IRANIAN DEPRESSED PATIENTS ATTEMPTING SUICIDE SHOWED IMPAIRED MEMORY AND PROBLEM-SOLVING
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Background – It has been longly well-known that depressed patients attempting suicide tend to retrieve overgeneral autobiographical memories and create less effective problem-solving strategies with a considerable slowness.

Methods – Two cognitive measures, autobiographical memory test and means-ends problem-solving task, Persian versions, were used to assess 20 parasuicide patients who met diagnostic and statistical manual of mental disorders criteria for major depression disorder (MDD), and were compared with a matched control group. The healthy subjects also met the criteria for subjects recruitment (no psychopathological background). Beck depression inventory (BDI) and Beck hopelessness scale (BHS) were performed to assess, respectively depression and hopelessness.

Results – It was found that the suicide attempters were more depressed and more hopeless than the matched healthy subjects. The results showed that the parasuicides produced more overgeneral memories and responded more slowly to positive than negative cue-word, compared to the control subjects. In the problem-solving task, the patients provided less effective strategies, fewer means, and more irrelevant means; also they took longer to respond to the matched healthy subjects. Moreover, there were significant correlations between autobiographical memory and problem-solving variables.

Conclusion – There were significant correlations between autobiographical memory and problem-solving variables. Clinical implications will be discussed.

Keywords • autobiographical memory • depression • problem-solving • suicide

Original Article

Introduction

Memory consists of three stages, i.e., encoding, storage, and retrieval. The latter refers to the attempt by which one tries to get access to the memory database, previously stored through the encoding process. The attempt made by one using personal (or autobiographical) memory database to find strategies and solutions to problems is called problem-solving ability.1

Williams and Broadbent2 showed a tendency to retrieve general rather than specific memories in some depressed patients undergone cognitive therapy. They concluded that depressed patients who had attempted suicide by overdose retrieved more general rather than specific aspects of personal memories and delayed retrieval of positive memories. They suggest that such a bias may have a precipitating role in suicidal attempt.

In addition, it is substantially evident that most of the suicide attempters show deficits in their problem-solving skills, particularly in association with difficulties in interpersonal relationships.3 Deficiencies in problem-solving are especially pivotal when high incidence of life events and crises is taken into account. Previously, Beck and his colleagues4 had noted a link between overgeneral statements and problem-solving difficulties, presenting suicidal case examples.

Evans et al5 tested the hypothesis that overgeneral personal memory retrieval is disabling because of its impact on problem-solving. Their hypothesis was approached by showing a positive correlation between less effective problem-solving strategies and greater depression symptoms.
solutions and more general memories. Subsequently, several studies detected the characteristics of autobiographical memory and problem-solving and the possible relationship between these two cognitive aspects. 6–8

Using an experimental cognitive paradigm, the present study was designed to extend memory and problem-solving research in a clinically depressed population, who attempted suicide, in a new cultural setting.

**Materials and Methods**

**Subjects**

Twenty depressed patients (8 men and 12 women: mean age= 28) admitted to the medical wards at Loghman Hospital in Tehran, Iran, and 20 healthy subjects (mean age= 27.6), matched for age and sex, were tested. The patients met DSM-IV criteria for major depression.9 The healthy subjects also met the criteria for subject recruitment. The patients were excluded if there were any background of psychopathology (except depression) and brain damage.

The patients were tested following recovery from overdose (20 – 35 hr after attempting suicide). The type and amount of drugs taken and time elapsed did not correlate with any dependent variable.

**Clinical scales**

Beck depression inventory (BDI)10 and Beck hopelessness scale (BHS)11 were performed to assess, respectively, the levels of depression and hopelessness in the subjects.

**Autobiographical memory test**

A cue-word paradigm was used in the current study. There are studies showing that this method to be an effective way of prompting subjects to retrieve appropriately valent memories.12 A 15-cue-word task, including 5 pleasant, 5 unpleasant, and 5 neutral adjectives in Persian language was administered to cue memories. These words had been previously piloted in 100 healthy subjects between 18 – 45 yr of age 13 to examine the validity of pleasant, neutral, and unpleasant words. The words were presented orally by the experimenter in a counterbalanced order. Subjects were given 1 min to retrieve a specific personal memory after presenting each word. If subjects did not recall any specific memory in the given time, they were encouraged to try again. When no specific response was given, a 60-second time was recorded as the latency. The experimenter and an independent judge rated specificity-overgenerality on an 11-point scale from 0 (very overgeneral) to 10 (very specific). A checklist including items such as time (date, duration, day, night, etc.), place (name of location, city, etc.), persons (sex, age, name, etc.), object (color, name, etc.), and situation (marriage, funeral, party, etc.) helped the judges to rate the subjects’ responses. The intrarater correlation was significant (r= 0.83). The average of the two judges’ ratings was used as final scores in data analysis.

**Means-ends problem-solving task**

Looking at the problem-solving task presented by Platt et al,14 a similar and culturally modified task including five situations were developed and used. The subject was presented with each situation that consisted of a story with a stated need and a desired end. The respondent was asked to complete the middle part of the story so that the protagonist would achieve the desired outcome. In the present study, a number of suitable components were scored namely, latency to response onset (first word of response), number of means (including relevant and irrelevant means), relevancy ratio (relevant means/number of means), and means effectiveness. Effectiveness rating was carried out performing the criteria used by Evans et al.5 In order to quantify effectiveness, the two independent raters used a three-point scale (0= “not at all effective”; 1= “effective”; and 2= “very effective”). An intrarater correlation of 0.81 was obtained. The raters’ mean scores were used in the analysis. The validity and reliability of the Persian version of means-ends problem-solving (MEPS) has been piloted by one of the authors in a previous study.13

**Semantic memory task**

To detect and control any slowness due to the overdosed drugs a semantic memory task assessing semantic processing, similar to that used by Williams and Broadbent,2 was included. In fact, subjects were asked to generate as many instances as they could in 1 min in each of the categories of flowers and housewares.

**Procedure**

The MDD patients newly admitted to the hospital because of suicidal attempt were interviewed and screened. Then, they were
encouraged by the experimenter to take part in the study (3 patients refused to participate). The participants were administered first the clinical scales and then the experimental measures. The healthy participants who were volunteers chosen closely matched the age and gender of the clinical participants and were screened by the experimenter. The same procedure as described for the patients was performed for them. The whole session was taped to enable the two judges to evaluate the subjects’ performance in the experiment. Total testing time (except clinical interview and assessment) averaged 30 – 45 min.

Results

Clinical characteristics

The suicide group scored significantly higher than the control group on the BDI (the suicide group: mean= 36.50, range= 24 to 49; the control: mean= 10.30, range= 3 to 21: \( t (19)= 10.19, p < 0.001 \)) and on the BHS (suicide: mean = 12.20, range= 4 to 20; control: mean= 5.25, range= 0 to 13: \( t (19)= 2.5, p < 0.05 \)). Across the entire sample, the BDI showed a high correlation with the BHS (\( r= 78, p < 0.001 \)).

Autobiographical memory

The data on latency and specificity were subjected (separately) to a three-way [2 (group: patients and comparison subjects) x 3 (valence: pleasant, neutral, and unpleasant) x 2 (sex: men and women)] multivariate repeated measures analyses of variance (Wilks’ Lambda). If there was any group interaction effect, a two-way multivariate repeated measures analysis of variance was performed for each group separately, followed by polynomial contrast tests (assessed by \( t \)) on the valence effect (ordered pleasant, neutral, and unpleasant). Furthermore, a series of paired \( t \)-tests were conducted to further detect the differences between pleasant/unpleasant and neutral clips.

1. Latency

The analyses yielded a significant valence effect [\( F (2, 17)= 8.18, p < 0.01 \)] and a significant group x valence (interaction) effect [\( F (2, 17)= 7.08, p < 0.01 \)] (Table 1). Separate analyses for each group showed significant valence main effects in either group [patients: \( F (2, 17)= 12.80, p < 0.01 \); comparison subjects: \( F (2, 17)= 3.95, p < 0.05 \)] with a linear effect for the study group (\( t= 5.11, p < 0.001 \)) and a quadratic effect for the control group (\( t= 2.46, p < 0.05 \)). The depressed group had slower retrieval of positive memories [\( t (19)= 2.08, p < 0.05 \)] and faster retrieval of negative memories [\( t (19)= 2.50, p < 0.05 \)], both compared to the neutral condition. There was no significant sex main or interaction effect.

2. Specificity

A significant valence effect [\( F (2, 17)= 34.85, p < 0.001 \)] and a group x valence (interaction) effect [\( F (2, 17)= 33.06, p < 0.001 \)] were found (Table 1). Further analyses yielded a significant valence effect [\( F (2, 17)= 4.71, p < 0.05 \)] only for the study group (Table 1). The depressed group tended to retrieve overgeneral memories, while the control group tended to retrieve specific memories. Paired \( t \)-tests did not show any significant differences between pleasant/unpleasant with neutral conditions. No sex main or interaction effect was obtained.

Table 1. Specificity (ratings 0 – 10) and latency (in seconds) of autobiographical memories in response to the cue words in the patient and control groups.

<table>
<thead>
<tr>
<th>Group</th>
<th>Specificity</th>
<th>Latency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive</td>
<td>Neutral</td>
</tr>
<tr>
<td>Patient group</td>
<td>3.29 ± 0.87</td>
<td>25.95 ± 14.21</td>
</tr>
<tr>
<td>Control group</td>
<td>6.04 ± 1.13</td>
<td>14.15 ± 6.20</td>
</tr>
</tbody>
</table>

SD= standard deviation.

Problem-solving

A series of paired \( t \)-tests were conducted to compare the two matched groups’ performance on problem-solving task. Table 2 shows statistics of problem-solving measures (latency, number of means, number of irrelevant means, relevancy ratio, and effectiveness) for the suicide attempter and control groups.

Compared to the control group, the study group provided less effective strategies, fewer means, and more irrelevant means. Moreover, lower relevancy ratio was found in the study group than the control group. The patients also took longer to respond to the task than the matched healthy subjects.
**Table 2.** Statistics on problem-solving measures [effectiveness (ratings 0 – 10), number of means, number of irrelevant means, relevancy ratio, and latency (in seconds)].

<table>
<thead>
<tr>
<th>Groups</th>
<th>df</th>
<th>Mean ± SD</th>
<th>t-test</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latitude</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>19</td>
<td>5.40 ± 2.16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attempter</td>
<td>19</td>
<td>6.15 ± 4.10</td>
<td>4.12</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Relevancy ratio</td>
<td>19</td>
<td>12.35 ± 4.40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>19</td>
<td>5.26 ± 2.63</td>
<td></td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Attempter</td>
<td>19</td>
<td>2.45 ± 1.91</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>19</td>
<td>0.90 ± 0.71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effectiveness</td>
<td></td>
<td>2.90 ± 1.97</td>
<td>3.73</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Control</td>
<td>19</td>
<td>5.40 ± 2.16</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>19</td>
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<td>19</td>
<td>12.35 ± 4.40</td>
<td></td>
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</tr>
</tbody>
</table>

**df** = degree of freedom; **SD** = standard deviation; **p** = p-value.

**Association between autobiographical memory and problem-solving**

The Pearson’s correlations between autobiographical memory retrieval and problem-solving strategies were examined separately in each group and also in all subjects. There were no significant correlations between autobiographical memory retrieval and problem-solving in either group. When taking the subjects together, two significant correlation coefficients appeared, one between memory specificity and effectiveness (r= 0.58, p < 0.001) and the other between memory specificity and relevancy ratio (r= 0.62, p < 0.001). That is, both effectiveness and relevancy were positively correlated with specificity in memory retrieval.

**Discussion**

The results showed that the suicide attempters were more depressed and more hopeless than the matched healthy subjects; also in response to the cue-words, they retrieved positive memories slower and negative memories faster; and they retrieved overgeneral memories. These findings are consistent with the results of some studies investigating the effects of induced mood states on memory. For example, Blaney and also Parrott and Sabini found a pattern of mood congruent recall showing that depressed subjects are more likely to recall negative than positive experiences. Such results support the construct accessibility view that depression is associated with a tendency to increased accessibility of negative concepts or constructs. However, there are findings from some other studies that contrast the predictions of the construct accessibility view.

Furthermore, the suicide attempters provided less effective, more irrelevant, and fewer problem-solving strategies than the control group; they also took longer to respond to the task. Problem-solving deficits observed in this population can be considered substantially important when viewed in the context of the high incidence of life difficulties and crises that confront them. Taken together, the suicidal behavior might be theoretically attributable to the hypothesis that impaired access to enough specific information from personal memory database would lead to dysfunctional problem-solving strategies, probably followed by a failure in tackling stressful situations.

It is due to this explanation that the rest of the results probably make sense; the overgenerality in autobiographical memory found in the present study is positively correlated with effectiveness and relevancy of problem solutions provided by the respondents. It means that people with more overgeneral memories provided less effective and relevant solutions.

One question that has to be clarified is whether the deficiencies in cognitive functioning including autobiographical memory retrieval and problem-solving are state (transient manifestation at times of low mood and/or crisis) or trait (persistent characteristic) phenomena. One way, and probably the most definite way, to examine this complexity and establish which is the antecedent, is to carry out a longitudinal study.

Since the experimenter was not blind in the present study, her possible bias was controlled by the second rater. The interrater high correlation coefficient rules out the experimenter’s bias as an explanation.

One can argue that most of the drugs taken in overdose could make the subject drowsy and slow down in performing the tasks, perhaps giving rise to the cognitive deficits in this study. The performance of the two groups in semantic memory task (that could be sensitive to drugs effect) did not differ, confirming no specific deficit regarding the drugs taken. In addition, the slower retrieval of positive memories, but not a general slowing down of retrieval, observed in the patients group further supports this reason.

Assuming the significance of the relationship between autobiographical memory retrieval and problem-solving, one can apply the present results
to the clinical setting; emphasizing on diary-keeping during the course of therapy and even afterwards would allow the patient to have access to specific memory information giving rise to better problem-solving strategies.

Although the present study extended our knowledge of the relationship between mood, suicidal behavior, and cognitive functioning in a different culture, in order to clarify the role of each and to draw a more detailed picture of the complexity, further investigations will be required. A series of studies is being carried out on depressed patients with or without suicidal intention, as well as anhedonic and nonanhedonic depressed patients in our laboratory.

In summary, the present study replicated the previously found autobiographical memory and problem-solving deficits of suicide attempters, and the possible relationship between them extending our understanding of such cognitive aspects in a different cultural setting.

References