

Answers to 7 questions about using neuropsychological testing in your practice

What assessments are available to you? How do findings inform your care of patients?

Neuropsychological evaluation, consisting of a thorough examination of cognitive and behavioral functioning, can make an invaluable contribution to the care of psychiatric patients. Through the vehicle of standardized measures of abilities, patients' cognitive strengths and weaknesses can be elucidated—revealing potential areas for further interventions or to explain impediments to treatment. A licensed clinical psychologist provides this service.

You, as a consumer of reported findings, can use the results to inform your diagnosis and treatment plan. Recommendations from the neuropsychologist often address dispositional planning, cognitive intervention, psychiatric intervention, and work and school accommodations.

Probing the brain–behavior relationship

Neuropsychology is a subspecialty of clinical psychology that is focused on understanding the brain–behavior relationship. Drawing information from multiple disciplines, including psychiatry and neurology, neuropsychology seeks to uncover the cognitive, behavioral, and emotional difficulties that can result from known or suspected brain dysfunction. Increasingly, to protect the public and referral sources, clinical psychologists who perform neuropsychological testing demonstrate their competence through board certification (eg, the American Board of Clinical Neuropsychology).

How is testing conducted? Evaluations comprise measures that are standardized, scored objectively, and have established psychometric properties. Testing can be performed on an outpatient or inpatient basis; the duration of testing de-



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Disclosure

The authors report no financial relationships with any company whose products are mentioned in this article or with manufacturers of competing products.



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In addition to the cognitive aspect of a neuropsychological evaluation, personality measures are incorporated when relevant

depends on the question for which the referring practitioner seeks an answer.

Measures typically are administered by paper and pencil, although computer-based assessments are increasingly being employed. Because of the influence of demographic variables (age, sex, years of education, race), scores are compared with normative samples that resemble those of the patient's background as closely as possible.

A thorough clinical interview with the patient, a collateral interview with caregivers and family, and review of relevant medical records are crucial parts of the assessment. Multiple areas of cognition are assessed:

- intelligence
- academic functioning
- attention
- working memory
- speed of processing
- learning and memory
- visual spatial skills
- fine motor skills
- executive functioning.

Essentially, the evaluation speaks to a patient's neurocognitive functioning and cerebral integrity.

How are results scored? Interpretation of test scores is contingent on expectations of how a patient should perform in the absence of neurologic or psychiatric illness (ie, based on normative data and performance-based estimates of premorbid functioning).¹ The overall pattern of intact scores and deficit scores can be used to form specific impressions about a diagnosis, cognitive strengths and weaknesses, and strategies for intervention.

Personality testing. In addition to the cognitive aspect of the evaluation, personality measures are incorporated when relevant to the referral question or presenting concern.

Personality tests can be broadly divided into objective and projective measures. Objective personality measures, such as the Minnesota Multiphasic Personality Inventory-Second Edition, require the examinee to respond to a set of items as true or false or on a Likert-type scale from

strongly agree to disagree. Responses are then scored in standardized fashion, making comparisons to normative data, which are then analyzed to determine the extent to which the examinee experiences psychiatric symptoms.

As part of testing, patients' responses to ambiguous or unstructured standard stimuli—such as a series of drawings, abstract patterns, or incomplete sentences—are analyzed to determine underlying personality traits, feelings, and attitudes. Classic examples of these measures include the Rorschach Test and the Thematic Apperception Test.

Personality measures and psychiatric testing are designed to answer questions related to patients' emotional status. These measures assess psychiatric symptoms and diagnoses, whereas neuropsychological measures provide an understanding of patients' cognitive assets and limitations.

7 Common questions about neuropsychological testing

1 Will my patient's insurance cover these assessments? The question is common from practitioners who are considering requesting an assessment for a patient. The short answer is "Yes."

Most payers follow Medicare guidelines for reimbursement of neuropsychological testing; if testing is determined to be medically necessary, insurance companies often cover the assessment. Medicaid also pays for psychometric testing services.

Neuropsychologists who have a hospital-based practice typically include patients with all types of insurance coverage. For example, 40% of patients seen in a hospital are covered by Medicare or Medicaid.²

A caveat: Local intermediaries interpret policies and procedures in different ways, so there is variability in coverage by geographic region. That is why it is crucial for neuropsychologists to obtain preauthorization, as would be the case with other medical procedures and services sought by referral.

Last, insurance companies do *not* pay for assessment of a learning disability. The rationale typically offered for this lack of



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Table 1

Why are patients referred for neuropsychological evaluation?

Common reasons

To inform the differential diagnosis when a patient or caregiver reports cognitive impairment
When a patient has a history of neurological illness or injury (epilepsy, stroke, traumatic brain injury)
Evaluation might assist in the diagnosis or treatment of attention-deficit/hyperactivity disorder
Evaluation may assist in diagnosis and treatment of dementia
Performance on a test might help determine 1) whether a patient has the capacity to manage his (her) affairs and 2) whether he requires surrogate management arrangements (eg, guardianship)
Testing can be used to evaluate the possibility of, or suspected, malingering in the context of secondary gain
Results can assist in dispositional planning for a patient who has known or suspected cognitive impairment
Testing can quantify intellectual functioning or psychiatric functioning, or both
When a patient is 1) returning to work or school or 2) seeking a finding of disability in the context of a neurological or psychiatric illness
Testing can help determine if driving is appropriate for a patient who has cognitive impairment

coverage? The assessment is for academic, not medical, purposes. In such a situation, patients and their families are offered a private-pay option.

2 What are the indications for neuropsychological assessment?

Psychiatric practitioners are one of the top medical specialties that refer their patients for neuropsychological testing.³ This is because many patients with a psychiatric or neurologic disorder experience changes in cognition, mood, and personality. Such changes can range in severity from subtle to dramatic, and might reflect an underlying disease state or a side effect of medication or other treatment.

Whatever the nature of a patient's problem, careful assessment might help elucidate specific areas with which he (she) is struggling—so that you can better target your interventions. *Table 1* lists common reasons for referring a patient for neuropsychological evaluation. Throughout this discussion, we describe examples of clinical situations in which neuropsychological testing is useful for establishing a differential diagnosis and dispositional planning.

3 How does neuropsychological testing help with the differential diagnosis?

As an example, one area in which cogni-

tive testing can be beneficial is in geriatric psychiatry.

Dementia. Aging often is accompanied by a normal decline in memory and other cognitive functions. But because subtle changes in memory and cognition also can be the sign of a progressive cognitive disorder, differentiating normal aging from early dementia is essential. *Table 2 (page 36)* summarizes typical changes in cognition with aging.

Neuropsychologists, through knowledge of psychometric testing and the brain-behavior relationship, can help you detect dementia and plan treatment early. To determine if cognitive changes are progressive, patients might undergo re-evaluation—typically, every 6 to 12 months—to ascertain if changes have occurred.

Mood disorders. Neuropsychological evaluation can be useful in building a differential diagnosis when determining whether cognitive symptoms are attributable to a mood disorder or a medical illness. Cognitive deficits associated with an affective disturbance generally include impairments in attention, memory, and executive functioning.⁴ The severity of deficits has been linked to severity of illness. When patients with a mood disorder demonstrate localizing impairments or those of greater severity than expected, suspicion arises that

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Testing might assist in the management of ADHD and dementia and the evaluation of possible malingering



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Patients being considered for deep brain stimulation, brain tumor resectioning, and epilepsy surgery often are referred for testing

Table 2

Typical changes in cognition with normal aging, compared with Alzheimer's disease and depression

Status	Memory	Attention	Visuospatial	Language
Normal aging	Intact compared with peers of same age	Intact compared with peers of same age	Intact compared with peers of same age	Intact compared with peers of same age
Alzheimer's disease	Impaired encoding and retention Free recall and recognition are impaired	Might be reduced compared with controls	Declines as disease progresses	Impaired fluency and naming
Depression	Mixed findings Good cued recall and recognition	Normal or slightly reduced	Generally intact	Normal

another cause likely better explains those deficits, and further medical testing then is often recommended.

Medical procedures. Increasingly, neuropsychological assessment is used to assist in determining the appropriateness of medical procedures. For example, neurosurgical patients being considered for deep brain stimulation, brain tumor resectioning, and epilepsy surgery often are referred for preoperative and postoperative testing. Treating clinicians need an understanding of current cognitive status, localization of functioning, and psychological status to make appropriate decisions about a patient's candidacy for one of these procedures, and to understand associated risk.

4 How is neuropsychological testing used for dispositional planning? The results of cognitive and psychological testing have implications for dispositional planning for patients who are receiving psychiatric care. The primary issue often is to determine the patient's level of independence and ability to make decisions about his affairs.⁵

Neuropsychological testing can help determine if cognitive deficits limit aspects of functional independence—for example, can the patient live alone, or must he live with family or in a residential care facility? Generally, the greater the cognitive impairment, the more supervision and assistance are required. This relationship between

cognitive ability and independence in activities of daily living has been demonstrated in many groups of psychiatric patients, including older adults with dementia,⁶ patients with schizophrenia,⁷ and those with bipolar disorder.⁸

Specific recommendations can be made regarding management of finances, administering medications, and driving. To formulate an appropriate dispositional plan, the referring psychiatrist might integrate recommendations from the neuropsychological assessment with findings of other evaluations and with information that has been collected about the patient.

5 Can neuropsychological testing be used to refer a patient for neurological and cognitive rehabilitation? Yes. The neuropsychologist is singularly qualified to make recommendations about a range of interventions for cognitive deficits that have been identified on formal testing.

Typically, recommendations for addressing cognitive deficits involve rehabilitation focused on development and use of compensatory strategies and modification to promote brain health.^{9,10} Rehabilitation therapy typically is aimed at increasing functioning independence and reducing physical and cognitive deficits associated with illness (eg, traumatic brain injury [TBI], stroke, orthopedic injury, debility).

Patients who have a TBI or who have had a stroke often have comorbid psychiat-

Executive functioning	Sensory-motor
Reduced speed of processing and inhibitory control (intact compared with peers of same age)	Intact compared with peers of same age
Slowed speed Reduced problem-solving ability Impaired awareness	Dyspraxia Slightly reduced motor speed Otherwise normal
Slowed speed Otherwise, generally intact	Slightly reduced motor speed, but normal

ric problems, including mood and anxiety disorders, that can exacerbate deficits and impede engagement in rehabilitation. The neuropsychological evaluation can determine if this is the case and if psychiatric consultation is warranted to assist with managing symptoms.

Premorbid psychiatric illness can affect rehabilitation. Formal neuropsychological testing can assist with parsing out deficits associated with new-onset illness compared with premorbid psychiatric problems. The evaluation of a patient before he begins rehabilitation also can be compared with evaluations made during treatment and after discharge to 1) assess for changes and 2) update recommendations about management.

Recommendations about cognitive interventions might include specific compensatory strategies to address areas of weakness and capitalize on strengths. Such strategies can include using internal mnemonics, such as *visual imagery* (ie, using a visual image to help encode verbal information) or *semantic elaboration* (using semantic cues to aid in encoding and recall of information). Methods can help train patients to capitalize on areas of stronger cognitive functioning in compensating for their weaknesses; an example is the *spaced-retrieval technique*, which relies on repetition of information that is to be learned over time.¹¹

Perhaps the most practical strategies for addressing areas of weakness are non-

mnemonic-based external memory aids, such as diaries, notebooks, calendars, alarms, and lists.¹² For example, for a patient with a TBI who has impaired memory, recommendations might include using written notes or a calendar system; using a pillbox for medication management; and using labels to promote structure and consistency in the home. These strategies are meant to promote increased independence and to minimize the effect of cognitive deficits on daily functioning.

Recommended strategies can include lifestyle changes to promote improved cognitive functioning and overall health, such as:

- sleep hygiene, to reduce the effects of fatigue
- encouraging the patient to adhere to a diet, take prescribed medications, and follow up with his health care providers
- developing cognitive and physical exercise routines.

In addition, a patient who has had a stroke or who have a TBI might benefit from psychotherapy or referral to a group program or community resources to help cope with the effects of illness.¹³

6 How does neuropsychological testing help determine the appropriate psychiatric intervention for a patient?

Results of neuropsychological testing can help determine appropriate interventions for a psychiatric condition that might be the principal factor affecting the patient's functioning.

Concerning psychoactive medications, consider the following:

Mood and anxiety disorders. Neuropsychological measures can help substantiate the need for pharmacotherapy in a comorbid mood or anxiety disorder in a patient who has a neurologic illness, such as stroke or TBI.

ADHD. In a patient who has attention-deficit/hyperactivity disorder (ADHD), results of cognitive testing might help determine if attention issues undermine daily functioning. Testing provides information beyond rating scale scores to justify diagnosis and psychopharmacotherapy.¹⁴

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Testing can assist with parsing out deficits associated with new-onset illness compared with premorbid psychiatric problems



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Neuropsychological evaluation is typically covered by health insurance

Related Resources

- The American Academy of Clinical Neuropsychology. www.theaacn.org.
- Definition of a clinical neuropsychologist: The following statement was adopted by the executive committee of division 40 at the APA meeting on August 12, 1988. *Clin Neuropsychol.* 1989;3(1):22. www.tandfonline.com/doi/abs/10.1080/13854048908404071#preview.
- American Academy of Clinical Neuropsychology. Practice guidelines for neuropsychological assessment and consultation. *Clin Neuropsychol.* 2007;21(2):209-231.

Dementia. Geriatric patients who have dementia often have coexisting behavioral and mood changes that, once evaluated, might improve with pharmacotherapy.

Other areas. Cognitive side effects of medications can be monitored by conducting testing before and after medication is started. The evaluation can address the patient's ability to engage in psychotherapeutic interventions. Patients who have severe cognitive deficits might have greater difficulty engaging in psychotherapy, compared with patients who have less severe, or no, cognitive impairment.¹⁵

Does neuropsychological testing help patients make return-to-work and return-to-school decisions? Yes. Cognitive and psychiatric functioning have implications for decisions about occupational and academic pursuits.

Patients who have severe cognitive or psychiatric symptoms might be or might not be able to maintain gainful employment or participate in school. Testing can help 1) document and justify disability and 2) establish recommendations about disability status. Those whose cognitive impairments or psychiatric symptoms are less severe

might benefit from neuropsychological testing so that recommendations can be made regarding accommodations at work or in school, such as:

- reduced work or school schedule
- reduced level of occupational or academic demand
- change in supervision or evaluation procedures by employer or school.

Cognitive strengths and weaknesses can be used to help a patient devise and implement compensatory strategies at work or school, such as:

- note-taking
- audio recording of meetings and lectures
- using a calendar.

Patients sometimes benefit from formal vocational rehabilitation services to facilitate finding appropriate employment, returning to employment, and implementing workplace accommodations.

In conclusion

Neuropsychological evaluation, typically covered by health insurance, provides the referring clinician with objective information about patients' cognitive assets and limitations. In turn, this information can help you make a diagnosis and plan treatment.

Unlike psychological testing, in which the patient is assessed for psychiatric symptoms and conditions, neuropsychological measures offer insight into such abilities as attention, memory, and reasoning. Neuropsychological evaluations also can add insight to your determination of the cause of symptoms, thereby influencing decisions about medical therapy.

Last, these evaluations can aid with de-

Bottom Line

Neuropsychological assessments are a useful consultation to consider for patients in a psychiatric setting. These evaluations can aid you in building and narrowing the differential diagnosis; identifying patients' strengths and weakness; and making informed recommendations about functional independence.

cision-making about dispositional planning and whether adjunctive services, such as rehabilitation, would be of benefit.

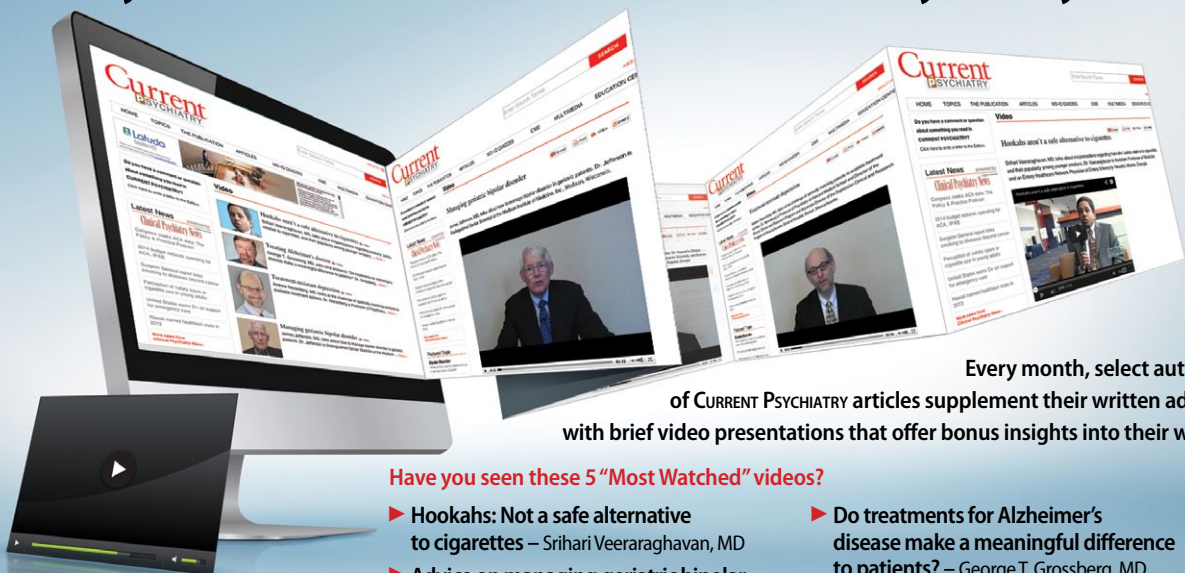
References

1. Donders J. A survey of report writing by neuropsychologists, I: general characteristics and content. *Clin Neuropsychol.* 2001;15(2):137-149.
2. Lamberty GT, Courtney JC, Heilbronner RC. *The practice of clinical neuropsychology: a survey of practices and settings.* New York, NY: Taylor & Francis; 2005.
3. Sweet JJ, Meyer DG, Nelson NW, et al. The TCN/AACN 2010 "salary survey": professional practices, beliefs, and incomes of U.S. neuropsychologists. *Clin Neuropsychol.* 2011;25(1):12-61.
4. Marvel CL, Paradiso S. Cognitive and neurologic impairment in mood disorders. *Psychiatr Clin North Am.* 2004;27(1):19-36,vii-viii.
5. Moberg PJ, Rick JH. Decision-making capacity and competency in the elderly: a clinical and neuropsychological perspective. *NeuroRehabilitation.* 2008;23(5):403-413.
6. Bradshaw LE, Goldberg SE, Lewis SA, et al. Six-month outcomes following an emergency hospital admission for older adults with co-morbid mental health problems indicate complexity of care needs. *Age Ageing.* 2013; 42(5):582-588.
7. Medalia A, Lim RW. Self-awareness of cognitive functioning in schizophrenia. *Schizophr Res.* 2004;71(2-3):331-338.
8. Andreou C, Bozikas VP. The predictive significance of neurocognitive factors for functional outcome in bipolar disorder. *Curr Opin Psychiatry.* 2013;26(1):54-59.
9. Stuss DT, Winocur G, Robertson IH, eds. *Cognitive neurorehabilitation: evidence and application.* 2nd ed. New York, NY: Cambridge University Press; 2008.
10. Raskin SA, ed. *Neuroplasticity and rehabilitation.* New York, NY: The Guilford Press; 2011.
11. Glisky EL, Glisky ML. Memory rehabilitation in older adults. In: Stuss DT, Winocur G, Robertson IH. *Cognitive neurorehabilitation.* 1st ed. New York, NY: Cambridge University Press; 2008.
12. Kapur N, Glisky EL, Wilson BA. External memory aids and computers in memory rehabilitation. In: Baddeley AD, Kopelman MD, Wilson BA. *Handbook of memory disorders.* Chichester, United Kingdom: Wiley; 2002: 757-784.
13. Stalder-Luthy F, Messerli-Burgy N, Hofer H, et al. Effect of psychological interventions on depressive symptoms in long-term rehabilitation after an acquired brain injury: a systematic review and meta-analysis. *Arch Phys Med Rehabil.* 2013;94(7):1386-1397.
14. Hale JB, Reddy LA, Semrud-Clikeman M, et al. Executive impairment determines ADHD medication response: implications for academic achievement. *J Learn Disabil.* 2011;44(2):196-212.
15. Medalia A, Lim R. Treatment of cognitive dysfunction in psychiatric disorders. *J Psychiatr Pract.* 2004;10(1): 17-25.

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Neuropsychological evaluations also can add insight to your determination of the cause of symptoms

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