Situational Familiarity and Feature Recognition in Schizophrenia

by Patrick W. Corrigan, Randy Silverman, James Stephenson, Joyce Nugent-Hirschbeek, and Brett J. Buican

Abstract

Research has shown that schizophrenia patients are less able to identify a situation's abstract features (goals) than its concrete features (actions). However, it has been unclear whether this differential deficit represents a cognitive dysfunction or a lack of familiarity with many situations because of impoverished social experiences. Twenty-nine inpatients with DSM-III-R diagnosis of schizophrenia completed the Situational Feature Recognition Test, Version 2 (SFRT-2). The SFRT-2 included familiar and unfamiliar situations of which subjects were asked to identify characteristic goals and actions. A 2 X 2 X 2 analysis of variance (group by feature abstraction by situational familiarity) found a significant three-way interaction. Post-hoc analyses suggested that patients were better able to recognize concrete features in familiar situations. Differences in discriminating power of the four conditions of the SFRT-2 had been diminished on standardization and cross-validation groups. Therefore, the differential deficits shown by the patient sample probably do not represent psychometric confound. Implications for remediation of social cognitive deficits are discussed.


The interpersonal deficits of schizophrenia may be better understood by describing their more primary, social cognitive deficits. Social cognitive functions that have been examined in schizophrenia include recognition of facial affect (Morrison et al. 1988), sensitivity to nonverbal body cues (Rosenthal 1974; Monti and Fingeret 1987), and perception of situational stimuli (Cramer et al. 1992; Corrigan and Green 1993a; Mueser et al. 1993). Because feature recognition has been shown to correspond with performance of social skills, clinical researchers have also examined patients' ability to identify features that describe an interpersonal situation (Schank and Abelson 1977; Bower et al. 1979; Argyle et al. 1981; Forgas 1983; Argyle 1986; Galambos et al. 1986).

Examples of situational features include the following: (1) actions comprising the characteristic behaviors that occur in a situation (e.g., customers at a restaurant follow the hostess to their seats, take menus, and place orders); (2) roles employed by situationally defined characters (e.g., the hostess seats customers, the barmaid serves drinks); (3) rules, including the subtle interpersonal customs that govern the situation (e.g., customers wait until the hostess calls them to be seated); and (4) goals defining the actor's purpose for entering and engaging in the situation (e.g., customers are trying to alleviate their hunger). Inability to identify and comprehend situational features will significantly impair an individual's ability to respond correctly to interpersonal demands (Schank and Abelson 1977; Galambos et al. 1986).

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Research has shown that schizophrenia patients are significantly less able to identify features that describe social situations than control subjects with no history of severe mental illness (Corrigan et al. 1992). Additional research has examined characteristics of situational features that may specifically impede accurate identification by schizophrenia patients. Argyle (1986) stated that features like rules and goals are relatively more abstract than features like actions and roles. Research by our group (Corrigan and Green 1993b) showed schizophrenia patients to be significantly less sensitive to abstract features than to concrete features. This finding is consistent with a large body of research suggesting that abstraction and cognitive flexibility are relatively deficient in schizophrenia patients (Braff et al. 1988; Goldberg et al. 1993; Heaton et al. 1994) and should be the focus of cognitive remediation (Brenner et al. 1992; Spring and Ravdin 1992).

It is difficult to determine whether a cognitive deficit like this represents direct effects of the disorder or occurs because patients are unfamiliar with the stimulus situation. Patients who experience prolonged institutionalization or social isolation are likely to be unfamiliar with common interpersonal situations (Lamb and Goertzel 1971; Goldstein 1981). This unfamiliarity may exacerbate deficits in recognizing abstract situational features. Our assumptions about familiarity were supported in the earlier study, in which lack of familiarity with social situations was shown to interact with abstract and concrete feature recognition (Corrigan and Green 1993b). The finding was based on a post-hoc analysis, however; familiarity was not directly manipulated in the study.

In this study, the effects of situational familiarity on feature recognition were examined directly by manipulating the familiarity of situations in the cognitive task. We hypothesized that abstract and concrete feature recognition would interact with the situation's familiarity—in particular, that abstract feature recognition would be significantly diminished in unfamiliar situations.

### Methods

Three steps were taken to address the interaction of feature recognition and situational familiarity. First, patients rated the familiarity of a list of situations to identify a subset that was reliably judged to be familiar and unfamiliar. The five most familiar and unfamiliar situations, as determined from these ratings, were then used to develop the Situational Feature Recognition Test-Version 2 (SFRT-2); the first version of the SFRT (Corrigan and Green 1993a) did not manipulate familiarity of social situations.

Chapman and Chapman (1973, 1978) warned that the magnitude of psychiatric patients' performance decrement between any two tasks (e.g., abstract vs. concrete feature identification or feature detection in unfamiliar and familiar situations) is a function of differences in the discriminating power of the component tests, as validated in similar nonpsychiatric groups. In cases where the difference in discriminating power between tests is large, the differential deficit attributed to patient groups may arise from statistical artifact. Differences in discriminating power between tests can be diminished by matching items across the component tests for difficulty and consistency. Therefore, the second step in this study was to diminish the discriminating power of SFRT-2 conditions on standardization and cross-validation samples. The final version of the SFRT-2 was then administered to a sample of schizophrenia patients to determine the effects of situational familiarity on abstract and concrete feature recognition.

### Identifying Familiar and Unfamiliar Situations

The first step in developing the SFRT-2 was to identify familiar and unfamiliar interpersonal situations based on the ratings of a sample of subjects with severe mental illness. To generate a test list for patients, five judges without a history of severe mental illness rated 57 situations on a 7-point familiarity scale (1 = extremely familiar). These situations were written according to the syntax: present participle, article, and noun (e.g., “building a snowman” or “placing a bet”). Thirty situations were then selected from this list: the 10 situations with the lowest average familiarity rating, the 10 situations with the highest average familiarity rating, and the 10 situations with the median average familiarity rating.

These 30 situations were then administered to 26 patients with severe mental illness who were participating in the partial hospitalization program at the University of Chicago Center for Psychiatric Rehabilitation. A generic (i.e., mixed-diagnosis) sample of severely mentally ill patients was recruited for this study, rather than a sample of schizophrenia patients,
because past history of institutionalization was thought to be the variable that affected familiarity. Familiarity ratings were not expected to change across samples of institutionalized subjects differing in diagnosis. Moreover, subsequent research to examine feature recognition of other severe psychiatric samples (e.g., bipolar disorders) is planned. Familiarity ratings based just on schizophrenia subjects would not be especially relevant in future research.

Subjects were asked to rate each situation on the same 7-point Likert Scale. Subjects in this group had diagnoses of schizophrenia (n = 8), schizoaffective disorder (n = 4), mood disorder (n = 10), or Axis II disorder (n = 4). Severe cases were defined as those involving multiple hospitalizations in State institutions and having lasted at least 5 years since first break, during which time competitive employment was not possible because of psychiatric disability. The sample was 50 percent female with an average age of 36.2 years (standard deviation [SD] = 11.8). The sample was 30.8 percent white and 69.2 percent African-American and had completed an average of 12.1 years of education (SD = 2.4). Of the subjects, 85.3 percent were single, 3.5 percent were married, and 11.2 percent were widowed or divorced. The 30 situations were administered to patients twice, with 2 days intervening, to examine test-retest reliability.

The five situations patients rated as most familiar (mean = 2.40, SD = 0.87) and the five they rated as least familiar (mean = 4.54, SD = 0.70) were selected for the SFRT-2. Test-retest correlation coefficients, using an intraclass correlation coefficient (ICC; Shrout and Fleiss 1979) for the familiarity ratings of each of the five Better Known and five Lesser Known situations averaged 0.69 (using an r to Z transformation to determine the average); ICCs ranged from 0.49 to 0.74. Differences in familiarity scores for the 10 situations identified by the sample of very severely mentally ill patients were cross-validated on the sample of subjects with schizophrenia described below.

Differences in responding to Better Known versus Lesser Known situations might be attributed to the vocabulary level of situation descriptions; it could be that the labels for Lesser Known situations were written with relatively more difficult words. To rule out this explanation, 15 severely mentally ill subjects, who were not included in the above sample, completed a 10-item multiple-choice vocabulary test containing synonyms for key nouns (obtained from the standard edition of the American Heritage Dictionary) used in the Better Known and Lesser Known situations. Results showed that 84 percent of the sample were able to identify the synonyms of all key nouns accurately. This finding suggested that vocabulary level was not confounding subjects' ratings of situational familiarity.

SFRT-2 Item Development and Validation. Two lists of situational features representing actions (e.g., an action for the Better Known situation “taking a test” is “reading a question”) and goals (e.g., a goal for “taking a test” is “to earn a degree”) were generated for each of the 10 SFRT-2 situations. Each list comprised 18 features, of which 8 were correct responses or targets and 10 were distractor items or nontargets. Three independent judges (doctoral-level mental health professionals) rated each item on a binary scale for its representation of the situation. Only 17 of the 360 items needed to be modified after this evaluation.

To ensure that these items were comprehensible to individuals with severe mental illness, nouns from items for 10 familiar actions, 10 familiar goals, 10 unfamiliar actions, and 10 unfamiliar goals were randomly selected from the list of 360 items and administered as a multiple-choice test to 15 severely mentally ill outpatients. Subjects correctly identified 93.3 to 96.7 percent of the synonyms for each word, depending on the condition from which the item was selected. We concluded, therefore, that vocabulary level was unlikely to have affected feature identification in this study.

To test for differences in discriminating power, the SFRT-2 was administered to a standardization group of 60 subjects who reported no prior history of mental illness requiring inpatient hospitalization or administration of antipsychotic or antidepressant medication. These subjects were instructed to “circle every action (or goal) that is usually associated with the situation” in each of the lists. To diminish errors that might result from misunderstanding the instructions, directions were repeated to subjects who circled more than five consecutive features on any one list or who circled no features on a list. The standardization sample was 76.3 percent female with an average age of 31.1 years (SD = 7.2). Subjects, of whom 82.5 percent were white, 7.0 percent Asian, and 10.5 percent...
African-American, had completed an average of 18.5 years of education (SD = 2.5). In terms of marital status, 48.3 percent were single, and 51.7 were married.

To reduce differences in discriminating power across the four conditions (abstract familiar, abstract unfamiliar, concrete familiar, concrete unfamiliar), some items in each task were discarded, so that conditions were similar for item consistency (using the KR-20) and for mean and variability of item difficulty (Chapman and Chapman 1973, 1978). Mean and SD of these values are summarized in Table 1. All items from one of the Lesser Known situations had to be omitted to ensure consistency among the familiar/unfamiliar conditions. Of the nine situations remaining, five were familiar and four were unfamiliar.

Means and SDs of item difficulties and consistencies of targets and nontargets for the four conditions were cross-validated on a separate sample of 40 subjects who did not report a history of severe mental illness. This sample was 78.0 percent female, with an average age of 32.7 years (SD = 8.4). Subjects, of whom 87.8 percent were white and 12.2 percent African-American, had completed, on average, 18.1 years of education (SD = 2.3). In terms of marital status, 48.7 percent were single, 33.3 percent married, and 17.9 percent divorced or separated.

Unfortunately, the educational level of both the standardization and cross-validation groups was much higher than usually found in groups of people with schizophrenia. In this case, differential deficits that may be found in subjects with schizophrenia could be attributed to differences in intelligence and educational level rather than the effects of schizophrenia (Chapman and Chapman 1973, 1978). Therefore, performance on the SFRT-2 was examined for an additional, cross-validation group (n = 21), consisting of subjects who had completed fewer years of education. On average, these subjects, of whom 38.1 percent were female, had finished 12.7 years of schooling (SD = 1.5). Mean age of subjects was 44.8 years (SD = 13.2). In this sample, 90.5 percent of the subjects were white, 9.5 percent African-American, 9.5 percent single, 81.0 percent married, and 9.5 percent divorced or separated.

Internal consistencies (KR-20s)
for targets and nontargets across the four SFRT-2 conditions are summarized in table 1 for the standardization and two cross-validation samples. The internal consistency for the correct identification of target items was similar across conditions and sufficiently high for all three samples. However, internal consistency was mixed for the nontarget items; the KR-20s of nontarget items representing goals were quite low in both cross-validation samples. This may have occurred because of the low variance in nontargets caused by a floor effect. Therefore, differences in the false identification of nontargets were not examined further in the study.

Means and SDs of item difficulty for the SFRT-2 conditions are also included in table 1. Results of a $3 \times 4$ analysis of variance (ANOVA) (group by SFRT-2 condition) showed that the hit rate, or percent of correctly identified targets, was very similar across SFRT-2 conditions ($F = 0.27, df = 3,354, p = 0.85$). However, nonsignificant trends were found for hit rate across groups ($F = 2.36, df = 2,118, p < 0.10$). This finding seems to reflect diminished performance by the less educated group. Additional analyses showed that hit rate was similar between the standardization and better educated, cross-validation group ($F = 1.02, df = 1,988, p = 0.31$). However, the hit rate for the less educated, cross-validation group was significantly lower than for the standardization group ($F = 4.78, df = 1,799, p < 0.05$).

The combined findings suggest that differences in discriminating power, representing hit rates, have been minimized across the four conditions of the SFRT-2 in standardization and cross-validation groups. Hit rate was significantly lower in the control sample that was less educated. However, diminished education had no appreciable effects on differences in discriminating power across SFRT-2 conditions. Therefore, differential deficits in hit rate across SFRT-2 conditions are likely to represent a characteristic of schizophrenia rather than a psychometric confound of the measure. As a result of this effort, the final task included 14 items per list: 6 targets and 8 nontargets.

Administration of the SFRT-2 to Subjects With Schizophrenia.

Subjects. Twenty-nine inpatients with DSM-III-R (American Psychiatric Association 1987) diagnoses of schizophrenia participated in this study. Diagnoses were based on either an expanded version of the Present State Exam (Wing et al. 1974) or the Structured Clinical Interview for DSM-III-R (SCID; Spitzer et al. 1990). Clinicians conducting either interview were trained to a minimum kappa of 0.60 according to criterion ratings in our laboratory. Subjects with histories of drug or alcohol dependence during the past year, or of tolerance and withdrawal during their lifetimes, were excluded. Subjects were also excluded if they had a chart history of organicity or mental retardation. To ensure that completion of the SFRT-2 by the sample of subjects with schizophrenia was not diminished by poor reading level or eyesight, subjects had to demonstrate at least a fourth-grade reading level as measured by the Wide Range Achievement Test-Revised (Jastak and Wilkinson 1984) and to have corrected vision of at least 20/30 as demonstrated on the Snellen eye chart.

The mean age of subjects with schizophrenia was 35.2 years (SD = 9.0). These subjects had completed an average of 12.3 years of education. Both values are similar ($p > 0.40$) to those of the less educated, cross-validation sample. In this sample, 37.9 percent of the subjects were white, 62.1 percent African-American, 62.1 percent female, 82.8 percent single, 3.4 percent married, and 13.8 percent divorced or separated. All patients received neuroleptic medications, with the average dose equal to 785 mg chlorpromazine equivalents (SD = 636). Twenty-seven of the 29 patients received benztropine for side effects, the average dose being 1.0 mg (SD = 1.4).

Procedure. Subjects who agreed to participate after being informed about the study's purpose were tested individually. Patients were administered the lists of situational features comprising the SFRT-2 in one of two counterbalanced conditions to control for order effects. Subjects received the same instructions for completing the SFRT-2 as the standardization and cross-validation groups. They were also instructed to rate the familiarity of each situation on the 7-point familiarity scale.

Results

The internal consistencies of hit rate for the four SFRT-2 conditions for patients were high, ranging from 0.75 to 0.84. An ANOVA across counterbalanced groups was completed to test for order effects; differences were negligible. Overall SFRT-2 hit rates were not shown to be significantly associated with age, gender, ethnicity, education,
marital status, or ingested dose of antipsychotic or anticholinergic medication for the subjects with schizophrenia. The latter rated the Better Known situations of the SFRT-2 as significantly more familiar than the Lesser Known situations ($F = 40.66, df = 1.28, p < 0.0001$). This finding cross-validates differences in the familiarity of SFRT-2 situations found by the group of severely mentally ill patients used to construct the test.

Differences Across SFRT-2 Conditions. The means and SDs of hit rate across the four SFRT-2 conditions are summarized in Table 2. The critical test in this study was a $2 \times 2 \times 2$ ANOVA (group by feature abstraction by situational familiarity), with hit rate as the dependent measure. No significant effect was found for group ($F = 0.01, df = 1.48$) or feature abstraction ($F = 1.12, df = 1.48$). However, subjects were able to identify significantly more features in the Better Known situation than in the Lesser Known situation ($F = 4.25, df = 1.48, p < 0.01$); this factor significantly interacted with group ($F = 7.71, df = 1.48, p < 0.01$). The interaction of familiarity and feature abstraction was not significant ($F = 0.60, df = 1.48$). The three-way interaction was significant ($F = 3.87, df = 1.48, p = 0.05$) thereby supporting the central hypothesis of the study.

Additional $2 \times 2$ analyses of the patient group better described the nature of these findings (such analyses for the control group were reviewed in the Methods section). The post hoc $2 \times 2$ ANOVA representing patients' hit rate on the SFRT-2 failed to show significant differences for correctly identifying actions versus goals ($F = 0.81, df = 1.28$). However, patients were significantly better able to correctly identify features in Better Known versus Lesser Known situations ($F = 11.37, df = 1.28, p < 0.01$). Moreover, the feature abstraction and the familiarity factors interacted significantly ($F = 4.84, df = 1.28, p < 0.05$). Results of matched-pair $t$-tests uncovered no significant differences for action and goal recognition across familiar situations ($t = 0.86$). However, patients identified significantly more actions than goals in Lesser Known situations ($t = 1.91, p = 0.05$).

Table 2. Mean and standard deviation of SFRT-2 hit rates for the schizophrenia sample

<table>
<thead>
<tr>
<th>SFRT-2 conditions</th>
<th>Hit rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Familiar situations</td>
<td></td>
</tr>
<tr>
<td>Actions</td>
<td>0.817a (0.127)</td>
</tr>
<tr>
<td>Goals</td>
<td>0.832a (0.146)</td>
</tr>
<tr>
<td>Unfamiliar situations</td>
<td></td>
</tr>
<tr>
<td>Actions</td>
<td>0.776b (0.153)</td>
</tr>
<tr>
<td>Goals</td>
<td>0.731c (0.190)</td>
</tr>
</tbody>
</table>

Note.—Means in each column with different superscripts differed significantly, SFRT-2 = Situational Feature Recognition Test, Version 2 (Corrigan and Green 1993a).

Discussion

Previous research suggested that the difference between recognition of actions and goals may represent patients' inability to process more abstract information like situational goals, as opposed to more concrete features like actions (Corrigan and Green 1993a). Findings from the study described in this article suggest that this difference is most apparent in unfamiliar situations. These differences seem to represent some characteristic of social cognition in schizophrenia per se, rather than a generalized performance deficit. Items comprising the actions versus goals and familiar versus unfamiliar conditions of the SFRT-2 were matched for item difficulty and consistency on standardization and cross-validation samples to diminish differences in discriminating power across subtests. Hence, differential deficits observed in this study do not seem to represent psychometric confounds of the SFRT-2.

Two factors might account for the effects of situational unfamiliarity on feature recognition: institutionalization and negative symptoms. Patients who have been hospitalized continuously for several years or who have exhibited a "revolving-door" pattern of patient care may not be familiar with situations common to individuals living in the community. As a result, they have more difficulty correctly identifying the situations' features. Alternatively, patients with marked negative symptoms may be relatively unconcerned about social reinforcers and less attentive to social cues—a hypothesis supported in an independent study (Corrigan et al. 1994). As a result, they are less familiar with many social situations and, therefore, less able to recognize features that describe unfamiliar situations. The differential deficit between abstract and concrete feature recognition becomes particularly marked in unfamiliar situations.

Findings from this study suggest that overall feature recognition (abstract + concrete) is affected by level of education. Control subjects in a less educated group had significantly lower, overall hit rates.
than better educated subjects. No differences were found in overall feature recognition between schizophrenia patients and the less educated control sample. This finding contradicts earlier research in which significant differences were found across groups of subjects with schizophrenia and control groups (Corrigan et al. 1992); the two samples in the latter study differed in educational level, however. Nevertheless, level of education did not seem to account for the differential deficit. Schizophrenia patients showed the differential deficit while subjects in the less educated control group did not.

Despite the comprehensive effort to rule out extraneous constructs that might confound our findings (e.g., word difficulty in SFRT-2 items), three limitations of the study must be examined in future research. We assumed, based on Argyle's (1986) work, that rules and goals were more abstract situational features than actions and roles. Unfortunately, this assumption was not supported by an independent index of abstraction (which would significantly differ with type of situational feature). As a result, we cannot discount an alternative conclusion; difference in feature recognition across familiar/unfamiliar situations might have occurred because the situational features in unfamiliar situations were more abstract. An independent index of abstraction needs to be included in future investigations.

Two subject variables may also have confounded results of the study. All of the patients, and none of the control subjects, were ingesting antipsychotic and/or antiparkinsonian medications, both of which have been shown to diminish cognitive and social cognitive functioning in schizophrenia patients (Spohn and Strauss 1989; Corrigan and Penn 1995). Therefore, between- and within-group differences in feature recognition may be due to medication differences across groups. This assertion is somewhat discounted by an absence of significant association between medication dose and any SFRT-2 score. However, dose of ingested medication has been shown to be a poor index of medication effects. This issue could be more directly tested by examining the relationship between medication plasma level and SFRT-2 score.

Ethnic differences, although not statistically significant, also existed between groups, with the patient sample having more individuals who identified themselves as African-American. A reasonable assumption is that situational familiarity varies with ethnic heritage. Although post-hoc analyses failed to support this assumption on the SFRT-2, the nonsignificant finding may represent limited power and should be more directly examined in future research.

The research has implications for the remediation of social cognitive deficit. Findings suggest that recognition of situational features increases when patients become more familiar with situations. Conversely, differences in recognition of abstract versus concrete features diminish in relatively familiar situations. Therefore, assisting patients to become more familiar with interpersonal situations may improve their ability to recognize appropriate features. This recommendation requires some information about what "familiar situation" means to a schizophrenia patient. Familiarity may be a function of how frequently subjects are present in, and interact with, various "unfamiliar" situations. Therefore, patients' behavior in various unfamiliar situations may improve as they are introduced to them.

Unpublished findings by our group have examined other factors that correlate with patients' ratings of situational familiarity (Corrigan, unpublished data 1993). Findings from this research suggest that patients' familiarity ratings of emotional situations are significantly associated with their ratings of comfort in these situations. Therefore, becoming familiar with "emotional" situations may, in part, be a function of becoming comfortable with the situations. This finding suggests that exposing patients to situations may require that coping strategies be included to help them become comfortable with unfamiliar social situations.

References


Bower, G.H.; Black, J.B.; and Turner, T.J. *Scripts in memory for...*


Corrigan, P.W.; Green, M.F.; and Toomey, R. Cognitive correlates to social cue perception in schizophrenia. Psychiatry Research, 53:141–151, 1994.


Wing, J.K.; Cooper, J.E.; and Sartorius, N. The Description and Classification of Psychiatric Symptoms: An Instruction Manual for the PSE and CATEGO Systems.

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Announcement

The Kurt-Schneider Award is sponsored by JANSSEN, GmbH, for exceptional scientific achievements. The aim of the award is to encourage psychiatric research, especially in the field of schizophrenia, including basic research (clinical psychopathology, biochemistry, physiology, pharmacology, genetics, epidemiology), diagnostics, therapy, and rehabilitation.

Articles will be accepted in either German or English and must be received by October 30, 1996. All entries (6 copies with a 1-page abstract) are to be sent to:

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