

Definition

The mental status examination is a structured assessment of the patient's behavioral and cognitive functioning. It includes descriptions of the patient's appearance and general behavior, level of consciousness and attentiveness, motor and speech activity, mood and affect, thought and perception, attitude and insight, the reaction evoked in the examiner, and, finally, higher cognitive abilities. The specific cognitive functions of alertness, language, memory, constructional ability, and abstract reasoning are the most clinically relevant.

Technique

In his *Treatise on Insanity*, published in 1801, Pinel, one of the fathers of modern psychiatry, gave some advice to his contemporary colleagues.

To seize the true character of mental derangement in a given case, and to pronounce an infallible prognosis of the event, is often a task of particular delicacy, and requires the united exertion of great discernment, of extensive knowledge and of incorruptible integrity.

One could scarcely improve on this advice in the present-day approach to mental status evaluation. The knowledge that the modern physician can bring to bear on this task is certainly much more extensive than in 1801. Nevertheless, the observational skills and subtle discriminations that constitute "great discernment," and the traits of professional and scientific integrity that are likewise required, must be cultivated afresh in each generation of physicians.

The mental status examination, in many respects, lends itself less well to a systematic and structured approach than other portions of the examination of the patient. On the one hand, because mental status testing can be threatening to the patient and requires much cooperation on the part of the patient, it is desirable to leave the mental status testing to the end of the overall evaluation when the patient can be placed most at ease and when some degree of rapport has been established between the examiner and the patient. On the other hand, the mental state of the patient colors the accuracy and sensitivity of the entire medical history, and from this standpoint, the physician wishes he or she could perform a mental status examination as a prelude to the rest of the medical history in order to have the assessment as a template against which to measure the accuracy of the rest of the history. The successful clinician must develop a style in which much of the mental status examination is performed through relatively unstructured observations made during the routine history and physical. The way in which the patient relates the history of the present illness will reveal much about general appearance and behavior,

alertness, speech, activity, affect, and attitude. A primary technique, then, in mental status testing is the imposition of some structure on these observations and raising them from the level of subliminal impressions to clinically useful descriptions of behavior.

When there is history or evidence of clinically significant psychiatric illness, such as aberrant behavior or thinking, abnormalities on neurologic examination, or difficulties in day-to-day performance on the job or in social situations, then a formal dissecting of specific cognitive abilities should be performed near the close of the physician-patient encounter. When this is done, the examination needs to be introduced carefully to the patient, with some explanation as to why it is being done, in order to enlist patient cooperation rather than resistance. The structured mental status examination should focus on the observations listed in Table 207.1.

Level of Consciousness

The level of consciousness refers to the state of wakefulness of the patient and depends both on brainstem and cortical components. Levels are operationally defined by the strength of stimuli needed to elicit responses, and the scheme of Plum and Posner (1980) is widely accepted.

A *normal* level of consciousness is one in which the patient is able to respond to stimuli at the same lower level of strength as most people who are functioning without neurologic abnormality. *Clouded consciousness* is a state of reduced awareness whose main deficit is one of inattention. Stimuli may be perceived at a conscious level but are easily ignored or misinterpreted. *Delirium* is an acute or subacute (hours to days) onset of a grossly abnormal mental state often exhibiting fluctuating consciousness, disorientation, heightened irritability, and hallucinations. It is often associated with toxic, infectious, or metabolic disorders of the central ner-

Table 207.1
The Mental Status Examination

Level of consciousness
Appearance and general behavior
Speech and motor activity
Affect and mood
Thought and perception
Attitude and insight
Examiner's reaction to the patient
Cognitive abilities
Attention
Language
Memory
Constructional ability and praxis
Abstract reasoning

vous system. *Obtundation* refers to moderate reduction in the patient's level of awareness such that stimuli of mild to moderate intensity fail to arouse; when arousal does occur, the patient is slow to respond. *Stupor* may be defined as unresponsiveness to all but the most vigorous of stimuli. The patient quickly drifts back into a deep sleep-like state on cessation of the stimulation. *Coma* is unarousable unresponsiveness. The most vigorous of noxious stimuli may or may not elicit reflex motor responses.

When examining patients with reduced levels of consciousness, noting the type of stimulus needed to arouse the patient and the degree to which the patient can respond when aroused is a useful way of recording this information.

Appearance and General Behavior

These variables give the examiner an overall impression of the patient. The patient's physical appearance (apparent vs. stated age), grooming (immaculate/unkempt), dress (subdued/riotous), posture (erect/kyphotic), and eye contact (direct/furtive) are all pertinent observations. Certain specific syndromes such as unilateral spatial neglect and the disinhibited behavior of the frontal lobe syndrome are readily appreciated through observation of behavior.

Speech and Motor Activity

Listening to spontaneous speech as the patient relates answers to open-ended questions yields much useful information. One might discern problems in output or articulation such as the hypophonia of Parkinson's disease, the halting speech of the patient with word-finding difficulties, or the rapid and pressured speech of the manic or amphetamine-intoxicated patient. Overall motor activity should also be noted, including any tics or unusual mannerisms. Slowness and loss of spontaneity in movement may characterize a subcortical dementia or depression, while akathisia (motor restlessness) may be the harbinger of an extrapyramidal syndrome secondary to phenothiazine use.

Affect and Mood

Affect is the patient's immediate expression of emotion; *mood* refers to the more sustained emotional makeup of the patient's personality. Patients display a range of affect that may be described as broad, restricted, labile, or flat. Affect is inappropriate when there is no consonance between what the patient is experiencing or describing and the emotion he is showing at the same time (e.g., laughing when relating the recent death of a loved one). Both affect and mood can be described as dysphoric (depression, anxiety, guilt), euthymic (normal), or euphoric (implying a pathologically elevated sense of well-being).

Affect must be judged in the context of the setting and those observations that have gone before. For example, the startled-looking patient with eyes wide open and perspiration beading out on the forehead is soon recognized as someone suffering from Parkinson's disease, when the paucity of motion and diminished eye blink are noted and the beads of perspiration turn out to be seborrhea.

Thought and Perception

The inability to process information correctly is part of the definition of psychotic thinking. How the patient perceives and responds to stimuli is therefore a critical psychiatric assessment. Does the patient harbor realistic concerns, or are these concerns elevated to the level of irrational fear? Is the patient responding in exaggerated fashion to actual events, or is there no discernible basis in reality for the patient's beliefs or behavior?

Patients may exhibit marked tendencies toward somatization or may be troubled with intrusive thoughts and obsessive ideas. The more seriously ill patient may exhibit overtly *delusional thinking* (a fixed, false belief not held by his cultural peers and persisting in the face of objective contradictory evidence), *hallucinations* (false sensory perceptions without real stimuli), or *illusions* (misperceptions of real stimuli). Because patients often conceal these experiences, it is well to ask leading questions, such as, "Have you ever seen or heard things that other people could not see or hear? Have you ever seen or heard things that later turned out not to be there?" Likewise, it is necessary to interpret affirmative responses conservatively, as mistakenly hearing one's name being called, or experiencing hypnagogic hallucinations in the peri-sleep period, is within the realm of normal experience.

Of all portions of the mental status examination, the evaluation of a potential thought disorder is one of the most difficult and requires considerable experience. The primary-care physician will frequently desire formal psychiatric consultation in patients exhibiting such disorders.

Attitude and Insight

The patient's attitude is the emotional tone displayed toward the examiner, other individuals, or his illness. It may convey a sense of hostility, anger, helplessness, pessimism, overdramatization, self-centeredness, or passivity. Likewise, the patient's attitude toward the illness is an important variable. Is the patient a help-rejecting complainer? Does the patient view the illness as psychiatric or nonpsychiatric? Does the patient look for improvement or is he or she resigned to suffer in silence?

Patient attitude often changes through the course of the interview, and it is important to note any such changes.

Examiner's Reaction to the Patient

The feelings aroused in the examiner by the patient are often a source of very useful information. These data are sometimes subtle and easily overlooked as the examiner, in an attempt to remain objective, fails to note how he or she is responding to the patient.

A developing sense of dysphoria in the examiner may be the first clue that the physician is dealing with a depressed patient. Frustration may be the response to the help-rejecting complainer while a feeling of being off-balance and slightly out of touch with the conversation may be an early indication that one is dealing with a schizophrenic patient.

Structured Examination of Cognitive Abilities

The preceding sections of the mental status examination provide a *Gestalt* view of the patient and his illness. A struc-

tured examination of specific cognitive abilities is a more reductionistic approach to the patient and pays careful attention to neuroanatomic correlates. Such testing logically follows a hierarchic ordering of cortical function with attention and memory being the most basic functions on which higher-ordered abilities of language, constructional ability, and abstract thinking are layered.

ATTENTION

The testing of attention is a more refined consideration of the state of wakefulness than level of consciousness. An ideal test of attentiveness should assay concentration on a simple task, placing minimal demand on language function, motor response, or spatial conception. Reaction times are frequently slowed in patients who have diminished attentiveness. This may become evident early in the course of examination and provide an important clue that the examiner is dealing with decreased attentiveness. One test often recommended is the ability to listen to digit spans of increasing length and repeat them back to the examiner. Another is to have the patient listen to a digit span and then repeat it backward. Perhaps a better test is to have the patient listen to a string of letters in which one letter is repeated frequently but randomly and to tap each time that letter is heard, for example, "Please tap each time you hear the letter K."

T L K B K M N Z K K T K G B H W K L T K . . .

The number of errors the patient makes is noted. Another test might be to have the patient count the number of times a given letter appears on a page full of randomly ordered letters.

LANGUAGE

The left perisylvian cortex mediates most aspects of language function in 99% of right-handed individuals and over half of left-handed individuals. Thus, an aphasia implies damage to the left hemisphere about 95% of the time. Basic examination of language function should include an assessment of spontaneous speech, comprehension of spoken commands, reading ability, reading comprehension, writing, and repetition.

The assessment of spontaneous speech is performed as the patient supplies answers to open-ended questions. In this evaluation one looks for disorders of articulation, abnormalities of content, disorders of output, and paraphasic errors. *Phonemic errors* are mistakes in pronunciation; *semantic errors* are errors in the meaning of words; *neologisms* are meaningless nonwords that have a specific meaning for the patient.

Repetition is tested by having the patient repeat sentences with several nouns and pronouns, for example, "That's what she said to them yesterday," and "No ifs, ands, or buts."

Comprehension is tested with several levels of responses. First the patient is asked complex yes and no questions such as, "Do you take off your clothes before taking a shower?" thereby minimizing the need for motoric and speech acts. Second, questions where gesture alone can be an adequate response are asked, for example, "Point to where people may sit down in this room." Finally, the patient is asked to follow a command with a motor response: "Squeeze my fingers."

Word-finding disability may be suspected when spontaneous speech is halting in nature as the patient searches for the proper word. To test this ability, the patient is asked to name a number of objects of several categories ranging

from the everyday to the more unusual. To stress this ability further the naming of parts of objects, for example, the crystal of a watch, the lead of a pencil, is also tested. Word fluency is more specifically tested by having the patient generate as many words in a given category as he or she is able in a fixed time period. Standard tests ask for such things as "items found in a supermarket" or "words beginning with the letters F, then A, then S."

Reading is tested by having the patient read out loud, listening for errors and testing reading comprehension by having the patient follow a written command, for example, "Close your eyes." Standardized short stories are available that patients can be asked to read and then later recall. These are scored on the remembrance of key items.

Writing is tested by having the patient sign his name, generate spontaneous sentences, or describe an object in writing.

MEMORY

Memory disturbance is a common complaint and is often a presenting symptom in the elderly. Memory can be grouped simplistically into three subunits: immediate recall, short-term memory, and long-term storage.

Short-term memory is the most clinically pertinent, and the most important to be tested. Short-term retention requires that the patient process and store information so that he or she can move on to a second intellectual task and then call up the remembrance after completion of the second task. Short-term memory may be tested by having the patient learn four unrelated objects or concepts, a short sentence, or a five-component name and address, and then asking the patient to recall the information in 3 to 5 minutes after performing a second, unrelated mental task.

Orientation largely reflects recent memory function. Questions such as, "Where are we right now? What city are we in? What is today's date? What time is it right now (to the nearest hour)?" are pertinent questions.

Immediate recall can be tested once again by having the patient repeat digit spans, both forward and backward. Long-term memory can be tested by the patient's ability to recall remote personal or historic events (e.g., the naming of previous presidents, major wars, date of the bombing of Pearl Harbor) or answer select questions from the WAIS information subtest. Obviously, in asking remote personal events, the physician must be privy to accurate information to judge the accuracy of the patient's response.

CONSTRUCTIONAL ABILITY AND PRAXIS

Apraxia is the inability, not due to weakness, to perform previously learned motor acts. The more common of these are ideomotor apraxias wherein the patient can initiate movements and manipulation of objects but is unable to pretend a given action. This modality is tested by asking the patient to "sew on an imaginary button," "use an imaginary scissors," or "light an imaginary cigarette."

Ideatory apraxia is the breakdown of higher-ordered sequencing of steps in the manipulation of real objects. It is tested by serial step commands, for example, "Take this piece of paper in your left hand, then fold it up, place it in the envelope, and seal the envelope."

Constructional inability is loss of the capacity to generate line drawings or manipulate block designs from verbal command or visual reproduction. Geschwind (1965) has pointed out that the older term "constructional apraxia" is insufficient to describe this ability as it involves integration of occipital, parietal, and frontal lobe functions and is there-

fore more complex than the word “praxis” would indicate. The patient is tested by being shown line drawings of increasing complexity and being asked to reproduce them. Next, the patient is asked to generate pictures from memory, for example, “Draw a clock face; put in the numbers; draw hands on the clock to say 8:20.” Finally, the patient may be asked to manipulate blocks (multicolored cubes from WAIS-R) to reproduce stimulus designs.

ABSTRACT REASONING

Insight, judgment, manipulation of knowledge to solve problems, and other forms of abstract thinking can only be tested very crudely in the clinic or laboratory. These abilities are perhaps best assessed by probing into how the patient functions on the job, in community affairs, and social situations by proxy interview as well as by patient interview.

Some elements can be formally tested by having the patient perform calculations (complex as well as rote tables), interpret proverbs, and describe similarities between ordered pairs, for example, “How is a tree like a banana?” “How is praise similar to criticism?”

Basic Science

Mental disorders causally related to brain disease have been known since antiquity, as evidenced in the works of the compilers of the Hippocratic tradition. Pinel’s influential *Treatise on Insanity* helped disseminate the idea that some mental illnesses have a psychologic causation, while others are secondary to physical illnesses.

Mental status testing stands as unique in the examination of the patient in that it attempts to examine that organ about which we understand the least. While the fundamental structural units of other organs (e.g., the nephron, the islet cell, the myofibril) have been understood at the molecular level, the human engram remains unelucidated. Until there is a quantum leap in understanding within the neurosciences, the brain must continue to be treated largely as a “black box” as the clinician attempts to observe, test, and codify its output—human behavior.

The past several decades have seen the development of a large body of literature dealing with neuropsychologic testing. It is beyond the scope of this chapter to consider this broad topic; however, some recent efforts to simplify and systematize the cognitive portion of mental status testing will be of interest and use to the primary-care physician.

The Kahn and Goldfarb (1960) Mental Status Questionnaire (MSQ) was one of the first efforts in this direction. It consists of 10 questions, selected from 31 in the original instrument that had the greatest discriminating power for “organicity.”

The Mini-Mental State of Folstein et al. (1975) is perhaps the most widely used “short, portable” mental status test. This is a 30-point test with 10 points devoted to orientation, 3 to registration, 5 to calculation, 3 to short-term memory, 8 to language function, and 1 to constructional ability. Much of the criticism leveled against short screening instruments is obviated if the user realizes the limitations of a screening test and does not overinterpret results.

The same axiom holds true in mental status testing as in the remainder of the history and physical—that a cursory examination will yield cursory data. For more complete mental status testing that allows more localizing potential and more sensitivity to changes over time, the mental status

exams of Strub and Black (1985) and of Mattis (1970) are commended to the reader.

Clinical Significance

What one thinks of as the “standard neurologic examination” is largely devoted to the testing of thresholds of perception of the special senses and the integrity of the motor and extrapyramidal systems. In terms of the cerebral cortex, the neurologic examination concerns itself mainly with the narrow motor and sensory strips around the central sulcus of Rolando. Large portions of the neocortex that are more removed from the primary motor and sensory strips mediate sensory input and formulate response. These association areas of the cortex especially include the frontal, temporoparietal, inferior temporal, and parieto-occipital regions of the brain.

Attentiveness

Attentiveness requires both an intact brainstem and cortical functioning. The ascending reticular activating system extending from the midbrain into the hypothalamus and thalamus profoundly influences arousal. Any substantive damage to the neocortex may likewise have an effect on arousal. Inattentiveness is often seen in effective disorders such as depression, and has been postulated to be secondary to dysfunction in the ascending biogenic amine pathways. Such dysfunction may be etiologic in the dementia syndrome of depression.

A condition of inattentiveness, then, does little to differentiate between toxic and metabolic states, diffuse cortical dysfunction, or psychiatric dysfunction. Such is not the case, however, when there is laterality to the inattentiveness. Instances of unilateral spatial neglect usually imply a destructive lesion of the contralateral parietal lobe.

Language

The left perisylvian cortex, receiving its vascular supply from the left middle cerebral artery, mediates most aspects of language function in over 95% of individuals. Any lesion within this region results in defective language performance.

The works of Paul Broca and Carl Wernicke of the late 1800s were some of the earliest to identify specialized functions of different areas of the neocortex. Lesions on the left side of the frontal lobe near the face area of the motor cortex (Broca’s area) lead to disruption in the ability to perform speech acts. The speech in patients with such lesions is labored, slow, often ungrammatical, and often displaying impaired articulation. The resultant speech pattern has been described as telegraphic. Comprehension, however, remains intact. Damage to a superior portion of the temporal lobe near the angular gyrus leads to fluent speech which may be grammatically correct and sound phonetically normal but is either semantically empty or overtly nonsensical (Wernicke’s aphasia).

Thus, the earliest models of language function postulated that the coordinated programs for performing speech acts lay within Broca’s area, while the seat of language comprehension lay within Wernicke’s area.

Later refinements of the theory of language function lay

in further elucidation of adjacent cortical association areas and their interconnections. Norman Geschwind (1965) developed an excellent operational classification of the aphasias based on hypothesized connections between receptive cortical areas and associative areas. For example, destruction of the arcuate fasciculus, the connection allowing conduction from Wernicke's to Broca's areas, leads to a speech disorder which may be fluent and Wernicke-like, but in which there is relatively good comprehension and severely impaired repetition. This is called *conduction aphasia*. The angular gyrus seems to mediate between visual and auditory centers of the brain, and lesions here have the effect of disconnecting auditory from written language. Such patients may speak and understand speech but not understand written language.

In some classifications, lesions in other cortical areas, as well as in subcortical structures, result in language disorders more subtle than strict loss of comprehension or loss of ability to perform speech acts. Such lesions may affect the normal pitch and cadence of speech and destroy subtleties of full comprehension such as appreciation of irony, sarcasm, and humor. These have been termed *transcortical aphasias*.

Some aphasic patients exhibit as their only defect a word-finding difficulty and exhibit circumlocution and an inability to name objects or parts of objects. Spontaneous speech is fluent and grammatic but with many word-finding pauses. This so-called *anomic aphasia* is seen with lesions in many parts of the dominant hemisphere and probably reflects either damage and patchy loss of the patient's internal lexicon of semantic memory or difficulty in accessing semantic memory.

Memory

Memory is a little understood function that has been an unsolved puzzle in neuroscience and a faculty imparting wonderment to artists and philosophers alike. That ethereal term we refer to as "consciousness," philosophically speaking, probably resides in immediate memory.*

The character Fanny in Jane Austen's *Mansfield Park* reflects upon this faculty:

If any one faculty of our nature may be called *more* wonderful than the rest, I do think it is memory. There seems to be something more speakingly incomprehensible in the powers, the failures, the inequalities of memory, than in any other of our intelligences. The memory is sometimes so retentive, so serviceable, so obedient: at others so bewildered and so weak; and at others again, so tyrannic, so beyond control! We are, to be sure, a miracle every way; but our powers of recollecting and of forgetting do seem peculiarly past finding out.

Finally, memory is an ability many people equate with intellectual prowess. It is no wonder that memory disturbance is one of the most distressing symptoms with which a patient may present.

An amnesic syndrome is produced by bilateral damage to the limbic system (hippocampus, mamillary bodies, an-

*The author credits this philosophic notion to Francis H.C. Crick. Descartes may have been more correct had he said, "I remember, therefore I am."

terior thalamus). This disorder, seen in Korsakoff's psychosis, bilateral hippocampal infarction, and herpes simplex encephalitis, results in a dramatic loss of short-term retention and, in the extreme, a total inability to lay down any long-term memory traces.

Cortical lesions of the dominant hemisphere tend to result in impairment of verbal retention, while nondominant hemispheric lesions with projections to the hippocampi result in nonverbal retention deficits. Thus a demonstration of a differential in verbal versus nonverbal memory ability has some localizing potential.

The primary degenerative dementias (Alzheimer's, Parkinson's, Pick's) result in complex anatomic and neurochemical disturbances that can affect much of the neocortical mantle. Memory disturbance is a prominent early symptom resulting first in a defective short-term memory followed by retrograde loss of more remote memory. A key clinical issue is the differentiation of pathologic dementia from age-related benign forgetfulness. Historic features suggesting early dementia would be memory loss sufficient to interfere with work, recreation, community affairs, or ability to carry out activities of daily living. Memory dysfunction that worsens over a matter of months tends to be pathologic. History of dysfunction, especially in complicated job-related skills, may be a more sensitive probe for an early dementia than mental status testing, and because of the importance of early detection of potentially treatable dementia, a metabolic work-up should not be deferred, even if the patient performs well on mental status testing.

Constructional Ability

Because of the left-hemisphere predominance in the vast majority of the population, and the frequency of aphasias in damage to this hemisphere, no mental status testing is complete without comparable tasks testing both language and nonlanguage function. It was once felt that the right hemisphere was dominant for spatial relationships, hence constructional abilities, but it is now clear that damage to either side of the brain can lead to disability in this faculty. A better generalization would be that the more severe the disability, the more likely the lesion is to be posterior to the Rolandic sulcus, and that severe constructional disability, in the absence of an aphasia, implies nondominant hemispheric involvement.

Disease processes giving rise to widespread cortical damage, such as Alzheimer's disease or multi-infarct dementia, often manifest constructional disabilities, and a deterioration of these abilities helps chart the course of the disease.

Abstract Reasoning

A tendency toward concreteness in thinking is a finding common to most disease processes with global effects on the brain. Because abstracting ability and calculation are dependent on premorbid IQ and educational level, some knowledge of these factors aids in the interpretation of patient performance.

Because of the bihemispheric dominance of calculation and abstraction and the high order of integration of these factors, disturbances here have limited neuroanatomic localizing potential. Nonetheless, some generalizations may be helpful. Derangement of social awareness and judgment,

along with emotional lability, is often seen with lesions to the frontal lobes.

Alexia and agraphia for numbers are strongly associated with acalculia, and patients who are severely impaired tend to have lesions posterior to the Rolandic sulcus. Both anarithmetia and spatial calculation disorders may be found predominantly in patients with left posterior hemisphere damage.

Because deficiency in information processing is central to major thought disorders, patients with depression, mania, or schizophrenia will often display impairment in abstract reasoning, and psychiatric illness figures prominently in the differential diagnosis.

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