

**ASSESSING**  

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**ADOLESCENT**  
**AND ADULT**  

---

**INTELLIGENCE**



**Alan S. Kaufman**

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# Assessing Adolescent and Adult Intelligence

Alan S. Kaufman

THE UNIVERSITY OF ALABAMA

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*For Nadeen,  
for her inspiration, insight, loyalty, and love,  
forever*

*and*

*For the memory of David Wechsler,  
mentor, friend, pioneer,  
with undying respect*

# P R E F A C E

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*Assessing Adolescent and Adult Intelligence* presents comprehensive coverage of the clinical and neuropsychological assessment of intelligence, particularly as measured by the Wechsler Adult Intelligence Scale—Revised (WAIS-R). The text focuses on ages 16 to 74 years, the WAIS-R age range, but also addresses research and assessment issues for adolescents aged 12 to 15 years and adults in their 80s. It is intended as the primary textbook for graduate-level courses in intellectual assessment, whether a beginning course or an advanced practicum, and whether the focus of the course is on theory, research, or practice. It is also designed to serve as a handbook for interns and professionals who routinely or occasionally evaluate adolescents and adults. The book is oriented toward practitioners, researchers, and academicians in the fields of clinical psychology, school psychology, neuropsychology, and educational psychology; but it is equally relevant for graduate courses and professionals in the related fields of psychiatry, special education, counseling, medical psychology, developmental psychology, gerontology, and psychometrics.

Because the WAIS-R is the instrument of choice for adolescent and adult intellectual assessment, this text focuses on the WAIS-R throughout its 17 chapters. The history of the clinical evaluation of adult intelligence virtually begins with David Wechsler's innovations and insights, culminating in the Wechsler-Bellevue;

present-day assessment of brain damage, retardation, psychopathology, dementia, and learning disabilities in adolescents and adults likewise begins with Wechsler's contributions. The main question faced by most examiners is not whether to give the WAIS-R, but what instruments should be used to supplement the WAIS-R. Memory tests? Other cognitive tasks? Achievement batteries? Adaptive behavior inventories? Tests of creativity? Thorough neuropsychological batteries? Tests in all of these areas are covered in some depth in *Assessing Adolescent and Adult Intelligence* (especially in Part IV); virtually every important test for the 12+ age range that was designed to measure intelligence or closely related skill areas is described and evaluated. Coverage of instruments includes tests that have recently been published (e.g., the Wechsler Memory Scale—Revised) and some that just became available as this book went to press (the Peabody Individual Achievement Test—Revised and the Woodcock-Johnson Psycho-Educational Battery—Revised). Evaluations are direct, sometimes hard hitting, and nearly always based on a blend of the empirical, the clinical, the practical, and the theoretical.

Indeed, the entire approach to assessment presented throughout the text represents a dynamic integration of the following ingredients: (a) over 1,000 clinical and neuropsychological research investigations on adolescent and adult intelligence, many on the WAIS-R or its pre-

deceivers; (b) an empirical approach to WAIS-R Verbal-Performance and subtest profile interpretation that can be applied at a sophisticated level by the psychometrically oriented professional, or via simple rules of thumb by the mathematically insecure; (c) a clinical, neuropsychological, and psychoeducational approach to intelligence tests that facilitates interpretation of significant profile fluctuations; (d) the application of theories of intelligence (e.g., Cattell-Horn, cerebral specialization) whenever the theories are clinically or neuropsychologically relevant; and (e) adherence to the *intelligent testing* philosophy, which elevates clinicians above the tests they use and places less emphasis on the IQs than on the peaks and valleys in the total test profile.

Throughout *Assessing Adolescent and Adult Intelligence*, the emotion-laden IQ concept is treated in a societal context. Controversies surrounding the IQ construct and challenges to intelligence tests are dealt with in a straightforward, rational, research-supported manner that often involves new syntheses of the existing literature. Many questions of interest to professionals and laypeople alike regarding the IQ and its clinical applications are addressed—for example: Is the IQ a valid construct, or should intelligence tests be abandoned? What portion of IQ is genetic, and is the black-white difference due to heredity? Are the Japanese smarter than Americans, and how does the U.S. compare with numerous other nations regarding changes in intelligence over the past few generations? Do adults evidence dramatic declines in their intelligence with increasing age? Is there a characteristic WAIS-R profile to aid in the diagnosis of Alzheimer's disease? Is either the Stanford-Binet IV or the Woodcock-Johnson—Revised a formidable competitor for the WAIS-R? Are the brief, commonly used Slosson and Shipley-Hartford tests suitable replacements for the WAIS-R when testing time is at a premium, and is the WRAT-R a worthy WAIS-R supplement?

I needed help with some questions and issues on key topics that extend beyond intelligence testing and enlisted experts on adaptive behavior inventories and neuropsychological batteries to write guest chapters. I am extremely grateful to Dr. Patti L. Harrison of the University of Alabama for her chapter on mental retardation, adaptive behavior, and giftedness (chapter 15); and to Dr. George Hynd and Ms. Margaret Semrud-Clikeman of the University of Georgia for their chapter on neuropsychological assessment (chapter 17). Their excellent contributions have enhanced greatly both the coverage and quality of this text.

In addition, I would like to acknowledge numerous individuals for other valuable contributions to *Assessing Adolescent and Adult Intelligence*. Dr. Cecil Reynolds graciously shared his WAIS-R data tape with me and my colleague, Dr. James McLean, allowing the three of us to conduct numerous investigations on topics that were essential to fill gaps in the literature and to facilitate WAIS-R profile interpretation (e.g., aging and IQ decline, factor analysis by gender and race, relationship of subtests to background variables). Cecil and Jim, along with Patti Harrison, George Hynd, and my wife Nadeen, merit my special appreciation for their professional competence and advice, and for their consistent friendship; each has left his or her mark on my personal and professional growth, and on the quality of this text.

Dr. Tom Oakland accepted the yeoman task of reviewing the entire 17 chapters composing this text. He spent countless hours carefully digesting each sentence, and made numerous valuable, insightful, and probing comments and criticisms. I tried to heed virtually all of his suggestions, and am grateful for his diligence and considerable expertise. Dr. Donald Kausler, an expert in the methodology and interpretation of research on aging, reviewed chapter 7 on age and IQ across the adult lifespan. I wanted an extra reviewer for this key topic, partly because of the controversial nature of the rel-

evant research, and partly because of a new longitudinal study of Wechsler intelligence that appears for the first time in this text. I am extremely grateful to Dr. Kausler for his excellent suggestions for improving the chapter (and for giving his "blessing" to my new study!). Dr. Kevin McGrew also merits thanks for reviewing carefully about 100 manuscript pages devoted to interpretation and evaluation of the Woodcock-Johnson. Unfortunately, nearly all of these pages are excluded from the text (winding up in the waste basket); they became obsolete when Woodcock announced in the summer of 1988 that a thoroughly expanded, revised, and restandardized Woodcock-Johnson battery was forthcoming.

I am grateful to several graduate students, all but one from the University of Alabama, for helping me locate and xerox literally thousands of research articles on adolescent and adult assessment: Toshinori (Toshi) Ishikuma, Richard Ittenbach, Valerie Okun, Marcia O'Neal, and Carol Schmitt. Toshi and his wife Harue have been especially vital in my effort to complete this text on time without sacrificing quality. They performed countless mathematical computations and generated numerous formulas for the tables in chapters 13 and 14, and contributed greatly to this text in many other ways as well. Toshi, my teaching assistant, has been an inspiration to me, an invaluable professional colleague and friend.

The University of Alabama merits my special, sincere thanks for its unflagging support of my research and writing. I am grateful for so many reasons to Dr. Joab Thomas (former President), Dr. E. Roger Sayres (President), Dr. Rod Roth (Dean of the College of Education), Dr. James McLean (Chairman of the Area of Behavioral Studies), Dr. Patti Harrison (Head of School of Psychology), and Brenda Spencer (typist).

I appreciate the numerous psychologists, including many former students and colleagues, who sent me copies of their case reports on adolescents and adults. In addition to selecting

several reports that were written by graduate students in my assessment courses at the University of Alabama, I selected two reports from Dr. Judith Ivins for inclusion in the text; I'd like to give a special thanks to Judy and to these former students (who are listed by name at the end of each pertinent report). I am indebted to Dr. Joanne Callan, Dr. Sidney Smith, and others at CSPP-San Diego for teaching me much about clinical assessment when Nadeen and I were on their core faculty. Also, I appreciate the kindness of Drs. Gary Robertson and Elizabeth Rengel of American Guidance Service for sending me a copy of the PIAT-R test and manual prior to publication, and of Drs. Robert Zachary and Marc Daniel of The Psychological Corporation for sending me a Differential Abilities Scales standardization kit along with prepublication information about this forthcoming test.

Allyn & Bacon has given me excellent support during the course of this arduous project. I am especially grateful to Bill Barke, Mylan Jaixen, John-Paul Lenney, Susan Brody, Wendy Calmenson, and Steven Hiatt for their extreme competence and kind cooperation.

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I was fortunate to have had the privilege of working closely with David Wechsler from 1970 to 1974. I learned much from this brilliant innovator, a wise and compassionate man. I have also learned much from my lifelong colleague and companion, Nadeen.

*Alan S. Kaufman*  
*January, 1990*

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## IQ Tests: Their History, Use, Validity, and Intelligent Interpretation

### INTRODUCTION

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The field of intelligence, particularly of adolescent and adult mental development, has dominated the psychological literature for decades, and now encompasses a diversity of domains within cognitive psychology, clinical psychology, psychobiology, behavioral genetics, education, school psychology, sociology, neuropsychology, and everyday life. Excellent 1,000-page handbooks are available with chapters written by experts in many aspects of intellectual theory, measurement, and development (Sternberg, 1982, 1988; Wolman, 1985), and even these texts cover only a portion of the territory and quickly become outdated. Consequently, in writing this text on the assessment of adolescent and adult intelligence, I have had to make several decisions about which areas to include and how thoroughly to cover each topic.

First, this book focuses on the clinical assessment of intelligence, and every topic must

bear, either directly or indirectly, on the clinical aspect of mental measurement. Since clinical assessment within the fields of neuropsychology, special education, and clinical, school, and counseling psychology involves individual evaluations, research on group-administered tests is subordinated to the more pertinent research on individual intelligence tests.

For example, the monumental efforts of Schaie and his colleagues to understand the development of adult intelligence (e.g., Schaie, 1983; Schaie & Strother, 1968; Schaie & Hertzog, 1983) have been based on the group-administered Primary Mental Abilities Test. The key findings from these innovative cross-sequential studies are of interest to psychology in general, but have limited applicability to the work of clinical and neuropsychological practitioners. Consequently, investigations by Schaie will be discussed in the context of aging studies on more pertinent instruments—the Wechsler Adult Intelligence Scale (WAIS; Wechsler, 1955) and its revision (WAIS-R; Wechsler, 1981) (Birren

& Morrison, 1961; Kaufman, Reynolds, & McLean, 1989; Parker, 1986).

### Wechsler's Scales

Even a casual observer of the clinical or neuropsychological assessment scene is aware that Wechsler's scales are uncontested as measures of adolescent and adult intelligence. Individuals in their teens and adults of all ages are invariably administered the Wechsler Intelligence Scale for Children—Revised (WISC-R; Wechsler, 1974) or the WAIS-R when they are referred to a competent professional for a thorough assessment of their intellectual abilities, usually as part of a clinical, vocational, neuropsychological, or psychoeducational evaluation. The WISC-R is used for adolescents as old as 16 years, while the WAIS-R is used for individuals aged 16 to 74.

I have elsewhere discussed the WISC-R as a clinical and psychometric tool (Kaufman, 1979b) and, in any case, the WISC-R will soon be superseded by an updated version. (The standardization of the WISC-III was under way as this book went to press.) For practical purposes, then, this book is primarily devoted to the WAIS-R, child of the WAIS and grandchild of the Wechsler-Bellevue Form I (Wechsler, 1939). This test battery has so far outdistanced its competition that any other test for adolescents and adults can reasonably be thought of as either a supplement or an alternative to the WAIS-R.

### Clinical Relevance of Theory

To be included in this book in any depth, a topic needs to contribute to a psychologist's understanding of intelligence in the clinical arena, not in the laboratory. For example, Horn and Cattell's (1966) theory of fluid and crystallized intelligence, including Horn's (1985) refinements of it, is treated throughout the book because it is instrumental in explaining changes

in verbal and nonverbal abilities with advancing age, and it underlies three new tests of adolescent and adult intelligence: the Woodcock-Johnson Psycho-Educational Battery—Revised (WJ) (Woodcock & Johnson, 1989a), the Stanford-Binet Intelligence Scale, Form IV (Thorndike, Hagen, & Sattler, 1986a), and the Kaufman Adolescent and Adult Intelligence Test (KAIT; Kaufman and Kaufman, in press *a*). In contrast, Sternberg's (1985) three-pronged triarchic theory of intelligence, though popular and widely discussed, is ignored because of its limited application to clinical assessment and the interpretation of the WAIS-R and other individual intelligence tests. Perhaps this theory will become valuable outside the laboratory once the Sternberg Multidimensional Abilities Test (cited by Cohen, Montague, Nathanson, & Swerdlik, 1988, pp. 239–240) becomes available, if the test author is successful in translating laboratory principles to the domain of the clinical psychologist, neuroclinician, and psychoeducational diagnostician.

### Reaction-Time and EEG Studies

Also excluded from this text, apart from the summary presented here, is the provocative laboratory research conducted on reaction time and evoked potentials. Jensen's (1985b) reaction-time investigations, which explore the relationships of psychometric intelligence scores to simple and complex reaction time (measured to the nearest millisecond), reflect a return to the similar techniques used by Sir Francis Galton and James McKeen Cattell in their anthropometric laboratories established before 1900. Eysenck and Barrett's (1985) use of electroencephalographs (EEGs) to assess IQ objectively takes advantage of modern technology and seems more like futuristic science fiction than a return to the sensorimotor "intelligence" tests of the pre-Binet era.

Yet the Jensen and Eysenck approaches share common elements: Both use machines requiring



simple motor responses like pushing a button; both are content-free measures of intelligence; and both seek to measure intelligence validly and objectively with high-tech instrumentation that may revolutionize contemporary standards of reliability. Reaction-time studies have produced correlations with IQ typically in the .35 range (actually  $-.35$ , reflecting the finding that shorter response times are associated with higher IQs). When several reaction-time tasks are combined into a battery, however, considerably higher coefficients are possible, perhaps in the .70 range (Vernon, 1983). Reaction-time tests discriminate among groups differing in intelligence, with the brighter subjects earning the lowest mean reaction-time scores (Jensen, 1982; Vernon, Nador, & Kantor, 1985). In addition, speed of response in reaction-time investigations correlates about equally well with IQ whether it is measured under timed or untimed conditions (Vernon & Kantor, 1986).

EEG studies have produced even more impressive statistical findings than the Jensen/Vernon reaction-time investigations, although cross-validation of the evoked potential research has been inconsistent (Brody, 1985). For example, research conducted in the early 1980s by D. E. and A. E. Hendrickson, based on a complex theoretical model and utilizing different methodologies than those used by Ertl (1971) in his pioneering research, yielded correlations between average evoked potential (AEP) and WAIS IQs in the .72 to .83 range (Eysenck & Barrett, 1985, Table 2). Ertl obtained coefficients that averaged about .30 (Chalke & Ertl, 1965; Ertl, 1971; Ertl & Schafer, 1969), while others have reported strictly negative results (e.g., Davis, 1971). Focusing on the positive results by the Hendricksons and others, Eysenck (1982) has argued that the EEG is a better measure of *g* than are the WAIS subtests.

Like computerized testing, the measurement of intelligence with binary response consoles and other types of chronoscopes to record reaction time—or with EEGs to permit mea-

surement of the “string” and “variance” of the AEPs—may become the procedure of choice in the twenty-first century. But as the twentieth century enters its final decade, these methodologies are still laboratory based and remain controversial (for criticisms, see Engel & Henderson, 1973; Longstreth, 1984; and Ruchalla, Schalt, & Vogel, 1985). These approaches have yet to have an impact on the clinical assessment of adolescents and adults referred for psychological or neuropsychological evaluation.

## OUTLINE OF THE BOOK

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*Assessing Adolescent and Adult Intelligence* has four parts:

- I. Introduction to the Assessment of Adolescent and Adult Intelligence (three chapters)
- II. Integration and Application of WAIS-R Research (five chapters)
- III. Interpretation of the WAIS-R V-P Discrepancy and Subtest Profile (six chapters)
- IV. Clinical and Neuropsychological Assessment with the WAIS-R and Other Instruments (three chapters)

Part I includes chapter 1, which discusses pertinent historical information, issues regarding validation of the IQ construct, and my philosophy of intelligent testing; chapter 2, which discusses pressing issues and challenges to the IQ concept (e.g., heritability of the IQ and the differences in intelligence among 14 nations); and chapter 3, which provides the rationale for the 11 subtests for adolescents and adults and traces the empirical and logical continuity from the Wechsler-Bellevue to the WAIS to the WAIS-R.

Part II presents research on the WAIS-R in five chapters, each one dealing with essential information about the interpretation of the IQ for adolescents and adults, and the understand-



ing of important psychological issues regarding intelligence, like race differences and the impact of aging on test performance: Administration, scoring, and stability (chapter 4); WAIS-R short forms, including two popular substitutes for the WAIS-R—the Shipley Institute of Living Scale (Shipley-Hartford; Zachary, 1986) and the Slosson Intelligence Test (Jensen & Armstrong, 1985) (chapter 5); IQ and the stratification variables (chapter 6); aging (chapter 7); and factor analysis (chapter 8).

Part III comprises three chapters on the interpretation of WAIS-R Verbal-Performance IQ discrepancies (9, 10, and 11), with a special focus on neuropsychological research involving patients with lateralized lesions; and three chapters (12, 13, and 14) dealing with the empirical and clinical interpretation of WAIS-R subtest profiles.

Part IV discusses a number of supplementary tests for adolescent and adult assessment and integrates them with the WAIS-R, focusing on clinical and neuropsychological assessment. Chapter 16 discusses and evaluates numerous supplements to the WAIS-R. These tests include the new Wechsler Memory Scale—Revised (Wechsler, 1987) and five individual achievement tests: Wide Range Achievement Test—Revised (WRAT-R; Jastak & Wilkinson, 1984); Woodcock-Johnson—Revised, Achievement portion (Woodcock & Johnson, 1989b); Kaufman Test of Educational Achievement (K-TEA; Kaufman & Kaufman, 1985a, 1985b), Brief and Comprehensive Forms; Peabody Individual Achievement Test—Revised (PIAT-R; Markwardt, 1989); and Woodcock Reading Mastery Test—Revised (Woodcock, 1987). In addition to the memory and achievement batteries, which are common supplements to the WAIS-R, are the homogeneous, quick Peabody Picture Vocabulary Test—Revised (PPVT-R; Dunn & Dunn, 1981) and three comprehensive intelligence tests that are best used to supplement the WAIS-R rather than serve as the main measure of mental ability:

the Woodcock-Johnson—Revised, Cognitive portion (Woodcock & Johnson, 1989a); the Stanford-Binet IV (Thorndike et al., 1986a); and the Detroit Tests of Learning Aptitude (DTLA-2; Hammill, 1985). The Detroit and new Binet, both standardized in the mid-1980s, have psychometric limitations (especially their norms), and they were not standardized across the whole adult range. The new Woodcock-Johnson, though psychometrically excellent and normed through old age, adheres to a theoretical model that seems to lack clinical pertinence. Nonetheless, each battery includes clever subtests that help augment the information provided by the WAIS-R, particularly for following up hypotheses generated during a psychoeducational or neuropsychological evaluation.

Part IV also contains two chapters guest-written by experts in their fields. Chapter 15, on the assessment of mental retardation, adaptive behavior, and giftedness, was written by Dr. Patti Harrison; chapter 17, on neuropsychological assessment, was written by Dr. George Hynd with his colleague, Margaret Semrud-Clikeman. A variety of WAIS-R supplements are treated in some depth in chapters 15 and 17: The Vineland Adaptive Behavior Scales (Sparrow, Balla, & Cicchetti, 1984), along with several other adaptive behavior tools are covered in chapter 15; and the Halstead-Reitan (Reitan & Wolfson, 1985) and Luria-Nebraska (Golden, Hammeke, & Purisch, 1980) are treated in chapter 17.

A variety of psychometric tools are thus evaluated in Part IV, but the WAIS-R, like the WAIS and Wechsler-Bellevue before it, remains the key tool for clinical and neuropsychological evaluation of adolescents and adults and, hence, the focus of all sections of the book. For who interprets the Halstead-Reitan in the absence of Reitan's ever-present Wechsler-Bellevue or the more modern WAIS-R? Who gives a Vineland without relating the results to Wechsler's global IQs? The chapters on clinical applications of intelligence tests, along with the previous