The Role of Perceptual Tests in Diagnosing Schizophrenia

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Introduction

Physicians treating insane people several hundred years ago knew they suffered from perceptual symptoms and signs. After 1900 most of these "insane" patients were called schizophrenic, a moderate improvement over "dementia praecox". Dr. John Conolly described these perceptual changes in his excellent book, *Indications of Insanity* (1974). He described how perceptual changes influence behaviour. He defined insanity as a disease of perception combined with an inability to determine whether these changes were real. He described a very depressed woman who was convinced her husband was dead. She knew he was dead because she could see his soul, sitting on a tree outside her hospital window. One day her husband forced himself into her room against the advice of her physician. She fainted, came to, and went home with him. She was able to correct her delusion by his presence. Before this, she could only reason from what she was seeing — from a visual hallucination. Conolly described other patients whose delusions were the direct result of perceptual changes. For example, the delusion that one was being poisoned was very common and fairly frequent several decades ago. It is rare now. Schizophrenics may have changes in taste perception so that foods taste flat, bitter, or peculiar, which may be due to a deficiency of zinc. Medicines and poisons used to be bitter. It would be easy to assume foods which tasted bitter had been poisoned. This taste change is fairly common in elderly people, also due to a deficiency of zinc, but they do not assume their food is poisoned. They do not have a problem distinguishing the reality that their sense of taste has changed, whereas schizophrenics might assume the change is in their food (poisoned), and not in themselves. Modern medicines taste sweet and few people know poisons can be bitter. This, I believe, is why schizophrenics who believe they are being poisoned are so rare today.

Bleuler's ideas eventually became popular and thought disorder became the predominant sign psychiatrists use to diagnose schizophrenia. Perceptual changes are given a much less dominant role, at least in the psychiatric literature. In practice, psychiatrists still depend on the presence of hallucinations, especially auditory: hearing voices or one's own thoughts. Perhaps this is because thought disorder may be abstract and difficult to determine, while visions and voices are easily described. Thought disorder has been described by describing thinking, its form and content, but has not been defined precisely.

The adrenochrome hypothesis of schizophrenia (Hoffer, 1981, 1982, 1985; Hoffer and Osmond, 1990), drew our attention to perceptual changes in 1955, and since then we have been followers of Conolly rather than Bleuler.

Perceptual symptoms and signs have been ignored by most physicians because they have been relegated to such a minor role. This is a pity since the earliest symptoms of these diseases are perceptual changes. It is also why many schizophrenics who also have mood swings or swings from excitement to depression are called manic-depressive (bipolar). They are not examined for the presence of perceptual symptoms and mood is given pre-eminent prominence in diagnosing.

In a recent review, Carpenter (1990) considered that positive symptoms, negative symptoms, incongruity of affect, cognitive and attentional disturbances and neurological symptoms were best for assessing Psychopathology of schizophrenia.

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He concluded that hallucinations are in the positive group. It is clear that almost the whole area of perceptual changes are given minor attention.

A few days ago a middle-aged man was referred to me complaining of a number of abdominal complaints present over the past four years. Repeated physical examinations and tests showed there was nothing wrong. But a routine mental status examination suddenly changed the entire picture. Until I asked him if he heard voices, I had concluded this was a simple case of excessive tension and perhaps food allergy. His response was surprising; apparently for four years he had been hearing two sets of voices emanating from his abdomen. The voice from the lower abdomen was very critical. The voice from the epigastrium was different, making comments about other matters. Both voices were originating from ethereal spirits from outer space, but he was not sure. He had a major perceptual disorder which was the basis of some delusional ideas. He then asked me why I had enquired about voices; no other physician had ever done so. I replied it was part of total examination. The Hoffer-Osmond Diagnostic test (HOD) and Experiential World Inventory (EWI) are particularly helpful in bringing up this kind of information.

We now have three systems for examining the mental state: (1) the Conolly system which we adhere to (Hoffer and Osmond, 1966, 1967); (2) the Bleulerian system which emphasizes thought disorder, used by most psychiatrists; (3) the emphasis on mood swings used by manic-depressive enthusiasts. In my opinion, the first system is the most accurate and leads to very early diagnosis, when treatment is simpler and much more successful.

A perceptual examination may be subjective or objective. The patient describes the perceptual changes, guided by appropriate questions. This may be very time-consuming and tiring for patients. Objective tests will pick up a few changes, but they are not nearly as rich or informative. It is similar to getting a description of any hallucinogenic experience induced by LSD, etc. To overcome some of these difficulties we developed a simple card-sorting test. The cards contain questions which, when answered true or false, provide a description of the perceptual world, of thought disorder and of mood. We studied the experiential world of schizophrenia by immersing ourselves in the model experiences caused by LSD, mescaline, and adrenochrome. We studied these experiences as described to us by many hundred volunteers who took these compounds in a controlled environment. We read the autobiographies of many recovered schizophrenics who described their own experiences, and we examined carefully several thousand schizophrenic patients. From this body of data we drew the questions.

Our first test (Hoffer, 1965; Hoffer and Osmond, 1961, 1961a, 1963; Hoffer, Kelm and Osmond, 1975), was given to several thousand patients and normal subjects. Nearly every patient admitted to the psychiatric ward at University Hospital, Saskatoon, was given this test on admission by nursing staff. Many patients were examined at the two Saskatchewan mental hospitals. The scores were derived by comparing large groups of schizophrenics — acute and chronic, depressions, alcoholics, brain damaged, children from ages 12 to 18, and normal adults. We found the HOD test very useful. We did not consider it the diagnostic test, but we did look upon it as an early warning test, i.e. if we had diagnosed the patient as depressive and if that patient had schizophrenic scores, we would re-examine the patient to determine if we had missed anything. Many patients would at first deny perceptual symptoms. Later, on the HOD, they would answer "True" for the same symptoms and then on re-examination would confirm they were indeed present.

I remain convinced the HOD test is the most useful diagnostic aid for diagnosing schizophrenia except for the Experiential World Inventory (EWI) (El Meligi and Osmond, 1970), which is even better. The EWI test is based on the same principle, i.e. to measure the experiential world, but it contains 400 questions compared to the HOD's 145 cards, and is more sophisticated. It is much more sensitive to the presence of early schizophrenia, and more valid.
In this report I hope to demonstrate to

my colleagues the usefulness of the EWI test by comparing it with the HOD test.

Description of Areas Covered by HOD and EWI

Perception

In our relationship to our environment, we depend upon our senses. They are the usual five: vision, hearing, touching, tasting and smelling, plus gravitational senses, time sense, and so on. Any one of our senses may develop changes. The less obvious changes are called illusions, the more striking ones are hallucinations. Examples of each type are described in our book *How to Live with Schizophrenia* (Hoffer and Osmond, 1968). Here are a few examples.

(a) Visual — Most of the changes induced by LSD are illusions. It ought to be called an illusionogenic substance, not an hallucinogen. Objects are really there but appear changed in colour, shape, form, etc. Words may pulsate (common with dyslexic children). Hallucinations are visions of people, angels, devils, scenes, explosions, and so on. Illusions are much more common than hallucinations in schizophrenics and come on earlier in the illness. Hallucinations come later and indicate a more advanced stage of the disease.

(b) Auditory — Illusions are distortions based upon background noise. Voices will be heard from running water, from random noises such as screeching tires, motors, and from radio and TV. In a perfectly quiet room there are no illusions. Hallucinations occur unrelated to sound stimuli. There is a sequence from illusions to hallucinations. Patients will first hear their own thoughts, later hear voices in their head, later these voices come from outside their head. As patients recover, these phenomena recede in reverse order. Often the phenomena recede into dreams when they are no longer pathological because there is no need to judge them real or not, and they do not lead to behavioural changes.

Hearing one's thoughts is considered pathognomonic of schizophrenia while auditory hallucinations are not. This was based upon a few studies only. I consider all auditory illusions and hallucinations equally valid in diagnosing, but of course they must be combined with thought disorder.

(c) Taste, Touch and Smell — Illusions and hallucinations of these senses are less frequent but are also diagnostic. The complaint that some patients make about their own body odour may not be an illusion. Schizophrenics may have a characteristic musty aromatic odour which they find objectionable. One of my female patients was enveloped by such an odour. One day she complained to me that her nurse made her bathe twice a day. It did not help as she was not dirty. When she recovered on Orthomolecular treatment, her body odour vanished.

All these areas are tested by the Hoffer-Osmond Diagnostic test and the Experiential World Inventory.

A retrospective HOD provides valuable information about the experiential world of the patient when very ill and any change with treatment. Patients can recall the world they were living in for several years unless they have had a series of electroconvulsive treatments (ECT). This tends to remove many of the symptoms from memory. This is why patients will believe that the treatment was not necessary — they no longer recall what they were like. If they could see a video of their behaviour before ECT, they would hardly recognize themselves. The retrospective HOD is also valuable to patients who can compare past scores with their present score.

Recently I asked a young patient, age 22, to complete a current and retrospective test for one year earlier. He began to hear voices when he was eight: one was evil and the other good. After his second admission and discharge he moved to a group home. He took an antidepressant and a small amount of tranquilizer when I first saw him in January 1990. He believed people were staring at him, occasionally felt unreal, heard voices regularly and occasionally saw visions. He was paranoid and depressed.

He was started on niacin 500 mg after each meal and ascorbic acid 1 gram after meals.

In June he was admitted to hospital for

three days and started on a different tranquilizer in small doses and the antidepressant was stopped. One month later he no longer heard voices, was occasionally paranoid, and felt good about himself. His HOD scores were as follows:

	Total	Perceptual	Paranoid	Depression
Retrospec.	100	21	10	10
Current	38	6	4	3
Normal Scores	(0-30)	(0-3)	(0-3)	(0-3)

Comparison of HOD and EWI

Over the past twenty years I have tested schizophrenic patients with both the HOD and the EWI. They were all examined clinically first. They had all been diagnosed schizophrenia before I saw them, and had been referred by their physician or psychiatrist from the United States or from Canada, outside of B.C. They were all treatment failures from the best tranquilizer treatment available in their own area. In most cases there was no doubt about the diagnosis and in most cases both the HOD and EWI tests gave scores within the schizophrenic range. They were also tested for kryptopyrrole in their urine. A small number out of several hundred seen were not clearly schizophrenic clinically, and gave non-schizophrenic scores on the HOD. They were usually on medication and were better, but had not regained their normal state. On the EWI they were clearly schizophrenic, i.e. their profile was in the schizophrenic area of the graph. This has happened often enough to convince me that the EWI test is more sensitive and valid. The following four case histories illustrate my conclusion.

AA

Mr. AA, age 27, had been sick five years. It began with depression and difficulty with concentration. His mother believed he had shown the first symptoms eight years before when he became very seclusive and spent many hours trying to figure out what life was all about. There was a marked changed in his personality. He dropped out of college but went back that fall and completed his year. That summer his father died. He again became very depressed and seclusive, and began to consider suicide. He also began to drink excessively but eventually was able to quit and had remained abstinent. His psychiatrist in the States advised him he had a thought disorder, which the patient and his mother assumed meant schizophrenia. In 1987 he was treated in hospital for one month and then started on Triavil, containing amitriptylene and perphenazine. By the time I saw him, he was better and was able to work, but he remained very insecure, very tense and obsessive. Any break in his routine, for example driving to Victoria, created a lot of anxiety.

Mental State - Perception. He still had visual illusions and feelings of unreality, but they were less severe than they had been. The world also was unreal and he often believed people were staring at him.

Thought. He was less paranoid than he had been but he had difficulty concentrating. He had a sense of guilt over his illness, believing himself to be a failure.

Mood. His depression was less severe but he was still very anxious and tense.

Physically he appeared to be well, but he had many large white areas on his fingernails. This indicated he was deficient in Pyridoxine and zinc. This may be caused by an excess of kryptopyrrole (KP), which combines with these two nutrients and causes the deficiency. The urine test for KP confirmed this; he had 450 mcg per liter. The normal range is 0-200.

His HOD scores for his present state were all normal. A retrospective test was done. He was asked to sort the cards as if he were back several years when he was much sicker. These scores were in the schizophrenic range. The scores are shown in Table 1 (p. 18).

He did a current state EWI. The profile is shown in Figure 1. (See figures p. 19). This is comparable to his retrospective scores but different from his current scores." The EWI agrees with the clinical findings. Had he done it when he was worse, his profile would have been in the schizophrenia range in Figure 1.

BB

This patient was 36 years old in 1986. In 1973 Mr. BB became paranoid and was admitted to hospital where he was started on medication. In 1986 he was admitted for the fifth time. He was very paranoid.

He had been started on a vitamin program in 1981 which he continued for two months. In January 1986, before his last admission to hospital, he resumed his use of vitamins. He was given parenteral tranquilizers which removed his paranoid ideas, but he remained depressed and tired, especially after each injection.

His HOD scores were normal, i.e. Total Score was 19, Perceptual 1, Paranoid 2, Depression 10, and Short Form 2. This is consistent with depression, not with schizophrenia. But the EWI profile was in the schizophrenic area, near the borderline with the non-schizophrenic (normal) area. This is shown in Figure 2.

CC

Age 35 in 1986. Mr. CC suffered from insomnia and poor concentration present for two years. According to his parents, he had been slow as an infant and was learning disordered. He was "pushed" through public and high school. Occasionally he would earn a B grade. Then he went to college for four years. Following this he had a succession of jobs but was not able to be independent.

In December 1984, following insomnia accompanied by hearing voices, he was treated in hospital. The voices told him he would die, over and over. After discharge he remained on medication until he developed tardive dyskinesia and stopped all medication early in 1986.

He told me he had also had visual hallucinations, seeing pictures into eternity. He still heard buzzing in his head. He had difficulty concentrating, and was tired and depressed.

His HOD scores were normal: Total 18, Perceptual 2, Paranoid 0, Depression 4, and Short Form 2, but his EWI profile was in the schizophrenic range (see Figure 3).

DD

Age 30 in 1987. Mr. DD had been depressed many years but it had been much worse for the last four years, and he was unable to work. He began to read about depression, concluding after a while that he had schizophrenia. He consulted a nutrition centre and was advised about diet and supplements. Within a few weeks he stopped crying, felt hopeful, became less paranoid, and was able to think more clearly. Later, he completed five, four-day water fasts and felt better after each one. When I saw him he was avoiding sugar, dairy products and oranges. He was still paranoid but it was not severe and he understood it was a symptom, but he was still depressed.

His HOD scores were normal: Total 27, Perceptual 0, Paranoid 0, Depression 4 and Short Form 0. A retrospective test for his pre-vitamin state gave the following scores: Total 71, Perceptual 14, Paranoid 7, Depression 18, Short Form 19. These are within the mean range for schizophrenia. His EWI profile was in the schizophrenia area (Figure 4).

I usually do not follow-up patients who come from outside B.C., but in March 1988 DD called me. He had gone back to work. In May 1990 he called again, very enthusiastic. He had just sold his business for a lot of money and was starting another. One of my criteria for recovery is the ability to pay taxes. Mr. DD had obviously recovered.

Discussion

The HOD and EWI both examine the perceptual world of patients. More accurately, they record deviations in sensation from the static world of normal people. Since perceptual deviations are found commonly in schizophrenic patients, these tests are diagnostic aids for schizophrenia. Other conditions also have perceptual symptoms, including toxic psychoses and the hallucinogens (Hoffer and Osmond, 1967). There is no trouble distinguishing these perceptual conditions from schizophrenia as schizophrenic scores remain high with time, while the other conditions show low, normal scores within a few days. Schizophrenic scores decrease when they begin to recover, no matter how they are treated: the scores are related to the illness, not the treatment. Heavily tran-quilized patients will still have very high scores even though their behaviour is more normal. Serial testing is very helpful.

Many physicians use the HOD for all their patients who are very anxious and depressed. They are able to select those who need more detailed examination to rule out schizophrenia. They find this test very helpful. I suggest they should add the

EWI to their battery of tests.

These four cases illustrate that the EWI is more valid for diagnosing schizophrenia than is the HOD**.** In most patients, both tests are concordant. I cannot recall a single patient with high HOD scores who scored normal on the EWI.

The HOD is simpler to administer and score, and for most patients is very helpful. The EWI requires more time to do and to score, but is more accurate. Both tests should be used to help diagnosis and to follow or to monitor response to treatment.

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Table 1
Scores

	Total	**Percept.**	**Paranoid**	**Dep.**	**Short Form**
Retrospective	**63**	**9**	**2**	**12**	**3**
Current					
Normal	**<30**	**<3**	**<3**	**<3**	**<1**

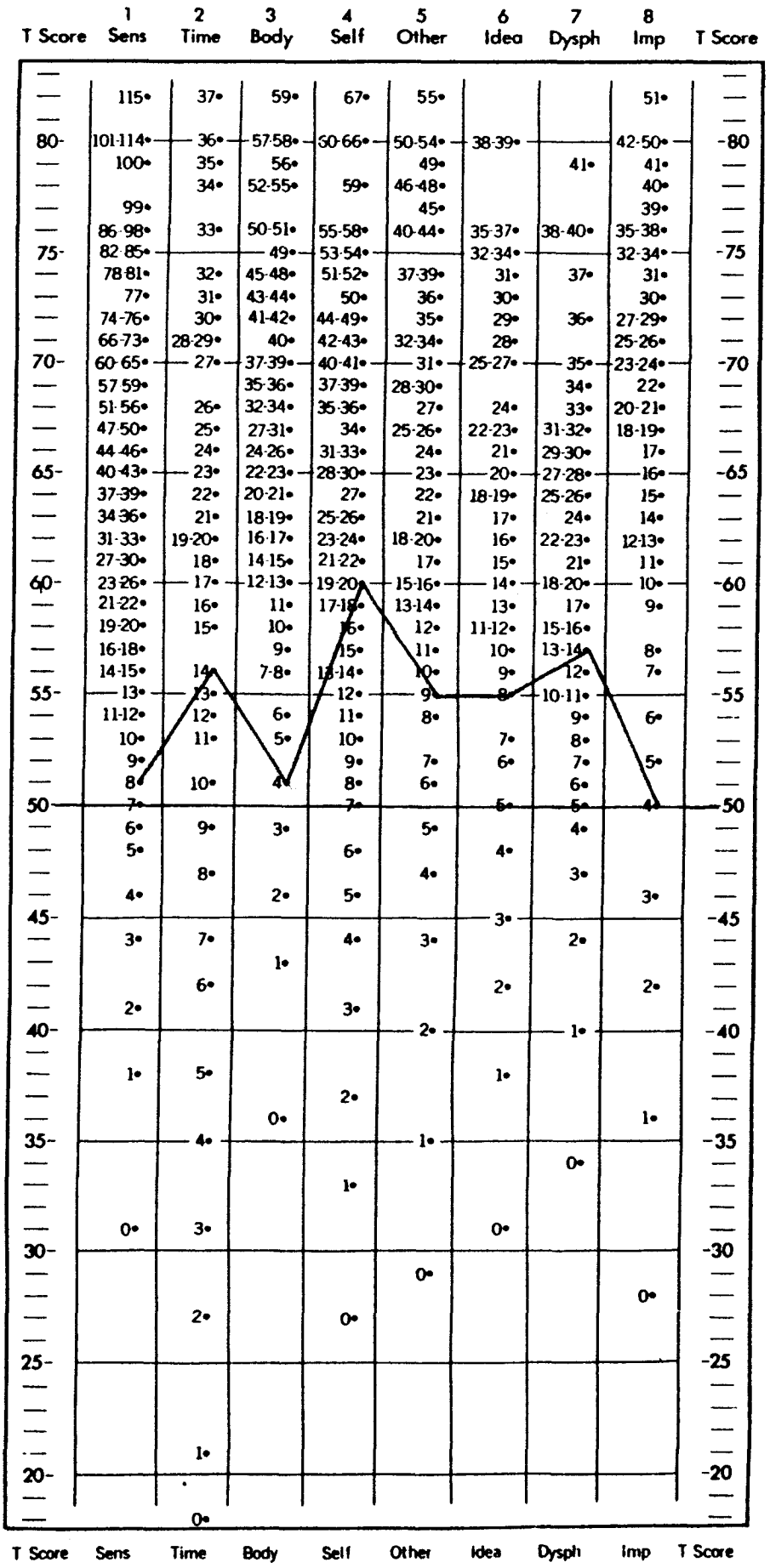

Figure 1. EWI Profile for AA

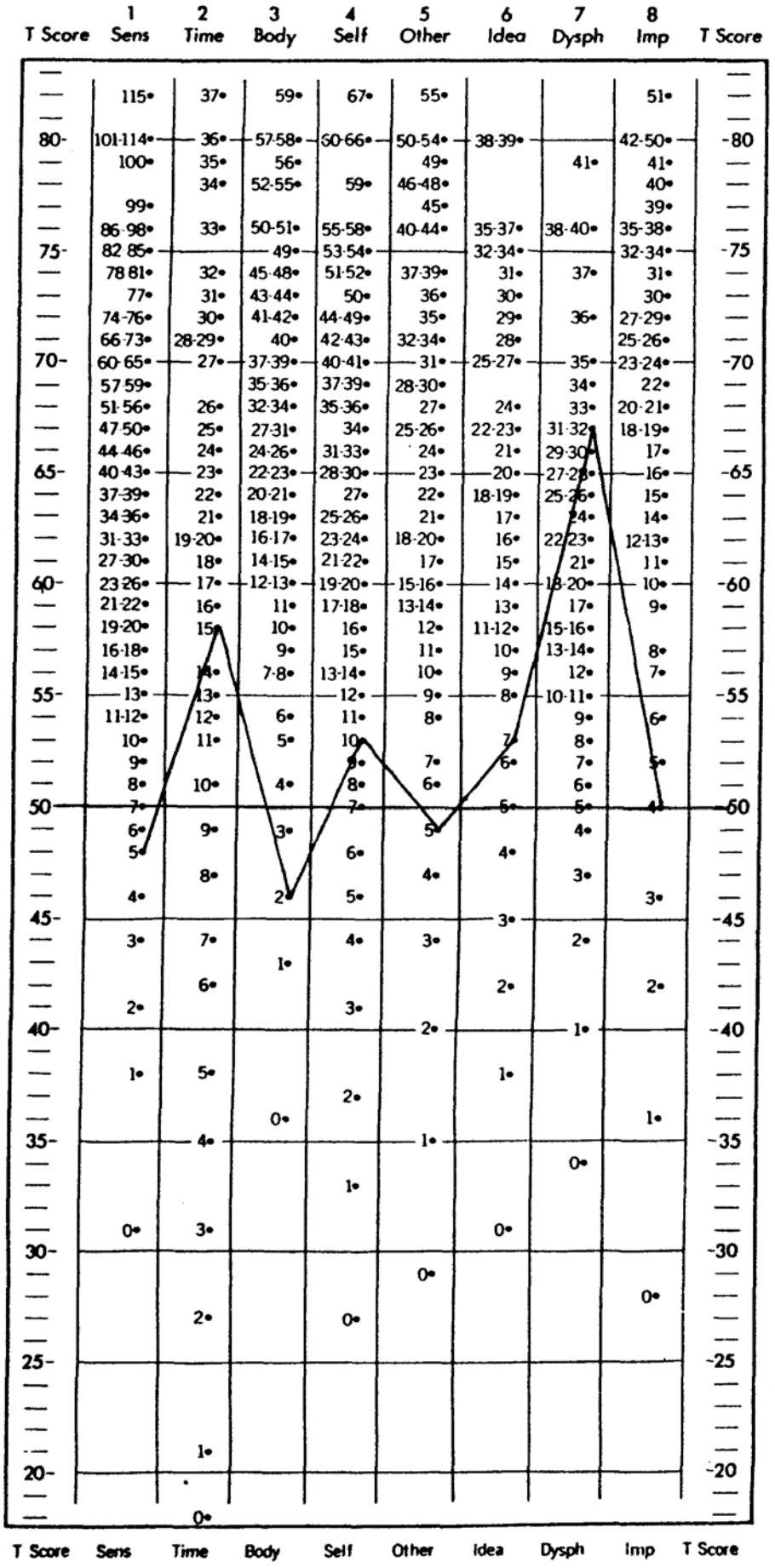

Figure 2.
EWI Profile
for BB

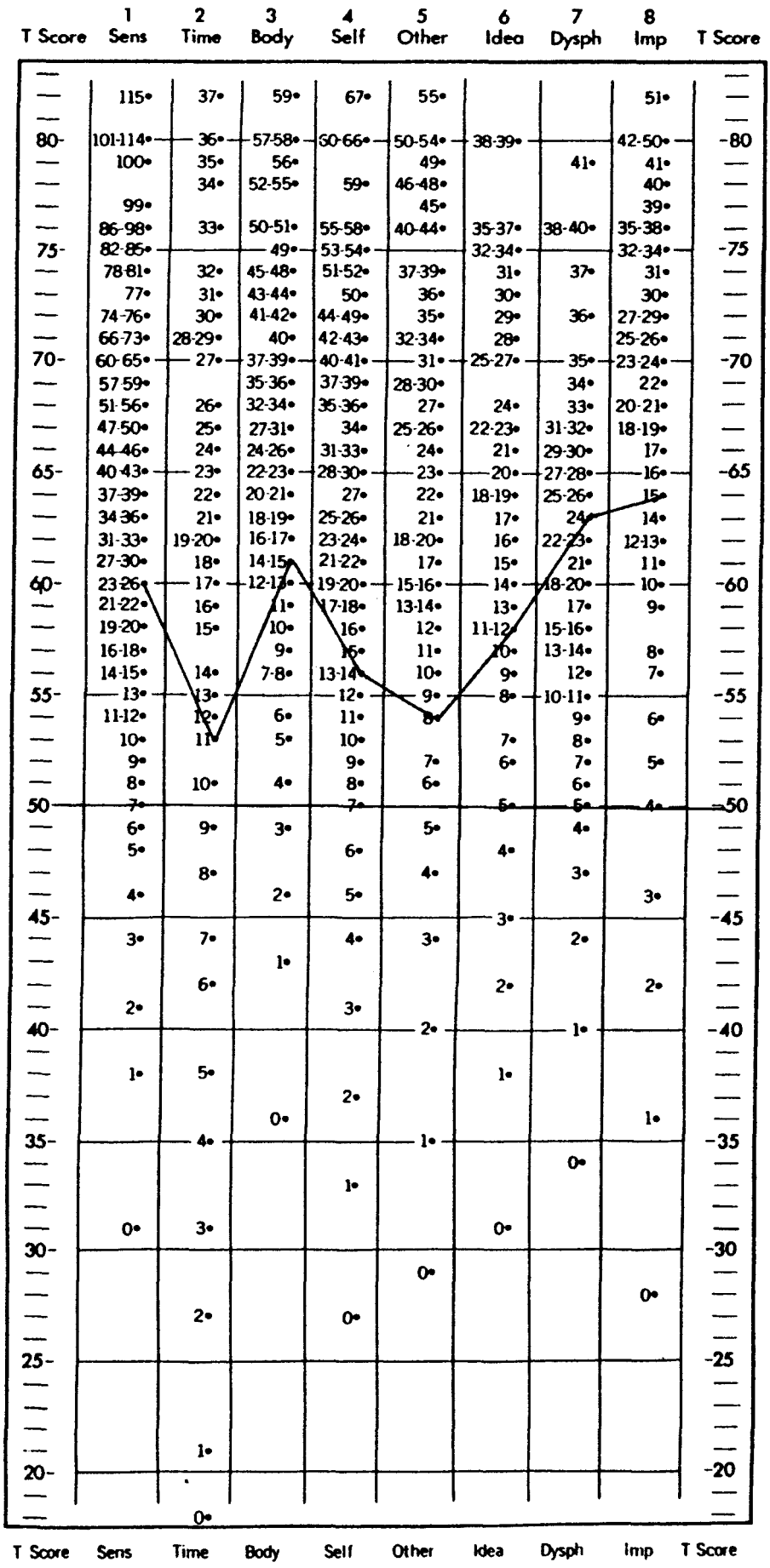

Figure 3. EWI Profile forCC

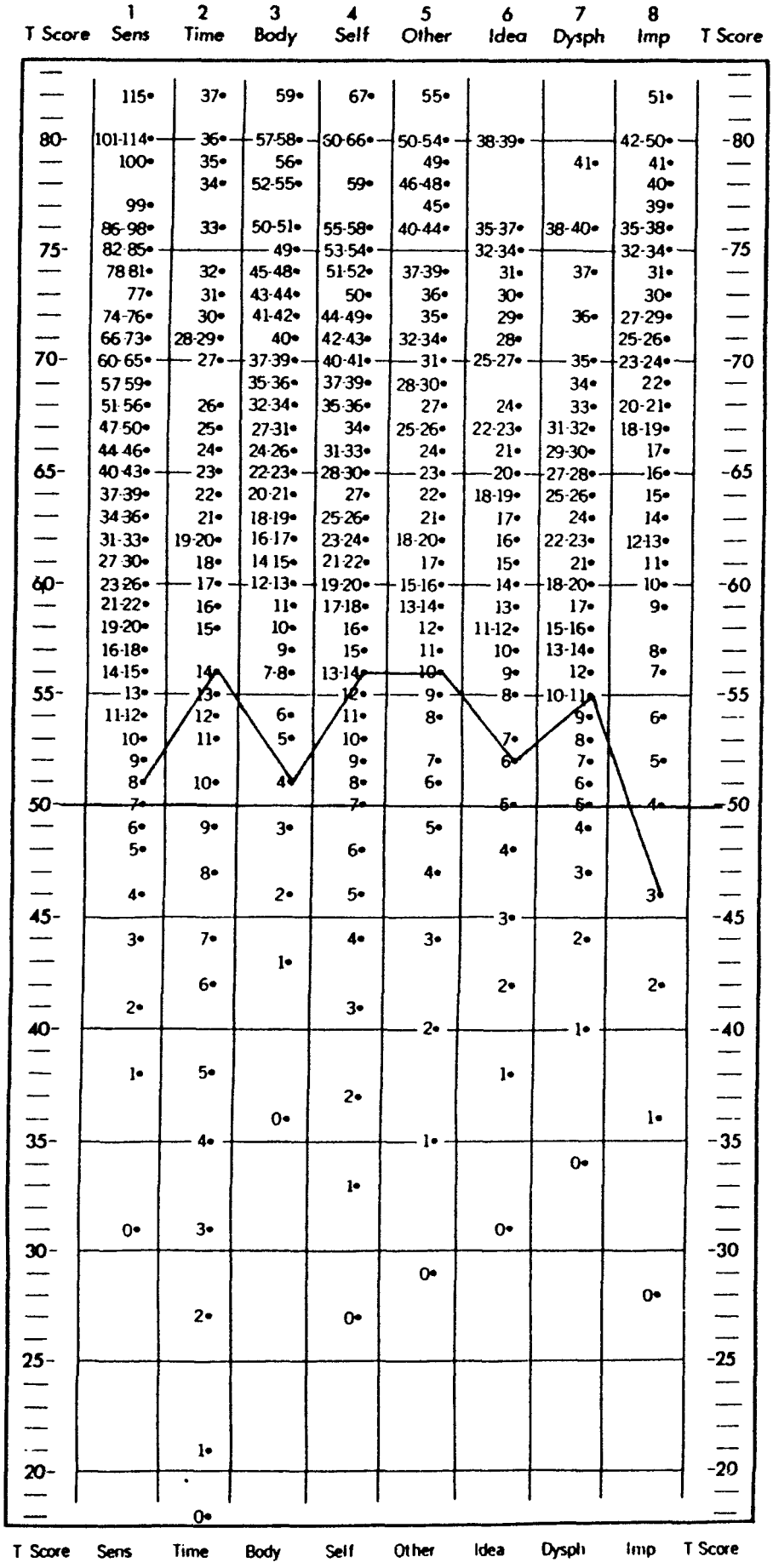

Figure 4.
EWI Profile
forDD