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THE EFFECTS OF VERBAL REINFORCEMENT

ON THREE SUBTESTS OF THE

WECHSLER ADULT INTELLIGENCE SCALE

(TITLE)

BY

Michael C. Klinnert

THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF

Master of Arts

IN THE GRADUATE SCHOOL, EASTERN ILLINOIS UNIVERSITY
CHARLESTON, ILLINOIS

1972

YEAR

I HEREBY RECOMMEND THIS THESIS BE ACCEPTED AS FULFILLING
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Approved by the Thesis Committee

(signed)

Chairman

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ABSTRACT

A verbal conditioning study was conducted in order to assess the effect of positive verbal reinforcement on the examinees' verbalization output and/or the individual scaled scores of the Vocabulary, Comprehension, and Similarities subtests of the WAIS. Twenty-seven female volunteer Ss were assigned to either a contingent reinforcement group, a random reinforcement group, or a non-reinforcement control group. A mixed design A.O.V. revealed no significant differences between treatment groups on the individual scaled scores of the subtests. An analysis of covariance for the composite of the three subtests scaled scores was also nonsignificant. A mixed design A.O.V. for the amount of verbalization to these three subtests revealed a significant treatment effect ($P < .001$), a significant subtest effect ($P < .001$), and significant treatment \times subtest interaction on verbalization ($P < .01$). A Tukey test indicated that the contingent reinforcement treatment produced significantly more verbalization than either the random reinforcement treatment or the non-reinforcement control treatment ($P < .05$). Another Tukey test showed that the Vocabulary subtest yielded significantly more verbalizations than either the Comprehension, or the Similarities subtest ($P < .05$), and that the Comprehension subtest yielded significantly more verbalizations than the Similarities subtest ($P < .05$).

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CHAPTER I

INTRODUCTION OF THE PROBLEM

A basic theory in testing has been that the test response is simply a sample of behavior at a given time and is a composite of the person and the stimuli present at the time of evaluation (Sundberg and Tyler, 1959). Masling (1957) has stated that there is evidence that subjects do not give the same responses to one examiner that they give to another because of instructions, the reinforcement given, the responses, the situation, and the personality of the examiner. Masling went on to say that these factors do affect the results of psychological tests and, in a later article, he pointed to a need for further research with the variables that affect the outcome of test performance (Masling, 1960).

Wechsler (1955) stated in his manual for the Wechsler Adult Intelligence Scale (WAIS), that the examiner should try to obtain the subject's cooperation and maintain his motivation by making encouraging remarks such as "good", "well that

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didn't take you long," while staying within the bounds of standardization.

Statement of the Problem

This investigation attempted to determine to what extent an increase in the examinee's verbalization occurs, in three subtests of the WAIS, as a result of the application of positive verbal reinforcement given by the examiner. This study tried to determine whether positive verbal reinforcement resulted in increased verbal output by the subjects and/or increased individual scaled scores by the subjects in the experimental group. The three subtests used were: Vocabulary, Comprehension, and Similarities.

Need for the Study

A study of the effects of positive verbal reinforcement in a particular test situation may give valuable information concerning administrative and procedural influences on psychological tests.

Limitations of this Study

This study attempted to study the effects of positive verbal reinforcement on three subtests of the WAIS. This did not suggest that positive verbal reinforcement affects a change in the full scale of the WAIS nor did it affect other subtests of the scale. Also, this study did not try to define intelligence parameters.

RELATED RESEARCH

Intelligence Testing--A Brief Overview

Anastasi (1961) stated that general intelligence tests present the subject with a wide variety of tasks in anticipation of an adequate sampling of all important intellectual factors. Many intelligence tests are validated against measures of academic achievement and are frequently used as preliminary screening devices for counseling, personnel selection, and in clinical settings.

Cronbach (1970) calls the general mental test the "most important technical contribution psychology has made to the practical guidance of human affairs."

Galton is given primary credit for initiating the testing movement (Anastasi, 1961). Galton developed methods for measuring physical characteristics, which were to later serve as models for later tests of individual differences (Cronbach, 1970).

Binet became interested in studying judgement, attention, and reasoning, and tried a variety of approaches. These approaches included the measurement of physical traits, handwriting analysis, and palmistry. Binet collaborated with Simon in the development of the 1905 Scale to study procedures for educating subnormal children. The 1905 Scale was a tentative instrument and no objective method for arriving at a total score had been formulated. A 1908 Scale was then devised which included age levels and the child's score could be expressed as a "mental age" (Anastasi, 1961). A third revision, the 1911 Scale, followed which extended the scale to the adult level.

Terman prepared a revision of the 1911 Scale, the Stanford Binet L M and added the term Intelligence Quotient, a ratio of mental age to chronological age (Anastasi, 1961).

Group procedures under the direction of Yerkes developed the group intelligence tests, the Army Alpha and Army Beta.

These were developed to screen the thousands of men getting inducted into the army. It was thought that their tests would measure capacities for intelligence and abilities independent of prior education.

Wechsler developed the Wechsler-Bellvue Intelligence Scale out of his experiences as a clinical psychologist. It was designed to provide an intelligence scale for adults. Wechsler felt that the individual scales of intelligence that were most frequently used were unsuitable for adults, because the content was often of limited interest to an adult, and also the emphasis on speed tended to handicap the older person (Anastasi, 1961).

Forms I and II of the Wechsler-Bellvue Intelligence Scale were not well suited to children and were replaced with the Wechsler Intelligence Scale for Children (WISC). Also The Wechsler-Bellvue Intelligence Scale was limited in the area of the normative sample and was replaced by the Wechsler Adult Intelligence Scale (Anastasi, 1961).

Verbal Conditioning

Verbal behavior was put into purely objective terms by Skinner (1957) when he asserted that the verbal response may be studied just as any other response. He also stated that verbal response is subject to the same kinds of variables that were seen previously in operant conditioning studies.

Greenspoon (1955) was among the first to demonstrate the operant paradigm in the area of verbal conditioning. In his study the subject was instructed to say all the words he could think of exclusive of sentences, phrases, and numbers, over a 50 minute interval. Groups I and II were reinforced for the plural noun contingency by the utterances "numm-hum" and "huh-uh" respectively. The third group, the control group, received no reinforcement. The results indicated the "numm-hum" increased the frequency of responses to plural nouns. "Huh-uh" decreased the frequency of response to plural nouns.

Cohen, Kalish, Thurston, and Cohen (1954) reinforced first person pronoun sentences and confirmed Greenspoon's (1955) and Taffel's (1954) findings that reinforcement does influence verbal response patterns. Also they indicated awareness of contingencies was not necessary.

Kanfer (1958) conditioned subjects to verbalize verbs. Kanfer's three groups, the Fixed-ratio Group, Fixed-interval Group, and the Variable-interval Group, were aware that they could earn points when their reinforcing stimulus, a green light, was on. The Fixed-ratio Group yielded the highest ratio of verbs per reinforcement and also exceeded the interval groups in the number of verbs given.

In a study to investigate the awareness controversy, Matarazzo, Saslow, and Pareis (1960) tried to condition both plural nouns and "human responses," such as "mother" and "brother." Two experimenters were used and although neither could condition plural nouns, both found success with "human responses." It was suggested that awareness was a prerequisite for conditioning.

McNair (1957) conditioned verbal responses to slides projected on a screen and concluded the subject need not be aware of the contingencies. Levin (1961) used a sentence completion task in a conditioning exercise, and concluded, with the help of a long interview, that those unaware, conditioned as well as those aware.

Craddick and Leipold (1962) followed the Greenspoon (1955) procedure. In one condition, one group was told they could earn a point every time the light came on. In the other condition, one group was told the contingencies for reinforcement. Each condition included an unaware group. From the results, Craddick and Leipold indicated awareness to be necessary for conditioning. Weinstein and Lawson (1963) concurred using the Greenspoon verbal learning procedure.

Oakes (1967) found on a Greenspoon (1955) conditioning task that his aware and unaware subjects did not differ in response frequency. David (1967), using a Taffel (1955) sentence completion task, concluded that awareness was necessary for conditioning, because his aware-reinforced subjects showed significantly higher conditioning scores than the unaware-reinforced subjects. Leftwich, Nawas, and Siegel (1969) replicated David's (1967) study and agreed with his findings.

In a later study Sheehan (1969) suggested that the Greenspoon (1955) and Taffel (1955) procedures were mutually exclusive and his results supported both contradictory hypotheses. In Sheehan's study, one group of experimenters were led to

expect that awareness was necessary for conditioning, and the second group of experimenters was led to the opposite conclusion. Sheehan's data supported neither the awareness nor the unawareness construct.

Miller and Rumans (1970) compared the Taffel (1955) procedure, which purported awareness to be necessary for conditioning, with the Greenspoon (1955) procedure. They concluded that whether or not awareness was needed depended on the procedure used. For Taffel type tasks, the more the subject was aware of the contingencies the more he learned. Miller and Rumans also state that Taffel's procedure led to more awareness, easier learning, and a more consistent relationship between learning and awareness, compared to the Greenspoon procedure. The studies which are the foundation of the work on awareness, are based on the Taffel procedure. Similarly, the work on unawareness is based on the Greenspoon procedure. Miller and Rumans (1970) found no consistent relationship between awareness and conditioning.

Finally, Miller and Hood (1970) using the Taffel (1955) procedure were able to condition both aware and unaware sub-

jects, without social deprivation having an effect on awareness or unawareness.

Verbal conditioning has also been used in the area of conversation and interviewing. Verplanck (1958) used seventeen members of a Psychology of Learning Class as experimenters and conditioned statements of opinion in twenty-four subjects. Buss and Durdee (1958) conditioned intensely hostile verbalizations and neutral verbalizations in an interview situation. Also Salzinger and Pisoni (1960) conditioned verbal affect responses in normal subjects.

In the area of testing, Nuthmann (1957) selected items from existing personality inventories and from items classified by students. He classified these items into the categories of acceptance of self and rejection of self. The items were displayed to the subject on 3x5 white index cards. Nuthmann concluded that it was possible to condition subjects to respond in a more self-accepting way using the reinforcer "good".

Wickes (1956) found examiner influence to be substantiated on a projective type test, which he devised for his own research purposes. In this study the experimenter reinforced movement responses.

In terms of intelligence testing, Masling (1960) used female accomplices, with a warm or cold attitude, and the Wechsler-Bellevue II to show the effect brought about by the warm more receptive subjects as opposed to the cold abrupt subjects. The study indicated that the warm subjects made better overall scores than the cold.

Although Fast (1967) found no significant difference between the performance of subjects following different administration of the WISC, Russell (1970) reported significant results following reinforcement on the Vocabulary, Comprehension, and Similarities subtests of the WISC. Also Sweet (1970) found that monetary reinforcement would significantly affect lower-class white and lower-class Negroes on verbal scales of the WISC.

A rather comprehensive review of the conditioning of verbal behavior was presented by Krasner (1958). This article gave the following summary information.

1. Thirty-one articles reporting studies of verbal behavior were reviewed in terms of setting, verbal responses, reinforcing stimuli, controls, length of sessions, relationships to personality variables, results, and "awareness."

2. Positive results were reported for generalized reinforcers such as "good" and "mmm-hmm."
3. The studies reviewed demonstrated that learning principles may be applied to the analysis of verbal behavior.
4. Some implications of verbal behavior studies for controlling the variables of interpersonal processes were discussed (Krasner, 1956).

CHAPTER II

EXPERIMENTAL DESIGN AND PROCEDURE

The research was designed to investigate the effects of positive verbal reinforcement on verbalization and/or the effects on scaled scores of the WAIS.

Subjects

The subjects (Ss) were twenty-seven female volunteer students from introductory psychology courses. These Ss were assigned to Experimental Group I, Experimental Group II, or the Control Group by the following method. The American College Testing Program (A.C.T.) composite score for each S was procured. These scores were ranked, and then divided into three blocks of nine scores each. The first block (B₁) contained the nine highest scores. Each of these nine scores was randomly assigned to one of the three groups. The second (B₂) and third blocks (B₃), the middle and lower range scores,

respectively, were assigned to one of the three groups in the same fashion as the first block (Meyers, 1966).

Procedure

Three verbal subtests of the WAIS were used. The order of presentation was chosen randomly. The first subtest, Vocabulary, was used because it correlated highly with the entire scale at .85, and also because Wechsler (1944) stated that vocabulary is an excellent measure of general intelligence and is an especially desirable test to have on any scale.

The second subtest, Comprehension, was used because the subject must furnish his own answer to the questions. Wechsler (1944) stated that success on this subtest depended on what practical information and general ability S brings to the administration.

The third subtest, Similarities, has been said to be the best test in the entire battery (Wechsler, 1944). Finally these subtests were used because they are the only ones which give the S a chance to express himself freely and these are the only tests scored on a one or two point level.

Experimental Group I (A1) received positive verbal reinforcement, "good, very good," for correct and partially correct answers. Partially correct answers were those designated by the WAIS Manual (1955) as receiving one point. The correct answers were those scoreable for the full two points.

Experimental Group II (A2) received random reinforcement based on the number of reinforcements received by the respective Experimental Group I subject. The number of reinforcements the Ss received in Experimental Group II varied from 5 to 5, depending on how many the S from Experimental Group I received. The number of reinforcements the S in Experimental Group II received was determined by the contingent reinforcements received by his paired Experimental Group I S in a yoked control design. The control Group (A3) received the standard WAIS administration.

A WAIS record form was used for each S. The scores for each subtest were totaled and converted to scaled scores, which appear on the form.

All of the Ss' responses were tape recorded, and the responses were transcribed to the WAIS record form simultane-

ously. To compute the verbal output for the Vocabulary subtest (C_{V1}), the Comprehension subtest (C_{V2}), and the Similarities subtest (C_{V3}), the number of words spoken by the S were counted.

Upon entering the testing situation, E said these words:

"Hi! I'm glad to see you could come. Have a seat. I'm going to be asking you some questions. All I want you to do is answer the questions to the best of your ability."

At the end of the testing situation E reminded the S not to discuss the test with anyone.

Controls

The WAIS record forms were scored by E and also by two judges. The judges were not able to distinguish which group the S is in, and subsequently if the S received reinforcement for any particular responses. Two more judges computed the number of verbalizations by S with E's verbalization erased. E and the judges compared computations until they were equal.

Apparatus

The apparatus consisted of one WAIS test kit and twenty-seven WAIS record forms produced by the Psychological

Corporation of 304 East 45th Street, New York, New York, 10012.

Two tape recorders were also used.

Hypotheses

1. There will be no significant difference between Experimental Group I, Experimental Group II, and the Control Group in scaled scores of the Vocabulary subtest.
2. There will be no significant difference between Experimental Group I, Experimental Group II, and the Control Group in the scaled scores of the Comprehension subtest.
3. There will be no significant difference between Experimental Group I, Experimental Group II, and the Control Group in the scaled scores of the Similarities subtest.
4. There will be no significant difference between Experimental Group I, Experimental Group II, and the Control Group in the amount of verbalizations to the three subtests of the WAIS.

CHAPTER III

RESULTS

Hypotheses

1. There will be no significant difference between Experimental Group I, Experimental Group II, and the Control Group in scaled scores of the Vocabulary subtest.

The analysis of variance for the mixed design, two between--and one within subjects variables for the Vocabulary subtest was found to be nonsignificant (See Table I).

2. There will be no significant difference between Experimental Group I, Experimental Group II, and the Control Group in the scaled scores of the Comprehension subtest.

The analysis of variance for the mixed design, two between--and one within subjects variables for the Comprehension subtest was found to be nonsignificant (See Table I).

3. There will be no significant difference between Experimental Group I, Experimental Group II, and the Control Group in the scaled scores of the Similarities subtest.

The analysis of variance for the mixed design, two-between--and one within subjects variables for the Similarities subtest was found to be nonsignificant (See Table I).

An analysis of covariance for the composite of the three subtests scaled scores was computed and found to be nonsignificant (See Table II).

TABLE I

ANALYSIS OF VARIANCE: WAIS SUBTESTS

Source of Variance	df	MS	F
Total	80		
Between Subjects	26		
Treatment (A)	2	8.161	.150
A.C.T. Blocks (B)	2	23.753	.415
Ab	4	1.753	.031
S/AB	13		
Within Subjects	54		
Subtests			
Scaled Scores (C)	2	100.198	.975
AC	4	.253	.002
BC	4	1.290	.013
ABC	8	2.624	.026
SC/AB	36		

TABLE II

ANALYSIS OF COVARIANCE: WAIS SUBTESTS COMPOSITE

Source of Variance	df	MS	F
Total	25		
Composite of Subtest			
Scaled Score (A)	2	14.196	1.461
S/A	23	9.176	

4. There will be no significant difference between Experimental Group I, Experimental Group II, and the Control Group in the amount of verbalizations to three subtests of the WAIS.

The analysis of variance for the mixed design, two between--and one within subjects variable for the amount of verbalization to the three subtests yielded several significant effects. First, a significant main treatment effect was found ($P < .001$, Table II). Following this, a Tukey multiple comparison test was computed for the mean number of verbalizations per group (Snedecor, 1956). The contingent reinforcement treatment of Experimental Group I produced significantly more verbalization output than either the random reinforcement treatment of Experimental Group II or the standard WAIS administrative treatment of the Control Group ($P < .05$). No significant difference was found between the random reinforcement treatment and the standard WAIS administrative treatment (See Table IV).

A further indication from the analysis of variance for the amount of verbalizations to the three subtests was a significant subtest effect ($P < .001$, Table III). Another

Tukey multiple comparisons test was computed for the mean number of verbalizations per subtest. The Vocabulary subtest yielded significantly more verbalizations than either the Comprehension subtest or the Similarities Subtest ($P \leq .05$). The Comprehension subtest yielded significantly more verbalizations than the Similarities subtest ($P \leq .05$, Table V).

Finally, a significant treatment subtest interaction on verbalization (AC interaction) was yielded by the analysis of variance for the amount of verbalizations to the three subtests ($F \leq .01$, Table III).

TABLE III

ANALYSIS OF VARIANCE: VERBALIZATION OUTPUT

Source of Variance	df	MS	F
Total	80		
Between Subjects	26		
Treatment (A)	2	96,438.975	10.741*
A.C.T. Block (B)	2	5,952.679	.653
AB	4	1,101.531	.123
S/AB	18	8,978.802	
Within Subjects	54		
Verbalization			
Output (C)	2	173,406.679	52.158*
AC	4	13,962.864	4.200**
BC	4	1,483.457	.446
ABC	8	1,209.225	.364
SC/AB	36	3,234.617	

*P < .001

**P < .01

TABLE IV

TUKEY MULTIPLE COMPARISON TEST: TREATMENT LEVELS

Treatment Level	\bar{x}	$\bar{x} - 460.333$	$\bar{x} - 512.222$
A1	793.556	333.223*	281.334*
A2	512.222	51.889	
A3	460.333		

P < .05

TABLE V

TUKEY MULTIPLE COMPARISON TEST:
VERBALIZATION OUTPUT/SUBTEST

Subtest	\bar{x}	$\bar{x} - 327.000$	$\bar{x} - 528.222$
Vocabulary Cv ₁	779.777	572.777*	245.777*
Similarities Cv ₂	582.222	201.222*	
Comprehension Cv ₃	327.000		

P < .05

CHAPTER IV

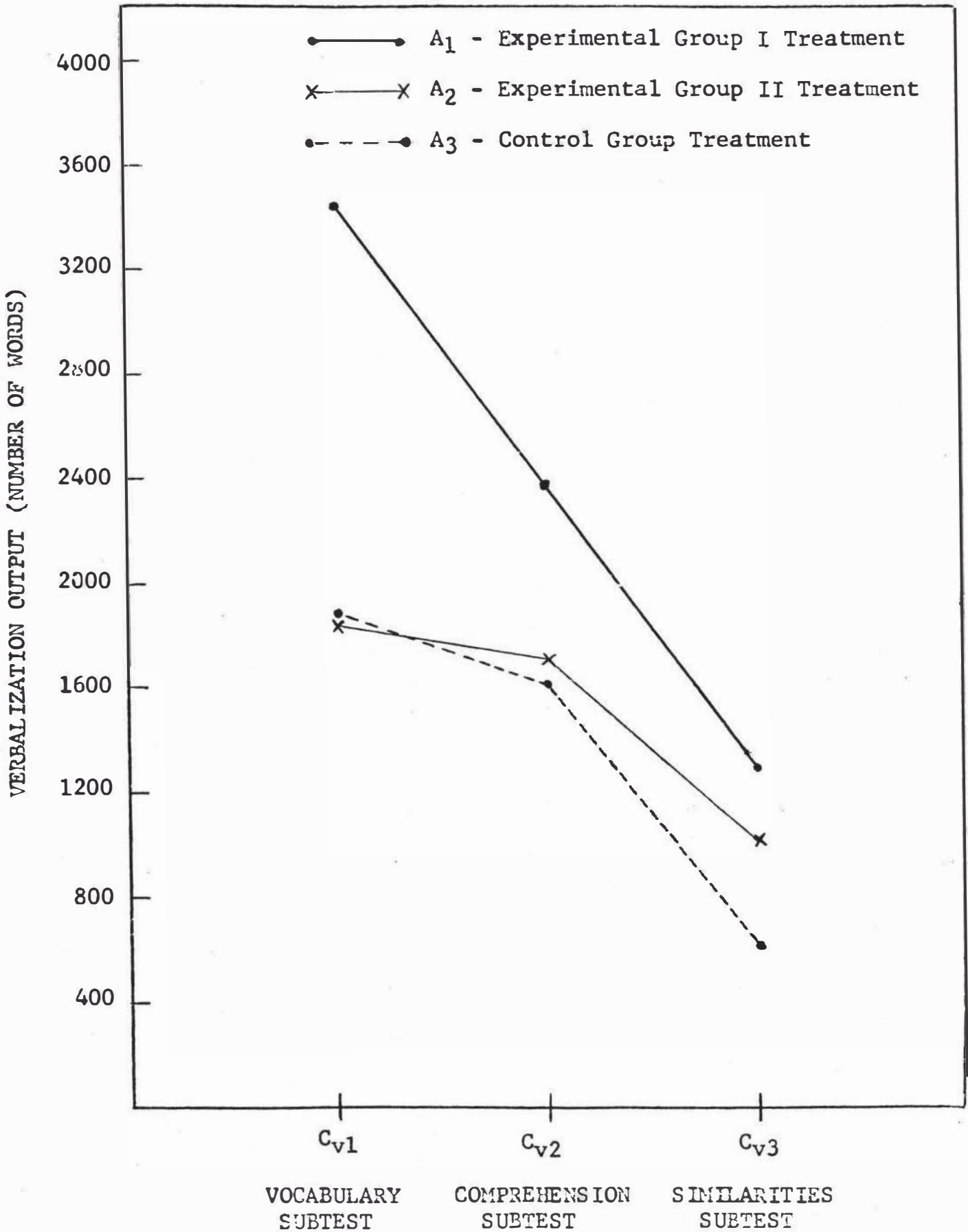
DISCUSSION

Prior to computing the analysis of variance for the amount of verbalization to the three subtests, a Hartley F-max test for homogeneity of variances was computed (Meyers, 1966). Heterogeneity was found to be present ($\alpha .05$), but not to an extreme degree ($\alpha .01$ nonsignificant). Pairing significance with assumed heterogeneity, the level upon which to assess the significance of the F-test, would be $\lambda = a-1/n-1$, with $a-1$ and $n-1$ degrees of freedom. This warrants acceptance of significance of the treatment effect ($P < .05$). Also the subtest effect was still found to be significant ($P < .01$), as was the interaction of the treatment--verbalization output effect ($P < .05$).

A visual inspection of the treatment subtest interaction on verbalization (AC interaction, Table III), as shown in Fig. I, indicated that the contingent reinforcement treatment of Experimental Group I yielded a greater amount of verbalization output per subtest than either the random reinforcement treatment of Experimental Group II or the standard WAIS administrative treatment of the Control Group.

Fig. I

TREATMENT x SUBTEST INTERACTION ON VERBALIZATION



The findings of this study agreed with Greenspoon (1955), Verplanck (1958), Oakes (1967), and Sheehan (1969) in that verbal reinforcement did increase verbal output. The findings are also consistent with Fast's (1967) results that there was no significant difference between the performance of Ss on different administrations of the WISC. The results of this study did not agree with Russell (1970), who found significant differences between a contingent reinforcement group and a control group on scaled scores of the Comprehension, Similarities, and Vocabulary subtests of the WAIS.

The absence of the reinforcement effects in the scaled score data coupled with the presence of the problem of awareness in verbal conditioning unresolved by this investigation. The finding that Ss reinforced for correct responses verbalized most, suggests that Ss misconstrued reinforcement contingencies, if aware at all. However, Ss randomly reinforced did not similarly become "falsely" aware and approximated non-reinforced Ss in verbalization output.

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