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ABSTRACT

Seventy-two scales collected from a previous study were administered to a group of 557 sixth grade, Philadelphia public school children who were mainly from the lower socioeconomic class. A matrix sampling approach was used in collecting the data. The mean value for each scale was established and these values were correlated. The resulting 72 x 72 matrix was factor analyzed using the Principal Components method with Varimax rotation of five factors. The five factors accounted for 33% of the variance. Comparisons were made with previous studies. (Author)

THE SEMANTIC STRUCTURE OF A SET OF SCALES DEVELOPED FOR USE WITH INNER-CITY PUPILS

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Office of Research and Evaluation

THE SCHOOL DISTRICT OF PHILADELPHIA

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ABSTRACT

Seventy-two scales collected from a previous study were administered to a group of 557, sixth grade, Philadelphia public school children who were mainly from the lower socioeconomic class. A matrix sampling approach was used in collecting the data. The mean value for each scale was established and these values were correlated. The resulting 72 x 72 matrix was factor analyzed using the Principal Components method with Varimax rotation of five factors. The five factors accounted for 33% of the variance. Comparisons were made with previous studies.

Introduction

The purpose of the development of the Semantic Differential was to obtain a quantitative index of meaning (Osgood, Suci and Tannenbaum, 1957). Since the technique used verbal encoding, it was necessary to develop "a carefully devised sample of alternative verbal responses which can be standardized across subjects ...(and which will be) representative of the major ways in which meanings vary [Osgood, Suci and Tannenbaum, 1957, p.19]." As Osgood, et al. pointed out in the same volume, the sampling of subjects, on the basis of which the scales were devised, was somewhat inadequate since the subjects were mostly college undergraduates.

It has been contended (McNamara, Ayrer and Farber, 1972) that scales developed on such a population might lead to an increase in error variance if used with elementary school children since the scales used are not typical of their language patterns. They would therefore be asked to rate a set of concepts with scales consisting of adjectives which they would not normally use to describe them. Furthermore, there is evidence from sociolinguistics (Bernstein, 1965, 1971; Robinson and Creed, 1968; Lawton, 1963; Raph, 1967) which indicates that lower socioeconomic class children have a language that differs from middle class children of the same age. This could further increase the error.

It was for these reasons that it was decided to develop a set of scales based upon the language patterns of elementary school children such as those that are found in the Philadelphia schools. Di Vesta, in two previous papers (1965, 1966), had developed scales on a sample of elementary school children which he described as middle socioeconomic. The Philadelphia school population, although varied, is primarily of lower

socioeconomic status and replication seemed justified because of this difference.

Any attempt to apply the Semantic Differential Technique to a new group for whom it is felt that established scales may not be appropriate requires, in addition to the development of the scales, a factor analysis of them. This is necessary since, if the desired index of meaning of the concept is to be of any value, it must reflect the score of that group on all of the basic dimensions of meaning. Osgood recognized this and The Measurement of Meaning (Osgood, Suci and Tanrenbaum, 1957) included a number of factor analytic studies in which there had been an attempt to determine the dimensionality of semantic space. In these studies the basic EPA - Evaluative, Potency, Activity - dimensions emerged. The Evaluative factor regularly appeared first and accounted for one-half to three-quarters of the extractable variance. It was defined by such scales as good-bad, sweet-sour, kind-cruel and beautiful-ugly. The Potency factor appeared second and accounted for about half as much variance as the first. It was defined by large-small, strong-weak and heavy-light. The Activity factor appeared third and accounted for about the same amount of variance as the second factor. It was defined by fast-slow, active-passive, and sharp-dull. Several other factors appeared in one or another of the studies and were defined as a stability, a tautness, a novelty and a receptivity factor.

Heise (1969) reviewed a number of studies in which the EPA structure showed up consistently including samples of schizophrenics, navy enlistees and men and women of various socioeconomic status.

Osgood, Minon and Archer (1962) had high school students rate 100 concepts on 50 scales. They found E (45% of the variance), P (12%)

and A (6%).

Tanaha and Osgood (1965) were able to demonstrate the EPA structure in a study in which the scales were used to rate lines and forms instead of verbal concepts.

In studies with elementary school children, Lilly (1966) had his parochial school subjects rate 20 concepts on 28 scales. He found EPA and Novelty and Stability. Di Vesta (1966) reported 3 separate factor analyses of 37 scales used to rate 20 concepts by pupils in grades 2-6. In the first analysis E, P and A accounted for 41%, 16 and 12% of the variance while a Dynamism factor accounted for 10%. The defining scales were virtually the same as Osgood's. In the second analysis, E, P and A also appeared along with Warmth, Tautness and Novelty-Reality but E accounted for only about 20% of the total variance.

Method

General Considerations

One of the problems in factor analytic work with the semantic differential is the need for a wide variety of concepts. The reason for the factor analysis is to determine the basic dimensions along which meaning varies. Obviously, if only one concept type is used, the opportunity for many dimensions to appear is restricted. Imagine using the Semantic Differential to rate paintings. The Evaluative factor would appear and, in fact, might be broken into a few E type factors but it would be difficult to get Par A. As a result, Heise (1969), for example, recommended that five concepts be used for each of the eight possible combinations of EPA: $E^{+}P^{+}A^{+}$, $E^{+}P^{+}A^{-}$, $E^{+}P^{-}A^{-}$, ..., $E^{-}P^{-}A^{-}$. This would mean 40 concepts as a minimum. Since there were 72 scales to factor analyze and it is desirable to have about four times as many subjects as

variables, it would be necessary to have 40 x 72 = 2880 responses from each of 300 subjects. If it takes five minutes to rate four concepts on nine scales it would take about six to seven hours to rate 40 concepts on 72 scales. It is difficult to imagine a principal saying yes to such a request (much less maintaining the pupil's interest). It was therefore decided to use a matrix sampling approach.

Matrix Sampling. Any set of testing data can be visualized as appearing in a subject by item matrix. It has been shown by Lord (1962), Shoemaker (1970a, 1970b, 1971) and others that results obtained from random sampling of both items and subjects from the matrix are virtually the same as those that would be obtained if all subjects responded to all items. Therefore, instead of giving 100 items to each of 100 people as in the traditional method, the 100 items are randomly assigned to ten-ten item tests and one of these tests is assigned to a randomly selected group of ten people.

This is a somewhat unusual approach so some justification is provided here. In factor analysis with semantic differential data, there are three sources of variance: scales, concepts, and subjects. In work of the nature described in this paper, it is standard procedure to sum across concepts, leaving a scale or item by subject matrix.

In this research, the scales were randomly assigned to groups of nine scales each - called scale packages. The order and polarity of each scale was randomly determined. The scale packages were randomly assigned to concepts. The concepts were randomly assigned to response forms and the response forms were randomly collated into groups of four. This means that any subject could have been assigned any combination of scales and thus each correlation should be representative of the correlation that would have been obtained if all students had responded to all scales.

Scales

The 72 scales used in the study came from a previous study by McNamara, Ayrer and Farber (1972). Of the 72 scales, 25 also appeared in the Measurement of Meaning (Osgood, Suci and Tannenbaum, 1957) and/or in Di Vesta's (1966) work. The scales were assigned to eight scale packages. The scales are listed in Table 1.

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Insert Table 1 Here
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Concepts

In order to obtain covariance terms across all eight scale packages (made necessary by the matrix sampling approach), it was necessary to have $n(n-1)/2 = 28$ pairings of scale packages.

It was decided to have each scale package pair appear twice on any one response sheet so it was necessary to have 28 different response sheets. Since there are four concepts to each response sheet, 112 concepts were necessary. Of these 50 came from the previous study, and the remainder were selected for study. They were selected to be representative of the pupil's total life space. They are shown in Table 2 along with the scale packages assigned to them.

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Insert Table 2 Here
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Administration

It was decided that a reasonable task for sixth grade subjects would be to have them rate 16 concepts (four pages).

A five-point semantic differential was used. Standard Osgood directions were used and modified for the sixth graders.

The examiners were the authors and two associates who had been trained to administer the instruments.

Subjects

The subjects were 557 sixth grade pupils chosen to be representative of Philadelphia elementary school pupils. Of the total about 70% would be considered lower socioeconomic class while the remainder were closer to middle class.

Analysis

A program was written to unscramble the responses and compute mean scores for each scale for each subject. These mean scores were submitted to BMD 03D (Dixon, 1964), a Biomed correlation program which allows for deletion of certain item values. In this case, blanks and zeroes were omitted. The resulting 72 x 72 matrix was factor analyzed using the Principal Components technique with unity in the diagonal. The Varimax criterion was used in rotation.

Results

In keeping with the exploratory nature of the study, in the first analysis, the computer was instructed to extract and rotate 8 factors or until an eiginvalue of .500 was reached. The results are shown in Table 3. Scales with loadings less than .40 are not included.

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Insert Table 3 Here
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The first factor (in fact, the first two factors), seemed to be evaluative, but only accounted for 11% of the variance. This is far less than one would expect. Another disturbing factor was that there were 26 eiginvalues greater than 1.0.

This gave rise to doubts about the use of the matrix sampling approach. In order to see what effect this might have had, it was decided to run a second set of factor analyses in which only those variables to

which everyone in subsets of the total sample had responded were factor analyzed. With four pages per respondent, it would have been possible to have a maximum of eight scale packages. As it turned out, 142 subjects had responded to scale packages 1, 3, 6, and 7; another 140 to 1, 3, 7, and 8; 149 to 2, 4, 5, and 6; 86 to 2, 3, 4, and 8; 79 to 1, 5, 6, and 8. If the matrix sampling approach had been responsible, the percentage of variance accounted for by the first three factors and the ratio of number of eiginvalues greater than 1.0 divided by number of variables should differ. Table 4 shows the results of those comparisons.

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Insert Table 4 Here
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The number of eiginvalues greater than 1.0 is also consistent with a previous study with 155 ninth grade Philadelphia pupils by one of the authors (Ayrer, 1972) in which 40 scales were factor analyzed and there were 14 eiginvalues greater than 1.0.

In addition, substantial similarity in factor structure was observed across the separate factorings.

This brief analysis corroborated the results of the 72 variable analysis and supported the conclusion that factor analysis based upon a matrix sampling approach was legitimate.

In Principal Components analysis, the dimensionality equals the order of the matrix and it is up to the investigator to determine which factors are meaningful and when to stop extracting. The usual rule of thumb is to stop when the eiginvalues drop below 1.0. In this case there were 26 eiginvalues greater than 1.0, a number which is too large for effective interpretation. Another technique which can be used in this case is Cattell's Scree Test: the factors are plotted against the percentage of variance for which the factor accounts. The curve flattens out,

according to Cattell, when the factors are largely accounting for random error (Cattell, 1966). When this test was applied to the data, it was decided to factor analyze a second time and stop rotating after five factors. The Eiginvalues of this matrix and the cumulative amount of variance extracted is shown in Table 5.

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Insert Table 5 Here
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The results of this second factor analysis are shown in Table 6.

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Insert Table 6 Here
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Of the 72 original scales, 42 had loadings of at least .40 on one of the five factors. Of the remaining 30, 10 are standard Osgood scales. This is not to say they are not worthwhile with such a population. Of the 10, 7 had loadings of greater than .40 on the initial, eight factor, solution, and the remaining three would have been included if the criterion had been .30 or better.

Discussion

This study had two basic purposes: (1) determining the dimensionality of the semantic space underlying the 72 scales and (2) determining which scales were the best measures of each dimension. Also of interest was a comparison of the findings of this study with those of Osgood, Suci and Tannenbaum (1957) and Di Vesta (1966).

Using the five-factor solution as the basis for this discussion, the results are different from most other studies the authors have seen. In most studies, the first three factors extracted are E, P, and A and they account for about 50% of the variance. This is certainly true for Osgood's reported studies and Di Vesta's.

In this study, the Evaluative dimension seems to split in two, the first two factors being clearly Evaluative. The first factor seems to involve characteristics of other people: ugly-handsome, ugly-beautiful, ugly-cute, rough-gentle, tiny-huge, strict-nice. The second factor seems to involve feeling relating to self: good-bad, angry-happy, comfortable-uncomfortable, sweet-sour, dumb-smart, weak-muscular.

Factor three is either Potency or, given the high loading for cold-warm may be Dynamism: a factor sometimes found (Di Vesta, 1966) which is a combination of Activity and Potency.

Factor four is another Evaluative factor but one which seems to involve a concern for Personal Safety: safe-dangerous, unhealthy-healthy, unkind-kind, unfriendly-friendly, etc.

Factor five seems to be a spillover factor. Its highest loadings are with dumb-intelligent, exciting-boring, and mean-nice: three scales which can be considered E or P depending on whether one sees them as conferring power on others or simply as characteristics of another human being. In addition, cowardly-brave, rough-smooth, and young-old, all load on at least EP if not EP and A. Moreover, seven of the ten scales have loadings between .40 and .50 allowing the hypothesis that they are the type of scale which is neither fish nor fowl and gets stuck between dimensions in rotation.

Under ordinary conditions, one would probably not venture too many opinions about these factors and their interpretation, but given the developmental and heuristic nature of this study, a few comments do not seem out of order. Pupils of this age are becoming very peer-oriented but, at the same time, are still quite under the dominance of adults. They are therefore very concerned about how other people are relating to

them and their view of the world is dominated by such things as looks, size, and how people are treating them. The self-image is very fragile at this point. They are also beginning to feel the stirrings of a drive for independence - the need to have some power in deciding what will happen to them. Finally, for many Philadelphia children, the question of their own personal safety is a real consideration and part of their view of the world must be filtered through that screen. It will be interesting to see if these findings are replicated in other big cities.

The number of eiginvalues greater than 1.0 and the proportion of variance extracted was, as mentioned previously, a surprise, since most other studies which have been published show that E, P, and A account for much more variance than was found here. The only study that was found which was similar was presented by Evans at the 1971 AERA meeting. He had pupils from ten high schools in Ontario and their companion junior high schools use 60 scales to rate nouns. Evans found 10 factors with eiginvalues greater than 1.0 which, together, accounted for 40% of the variance. The first factor accounted for 18% of the variance and none of the remaining nine accounted for more than 4%.

Given the consistency of these eiginvalue-cumulative variance results in this study and the previous study by Ayrer (1972), the tendency is to suggest that this kind of a finding is typical of what will be found with subjects from large city school systems. Again, it is hoped there will be some attempts at replication.

Finally, it should be pointed out that 28 of the 43 scales with loadings of .40 or better on the factors in this study came from the McNamara-Ayrer-Farber study previously reported. The implication is that a series of new scales has been created with known factorial composition which are more typical of the language of elementary school children.

Even if only those scales with loadings of .60 or better are used, the following are now available: good-awful, interesting-dull, ugly-cute, rough-gentle, angry-happy, comfortable-uncomfortable, dumb-smart, safe-dangerous, unkind-kind, unhealthy-healthy, dumb-intelligent, exciting-boring, and mean-nice.

Further studies are to be carried out in grades 4, 7, and 8 to determine whether the findings in this study are consistent across grades.

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TABLE 1.

List of Seventy-two Scales Used in the Study

Weak-Strong*
Cold-Hot*
Good-Bad*
Fast-Slow*
Soft-Hard*
Long-Short*
Dull-Sharp*
Rough-Smooth*
Sweet-Sour*
Black-White..(O)
Beautiful-Ugly..(O)
Red-Blue..(D)
Round-Square..(D)
Big-Little..(D)
Clean-Dirty..(O)
New-Old..(D)
Small-Large..(O)
Sad-Happy..(O)
Ugly-Pretty..(D)
Awful-Nice..(O)
Wide-Narrow..(O)
Young-Old..(O)

High-Low..(O)
Bright-Dark..(O)
Brave-Cowardly..(O)
Loud-Soft..(O)
Cold-Warm.
Fat-Skinny.
Strict-Nice.
Mean-Nice.
Easy-Hard.
Yellow-Green.
Blue-Green.
Male-Female.
Rough-Gentle.
Rough-Soft.
Boring-Exciting.
Dull-Exciting.
Uninteresting-Interesting.
Interesting-Dull.
Boring-Interesting.
Tall-Short.
Big-Small.
Intelligent-Dumb.

Smart-Dumb.
Smart-Stupid.
Kind-Mean.
Kind-Unkind.
Dull-Colorful.
Dull-Bright.
Loud-Quiet.
Awful-Wonderful.
Awful-Good.
Fat-Thin.
Angry-Happy.
Wide-Thin.
Unnecessary-Necessary.
Warm-Cool.
Comfortable-Uncomfortable.
Dangerous-Safe.
Healthy-Sick.
Healthy-Unhealthy.
Muscular-Weak.
Noisy-Quiet.
Loving-Hating.
Brave-Scared.
Huge-Tiny.
Huge-Small.
Ugly-Handsome.
Ugly-Cute.
Friendly-Unfriendly.

*Appears in Di Vesta's (1966) and Osgood's (1957) Lists.

.Appears only in this study.

..Appears in Di Vesta's or Osgood's Lists.
(Initials indicate which.)

TABLE 2.

Concepts Used in This Study Arranged By Scale Package

1	2	3	4	5	6	7	8
Parents	Adults	Smoking	Hot Dogs	School Work	Teenagers	Winter	My Friends
Peace	Medicine	My Community	Baseball Player	Bed	Cat	Brother	Shoes
Hairdresser	Our Flag	Spelling	Getting Suspended	Teacher	Dancing	Dog	Prison
Skates	Ice Cream	Thunder	Staying After School	Football Player	Snow	America	Farm
Class	Nurse	Man	Cowboy	Hair	Cake	Tree	My City
House	Party	School Yard	Mini-Skirts	Fish	Policeman	Liver	Boys
Bicycle	Truck	War	Drugs	Singer	Drug Store	Cherry Pie	Flowers
Summer	Candy	Children	Maxi-Skirts	Work	Dating	Girls	Philadelphia
Spinach	Newspaper	Grandmother	Recess	Basketball Player	Telephone	Apple	Principal
Report Card	Fire	Studying	Music	Desk	Cow	Money	Book
Sister	Noise	Army	Rain	Taxi	Classmates	Moon	Wet
Job	Games	River	Chair	Supermarket	Street	Homework	Reading
Me	Coat	Bread	Tests	Woman	Dancer	My Clothes	My School
Baby	Car	Television	Toys	School	Birthday	Auto Mechanic	Radio

TABLE 3.

Results of First Factor Analysis

Scale Name	Factor 1	2	3	4	5	6	7	8
Ugly-Cute	.75							
Ugly-Beautiful	.73							
Bright-Dark	-.67							
Interesting-Dull	.62							
Awful-Good	.59							
Rough-Gentle	.51							
Wonderful-Awful	-.45		.48					
Black-White	.41							
Good-Bad		.84						
Comfortable-Uncomfortable		.79						
Happy-Angry		.79						
Dumb-Smart		-.75						
Bright-Dull		.66						
Sour-Sweet		-.58						
Weak-Muscular		-.47						
Cold-Warm			.66					
Soft-Hard			.61					
Small-Large			.58					
Soft-Rough			.52					
Thin-Fat			.50					
Clean-Dirty			.71					
Safe-Dangerous			.71					
Unkind-Kind			-.64					
Unhealthy-Healthy			-.63					
Unfriendly-Friendly			-.54					
Pretty-Ugly			.51					
Exciting-Dull			.48					
New-Old			.45					
Dumb-Intelligent			-.44	.63				
Mean-Nice				.63				
Exciting-Boring				.62				
Square-Round				.48				
Low-High				.46				
Little-Big				.44				
Cowardly-Brave				.43				
Rough-Smooth				.42				
Long-Short					.60			
Hard-Easy					.59			
Narrow-Wide					-.58			
Small-Huge					-.53			
Fat-Skinny					.47			

TABLE 3. (continued)

Results of First Factor Analysis

Scale Name	Factor 1	2	3	4	5	6	7	8
Ugly-Handsome						.64		
Happy-Sad						-.61		
Healthy-Sick						-.58		
Uninteresting-Interesting						.55		
Colorful-Dull							-.51	
Slow-Fast							.48	
Tiny-Huge							.46	
Nice-Awful								.62
Dull-Sharp								-.46
Thin-Wide								.43
Mean-Kind								-.43
Dull-Bright								-.42
Big-Small								.42
Hating-Loving								-.40
Eigenvalues	8.04	5.67	3.97	3.25	2.95	2.76	2.42	2.21
Percent of Total Variance Extracted	11	8	6	4	4	4	3	3

TABLE 4.

Comparison of Eight Package and Four Package Analyses

Scale Packages Factor Analyzed	Percent of Variance Accounted For By Factor 1	2	3	No. of Eigenvalues >1.0 / No. of Variables
1, 2, 3, 4, 5, 6, 7, 8	11	8	5.5	$\frac{26}{72}$ = 36%
2, 3, 4, 8	13	11	7.5	$\frac{12}{36}$ = 33%
2,4,5,6	17	10	7	$\frac{10}{36}$ = 28%
1,3,7,8	15	10	7.5	$\frac{11}{36}$ = 31%
1,3,6,7	14.6	9.2	6.4	$\frac{12}{36}$ = 33%
1,5,6,8	15.7	9.5	8	$\frac{12}{36}$ = 33%

TABLE 5.

Eigenvalues and Cumulative Variance Extracted

Eigenvalues

8.03665	5.67097	3.96861	3.24706	2.95042	2.75796	2.41849	2.20581	2.17795	2.03104
1.86625	1.80894	1.74108	1.65113	1.59798	1.46749	1.38181	1.35792	1.31012	1.22614
1.16593	1.15834	1.09004	1.02718	1.01476	1.01310	0.93397	0.90610	0.85299	0.82970
0.77638	0.74541	0.73979	0.70196	0.68134	0.63250	0.61021	0.59539	0.56797	0.53912
0.49676	0.47748	0.46519	0.44795	0.42657	0.39901	0.38312	0.36791	0.34785	0.32669
0.29841	0.28171	0.25726	0.23168	0.20954	0.18686	0.17319	0.15886	0.14333	0.10026
0.09161	0.06665	0.04058	0.03120	0.00455	-0.05351	-0.08334	-0.15167	-0.22753	-0.30418
-0.33363	-0.71729								

Cumulative Proportion of Total Variance

0.11162	0.19038	0.24550	0.29060	0.33158	0.36988	0.40347	0.43411	0.46436	0.49257
0.51849	0.54361	0.56779	0.59073	0.61292	0.63330	0.65249	0.67135	0.68955	0.70658
0.72277	0.73886	0.75400	0.76827	0.78236	0.79643	0.80940	0.82199	0.83383	0.84536
0.85614	0.86649	0.87677	0.88652	0.89598	0.90477	0.91324	0.92151	0.92940	0.93689
0.94378	0.95042	0.95688	0.96310	0.96902	0.97456	0.97989	0.98500	0.98983	0.99436
0.99851	1.00242	1.00599	1.00921	1.01212	1.01472	1.01712	1.01933	1.02132	1.02271
1.02398	1.02491	1.02547	1.02590	1.02597					

TABLE 6.

Results of Second Factor Analysis With Rotation of Five Factors

Scale Name	Loading in Previous Studies*	Factor 1	2	3	4	5
1. Ugly-Beautiful	E	.75				
2. Awful-Good	none	.69				
3. Interesting-Dull	none	-.68				
4. Ugly-Cute	none	.68				
5. Rough-Gentle	none	.63				
6. Bright-Dark	E	-.48				
7. Dull-Bright	none	.46				
8. Tiny-Huge	none	.43				
9. Loud-Quiet	none	.43				
10. Ugly-Handsome	none	.42				
11. Strict-Nice	none	.40				
12. Good-Bad	E		.81			
13. Angry-Happy	none		.76			
14. Comfortable-Uncomfortable	none		.76			
15. Dumb-Smart	none		-.72			
16. Bright-Dull	none		.64			
17. Sour-Sweet	E		-.55			
18. Weak-Muscular	none		-.46			
19. Cold-Warm	A			.64		
20. Small-Large	P			.58		
21. Soft-Rough	none			.56		
22. Soft-Hard	P			.55		
23. Wonderful-Awful	none			-.49		
24. Thin-Fat	none			.48		
25. Smart-Stupid	none			.42		
26. Safe-Dangerous	none				-.72	
27. Clean-Dirty	E				-.68	
28. Unkind-Kind	none				.67	
29. Unhealthy-Healthy	none				.64	
30. Unfriendly-Friendly	none				.57	
31. Pretty-Ugly	E				-.48	
32. Exciting-Dull	none				-.40	
33. Dumb-Intelligent	none				.40	.64

TABLE 6. (continued)

Results of Second Factor Analysis With Rotation

of Five Factors

Scale Name	Loading in Previous Studies*	Factor 1	2	3	4	5
34. Exciting-Boring	none					-.63
35. Mean-Nice	none					.63
36. Square-Round	novelty-reality					.48
37. Cowardly-Brave	E-P					.46
38. Rough-Smooth	E-P-A					.45
39. Low-High	E					.45
40. Young-Old	E-P-A					-.44
41. Little-Big	P					.41
42. Dull-Bright	none					.41
Eigenvalue		8.04	5.67	3.97	3.25	2.95
Percent of Total Variance		11	8	6	4	4

*The previous studies were by Osgood, Suci and Tannenbaum (1957) and Di Vesta (1966).