Alternating Antagonism between Two Languages with Successive Recovery of a Third in a Trilingual Aphasic Patient

REZA NILIPOUR AND HASSAN ASHAYERI

College of Rehabilitation Sciences, Tehran

The recovery of the languages of an aphasic patient premorbidly almost equally proficient in Farsi and German, with a good knowledge of English, is described. For the first week post-trauma, the patient was in no condition to speak. He then spoke only a little Farsi for 5 days, after which he spoke only German for the next 3 weeks, even when addressed in Farsi by his unilingual relatives. The patient then switched back to using only Farsi for 4 days, after which he regained voluntary control over each of his languages, including English. The patient was repeatedly assessed with equivalent versions of the BAT (M. Paradis et al. 1987, Bilingual Aphasia Test). His residual capacities across languages are described. The patient differs from previously reported cases in that even his comprehension of Farsi was impaired during the period when only German was available for expression. The patient recovered voluntary control over the use of his three languages 14 months postonset.

INTRODUCTION

Six patterns of recovery of the two languages of bilingual aphasic patients have been identified in the literature, namely, parallel, differential, successive, selective, mixed, and antagonistic restitutions (Paradis, 1977). Recently, a new mode of antagonistic recovery has been reported, namely, alternating antagonistic recovery (Paradis, Goldblum, & Abidi, 1982). However, to the best of our knowledge, no comprehensive report of a polyglot patient whose native language is Persian has been documented in the literature so far (cf. Paradis, 1983).

The trilingual aphasic patient described in this report was a native speaker of Farsi. This may be considered as an additional case of alternating antagonistic recovery, in that the patient recovered only one language after trauma (Farsi), then lost access to this first recovered language.
while another language (German) became available. He then lost access to German, and the first recovered language became available again while the third language (English) remained unavailable throughout. More specifically, at the first stage and for 16 days, only Farsi was available to the patient, then he lost access to Farsi, and German became the only available language for 3 weeks. At the last stage, Farsi reappeared at the expense of German, while English remained unavailable. His English did not recover until 6 weeks postonset.

The patient suffered word-finding difficulty (anomia) in the available language at every stage of his recovery. His anomia was so severe in the other languages that he could not name the members of his family or even point to the most familiar objects. He could recognize them and point to them on request in German and English, but not in Farsi (his mother tongue and currently used language) during the period when Farsi was available to him.

SUBJECT

A.S. was a 49-year-old educated right-handed male with no history of familial left-handedness. He was an experienced orthopedic surgeon. He finished high school in Iran and went to Germany for his university education when he was 18 years old. He lived in Germany for 16 years and received his university degrees and specialty in orthopedics from German universities in Hannover and Frankfurt. While he was in Europe he spent 1 year in England doing research at English medical institutions. He lived in Tehran and practiced in his field of specialty for the 16 years prior to the onset of aphasia, but visited Germany for 1 to 2 months every year.

The patient was a Farsi native speaker. Besides Farsi, he knew both German and English. He could read and write in all three languages, but Farsi and German were his dominant languages. The medium of instruction was Farsi during his elementary and high school years. He learned English as a foreign language in high school at the rate of 3 hr a week for 6 years. Then he learned German in Germany as a college student and continued his higher education in Germany for 16 years.

During the 2 years prior to his accident the patient studied English, and he had passed the IAS (Iran American Society) English proficiency exams.

A.S. was an active surgeon with some talent in music and poetry. He was familiar with Persian and Western classical music and played the violin and the piano. He also wrote Persian poetry.

Anamnesis

On September 2, 1985, A.S. was the victim of an explosion. The explosion caused left frontotemporal trauma. He lost consciousness mo-
mentarily and was hospitalized on the same day. Upon regaining consciousness he was able to speak a few words in Farsi, but after 16 days he switched to German. He comprehended both Farsi and German, but to everybody's surprise he spoke only in German even to monolingual Farsi visitors. This condition lasted for 3 weeks. He then switched back to Farsi. During that time, the patient was unable to speak or understand English. A.S. regained the use of English only after having maximally recovered both Farsi and German.

**Ophthalmological Examination**
- Right—0.5 sph 5/10
- Left —0.5 sph 10/10
Fondus normal. Right visual field neglect.

**Neurological Findings**

The patient suffered right hemiparesis with emphasis on brachiofacial and right lateral hemianopsia. His general internal conditions were, on the whole, without any pathological conditions. Other neurological findings were these:
- Hyperreflexia, positive Troemners, knips, Babiniski dexter,
- Vigorimeter: R. 0.9 KP/cm²
  - L. 1.2 KP/cm²

**EEG: January 12, 1986**

The EEG showed a mild degree of intermingled irregular 5–7 CPS. There was activity over the left temporal region suggestive of an underlying dysfunction or an underlying epileptiform process.

**CT Scan**

CT scan (Fig. 1) showed a left frontotemporal lesion. There were signs of skull bone defect after the surgical removal of bone and shrapnel fragments. The size of the frontotemporal lesion was estimated at about $2 \times 2$ cm. There were no signs of hematoma. The cellamedia were not lateralized.

**Carotid Angiogram**

The angiogram was normal. There was no hematoma or pathology, and there were no signs of elongation.

**Neuropsychological Findings**

The patient was disoriented 1 day after the operation and to some extent until September 11, 1985. He had good time and space orientation after that.

There were no symptoms of apraxia or agnosia. He had good right–
left recognition and he was able to recognize parts of the body, photographs, and colors. He could also recognize doctors and friends.

The patient's short-term memory was 5 digits in Farsi, but 4 digits in German and English. He remembered events before and after the accident. He showed signs of sensory amnestic aphasia at different times in
Farsi, German, and English, but it was more severe in Farsi during the noncritical stage of language recovery.

Clinical History

From September 2 to 18, 1985, the patient was hospitalized at a hospital in Tehran, in which the environment was monolingual Farsi, but the staff members were familiar with English. A left frontotemporal lesion as a consequence of the explosion was diagnosed. On the same day, the patient underwent head surgery to remove skull fragments and other debris from the lesion area. He was tracheotomized on the same day and remained in this condition for 7 days. He remembered recent events, especially the events related to the moments before and after the explosion.

Linguistic Tests

The patient was tested in Farsi, German, and English with equivalent experimental versions of the Bilingual Aphasia Test (BAT) (Paradis et al. 1987). The order of administering the three versions of the BAT was Farsi, German, and English. Because of the patient’s fatigue and short memory span, we were forced to administer each version in several sessions. But the general conditions of administering each version were kept constant. He was tested regularly twice a week on Mondays and Wednesdays from September 26, 1985, on.

Farsi and English versions were administered by Dr. Nilipour, a native Farsi linguist who completed his higher education in Iran and the United States; the German version was administered by Dr. Ashayeri, a neurologist educated in Germany. The results obtained on the three versions of the BAT under the above-mentioned conditions are reported in the following pages.

Each of the three versions of the BAT include three parts. In Part A, the patient’s language history is established. It consists of 50 questions and is intended to obtain information about the patient’s premorbid state of bilingualism and contexts of acquisition.

Part B includes, for each language, spontaneous speech, comprehension subtests, repetition, naming, series recitation, sentence construction, test of verbal fluency, semantic and grammatical subtests, a verbal auditory discrimination test, reading, writing, and mental arithmetic.

Part C is a test for each pair of languages, comprising translation and acceptability judgments for sentences incorporating syntactic surface structures of the other language.

In what follows we first discuss the general course of the patient’s language recovery and then we present the results obtained on the BAT in Farsi, German, and English.
Language Recovery Pattern

A.S.'s linguistic behavior can be divided into two quite distinct stages from the onset of the trauma on September 2 to October 15, 1985. The first stage was characterized by the alternating antagonistic recovery of two languages (Farsi and German) with a temporary loss of the third (English).

This stage may be called the critical recovery period. It lasted from September 2 through October 11, 1985. The antagonistic recovery period of Farsi and German in the absence of English can be divided into the following phases:

<table>
<thead>
<tr>
<th>No Output</th>
<th>Farsi Output</th>
<th>German Output</th>
<th>Farsi Output</th>
<th>Farsi German Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept. 2-11</td>
<td>Sept. 12-17</td>
<td>Sept. 18-15</td>
<td>Oct. 11-15</td>
<td>Oct. 16+</td>
</tr>
</tbody>
</table>

The patient was tracheotomized for 7 days and was in a critical condition. Therefore, during the first 10 days, his linguistic output was nonexistent. He nevertheless remembers this period very well, and also everything before and after the explosion.

The second phase started with Farsi output and continued for 6 days. During this period his linguistic output was mainly Farsi with occasional German phrases until he switched completely to German to the surprise of everybody at home. This phase lasted for 24 days.

During the third phase, his linguistic output was in German, regardless of the kind of input he received. Since the environment was Farsi monolingual, only those who knew German could communicate with him. But he had no control over his linguistic output, so he was unable to switch back to Farsi. His daughter, his son, and his relatives would talk to him in Farsi, but he would answer in German. He would continue in German despite their insistence. Thus, during this phase, he could decode Farsi but could encode only in German.

Finally, on Friday, October 11, at a family gathering, upon the insistence of his sister-in-law who did not know any German that he speak Farsi, he realized that he had been speaking German to everybody. At this very moment he switched to Farsi and gradually lost his ability to express himself in German. This phase was the final phase of the stage which can be described as German and Farsi mutual antagonism.

The second main stage may be called the noncritical period in which he had some control over his linguistic output.

During the first phase of this period the patient could switch voluntarily from German to Farsi with some occasional phrases and sentences in
German interspersed. This phase continued for 5 days until he entered
the second phase in which he had some control over the choice of
language and consequently his output could be Farsi, German, or English.

Keeping these two main stages of language recovery and their respective
phases in mind we shall describe his linguistic production and compre-
rehension across modalities in the various languages.

*September 26, 1985*

A.S. was first tested on September 26, 1985, when his production was
still exclusively in German. He was extremely emotional. Although he
was meeting us for the first time, he clearly expressed affection and
emotion by saying, several times during the session, “Ich liebe dich”
(I love you). He became very unhappy and emotional upon recalling the
accident and cried many times very loudly on different occasions. In
fact, when he said, “Ich liebe dich,” he burst into tears.

He answered nearly all questions put to him (in Farsi or German) in
German, even when he was addressed in Farsi. That is, his voluntary
and spontaneous speech was basically in German, regardless of the language
of the speaker. He would easily communicate in German with his German
examiner, but when a Farsi speaking examiner questioned him, he was
reluctant to switch to Farsi and he refused to do so by saying, “Ich bin
müde! Ich verstehe nicht.” (I am tired! I don’t understand.) He expressed
his complaints and sorrows in German. In answer to the question put
in Farsi by the Farsi-speaking examiner, “What is this in Farsi?” he
replied, “Das ist ein Messer” (That is a knife).

He was not able to follow instructions to commands in Farsi. Lexical
comprehension and syntactic comprehension questions in Farsi were
equally impossible. His repetition was very poor in Farsi. But he could
communicate in German with the test administrator who knew German.
At this point we did not yet have the German version of the BAT. Both
examiners were present during this session.

*October 13, 1985*

In the second session, the patient produced Farsi but almost no German.
He could also write in Farsi. He wrote one page of 60 words in Farsi,
but he could not write even one line of German. He could read Farsi
text, but could not read German.

The only German he produced during this whole session was the
following:

<table>
<thead>
<tr>
<th>German phrase</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ich bin heute</td>
<td>(I am today)</td>
</tr>
<tr>
<td>Ich will in deutsch schreiben</td>
<td>(I want to write in German)</td>
</tr>
<tr>
<td>Warum sage ich nicht /kebrit/</td>
<td>(Why don’t I say “matches”—</td>
</tr>
<tr>
<td>verstehe mich Sie?</td>
<td>Do you understand me?)</td>
</tr>
</tbody>
</table>
Several times during this session he decided to switch to German, but ended complaining in Farsi, “I knew German and could speak like German native speakers. But it is very difficult now. It has gone wrong. I have to learn it again.”

He was very emotional and sad from the beginning of this session and burst into tears many times. His complaints were all in Farsi. Both examiners were present during this session.

His Farsi output was fluent and grammatical, but marked with a few cases of semantic paraphasia and some cases of paragrammatism in the structure of Farsi compound verbs.

He was also anemic during this stage and could not name familiar objects and could not recall his wife’s and his daughter’s names on request. He would tire very easily and would answer our questions by saying “I am tired.”

October 16, 1985

The patient was given the standard (Farsi) test on October 16, 1985. At this stage, he was able to switch to any of the three languages he knew premorbidly. He was more stable than during the previous sessions and was able to cooperate with us during the administration of the Farsi version of the test. We managed to administer this version in four different sessions which took place on October 16, 21, and 23, and November 6, 1985. The results of the Farsi test are shown in Fig. 2. Our data concerning the patient’s Farsi include the tasks reported in the profile as well as his spontaneous speech, descriptive speech, and spontaneous writing.

December 7, 1985

The standard German version of the BAT was started on December 7, 1985, and continued over four different sessions (December 7, 16, and 25, 1985, and January 16, 1986). At this stage the patient was cooperative and calm. He spoke in Farsi when he came to us, but he was able to switch to German and to follow the German instructions during the test.

Our data on this version of the test include the tasks shown in the profile as well as descriptive speech and spontaneous writing. Figure 3 represents the patient’s performance on different tasks of the German test administered on the above-mentioned dates.

December 18, 1985

The patient was tested in English with the standard English version of the BAT. The English test was started on December 18, 1985, and
<table>
<thead>
<tr>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluency (515, 541; 516, 517; 531, 557)</td>
</tr>
<tr>
<td>Accuracy (520, 521; 524-529, 546, 547; 550-554)</td>
</tr>
<tr>
<td>Complexity (516, 517; 542, 543; 529, 555; 530, 556)</td>
</tr>
<tr>
<td>Lexical Access (519, 545; 531, 557; 532, 558; 534, 560)</td>
</tr>
<tr>
<td>Pointing (23-32)</td>
</tr>
<tr>
<td>Simple Commands (33-37)</td>
</tr>
<tr>
<td>Semi-Complex Commands (38-42)</td>
</tr>
<tr>
<td>Complex Commands (43-47)</td>
</tr>
<tr>
<td>Verbal Auditory Discrimination (48-65)</td>
</tr>
<tr>
<td>Syntactic Comprehension (66-152)</td>
</tr>
<tr>
<td>Semantic Categories (153-157)</td>
</tr>
<tr>
<td>Synonyms (158-162)</td>
</tr>
<tr>
<td>Antonyms (163-172)</td>
</tr>
<tr>
<td>Grammaticality Judgments (173-182)</td>
</tr>
<tr>
<td>Semantic Acceptability (183-192)</td>
</tr>
<tr>
<td>Repetition (Words) (193-251)</td>
</tr>
<tr>
<td>Lexical Decision (194-252)</td>
</tr>
<tr>
<td>Repetition (Sentences) (253-259)</td>
</tr>
<tr>
<td>Series (260-262)</td>
</tr>
<tr>
<td>Verbal Fluency (263-267)</td>
</tr>
<tr>
<td>Naming (269-288)</td>
</tr>
<tr>
<td>Sentence Construction (289-313)</td>
</tr>
<tr>
<td>Semantic Opposites (314-323)</td>
</tr>
<tr>
<td>Derivational Morphology (324-333)</td>
</tr>
<tr>
<td>Morphological Opposites (334-343)</td>
</tr>
<tr>
<td>Mental Arithmetic (347-361)</td>
</tr>
<tr>
<td>Listening Comprehension (362-366)</td>
</tr>
<tr>
<td>Oral Reading (Words) (367-376)</td>
</tr>
<tr>
<td>Oral Reading (Sentences) (377-386)</td>
</tr>
<tr>
<td>Reading Comprehension (Paragraph) (387-392)</td>
</tr>
<tr>
<td>Copying (393-397)</td>
</tr>
<tr>
<td>Dictation (Words) (398-402)</td>
</tr>
<tr>
<td>Dictation (Sentences) (403-407)</td>
</tr>
<tr>
<td>Reading Comprehension (Words) (408-417)</td>
</tr>
<tr>
<td>Reading Comprehension (Sentences) (418-427)</td>
</tr>
<tr>
<td>Spontaneous Writing (813-835)</td>
</tr>
</tbody>
</table>

Fig. 2. Farsi profile (16, 21, 23 October and 6 November 1985).
Fluency (515, 541; 516, 517; 531, 557)
Accuracy (520, 521; 524-528; 546, 547; 550-554)
Complexity (516, 517; 542, 543; 529, 555; 530, 556)
Lexical Access (519, 545; 531, 557; 532, 558; 534, 560)
Pointing (23-321)
Simple Commands (33-37)
Semi-Complex Commands (38-42)
Complex Commands (43-47)
Verbal Auditory Discrimination (48-65)
Syntactic Comprehension (66-152)
Semantic Categories (153-157)
Synonyms (158-162)
Antonyms (163-172)
Grammaticality Judgments (173-182)
Semantic Acceptability (183-192)
Repetition (Words) (193-251)
Lexical Decision (194-252)
Repetition (Sentences) (253-259)
Series (260-262)
Verbal Fluency (263-267)
Naming (269-288)
Sentence Construction (289-313)
Semantic Opposites (314-323)
Derivational Morphology (324-333)
Morphological Opposites (334-343)
Mental Arithmetic (347-361)
Listening Comprehension (362-366)
Oral Reading (Words) (367-376)
Oral Reading (Sentences) (377-386)
Reading Comprehension (Paragraph) (387-392)
Copying (393-397)
Dictation (Words) (398-402)
Dictation (Sentences) (403-407)
Reading Comprehension (Words) (408-417)
Reading Comprehension (Sentences) (418-427)
Spontaneous Writing (813-815)

Fig. 3. German profile (7, 16 and 25 December 1985 and 16 January 1986).
continued over four different sessions on December 18, 24, 28, and 31, 1985.

During this stage the patient's general mental condition was calm and stable. He was also able to switch to English, but on some occasions he would switch to either German or Farsi to explain his difficulty in responding to some tasks of the test in English.

Figure 4 represents the patient's performance on different tasks of the English test on the above-mentioned dates. Our English data comprised the tasks shown in the profile as well as the patient’s spontaneous writing. The patient was also able to provide a sample of his descriptive speech in English.

The Residual Capacities across Languages

The juxtaposition of the scores obtained on the BAT in the three languages during the noncritical phase gives us a clear picture of the patient’s relative capacities (Fig. 5). Since the subtests of the BAT are interrelated with specific aspects of language structure (linguistic levels) as well as with specific language skills, the profile may be used not only for differential recovery interpretations across languages but also for clinical syndromatic purposes.

The profile shows that the residual capacities in the three languages are not exactly the same. In other words, based on the results shown in this profile one can conclude that in the end the three languages have been recovered differentially. The most recovered language is Farsi, the least recovered is English, and German is in between.

As can be seen, the patient scored differentially on the same task even in the case of German and English. In what follows, the qualitative distribution of the tasks across languages will be reviewed briefly.

The 31 tasks presented in the profile may be classified into four groups on the basis of the elicited responses:

1. Spared Tasks (scores 80 to 100%)
2. Relatively Spared Tasks (scores 50 to 80%)
3. Severely Impaired Tasks (scores 1 to 50%)
4. Failed Tasks (score 0%)

The patient’s common residual capacities in the three languages can best be seen among the spared tasks. There were eight spared tasks in Farsi as compared to six in German and five in English. Only three of the spared tasks were common across the three languages. These were as follows: (Numbers in parentheses that follow the name of each task
Fluency (515, 541; 516, 517; 531, 557)
Accuracy (520, 521; 524-528; 546, 547; 550-554)
Complexity (516, 517; 542, 543; 529, 555; 530, 556)
Lexical Access (519, 545; 531, 557; 532, 558; 534, 560)
Pointing (23-32)
Simple Commands (33-37)
Semi-Complex Commands (38-42)
Complex Commands (43-47)
Verbal Auditory Discrimination (48-63)
Syntactic Comprehension (66-152)
Semantic Categories (153-157)
Synonyms (158-162)
Antonyms (163-172)
Grammaticality Judgments (173-182)
Semantic Acceptability (183-192)
Repetition (Words) (193-251)
Lexical Decision (194-252)
Repetition (Sentences) (253-259)
Series (260-262)
Verbal Fluency (263-267)
Naming (269-288)
Sentence Construction (289-313)
Semantic Opposites (314-323)
Derivational Morphology (324-333)
Morphological Opposites (334-343)
Mental Arithmetic (347-361)
Listening Comprehension (362-366)
Oral Reading (Words) (367-376)
Oral Reading (Sentences) (377-386)
Reading Comprehension (Paragraph) (387-392)
Copying (393-397)
Dictation (Words) (398-402)
Dictation (Sentences) (403-407)
Reading Comprehension (Words) (408-417)
Reading Comprehension (Sentences) (418-427)
Spontaneous Writing (813-835)

Fig. 4. English profile (18, 24, 28 and 31 December 1985).
### FIG. 5. Scores across languages. Numerical figures in each column represent the number of correct items on each task. The total number of items per task can be deduced from the item numbers in parentheses after the name of each task.
refer to item numbers in the BAT. Three-letter language codes refer to the language computer-codes, as provided in Paradis, 1987, p. 207.)

<table>
<thead>
<tr>
<th>Task</th>
<th>PER</th>
<th>DEU</th>
<th>ENG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repetition (word) (193–251):</td>
<td>28/30</td>
<td>28/30</td>
<td>28/30</td>
</tr>
<tr>
<td>Oral Reading (words) (367–376):</td>
<td>10/10</td>
<td>9/10</td>
<td>10/10</td>
</tr>
<tr>
<td>Copying (393–397):</td>
<td>5/5</td>
<td>5/5</td>
<td>4/5</td>
</tr>
</tbody>
</table>

As to the severely impaired and failed tasks, what comes out most clearly is that the patient totally failed complex commands (38–42), semantic tasks (153–172), listening comprehension (362–366), and reading comprehension (387–392) across languages. Poor naming (4,1,2/20), poor repetition of sentences (1,1,1/7), and poor sentence construction (1,0,0) were also among the common deficits across languages. Even impaired pointing (5,8,7/10) and abnormal writing were noticeable across languages.

Syntactic comprehension (66–152) was almost equally impaired in the three languages:

- **PER:** 25% (22/87)
- **DEU:** 26.4% (23/87)
- **ENG:** 20.6% (18/87)

The correct items on the syntactic comprehension task mainly stem from the comprehension of possessive noun phrases. The distribution of correct scores was as follows:

<table>
<thead>
<tr>
<th>Task</th>
<th>PER</th>
<th>DEU</th>
<th>ENG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple sentences</td>
<td>2 (66 and 72)</td>
<td>4 (66, 71, 89, and 99)</td>
<td>4 (66, 71, 72, and 106)</td>
</tr>
<tr>
<td>Possessives</td>
<td>13</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Others</td>
<td>7</td>
<td>9</td>
<td>5</td>
</tr>
</tbody>
</table>

As far as the extent of recovery across languages is concerned, English was poor overall: on no task did the patient score significantly better than in the other languages, but in many sections he scored considerably lower. Farsi and German were almost equally recovered. But the final overall recovery was differential recovery, with Farsi, German, and English.

**Syndromatic Interpretation**

The general picture of the patient’s residual capacities across languages (Fig. 5) based on the elicited responses may also be interpreted syndromatically. Based on the patient’s performance on tasks related to specific
linguistic skills (comprehension, repetition, expression, judgment, reading, and writing) compared to normal performance, the clinical symptomatic picture of our patient’s performance may be summarized as fluent speech, poor comprehension, relatively good repetition, and impaired writing.

According to symptomatic classifications proposed by Paradis (see Paradis, 1987, Chapter 4, for full discussion) and on the basis of the elicited responses on different tasks of the BAT our trilingual patient can easily be diagnosed as having transcortical sensory aphasia.

*Translation: November 6, 1985*

The patient’s ability to translate between each pair of languages was tested on two separate occasions. The first translation test was Farsi–German and the second one was Farsi–English.

The Farsi–German translation test consisted of two sets of words in each language, with three concrete and three abstract words in each set. This test was given on November 6, 1985.

The Farsi words were first presented to the patient orally one by one and he was asked to provide the German equivalent in each case. The Farsi words were as follows:

1. /ziba/ “beautiful”
2. /dast/ “hand”
3. /azâdi/ “freedom”
4. /ketâb/ “book”
5. /zešt/ “ugly”
6. /sib/ “apple”

The patient was not able to translate any of the above Farsi words into German. (However, he said he understood all of the items in Farsi.)

The second set of words was in German. The patient was asked to provide the Farsi translation of each German word. The German words and the elicited answers are listed below.

1. Nacht — /sâb/ “night”
2. hubsch — /qašang/ “beautiful”
3. müde — /xaste/ “tired”
4. Birne —
5. Uhre —
6. Fahrrad — /mâšin/ “car”

As can be seen from the above, the patient made four attempts at translation, only three of which were correct. Items 1, 2, and 3 were correct but 6 was a semantic paraphasia (“car” for “bicycle”). He
understood 4 and 5, but could not provide any equivalent for them in Farsi.

Thus, translation between Farsi and German was unidirectional, from German into Farsi, but not vice versa. The patient was able to translate 50% of the German words into Farsi, but none of the Farsi words into German.

**November 27, 1985**

The patient was given the English–Farsi Part C of the BAT on November 27, 1985. The test comprised word recognition, translation of words, translation of sentences, and grammatically judgment tasks. Each task has two equivalent versions, one Farsi–English and one English–Farsi.

The recognition task comprised 5 target words in one language to be recognized from among a list of 10 words in the other language.

**Farsi–English Word Recognition**

Five Farsi words, /deraxt/ “tree,” /bat-f/ “snow,” /panţere/ “window,” /čakoš/ “hammer,” and /måhi/ “fish” were presented one by one along with 10 English words (apple, snow, bicycle, hammer, door, fish, window, cup, tree, and hat), but only two target words (/bat-f/ “snow” and /måhi/ “fish”) were recognized from the list by the patient.

**English–Farsi Word Recognition**

Five English words (milk, house, shirt, flower, and chair) were presented to the patient and he was asked to tell us which of the words in the Farsi list had the same meaning (five target words and five distracters). The patient was able to recognize three of the English target words from the Farsi list. These were “shirt” = /Pirâhan/, “flower” = /gol/ and “house” = /xâne/.

**Translation of Words**

This task comprised 10 target words (5 abstract and 5 concrete) to be translated from one language into the other in each direction.

The patient was able to translate only one item (1/10) from Farsi into English (/qâšoq/ = spoon) and two items (2/10) from English into Farsi (butter = /kareh/, fear = /tars/).

**Translation of Sentences**

This task comprised six sentences to be translated from one language into the other (six from Farsi into English and six from English into Farsi).

Every sentence was read aloud to the patient three times in accordance with his request. He was not able to translate from either language into the other.
Grammaticality Judgments

In this task the patient was asked to indicate whether the sentences read to him in Farsi or English were grammatically correct. There were eight sentences in each set, two grammatically correct, and six incorrect. Each sentence was read to the patient three times.

The patient's grammaticality judgments on Farsi sentences were as follows:

He accepted 486. (/*man zendegiye šahrirā be zendegiye rustāi tarjih mideham/ "I prefer cosmopolitan life to rural life") as grammatically correct, but could not comment on 492. (/*Čand sāl ast ke az u xabari nadāram/ "I have not heard from him for some years"). Four of the ungrammatical sentences were judged as grammatically correct: 484. /*in qazā az ān qazā farq dārad/ ("This dish is different from that one"); 490. /*pedarum urā diruz telefon kard/ ("My father called him yesterday"); 494. /*u maryam ra ezdevāj kard/ ("He married Maryam"); 496. /*hassan dar pedaraš imān nadārad/ ("Hasan does not believe in his father"). Two of them were judged as incorrect: 482. /*man ruye xiyabane naderi zendegi mikonam" ("I live on Naderi street"); 488. /*mixāham ke urā raft/ ("I want him to go"). The patient was not able to make any corrections on sentences judged by him as grammatically incorrect.

The English sentences (498. "My sister lives in the second floor"); 500. "She loves her new job"; 502. "This book is different from that one"); 504. "London is very far from here"; 506. "My father wants me go home"; 508. "Ali called to him last night"; 510. "He married with Mary"; 512. "Reza does not believe to his friends") were read to the patient aloud three times. He accepted all of the sentences as grammatically correct and consequently made no corrections on any of them.

To summarize, the patient's ability to translate was very limited and did not reach beyond the word level in both pairs of languages (Farsi-German and Farsi-English).

In the case of Farsi-German, the patient's ability to translate words was unidirectional, only from German into Farsi but not the reverse.

Linguistic Deficits

Anomia: One of the major characteristics of the patient's linguistic deficits may be called amnestic aphasia (anomia). The following data were obtained in the naming subtest of the BAT in Farsi (PER), German (DEU), and English (ENG).

1. PER (4 items out of 20)
The correct items are as follows:
269. /*ketāb/ "book"
270. /*eynak/ "glasses"
273. /*kerāvāt/ "tie"
276. /dastkeš/ “gloves”
The rest of the items were left unanswered.

2. DEU (only 1 out of 20 items)
270. brille

3. ENG (2 items out of 20)
278. card
280. button

As can be seen, his anemic deficit was severe in the three languages he knew premorbidly. The severity of the deficit seemed to be rather different across languages. It seemed to us that the anemic deficits could be arranged in a hierarchical order of severity.

1. Loss of the name for the concept
(No output and no comprehension): /kif/ “bag”

2. No output but auditory as well as visual comprehension

3. Output in semantic paraphasia but good comprehension, auditory as well as visual.

The first group of names are the ones which were lost from his inventory of words. In other words, the phonological as well as semantic representations of the sign (word) were no longer available to him. When the object was presented to him he would not be able to name it. When the correct name was given to him verbally or in written form he would refuse to accept it as the label for that object. For example, when a bag was presented to him he would not be able to say its name in Farsi. Then we would say /kif/, but he would refuse to accept it as the right name, and he commented in Farsi:

“What does that mean?”
“Is this a Farsi word?”
“This is a strange word for me.”

The Farsi names of the objects he had difficulty accepting are as follows:

1. /kif/ “bag”
2. /gus/ “car”
3. /mu/ “hair”
4. /šâne/ “comb”
5. /qâšoq/ “spoon”
6. /čangâl/ “fork”
7. /bošqâb/ “plate”
8. /čâqu/ “knife”
9. /tâxtexâb/ “bcd”
10. /jabe/ “box”
November 6; 1985

He was not able to name Löffel (spoon), Gabel (fork), and Messer (knife) in German on request. When the names were presented to him he understood all of them and commented, "They are easy." He was also able to comprehend /lab/ = "lip," /češm/ = "eye," and /hini/ = "nose" in Farsi, but he did not comprehend /guš/ = "ear" and /mu/ = "hair."

The patient was suffering from not being able to understand these words in Farsi. This aspect of anomia has been already acknowledged by Benson (1979, p. 155) and others (Goldstein, 1924; Head, 1926; Luria, 1966) as characteristic of semantic anomia in which "the word no longer represents the object" for the patient. (Also, the location of pathology has been often suggested as the area of the dominant angular gyrus (Benson, 1979, p. 155).)

Since we noticed semantic anomia in his Farsi output, we decided to check this deficit in German and English. Interestingly enough, the nature of the phenomenon was different in the sense that he was not able to name the objects properly but he was able to relate the word to the object via auditory or visual input in these two languages.

On January 23, 1986, we presented the words to him first in Farsi then in German and English. As an example, we presented /kif/ "bag" and his reaction was as follows: "/kif/ is still unknown to me. It does not exist in me at all. /kif/ is a strange word for me."

But when we presented Tasche or bag his reactions were of a completely different nature: "Tasche is easy. It makes sense. I understand its meaning. Bag is also easy."

After the three versions of the BAT had been administered, a speech therapy program was arranged for him. The aim of the therapy was to help him remember or relearn the semantic anemic concepts in Farsi. Video tapes were made before and after the speech therapy program. Our program was based on the hypothesis that the patient would be able to relearn these concepts via a number of known attributes (modifiers).

With this hypothesis in mind, we selected a few very familiar attributes for every concept. Every item was written on one card. First we made sure that the attributes were known to the patient. Then we arranged them in vertical order and presented every unknown item. The patient was asked to go over the list of attributes and relate each concept to the proper list of known attributes one at a time. This procedure went on until the unknown concept made sense to him. This procedure continued for every item several times during each therapy session. The method helped him to relate the unknown item to a group of attributes with which he was already familiar. As a result the relearning process gradually took place.
The results showed that after 2 months of therapy he had a different feeling toward the unknown items. In contrast to his previous rejection of the words, when the input was either auditory or visual he reported that the words made sense to him. By the end of the program he was even able to name the objects on request. The early stages of his first naming trials were in the form of phonological outputs which resembled the target word rhythmically, e.g.,

/kif/ — /sib/ /kis/ /gis/ /gif/ /lif/ /lib/
/taxte xâb/ — /lifte xâb/ /kepte xâb/ /gofte xâb/

He told us that in the early stages of naming he would rely on rhyming of the target word with the most familiar words for him. It is interesting to note his comments about the meaning of the relearned words. On May 11, 1986, he said, "This /kif/ is not the same as the original /kif/. Now /kif/ has two meanings for me. The old (original) meaning which goes on and off, and the new meaning which I have learned here."

The second group of anemic items were the names he was not able to call upon on request. But he was able to comprehend them when the input was either auditory or visual. There were many items in this group. Here are a few examples:

/ketâb/  "book"
/dokme/  "button"
/cesm/   "eye"
/pâkat/  "envelope"
/fenjun/ "cup"

This feature of anomia was common to the three languages involved.

The third group of anomic items was in the form of semantic paraphasia. These items appeared most of the time in his spontaneous speech, writing, or free conversation. Many of them were either place or person names:

<table>
<thead>
<tr>
<th>Patient's output</th>
<th>Target word</th>
</tr>
</thead>
<tbody>
<tr>
<td>/yunân/</td>
<td>&quot;Greece&quot; = /almân/  &quot;Germany&quot;</td>
</tr>
<tr>
<td>/Suvîs/</td>
<td>&quot;Switzerland&quot; = /almân/  &quot;Germany&quot;</td>
</tr>
<tr>
<td>/âqâ/</td>
<td>&quot;man&quot; = /xânôm/  &quot;lady&quot;</td>
</tr>
<tr>
<td>/medâd pûkon/</td>
<td>&quot;eraser&quot; = /medâd/  &quot;pencil&quot;</td>
</tr>
<tr>
<td>/kelid/</td>
<td>&quot;key&quot; = /qeyci/  &quot;scissors&quot;</td>
</tr>
<tr>
<td>/sû?at/</td>
<td>&quot;watch&quot; = /eynak/  &quot;glasses&quot;</td>
</tr>
<tr>
<td>/bûni/</td>
<td>&quot;nose&quot; = /pû/  &quot;foot, leg&quot;</td>
</tr>
<tr>
<td>/mâsin/</td>
<td>&quot;machine&quot; = /televizion/&quot;TV&quot;  &quot;radio = /ràdiyo/</td>
</tr>
<tr>
<td>/kesvar/</td>
<td>&quot;country&quot; = /bîmârestân/  &quot;hospital&quot;</td>
</tr>
<tr>
<td>/cub/</td>
<td>&quot;wood&quot; = /miz/  &quot;table&quot;</td>
</tr>
<tr>
<td>/âhan/</td>
<td>&quot;iron&quot; = /miz/  &quot;table&quot;</td>
</tr>
<tr>
<td>/pesaram/</td>
<td>&quot;my son&quot; = /zanam/  &quot;my wife&quot;</td>
</tr>
<tr>
<td>/mûdaram/</td>
<td>&quot;my mother&quot; = /zanam/  &quot;my wife&quot;</td>
</tr>
<tr>
<td>/doxtaram/</td>
<td>&quot;my daughter&quot; = /zanam/  &quot;my wife&quot;</td>
</tr>
</tbody>
</table>
Language Mixing

We observed some evidence of language mixing in the patient’s free conversation and while we administered different versions of the BAT. These items may be categorized into three groups based on the context of their mixed occurrence.

Items in the first group occurred during the last phase of the antagonistic period, when the patient’s dominant language was German. These examples were elicited when the patient was addressed in English (1–4) or in Farsi (5 to 7):

1. mein father
2. Ich habe said yes, ales zwei ich nicht.
Ich wess nicht. Das kaput gesacht.
3. Verstehe me sie?
4. Ich will in Deutsch schreiben.—This is German.
5. Ich sage /qati pati/ “mixed.”
6. Das ist /madar/ mother.
7. Das /pesar/ “boy” tüt nicht.

The second group of mixed items was elicited during the postantagonistic period when the patient had switched mainly to Farsi, but when English was still inhibited. After the patient had been addressed in German, he replied,

1. Ich habe for her /faqat/ (“only”) /âmrikâ/ (“English”) nicht gesacht.
2. /cerâ/ (“why”) sag ich nichts?
3. Where /gofte/ (“said”)?
4. Aber learned it wie halb in ein and halb ein Jahr and sechs Monaten.
5. Ist das in Deutsch?

The following group of mixed utterances also emerged while the patient was administered the English version of the BAT.

1. Ich verstehe English aber ich can nichts sagen.
2. Again mal “once more”
3. Ich cannot verstehe.’’
4. Careful is einfach.
5. But ich komme nicht.
6. I can nicht.
7. Warum ich cannot speak?
8. I vergessen.
9. /man/ “I” müde /hastam/ = “I am tired.”

As can be seen, the direction of mixing in this case was from German to English.

Two cases of morphological mixing were also observed during this period while the patient was administered the morphological opposites (324-333) task in English:

trust —nicht trust = “distrust”
believable—nicht believable = “unbelievable”

We only observed one example in which the three languages were mixed. This occurred when the patient asked for the repetition of an English sentence:

One mal /dige/ (“more”) = “one more time”

ENG DEU PER

Spontaneous Speech, Farsi

We were able to elicit the patient’s spontaneous speech in Farsi on October 21, 1985. His Farsi speech was fluent with a total number of 227 words and the type/token ratio of 1.4 (130/92). The MLU was also six words per utterance. There were two cases of semantic paraphasia and many instances of word-finding difficulty. The syntactic deficits of the patient’s speech were characterized by four cases of paragrammatism and three cases of missing obligatory morphemes. The discourse was cohesive and pragmatically sound. The patient expressed his personal feelings and problems when he was hospitalized.

A sample of the patient’s descriptive speech was also obtained on October 18, 1985. The sample consisted of a total of 95 words and MLU of 6. The type/token ratio was 2. There were three cases of agrammatism with only one case of missing obligatory morpheme. Word-finding difficulties were noticeable and appeared in the form of six paraphasic items, unnecessary pauses, and vague pronouns. The text was not very cohesive, but it was pragmatically sound.

Spontaneous Speech, German

The patient’s German spontaneous speech was obtained on October 18, 1985. Since he could not find a topic of his own he found it easier to describe the picture story of the BAT. He provided a total of 160
words in his description, but they were mixed with paraphasic and neologistic elements.

The patient’s German speech was fluent, but mixed with perseverative words and phrases. The discourse was, on the whole, cohesive and pragmatically sound, but it was not grammatically complex and representative of his premorbid competence in German.

Spontaneous Speech, English

The patient’s spontaneous speech in English was also obtained on October 18, 1985. This date may be regarded as the post-traumatic landmark for the patient’s English recovery. He was first asked to tell us about the research and academic experiences he had had in England. At this point, both Farsi and German had been recovered and he could switch to either of them.

Several times he tried to switch to English, but he failed by initiating in German or Farsi. Then he was asked to try the picture story. His first trials were not very successful, but he was willing to listen to the English examiner in English and continue his trials. His unsuccessful trial was followed by, “Ich verstehe English, aber ich kann nichts sagen.”

After listening to the examiner several times he began his English with these questions: “What did you say to me?” “What have you seen?” “Have seen her?” “dis close. . . .”

Then he started to describe the story. After a few sentences about the story he found himself unable to describe it, but he continued in English by complaining about his present English as compared with his premorbid English.

We were able to elicit a total of 238 words in his English speech, but these were mixed with German phrases and words as well as paraphasic and neologistic elements. Several times he switched back and forth to German momentarily.

His English was, on the whole, fluent but perseverative, as well as incohesive and mixed with paraphasic and neologistic elements. The discourse was pragmatically sound and comprehensible to the extent that he complained about his English and explained his premorbid English competence.

Spontaneous Writing in Farsi

The patient’s spontaneous writing in Farsi was obtained on three different occasions: October 15, 1985, December 5, 1985, and September 8, 1986.

The first sample comprises one whole page of handwritten Farsi with some spelling errors and unrecognizable scribbles. The patient’s second spontaneous writing had fewer spelling errors and was more legible. But the text was perseverative with evidence of semantic paraphasia, verbal paraphasia, agrammatism, and paragrammatism. Both samples were neither
cohesive nor grammatically sound. The linguistic impairments of these two samples were consistent with the patient's performance in other tasks of the BAT shown in the Farsi profile.

The third sample (September 8, 1986) was legible and organized with only one spelling error. It comprised 107 words as compared to about 70 in the first two samples. The text was not perseverative, but had four examples of agrammatism, one of paragrammatism and three literal paraphasias. The content of the text was cohesive and pragmatically sound. But there were three semantically deviant sentences.

On the whole, the patient's recovery in writing Farsi was remarkable.

Writing in German

Three samples of the patient's spontaneous writing in German were obtained on three different occasions: October 15, 1985, December 29, 1985, and September 8, 1986.

All three samples were obtained during the differential recovery period. The first two samples were very short (about 45 words each) as compared with the third sample of 60 words. The first two samples were full of spelling errors and unrecognizable scribbles. Their content was noncohesive and did not seem pragmatically sound. These two samples were representative of his performance during the administration of the BAT.

The third sample was written legibly with very few spelling errors. Also, the content was rather cohesive, but it had some perseverations. In general, it reflected a considerable improvement in his German spontaneous writing.

English Spontaneous Writing

The patient was not able to provide a sample of his spontaneous writing during the time we were administering the BAT. However, we managed to elicit a sample of his spontaneous writing on September 8, 1986. His writing in English was legible and he had 10 spelling errors. He wrote 60 words, and there was evidence of semantic and verbal paraphasia. There were two cases of agrammatism and seven cases of paragrammatism. The text did not sound very pragmatic and cohesive because of paragrammatic as well as paraphasic elements, but the content was comprehensible if one could "read between the lines."

The type/token ratio of this text was 1.7 with an MLU of 9 words.

DISCUSSION

The trilingual aphasic patient described here is the second documented case of alternating antagonism reported (following Paradis et al., 1982). Our patient is remarkable in certain respects, namely, (1) he is a trilingual patient and was premorbidly almost equally proficient in three languages, one of which (Farsi, his mother tongue) was structurally quite distant
from the other two (German and English); (2) during the period of alternating antagonism which lasted for more than three weeks, German, the patient’s second dominant language, was competing with Farsi, his native language as well as the language of the environment; and (3) the three languages recovered differentially over 2 months, with Farsi as the best recovered language (though with severe semantic anomia), and German and English as the second and third, respectively.

At least three types of tentative explanation of such a recovery pattern may be proposed: (1) Languages are subserved by the same underlying neural substrate but the activation threshold of the neural system is proportionate to the frequency of its use. That is, the more often a language is used, the more available it is (Paradis, 1985); (2) languages are subserved by different though intertwined neural circuits in the same general anatomical area and are selectively susceptible to inhibition (Paradis et al., 1982); (3) languages may be differentially lateralized. The second language may be more lateralized to the right hemisphere when it is learned postpubertally (Vaid & Genesee, 1980; Vaid, 1983).

Given the context and age of acquisition of the three languages, as well as the patient’s premorbid proficiency, and on the basis of the activation threshold criterion, one would have expected Farsi to be the first and best recovered language after the trauma. Indeed, Farsi was the most frequently used language premorbidly. Instead, after a short period of minimal Farsi output, German became the only language available for expression, with some concomitant comprehension difficulties in Farsi.

In order to understand the pathological process that led to the antagonistic recovery as described above, a number of dynamic variables need to be considered independently during each stage of recovery, as follows:

1. The postmorbid cognitive condition of the patient at each stage;
2. intra- and inter-hemispheric associations during the acute stage;
3. the involvement of the limbic system;
4. excitation and inhibition processes of the neural networks subserving each language.

During the acute stage, our aphasic patient was cognitively disturbed and produced some confabulatory speech. He was also emotionally traumatized by the accident. He was very emotional and affective in his behavior, reflecting the involvement of the limbic system. Weaker inter- and intrahemispheric associations caused by the frontotemporal lesion in the dominant hemisphere may also be assumed.

It seems that the pattern and rate of our patient’s language recovery is a function, at each stage, of his cognitive condition and of the involvement of his limbic system. It would therefore seem reasonable to suggest that the inhibition of Farsi is a consequence of the lesion in the dominant hemisphere, while at the same time the intact right hemisphere is activated.
and allows for the involuntary use of German during the acute stage (see Albert & Obler, 1978, p. 240).

**CONCLUSION**

Our patient was systematically and comprehensively assessed in each of his three languages with equivalent versions of the *Bilingual Aphasia Test* (Paradis et al., 1987). He exhibited an alternating antagonistic recovery between two languages (Farsi and German) over a period of 1 month, followed by the recovery of the third language (English) only when the use of the other two was finally under voluntary control.

This case shows, once more, that languages can be independently functionally disturbed by cerebral trauma. Each language can be selectively operative for varying periods of time. Various patterns of recovery are not mutually exclusive over time, and different patterns may hold between different sets of languages.

More systematic investigations of polyglot aphasic patients, using the same measuring instrument in all languages, will bring us closer to an understanding of this complex multivariable phenomenon.

**REFERENCES**


