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ABSTRACT

This study tests the appropriateness of Torrance's assumptions of trait independence and the combinability of measures (Torrance Tests of Creative Thinking) with respect to the scoring of the tests for a younger population and estimates the homogeneity of the scores. The sample consisted of 128 elementary school children. Results indicate that separate scoring for fluency, flexibility, and originality traits is not warranted, because any special dispositions for these traits that may exist are overwhelmed by the task specificity of the scores. It is suggested that the Torrance scores reveal nothing interesting about the individual, and the report contends that use of more than a single score from the Torrance battery makes little sense. The major question still unanswered is when, if ever, it makes sense to use a score from the Torrance battery. (AE)

THE INTERPRETATION OF TORRANCE CREATIVITY SCORES

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Among the tests developed to measure aspects of creativity one of the most prominent is the verbal battery of the Torrance Tests of Creative Thinking.[1] The battery can be scored to yield scores for these distinctive aspects or traits of creativity -- fluency, flexibility, and originality -- as well as a composite total of "creativity." The fluency score is a measure of the subject's ability to produce a large number of adequate responses for a given task. The flexibility score is a measure of the subject's ability to produce a variety of types of responses. The originality score, finally, is a measure of the subject's ability to generate responses that are relatively uncommon.

The Torrance tests of "creativity" are scored for each of the separate traits on the assumption that (i) the scores on different tasks can be combined to form a composite measure of the trait in question, and (ii) that the traits are independent of one another. In the tradition of Campbell and Fiske (1959) such assumptions are the criteria of convergent and discriminant validity, respectively.

In a recent study, the appropriateness of Torrance's assumptions of trait independence and the combinability of measures have been questioned by Harvey et. al. (1970). Their work was done with a group of adults; it indicated that for the adult group, the scoring of separate traits was inefficient and the scores failed to correlate with other measures one might expect to be linked with creativity.

The results obtained by Harvey et. al. might be confined to an adult sample. Alternatively, they might be the result of very low score reliabilities. The study reported here is an attempt to replicate some of the findings of

[1]The batteries of the Torrance Tests of Creative Thinking include Verbal Forms A and B and Figural Forms A and B.

Harvey et. al. with respect to the scoring of the Torrance tests for a younger population and to estimate the homogeneity of the scores.

Method - Scoring Analysis

The Torrance Test Booklet A, Thinking Creatively With Words (1966), was administered to a sample of 128 Ss in grade 4 (n = 21), grade 5 (n = 58), and grade 6 (n = 49).[1] There were 11 boys and 10 girls in grade 4, 30 boys and 28 girls in grade 5, and 23 boys and 26 girls in grade 6, making a total of 64 boys and 64 girls in the total sample. All children in the sample were from a single elementary school. All fifth and sixth graders in the school were included, but, for reasons unconnected with this study, only those fourth graders with above average I.Q.s were included in the sample. Henmon-Nelson I.Q.'s from the school's normal testing program were available for each child.

The battery of activities in Booklet A, Thinking Creatively With Words, consists of seven tasks, as indicated in Table 1. Each task is timed and the total time required for a test administration is 45 minutes. The behavior sample for each task is scored for fluency, for flexibility, and for originality, except for task 6, "Unusual Questions," which is not scored for flexibility. The correlations between these scores -- seven fluency scores, six flexibility scores, and seven originality scores -- and grade level and IQ were computed. Then grade level and IQ were partialled out of the correlation matrix. The most informative of these correlations are presented in Tables 1 and 2.

[1]The data were collected by Bernard Barrish in the research study reported in his doctoral dissertation, Inductive versus deductive thinking strategies with high and low divergent thinkers. Stanford University, Spring, 1970

Discussion of Results

If the postulated traits of fluency, flexibility, and originality are independent then the within-task, between trait correlations should be low. The results, shown in Table 1 indicate that this is not the case. The correlations are quite large and remain so as I.Q. and grade level are "controlled". They are much larger than the within-trait, between task correlations reported in Table 2. The similarity of these results with those of Harvey et. al. confirms their conclusion that the separate scoring for fluency, flexibility, and originality has no warrant. Whatever special dispositions for fluency, flexibility, or originality may exist are simply overwhelmed by the task specificity of the scores.

Does this result argue for abandonment of the Torrance Tests? Not necessarily. The creativity total, fluency total, flexibility total, and originality total give essentially similar information about any individual. The question is whether the information is informative. The claim of testers of creativity is that a trait exists that is independent of intelligence and that when measured tells us something of interest about an individual. The existence of a trait is not disproved by the data in hand.

The tasks can be scored separately (so that the sum of the fluency, flexibility, and originality scores on task 1 constitutes the score for task 1, etc.). The intercorrelations and standard deviations of these task scores are given in Table 3. These task scores, when summed, give the total creativity score for an individual. Cronbach's alpha (1951) for the creativity total conceived in this way is .78. Alpha for the portion of the creativity total independent of grade level and I.Q. is .73. There is considerable shared variance across tasks and it is, by and large, independent of measured intelligence.

Scores from the Torrance Tests, then, are not random numbers -- they may well be measures of a trait reasonably independent of intelligence. But does a Torrance score tell us anything interesting about the individual. The results obtained by Harvey et. al. suggest that they don't. If, however, one was interested in trying to find instances in which the Torrance scores were interesting, existing scoring procedure could be made less cumbersome. The fluency total correlates r = .96 with the creativity total (in part because they share much of the task specific variance), it has an alpha of .76, and it is the result of the easiest scoring procedure that can be applied. Thus one could use only the fluency total in his search for a validation of the Torrance scores. If one wanted to economize even more, it seems likely that using only three of the seven tasks -- Product Improvement, Unusual Uses, and Unusual Questions -- and scoring them for fluency only would provide most of the information found in the creativity total. Alpha for this short-form scoring is .77. The short form scoring total correlates r = .91 with the creativity total.

The scoring scheme to be adopted in attempts to validate the Torrance Tests is, of course, only partly a question of convenience. The choice also involves questions of taste and intuition. But it should be evident that use of more than a single score from the Torrance battery makes little sense, and that the major question still unanswered is whether, or, put more optimistically, in what context it makes sense to use a score from the Torrance battery at all.

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TABLE 1

CORRELATIONS BETWEEN TRAITS AND WITHIN TASKS

Task	Trait	Observed Trait: Fluency	Observed Trait: Flexibility	With IQ And Grade Level Partialled Out Trait: Fluency	With IQ And Grade Level Partialled Out Trait: Flexibility
1. Asking Questions	Flexibility	.81		.79	
	Originality	.63	.50	.59	.45
2. Guessing Causes	Flexibility	.88		.86	
	Originality	.63	.61	.63	.59
3. Guessing Consequences	Flexibility	.59		.56	
	Originality	.60	.71	.54	.67
4. Product Improvement	Flexibility	.69		.68	
	Originality	.60	.46	.59	.44
5. Unusual Uses	Flexibility	.71		.71	
	Originality	.71	.62	.72	.60
6. Unusual Questions	Flexibility				
	Originality	.44		.40	
7. Just Suppose	Flexibility	.84		.83	
	Originality	.62	.60	.55	.55

TABLE 2

CORRELATIONS BETWEEN TASKS AND WITHIN TRAITS

2a. Observed Correlations

Trait		Task No.	1	2	3	4	5	6
	Asking Questions	1						
	Guessing Causes	2	.42					
	Guessing Consequences	3	.24	.28				
Fluency	Product Improvement	4	.27	.31	.28			
	Unusual Uses	5	.32	.30	.28	.58		
	Unusual Questions	6	.38	.20	.28	.53	.55	
	Just Suppose	7	.18	.25	.28	.39	.40	.30
	Asking Questions	1						
	Guessing Causes	2	.30					
Flexibility	Guessing Consequences	3	.38	.40				
	Product Improvement	4	.31	.34	.36			
	Unusual Uses	5	.39	.37	.38	.41		
	Just Suppose	7	.37	.23	.24	.27	.43	
	Asking Questions	1						
	Guessing Causes	2	.22					
	Guessing Consequences	3	.33	.19				
Flexibility	Product Improvement	4	.19	.28	.28			
	Unusual Uses	5	.18	.17	.30	.29		
	Unusual Questions	6	.19	.23	.15	.19	.34	
	Just Suppose	7	.19	.14	.15	.24	.07	.14

2b. Partial Correlations, IQ and Grade Level Removed

Trait		Task No.	1	2	3	4	5	6
	Asking Questions	1						
	Guessing Causes	2	.35					
	Guessing Consequences	3	.17	.22				
Fluency	Product Improvement	4	.18	.23	.21			
	Unusual Uses	5	.28	.25	.25	.55		
	Unusual Questions	6	.30	.11	.20	.48	.53	
	Just Suppose	7	.06	.16	.16	.31	.36	.19
	Asking Questions	1						
	Guessing Causes	2	.23					
Flexibility	Guessing Consequences	3	.31	.32				
	Product Improvement	4	.28	.31	.34			
	Unusual Uses	5	.37	.33	.33	.42		
	Just Suppose	7	.30	.15	.17	.22	.43	
	Asking Questions	1						
	Guessing Causes	2	.18					
	Guessing Consequences	3	.28	.17				
Originality	Product Improvement	4	.14	.23	.25			
	Unusual Uses	5	.18	.14	.33	.29		
	Unusual Questions	6	.12	.21	.09	.17	.35	
	Just Suppose	7	.08	.09	.06	.20	.07	.06

TABLE 3

CORRELATIONS AND STANDARD DEVIATIONS FOR TASK SCORING

3a. Observed Correlations and Standard Deviations

Task	Task No.	1	2	3	4	5	6	Standard Deviation
Asking Questions	1							6.97
Guessing Causes	2	.36						7.19
Guessing Consequences	3	.39	.33					6.88
Product Improvement	4	.31	.32	.39				10.21
Unusual Uses	5	.35	.31	.42	.56			14.83
Unusual Questions	6	.34	.21	.30	.46	.50		8.39
Just Suppose	7	.25	.23	.27	.41	.40	.27	5.02

3b. Partial Correlation and Standard Deviations With IQ and Grade Level Partialled Out

Task	Task No.	1	2	3	4	5	6	Standard Deviation
Asking Questions	1							6.48
Guessing Causes	2	.30						6.89
Guessing Consequences	3	.31	.26					6.50
Product Improvement	4	.23	.26	.32				9.74
Unusual Uses	5	.32	.28	.39	.54			14.52
Unusual Questions	6	.24	.14	.22	.40	.49		7.84
Just Suppose	7	.13	.15	.16	.35	.38	.15	4.61