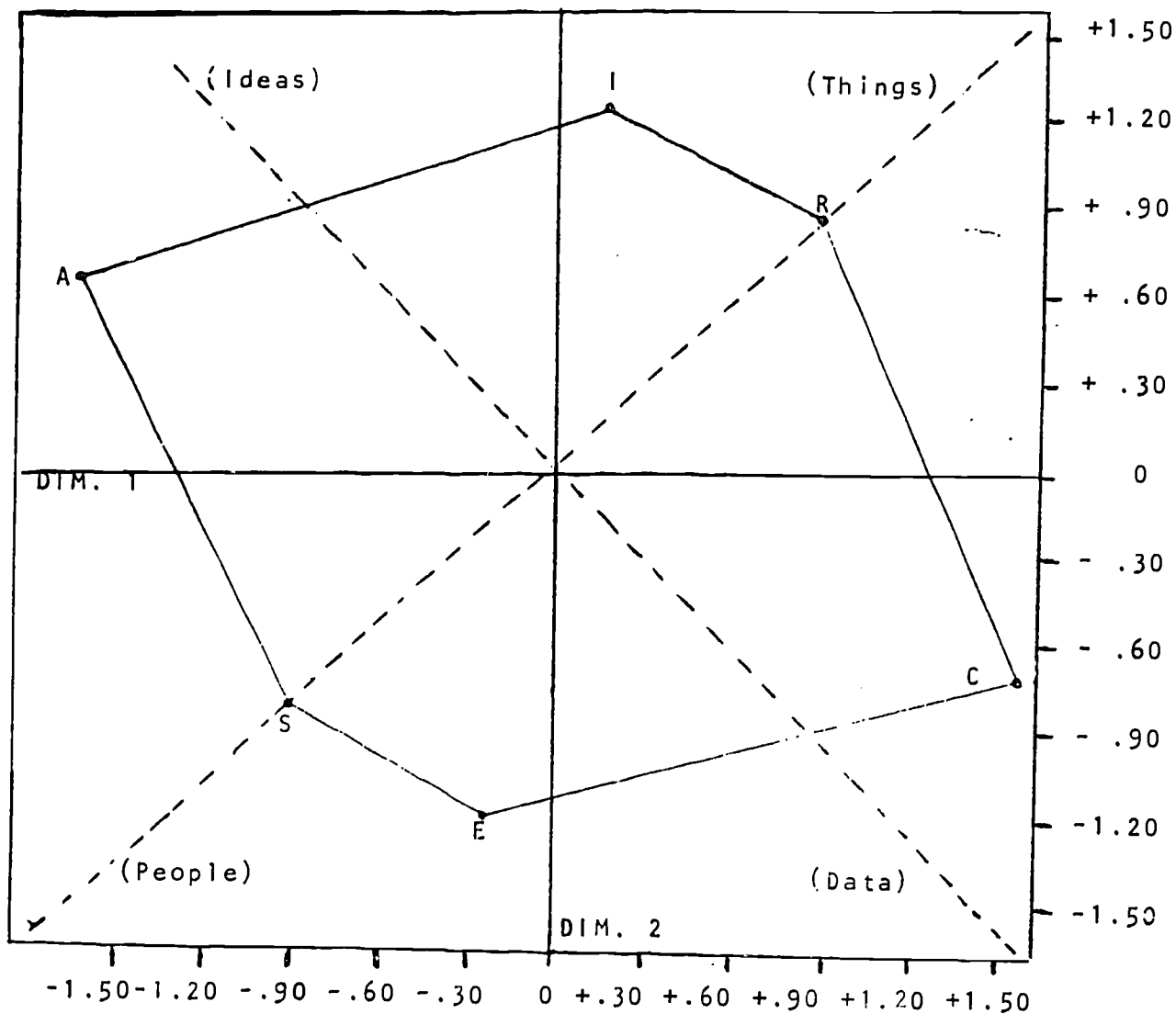


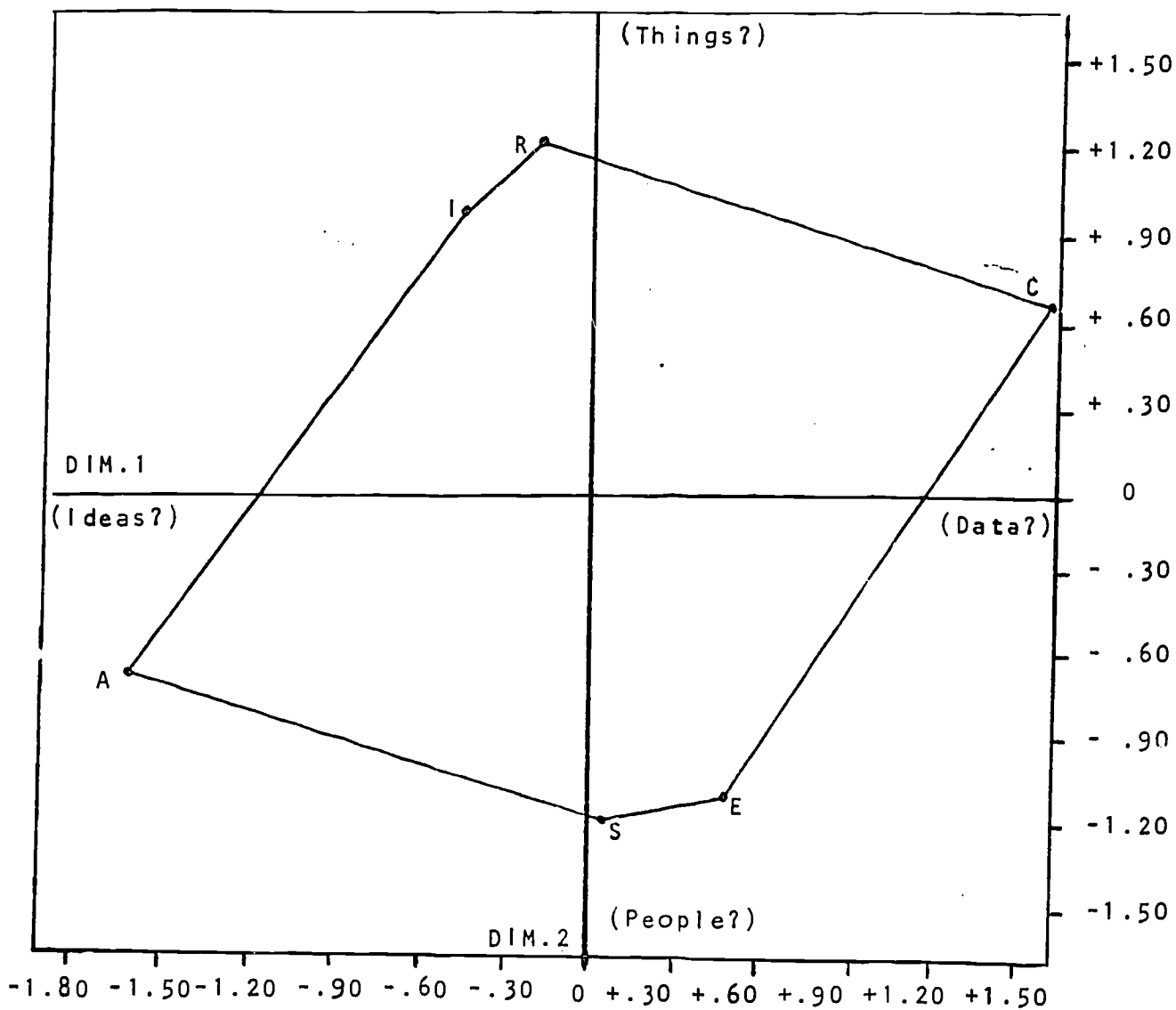
Figure 2. Stimulus space from nonmetric Euclidian distance multidimensional scaling model for six occupational themes.



$$\underline{R}^2 = .573$$

Stimulus	ALSCAL Dimension	
	1	2
Realistic (R)	.9022	.8803
Investigative (I)	.2038	1.1256
Artistic (A)	-1.6450	.6629
Social (S)	-.8646	-.7934
Enterprising (E)	-.2192	-1.2023
Conventional (C)	1.6228	-.6730

Figure 3. Group stimulus space from individual differences scaling model for six occupational themes.

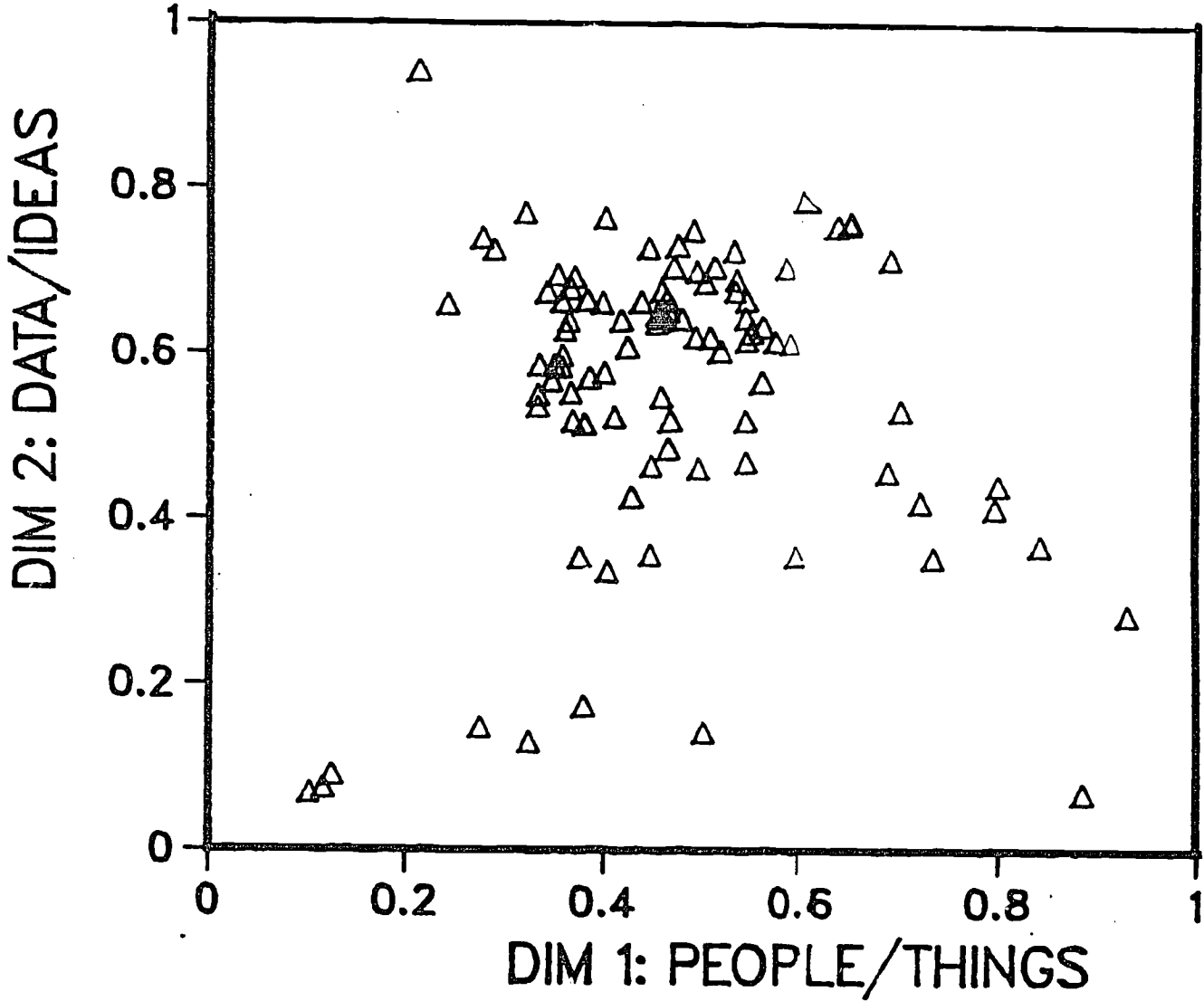


$$\underline{R^2} = .590$$

Stimulus	ALSCAL Dimension	
	1	2
Realistic (R)	-.1579	1.2393
Investigative (I)	-.4079	1.0312
Artistic (A)	-1.6745	-.6244
Social (S)	.0554	-1.1871
Enterprising (E)	.5380	-1.0945
Conventional (C)	1.6469	.6355



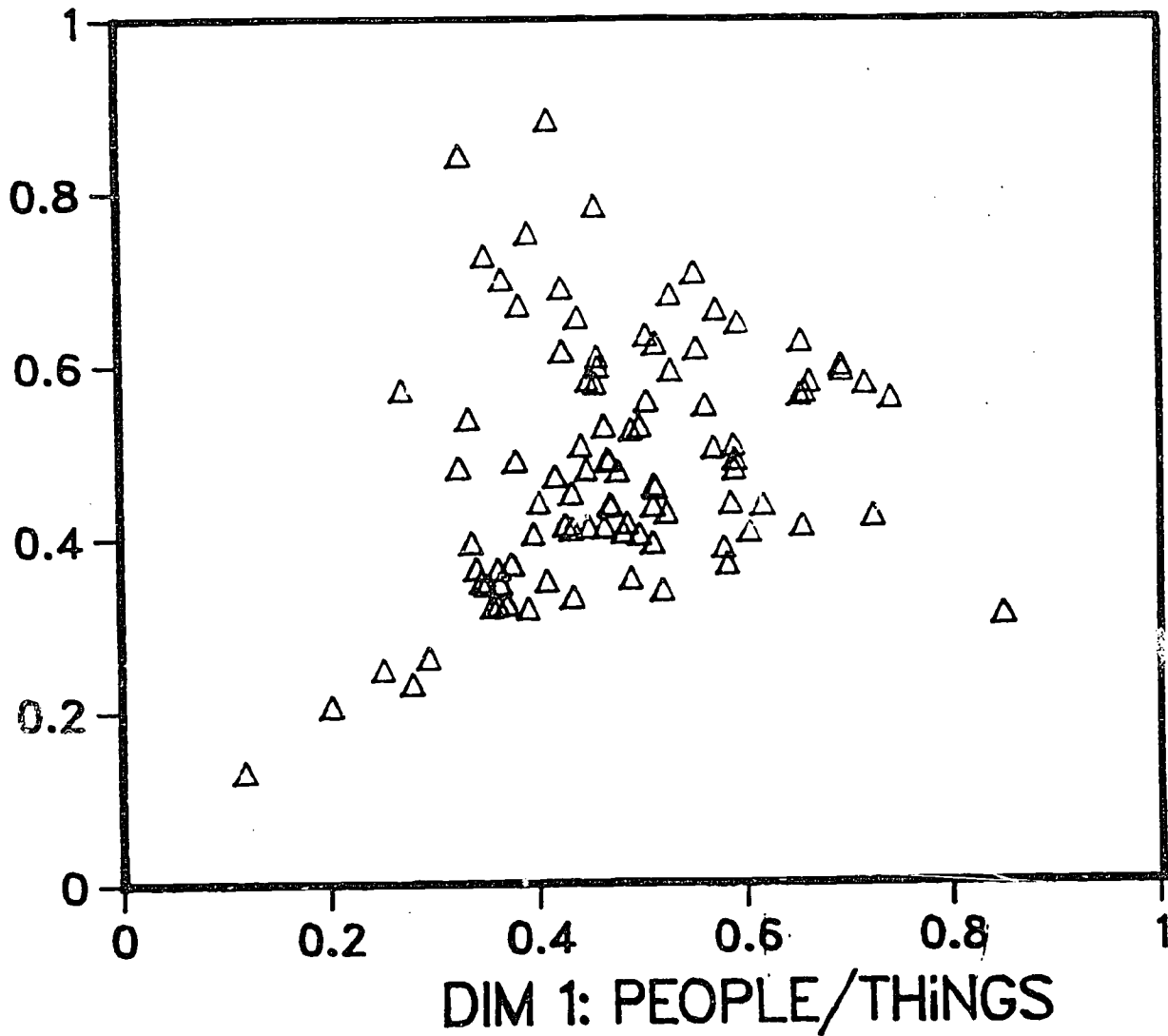
Figure 4. Derived subject weights from two-dimensional individual differences model for six occupational themes.



25

Figure 5. Derived subject weights from Procrustes fit to a hexagonal configuration for six occupational themes.

DIM 2: DATA/IDEAS



**END**

**U.S. DEPT. OF EDUCATION**

**OFFICE OF EDUCATIONAL  
RESEARCH AND  
IMPROVEMENT (OERI)**

**ERIC<sup>®</sup>**

**DATE FILMED**

**NOV 4 1987**