

Cognitive Processing and its Relationship to Symptoms and Social Functioning in Schizophrenia

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This study analyses the relationship between contextual processing ability and symptom and social status in schizophrenia. The results showed that current symptom status is related to occupational status, and contextual processing is related to current symptom status and employment history. Current symptom severity in chronic schizophrenics may indicate an increased frequency and/or duration of symptom episodes in the past, and therefore an increase in the periods in which contextual processing was disturbed, which would therefore account for the observed decrease in work achievements.

Much work concerned with schizophrenia is conducted within two separate frameworks, cognitive and social, with little communication and transfer of skills between them. Thus while cognitive approaches assert the primacy of abnormal cognitive processes (e.g. Neale & Oltmanns, 1980), social approaches invoke stress factors and or social learning theories (e.g. Argyle, 1978; Bellack, 1984) and focus on training, without the involvement of detailed cognitive analyses. While such training is justified since schizophrenic patients tend to “have difficulties initiating social behaviour” (Lieberman *et al*, 1984) it is also clear, as Falloon *et al* (1984) point out, that “a crucial component of social competence is the ability to perceive and accurately process relevant social cues that guide an individual in selecting the appropriate response to any situation”. The failure to consider such contextual processing seems to be reflected in outcome studies (Falloon *et al*, 1984) which show that training in problem solving and social skills tends not to improve social functioning even in variously changed environments, suggesting that the factors that create and maintain social impairment are not adequately addressed at present. It is therefore important to clarify how contextual processing may be implicated in social functioning and how both relate to symptoms in schizophrenia, so that more effective intervention techniques may be developed. The aim of the present study is therefore to explore such a link in an analysis addressing contextual processing ability *vis à vis* symptom status and social functioning in schizophrenia.

For this purpose a word association test was devised. The task, (a) examines contextual processing, which is a prerequisite for adequate social functioning (Bransford & McCarrell, 1974); and (b) analyses contextual processing at a particular level, distinguishing it from more complex within-sentence and between-sentence processes.

Method

Subjects

All 19 patients (12 day hospital patients, 5 in-patients, 2 out-patients; age range 20–47 years) were on neuroleptic medication. Other demographic information is given in Table I.

Diagnosis was established by applying Feighner *et al* (1972) criteria to the case notes of patients who had a hospital diagnosis of schizophrenia. Symptom ratings were obtained from patient examinations by the author at the time of testing, using the standardised psychiatric assessment scale of Krawiecka *et al* (1977). The presence/absence of symptoms (delusions, hallucinations, incoherence of speech, poverty of speech, and flattening of affect), but not the severity of symptoms, of 14 of the 19 patients were checked with the patients' registrar. Agreement was very high, with only one discrepancy, concerning the presence/absence of hallucinations. The discrepancy was resolved by accepting the author's rating carried out at the time of testing, which found no evidence of hallucinations in the past week.

Design

Three sets of variables were examined.

Social competence. Following Platt & Spivack (1972), social competence was assessed on the basis of biographical data concerning social functioning across time in terms of pre-morbid IQ, education, occupation, employment history, marital status, and duration of personal relations. Pre-morbid IQ was estimated from a combined Nart and Schonell error score (Nelson, 1982). All other measures were derived from interviews with the patients and medical case notes.

Symptom status. Symptoms were analysed in terms of: age at and years since the first onset of schizophrenic symptoms, derived from the case notes; and number and severity (the sum of each subject's symptom ratings) of current symptoms, derived from the Krawiecka *et al* (1977) symptom ratings scale.

Cognitive status. This was established by digit span and contextual processing. Digit span (the sum of digits forward

TABLE I
The range of scores obtained for each cognitive, symptom,
and social measure

| Parameters | Range of scores ¹ |
|---|------------------------------|
| <i>Cognitive</i> | |
| Unintended responses | 0–15 |
| Digit span | 8–14 |
| <i>Symptom</i> | |
| Age at first onset: years | 13–37 |
| Years since first onset | 1–31 |
| Number of symptoms (out of a maximum of 5) | 0–3 |
| Severity of symptoms (out of a maximum of 20) | 0–11 |
| <i>Social</i> | |
| Pre-morbid IQ | 91–122 |
| Duration of personal relations: years | 1–16 |
| Marital status | 1–3 |
| Education | 1–5 |
| Occupation | 2–4 |
| Employment history | 2–5 |

Methods of scoring are given in the text.

*Definitions are provided in the procedure section.

1. Ranges, rather than means, are more appropriate for correlational analyses.

and backward) was used to measure immediate memory span, which if impaired could account for inadequate contextual processing in encoding terms. Contextual processing was assessed in a word-association test which comprised 20 word pairs in which the first word of the pair (e.g. 'HAND') indicated the intended meaning of a homophone (e.g. 'PALM'), which was the second word in the pair.

Procedure

Subjects were tested individually and given:

- the National Adult Reading Test (NART) and the Schonell Graded Word Reading Test (GWRT) (Nelson, 1982)
- the digit span test (forward and backward) from the Wechsler Adult Intelligence Scale (Wechsler, 1955)
- the word-association test described above
- the Krawiecka-based symptom ratings
- questions concerning their social status (information from this was subsequently checked and found to be consistent with the case notes).

Social variables were categorised and coded as follows: *Education*: 1 = with university degree, 2 = with A levels, 3 = with O levels, 4 = secondary schooling, 5 = incomplete secondary schooling. *Occupation*: 1 = professional/managerial, 2 = clerical/secretarial, 3 = skilled work, 4 = semi-skilled and unskilled work. *Employment*: 1 = regular employment for ten years and unemployed for less than one year, 2 = regular employment for ten years but

unemployed for more than one year, 3 = fluctuating employment or frequent shifts, 4 = as above but also unemployed for at least five years, 5 = usually unemployed. *Marital*: 1 = married, 2 = divorced, 3 = single.

A free-association format was used for the word-association test. Each word pair was read to the subject, one at a time, and the subject was asked to respond "as quickly as possible with the first word which comes to mind" after the experimenter had said the word pair. Each response was immediately written down by the experimenter. Each subject received and responded to a practice item to ensure that the task had been understood. Responses were scored as intended when they were contextually appropriate. For example 'LEAVES' in response to 'TREE-BARK'. Responses were scored as unintended when they were contextually inappropriate, for example, 'DOG' or 'SUGAR' in response to 'TREE-BARK'. 'DOG' is contextually inappropriate because it refers to the other, in this context unintended, meaning of 'BARK'.

Scoring was carried out by two independent raters who were blind to the identity of the subjects. Discrepancies between the raters were 3.6% and resolved by a third rater.

Results

All statistics are rank-order correlations. The data displayed in Table I were examined for associations pertaining to: (a) cognitive variables, relating unintended meaning responses with digit span, each cognitive variable with each symptom variable, each cognitive variable with each social variable, and each cognitive variable with a global scale of the mean of the ranked scores of all six social variables; (b) each symptom variable *vis-à-vis* each social variable.

The correlational analysis between unintended meaning responses and digit span showed no significant relationship.

Correlational analyses showed a significant relationship between increased unintended meaning responses and current symptom status, both in terms of increased numbers of symptoms ($r=0.55$; $P<0.05$) and increased severity ratings ($r=0.57$; $P<0.05$), but there was no such relationship with symptom history (i.e. years since and age at first onset).

Of all the analyses of social status, only employment history was significantly related to frequency of unintended meaning responses ($r=0.63$; $P<0.01$), indicating that increases in the latter relate to decreased achievements in the former.

Only occupation and employment history were significantly related to symptoms: decreased occupational status was related to increased numbers of symptoms ($r=0.602$; $P<0.01$), increased symptom severity ($r=0.608$; $P<0.01$), and younger ages at first onset ($r=0.722$; $P<0.01$), indicating that the earlier the onset, the worse the employment record.

Discussion

While there is much separate work, theoretical and clinical, concerned with symptom, cognitive, and social variables in schizophrenia, and while there are claims about the relationship between these variables,

it has as yet not been empirically analysed. The aim of the present study was therefore to provide, as a first step, some explorative but empirically based analyses of this triadic relationship. Although these analyses are constrained by small sample size and social measures which are rather coarsely grained and narrow in scope, they have nevertheless provided some useful links, showing that:

- (a) age at first onset of symptoms is related to occupational status and employment history
- (b) current symptom status is related to occupational status
- (c) contextual processing is related to current symptom status and employment history.

More specifically, and unsurprisingly, the analyses suggest that the earlier in a person's life the onset of symptoms, the lower the chances of achieving a higher occupational status and maintaining work regularly over time. However, quantitative and qualitative increases in *current* symptom severity are also implicated in maintaining low occupational status. Since symptoms are variable both in number and severity, reflected in for example hospital admissions and discharge, current symptom status and low occupational status must be linked via some other variable. A possible candidate, not investigated in the present study, is symptom frequency and duration, suggesting that increased severity may be related to more frequent and or prolonged episodes. This hypothesis is also consistent with the finding that inadequate contextual processing too must be linked to employment history via symptom frequency/duration, since it is not an enduring problem but corresponds to current symptom severity.

Taken together, the findings suggest that, at least in this chronic population, increased symptom numbers and severity may entail more frequent and or prolonged episodes and therefore more periods in which contextual processing is impaired, which in turn would detrimentally affect the ability to engage in activities necessary for the development and maintenance of work-related skills.

It is also pertinent to consider that impaired contextual processing in the present study seems specifically related to current symptom status, since no significant correlations emerged in relation to the other variables (e.g. education and IQ). It is possible that medication may be implicated, although two factors would argue against this. One is the fact that all patients in this study were on psychotropic

medication and yet contextual processing differences emerged in relation to current symptom status. The other is evidence suggesting that psychotropic medication is associated with improved cognitive processing (Oltmanns *et al*, 1978). Nevertheless effects of medication, particularly the effects of different dosages and the accumulated effects of long-term medication, remain unclear.

Further research is also indicated for clarifying the nature of the suggested interdependence of cognitive, symptom, and social variables, since this would have important implications for the management of schizophrenia. For example skills training may be more effective if patients' cognitive functioning were taken into consideration.

To conclude, although limited in scope, the present study provides a useful first step towards multifocal analyses by identifying an important relation between contextual processing, symptoms, and work.

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