DOCUMENT RESUME

ED 078 083 TM 002 902

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TITLE Adapting Word Association for Use as an Evaluation Technique.
PUB DATE Feb 73
NOTE 15p.; Paper presented at Annual Meeting of American Educational Research Association (New Orleans, Louisiana, February 25-March 1, 1973)

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS *Association Tests; *Associative Learning; Comparative Analysis; *Evaluation Techniques; Projects; Response Style (Tests); Technical Reports; Test Results; Word Recognition

ABSTRACT

This paper outlines one approach for adapting the widely used word association technique for use as an evaluation measure. In this approach, project participants are presented with a number of stimulus words reflecting project objectives and are asked to give free associations to these terms. Responses are scored either by the nature of semantic content or by judgment of subjective quality and the resulting scores for pre and post administrations are statistically compared. The technique has been successfully employed in several evaluation studies, and has promise of providing the evaluator with an instrument that has rapidly alterable stimuli. (Author)

ADAPTING WORD ASSOCIATION FOR USE AS AN EVALUATION TECHNIQUE

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This paper outlines one approach for adapting the widely used word association technique for use as an evaluation measure. In this approach, project participants are simply presented with a number of stimulus words reflecting project objectives and are asked to give free associations to these terms. Responses are scored either by the nature of semantic content or by judgment of subjective quality and the resulting scores for pre and post administrations are statistically compared. The technique has already been successfully employed in several evaluation studies with widely differing objectives and subjects, and has promise of providing the evaluator with an instrument that has rapidly alterably stimuli, allowing immediate reaction to changing project objectives.

Paper presented at AERA Meeting, New Orleans, February, 1973.

ADAPTING WORD ASSOCIATION FOR USE AS AN EVALUATION TECHNIQUE

Word association has long been a popular technique in clinical and experimental investigations. It was originally used as a clinical technique for eliciting responses relating to underlying but unrecognized dynamic structures. Later, the publication of a normative list of 100 words and their associates by Kent and Rosenoff (1910) provided a comparison point for many descriptive and methodological studies of verbal behavior. More recent studies with word association have focused on the experimental investigation of verbal structures and verbal development. The technique has proven useful in group comparison studies and in experimental manipulations of factors influencing verbal associations.

The studies presented in this paper extend the word association technique into the area of educational evaluation. The rationale for this extension is that word association represents a low-level but direct means of assessing the degree to which an individual benefits cognitively from an educational experience. In simple terms, it is assumed that if an individual has gained anything cognitively from exposure, it will be reflected in the quality and frequency of associations evoked by elements from the material or situation experienced. Past research has suggested that word associations are stable (Jung, 1962) and yet are quite sensitive to experimental manipulation, which provides the potential for use as an evaluation technique.

From the outset, it must be pointed out that the technique presented here is not presumed to assess all types of outcomes. These applications have concentrated on the cognitive aspects of behavior. While word association may well also be an indicant of non-cognitive outcomes, we have not investigated this possibility. Further, we are not recommending that this approach should replace other, stronger evaluation techniques-such as criterion-referenced tests-when such techniques are appropriate. Rather, we believe that word association can play a valuable role in evaluations where stronger techniques are not appropriate.

or, due to practical limitations, will not be applied.

The word association approach being presented here has been used in three types of studies to date. It was first used in a Title I summer enrichment program, where culturally deprived students were given the opportunity to visit a number of historical, cultural, business, civic and recreational sites (DiLuzio and Katzenmeyer, 1970; DiLuzio, Lesyk and Blixt, 1971; Hunter and Blixt, 1972). It has also been used in a Title III K-6 curriculum development study of technology and its impact on society (Blixt and DiLuzio, 1972). Finally, it was employed in an experimental college unit on war and peace (Deming, 1971).

Methodology

We have employed the word association technique in diverse evaluations, with details of the procedures differing somewhat in each according to need. The approach presented here is currently being employed in the Title III evaluation mentioned above.

Selection of Stimuli and Administration

In the technology study, the teacher for each unit is asked to supply a number of words drawn from the content of the unit to be presented. These words are examined by the evaluator for linguistic structure, meaningfulness, (Paivio, Yuille, and Madigan, 1968) and associative value (Palermo and Jenkins, 1964). Then in cooperation with the teachers, five words are chosen for the evaluation. These five words are presented to the children prior to the introduction of the curriculum unit and the children are instructed to write down as many associations to each as possible in one minute. For younger children the associations are given orally and recorded by the teacher. After completion of the curriculum unit, the same five words are again presented to the students under the same instructions. Thus, this assessment procedure takes approximately ten minutes of the students' time for each unit.

Scoring

Again, several approaches have been tried in scoring the word associations. For younger students, responses are currently being scored for quality on a

3 point scale: 3 for a synonym or superordinate; 2 for a major use or major characteristic; and 1 for a minor use or minor characteristic. Examples of this scoring procedure are given in Appendix A. The frequency of relevant responses is also recorded.

When employing the technique in the evaluation of the experimental college class, the quality of associations was determined by content experts. Four Political Scientists reached group consensus for each response given. As yet we have not developed an objective scoring scheme for college students.

Scorer Reliability

In most of our investigations of the word association technique, scorer reliability has been no problem as the scorers were members of the evaluation team. Under circumstances of extensive interaction among team members we have found that nearly perfect agreement among judges can be reached quite rapidly. However, it is our intention that the technique will also be useful for project personnel and teachers and will not require the presence of a trained evaluator. For that reason, we have had teachers in the Title III Project do scoring for their own units. Interscorer reliabilities for teachers and the evaluator are given in Table 1. These results are reasonably good and notable because they were achieved with minimal training of the teachers. It is expected that reliabilities would be increased with additional training.

Validity

Evidence for validity of this technique is still preliminary and incomplete; however, we have collected data in several of the studies that have demonstrated its sensitivity to change after instruction. Results from the Title I summer program are given in Tables 2 and 3. The number of significant increases in these tables is striking in light of the fact that the "instruction" presented was simply a trip to an historical, civic, business, or recreational setting, and that the pre and post evaluations occurred only three days apart. Teachers on this project were also asked to rank the trips for degree of educational worth.

Table 1

Inter-scorer Reliabilities for Teachers and Evaluator in Title III Technology Curriculum Project, Spring, 1972*

Teacher A	B	C	D	Evaluator
A	.782	.691	.752	.861
B		.802	.671	.853
C			.782	.761
D				.856
Evaluator				

*Each scorer scored responses of 25 children to 5 concepts in each of grades K, 2 and 4.

Table 2

Pre and Post Test Comparison of Word Association Quality Scores for Students Participating in Title I Field Trips

Summer, 1971

Field Trip	df	Pretest Mean	Posttest Mean	Mean Difference	t	Probability
Dover	39	2.626	2.689	.063	.4998	
Dairy	25	3.659	3.804	0.145	1.4403	
Fruit Farm	31	2.798	2.976	.177	2.3435	.05
Wooster	32	1.399	2.491	1.091	7.3171	.01
Sea World	23	2.235	2.220	-.015	-.1086	
Museum	20	3.391	3.356	-.035	-.3358	
Court	15	3.195	3.372	.177	1.0669	
Pittsburgh	23	2.625	2.632	.006	.0546	
Playhouse	29	2.513	2.862	.709	6.6314	.01
Columbus	24	1.500	2.954	1.454	8.4634	.01
Niagra Falls	26	2.121	2.229	.109	.8370	
Airport	22	3.047	3.317	.270	1.4632	
Cooks Forest	20	3.227	3.149	-.078	-.6206	
Akron	25	1.966	2.778	.813	5.3593	.01

Table 3

Pre and Post Test Comparisons of Word Association Frequency Scores for Students Participating in Title I Field Trips
Summer, 1971

Field Trip	df	Pretest Mean	Posttest Mean	Mean Difference	t	Probability
Dover	39	12.850	17.150	4.300	7.9849	.01
Dairy	25	18.769	18.885	.115	.1031	
Fruit Farm	31	20.656	24.969	4.313	4.6239	.01
Wooster	32	5.727	15.879	10.152	9.0584	.01
Sea World	23	18.042	22.917	4.875	4.0031	.01
Museum	20	20.095	23.095	3.000	2.1163	.05
Court	15	17.562	20.437	2.975	3.3986	.01
Pittsburgh	23	16.417	22.958	6.542	4.8750	.01
Playhouse	29	14.800	21.933	7.133	6.0450	.01
Capitol	24	12.160	23.280	11.120	6.9440	.01
Niagara Falls	26	15.111	17.444	2.333	2.0888	.05
Airport	22	21.522	23.957	2.435	1.2639	
Cooks Forest	20	25.714	32.238	6.524	3.6398	.01
Akron	25	12.385	19.115	6.731	8.3622	

This ranking correlated .82 with mean word association quality scores for those trips.

Data from the Title III Project on technology are given in Table 4. Results here are less striking than with the Title I Project, although there were a number of significant differences between the experimental and control groups in adjusted post-test associations. However, it should be pointed out that these curriculum units were being presented for the first time and that the word association technique was the only one of a number of evaluation instruments that showed consistent differences between experimental and control groups favoring the experimental groups.

Significant differences were also found in the experimental college study. There the experimental group had higher quality of association scores than the control group across five concepts. No significant differences were found for frequency of relevant associations.

Several correlation studies have also been carried out in the Title III Project. Intercorrelations of post-test word association responses and subscales of math, study skills, and reading from the California Achievement Test are given in T). It is apparent that the individual differences found in this word association task are strongly related to reading achievement and to some extent with study skills. Intercorrelations of word association quality scores and teachers ranking of each child's knowledge of the unit are listed in Table 6. There was a sizeable relationship in all grades, but particular in the younger grades, between the individual differences variation for word association and the teachers' judgment of degree of knowledge. More important, however, is that the technique be sensitive to cognitive change, as the studies above suggest it is.

Several additional validity studies are now underway. Word association scores will be correlated with teachers ranking of amount of knowledge gain, to give a sharper estimation of the extent to which the word association technique mirrors changes seen by the teachers. Second, the word association scores will be correlated with the child's estimate of the degree to which he or she has benefited

Table 4

Analysis of Covariance of Word Association Scores For Experimental and Control Students in a Title III Technology Curriculum Project, Grades K-6

Spring, 1972

Grade	Wd. Assoc.	df	F	Probability
K	Quality	46	18.11	.01
	Frequency	46	12.54	.01
1	Quality	40	3.56	
	Frequency	40	0.00	
2	Quality	28	8.61	.05
	Frequency	28	3.89	
3	Quality	28	.17	
	Frequency	28	1.85	
4	Quality	28	2.03	
	Frequency	28	13.31	.01
5	Quality	34	.01	
	Frequency	34	4.45	.05
6	Quality	22	6.03	.05
	Frequency	22	7.46	.05

Table 5

Intercorrelations of Word Association and California Achievement Test Scores for 4th, 5th and 6th Grades

California Achievement	Word Association	4th	5th	6th	Total
Math	Quality	.04	.22	.25	.08
	Frequency	.01	.07	.11	.06
Study Skills	Quality	.22	.20	.37	.34
	Frequency	.19	.18	.21	.05
Reading	Quality	.37	.41	.66	.56
	Frequency	.23	.38	.36	.61

Table 6

Correlations of Word Association Quality Scores and Teachers Rankings of Amount of Knowledge

Level	Mean Correlation	Range*
K	.77	.69-.81
1	.65	.52-.72
2	.60	.43-.75
3	.44	.33-.59
4	.57	.41-.69
5	.41	.55-.61
6	.35	.21-.44

*The correlations of association quality score and the teacher's ranking was done for each of 5 concepts at each grade level.

by having the children designate the associations that they conside
the best, to find if our scoring scheme reflects the students' esti
of quality. There will also be criterion-refe- ced tests for each
unit that should provide useful correlational information.

Conclusions and Implications

The word association approach presented here is far from compl
is premature to make claims that it will become a useful addition t
evaluator's assortment of approaches. The scoring scheme being emp
still quite primitive, and further theoretical development is neede
technique, particularly as it relates to concept development. Howe
preliminary results have been encouraging. The technique is sensit
and instructional innovation and it can be applied without substant
experience. This is a matter of real concern, as many projects can
trained evaluators for all of their assessments. Additionally, the
technique can be employed in evaluation settings where objectives
particularly well spelled out. An example is the Title I Project m
where the major purpose was one of enrichment and thus cognitive ou
not identified or even known in any great detail.

A final area of potential use for the word association is in p
objectives change over time. Many of the stronger evaluation techn
demand that project objectives remain the same from beginning to en
carefully constructed criterion-referenced tests become less relevan
outcomes. Yet in many school projects the process of deve'opment i
and it is appropriate to shift or alter objectives as the project ma
The word association technique has the advantage of rapidly alterabl
and no predetermined responses which permits it to be altered with a
of time and effort expended.

On the practitioner's level, the technique has been particularl
for providing feedback to teachers and project personnel. They can

changes for each of the concepts used, and relate the findings to instructional activities. Revisions in the curriculum, instruction, or measuring instrument are easily derived from this feedback procedure.

For these reasons, we feel that the word association is a promising evaluation approach, and we would like to see it explored and critically examined by other evaluators. We will be glad to give any details that we have about the technique to other evaluators who are interested in applying this technique.

References

Blixt, S. and DiLuzio, G. Results of the Study of a Technological Exploratorium, Hudson Title III Project, Supplementary Report #1, 1972.

Deming, B. The development of a curriculum evaluation model and its application to an experimental college program. Unpublished Ph.D. dissertation. Kent State University, 1971.

DiLuzio, G. and Katzenmeyer, C. Evaluation of Alliance Environmental Enrichment Program, Bureau of Educational Research, Kent State University, 1970.

DiLuzio, G., Lesyk, C. and Blixt, S. Evaluation of Alliance Environmental Enrichment Program, Bureau of Educational Research, Kent State University, 1971.

Blixt, S. and DiLuzio, G. Results of the Study of a Technological Exploratorium, Hudson Title III Project, Supplementary Report #1, 1972.

Hunter, W. and Blixt, S. Evaluation of Alliance Environmental Enrichment Program, Bureau of Educational Research, Kent State University, 1972.

Jung, J. Consistency of Responding on a Successive Word-Association Test. Journal of Verbal Learning and Verbal Behavior, 1967, 6, 766-770.

Kent, G. H. and Rosanoff, A. J. A Study of Association of Insanity. American Journal of Insanity, 1910, 67, 37-96, 317-390.

Paivio, A., Yuille, J. C., and Madigan, S. A. Concreteness, Imagery, and Meaningfulness Values for 925 Nouns. Journal of Experimental Psychology: Monograph Supplement, 1968, 76, No. 1, pt. 2.

Palermo, D S. and Jenkins, J. J. Word-association Norms: Grade School Through College. Minneapolis: University of Minnesota Press, 1964.

Appendix A

Scoring Scheme for Assessing Quality of Associations of Younger Children

Score 3

(a) A superordinate classification
Example: moth-bug
horse-animal

(b) Description of less important yet applicable function

Example: car - to carry groceries
horse - to pull
water - to swim in

Score 2

(a) A definitive feature or distinguishing characteristic of subject

Example: rain - water
zoo - animals
Niagara Falls - water

(b) Description of the common function or major use of subject

Example: car - to carry people
horse - to ride
house - to live in
water - to drink

Score 1

Description of less important yet applicable use or characteristic

Example: car - to carry groceries
horse - to pull
water - to swim in