The Neuropsychology Casebook

D.L. Orsini W.G. Van Gorp K.B. Boone

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DONNA L. ORSINI

Clinical Neuropsychologist, Daniel Freeman Memorial Hospital, Inglewood, California 90301, USA; Clinical Assistant Professor of Psychology, University of Southern California School of Medicine, Los Angeles, California 90033, USA

WILFRED G. VAN GORP

Chief, Neuropsychology Assessment Laboratory, West Los Angeles Veterans Administration Medical Center, Los Angeles, California 90073, USA; Assistant Professor in Residence, Departments of Psychiatry and Biobehavioral Sciences, UCLA School of Medicine, Los Angeles, California 90024, USA

KYLE BRAUER BOONE

Assistant Clinical Professor of Neuropsychology, Departments of Psychiatry and Biobehavioral Sciences, UCLA School of Medicine, Los Angeles, California 90024, USA; Research Associate and Clinical Supervisor (Neuropsychology), Department of Psychiatry, Harbor-UCLA Medical Center, Los Angeles, California 90509, USA

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Preface

The Neuropsychology Casebook was developed to fill the existing gap in the current body of literature on clinical neuropsychology. Although texts are available that describe neuropsychological tests and others provide information on syndromes, this volume provides descriptions of neuropsychological test performance for individuals with various syndromes. It was designed to illustrate the process of clinical interpretation of test findings and report writing for the individual case. Our aims are to provide both the student and practicing professional with a collection of actual neuropsychological case studies that typify many of the cardinal disorders or syndromes frequently seen by practicing clinical neuropsychologists. We have not provided an exhaustive survey of case studies representing many of the disorders commonly seen in neuropsychology; rather, we have focused on a few select cases that illustrate some of the more common disorders.

This book includes detailed case reports complete with referral questions, historical information, relevant neuroradiological findings, actual neuropsychological test data, and clinical interpretations that take into account all available information on the patient. The cases are discussed in the chapter commentaries with reference to how each compares and contrasts with the prototypic case for that disorder or syndrome. Such case studies help to highlight the various types of behavioral and cognitive sequelae associated with common clinical disorders. The case studies, which are examined through an hypothesis-testing approach, are also aimed at demonstrating how neuropsychological principles and methods are applied.

Case presentations are based on actual patients referred for neuropsychological evaluation. The majority of these cases were referred to the UCLA Neuropsychiatric Institute where each patient was evaluated by one of the authors while serving as post-doctoral fellows in the UCLA Neuropsychology Training Program. A number of cases were also selected from patients evaluated under the supervision of Dr. Van Gorp at the West Los Angeles Veterans Administration Center (Brentwood Division) and from the Harbor-UCLA Medical Center, Department of Psychiatry, where they were evaluated under the supervision of Dr. Boone.

We are deeply indebted to Dr. Paul Satz for his close guidance and support while we were his trainees as post-doctoral neuropsychology fellows at UCLA.

It is out of the tradition of case example, taught to us by Dr. Satz, that this book is written.

We also would like to acknowledge the support of the UCLA fellows, past and present, West Los Angeles Veterans Administration staff and interns, and Harbor-UCLA interns, including Allen Brandon, Louis D'Elia, Julianne Fishman, Patricia Gross, Robert Kern, Cheryl Lanktree, Alexander Piatka, and David Schretlen. We also acknowledge the helpful comments of Dean Delis in his review of an earlier stage of a section of our manuscript. Special thanks are also extended to individuals who have been supportive as well as inspirational to our work, Drs. Jeffrey Cummings and Frank Benson. Finally, we would like to thank our families—Enzo Orsini, Lauren Orsini, Rodney Boone, and Steve Buckingham—for their support and encouragement during the course of this project.

DONNA L. ORSINI
WILFRED G. VAN GORP
KYLE BRAUER BOONE

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Introduction

Purpose of the Neuropsychological Evaluation

Neuropsychological assessment has gained increasing popularity over the past decade as its contributions have become widely recognized. Consequently, neuropsychologists are now more commonly employed in such settings as acute care and rehabilitation hospitals, clinics, and private offices. The overall benefits of a thorough neuropsychological evaluation are manifold—to determine the effects of a brain insult on cognitive and emotional functioning; to provide a description of the extent and quality of cognitive, emotional, and/or motor dysfunction; to provide a measure of the patient's potential and course of recovery following brain injury; to provide a calculated estimate of the baseline (or premorbid) level of functioning; to assist in the formulation of a differential diagnosis; to help determine localization of lesion; and to facilitate educational, vocational, and rehabilitation planning.

The neuropsychological evaluation can offer a measure of the patient's overall pattern of cognitive strengths and weaknesses. Moreover, repeated assessments over time provide an index of behavioral change that allows factors such as treatment interventions, progression or improvement of illness, aging, and developmental growth to be systematically evaluated. The differential diagnosis between a CNS-based disease and a process that is primarily “functional” in origin is an important aspect of the neuropsychological evaluation, particularly as it impacts on the method of treatment intervention.

Neuropsychological evaluations generally prove to be useful in a variety of contexts. Individuals who potentially could benefit from a neuropsychological evaluation include: 1) patients with known central nervous system (CNS) dysfunction such as stroke, head injury, tumor, or dementia for assessment of cognitive/emotional functioning aimed at providing information regarding degree of deficits and the extent of sparing of functioning; 2) individuals with suspected, but undocumented, CNS dysfunction to ascertain the presence of any cognitive dysfunction; or 3) individuals undergoing treatment (i.e., medication, surgery) that may effect a cognitive/behavioral change secondary to the intervention.

The Neuropsychological Evaluation

A thorough neuropsychological evaluation includes: 1) careful review of all available medical records; 2) a detailed interview with the patient and/or family member; and 3) the quantitative and qualitative assessment of cognitive, motor, and emotional functioning, and interpretation of these findings.

INTERVIEW

The interview process is an integral part of the neuropsychological examination as it provides an opportunity to gather data on the patient's background and presenting problems that will moderate interpretation of the test scores. It also offers an opportunity for the examiner to formulate hypotheses regarding the patient's underlying cognitive deficits, which can be tested during the evaluative process. For this reason, the interview should be conducted before the testing whenever possible. It is often useful to interview a family member or significant other in addition to the patient. This is particularly worthwhile when the patient's ability to supply historical information is in question, such as in the case of a demented individual. During collection of historical information and test administration, the examiner should note the patient's mental status, mood and affect, general response style, test-taking attitude, personality attributes, speech characteristics (prosody, fluency), and general physical appearance (grooming, physical anomalies). Also, it is helpful to determine the patient's degree of insight regarding his or her illness and reasons for the evaluation. All of these factors will prove useful in making a differential diagnosis.

Information regarding the patient's background is significant because it helps the examiner to formulate a working hypothesis of the patient's premorbid state of functioning. Data regarding occupational and educational attainments of the patient and immediate family members may provide an index of the patient's endowed intelligence and cognitive potential. Such information is valuable in the interpretation of test results and when making estimates related to extent and quality of cognitive loss following brain injury.

Specific aspects of the personal history to be queried include basic information regarding the patient's age, gender, cultural background, educational level and performance, and occupational status and history. Information regarding self-professed handedness and familial sinistrality may uncover subtle differences in brain organization that could underlie different methods of approaching cognitive tasks. A detailed account of past insults to the central nervous system should also be obtained, such as head injuries sustained in childhood or adulthood. It is important to determine whether the patient has had any past hospitalizations, surgeries, or treatment, or has been exposed to toxic substances (i.e., paint, asbestos, lead).

Indicators of the patient's premorbid strengths and weaknesses are important to consider as well. These kinds of data could be obtained by asking the patient which subjects he or she performed best and worst in school or by identifying

hobbies. Information should be collected regarding birth and developmental history, such as language and motor milestones in particular, to provide data regarding possible developmental slowness or learning disabilities. It should be determined whether the patient has engaged in previous psychological or neuropsychological testing, and if so, those results should be obtained for comparative purposes. Also, information regarding intake of alcohol and recreational and prescribed drugs should be obtained. It is important to ascertain whether the patient has had any chronic illnesses or is currently taking any medications. Information regarding whether the patient has incurred injury to his upper extremities is important for interpretation of the results of the motor examination. Furthermore, the examiner is advised to question whether the patient has had any past psychiatric hospitalizations or treatment, any unusual perceptual experiences such as auditory or visual hallucinations, strange sensations, depression, or suicidal ideation or plans. It is also important to ascertain whether there is a family history of psychiatric and/or neurologic illnesses.

A description of the patient's presenting cognitive, physical, and psychological complaints and symptoms should be obtained. This should include information regarding whether the symptoms developed insidiously or acutely, data that could bear importance in the differential diagnosis, for example, of a vascular disorder. Accordingly, the examiner should investigate whether the patient has had any recent changes in either sleeping or eating habits, hand preference or strength, cognitive state, or mood.

TESTING APPROACH

The evaluative process provides a measure of the patient's cognitive and emotional strengths and weaknesses, helps in formulating a diagnosis of the illness, and leads to recommendations to help improve the patient's quality of life. Often recommendations are most useful when they provide strategies (i.e., mnemonic) to help the person adapt to or cope with cognitive problems. Toward this aim, it is necessary to first understand the pattern of neuropsychological performance; that is, the specific nature of the patient's deficits and preserved abilities. A flexible approach that tests hypotheses in a systematic fashion is quite helpful toward this goal.

The hypothesis-testing approach, based on the teaching of A.R. Luria (1966; 1973), provides an exemplary framework for neuropsychological assessment. Essentially, this approach entails testing patient-specific hypotheses regarding locus, quality, and extent of brain impairment. These hypotheses can be generated based on the information obtained from medical records, the interview, and from the referring source. Specific tests are then administered to help determine the degree of impairment or preservation of various cognitive functions. After a deficit is identified on screening, additional tasks can be administered to more carefully delineate the nature of the dysfunction. For example, a gross memory impairment may be uncovered upon brief examination, which then may be followed by careful verbal versus nonverbal, free recall versus recognition memory

testing to ascertain the quality and extent of memory impairment. In the final analysis, each patient is administered a battery of tests unique to his/her symptomatology. Luria strongly advocated focusing on the manner in which a person solves a task and not only on the quantitative score derived from the test. This emphasis on the process in which a task is solved is also advocated by Edith Kaplan (1983). For example, a patient eventually might be able to copy a complex line drawing, but the strategy may be quite haphazard and inefficient, suggesting some compromise although the final product may be within normal limits. Moreover, test interpretation is never based on a single test score but on the overall profile of test performance as a whole.

The hypothesis-testing approach differs from a predesignated or standard battery approach, such as the Halstead-Reitan Battery (Reitan & Davison, 1974) or Luria-Nebraska Battery (Golden, Hammek, & Purisch, 1978), in several ways. The standard battery approach generally entails administration of a fixed set of tasks to each patient regardless of presenting symptomatology. Because of its rigid nature, the battery approach confers less flexibility and is often less proficient at determining the individual profile of abilities and weaknesses. Generally, it also focuses less on the quality or manner in which the patient performs a task and more on the test score, and may thereby tend to overlook important subtleties. This is particularly true if the battery is administered by a technician not trained in neuropsychology, who may miss methods of the patient's task solving approach that represent characteristic types of dysfunction. Another problem with the battery approach, particularly by the Halstead-Reitan Battery, is length of test administration. Tests are administered that may not be pertinent to the individual patient. A long battery may not only be costly for the patient, but can also be very arduous and tiresome for the impaired patient. Another significant concern with fixed batteries such as the Halstead is that they are not able to sufficiently measure memory, language, or "frontal lobe" functioning. Recently, our knowledge regarding these areas of cognition has vastly increased, and new and more sophisticated tests have been devised. The hypothesis-testing approach allows ready incorporation of such new tasks; batteries, by their fixed nature, remain locked to the knowledge available at the time of the battery development.

Another problem with the battery approach is misuse by untrained individuals. For example, the Luria-Nebraska Battery (Golden et al., 1978) has a high probability for diagnostic errors by individuals who have had no formal training in brain behavior relationships. The Luria-Nebraska Battery carries the illusion of straightforward locus-function determinations. The presence of 14 scales that purport to link structure with function invite misuse of this battery by individuals who are not fully knowledgeable regarding neuropsychological theory. Adding to this problem is the fact that questions have been raised regarding the development and validity of the batteries. For example, users of the Luria-Nebraska Battery are at a disadvantage because the samples used in standardizing it have not been well controlled for age, education, and medication, among other factors

(Adams, 1980). There are additional problems concerning the validity of the scoring system as well (Adams, 1979; Spiers, 1981).

Although each predesignated battery may be too rigid by itself, it is often useful to incorporate some of the tasks from the batteries when they are warranted. In this regard, some of the tasks from the Halstead-Reitan Battery can be used very effectively without requiring the administration of the entire battery.

We utilize various tasks in an effort to survey a functional area (i.e., intelligence, attention and concentration, verbal and nonverbal memory, language, perception and sensation, motor skill). Table I lists some tasks that are often useful for adults when measuring cognitive, emotional, and motor functioning.

More detailed information regarding the tests, including descriptions, can be found for most of these tests in Lezak's (1976; 1983) texts on neuropsychological assessment. It should be noted that some of the functional categories overlap, hence some tasks can be included in more than one category (i.e., the Rey-Osterrieth Complex Figure can provide information regarding both memory and perceptual functioning).

The hypothesis-testing approach to assessment can be used with the measures listed in Table I. For example, if poor performance on the Block Design and Object Assembly subtests of the WAIS-R are uncovered, the examiner may hypothesize that the patient has problems in visual-motor integration. To test whether these problems are also found without a motor component, the Hooper Visual Organization Test may be administered. If the patient performs within the normal range on this measure, one tenable hypothesis is that visual perceptual processes are intact and that the deficit lies in constructional ability. Another example—the patient who presents with reduced ability to generate vocabulary definitions on the vocabulary subtest of the WAIS-R can be administered the PPVT-R to assess whether an actual loss of vocabulary is present or whether the deficit lies mainly in the expression of linguistic knowledge.

Test Interpretation

Interpretation of the neuropsychological test performance should consider factors related to individual variability, qualitative analysis, test-taking behavior, test conditions, test score conversions, and normative data. Each of these factors is discussed in the following sections.

INDIVIDUAL VARIABILITY

Results of the neuropsychological exam should be considered in light of the individual's unique background information. Such background variables, discussed earlier, include cultural background, native language, handedness, educational and occupational attainments, and endowed intelligence. An individual from a different culture and for whom English is a second language

TABLE I. Useful tests for measuring functional neuropsychological competence in adults.

Intelligence
Wechsler Adult Intelligence Scale—Revised (WAIS-R)
Attention/Concentration
Digit Span
Trail Making
Wechsler Memory Scale—Mental Control subtest
Continuous Performance Test
Serial 7s Subtraction
Language
Boston Diagnostic Aphasia Examination
Boston Naming Test
Controlled Word Association Test (FAS)
Reitan-Indiana Aphasia Screening Exam
Token Test
Peabody Picture Vocabulary Test—Revised (PPVT-R)
Verbal Memory
California Verbal Learning Test
Rey Auditory Verbal Learning Test
Shopping List Test
Wechsler Memory Scale
Logical Memory subtest with delayed recall ^a
Associate Learning subtest with delayed recall ^a
Nonverbal Memory
Wechsler Memory Scale—Visual Reproductions subtest
with delayed recall ^a
Rey-Osterrieth Complex Figure with 3 minute delayed recall
Perceptual/Organizational
Rey-Osterrieth Complex Figure—Copy format
Hooper Visual Organization Test
Beery Visual Motor Integration Test
Draw-a-Clock
Sensory
Halstead-Reitan Sensory-Perceptual Exam
Motor
Finger Tapping
Grooved Pegboard
Grip Strength
Lateral Dominance Exam
Frontal Systems
Wisconsin Card Sorting Test
Rey Tangled Lines
Auditory Consonant Trigrams
Stroop Test
Personality
Minnesota Multiphasic Personality Inventory
Sentence Completion
Thematic Apperception Test
Academic Achievement
Wide Range Achievement Test—Revised (WRAT-R)
Peabody Individual Achievement Test (PIAT)

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^a Delayed recall is typically assessed 20–60 minutes following the initial presentation (Lezak, 1983).

typically will be at a disadvantage on most standardized tests that have been normed on English-speaking Americans. Also, bilingual individuals for whom English is a second language often perform verbal tasks more poorly than non-verbal tasks. In addition, task performance may be influenced by the person's genetic manual laterality.

The individual's level of intellectual functioning should be considered when interpreting neuropsychological test scores. For example, verbal memory functioning should be interpreted within the context of one's verbal intellectual functioning as they are expected to be at comparable levels. The person's educational level and occupational role can provide a general means to estimate the premorbid intellectual level of the patient. This is most important in ascertaining the extent, if any, of the cognitive loss following brain injury. For example, a person with a law degree employed as an attorney presenting with low average intellectual functioning following a brain injury may be suspect for recent deterioration in cognitive processing abilities. In comparison, another person who scores in the low average range on intellectual testing, who has a considerably lower educational and occupational level, may be less likely to have presenting low intellectual level explained by a recent brain insult. Overall, most scores should be interpreted in light of IQ and educational and occupational attainments.

QUALITATIVE ANALYSIS

The process by which the patient solves a task may lend generous insights into the underlying deficit. Kaplan (1983) provides an excellent example of this in her description of the process approach to the Block Design task. She points out that brain-damaged individuals will frequently solve this task in a characteristic fashion depending on the laterality of the lesion. Individuals with damage to the right side of the brain generally fail to attend to the gestalt of the geometric pattern, whereas those with left-sided damage are able to preserve the configuration matrix but tend to display simplification and confusion.

TEST-TAKING BEHAVIOR

Test performance can be affected by a host of behavioral considerations. For example, factors such as low motivation, anxiety, fatigue, or the transient effects of medication may generate the appearance of a deficit or may exacerbate real deficits. Moreover, performance may be manipulated by a patient with attempts to feign a deficit, either consciously or unconsciously. Other times, a patient's impulsive style in task solving will denigrate test performance. Equally important in test score interpretation is the patient's familiarity with the test materials. If the patient has been exposed to a particular test before, practice effects may spuriously elevate test performance. However, depending on the type of brain injury, brain-injured individuals may not always manifest practice effects (Shatz, 1981).

TEST CONDITIONS

Test conditions that are less than optimal may generate apparent, but not real, deficits; other times they may enhance real deficits. Poor test conditions are caused by noise, inadequate lighting, and distractions, among other factors. Realistically, optimal test conditions are not always possible. This is particularly true for the hospital patient who may require bedside test administration. Testing under such conditions may be hampered by intrusions of hospital staff during task administration, particularly during attention testing. Also, a hospital roommate may induce distractions and noise factors. Moreover, it is not always possible to administer all tests that are considered important due to time constraints or limited patient cooperation.

TEST SCORE CONVERSIONS

Raw test scores can be converted to standard scores to reflect how the individual's performance deviates from the average. The Z-score represents the amount of deviation of a score from the mean of the population from which it is drawn. It can be computed using the following formula:

$$Z = \frac{\text{raw score} - \text{mean score}}{\text{standard deviation}}$$

The normal curve has a mean of zero and a standard deviation of one. The distance in standard units that a score is from the mean of a comparison standard will determine test performance. It is generally accepted that differences of two standard deviations or more may be considered significant, whereas differences of one to two standard deviations suggest a trend (Payne & Jones, 1957).

Converting the raw score to a percentile is also helpful in describing how the individual's performance differs from an average score on that particular measure. Percentiles are also more readily understood by the general public than are Z-scores. Percentile equivalents can be calculated based on a table of normal curve functions (see Appendix, Table A), which presents percentile ranks from 1 to 99 and corresponding Z-score equivalents. To show how to use this table, we will take an example of a finger tapping normative score, which has a mean of 45.2 and a standard deviation of 6.0. An individual who obtains a score of 50.6 will be compared with the norm by converting his or her raw score into a score using the standard formula above:

$$\frac{50.6 - 45.2}{6.0} = .90$$

Using the table, one can see that the percentile equivalent to a Z-score of +.90 is 82. Therefore, this individual's ability level on the Finger Tapping Test is found to be at the 82nd percentile. To interpret this percentile in terms of ability level, refer to the commonly accepted classification of ability levels (see Appendix,

Table B). This table indicates that the finger tapping score of 50.6, with a corresponding Z-score of .90 and a percentile rank of 82, is within the high average range of ability.

NORMATIVE DATA

Interpretation of test performance is based on how the individual's performance differs from a comparison standard and generally involves the way "normal," or non-brain-damaged, people perform on the particular measure. A major problem in neuropsychological assessment at this time is that few tests are properly normed. A well normed test involves administering the measure to a large sample of individuals with stratified sampling. Accordingly, one of the best normed measures is the Wechsler Adult Intelligence Scale—Revised (WAIS-R) (Wechsler, 1955; 1981), which has been normed on a large sample of individuals classified by age, sex, race, geographic region, occupation, education, and urban-rural residence. Unfortunately, few neuropsychological tests have been standardized in this manner. Moreover, normative information may differ for the same tests based on different researchers collecting normative data on small sample sizes. Variations in test scores may reflect sample differences including age, sex, cultural background, and educational level. This often renders differences in test interpretation depending on which norms were used to interpret the patient's test performance. Another problem is that it is often quite difficult to locate normative data on certain tests. In light of these problems, we present a list of references for normative data for the majority of tests discussed in the case presentations that appear in subsequent chapters (see Appendix, Table C). It should be noted that additional normative data are also available for many of these tests.

Report Writing

There are various ways to write an effective neuropsychological report, thereby precluding the idea of any one ideal approach. However, there are some key features that can enhance the usefulness of any neuropsychological report.

The effectiveness of a neuropsychological report can be augmented when the following factors are included:

1. Statement of the referral question—the referring professional's reason for requesting a neuropsychological examination
2. Presenting symptoms—behavioral, cognitive, and/or neurological
3. Background and historical information on the patient
4. Behavioral observations of the patient during the evaluation
5. List of neuropsychological and psychological tests administered
6. Test results and interpretation presented by functional system—intelligence, memory, language, and motor, for example
7. Summary impressions, conclusions, and recommendations

The above factors provide a general outline for basic report writing. It is often helpful to begin a report by stating the reason for the referral, the source of the referral, and what is expected to be accomplished by the neuropsychological evaluation. A thorough history of the patient's background is also critical, including presenting illness and/or symptoms, medical history, and educational and occupational levels. Background historical information should present an integrated summary of information obtained from the medical chart, referring source, and the interview. Behavioral observations of the patient during the evaluation are also useful information. This should include the person's test-taking attitude, mental status, mood and affect, general response style, personality attributes, speech characteristics, and general physical appearance. A list of the tests administered is also helpful, particularly to other psychologists whose familiarity with them will enhance their understanding of the report. It is our general practice to include in each report a list of the tests administered, with scores listed in the report text, rather than a data summary sheet. However, for the purposes of this book, we have provided a data summary sheet that also provides names of the tests administered. Finally, the report should conclude with a summary of findings with appropriate recommendations. In this section, the facts from the patient's background history, behavior during evaluation, and test results can be integrated to form impressions and conclusions regarding his or her problems, their underlying etiology, and ways in which to treat the patient. It is useful to include specific treatment intervention strategies, particularly to aid in plans for rehabilitation.

Accordingly, a report that uses subsections based on the above points can be very effective and straightforward. The following outline can be used:

OUTLINE FOR A NEUROPSYCHOLOGICAL REPORT

Name of Patient:

Patient's Birthdate:

Patient's Hospital Identification Number (if any):

Date of Evaluation:

Reason for Referral—specific referral questions.

Pertinent History—age, sex, handedness, education, occupation, medical and psychiatric history, description of symptoms.

Behavioral Observations—test-taking behavior, mood, affect, salient personality characteristics, attire, grooming.

Tests Administered—list of individual tests.

Test Results—listed by function, including scores converted to percentiles and descriptive statements of the manner in which tests were approached and attempted.

Function

Gross Cognitive
Intelligence

Attention/Concentration
 Language
 Perceptual/Organizational
 Memory
     Verbal
     Nonverbal
 Motor
 Sensory
 Frontal Systems
 Academic Achievement
 Personality

Summary Impression—integration of the results with statements as to possible diagnosis and treatment recommendations.

Our approach is to present the test results by functional systems (i.e., intelligence, memory, visual spatial, motor, language). This assists in making decisions regarding localization of dysfunction and helps to target behaviors for rehabilitation efforts. A thorough neuropsychological report should include not only test score equivalents but also descriptive statements regarding the manner in which the tasks were approached and/or solved. The latter type of information may lend insights into the nature of the underlying deficits.

Summary

The information presented in this introduction has been designed to assist in: 1) determining the circumstances under which a neuropsychological evaluation is useful, 2) understanding the essentials of the neuropsychological exam, 3) presenting some commonly used tasks, 4) providing a test interpretation guide, and 5) furnishing a format for report writing.

The chapters that follow should clarify some of these points by providing actual neuropsychological reports. Each chapter begins with a brief, general overview of the condition and presents some basic cognitive findings that may be revealed on neuropsychological exam. These brief chapter introductions are not intended as conclusive summaries or critiques of the literature. Rather, they may offer the student or trainee a synopsis of general neuropsychological correlates of the syndromes, thereby providing a framework for understanding the case presentations. Case reports are then presented to illustrate the process of clinical interpretation of test findings and report writing. We have not provided an exhaustive selection of cases to fit all the various types of syndromes or disorders seen in neuropsychology. Rather, a few cases were selected that are believed to typify the more common types of disorders referred to neuropsychologists in a clinic or acute care setting. The case presentations are based on actual patients who were referred for neuropsychological evaluation in a hospital or clinic and identifying factors have been obscured to protect confidentiality. Case presenta-

tions include historical information, reason for referral, test data (both quantitative and qualitative), a quantitative test data summary sheet, and summary interpretation and recommendations. The case presentations illustrate how to integrate historical information, test data, and qualitative indices to aid in patient diagnosis, care, and rehabilitation planning.

The case studies, which are examined through an hypothesis-testing approach, are also aimed at demonstrating how neuropsychological principles and methods are applied. Each chapter concludes with a brief commentary that helps to illuminate or highlight important features.

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