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# VERBAL CONCEPT LEARNING : A FUNCTION OF INTELLIGENCE,AND TASK COMPLETION

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The purpose of the study was to throw light on the nature of verbal concept learning by systematically studying the effect of subjects × independent variables on performance. The investigation attempted to know the effects of intelligence, task-complexity and instruction on performance in verbal concept learning. A 2×2×2 factorial experiment with equal replications was used. For each intelligence level considered separately, it was a randomized group design. The results showed that intelligence × task, intelligence × instruction and task × instruction effects on performance were significant. The triple interaction effects on performance were not significant.



Jensen (1996) says that in the experimental literature on concept learning 50-90% of variance in the dependent variable is due to individual differences or to some combination of individual differences and true measurement error. This 'between subject' variance, of course, is usually just part of the error term in most of the experimental design in concept learning. Hence, the study of individual differences in concept learning is a virgin territory, yet, to be explored by the researcher.

Individual differences in the dependent variable can be studied through the manipulation of different independent variables. The *E* has to design the experiment in such a way that he can study the effect of the interaction between the organization and independent variables on the dependent variable. By that way the *E* can learn more about the nature of concept learning than by the group mean differences resulting from the manipulation of a particular independent variable.

Previous studies in verbal concept learning dealt with how performance was determined either by stimulus or organismic variables (Underwood & Richardson, 1956; Kendler & Karasik, 1958; Freedman & Mednick & Freedman, 1960; Higgins, et al., 1963; Mayzner, 1962; Mayzner & Tresselt, 1962; Mednick & Halpern, 1962; Coleman, 1964; Dunn, 1968; Jacobson, et al., 1969). The present investigation attempted to know how performance in verbal concept learning was determined by the interaction between organismic and stimulus variables, namely intelligence, task complexity and instructions. The study aimed at an improved experimental design so as to add more knowledge about the nature of concept learning and aid theoretical development.

 

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VERBAL CONCEPT ATTAINMENT

METHOD

***Experimental Design***: A 2×2×2 factorial experiment with three factors at two levels each was used. The three factors were intelligence, task-complexity and instruction. Within each level of intelligence Ss were randomly assigned to each level of the other two treatment factors, namely, task-complexity and instruction. So the experimental design was a randomized group design for each intelligence level considered separately. It was a complete factorial experiment with equal replications.

***Subjects:*** 60 high intelligent (HI) and 60 low intelligent (LI) female students of College, , were selected on the basis of their obtained test scores on Mohsin's Verbal Intelligence Test. In respect of age, sex, language, and educational standing, the sample was homogeneous.

***Task*****:** The concepts were embedded in verbal material. The two lists for simple task (ST) and complex task (CT) were prepared having words selected from the categorized list developed by the author. The two lists were alike in respect of concept name, number of instances of each concept, variation in response dominance within instances of each concept, number of overlapping responses, etc. They differed in simplicity-complexity of the task in terms of dominance level (DL) of the concept and consequently the number and strength of irrelevant responses, too.



***Instructions*****:** Each S was given detailed common instructions which described the characteristics of the stimulus words, the method of presentation, the desired response from the S. the type of feedback by the E and the criterion of problem solution. The only way in which the two types of instructions differed was the specificity or non-specificity of the information regarding the nature of concept.

***Non-specific Instruction (Ns Ins):*** "I shall show you a list of 12 common nouns. Four of these nouns can be grouped by the same word, four others by a different word and the rest four by another word. Thus, these twelve nouns can be classified into three groups having four nouns in each group with the help of three distinct words.

These twelve nouns will be presented to you one by one at a regular rate of 4 second each. Within this period, your task is to guess and say instantly a word about that noun.

Each time you respond, I shall tell you 'right' or 'wrong' about your response immediately. To regard your response as right or wrong will be my judgment not that it is really right or wrong.

In this way, you are to go through the entire list trial after trial, and try to respond to each noun till you are able to give the correct response for all nouns. Remember, when all your responses are correct, you will be saying only three words over and over again. Try your best to classify the twelve nouns as quickly as possible into three groups each having four nouns."

***Specific Instruction (S Ins)*****:** In specific instruction all other information were the same as in the non-specific instruction except the first paragraph which is substituted by the information below.

 

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"I shall show you a list of 12 common nouns. Four of these nouns can be described by the same adjective and the rest four by still another adjective. Thus, these twelve nouns can be classified into three groups hav ing four nouns in each group with the help of three distinct adjectives describing the shape, colour, or task of the object for which the noun stood."

***Procedure*:** 60 HI and 60 LI Ss were tested individually on simple or complex task with specific or non-specific instruction. With a particular type of instruction the E showed the list of nouns to the S through the aperture one by one at a regular rate of 4 seconds each. The E said 'right' or 'wrong' to the S's response every time and noted down each response or no response. An interval of 5 seconds each was given between the two trials. An introspective report was also collected on a questionnaire. The same procedure was continued with all Ss in all conditions.

RESULT AND DISCUSSION

Table 1 shows mean trial scores in 8 treatment combinations. The table 2 shows that all the two-factor-interaction-effects performances are significant.

Table1. Mean Trial Scores in 8 Treatment Combinations

| Task | Complex | | Simple | |
|---|---|---|---|---|
| Intelligence of subjects | Specific | Non-specific | Specific | Non-specific |
| High | 8.6 | 8.2 | 4.0 | 3.5 |
| Low | 10.4 | 16.5 | 3.6 | 5.4 |



Table2. Summary of the Complete Analysis of Variance of Performance Scores for the 2×2×2 Factorial Experiments

| Symbol | Source of Variation | Sum of Square | df | Mean Square | F-Ratios |
|---|---|---|---|---|---|
| A | Intelligence (I) | 365.51 | 1 | 365.51 | 79.11** |
| B | Task (T) | 1593.11 | 1 | 1593.11 | 344.82** |
| C | Instructions (Ins) | 154.01 | 1 | 154.01 | 33.33** |
| A×B | I×T | 201.61 | 1 | 201.61 | 43.64** |
| A×C | I×Ins | 35.11 | 1 | 35.11 | 7.60** |
| B×C | T×Ins | 43.51 | 1 | 43.51 | 9.42** |
| A×B×C | I×T×Ins | 1.63 | 1 | 1.63 | ns |
| Error | Within Treatment | 332.51 | 72 | 4.62 | ns |
| Total | | | 79 | | |

**p<.01

Table3. Summary of the Complete Analysis of Variance of Performance Scores for the 2×2×2 Factorial Experiments

| Double Interactions | Unplanned Comparisons | Df | Obtained t-scores | Significance level |
|---|---|---|---|---|
| Intelligence | HI, ST Vs LI, ST | 1.10 | 1.61 | ns |

 

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| | | | | |
|---|---|---|---|---|
| × Task-complexity | HI, CT Vs LI, CT | 7.45 | 10.93 | ** |
| Intelligence × Instruction | HI, S Ins Vs HI, Ns Ins. | 1.45 | 2.13 | ns |
| | LI, S Ins Vs LI, ns Ins. | 4.10 | 6.03 | ** |
| Task-complexity × Instruction | ST, S Ins Vs ST, Ns Ins. | 1.30 | 1.91 | ns |
| | CT, S Ins Vs CT, Ns Ins. | 4.25 | 6.25 | ** |

But the significant mean square (A×B) cannot tell on what level of the B factor the difference in mean scores of the two levels of A is significant. So further analysis was needed. After applying Scheff's test which does not require planning of the comparisons in advance, the following results were obtained (Table 3).

Table 3 indicates that Intelligence × Task interaction effects on performance are significant in complex task but not in simple task. It seems that because the number and strength of irrelevant responses are greater in complex task, they impose more cognitive strain on the subjects. So highly intelligent subjects with their greater cognitive ability may learn the concepts more quickly than the low intelligent subjects in complex task.

Table 3 shows that Intelligence× Instruction interaction effects on performance are significant on LI subjects but not on HI subjects. By specific instruction, the number of irrelevant responses is reduced and the task becomes easier than in non-specific instruction. So LI subjects with their low cognitive ability are assisted by specific instruction.



Table 2 indicates that Task × Instruction interaction effects on performance are significant in complex task but not in simple task. It is so perhaps because in complex task, specific information regarding the type of meditational responses may reduce the number of irrelevant responses and may make the task easier.

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