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ABSTRACT

A three-year combined sample of 103 master's level counseling students was administered five measures of cognitive complexity, selected on the bases of previous factor analytic research and their potential relevance to counseling research. The instruments were designed to measure the processing of social stimuli, and included the Interconcept Distance Measure of Cognitive Complexity, Intolerance of Trait Inconsistency Scale, Category Width Scale, Intolerance of Ambiguity Scale and the Paragraph Completion Measure of Integrative Complexity. A test of the intercorrelation matrix of the measures was not significant, substantiating the independence of the measures demonstrated by previous research. The use of cognitive complexity measures, particularly single measures, in counseling research needs to be further examined to determine if the complexity domain is even more differentiated than it now seems. (Author)

COGNITIVE COMPLEXITY VARIABLES AND COUNSELING RESEARCH

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The construct of cognitive complexity-simplicity (Bieri, 1955) has been construed as an information processing variable which influences a person's discrimination and interpretation of events. In particular, some individuals use many dimensions for discriminating and attributing meaning to stimuli, while others are prone to use few dimensions. There is evidence (Brennan, 1974) to suggest that individuals may vary in complexity depending upon the nature of the stimuli, thereby suggesting the construct is not a unitary generalized trait.

One particular class of stimuli for which the cognitive complexity construct has evidenced variability among individuals has been that of interpersonal information (Vannoy, 1965). To the extent that counseling can be viewed as an activity by the counselor involving the exchange and cognitive processing of this type of information, the construct assumes potential relevance as a counseling research variable. Despite factor analytic evidence (Vannoy, 1965) that even within this class of stimuli cognitive complexity is a multifaceted construct and not a unitary generalized trait, a review of recent counseling studies that used cognitive complexity as a research variable (Davis, Cook, Jennings, & Heck, 1977; Heck & Davis, 1973; Knefelkamp & Slepitza, 1976; Neufeldt, Zimmer, & Mayton, 1977; Rosenthal, 1977; Widick, 1977) reveals the use of single measures of an apparently factorially complex variable.

Previous research (Gardner & Schoen, 1962; Vannoy, 1965) concerning the interrelationship of various cognitive complexity measures has resulted in a relatively low degree of test intercorrelations, thus resulting in complex factor loading patterns. However, the results of these studies were based on

samples of undergraduate students from approximately fifteen years ago. Numerous researchers (Baltes & Nesselroade, 1973; Friedrich, 1972; Nunnally, 1973) have indicated that such variables as time, age, generational differences, and other sampling parameters can affect the invariance of factor patterns thereby creating generalization problems. In short, there is very limited information concerning the structure of complexity variables with a counselor population.

The purpose of this study was to examine the factor structure of a set of five cognitive complexity measures for a counselor trainee sample. If the structure replicates the pattern of previous research (Vannoy, 1965) that used a different sample, then conclusions and generalizations about the complexity variable would be restricted to the particular measure(s) used. In this case, there could be different types of cognitive complexity thereby making the generalized concept of cognitive complexity rather ambiguous. However, if multiple measures are interrelated to a significant degree, then the use of single measures and inferences about a general complexity construct derived from single measures would be justified.

METHOD

Subjects

Subjects were a three year combined sample of 30 male and 73 female counseling graduate students who were in their first semester of a Master's degree program at the University of Kansas. All subjects were enrolled in a counseling laboratory course and voluntarily completed the five cognitive measures used in this study within the first two weeks of the semester.

The subjects were told that the purpose of the study was to learn more about the information processing strategies of counselors.

Instruments

Vannoy's (1965) factor analytic study of 20 diverse cognitive complexity measures yielded eight rotated factors suggesting that there are several different aspects of the processing of interpersonal information (cognitive complexity). A subset of five measures was selected on the following bases: (1) each measure showed a primary loading on different factors, and, (2) each measure represented a different form of measurement.

Interconcept Distance Measure of Cognitive Complexity (IDM)

This instrument was Blaas's (1975) modification of Vannoy's (1965) IDM instrument and consisted of subjects rating 20 person concepts by means of fourteen 7-point semantic differential scales. Mean distance scores between the 20 concepts were computed for each subject with the degree of complexity assumed to be related to the magnitude of the mean distance score. The IDM had a primary loading on Vannoy's Factor II.

Intolerance of Trait Inconsistency (ITI)

The revised form of the ITI (Steiner & Johnson, 1963) consists of 15 items with each item containing two pairs of traits. One pair of traits had been judged to be equally good while the other pair had been judged to be unequally good. Subjects were asked to choose which pair of traits was more likely to occur in people. Scores were obtained by counting the number of times subjects chose the equally good pair of traits. Higher scores reflected a greater intolerance of inconsistency, hence, a more cognitively simple view of people. The ITI had a primary loading on Vannoy's Factor VI.

Category Width (CW)

Vannoy's (1964) modification of Pettigrew's (1958) scale was used and consisted of 10 items each having two parts. Each subpart required the subjects to provide their personal estimate of either the highest or lowest boundary value within which a known value could vary. The CW measures the tendency to use broad or narrow categories in classifying objects, with this tendency presumed to be a component of the complexity variable. The CW had a primary loading on Vannoy's Factor VII.

Intolerance of Ambiguity (IA)

The IA was developed by Budner (1962) and consists of eight positively stated and eight negatively stated Likert-type items to which subjects were to respond with +3 (strongly agree), +2 (moderately agree), etc. On positive items, a score of 7 was assigned for strong agreement, 6 for moderate agreement, etc., while scoring on the negative items was in the reverse direction. High scores indicate the tendency to interpret ambiguous situations as threatening, hence reflecting a more simplistic processing system. The IA had a primary loading on Vannoy's Factor I.

Paragraph Completion Measure of Integrative Complexity (PCM)

The PCM is derived from the Conceptual Systems Theory of Harvey, Hunt, & Schroder (1961) and consists of a set of five incomplete sentences which each subject was asked to complete and to add a minimum of two additional sentences within a two minute time period. Responses were scored by two independent raters according to a manual (Hunt, Kingsley, Marsari, Shore, & Sweet, Note 1). The mean of the five scores represents the level of integrative complexity (Schroder, Driver, & Streufert, 1967). The PCM was the

single loading on Vannoy's Factor VIII.

The inter-rater reliability for the PCM across the three year sample ranged between r = .72-.77.

Procedure

Druing the second class period of their first semester of the counseling laboratory course, all subjects completed the timed Paragraph Completion Measure and were given a packet of the remaining instruments to be returned the following week.

Analysis

An intercorrelation matrix of the five measures was generated using Pearson Coefficients. In order to determine whether the correlation matrix was worth factor analyzing, the matrix was examined for statistical significance by using a test for complete independence (Morrison, 1967). The matrix is presented in Table 1 along with the intercorrelations of these five variables found in Vannoy's (1965) study. Vannoy's correlations were also tested for statistical significance.

RESULTS

Insert Table 1 here

The test for complete independence yielded a chi square of 16.94 which for 19 degrees of freedom failed to reach statistical significance at the .05 level. This means that the variables were not significantly correlated in the counselor trainee sample and there was no point in any factor analysis of the matrix. It is quite clear that these five measures of complexity are measuring independent processes.

Like the correlations found in this study, the coefficients for these five variables in the Vannoy study are quite low. The test of significance on the intercorrelations of the five variables in Vannoy's data yielded a chi square value of 12.73 which failed to reach significance at the .05 level. Since these variables were not significantly correlated, apparently they were measuring independent processes in that sample as well.[1]

DISCUSSION

The original intent of this study was to provide a partial description of the factor structure of the cognitive complexity construct utilizing a sample of complexity measures with a sample of counselor trainees. Previous research utilizing different population samples and measures have shown that, in general, different measures of the construct tend not to be significantly correlated. In light of the fact that measures of information processing variables are gaining increased attention in counseling research and that structural patterns may change between different samples, it was important examine the structure of the construct within a counselor population.

Since the intercorrelation in this study, as well as those in Vannoy's (1965) were not significantly related, it appears that the structures of these measures were similar in the two different samples. The evidence suggests that the statistical independence was reasonably stable across different groups and is not affected by changes in sample characteristics.

If the assumption is made that the five measures assess complexity of

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[1] Vannoy's factor analysis was based on the matrix of 20 cognitive complexity variables including the subset of five used in this study. The significance of that matrix was not tested by Vannoy before being factor analyzed. The current researchers tested that 20 x 20 matrix obtaining a chi square of 519.26 which for 190df was significant ($p < .001$).

processing social stimuli, as each measure purports to do, then the complexity construct is not a monotrait as the measures lack convergent validity (Campbell & Fiske, 1959). This supports the views of Scott (1963) and Gardner and Schoen (1962) that no single cluster of traits can account for cognitive complexity. Thus if all are measuring differing aspects of complexity, an individual who is complex on one variable might be cognitively complex or simple on any of the others. It is important to note that since this sutdy did not permit obtaining data on discriminant validity, it is possible that none of the measures adequately represent the complexity construct.

There is the possibility that the low degree of test intercorrelations obtained was due to a sufficient degree of test unreliability. Three of the measures (CW, IA, PCM) report test-retest reliabilities ranging between .49-.72 across different samples. Reliability data on the IDM and ITI is not known.

It must be noted that the measures used in this study represent only a subset of cognitive complexity measures purporting to assess the ways in which individuals discriminate and classify personal-social stimuli. Of current interest to counseling researchers are the views of Perry (1970), Kelly (1955), and Kohlberg, et al. (1977). Future research might incorporate these to determine if the complexity domain is even more differentiated than it now appears to be.

Finally, more work needs to be done on the issues of reliability, convergent/discriminant and construct validity. Until this is done, it appears that references about a general complexity construct based on studies using single measures is not justifiable.

Table 1

Correlation Matrix of Five Measures of Cognitive Complexity

Measure	1	2	3	4	5
1. Interconcept Distance	-				
2. Category Width	.15[a] (-.20)[b]	-			
3. Intolerance Trait Inconsistency	-.12 (.07)	-.08 (-.06)	-		
4. Intolerance of Ambiguity	-.16 (.06)	-.15 (-.20)	.06 (.00)	-	
5. Paragraph Completion	.00 (-.10)	.16 (-.10)	.04 (.04)	-.22 (-.06)	-

Note. N = 103 for the sample of 103 counselor trainees
N = 113 for Vannoy's (1965) sample of male undergraduates

[a]Correlation coefficients for present study

[b]Correlation coefficients for Vannoy's (1965) study

Reference Note

1. Hunt, D.E., Kingsley, R.C., Massari, D.J., Shore, R.E., & Sweet, J.S. Conceptual level scoring from paragraph completions in adolescents. Unpublished manuscript, Syracuse University, 1967.

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