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REACTION PATTERNS DURING A PERFORMANCE TEST

FRED KROEGER AND MACK T. HENDERSON

On previous experimentation with the Grinnell Eye-hand Co-ordination Test it was observed that each subject approached the test in a different manner. Could these things be observed during the test performance? If these observations could be made with reasonable accuracy, it would be likely that this technique would give us much needed information regarding the work habits and other personal characteristics of the person taking the test. With this purpose in mind it was decided to make some direct observations of persons taking the Grinnell Eye-hand Co-ordination Test. B. L. Travers (1941) in his article IMPROVING PRACTICAL TESTS, has also expressed the need for a procedure of direct observations which will show personal characteristics of subjects being tested.

APPARATUS

The subject is seated at a table (69 cm. x 107 cm.). Directly in front of him is an automobile steering wheel, with a horn button mounted in the center of the wheel. At his right is a standard gear shift lever; at his left is a hand brake. At the back of the table and facing S is a verticle screen (60 cm. x 92 cm.) containing sixteen irregularly spaced visual instructions. In many instances, these instructions are made to look like standard highway signs. Other printed instructions are included such as "shift to reverse", "horn", "shift to high." Each one of these visual stimuli may be illuminated by a six-volt bulb mounted directly behind the stimulus. S is asked to make the response suggested by the stimulus as soon as the sign is illuminated. A switch is mounted on the front right-hand part of the table so that S may start the experiment himself. By throwing this switch, the first stimulus is illuminated. When S makes the correct response to the first stimulus, the second visual instruction appears immediately. A correct response to the second stimulus provides the third instruction, etc. The last instruction of the series is "switch off". When S throws off the switch, the experiment is ended. The time elapsing from the beginning of the experiment to the end is measured in hundredths of a second (by a Standard Electric Precision Timer), and this time is regarded as a score for that trial. In other words,

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this apparatus measures serial reaction time. If S makes an incorrect response, he is penalized by the time factor only.

The apparatus has been kept simple in order that it may be used as a measure of eye-hand co-ordination for non-drivers as well as drivers. It has been found that little or no more time is required to instruct non-drivers in the apparatus than to instruct drivers.

Procedure

Forty college girls were used as subjects in this experiment. Each girl took the Grinnell Eye-hand Co-ordination Test and then made several introspections regarding her reactions during the test performance. To aid the subject in her introspection, she was asked a standard list of questions. Some of these were: when during the test were you relaxed and when were you tense? Did you feel confused at any time during the test, and if so, when and why? What did you do and what did you think and feel while you were confused? How well do you think you did on the test?

All forty test performances were observed by one rater and twenty of these performances were rated by two. Immediately after the three trials, the observer or observers rated the subject by means of a graphic rating sheet on: amount of confidence; whether the subject's movements were rough or smooth; the amount of verbalization; whether she was calm or restless; whether she proceeded deliberately or impulsively. A check list to supplement the data of the rating sheet provided an opportunity to indicate whether or not the subject was cocky, profane, embarrassed, self-conscious, or confused.

The subject was instructed to work quickly but carefully because her score would depend on the amount of time it took her to complete the entire series.

She was told to begin the test by throwing the switch which illuminated the first instruction. The subject performed the test three times and after each trial she was given her score for that trial, as a subtle encouragement to do better.

Results

The data show that the subjects could be differentiated on the basis of the rated observations and that the information recorded was specific. Both raters reported also that they felt it was not difficult to make judgments regarding individual reactions.

To check the reliability of the observations the ratings of both the observers were correlated by the Rank Difference method. For the twenty cases observed by two raters the correlations for the various traits ranged from .47 PE. .13 to .66 PE .09.

Table I—Correlations of the observations of the Two raters—by Rank-Difference Method

Trait observed	*Rho*	*P.E.*
Confidence	.66	.09
Smooth-Rough Movements	.59	.10
Calm-Excited	.48	.12
Deliberate-Impulsive	.47	.12

These correlations seem very high when compared with the Symonds' (p. 95, 1931) statement that "a reliability coefficient of .55 can be said to be typical for rating personality traits by ordinary judgment." These high correlations are particularly significant in the light of the fact that the raters had not discussed with each other the connotations of the terms on the rating sheet. These ratings might have been even higher if the raters had agreed upon specified definitions of the terms.

In the main, the introspective data did not yield much information of value. However, the two questions which yielded the most significant data were: "When were you tense and when were you relaxed?", and "How well do you think you did on the test?" The answers to the first question, "When were you tense and when were you relaxed?" very definitely showed methods of attack. For instance, when the question was answered, "I was tense during the first trial," it was revealed through further questioning that the subject felt uncertain in this new situation and became more relaxed with increased knowledge and familiarity with the apparatus. When the question was answered, "I felt relaxed during the first trial and I felt increasingly tense during the next two trials," further questioning revealed that the subject was trying to beat his former time.

Many of the subjects, in answering the second question, "How well do you think you did on the test?" said that they felt they had only done average work, while a few said that they had done "not so good" and some said they had done better than average. Often it was apparent to the observer that the people who answered that they had done only average or below average on the test were merely being modest, and that all of the answers showed certain personality traits. The answers to this question did not necessarily correspond to the test scores.

The test score averages showed that there was a difference between those who were rated as proceeding calmly and smoothly and those who reacted in a jerky and impulsive manner, but this difference was so slight that it was decided that even though the scores have not as yet been submitted to statistical treatment, the differences in the averages are probably insignificant.

The same could be said for the score averages of those who approach the test in a confident manner and those who felt unsure of themselves.

Perhaps averages are not as important as it would seem. It is probably more important to state how the subject proceeded, no matter what his score. This would imply that information of this type should be individualized. For instance, many of the girls who made the fastest scores, reacted impulsively and made rough movements, yet just as many fast scores were made by those who reacted calmly and smoothly. Also the ratings showed that slow scores were made by the same methods that were used to make fast scores. Many times girls who reacted impulsively and roughly became excited and made mistakes, making their scores as slow as those who proceeded very calmly and deliberately.

Conclusions

1. The data indicate that the reactions of an individual in a test performance can be observed with reasonable accuracy.

2. The graphic rating scale is a convenient method of recording these observations for the scale yields specific as well as reliable information.

3. It is felt that these observations can be useful as supplementary data because many times the test score does not indicate enough about the subject. Some subjects may proceed calmly and deliberately and some may proceed in an erratic and impulsive fashion, yet in spite of this get the same score.

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