

Standardization of the Face-Hand Test

Martin A. Green, M.D. and Max Fink, M.D.

A SIMPLE PERCEPTUAL TEST, the face-hand test, has been introduced in previous studies and the responses of normal subjects and of patients with psychiatric disorders described in detail.¹⁻⁶ The test consists of applying touch or pinprick stimuli simultaneously to the face and hand while the subject's eyes are closed. The subject is then asked to describe and to localize the percepts. Two general types of responses occur. The two stimuli may be perceived and localized correctly, or the subject may perceive only one stimulus and either not perceive the other (phenomenon of extinction) or mislocalize the second stimulus (phenomenon of displacement).⁷ Most often the mislocalization or displacement occurs to another part of the subject's body, but occasionally there is displacement into extrapersonal space or onto the examiner (exosomesthesia).⁸ Displacement of stimuli across the midline of the body (allesthesia) may also occur.⁹

Normal adults show errors in perception on the initial trials of the face-hand test. Characteristically these errors consist of extinction of the stimulus to the hand whereas the face stimulus is perceived correctly (phenomenon of face dominance). As tests are repeated the errors disappear so that by the tenth trial nearly all subjects correctly perceive both stimuli and then continue to be correct on subsequent trials. This type of response has been termed a "negative face-hand test." It occurs not only with normal adults but also in patients with schizophrenia, depression, or severe anxiety.

In contrast, patients with an organic mental syndrome show extinction and displacement after ten trials of testing or as long as testing is continued. Such a response is termed a "positive face-hand test." A "positive face-hand test" is also manifested by normal children, normal aged persons, and mental defectives.

Because of the differential response of these several groups of subjects, the face-hand test has become useful clinically in detecting the presence of organic brain disease. During the course of our studies, however, it has been noted that patients with an organic mental syndrome vary greatly in the type and

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frequency of perceptual errors. Also, subjects without organic brain disease occasionally manifest a positive face-hand test. The questions which arise from these observations are: 1) Is it possible to classify or standardize the different types of errors occurring in subjects with a positive face-hand test? 2) Is there a correlation between the types of responses and different groups of subjects? 3) Is there a type of response which can be said to occur only in patients with severe disease of the brain? The present study is an attempt to answer these questions.

METHOD AND RESULTS

Previous records of the face-hand test were reviewed for almost 1,000 patients with organic mental syndrome, normal adults, and schizophrenic adults, as well as lesser numbers of normal children, normal aged persons, and subjects with mental deficiency, depression, and severe anxiety. Additional groups of some of these subjects were also tested in a systematic manner with different types of stimuli. The criteria used to formulate a standardization of the face-hand test were: 1) type of perceptual error; 2) frequency of various errors with different stimuli (touch, rubbing or scratching, and pinprick); 3) effect on the frequency of errors when the subject observes the application of stimuli (factor of attention). Fifteen to 30 trials of the test were usually done for each subject.

TABLE 1
FEATURES OF POSITIVE FACE-HAND TESTS
(Persistent errors after 10th trial)

<i>One-plus</i>	<i>Two-plus</i>	<i>Three-plus</i>	<i>Four-plus</i>
Extinction only with touch stimuli.	Extinction with touch, rubbing, and pinprick stimuli. Occasional displacement with touch stimuli.	Extinction and displacement with touch, rubbing, and pinprick stimuli.	Same as three-plus with at least one of the following features: a) exosomesthesia, b) allesthesia, c) frequent perseveration, d) occurrence of errors while subject watches the stimuli being applied.

Based on these criteria, it was possible to divide patients showing a positive face-hand test into four groups. The characteristic responses for each group are summarized in table 1. These responses with examples are described more fully in the following paragraphs.

One-plus face-hand test: Subjects in this group show errors only of extinction and not of displacement. These errors occur only with touch stimuli. When pinprick is used, both stimuli are perceived correctly, although errors will again appear when touch stimuli are reintroduced.

Case 1.—A 64 year old man with mild diabetes was admitted with a history of difficulty in walking for the previous year and a half. For at least the same period of time he had been depressed, slept and ate poorly, and was impotent. The only neurologic finding was a slow, hesitant, shuffling gait. There was no evidence of peripheral vascular disease. The patient appeared depressed, showed psychomotor retardation, and cried readily. The sensorium was intact. Spinal fluid, electroencephalogram, and roentgenograms of

the spine were normal. The diagnosis was involuntional psychosis, depressed type. The gait difficulties were thought to be secondary to the depression.

This patient showed a one-plus response on the face-hand test. A sample of his responses follows:

<i>Stimulus</i>	<i>Location</i>	<i>Response</i>	<i>Type of error</i>
touch	right cheek-left hand	right cheek	extinction
touch	left cheek-right hand	left cheek	extinction
touch	right cheek-right hand	right cheek	extinction
touch	left cheek-left hand	left cheek	extinction
touch	right cheek-left cheek	correct	
touch	right hand-left hand	correct	
touch	right cheek-left hand	right cheek	extinction
touch	left cheek-right hand	correct	
touch	left cheek-left hand	correct	
touch	right cheek-right hand	right cheek	extinction
touch	left cheek-left hand	left cheek	extinction
pinprick	right cheek-left hand	correct	
pinprick	left cheek-right hand	correct	
pinprick	right cheek-right hand	correct	
pinprick	left cheek-left hand	correct	
touch	right cheek-left hand	correct	
touch	left cheek-right hand	left cheek	extinction

Comment: Although this type of response occurs in patients with cerebral disease, it is not always characteristic for this group. It is also observed in patients with depression, as this case illustrates, and may occur in anxiety states, schizophrenia, and, occasionally, in normal adults.

Two-plus face-hand test: In this group extinction occurs with pinprick and rubbing stimuli as well as with touch stimuli. These errors may be just as frequent with both types of stimuli or may be more conspicuous with touch than with pinprick or rubbing. Displacement is not present, as a rule, but may occur on an occasional trial.

Case 2.—A 72 year old man had a five week history of mental and behavioral changes. These consisted of disorientation, confused behavior, and intermittent mutism. Examination showed an organic mental syndrome characterized by partial disorientation, defects in recent memory, evasions and circumlocutions in answering questions, denial of illness, and pain asymbolia. There were no other neurologic disabilities. The spinal fluid, electroencephalogram, and skull roentgenograms were normal. A pneumoencephalogram showed an increased amount of air over the cerebrum and increase in the size of the ventricles.

This patient's responses on the face-hand test characterize the two-plus type of response. A sample of these responses follows:

<i>Stimulus</i>	<i>Location</i>	<i>Response</i>	<i>Type of error</i>
touch	left cheek-right hand	left cheek	extinction
touch	right cheek-left hand	right cheek	extinction
touch	left cheek-left hand	left cheek	extinction
touch	right cheek-right hand	right cheek	extinction
touch	right cheek-left cheek	correct	
touch	right hand-left hand	correct	
touch	right cheek-left hand	right cheek	extinction
pinprick	left cheek-right hand	left cheek	extinction

<i>Stimulus</i>	<i>Location</i>	<i>Response</i>	<i>Type of error</i>
pinprick	right cheek-left hand	correct	
pinprick	left cheek-left hand	left cheek	extinction
pinprick	right cheek-right hand	right cheek	extinction
pinprick	left cheek-right hand	left cheek	extinction

Comment: This response occurs most often in patients with cerebral disease, although occasionally patients with anxiety states, depression, or schizophrenia may also exhibit it. It is not seen in normal adults.

Three-plus face-hand test: This group is characterized by the occurrence of displacement as well as extinction with both touch and pinprick stimuli. The frequency of extinction and displacement may be equal or unequal and, likewise, the number of errors with touch and pinprick will be variable.

Case 3.—A 57 year old chronic alcoholic was found in the street in a stuporous condition. His breath had an alcoholic odor and there was a laceration over his right forehead. There were no focal neurologic signs. During the first hospital day the patient gradually became fully conscious. Speech was rambling and at times almost incoherent. He was completely disoriented and had severe memory defects with confabulation. He expressed paranoid ideas and was hostile and assaultive. There were no hallucinations. Spinal fluid and skull roentgenograms were normal. The diagnosis was acute and chronic alcoholism with deterioration.

A sample of this patient's responses on the face-hand test, indicative of a three-plus response, follows:

<i>Stimulus</i>	<i>Location</i>	<i>Response</i>	<i>Type of error</i>
touch	right cheek-left hand	right cheek-left cheek	displacement
touch	left cheek-right hand	right hand-left hand	displacement
touch	right cheek-right hand	right cheek	extinction
touch	left cheek-left hand	correct	
touch	left cheek-right hand	left cheek	extinction
touch	right cheek-left hand	right cheek-left cheek	displacement
touch	right hand-left hand	correct	
pinprick	right cheek-left hand	right cheek-left cheek	displacement
pinprick	left cheek-right hand	left cheek-right cheek	displacement
pinprick	right cheek-right hand	right cheek	extinction
pinprick	left cheek-left hand	left cheek	extinction

Four-plus face-hand test: This group shows the most severe perceptual errors. In addition to frequent extinction and displacement, as seen in the three-plus group, one or all of the following phenomena may be seen with touch and pinprick stimuli: 1) exosomesthesia; 2) allesthesia; 3) frequent perseveration of responses; 4) occurrence of perceptual errors even while the subject keeps his eyes open and sees the areas stimulated.

Case 4.—A 60 year old man had a three year history of disorientation, forgetfulness, and loss of interest. On examination he showed a severe organic mental syndrome manifested by complete disorientation, marked memory defects, and inability to calculate. He was alert and cooperative. There were no other neurologic signs. Spinal fluid and skull roentgenograms were normal. The electroencephalogram showed moderate, diffuse, bi-synchronous slowing with slow alpha. A pneumoencephalogram disclosed abnormal increased amounts of air in the subarachnoid spaces overlying the cerebral cortex.

A sample of the patient's responses, indicating a four-plus face-hand test, follows:

<i>Stimulus</i>	<i>Location</i>	<i>Response</i>	<i>Type of error</i>
touch	right cheek-left hand	right cheek	extinction
touch	left cheek-right hand	left cheek-	exosomesthesia
		extrapersonal space	
touch	right cheek-right hand	right cheek	extinction
touch	left cheek-left hand	right cheek	perseveration
touch	right hand-left hand	correct	
touch	right cheek-left hand	right cheek-left cheek	displacement
touch	left cheek-right hand	left cheek-left hand	allesthesia
pinprick	right cheek-left hand	right cheek-left cheek	displacement
pinprick	left cheek-right hand	left cheek	extinction
pinprick	right cheek-right hand	right cheek	extinction
pinprick	left cheek-left hand	left cheek-	exosomesthesia
		extrapersonal space	
pinprick (eyes open)	right cheek-left hand	right cheek-	exosomesthesia
		extrapersonal space	

Comment: Three-plus and four-plus responses invariably indicate disease of the brain. They are never found in normal adults or in patients with psychogenic disorders.

These responses have been occasionally seen, however, in normal children under the age of six,⁴ aged persons without manifest disease of the brain,⁶ and mental defectives.¹⁰ The distribution of responses of children and aged persons are related mainly to age. The youngest children and the oldest adults show three-plus and four-plus responses. With changes in age away from these extremes, one-plus and two-plus responses become more frequent. Of the subjects with mental deficiency, those with the lowest mental age have three-plus and four-plus responses, while one-plus and two-plus responses predominate in subjects with higher mental ages.

Table 2 summarizes the distribution of the four different types of responses among the various groups of subjects. Only patients with an organic mental syndrome show three-plus and four-plus responses. Such responses may be considered diagnostic of an organic mental syndrome.

DISCUSSION

In answer to the questions raised at the outset of this paper, our results indicate that four general types of positive face-hand tests occur and that

TABLE 2
PERCENTAGE FREQUENCY OF ONE-PLUS TO FOUR-PLUS POSITIVE FACE-HAND TEST
IN DIFFERENT GROUPS OF SUBJECTS

	<i>Negative F-H test</i>	<i>One- plus</i>	<i>Two- plus</i>	<i>Three- plus</i>	<i>Four- plus</i>
Organic mental syndrome	10	7	25	33	25
Normal adults (below 60 years of age)	99	1	0	0	0
Schizophrenic adults	nearly all	occa- sional	rare	never	never
Patients with anxiety states	nearly all	occa- sional	rare	never	never
Patients with psychogenic depression (all age groups included)	70	22	8	0	0

these types can be correlated with different groups of subjects (table 2). Our attention was focused mainly on whether there was a type of response which occurred only in patients with severe disease of the brain. All adult subjects with a three-plus or four-plus response have organic brain disease. Such responses are never seen in normal subjects or patients with psychogenic disorders, even though these groups may occasionally show one-plus or two-plus responses.

Patients with cerebral disease manifesting a four-plus response invariably show the severest or most advanced form of mental changes. Otherwise there is no good correlation between the type of positive face-hand test and the severity of sensorial defects. Some patients with severe mental changes may have only a two-plus response. In addition, 10 per cent of patients with an organic mental syndrome have a negative face-hand test. It is realized that the use of a one to four-plus nomenclature for the groups implies an increasing degree of cerebral dysfunction. This nomenclature was used because of convenience and such an implication is not intended.

This classification of a positive face-hand test should be useful clinically. In testing neurologic patients, the exact type of positive face-hand test should be recorded, rather than the designation "the face-hand test was positive" as has been done until now. Such a procedure will make it easier to judge whether the type of positive face-hand test indicates definite cerebral disease or whether it may be a manifestation of anxiety or depression. The use of such a classification will also make it easier to compare the response of patients at different times during their illness. In addition, it is valuable in clinical experimental work, for it has been applied in studies of the effects of drugs on perception and the responses of patients to electroshock treatment. In such studies alteration in perception can be measured by observing the duration and incidence of the variety of positive face-hand tests during the periods of testing.

SUMMARY

A standardization of the face-hand test is presented. A positive face-hand test is designated as one in which errors persist after the tenth trial. Four classes of positive face-hand tests are recorded. A one-plus face-hand test consists of extinction only with touch stimuli. A two-plus response is characterized by extinction with pinprick and rubbing stimuli, as well as with touch stimuli. A three-plus response consists of extinction and displacement with touch, rubbing, and pinprick stimuli. A four-plus response has all the characteristics of a three-plus response and in addition at least one of the following features: a) exosomesthesia; b) allesthesia; c) perseveration of responses; d) occurrence of errors even while the subject observes application of the stimuli. Three-plus and four-plus responses invariably indicate disease of the brain in subjects over the age of six years. One-plus and two-plus responses occur in patients with brain disease but are also manifested by a small number of normal adults and patients with psychogenic disorders.

Patients with a four-plus response show the severest mental changes but the converse is not true. There is no correlation between the severity of the mental changes and the type of positive face-hand test manifested. Usefulness of this classification in the study of patients clinically and in experimental work is suggested.

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Introduction:

In previous studies a simple perceptual test, the face-hand test, was introduced and the responses of normal subjects and of patients with psychiatric disorders were described in detail (1-6). The test consists of applying touch or pinprick stimuli simultaneously to the face and hand while the subject's eyes are closed. The subject is then asked to describe and to localize the percepts. Two general types of responses occur. The two stimuli may be perceived and localized correctly. Or, the subject may perceive only one stimulus and either not perceive the other (phenomenon of extinction) or mislocalize the second stimulus (phenomenon of displacement) (7). Most often the mislocalization or displacement occurs to another part of the subject's body, but occasionally there is displacement into extrapersonal space or onto the examiner (exosomesthesia) (8). Displacement of stimuli across the midline of the body (allosomesthesia) may also occur (9).

Normal adults show errors in perception on the initial trials of the face-hand test. Characteristically these errors consist of extinction of the stimulus to the hand whereas the face stimulus is perceived correctly (phenomenon of face dominance). As the tests are repeated the errors disappear so that by the tenth trial nearly all subjects correctly perceive both stimuli and then continue to be correct on subsequent trials. This type of response has been termed a "negative face-hand test." It occurs not only with normal adults but also in patients

with schizophrenia, depression, or severe anxiety.

In contrast to the preceding subjects, patients with an organic mental syndrome show extinction and displacement after ten trials of testing or as long as testing is continued. Such a response is termed a "positive face-hand test." A "positive face-hand test" is also manifested by normal children, normal aged persons, and mental defectives.

Because of the differential response of these several groups of subjects, the face-hand test has become useful clinically in detecting the presence of organic brain disease. During the course of our studies, however, it has been noted that patients with an organic mental syndrome vary greatly in the type and frequency of perceptual errors. Also, subjects without organic brain disease occasionally manifest a positive face-hand test. The questions which arise from these observations are: 1) Is it possible to classify or standardize the different types of errors occurring in subjects with a positive face-hand test?; 2) Is there a correlation between the types of responses and different groups of subjects?; 3) Is there a type of response which can be said to occur only in patients with severe disease of the brain? The present study is an attempt to answer these questions.

Method and Results:

We reviewed our previous records of the face-hand test done in almost 1000 patients with organic mental syndrome, normal adults, and schizophrenic adults, as well as in lesser numbers of normal children, normal aged persons, and subjects with

mental deficiency, depression and severe anxiety. Additional groups of some of these subjects were also tested in a systematic manner with different types of stimuli. The criteria used to formulate a standardization of the face-hand test were: 1) type of perceptual error; 2) frequency of various errors with different stimuli (touch, rubbing or scratching, and pinprick); 3) effect on the frequency of errors when the subject sees the application of the stimuli (factor of attention). Fifteen to thirty trials of the test were usually done for each subject. --

Based on these criteria, it was possible to divide patients showing a positive face-hand test into four groups. The characteristic responses for each group are summarized in Table I. These responses with examples are described more fully in the following paragraphs.

TABLE I

Features of Positive Face-Hand Tests
(Persistent errors after 10th trial)

<u>One-plus</u>	<u>Two-plus</u>	<u>Three-plus</u>	<u>Four-plus</u>
Extinction only with touch stimuli	Extinction with touch, rubbing, and pinprick stimuli. Occasional displacement with touch stimuli.	Extinction and displacement with touch, rubbing and pinprick stimuli	Same as three-plus with at least one of the following features: a) exosomesthesia b) allesthesia c) frequent perseveration d) occurrence of errors while subject watches the stimuli being applied.

One-Plus Face-Hand Test: The subjects in this group show errors only of extinction and not of displacement. These errors occur only with touch stimuli. When pinprick is used, both stimuli are perceived correctly, although errors will again appear when touch stimuli are reintroduced.

Case I: A 64 year old man with mild diabetes was admitted with a 1½ year history of difficulty in walking. For at least the same period of time he had been depressed, slept and ate poorly, and was impotent. The only neurological finding was a slow, hesitant, shuffling gait. There was no evidence of peripheral vascular disease. The patient appeared depressed, showed psychomotor retardation, and cried readily. The sensorium was intact. Spinal fluid, electroencephalogram, and X-rays of the spine were normal. The diagnosis was involuntional psychosis, depressed type. The gait difficulties were thought to be secondary to the depression.

This patient showed a one-plus response on the face-hand test. A sample of his responses follows:

<u>Stimulus</u>	<u>Location</u>	<u>Response</u>	<u>Type of Error</u>
touch	right cheek-left hand	right cheek	extinction
touch	left cheek-right hand	left cheek	extinction
touch	right cheek-right hand	right cheek	extinction
touch	left cheek-left hand	left cheek	extinction
touch	right cheek-left cheek	correct	
touch	right hand-left hand	correct	
touch	right cheek-left hand	right cheek	extinction

touch	left cheek-right hand	correct	
touch	left cheek-left hand	correct	
touch	right cheek-right hand	right cheek	extinction
touch	left cheek-left hand	left cheek	extinction
pinprick	right cheek-left hand	correct	
pinprick	left cheek-right hand	correct	
pinprick	right cheek-right hand	correct	
pinprick	left cheek-left hand	correct	
touch	right cheek-left hand	correct	
touch	left cheek-right hand	left cheek	extinction

Comment: Although this type of response occurs in patients with cerebral disease, it is not always characteristic for this group. It is also observed in patients with depression, as this case illustrates, and may occur in anxiety states, schizophrenia, and, occasionally, in normal adults.

Two-Plus Face-Hand Test: In this group extinction occurs with pinprick and rubbing stimuli as well as with touch stimuli. These errors may be just as frequent with both types of stimuli or may be more conspicuous with touch than with pinprick or rubbing. Displacement is not present, as a rule, but may occur on an occasional trial.

Case II: A 72 year old man had a 5 week history of mental and behavioral changes. These consisted of disorientation, confused behavior, and intermittent mutism. On examination there was an organic mental syndrome characterized by partial disorientation, defects in recent memory, evasions

and circumlocutions in answering questions, denial of illness, and pain asymbolia. There were no other neurological disabilities. The spinal fluid, electroencephalogram, and skull X-rays were normal. A pneumoencephalogram showed an increased amount of air over the cerebrum and increase in the size of the ventricles.

This patient's responses on the face-hand test characterize the two-plus type of response. A sample of these responses follow:

<u>Stimulus</u>	<u>Location</u>	<u>Response</u>	<u>Type of Error</u>
touch	left cheek-right hand	left cheek	extinction
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touch	right cheek-left cheek	correct	
touch	right hand-left hand	correct	
touch	right cheek-left hand	right cheek	extinction
pinprick	left cheek-right hand	left cheek	extinction
pinprick	right cheek-left hand	correct	
pinprick	left cheek-left hand	left cheek	extinction
pinprick	right cheek-right hand	right cheek	extinction
pinprick	left cheek-right hand	left cheek	extinction

Comment: This response occurs most often in patients with cerebral disease although occasionally patients with anxiety states, depression or schizophrenia may also exhibit it. It is not seen in normal adults.

Three-Plus Face-Hand Test: This group is characterized by the occurrence of displacement as well as extinction with both touch and pinprick stimuli. The frequency of extinction and displacement may be equal or unequal and, likewise, the number of errors with touch and pinprick will be variable.

Case III: A 57 year old chronic alcoholic was found in the street in a stuporous condition. His breath had an alcoholic odor and there was a laceration over his right forehead. There were no focal neurological signs. During the first hospital day the patient gradually became fully conscious. Speech was rambling and at times almost incoherent. He was completely disoriented and had severe memory defects with confabulation. He expressed paranoid ideas and was hostile and assaultive. There were no hallucinations. Spinal fluid and skull X-rays were normal. The diagnosis was acute and chronic alcoholism with deterioration.

A sample of this patient's responses on the face-hand test, indicative of a three-plus response, follows:

<u>Stimulus</u>	<u>Location</u>	<u>Response</u>	<u>Type of Error</u>
touch	right cheek-left hand	right cheek-left cheek	displacement
touch	left cheek-right hand	right hand-left hand	displacement
touch	right cheek-right hand	right cheek	extinction
touch	left cheek-left hand	correct	
touch	left cheek-right hand	left cheek	extinction
touch	right cheek-left hand	right cheek-left cheek	displacement

touch	right hand-left hand	correct	
pinprick	right cheek-left hand	right cheek- left cheek	displacement
pinprick	left cheek-right hand	left cheek- right cheek	displacement
pinprick	right cheek-right hand	right cheek	extinction
pinprick	left cheek-left hand	left cheek	extinction

Four-Plus Face-Hand Test: This group shows the severest perceptual errors. In addition to frequent extinction and displacement, as seen in the three-plus group, one or all of the following phenomena may be seen with touch and pinprick stimuli: 1) exosomesthesia; 2) allesthesia; 3) frequent perseveration of responses; 4) the occurrence of perceptual errors even while the subject keeps his eyes open and sees the areas stimulated.

Case IV: A 60 year old man had a three year history of disorientation, forgetfulness, and loss of interest. On examination he showed a severe organic mental syndrome manifested by complete disorientation, marked memory defects, and inability to calculate. He was alert and cooperative. There were no other neurological signs. Spinal fluid and skull X-rays were normal. EEG showed moderate, diffuse, bisynchronous slowing with slow alpha. A pneumoencephalogram disclosed abnormal increased amounts of air in the subarachnoid spaces overlying the cerebral cortex.

A sample of the patient's responses, indicating a four-plus face-hand test, follows:

<u>Stimulus</u>	<u>Location</u>	<u>Response</u>	<u>Type of Error</u>
touch	right cheek-left hand	right cheek	extinction
touch	left cheek-right hand	left cheek- extrapersonal space	exosomesthesia
touch	right cheek-right hand	right cheek	extinction
touch	left cheek-left hand	right cheek	perseveration
touch	right hand-left hand	correct	
touch	right cheek-left hand	right cheek- left cheek	displacement
touch	left cheek-right hand	left cheek- left hand	allesthesia
pinprick	right cheek-left hand	right cheek- left cheek	displacement
pinprick	left cheek-right hand	left cheek	extinction
pinprick	right cheek-right hand	right cheek	extinction
pinprick	left cheek-left hand	left cheek- extrapersonal space	exosomesthesia
pinprick (eyes open)	right cheek-left hand	right cheek- extrapersonal space	exosomesthesia

Comment: Three-plus and four-plus responses invariably indicate disease of the brain. They are never found in normal adults or in patients with psychogenic disorders.

These responses have been occasionally seen, however, in normal children under the age of six (4), aged persons without manifest disease of the brain (6) and mental defectives (10). The distribution of the responses of the children and aged persons are related mainly to age. The youngest children and the oldest adults show three-plus and four-plus responses.

With changes in age away from these extremes, one-plus and two-plus responses become more frequent. Of the subjects with mental deficiency, those with the lowest mental age have three-plus and four-plus responses while one-plus and two-plus responses predominate in subjects with higher mental ages.

Table II summarizes the distribution of the four different types of responses among the various groups of subjects. Only patients with an organic mental syndrome show three-plus and four-plus responses. Such responses may be considered diagnostic of an organic mental syndrome.

TABLE II

Frequency of One-Plus to Four-Plus Positive
Face-Hand Test in Different Groups of Subjects

	<u>Negative F-H test</u>	<u>One- Plus</u>	<u>Two- Plus</u>	<u>Three Plus</u>	<u>Four- Plus</u>
Organic Mental Syndrome	10%	7%	25%	33%	25%
Normal Adults (below 60 years of age)	99%	1%	0	0	0
Schizophrenic Adults	nearly all	occas- ionally	rare	never	never
Patients with anxiety states	nearly all	occas- ionally	rare	never	never
Patients with psycho- genic depression (all age groups included)	70%	22%	8%	0	0

Discussion:

In answer to the questions raised in the introduction, our results indicate that four general types of positive

face-hand tests occur and that these types can be correlated with different groups of subjects (Table II). Our attention was focused mainly on the question of whether there was a type of response which occurred only in patients with severe disease of the brain. All adult subjects with a three-plus or four-plus response have organic brain disease. Such responses are never seen in normal subjects or patients with psychogenic disorders, even though these groups may occasionally show one-plus or two-plus responses.

Patients with cerebral disease manifesting a four-plus response invariably show the severest or most advanced form of mental changes. Otherwise there is no good correlation between the type of positive face-hand test and the severity of the sensorial defects. Some patients with severe mental changes may have only a two-plus response. In addition, 10% of patients with an organic mental syndrome have a negative face-hand test. It is realized that the use of a one to four-plus nomenclature for the groups implies an increasing degree of cerebral dysfunction. This nomenclature was used because of convenience and such an implication is not intended.

This classification of a positive face-hand test should be useful clinically. In testing neurological patients, the exact type of positive face-hand test should be recorded, rather than the designation "the face-hand test was positive" as has been done until now. Such a procedure will make it easier to judge whether the type of positive face-hand test indicates definite cerebral disease or whether it may be a manifestation of anxiety or depression. The use of such a

classification will also make it easier to compare the response of patients at different times during their illness. In addition, it is valuable in clinical experimental work, for it has been applied in studies of the effects of drugs on perception, and the responses of patients to electroshock treatment. In such studies alteration in perception can be measured by observing the duration and the incidence of the variety of positive face-hand tests during the periods of testing.

Summary:

A standardization of the face-hand test is presented. A positive face-hand test is described as one in which errors persist after the tenth trial. Four classes of positive face-hand tests are recorded. A one-plus face-hand test consists of extinction only with touch stimuli. A two-plus response is characterized by extinction with pinprick and rubbing stimuli, as well as with touch stimuli. A three-plus response consists of extinction and displacement with touch, rubbing, and pinprick stimuli. A four-plus response has all the characteristics of a three-plus response and in addition at least one of the following features: a) exosomesthesia; b) allesthesia; c) perseveration of responses; d) occurrence of errors even while the subject sees the application of the stimuli. Three-plus and four-plus responses invariably indicate disease of the brain in subjects over the age of six years. One-plus and two-plus responses occur in patients with brain disease but are also manifested by a small number of normal adults and patients with psychogenic disorders. Patients with a four-plus

response show the severest mental changes but the converse is not true. There is no correlation between the severity of the mental changes and the type of positive face-hand test manifested. The usefulness of this classification in the study of patients clinically and in experimental work is indicated.

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