LINGUISTIC COMPETENCE AND PSYCHOPATHOLOGY: CONSTRUCTION OF A TEST OF LINGUISTIC COMPETENCE

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SUMMARY

A battery of tests for measuring linguistic competence has been constructed. The battery consists of ten subtests. After validation and initial trial the tests were modified and then administered in two tryouts to schizophrenic patients and normal subjects. Test retest reliability was established in both patients and normals. In the patient group picture arrangement (story) and definitions subtests had low insignificant correlations. Among the normals household objects (categories), emotions and definitions had low correlations. On the basis of the above results definitions and emotions subtests were deleted from the test battery. On comparison of the group means patients scored lower than normals. They differed significantly only in colour naming and in MLU. This indicates that linguistic competence as measured by this instrument by and large does not deteriorate with the onset of schizophrenic illness.

Speech is a species-specific attribute of Homo sapiens. A study of psycholinguistics shows that various communities of man also differ from one another in type and organization of language used. Concepts available in two languages differ because language limits and facilitates particular concepts (Whorf 1950).

Language and Schizophrenic Phenomenology

In man, language seems to be an essential pre-requisite for the total and essential manifestation of schizophrenic symptomatology. As there are important differences both in symptomatology and outcome of schizophrenia (WHO 1973, 1979) and in use of language ability across cultures (Varma 1982), it may be that these two may be functions of each other. It has been noticed that schizophrenic patients in developing countries, having languages with greater emphasis on somatic expressions, more often develop catatonic symptoms and make greater use of body language. People using languages which permit verbalization of wider range of emotional state, manifest psychic anxiety and high systematized and elaborate delusions (Hoch 1958, 1961). Chomsky (1965) has emphasized the distinction between competence and performance as regards language. In schizophrenia, “there is evidence that the underlying language ability (competence) is not impaired” (Koplin 1968). Language limits and facilitates particularly concepts. Consequently, if two languages differ, the concepts available also must differ. Each language embodies and perpetuates a particular world view. It has been found that the background linguistic system of each language is not merely a reproducing instrument for voicing ideas but rather is itself the shaper of ideas, the guide.
for individual mental activity, for the analysis of impressions and for mental synthesis in trade (Whorf 1961).

In an earlier paper (Varma 1982) we have discussed the transcultural difference in language, linguistic competence and psychopathology and have hypothesized that linguistic competence may determine psychopathology and may explain intracultural and cross-cultural differences in it. For experimental validation of the above hypothesis, it is essential to have a meaningful and reliable tool to measure linguistic competence. To start with, we have taken up the task of constructing such a test valid in one language and culture. Although this will suffice an intra-cultural study, for a cross-cultural study equivalent instruments with validity in the respective linguistic and cultural system will be needed. It is hoped that it will be possible to achieve that objective also at sometime in the future.

The present paper which reports part of an on-going study pertaining to the construction of a test of linguistic competence, valid at least in the Hindi-speaking population of North India. It was felt that linguistic competence may be an independent personality attribute. It is possible that the test may, in the future, be adopted for other linguistic and cultural groups. The overall objective of this study was to investigate the following hypothesis:

1) Linguistic competence importantly determines manifestations and outcome of schizophrenia within and across the different linguistic groups. Those with higher competence are more likely to develop elaborate thinking disorders and have a worse prognosis, and those with lower competence to manifest somatic and catatonic symptoms, perplexity and to have a better prognosis.

2) The various clinical types of schizophrenia differ from one another in linguistic competence.

3) Various societies differ from one another in mean linguistic competence of its members.

The present paper concerns itself with the construction and standardization of an instrument to measure linguistic competence in normal and schizophrenic subjects in the local population.

**Material and Methods**

Construction of a composite measure of linguistic competence took into account some of the variables earlier described. It includes colour naming and mean length of utterances (Brown 1965). In addition, a number of additional subtests were added by us for the initial tryout to study if these also measured a similar variable reliably and could thus be incorporated in a test of linguistic competence. The measures of linguistic competence that we started with, were the following:

1. Number of colours named in a rainbow chart.
2. Concept of time as studied by a number of action pictures.
3. Spatial relationships as studied by picture denoting these.
4. Length of utterance as the number of morphemes in spontaneous response to a visual stimulus.
5. Naming types of household possessions and filial relationships.
6. Relational and quantitative dimensions of shape, size and number.
7. Vocabulary.

Based on the above areas, eight tests of linguistic competence were devised and
administered on a few patients of the psychiatry ward to see the feasibility of administration and degree of discrimination these elicit, independent of intelligence and education. The results were encouraging.

For testing the mean length of utterance (MLU) the first and second cards from the TAT (Indian adaptation) were chosen because of their apparently less anxiety-provoking format and potentiality to elicit lengthy and descriptive responses. Out of the two cards it was found that the second TAT card which depicts a farming scene elicited greater length of utterance and appeared to be more discriminatory.

For colour naming, strips of 33 colours were cut out from a colour chart, pasted on different white cards and then administered to subjects. The subjects were asked to name each colour.

The rationale behind the assessment of the relationship between time and space, concept formation and language was the linguistic relativity hypothesis of Whorf (1950) discussed earlier. It also measures the synthetic a-priori concepts of Kant—time, space and casualty. Thus, for the assessment of temporal and spatial relationships, 15 sketches were prepared each on a different card showing objects in differential motion, in various spatial relationships and sequential representation of events which portray a coherent and purposive activity. The subjects were asked to describe these sketches and their responses were assessed as to the correctness of perception of spatial and temporal relationships. After showing these cards to other artists some changes were made in these cards and a set of 18 cards were sketched. 3 cards were used as examples for the tests.

Subsequent to this exploratory tryout, a test of linguistic competence consisting of 10 sub-tests was devised and was administered to patients and normal subjects for this pilot tryout. The subtests and their method of administration and scoring were as follows:

1. Colour naming: A set of 30 pastel colour cards were shown. The subject was asked to name each colour. One mark was given for each distinct colour named.

2. Naming filial relationships: The subject was asked to name all possible filial relationships. One mark was given for each filial relationship named irrespective of sex. For example, if the subject gives the response, brother-sister, two marks were awarded.

3. Naming household objects: The subject was asked to name all possible household objects. Number of objects and of categories to which they belonged was recorded.

4. Mean length of utterance (MLU): The subject was asked to respond to TAT card-2 (Indian adaptation—Chaudhury, U., 1967) depicting a farming scene. MLU was calculated by dividing the total number of morphemes in the narrative by the number of utterances (i.e. pauses). Also the total number of morphemes in the response was calculated.

5. Emotions test: The subject was asked to respond to ten hypothetical emotion-provoking statements on semi-structured response categories. For example, one of the questions was “How would you feel if you won the first prize in a lottery?” One mark was given for only indication of emotion, two marks for complete expression of it and three marks for its further elaboration.
6. **Picture arrangement**: The subject was demonstrated a set of cards "NEST" from the WAIS-R Picture Arrangement test (Ramalingaswamy 1975). The subject was then asked to arrange the cards correctly and verbalize the story of the other sets also i.e. "HOUSE", "CHILDREN" and "RAIN". Two marks were given for correct arrangement and two marks for the correct verbalization.

7. **Temporal and spatial relationships**: The subject was shown 15 cards (apart from 3 shown for demonstration) and asked what they perceived in each picture. One mark was given for the correct temporal or spatial relationship in each card. No mark was given for any other response. An example, for spatial relationship, a card depicting a pair of spectacles lying on the table was shown. Examples of temporal relationship were a card showing a morning scene with the sun rising and cards depicting relative speed. The subject was expected to perceive and report the space relationship - spectacles on table rather than spectacles and table. The subject was expected to perceive and report the space relationship.

8. **Vocabulary**: The vocabulary subtest from the Stanford-Binet Intelligence Test (1960) Hindi adaptation (Kulshrestha 1971) of Form L-M was administered. There are 45 items in this test. The subject is asked the meaning of each word. One mark is given for each correct meaning. Examples of the items were camel, umbrella etc in Hindi.

In the second tryout certain modifications were made and two new subtests were added.

9. **Definitions**: 6 words were given to the subject who had to define the words. The words were - 'cow' (given as an example), 'bicycle', 'radio', 'horse', 'chapati', 'potato' (in Hindi). One mark was given for each sememe correctly given. Redundancy was negatively scored.

10. **Similarities**: Suri's (1975) test of similarities was also included. The test has 10 items, each item consisting of a pair of words, e.g., banana-orange. The subject has to tell the similarity between two objects. Responses are scored on a 4-point scale (0-3) in increasing abstractness of the response.

Face validation of the test was done by sending the test battery to thirty eminent professionals out of which were ten psychiatrists, ten psychologists and ten linguists. Their suggestions were incorporated in the test battery.

To correlate linguistic competence with intelligence, I.Q. was measured by the Raven's Standard Progressive Matrices.

The sample for both tryouts were selected from amongst the patients who came to the Department of Psychiatry, PGI, Chandigarh. The following criteria were followed for the selection of subjects. Age in the range of 16 years to 55 years were included in the study. Only those relatives of non-schizophrenic patients were included in the normal sample to avoid the error of genetic predisposition. All the normal subjects and the schizophrenic patients were screened for colour blindness to avoid any error in the colour naming test. To confirm the diagnosis all the schizophrenics were administered the Present State Examination, short version (Wing et al 1974).

In the first tryout, 17 schizophrenics and 13 normals subjects were tested. In the second tryout, 30 schizophrenic patients
and 30 normal subjects were assessed. In the first tryout the comparison between the schizophrenic patients and normal subjects on subtests of linguistic competence was done using the ‘t’ test. In the first and second tryouts the intercorrelations among subtests among schizophrenics and normals were computed separately using the product-moment coefficient of correlation. The test-retest reliability of the subtests of linguistic competence was established in the second tryout separately for patients as well as normal subjects.

Results

In the first tryout, on comparison of the group means (Table 1) the patients differed from normal subjects significantly only in colour naming and in MLU in both of which patients scored lower than normals. The differences on other subtests were not significant.

Tables 2 and 3 give the results, of the first tryout, in which the correlations between the subtests of linguistic competence amongst patients and normals subjects have been separately analysed.

Amongst both patients and normals, a cluster emerged consisting of family relationship, household objects and picture-arrangement subtests which positively correlated significantly with each other, thus indicating that these three may measure the same personality dimension and thus could be more sensitive indicators of linguistic competence. Amongst patients, and not in normal subjects, these tests also had a significant positive correlation with temporal and spatial relationships subtest; and amongst them picture arrangement correlated with MLU. Among the normal subjects, on the other hand, vocabulary subtest correlated significantly with a number of subtests like family relationships, household objects, picture arrangement, and emotions, indicating that in normals but not in patients these subtests among normals, whereas it did not correlate with any subtest in the patient group.
Table 2

Inter correlations among subtests in schizophrenic subtests (N = 17)

|               | Colour Naming | Family Relationships | Household Obj (Category) | TAT (MLU) | TAT (MORPHEMES) | Picture Arrangements | Emotions | Vocabulary | Temp and Spatial | IQ |
|---------------|---------------|----------------------|--------------------------|-----------|-----------------|----------------------|----------|------------|------------------|----|
| Colour Naming | .15           | -.009                | .40                      | -.08      | -.11            | -.02                 | .15      | .66**      | .21               | -.01|
| Family Relations | .73**         | .71**                | .21                      | .27       | .79**           | .39                  | .25      | .72**      | .04               | .16|
| Household Objects (number) | .73**         | .43                  | .21                      | .64**     | .01             | .09                  | .69**    | .69**      | .16               | .23|
| Household Objects (Categories) | .39           | .49*                 | .70**                    | .35       | .39             | .75**                | .23      | .38        | .18               | .39|
| TAT (MLU)     |               |                      |                          |           | .52*            | .72**                | .32      | .49*       | .38               | .18|
| TAT (MORPHEMES) |               |                      |                          |           | .45**           | .40                  | .13      | .55*       | .39               | .39|
| Picture Arrangements |               |                      |                          |           | .38             | .43                  | .74**    | .09        |                   |    |
| Emotions      |               |                      |                          |           | .52             | .42                  | -.37     |            |                   |    |
| Vocabulary    |               |                      |                          |           | .37             | .012                 |          |            |                   |    |
| Temporal and Spatial |               |                      |                          |           | .38             |                      |          |            |                   |    |
| IQ            |               |                      |                          |           |                 |                      |          |            |                   |    |
|                      | Colour naming relationships | Family Number | Household Obj Categ. | TAT MLU | TAT Morphemes | Picture Arrang. | Emotions | Vocabulary | Temp and Spat. | IQ  |
|----------------------|-----------------------------|---------------|---------------------|---------|---------------|----------------|----------|------------|----------------|-----|
| Colour Naming        | .36                         | .14           | .14                 | .11     | .63*          | .27            | .026     | .50**      | .50            | -.03|
| Family Relations     |                            | .68**         | .56*                | .25     | .15           | .63*           | .32      | .53         | .32            | .65*|
| Household Objects (number) |                   | .61*          | .14                 | .04     | .91**         | .19            | .50      | .22         | .65*           |
| Household Objects (Categories) |                       | -.35          | .01                 | .63     | .46           | .60*           | .12      | .84**      |                |
| TAT (MLU)            |                            | .11           | -.09                | -.18    | .22           | .05            | -.09     |            |                |
| TAT (MORPHEMES)      |                            |               | .07                 | .05     | .29           | .18            | -.08     |            |                |
| Picture Arrangements |                            |               | .40                 | .73**   | .68           | .53            |          |            |                |
| Emotions             |                            |               |                      | .76**   | .05           | -.04           |          |            |                |
| Vocabulary           |                            |               |                      | .56     | .30           |                |          |            |                |
| Temporal and Spatial |                            |               |                      |         |               |                |          |            |                |
| IQ                   |                            |               |                      |         |               |                |          |            |                |
In the second tryout, 30 schizophrenic patients and 30 normal subjects were tested. In the patient group, the results were similar to that of the first tryout. Spatial and temporal relationships subtest correlated significantly with almost all other subtests, such as family relationships, household objects, TAT, definitions, picture arrangement, vocabulary and similarities.

The test-retest reliability (Table 4) was established during the second tryout with the interval between the two administrations being one month. 16 patients and 12 normal subjects were retested. In the patient group, picture arrangement (story) and definitions (sememes and redundancy) had low, insignificant correlations. In the normal subjects, household objects (number of categories), emotions and definitions had low correlations. On the basis of the above results and discussion with experts, definitions and emotions subtest was removed from the battery of tests after the second tryout.

Table 4
Test – Retest Reliability
(interval = 1 month)

| Tests                                    | Patients N = 16 | Normal Subjects N = 12 |
|------------------------------------------|----------------|------------------------|
| Colour naming                            | .84**          | .90**                  |
| Family relations                         | .85**          | .79**                  |
| Household objects (Number)               | .72**          | .70**                  |
| Household objects (Categories)           | .55**          | .46                    |
| Emotions                                 | .62**          | .59**                  |
| Picture arrangement (Arrg)               | .54*           | .39**                  |
| Picture arrangement (Story)              | .37            | .88**                  |
| Spatial and Temporal Relations           | .76**          | .81**                  |
| Definitions (Sememes)                    | .37            | .52                    |
| TAT-Morphemes                            | .96**          | .97**                  |
| TAT-MLU                                  | .86**          | .87**                  |

Discussion

The results of the study show that the scores of linguistic competence discriminate across individuals and hence is a variable. The scores are stable over time which clearly indicates that the measurement of linguistic competence is reliable. Repeat measurement gives consistent and stable results (Table 5) with correlations being as high as .80 in most of the subtests.

The results also indicate that linguistic competence is relatively independent of IQ. Among the normal subjects, IQ correlated significantly only with filial relationships subtest and household objects subtest, whereas it did not correlate with any subtest in the patient group. It suggests that the parameters being studied are relatively independent of IQ.

The comparison of the group means between the schizophrenic patients and the normal subjects show no significant difference except in colour naming and MLU. This indicates that linguistic competence as measured by this instrument by and large does not deteriorate with the onset of schizophrenic illness. Hence, it is not simply a function of the disease process or psychopathology, but measures a personality variable independent of it.

The linguistic test battery however has some limitations. Some of the tests may be partially dependent upon perception (e.g. colour naming subtest) and concept formation (e.g. temporal and spatial relationship subtest). However, these psychological functions cannot sufficiently explain linguistic competence which must be viewed as a holistic ability and a personality dimension in its own right.

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