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TACTILE PERCEPTUAL TESTS IN THE DIFFERENTIAL DIAGNOSIS OF PSYCHIATRIC DISORDERS[1]

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Visual perceptual performance tests like the Rorschach, Thermatic Apperception and Bender Visual Gestalt tests are widely used in the evaluation of psychiatric disorders. Recently, a simple test of tactile perception—the face-hand test—has been described (2). By this test, characteristic performances of normal adults (2) and patients with diffuse cerebral dysfunction (3) have been differentiated.

The face-hand test is an application of the technique of multiple simultaneous stimulation (1). The examiner lightly touches, simultaneously, the cheek and the hand of the subject. The latter is then asked to describe and localize the stimuli. Normal adults readily name and localize the two stimuli within the initial few trials of the test. Once correct, they are thereafter correct on all similar tactile stimulation tests. In contrast to normal subjects, patients with psychoses due to disease of the brain are not able to perceive or correctly localize one of the two simultaneously applied stimuli, even after many trials of the face-hand test. They consistently make errors in the stimuli to the hand (and conversely, they rarely make errors in the perception of the stimuli to the face). This type of response has been observed in 90 per

1 From the Department of Neurology and Psychiatry, New York University College of Medicine, Bellevue Psychiatric Hospital and the Hillside Hospital. This work aided. in part, by grant #MH 139 from the U. S. Public Health Service, National Institutes of Health.

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cent of the patients with diffuse brain dysfunction, and has been described as a sign of the organic mental syndrome (3).

These simple tactile perceptual tests have now been applied to patients with hysteria, schizophrenia and psychic depression. The responses of these patients to repeated trials of the face-hand test will be described.

Subjects

The subjects were patients from the wards of Bellevue Psychiatric Hospital. These patients had one of the following conditions: schizophrenia, psychoneuroses, psychic depressions or organic psychoses. The patients with schizophrenia manifested the various clinical varieties of the disorder. The patients with psychoneuroses were those hospitalized for severe anxiety, reactive depression, or behavioral outbursts necessitating inpatient observation. The patients with depression in this group were predominantly young adults in whom the psychiatrist obtained a history of recent stress precipitating admission to the hospital. In addition, patients with diagnoses of "character disorder" or "behavioral disorder," and without evidence of psychosis, were included in this group.

Patients with depressions were studied in two groups. The young adults with "reactive depressions" were included in the group of patients with psychoneuroses. The second group were the older adults, in whom the diagnosis of involutional psychosis was made. In some instances, these patients presented evidence of impairment of memory, concentration, calculation, and orientation. The diagnostic differentiation of their disorder from psychoses due to disease of the brain was difficult. The diagnoses were usually made after extended periods of observation and with the aid of psychometric studies.

The patients classified as having organic psychoses manifested the usual memory disturbances, disorientation, emotional lability and confusion characteristic of the "organic mental syndrome" (3). The etiology in these cases varied between central nervous system syphilis, posttraumatic states, senility, presenile dementia and alcoholism.

Method

During a routine examination, the face-hand test is applied. The patient is asked to close his eyes. In the sitting position, with his hands lying naturally in his lap, the patient's cheek, and dorsum of the hand on the side opposite to the cheek, are simultaneously touched by the examiner's fingers. The patient is then asked "What did you feel?" The normal adult usually points to the cheek and states: "You touched me here" or "I felt something here," making no mention of the stimulus to the hand.

The patient is again asked to close his eyes, and the stimulation repeated. This time the opposite cheek and hand are touched. He is asked whether he had felt anything. The usual response is a correct localization and identification of both stimuli. If only one stimulus is reported, it is the stimulus to the cheek. At this time, the examiner asks: "Did you feel another touch anywhere else?" The normal subject usually points to the hand stimulated and admits: "I felt something there—I thought you may have brushed against it."

On the third and fourth trials of the face-hand test, the cheek and hand of the same side of the body are stimulated—first on one side and then on the other. Finally, both cheeks and then both hands are stimulated. This sequence of six tests is repeated. Subsequent to these trials, other parts of the body are tested in a similar fashion, such as cheek and foot, or breast and hand.

Cutaneous stimuli other than a light touch have been used such as multiple light touches (rubbing), single pinpricks, multiple pinpricks, and less frequently, temperature tubes (hot-cold) and tuning forks (c128). With these cutaneous stimuli the observations are qualitatively the same as with touch stimulations, although the frequency of errors is much less (2).

In each case where defects were apparent on face-hand tests, standard tests of single stimulation by touch and pinprick were applied. Only a few subjects, those with evidence of focal cerebral damage, myelopathy or peripheral neuropathy, made errors on these single stimulation tests. Their reactions were not considered in these results.

Results

The usual responses of the normal adults to the face-hand test were: (a) perception of one stimulus only—usually the one to the cheek, and only rarely the one to the hand; (b) perception of the two stimuli, correctly localized; and (c) perception of two stimuli, but one mislocalized. This mislocalization was almost always a mislocalization of the hand percept, which was displaced to the homolateral cheek. Such "displacements" were rare in the normal, but frequent in subjects with disease of the brain.

Normal adults manifested incorrect type (a) and (c) responses on the initial few trials only. As reported previously, 50 per cent of the normal adults made errors on the initial trial of the face-hand test; 22 per cent on the second trial; and errors became less and less frequent until by the tenth trial, less than ½ per cent still made errors (2). It is apparent that normal adults can readily discriminate two tactile stimuli and accurately localize these within the first few trials of the test. Also, once the normal adult was correct on one trial, he was found to be correct on all subsequent trials regardless of the body part tested or the rapidity with which the tests were applied.

Adults with Psychoneuroses: Most of the subjects with psychoneuroses responded in a fashion similar to normal adults on both the initial and on multiple trials of the face-hand test. Subjects with manifest anxiety, after identifying the cheek stimulus on the initial trial, perseverated in this response. Through many trials they persisted in naming only the cheek stimulus, even insisting that there was no other stimulus. This type of report was maintained until the examiner emphasized that there were two stimuli. As soon as the subjects realized that there were two stimuli they were correct both in naming and localizing subsequent simultaneous stimuli, as well as single stimuli interspersed at random. During the time that errors were apparent on multiple trials of the face-hand test, these anxious patients never displaced a stimulus, i.e., recognized that there had been two stimuli, but mislocalized one to another body part. It was as if they were in a mental set of "oneness," and this set persisted until broken by

the examiner. When they got into a mental set of "twoness," they were correct on all subsequent trials, perceiving and correctly localizing the two stimuli.

In a majority of patients with hysteria, including those with hysterical amnesia, the face-hand tests showed normal responses. In a few the responses were abnormal. Thus there were some who reported the sensation on one side of the body correctly, but denied all stimuli on the side which showed a hysterical type of sensory defect. There were some patients who showed "allocheiria."[4] They mislocalized a stimulus from one side of the body to a homologous part on the opposite side. This mislocalization or displacement occurred from the side with hysterical defective sensation to the side with normal sensation.

Adults with Schizophrenia: Most patients with schizophrenia were able to discriminate the stimulus applied to the face and hand correctly on the first few trials just as normal adults could. However, there were a number of patients in this group who presented bizarre responses. The touch stimuli were occasionally misidentified and were reported as "a burning" or "a fly crawling." Frequently, the number of percepts were multiplied. Instead of perceiving the two applied stimuli they reported three, four or even six percepts in a variety of body parts. Similarly, a single stimulus was reported as two, three or four percepts, occasionally omitting the locus of the original stimulus. Such patients usually persisted in the bizarre behavior on repeated testing on subsequent days. In two instances, there were bizarre responses even when the test was applied with the eyes open. A number of the paranoid patients refused to close their eyes and permitted examination provided they could see. Obviously, under this condition, they were correct on all trials of the face-hand test.

Patients with schizophrenia, admitted to Bellevue Hospital for frontal lobe "topectomy" operations, were able to perceive and

[4] The term allocheiria should be distinguished from allesthesia. According to Ernest Jones, the British psychoanalyst, the crossed sensory displacement manifested by patients with hysteria is to be called allocheiria, while that shown by patients with disease of the nervous system is to be called allesthesia. Based on our experience the distinction between the two is made largely on the total clinical picture. In one there is the long history and symptoms typical of hysteria, while in the other the history and neurologic signs show patterns characteristic of organic disease (4).

localize the two simultaneous stimuli during the initial period of testing. During the first two weeks after topectomy operations, however, the patients manifested the "organic" type of response to the face-hand test. As will be described later, this pattern consisted of omissions and mislocalizations of stimuli on repeated testing. As the patients recovered from the operation, the errors on repeated trials of the face-hand test decreased. Ultimately, they correctly reported the simultaneous cutaneous stimuli and reacted in a manner no different from the nonoperated schizophrenic patients or normal subjects.

Patients with Psychic Depression: Patients with "reactive depression" were co-operative and usually correct on the initial as well as on subsequent trials of the face-hand test. Their responses were most like the normal pattern. Of the patients with severe involutional melancholia, some were frequently unco-operative. They were suspicious of the request to keep their eyes closed and if they permitted stimulation, would report only one of the stimuli. The stimulus they reported was the one to the face. They omitted the one to the hand. Like the patients with manifest anxiety, they frequently persisted in giving one response through many trials—until the idea of "twoness" was apparent to them. Thereafter, they were usually correct in their responses (Case I).

Patients with a manic excitement correctly identified the two stimuli on the initial trial of the face-hand test. On subsequent trials they were frequently unco-operative, commenting that the test was too easy, or silly; when co-operative they were usually correct on subsequent trials.

Organic Mental Syndrome: The reactions of the patients with organic mental syndromes to multiple trials of the face-hand test are different from those observed in normal subjects or patients with neurosis or schizophrenia. Ninety per cent of all patients with organic mental syndrome repeatedly fail to report one of the two stimuli, or when reporting two, mislocalize one of them. Again the perceived stimulus is the one applied to the face. The stimulus to the hand is usually not perceived or it is mislocalized. This type of response is consistent and highly predictable.

A patterned response is also apparent in tests of body areas other than the face and hand. An "order of dominance" in tests

of other body areas could be established in these patients. In this order the face is the most dominant with penis, trunk, breast, foot, thigh and hand less dominant, in descending order. When tactile stimuli are simultaneously applied to any two body areas, the errors in localization will occur in the part of lesser dominance. For example, if stimuli are applied simultaneously to the cheek and penis, the patient will report the cheek stimulus alone; but if the stimuli are applied to the penis and the hand, then the stimulus to the penis will be reported.

These omissions and mislocalizations of percepts persist for many trials and on many days of testing. The inability of the patient with an organic psychosis to discriminate two cutaneous stimuli is so consistent, that it is considered a sign of the organic mental syndrome (3) (Case 2).

Effect of Electro-Convulsive Therapy: In patients with schizophrenia or psychic depressions, electro-convulsive therapy induces a similar "organic" type of reaction to the face-hand test. During the period of confusion immediately following the treatment, the patients consistently report only the cheek stimulus or mislocalize the hand stimulus to the cheek. This is transient during the first few treatments, but near the end of a course of therapy these reactions persist for longer and longer periods, until they are apparent hours or even days after the treatment. Patients who had a course of electro-convulsive therapy and were readmitted to the hospital after a lapse of months failed to show this "organic" reaction.

Case Reports

The following case reports are selected as illustrating the types of responses observed.

Case 1: S. S., a forty-year-old woman, was admitted to the neurological service complaining of backaches in recurrent episodes of eight years. During the past year she noted difficulties in recollection and in her ability to calculate. She had been a bookkeeper and now found herself unable to calculate accurately or rapidly enough to continue work. On occasions she had misplaced valuable family possessions only to find pawn tickets in their place.

During interviews under sodium amytal she cried readily and related many recent family difficulties, including the suspension of her husband's license as an auctioneer and her son's classification in 1A by Selective Service. Her difficulties apparently began with these events.

Medical and neurological examinations were negative except for some varying areas of hypesthesia and hyperesthesia. Psychiatric examination revealed marked psychomotor retardation. There were deficits in memory and calculation. She was able to relate details of her history and of world events, but was unable to relate details about her work or family affairs. These latter details were readily apparent, however, in interviews under the influence of sodium amytal. On simple calculation tests she made few errors, though she was slow in response. On more complex tests commensurate with her occupation as a bookkeeper, she made numerous errors and showed many hesitations. Many answers were reported questioningly. The admission clinical diagnosis was "organic disease of the brain." This was based on such symptoms as psychomotor retardation, memory deficits and difficulties in calculation.

Face-Hand Test: On the initial face-hand testing the patient persisted in giving the cheek response only for eight trials, but thereafter, was consistently correct for twenty trials. There were no displacements of percepts. On subsequent days she was correct on the initial and all subsequent tests. These findings suggested that the symptoms were not due to disease of the brain.

Course in Hospital: To exclude organic disease the patient was subjected to a series of tests. Neurological examinations, electroencephalography and pneumoencephalography revealed no evidence of organic brain disease. A psychological survey revealed an average intellectual capacity (IQ 106) without any evidence of organic deterioration. The personality survey revealed severe anxiety and depression, with some bodily preoccupations. The final diagnosis was depression and the patient was discharged for further care in the psychiatric clinic.

Comment: This case illustrates the problem in the differentiation of psychic depressions and organic psychoses. As a rule we found that the preservation of the ability to discriminate and

localize double tactile stimuli speaks against organic disease. Only 10 per cent of patients with organic mental syndrome showed normal response to the face-hand tests. The converse was not true. There were no instances in which a normal person made persistent errors on face-hand tests. If errors are made, it usually turns out that the patient has disease of the brain, no matter how bizarre the mental picture may be. This is illustrated by the next case.

Case 2: H. B., an elderly white male appearing about sixty years of age, was admitted by the police who found him wandering about the streets. He was unable to give his name or home address. He did not answer questions, though he spontaneously requested water and food. A few days after admission he began to speak freely, gave his name as "The Messiah" and his home as the hospital. He was facetious, quick in speech and coherent. A complete delusional system relating to God, the patient's previous sojourn in heaven, his mission on earth, etc., was related. No other anamnestic data were available.

Under further observation he showed the Ganser syndrome. For all questions of orientation, general information and calculation, he answered relevantly but was only approximately correct. He was almost but not quite right. He did not answer any questions of personal history except for the distant past and then he related a disjointed, rambling, confabulatory story. To many observers it seemed as if the patient had a "hysterical" type of psychosis.

During examination on admission the patient appeared chronically ill. The blood pressure was 180/100 and urine contained four plus sugar. There were hemorrhages and exudates in the ocular fundi. Neurological studies showed absent ankle jerks, diminution of vibration sense in toes and ankles, with normal position, touch and pinprick perception. Other defects were apparent on special sensory studies.

Face-Hand Test: On the face-hand test this patient presented an "organic" pattern. In the initial testing, he repeatedly reported only one of the two stimuli—that of the face. After many trials and a number of trials with eyes open, he began to report the two stimuli but now mislocalized the hand percept to the cheek. In testing on consecutive days, similar mislocalizations and omissions were apparent, both on the face-hand test and on similar

tactile tests of other body parts. An abstract of the record, which evinces the "organic" pattern on double simultaneous stimulation testing with light touch stimuli is presented here.

Stimulation	*Response*
Right cheek, left hand	Right cheek
Left cheek, right hand	Left cheek
Right cheek, right hand	Right cheek
Left cheek, left hand	Left cheek
Right and left cheeks	Correct
Right and left hands	Correct
Right cheek, left hand	Right and left cheeks
Left cheek, right hand	Right and left cheeks
Left cheek, left hand	2 percepts left cheek
Right cheek, right hand	Right cheek

Further neurological studies revealed a diffusely abnormal electroencephalogram; a symmetrically, diffusely dilated ventricular system on pneumoencephalography; and evidences of organic deterioration on the psychological tests.

Course in the Hospital: Under observation the patient showed a gradual and persistent improvement. After six weeks in the hospital he recalled some facts which led to his entering Bellevue. He remembered his address and social security number. As he improved clinically errors on the face-hand tests became infrequent. When the errors were sparse, intravenous administration of three grains of sodium amytal produced once again the persistent omission and mislocalization of percepts characteristic of the organic mental syndrome.

Comment: Here is a patient who was thought to be hysterical but the face-hand test contradicted this impression. The persistence of errors on multiple trials of the face-hand test made us think of an organic disorder. The subsequent special studies confirmed this suspicion.

Conclusion

As with visual perceptual tests, such as the Rorschach, this simple tactile test- the face-hand test—has been found to be useful

in evaluating psychiatric patients. Anxiety, paranoid attitudes, autistic thinking and misinterpretation of environmental stimuli are manifest on face-hand tests. Characteristic behavior patterns are seen in some schizophrenic and hysteric patients. In the evaluation of patients with mental changes due to dysfunction of the brain the face-hand test is of diagnostic significance. The inability of these subjects to discriminate the two simultaneous stimuli on repeated trials and the characteristic errors of omission or mislocalization of the hand stimulus are unique. Such errors are not observed in normal, schizophrenic, hysteric or depressed adults.

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The face-hand test is an application of the technic of multiple simultaneous stimulation (3). The examiner lightly touches, simultaneously, the cheek and the hand of the subject. The latter is then asked to describe and localize the stimuli. Normal adults readily name and localize the two stimuli within the initial few trials of the test. Once correct, they are thereafter correct on all similar tactile stimulation tests. In contrast to normal subjects, patients with psychoses due to disease of the brain are not able to perceive or correctly localize one of the two simultaneously applied stimuli, even after many trials of the face-hand test. They consistently make errors in the stimuli to the hand, (and conversely, they rarely make errors in the perception of the stimuli to the face). This type of response has been observed in ninety per cent of the patients with diffuse brain dysfunction, and has been described as a sign of the organic mental syndrome (2).

These simple tactile perceptual tests have now been applied to patients with hysteria, schizophrenia and psychic depression. The responses of these patients to repeated trials of the face-hand test will be described.

<u>Subjects:</u>

The subjects were patients from the wards of Bellevue Psychiatric

Hospital. These patients had one of the following conditions: schizophrenia, psychoneuroses, psychic depressions or organic psychoses. The patients with schizophrenia manifested the various clinical varieties of the disorder. The patients with psychoneuroses were those hospitalized for severe anxiety, reactive depression, or behavioral outbursts necessitating in-patient observation. The patients with depression in this group were predominantly young adults in whom the psychiatrist obtained a history of recent stress precipitating admission to the hospital. In addition, patients with diagnoses of "character disorder" or "behavioral disorder," and without evidence of psychosis, were included in this group.

Patients with depressions were studied in two groups. The young adults with "reactive depressions" were included in the group of patients with psychoneuroses. The second group were the older adults, in whom the diagnosis of involutional psychosis was made. In some instances, these patients presented evidence of impairment of memory, concentration, calculation, and orientation. The diagnostic differentiation of their disorder from psychoses due to disease of the brain was difficult. The diagnoses were usually made after extended periods of observation and with the aid of psychometric studies.

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METHOD:

During a routine examination, the face-hand test is applied. The patient is asked to close his eyes. In the sitting position, with

his hands lying naturally in his lap, the patient's cheek, and dorsum of the hand on the side opposite to the cheek, are simultaneously touched by the examiner's fingers. The patient is then asked "What did you feel?" The normal adult usually points to the cheek and states: "You touched me here" or "I felt something here," making no mention of the stimulus to the hand.

The patient is again asked to close his eyes, and the stimulation repeated. This time the opposite cheek and hand are touched. He is asked whether he had felt anything. The usual response is a correct localization and identification of both stimuli. If only one stimulus is reported, it is the stimulus to the cheek. At this time, the examiner asks: "Did you feel another touch anywhere else?" The normal subject usually points to the hand stimulated and admits: "I felt something there - I thought you may have brushed against it."

On the third and fourth trials of the face-hand test, the cheek and hand of the same side of the body are stimulated - first on one side and then on the other. Finally, both cheeks and then both hands are stimulated. This sequence of six tests is repeated. Subsequent to these trials, other parts of the body are tested in a similar fashion, such as cheek and foot, or breast and hand.

Cutaneous stimuli other than a light touch have been used such as multiple light touches (rubbing), single pin-pricks, multiple pin-pricks, and less frequently, temperature tubes (hot-cold) and tuning forks (c128). With these cutaneous stimuli the observations are qualitatively the same as with touch stimulations, although the frequency of errors is much less (1).

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single stimulation tests. Their reactions were not considered in these results.

RESULTS:

The usual responses of the normal adults to the face-hand test were: (a) perception of one stimulus only - usually the one to the cheek, and only rarely the one to the hand; (b) perception of the two stimuli, correctly localized; and (c) perception of two stimuli, but one mislocalized. This mislocalization was almost always a mislocalization of the hand percept, which was displaced to the homolateral cheek. Such "displacements" were rare in the normal, but frequent in subjects with disease of the brain.

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Adults with Psychoneuroses: Most of the subjects with psychoneuroses responded in a fashion similar to normal adults on both the initial and on multiple trials of the face-hand test. Subjects with manifest anxiety, after identifying the cheek stimulus on the initial trial, perseverated in this response. Through many trials they persisted in naming only the cheek stimulus, even insisting that there was no other stimulus. This type of report was maintained until the examiner emphasized that there were two stimuli. As soon as the

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In a majority of patients with hysteria, including those with hysterical amnesia, the face-hand tests showed normal responses. In a few the responses were abnormal. Thus there were some who reported the sensation on one side of the body correctly, but denied all stimuli on the side which showed a hysterical type of sensory defect. There were some patients who showed "allochiria."* They

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However, there were a number of patients in this group who presented bizarre responses. The touch stimuli were occasionally misidentified and were reported as "a burning" or, "a fly crawling." Frequently, the number of percepts were multiplied. Instead of perceiving the two applied stimuli they reported three, four or even six percepts in a variety of body parts. Similarly, a single stimulus was reported as two, three or four percepts, occasionally omitting the locus of the original stimulus. Such patients usually persisted in the bizarre behavior on repeated testing on subsequent days. In two instances, there were bizarre responses even when the test was applied with the eyes open. A number of the paranoid patients refused to close their eyes and permitted examination provided they could see. Obviously, under this condition, they were correct on all trials of the face-hand test.

Patients with schizophrenia, admitted to Bellevue Hospital for frontal lobe "topectomy" operations, were able to perceive and localize the two simultaneous stimuli during the initial period of testing. During the first two weeks after topectomy operations, however, the patients manifested the "organic" type of response to the face-hand test. As will be described later, this pattern consisted of omissions and mislocalizations of stimuli on repeated testing. As the patients recovered from the operation, the errors on repeated trials of the face-hand test decreased. Ultimately, they correctly reported the simultaneous cutaneous stimuli and reacted in a manner no different from the non-operated schizophrenic patients or normal subjects.

<u>Patients with Psychic Depression:</u> Patients with "reactive depression" were cooperative and usually correct on the initial as well as on subsequent trials of the face-hand test. Their responses were most like the normal pattern. Of the patients with severe

involutional melancholia, some were frequently uncooperative. They were suspicious of the request to keep their eyes closed and if they permitted stimulation, would report only one of the stimuli. The stimulus they reported was the one to the face. They omitted the one to the hand. Like the patients with manifest anxiety, they frequently persisted in giving one response through many trials - until the idea of "twoness" was apparent to them. Thereafter, they were usually correct in their responses (case I).

Patients with a manic excitement correctly identified the two stimuli on the initial trial of the face-hand test. On subsequent trials they were frequently uncooperative, commenting that the test was too easy, or silly; when cooperative they were usually correct on subsequent trials.

Organic Mental Syndrome: The reactions of the patients with organic mental syndromes to multiple trials of the face-hand test are different from those observed in normal subjects or patients with neurosis or schizophrenia. Ninety per cent of all patients with organic mental syndrome repeatedly fail to report one of the two stimuli, or when reporting two, mislocalize one of them. Again the perceived stimulus is the one applied to the face. The stimulus to the hand is usually not perceived or it is mislocalized. This type of response is consistent and very predictable.

A patterned response is also apparent in tests of body areas other than the face and hand. An "order of dominance" in tests of other body areas could be established in these patients. In this order the face is the most dominant with penis, trunk, breast, foot, thigh and hand less dominant, in descending order. When tactile stimuli are simultaneously applied to any two body areas, the errors in localization will occur in the part of lesser dominance. For example, if stimuli are applied simultaneously to the cheek and penis,

the patient will report the cheek stimulus alone; but if the stimuli are applied to the penis and the hand, then the stimlus to the penis will be reported.

These omissions and mislocalizations of percepts persist for many trials and on many days of testing. The inability of the patient with an organic psyshosis to discriminate two cutaneous stimuli, is so consistent, that it is considered a sign of the organic mental syndrome (2) (case 2).

Effect of Electro-Convulsive Therapy: In patients with schizophrenia or psychic depressions, electro-convulsive therapy induces a similar "organic" type of reaction to the face-hand test. During the period of confusion immediately following the treatment, the patients consistently report only the cheek stimulus or mislocalize the hand stimulus to the cheek. This is transient during the first few treatments, but near the end of a course of therapy these reactions persist for longer and longer periods, until they are apparent hours or even days after the treatment. Patients who had a course of electro-cOnvulsive therapy and were readmitted to the hospital after a lapse of months failed to show this "organic" reaction.

CASE REPORTS:

The following case reports are selected as illustrating the types of responses observed.

Case 1: S.S., a 40 year old woman, was admitted to the neurological service complaining of backaches in recurrent episodes of eight years. During the past year she noted difficulties in recollection and in her ability to calculate. She had been a bookkeeper and now found herself unable to calculate accurately or rapidly enough to continue work. On occasions she had misplaced

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During interviews under sodium amytal she cried readily and related many recent family difficulties, including the suspension of her husband's license as an auctioneer and her son's classification in 1A by Selective Service. Her difficulties apparently began with these events.

Medical and neurological examinations were negative except for some varying areas of hypesthesia and hyperesthesia. Psychiatric examination revealed marked psychomotor retardation. There were deficits in memory and calculation. She was able to relate details of her history and of world events, but was unable to relate details about her work or family affairs. These latter details were readily apparent, however, in interviews under the influence of sodium amytal. On simple calculation tests she made few errors, though she was slow in response. On more complex tests commensurate with her occupation as a bookkeeper, she made numerous errors and showed many hesitations. Many answers were reported questioningly. The admission clinical diagnosis was "organic disease of the brain." This was based on such symptoms as psychomotor retardation, memory deficits and difficulties in calculation.

Face-Hand Test: On the initial face-hand testing the patient persisted in giving the cheek response only for 8 trials, but thereafter, was consistently correct for 20 trials. There were no displacements of percepts. On subsequent days she was correct on the initial and all subsequent tests. These findings suggested that the symptoms were not due to disease of the brain.

Course in Hospital: To exclude organic disease the patient was subjected to a series of tests. Neurological examinations, electroencephalography and pneumoencephalography revealed no evidence

of organic brain disease. A psychological survey revealed an average intellectual capacity (IQ 106) without any evidence of organic deterioration. The personality survey revealed severe anxiety and depression, with some bodily preoccupations. The final diagnosis was depression and the patient was discharged for further care in the psychiatric clinic.

Comment: This case illustrates the problem in the differentiation of psychic depressions and organic psychoses. As a rule we found that the preservation of the ability to discriminate and localize double tactile stimuli speaks against organic disease. Only 10 per cent of patients with organic mental syndrome showed normal response to the face-hand tests. The converse was not true. There were no instances in which a normal person made persistent errors on face-hand tests. If errors are made, it usually turns out that the patient has disease of the brain, no matter how bizarre the mental picture may be. This is illustrated by the next case.

Case 2: H.B., an elderly white male appearing about 60 years of age, was admitted by the police who found him wandering about the streets. He was unable to give his name or home address. He did not answer questions, though he spontaneously requested water and food. A few days after admission he began to speak freely, gave his name as "The Messiah" and his home as the hospital. He was facetious, quick in speech and coherent. A complete delusional system relating to God, the patient's previous sojourn in heaven, his mission on earth, etc., was related. No other anamnestic data were available.

Under further observation he showed the Ganzer syndrome. For all questions of orientation, general information and calculation, he answered relevantly but only approximately correct. He was

almost but not quite right. He did not answer any questions of personal history except for the distant past and then he related a disjointed, rambling, confabulatory story. To many observers it seemed as if the patient had a "hysterical" type of psychosis.

During examination on admission the patient appeared chronically ill. The blood pressure was 180/100 and urine contained four plus sugar. There were hemorrhages and exudates in the ocular fundi. Neurological studies showed absent ankle jerks, diminution of vibration sense in toes and ankles, with normal position, touch and pin prick perception. Other defects were apparent on special sensory studies.

Face-Hand Test: On the face-hand test this patient presented an "organic" pattern. In the initial testing, he repeatedly reported only one of the two stimuli - that of the face. After many trials and a number of trials with eyes open, he began to report the two stimuli but now mislicalized the hand percept to the cheek. In testing on consecutive days, similar mislocalizations and omissions were apparent, both on the face-hand test and on similar tactile tests of other body parts. An abstract of the record, which evinces the "organic" pattern on double simultaneous stimulation testing with light touch stimuli is presented here.

Stimulation	Response
Right cheek, left hand	Right cheek
Left cheek, right hand	Left cheek
Right cheek, right hand	Right cheek
Left cheek, left hand	Left cheek
Right and left cheeks	Correct
Right and left hands	Correct
Right cheek, left hand	Right and left cheeks
Left cheek, right hand	Right and left cheeks
Left cheek, left hand	2 percepts left cheek
Right cheek, right hand	Right cheek

Further neurological studies revealed a diffusely abnormal electroencephalogram; a symmetrically, diffusely dilated ventricular system on pneumoencephalography; and evidences of organic deterioration on the psychological tests.

Course in the Hospital: Under observation the patient showed a gradual and persistent improvement. After six weeks in the hospital he recalled some facts which led to his entering Bellevue. He remembered his address and social security number. As he improved clinically errors on the face-hand tests became infrequent. When the errors were sparse, intravenous administration of three grains of sodium amytal produced once again the persistent omission and mislocalization of percepts characteristic of the organic mental syndrome.

Comment: Here is a patient who was thought to be hysterical but the face-hand test contradicted this impression. The persistence of errors on multiple trials of the face-hand test made us think of an organic disorder. The subsequent special studies confirmed this suspicion.

CONCLUSION:

As with visual perceptual tests, such as the Rorschach, this simple tactile test- the face-hand test - has been found to be useful in evaluating psychiatric patients. Anxiety, paranoid attitudes, autistic thinking and misinterpretation of environmental stimuli are manifest on face-hand tests. Characterstic behavior patterns are seen in some schizophrenic and hysteric patients. In the evaluation of patients with mental changes due to dysfunction of the brain the face-hand test is of diagnostic significance. The inability of these subjects to discriminate the two simultaneous stimuli on repeated trials and the characteristic errors of omission or mis-localization of the hand stimulus is unique. Such errors are not observed in normal, schizophrenic, hysteric or depressed adults.

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