Gifted Students With Learning Disabilities:
Who Are They?

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Abstract

More than 20 years ago, psychologists first described gifted students with learning disabilities (LD). In the past decade, several sets of identification criteria have been proposed for this population. Many of the suggested assessment practices are unsupported by research in psychoeducational assessment, and some have been directly contradicted by recent research. We argue that an uncritical acceptance of the concept of concomitant giftedness and LD has led to unsound identification procedures and to interventions that are not targeted properly. Specific recommendations for future research and implications for current clinical practice are discussed.

One way to operationalize learning disabilities (LD) is as a discrepancy between an individual's ability and his or her achievement or performance. Although the use of this method of clinical diagnosis has been criticized by many (see Bradley, Danielson, & Hallahan, 2002), the basic idea may still serve as a useful heuristic for understanding the gifted student with LD. Within the discrepancy paradigm, it is easy to imagine an individual whose measured general ability is significantly above average (i.e., in an absolute sense, relative to the population at large) but whose achievement in some academic subject area is squarely in the below-average range. Such an individual would seem to simultaneously possess giftedness and a specific learning disability, at least by definition (i.e., by meeting criteria for both classifications). Furthermore, it seems reasonable that such an individual might well benefit from interventions to remediate the LD and from services to develop skills in those areas where the individual has above-average abilities.

In this article, we briefly review the history of this "dual exceptionality" before examining proposed definitions of children with both giftedness and learning disabilities (G/LD). We then describe four recently proposed sets of guidelines for the diagnostic assessment of G/LD children, and we evaluate these guidelines in the light of recent empirical research in psychoeducational assessment. Finally, we discuss the empirical basis for interventions for the G/LD population, propose four specific research projects to better understand the concept of G/LD, and conclude by discussing what steps clinicians might take when faced with children who have uneven ability profiles.

Two previous works have discussed similar issues. Vaughn (1989) was the first scholar to critique the G/LD field, providing a comprehensive review of the G/LD literature and describing the need for research validating the identification practices and the intervention programs that had been proposed at that time. Specifically, Vaughn noted that many of the published papers describing the G/LD child relied on "case studies, observations by teachers and clinicians, self-reports from persons who are gifted/LD, and intuition" (p. 124) rather than on systematic empirical investigation. Five years later, Cohen and Vaughn (1994) provided an update and reached largely the same conclusions, maintaining that although "there is little doubt that students who are both gifted and learning disabled exist" (p. 93), research had yet to provide reliable and valid ways of identifying such students. In some ways, the current article begins where Cohen and Vaughn left off, using research from the past decade to evaluate work in the G/LD field from the same time period. We also hope to go beyond an evaluation of the current G/LD literature to show how assessment procedures contribute to our understanding of children with uneven ability profiles and how new research is required not only to increase the validity of diagnostic assessment, but also to better understand what it could mean to be gifted and have LD.

Several topics, though worthwhile, are beyond the scope of the present ar-

ticle. We will not provide a general evaluation of the state of G/LD research (for this, see Cohen & Vaughn, 1994). Also, we will not provide a comprehensive review or analysis of definitions of giftedness or LD, but we direct the reader to Bradley et al. (2002) for the latter. We instead limit our aim to a critique of present identification practices in the G/LD area, along with a context of historical antecedents and a discussion of clinical consequences.

History and Definitions

The "Gifted Handicapped" Population

It has long been realized that intellectually gifted students may nevertheless have a disability such as visual impairment. Case studies of Helen Keller, Steven Hawking, and other eminent individuals have attested to this. However, proactive attempts to *find* these students only began with the mainstreaming movement (Whitmore & Maker, 1985). Gifted education advocates noted that moving students with disabilities into the general education classroom allowed these children to show talents and skills that might have been ignored in special education classrooms.

This recognition prompted a response from professional organizations, leading to a committee on "gifted handicapped children" formed by the Council for Exceptional Children (CEC), two national conferences on the topic in 1976 and 1977, and even a new "gifted handicapped" category for documents catalogued by the Educational Resources Information Center (ERIC) to make the latest information more available to scholars from a variety of disciplines (Whitmore & Maker, 1985, Chapter 1).

Textbooks on gifted education gradually began to incorporate work in this area. Davis and Rimm (1989) were typical in devoting a chapter to "the handicapped gifted child" and estimating the size of this population to be large (in their case, between 300,000 and 450,000 children). Davis and Rimm emphasized that identifying giftedness in students with disabilities requires procedures different from those in a typical giftedness assessment. Specifically, they recommended the use of behavior rating scales, creativity inventories, peer or self-nominations, and prolonged student observation.

It is important that from the beginning of work in this new area, scholarship was conducted from an advocacy perspective: The "gifted handicapped" were viewed as languishing in special education classes where they were denied the *right* to fully develop their talents. Whitmore and Maker (1985) were clear on this point, describing the G/LD field as "emerging within the context of moral concern for the civil right of all children to have an appropriate public school education that will help them fully develop their potential for life satisfaction and contribution to society" (p. 6).

Gifted Children With Specific LD

The "gifted handicapped" movement initially concentrated on children with sensory and physical disabilities, but it was not long before scholars began to extend their interest to students with LD. The earliest articles on this topic were not empirical studies but, instead, descriptions of eminent (and ostensibly gifted) individuals whose biographies suggested deficits that might be characterized today as LD. For instance, Thompson (1971) provided biographical sketches of Thomas Edison, Albert Einstein, and others, with special reference to these individuals' isolated deficits, such as Harvey Cushing's poor spelling. Thompson even diagnosed William James (a voracious reader; see Bjork, 1997), with dyslexia, based on a brief autobiographical passage in James' *Principles of Psychology* about the visualizing of alphabet letters. Similarly, Elkind (1973) cited Winston Churchill and Igor Sikorsky (a pioneering aviator) as examples of gifted individuals with LD.

These descriptive pieces aside, the first two major works on G/LD children were published in 1983. One was an edited volume entitled *Learning-Disabled/Gifted Children: Identification and Programming* (Fox, Brody, & Tobin, 1983), based on the proceedings of a 1981 conference held by the Johns Hopkins University. None of the contributors offered a clear working definition of G/LD students, except by separately advocating certain views of giftedness and LD. In general, the contributors endorsed very broad notions of giftedness (far beyond IQ tests), and stressed the below expected achievement aspect of LD. Tannenbaum and Baldwin (1983), for instance, endorsed a "social–psychological perspective" on giftedness, in which environmental and chance factors interact with the individual's abilities to produce gifted performance, and they also characterized LD as "a considerable discrepancy between the child's potential and actual work performance" (p. 20).

The same year, Daniels (1983) published *Teaching the Gifted/Learning Disabled Child*, a description of several programs designed to help children whose academic skills lagged behind their above-average ability. Daniels described two groups of children for which the G/LD label was appropriate: (a) children with reading problems who have high intelligence but who have never been given an IQ test, and (b) children who perform at grade level but who could progress at a faster rate were it not for undiagnosed LD (Daniels, p. xi). This latter group is the first description of the "masking hypothesis"—the idea that G/LD children may appear ordinary and average in the general education classroom, as their giftedness and learning disabilities "cancel each other out." The masking hypothesis is crucial to the claim that such a large group of G/LD students remains undetected.

Whitmore and Maker (1985) similarly argued that G/LD students are ignored, and they attributed this to

identification procedures that relied on IQ testing. They opined that "for too many years intellectual giftedness was equated with a 'high' intelligence quotient" (p. 7) and concluded that "gifted individuals with specific learning disabilities are the most misjudged, misunderstood, and neglected segment of the student population" (p. 204). Whitmore and Maker also echoed Tannenbaum and Baldwin (1983) in suggesting that LD expresses itself as a failure to live up to potential; Whitmore and Maker argued that we "should be familiar with identified strengths and vulnerabilities [of G/LD individuals] . . . *in order to facilitate the development of potential*" (p. 204, italics added).

Advocacy for educational services has generally preceded basic research on the G/LD population. It was not until the mid-1990s that researchers at the University of Connecticut began the first intensive study of G/LD students, focusing on identifying characteristics of G/LD status as well as on intervention strategies. Reis, Neu, and McGuire (1995) conducted extensive interviews with college students who had been identified as having both LD and a high IQ, trying to identify school factors that promoted or impeded their academic success. Under *Project High Hopes*, Gentry and Neu (1998) developed procedures for identifying talent in middle school students and selected students to participate in a summer program; Neu (2003) discussed case studies of several students whose academic and social skills benefited from this program.

These more recent studies have frequently avoided giving a definition, except to say that G/LD students meet criteria for both giftedness and LD. An exception to this trend was found in Baum (1990), who described G/LD students as those who "exhibit remarkable talents or strengths in some areas and disabling weaknesses in others" (¶3). The National Association for Gifted Children (1998) went further, describing three kinds of G/LD students: "(1) identified gifted students who have subtle learning disabilities, (2) students with a learning disability but whose gift has not been identified, and (3) unidentified students whose gifts and learning disabilities may be masked by average school achievement" (p.1). Beyond this, definitions have turned into assessment guidelines, and so we continue to discuss the definition of the G/LD construct throughout the following section, after noting that the history of definitions of G/LD includes two critical elements: (a) the masking hypothesis and (b) the assumption that any student's achievement should be judged against that student's potential, rather than against age-typical or grade-typical achievement norms.

Assessment Issues

Proposed Identification Guidelines

Optimally, definition guides assessment, and so definitions must provide accurate characteristics, symptoms, and measures of a disorder or disability. Such definitions should be empirically validated by being shown to distinguish those who have the exceptionality from those who do not. In search of such definitions, we surveyed articles, book chapters, and books on G/LD students from the past 10 years (1995 through 2004). Four documents that gave guidelines for the assessment and diagnosis of G/LD status were found. Other documents either referred to one of these four primary sources or did not deal substantively with assessment or diagnosis. Here we describe the four sets of assessment guidelines, and then we review the research underlying the four practices endorsed by these guidelines: scatter analysis, profile analysis, broad definitions of intelligence and giftedness, and ability–achievement discrepancy models of LD.

Brody and Mills (1997). Brody and Mills (1997) comprehensively reviewed issues related to G/LD students, including assessment procedures. They were concerned with what they took to be the underdiagnosis of G/LD children who could benefit from intervention if knowledgeable school personnel identified such students. Brody and Mills concluded that three factors are especially important when considering whether to label a child as G/LD: (a) evidence of outstanding talent, (b) an aptitude–achievement discrepancy, and (c) a processing deficit. This led to assessment recommendations that included identification of the giftedness aspect of the G/LD diagnosis through an integration of IQ scores with more subjective indices, such as structured interviews, behavioral observations, creativity tests, and teacher nominations. More specifically, their recommendations included all four practices to be discussed here: scatter analysis, profile analysis, broad definitions of intelligence and giftedness, and ability–achievement discrepancy models of LD.

McCoach et al. (2001). McCoach, Kehle, Bray, and Siegle (2001) proposed "best practice" guidelines for identifying G/LD students. Their purpose was to provide practicing school psychologists with explicit criteria for the G/LD diagnostic category. McCoach et al. suggested that students be assessed for G/LD status in essentially the same way that other LD evaluations are conducted, "until sufficient evidence exists to create differential identification procedures for these students" (p. 410). In practice, McCoach et al. endorsed a discrepancy conceptualization of LD (but did not discuss a particular discrepancy formula) and recommended the use of IQ tests, achievement tests, and other tools, such as curriculum-based assessments and portfolio reviews. They appeared to differentiate G/LD students from non-gifted LD students by using IQ tests (i.e., requiring a high IQ), but they were reluctant to endorse a specific IQ cutoff value. In many ways, McCoach et al. were the exception in these sets of guidelines: They strongly recommended against scatter and profile

analysis, and they were ambiguous on the question of broad definitions of giftedness, endorsing IQ tests but defining giftedness as "an outstanding ability to grapple with complexity" (p. 404). Their endorsement of discrepancy models of LD was the only feature that clearly united their recommendations with those of the other works.

Nielsen (2002). Nielsen (2002) presented test data taken from the assessment files of more than 300 G/LD students to produce a set of assessment recommendations. She related those recommendations to pragmatic considerations, such as state legal definitions of giftedness, and she proposed reforms at the school and district levels to better identify and serve G/LD students. Nielsen stressed the need for comprehensive psychoeducational batteries, an examination of discrepancies between performance on different measures, and flexibility in identification criteria such as cutoff scores. Specifically, Nielsen recommended that diagnosticians look for low scores on the Coding and Digit Span subtests of the Wechsler scale, as well as for extreme subtest scatter, defined as "a difference of 7 scaled-score points between the highest and lowest subtests" (p. 100). Thus, she endorsed scatter analysis, and she also recommended profile analysis, broad definitions of giftedness, and discrepancy definitions of LD.

Silverman (2003). Finally, Silverman (2003) provided an overview of different types of G/LD students (e.g., gifted students with dyslexia, gifted students with "spatial disorientation") and described modifications to standard assessment protocols for giftedness when students may have LD. Silverman argued that the inspection of separate subtest scores is imperative, as giftedness and LD can "mask" each other in a variety of ways, such that G/LD students frequently are undetected or misdiagnosed. She also noted that additional conditions such as attention problems, learning styles, and anxiety can influence test performance and should be taken into account when interpreting discrepancies between different tests and subtests. Like Nielsen (2002) and Brody and Mills (1997), Silverman endorsed all four of the practices that we discuss here.

Our aim in the following sections is to judge these recommended assessment practices against the findings of recent research in psychometrics and educational assessment. We have chosen four specific practices for extended analysis: scatter analysis, profile analysis, broad definitions of intelligence in giftedness assessment, and discrepancy-based conceptualizations of LD. Each of these practices has been the focus of researchers outside the G/LD field, and so evaluations of these practices are available from scholars who are neutral with regard to the status of the G/LD concept.

Much of the research that we use to critique G/LD assessment has been discussed before, but it takes on a new relevance in the area of G/LD. First, high-ability students have characteristics with direct implications for certain assessment practices. For instance, a 30-point IQ–achievement discrepancy takes on a different meaning when the IQ is 145. Second, gifted education—both as a scholarly field and in practice—is often administratively separate from the rest of special education, and so those who work in the area of G/LD may not be aware of the implications of the research presented here.

Ability Test Scatter and Range

One popular way to identify students who have LD, and especially G/LD students, is to examine the subtest scatter on a standard IQ test. For instance, on the *Wechsler Intelligence Scale for Children*, fourth edition (WISC-IV), there are 15 subtests covering different domains of cognitive ability. A clinician might look for supporting evidence for a G/LD classification by examining the size of the difference between the child's highest and lowest subtest scores. Clinicians who use this practice generally hold that larger score ranges make LD status more probable. All of the proposed G/LD guidelines except those of McCoach et al. (2001) endorse scatter analysis.

In the general cognitive assessment literature, two main objections have been raised concerning the practice of scatter analysis: the high incidence of "extreme scatter," and the random distribution of measurement error. First, it is unclear whether a child should be considered to be unique merely because there is a large range between his or her best and worst performances. Although scatter may be "significant" at a certain p value level, this only tells the clinician that the difference between the two subtest scores is likely to be *real* (i.e., rather than being due to chance error), not that the difference is *diagnostically useful*. For instance, of the 2,200 children from the WISC-III standardization sample, 42.7% had at least *one* subtest score that was significantly ($p < .05$) below the child's own mean performance across the subtests (Glutting, McDermott, Watkins, Kush, & Konold, 1997), but it is unlikely that all of these children had processing deficits (or LD) in the domain of their lowest subtest score; therefore, scatter in itself should hardly raise a red flag for a diagnostician.

When applied to G/LD assessment, the objection to the diagnostic use of the high incidence of scatter takes on even more weight. Detterman and Daniel (1989) examined data from the *Wechsler Adult Intelligence Scale–Revised* (WAIS-R) and WISC-R standardization samples, focusing on the intercorrelations between different subtests. Participants were assigned to ability groups based on their Information subtest scores, and Detterman and Daniel found that the average subtest intercorrelations were fairly large for the lowest ability groups (uncorrected r was .42 for the WISC-R and .56 for the WAIS-R), but much smaller for the highest ability groups (uncorrected r was .22 for the WISC-R and .26 for the WAIS-R). To put it another way, *there*

is far more scatter among the subtests of high-ability participants, and so high-ability children are very likely to meet whatever scatter cutoff criteria are suggested by a school district's G/LD specialist, whether these children have LD or not.

A second concern with scatter analysis is that although measurement error (due to the imperfect reliability of a test) is typically assumed to be randomly distributed (see Crocker & Algina, 1986), G/LD researchers who use scatter analysis often take a *high* score on a single test or subtest to indicate the child's "true" ability, then proceed to explain an *average* test or subtest score in the same child as being evidence of LD, as the child is not performing consistent with his or her "expected performance." To take one example of this, Silverman, in an earlier work (Silverman, 1989), suggested that clinicians compare scores between different subtests, and even different items, and "trust that the higher scores reflect the children's abilities" (p. 40). There seems to be no empirical support for her position, but it encourages clinicians to put their trust in scores that are *by definition* unrepresentative of the child's overall performance. As Gordon, Lewandowski, and Keiser (1999) asked, "why is someone who is average in spelling but outstanding in reading comprehension and math considered disabled in spelling—why is he or she not just considered to be unusually good at math and reading comprehension?" (p. 488).

Profile Analysis

Profile analysis is a practice related to scatter analysis, but distinct from it in important ways. Profile analysis examines specific subtest *clusters* of tests or batteries, viewing certain patterns of poor performance as diagnostic of different underlying disorders. Some assessment scholars (e.g., Naglieri, 1999, 2003) have argued that composite scales from theory-based tests must be used to construct meaningful profiles, whereas other scholars, such as those who advocate a cross-battery approach (Flanagan & Ortiz, 2001) have disagreed, instead arguing that many subtests from theory-based tests have usable analogues in atheoretical tests and that these individual subtest scores can be used in profile analysis.

Often, profile analysis is associated with a neuropsychological conceptualization of LD: A child is given a comprehensive battery of tests designed to assess a large array of psychological processes, and his or her performance is compared across processing domains. Initially, this technique was used to locate organic neurological problems (Zillmer & Spiers, 2001). Learning disabilities were originally conceptualized as neurospychological disorders (Hallahan & Mock, 2003), and much has been written about the neuropsychological profiles of students with LD. Again, with the exception of McCoach et al. (2001), all of the G/LD guidelines rely on some form of profile analysis.

The concerns raised about scatter analysis also apply to profile analysis, but this latter practice has its own problems as well (for a recent review, see Watkins, Glutting, & Youngstrom, 2005). First, for almost any cognitive test, the individual subtests have lower reliability coefficients than the total test score. Therefore, it is unclear whether the same profile of strengths and weaknesses would result if the same tests were given twice to the same child on a different day, or if two different cognitive ability tests were given to the same child. A reliability coefficient of .90 or above is the standard for tests used for educational classification decisions, but very few individual subtests have reliability coefficients this high.

A second problem with profile analysis may be specific to the G/LD population: So far, research has been unable to identify a specific G/LD profile. To take one example, in the 1980s and 1990s, researchers compared G/LD students' scores on the verbal and performance scales of the WISC-R and WISC-III. Schiff, Kaufman, and Kaufman (1981) found that G/LD students obtained higher scores on the verbal cluster of subtests in the Wechsler tests than on the performance subtests, but Fox (1983) found more G/LD students whose performance IQ exceeded their verbal IQ than vice versa, and Barton and Starnes (1989) found no significant difference between the mean verbal–performance discrepancies of G/LD students and gifted students without LD. This lack of consistent profiles in G/LD students is a concern, and it has led G/LD commentators to rely on their intuition in each individual case. For instance, Silverman, in an earlier work, stated that "my PhD in learning disabilities enables me to discern patterns in gifted children resembling the subtest scatter seen in profiles of learning-disabled youngsters" (Silverman, 1989, p. 37).

A major problem in past research used to establish a consistent set of G/LD profile guidelines is that the *same* test scores used to define the G/LD group have been subjected to profile analysis, making for circular reasoning. For instance, Nielsen (2002) presented results from four data sets of WISC-R scores of G/LD children in an attempt to find a useful diagnostic profile. The results were remarkably consistent across datasets, with scores on the Arithmetic, Digit Span, and Coding subtests all lower than scores on the other subtests. Nielsen noted that these subtests all involve "sequential reasoning," and high scores on these subtests require "freedom from distractibility" (p. 96). She recommended that clinicians look particularly for relative weaknesses on the Coding and Digit Span subtests, which may be a clue to G/LD status. However, because scores on the same test were used to classify the students as G/LD initially, it is unclear how helpful this profile analysis was in identifying a distinct category of students.

If profile analysis is to be made more helpful, any diagnostically valuable profiles would have to be validated through studies that form a G/LD group based on one set of objec-

tive criteria (*not* on the hypothesized test profile), and then examine their psychoeducational test performance on independent measures. As neither Nielsen (2002) nor other scholars have done this, we currently do not have empirical evidence to support the practice of profile analysis for G/LD or to inform clinicians on how to conduct such analyses. As such, profile analysis, like scatter analysis, tends to be applied to individual cases using clinical intuition and interpretation, which in turn is used, improperly, to justify a diagnosis of LD or G/LD.

Assessment of Giftedness

The IQ test has traditionally been viewed as the gold standard for the assessment of giftedness (Callahan, 2000), and many states still require minimum IQ scores (usually between 130 and 140) to define a child as gifted. However, in the past 30 years, many psychologists have challenged the IQ conceptualization of giftedness as narrow and dismissive of talents and personal qualities that, though not assessed on traditional IQ tests, may be very integral to giftedness (see Renzulli, 1978; Winner, 1996).

To remedy this narrowness, two sets of practices have become popular: the administration of standardized measures other than IQ tests, and the use of recommendations from individuals who know the child, such as parents, teachers, and even peers (Davis & Rimm, 1989). Moreover, the definition of giftedness has been extended to cover talents in specific academic areas as well as nonacademic areas such as musical ability, "leadership potential," and creativity (Renzulli, 1986).

All sets of G/LD assessment recommendations reviewed here endorsed these newer methods, except for McCoach et al. (2001), who defined giftedness as "an outstanding ability to grapple with complexity" (p. 404) but did not take an explicit position on these newer methods of identification. The other three articles recommended a wide variety of assessment procedures, including rating scales of creative behavior (Nielsen, 2002), teacher nominations (Brody & Mills, 1997), and classroom observation (Silverman, 2003). Silverman advocated the most radical changes in the giftedness assessment process for G/LD students, arguing that "children's vocabulary, . . . their contributions in class discussions, their sophisticated concepts, their moral sensitivity, their extensive knowledge in a given subject domain (such as computers), and the presence of giftedness in siblings should all be taken into account and *given greater weight in placement decisions than test scores*" (p. 539, italics added).

G/LD advocates have also questioned the use of IQ test cutoff scores, either because of general concerns about the consequences of IQ testing (e.g., Davis & Rimm, 1989) or because they endorse the masking hypothesis and are concerned that in a G/LD student, the LD will depress the IQ score below typical cutoffs. Nielsen (2002), for instance, argued that "demanding that twice-exceptional [i.e., G/LD] children achieve an intelligence test score at or above 130 is inappropriate and self-defeating" (p. 99). Still other critics have argued that traditional IQ tests should not be used to identify gifted minority students due to the subtests' achievement-loaded nature, ethnic group differences in achievement levels, and the resultant disparities in the numbers of minority students in gifted support classes. Naglieri and Ford (2003) made this argument and suggested the use of a nonverbal cognitive ability test for minority students as less biased against minority students.

However, any criticisms leveled against IQ tests must be weighed against their considerable advantages. IQ tests serve as the gold standard for psychometric reliability and validity (see, e.g., Deary, 2000; Jensen, 1980; Mackintosh, 1998), with the Full Scale IQ being a remarkably dependable measure, both across time and internally among its component subtests. Moreover, the norming samples used for general ability measures are among the largest and most representative of the U.S. population of any test to be encountered. Furthermore, the Full Scale IQ score explains approximately one quarter of the variability in performance at school. If IQ tests (or similar cognitive processing batteries, such as the *Cognitive Assessment System*; see Naglieri, 1999) are not used, it is unlikely that we will be able to find other measures that meet these criteria.

Another criticism of IQ tests—that they narrowly define human ability, focusing on some areas (e.g., verbal expression, mathematical reasoning) to the exclusion of others (e.g., artistic talent, physical agility)—deserves comment. Rather than an unfortunate byproduct of standardization, this is a deliberate maneuver designed to examine those human abilities that are likely to matter most in the environments that use IQ tests. For instance, IQ tests ignore athletic ability, but no sports coach uses IQ tests to select players. Individually administered intelligence tests are indeed weighted toward verbal, mathematical, and visual–spatial abilities, but it is those abilities that appear to matter a great deal at school and, later on, at work (Deary, 2000, Chapter 1).

Admittedly, these research findings contrast sharply with the expansive definitions of intelligence and giftedness offered by Renzulli (1978) and Gardner (1983) and endorsed by G/LD scholars. However, the tools that these scholars recommend for G/LD assessment simply do not match these measures of general cognitive ability (including batteries of cognitive processing tests as well as IQ tests) in their psychometric characteristics or in their relevance to educational programming. The creativity assessments suggested by Nielsen (2002) often have psychometric characteristics of debatable adequacy (Hunsaker & Callahan, 1995), and the acceptance of students with artistic talent or leadership capability as gifted (Brody & Mills, 1997) makes it unclear whether most students would not fall into a "gifted"

classification, so long as they have *some* area of high ability, achievement, knowledge, or talent. A youngster with apparent expertise on the names of dinosaurs might meet Silverman's (2003) criteria ("extensive knowledge in a given subject domain"), but without high general ability, that child's prognosis in a special education gifted support class might be poor.

Perhaps much of this debate is actually predicated on different views of the purpose of schooling. G/LD scholars are concerned that children with exceptional talents are left languishing in general education classrooms without specialized services designed to develop skills in their areas of high ability. These researchers ask schools to "ferret out the gifts" (Silverman, 2003, p. 538) of each child and provide whatever services are necessary to help the child to reach his or her potential. Gordon et al. (1999), in contrast, argued that in a world with limited resources, spending money on students who are doing well but who could be doing better (i.e., achieving their potential) should take a backseat to helping those with more severe disabilities whose performance falls below a certain minimum standard. It is unlikely that these two competing views of schooling can be reconciled using empirical research, but this particular philosophical question need not be decided before the validity of specific assessment practices is evaluated.

Ability–Achievement Discrepancies

As we mentioned at the outset, LD have traditionally been operationally defined as discrepancies between an individual's ability and his or her actual performance on tasks in some subject area. In some states and school districts, this conceptualization has led to the use of a formula: A referred child is given an IQ test and a standardized achievement test, and if the difference between the standard scores of the two measures exceeds some critical value (such as 2 *SD*), the child is labeled as having LD.

The LD field as a whole seems to be moving away from these IQ–achievement discrepancy formulas; new models are focusing on a student's response to intervention (Gresham, 2002), absolute low achievement (Stanovich, 1999), or cognitive processing problems (Naglieri, 2003). However, the area of G/LD scholarship appears to be clinging tightly to the discrepancy conceptualization, with all of the recent G/LD identification guidelines endorsing this practice, including Silverman (2003), who claims that many G/LD children have significantly higher *achievement* than *ability*, rather than vice versa. Scholars have offered many criticisms of the discrepancy conceptualization of LD (see, e.g., Bradley et al., 2002; Sternberg & Grigorenko, 2002); only a few representative criticisms will be reviewed here.

First, the psychometric qualities of difference scores are poor; discrepancies between two tests are not consistent over time, and their reliability is worse when the two tests are significantly correlated (Crocker & Algina, 1986), as valid intelligence and achievement tests typically are. In addition to this fragility, the specific tests that are chosen often determine whether a discrepancy is found, and so school psychologists will often search for tests that lead to a discrepancy if the school wishes to make a diagnosis of LD.

A second criticism has been made by researchers who have repeatedly found no difference between low-achieving students with low IQs (i.e., IQ-consistent low achievers) and low-achieving students with high IQs (i.e., IQ-discrepant low achievers). A recent meta-analysis (Stuebing et al., 2002) reviewed 46 studies that compared IQ-discrepant poor readers to IQ-consistent poor readers. These investigators found negligible effect sizes for the difference between the two groups' behavior (d = –.05) and achievement (d = –.12). Only cognitive ability showed a small but significant effect (d = .30), and this was obviously confounded by the fact that the groups were classified in part based on the students' cognitive ability (see also Fletcher et al., 1994). If students who perform significantly below average in a subject area appear the same regardless of their cognitive ability level, the IQ–achievement discrepancy formula would seem to be creating arbitrary groups rather than clinically meaningful ones.

Finally, discrepancy formulas are based on misunderstandings about the nature of intelligence and IQ tests. The tasks in most intelligence tests and those in achievement tests measure many of the same cognitive processes and similar learned knowledge, so it is unclear why a learning disability that disrupts cognitive processes and impedes the acquisition of knowledge would depress achievement scores but not IQ scores. Moreover, recall that intelligence tests explain only 25% of the variability in academic achievement in typical populations—a considerable proportion, but not so much as to make performing (i.e., achieving) at a level that is "discrepant" from one's IQ strange. Even measures such as the *Cognitive Assessment System* (Naglieri, 1999) and the Kaufman batteries (Lichtenberger, Broadbrooks, & Kaufman, 2000), which appear to show higher correlations with standardized achievement tests than traditional IQ tests (see Naglieri & Bornstein, 2003), still leave about 50% of the variability in achievement unexplained. It is worth remembering that a bivariate scatterplot will *always* yield a regression equation, regardless of the size of the correlation between the two variables. As such, predictions may be made from IQ to achievement, but "IQ-consistent" achievement should not be our default hypothesis when the correlation between IQ and achievement is only .5 (see also Sternberg, Grigorenko, & Bundy, 2001).

Regardless of the tests used to formulate a diagnosis, a discrepancy-based approach is especially problematic in G/LD assessment. An often overlooked component of diagnosis is the determination of clinical impair-

ment. The *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition (*DSM-IV*; American Psychiatric Association, 1994) diagnostic criteria for "Learning Disorders" include the IQ–achievement discrepancy as Criterion A. However, many clinicians seem to ignore Criterion B, particularly with regard to gifted students. Criterion B notes that the individual's problem "significantly interferes with academic achievement" (p. 48). The Americans with Disabilities Act (ADA; 1990) goes even further in stating that an individual with a disability must be significantly impaired relative to most people and substantially limited in a major life activity (e.g., school learning). These criteria impose a second hurdle beyond mere discrepancy. Although the Individuals with Disabilities Education Act (IDEA; 1997) does not explicitly mention impairment, its use of *disorder* in the definition of specific learning disability ("a disorder in one or more of the basic psychological processes"; 20 U.S.C. §1401) implies a similar concept. If this idea of impairment (in an absolute sense, relative to the general population) is ignored, if discrepancies alone are used, and if the right mixture of ability and achievement tests are chosen, a majority of gifted students could be classified as having LD. Therefore, before advocating a discrepancy model, clinicians and educators must honestly ask whether a student with an IQ in the 98th percentile merits special services and accommodations when his or her reading achievement score is at the 80th percentile, whereas students with lower ability and achievement scores do not merit such attention. Reliance on a strict discrepancy criterion, without applying the impairment criterion, can—and does—lead to such decisions in the schools.

An issue related to discrepancy criteria concerns the "masking" hypothesis and the lowering of gifted IQ cutoffs (recommended by, e.g., Nielsen, 2002) for students with LD. If we are not careful, the idea that giftedness and LD mask each other leads to a situation where *no* claim of G/LD status can be falsified. It is difficult to think of a test profile that cannot be explained as a "masked" G/LD situation. For example, consider a student with average IQ and average achievement—a seemingly typical child whose performance can be explained as that of a G/LD child whose giftedness is suppressed by a learning disability, yet whose disability is evidenced by merely average achievement (presumably instead of below-average achievement). This may lead to a slippery slope whereby most students fit a G/LD definition. Such a practice runs counter to establishing G/LD students as a valid, distinct, and underserved group.

Conclusions

The Meaning of an Uneven Profile

Given that a child referred for a G/LD evaluation typically has an uneven profile of test (and subtest) scores, school psychologists, teachers, and parents must know how to interpret such unevenness. Three guidelines serve as rules of thumb that can be gleaned from the empirical literature reviewed thus far.

First, uneven profiles should not be viewed as "abnormal" in a statistical sense—they are in fact quite common. Assessment experts who have argued against profile analysis have noted repeatedly how the "base rate" (i.e., the percentage of individuals in the general population who show a certain degree of scatter or discrepancy) is often high enough to keep an uneven profile from being diagnostic of any disorder whatsoever (see Kavale & Forness, 1984, for one seminal review).

Second, an uneven profile does not necessarily indicate unevenness in any latent capacities residing within the child; it is just as likely to be the result of motivation, past learning experiences, or measurement error. A child who is given vocabulary games to play might score especially well on the vocabulary subtest of an intelligence test, but this is no reason to think that the child's "true cognitive potential" is that of his or her vocabulary subtest score and that the other, lower scores represent disabilities that are keeping the child from reaching his or her potential. Similarly, a child who dislikes mathematics (for some reason apart from low ability) may have a very low score on the mathematics subtests of a standardized achievement battery, but this is not diagnostic of a specific learning disability in mathematics resulting from some sort of information processing problem.

Finally, due to the lack of reliability of individual subtests and difference scores, an assessment that finds an uneven profile might find an even profile (or a different uneven profile) if the assessment is repeated a few weeks later, and so interpretations based on the specific pattern of unevenness should be made with extreme caution. When a child does poorly on a cluster of subtests, it is easy to hypothesize an element common to those subtests, but it is not clear that the child has a *disability* related to that common element.

In short, an uneven test score profile per se is not a problem, and it should be ignored when it does not occur in the context of some functional impairment; when a functional impairment (relative to the average student) is indeed present, it is the impairment itself—rather than the uneven profile—that is in need of remediation or accommodation. A student with an IQ of 137 and a reading achievement standard score of 115 has a significant discrepancy yet performs better in reading than 84% of the population. Few would argue that such a student should get special accommodations in tests, let alone remedial reading services.

Assessment for Intervention

It has long been argued that assessment is useful to the extent that it informs effective interventions (see Reschly, 1997). This point is not lost in

the area of G/LD assessment. The treatment recommendations in the four articles reviewed earlier include formal Individualized Education Programs (IEPs), opportunities for remediation of LD and for the further development of special talents, and counseling for the problems resulting from "years of accumulated frustration and confusion over their dual exceptionality" (Nielsen, 2002, p. 105).

More specifically, Brody and Mills (1997) argued that it is "essential" that G/LD students receive instruction where "pace, level, and content can be geared to ability, interest, and learning style" (p. 292). McCoach et al. (2001) were even more explicit, saying that G/LD students should be allowed "to work at an appropriate level in each subject area, even if this results in grade level asynchronies within the student's educational program" (p. 409). Nielsen (2002) suggested that G/LD students "need" access to video and digital cameras and computers with Internet access to "remove or reduce barriers to learning" (p. 105). These intervention suggestions are fairly general and not distinct from recommendations made for all students with LD—or indeed for all students. To progress beyond this kind of intervention recommendation, scholars would need to better understand the nature of these students and design targeted interventions that can be subjected to validation research. Models for this certainly exist for students with attention-deficit/hyperactivity disorder (see DuPaul & Stoner, 2003).

We might also note that the recommended interventions are expensive and labor intensive, indeed almost utopian. Optimally, *all* students would receive truly individualized instruction, moving at their own pace through classes that are augmented by the resources just described. However, as we have argued, the G/LD population is so poorly defined as to make it difficult to see who should be given access to these interventions. That these programs have been proposed by student advocates is understandable, but should they be offered to a group of students whose composition is a matter of such debate and who may not differ significantly from other students who do not receive special services?

Rather than merely advocating for special resources, we need to focus on making identification therapeutically meaningful. We must clearly define the gifts and needs that G/LD students have that make their participation in programs outside of the general education curriculum not just beneficial but necessary. When the endorsed identification procedures do not necessarily require low achievement *or* exceptionally high ability in the normal sense of these terms, it is unclear why G/LD students require resources that other students do not.

A Suggested Research Agenda

We agree with earlier investigators (Cohen & Vaughn, 1994; Vaughn, 1989) about the lack of empirical research supporting the current definitions, identification criteria, and interventions proposed for G/LD students, and, in that spirit, we offer several lines of research aimed at addressing important questions and providing evidence-based clinical guidance.

First, we need base-rate data on gifted children's ability and achievement profiles and discrepancies. In most states, compared to other special education services, gifted education services are administered haphazardly, and this often means that students identified as "gifted" for the purposes of a special program do not receive a comprehensive psychoeducational assessment. Therefore, archival data of intelligence and achievement test scores of gifted children are uncommon. If we could administer an IQ test and an individual standardized achievement test to a reasonably large number of children who were referred for gifted services, we would be in a far better position to confidently evaluate the *practical* significance (i.e., real-world utility; see Kirk, 1996) of the scatter and discrepancy cutoffs suggested by the scholars whose works we have reviewed here. As described earlier, there is reason to think that base rates of scatter would be higher in the gifted population (Detterman & Daniel, 1989).

A second needed project would investigate those students who meet the most conservative criteria for G/LD status: IQ above 130 and significantly below-average achievement (standard score < 85) in a subject area, with certain alternative explanations (e.g., motivation) ruled out. A fifth grader who obtains a Full Scale IQ of 130 and a reading score of 80 demonstrates a degree of variability that (a) far exceeds the norm and (b) causes authentic impairment. By studying such students, we might be able to identify a rather "pure" and undisputed group of dually exceptional children. Careful study of these children should help us better define the G/LD category and evaluate targeted interventions. We could then determine if such students are distinct from other gifted students, such as those with high IQs but average achievement.

A third, related research project would attempt to test the controversial "masking hypothesis," the idea that giftedness and LD mask each other. Let us start by defining two groups: Say that students in Group A meet the "conservative" criteria for G/LD just described (i.e., IQ above 130 and a truly below-average achievement score in some area), whereas students in Group B have impressive amounts of scatter in their profiles but do not have either above-average IQs or significantly impaired achievement in an absolute sense. The claim that proponents of the masking hypothesis appear to make is not just that students in Groups A and B could both benefit from special services, but the stronger claim that students in Groups A and B are *alike* in some fundamental way that makes them fall into the G/LD category. The G/LD literature is replete with hypotheses about what makes these groups similar: metacognitive ability (Hannah, 1989), brain activity as indexed by electroencephalogram (EEG; Bireley, Languis, & Williamson, 1992), or even

certain socioemotional characteristics (Vespi & Yewchuk, 1992). To find that students in both Groups A and B share something that other students do not seems counterintuitive, but it is necessary for the masking hypothesis to be plausible. Investigators could perform pairwise comparisons between Group A, Group B, and a third group of students who meet neither the conservative IQ–achievement criteria nor the scatter criteria required for Groups A and B, respectively. Comparing these three groups of students on various proposed features of the G/LD profile would be one empirical test of the masking hypothesis.

Finally, the interventions that are already in place in some school districts (e.g., Weinfeld, Barnes-Robinson, Jeweler, & Shevitz, 2002) provide a ripe source for a fourth line of research. One way to investigate diagnostic categories (e.g., in medicine) is by examining response to treatment. It is easy to envision an experiment modeling the growth of a set of academic skills in four groups of students: (a) identified G/LD students who remain in their general education classroom with no modifications, (b) identified G/LD students who receive special, individualized services of the type suggested by Brody and Mills (1997), (c) non–G/LD students who receive those same special services, and (d) non–G/LD students who remain in their general education classroom. If these diagnostic categories are meaningful and the programs are defensible, we should expect the rate of growth in the G/LD students who are receiving special services to outpace both that of G/LD students who remain in general education and, critically, that of non–G/LD students who are exposed to individualized instruction. Looking at the pattern of growth in these four groups would yield insights regarding (a) which components of the special, individualized instruction help most, and (b) which components help G/LD students differentially.

These research projects would help justify the current intervention programs and validate the accompanying identification practices, but their importance extends beyond this goal of justification. Until these research projects are completed, and completed with very specific outcomes, the very idea of gifted students with LD can be criticized as an arbitrary category based on a poor psychometric foundation. We need research that differentiates G/LD students from others, because a prerequisite to saying with certainty that a child has G/LD status is being able to say that another child does not. The current assessment guidelines do not provide this falsifiability that is so important in clinical diagnosis, and so, for the moment, it is not clear who the G/LD students are. Although the four lines of research described here are not sufficient to answer this question in a comprehensive manner, they represent necessary first steps on the path toward more focused research questions.

Interim Guidelines for Clinical and Educational Practice

Until the aforementioned research is done, we are still faced with children whose confusing patterns of competence challenge classical diagnostic categories and leave school personnel unsure how to help them. What is to be done?

First, we should stop using practices that the empirical literature has thoroughly discredited, such as scatter analysis and profile analysis. Some G/LD scholars have suggested that these procedures may not be valid in the general population yet would have utility for gifted students. However, the burden of proof is on these scholars to provide evidence for this contention.

Second, we should stop basing the diagnosis of G/LD on the masking hypothesis, at least until research can be done to support this currently unfalsifiable postulate. At present, the masking hypothesis can only be taken on faith, and yet among G/LD assessment guidelines its acceptance is not the exception but the rule (McCoach et al., 2001 being the only exception here).

Instead, we should use operational definitions of giftedness and LD that are psychometrically defensible and useful for classification in school programs. Giftedness assessment methods that are popular but do *not* meet these criteria include creativity tests, isolated high scores on single subtests, and peer nominations. At the present time, IQ tests and comparable batteries of cognitive abilities that yield general ability indices appear to be the most acceptable primary measures of giftedness, even though access to a gifted support program may be based on a comprehensive evaluation integrating multiple sources of information. The conceptual relevance of IQ tests in this role is enhanced by their relationship to the ability to learn information (e.g., Rapport et al., 1997). Moreover, absolute low achievement in an academic skill area, though only one of many ways to operationalize LD, has immediate "treatment validity" for the purposes of academic programming (see Dombrowski, Kamphaus, & Reynolds, 2004; Stanovich, 1999), because students who score, for instance, in the bottom 10% of the distribution on a reading test *by definition* have an impairment, do indeed need special help, and should receive appropriate services. When a student has an IQ score in the gifted range (i.e., a standard score above 130) *and* significantly below-average achievement (i.e., a standard score below 85), describing the child as gifted *and* as having LD seems reasonable; in this case, there is a very substantial discrepancy between IQ and achievement, but it is not the discrepancy per se that leads to the diagnosis.

Admittedly, the cutoff values that we give in this example (130 and 85) are arbitrary in the sense that reasonable differences of opinion exist about whether giftedness should be defined as scores above the 95th or the 98th percentile and whether students in the bottom 10% or 15% of an achievement domain should be targeted for special services. Our main concern is that the student's ability is substantially above average and that his or her achievement is substantially below average *when compared to peers of the same age* rather than making unwarranted intra-

individual comparisons. Cutoff scores are always problematic, in that they artificially partition a distribution into groups, such that two individuals on different sides of the dividing line may be more similar to each other than either individual is to other members of his or her own group; thus, if 130 is used as a cutoff for giftedness, two students with IQs of 125 and 135 are more similar than the student with an IQ of 125 is to a third student who has an IQ of 100. However, eligibility for services is determined by diagnostic statuses that are assigned in a present–absent fashion, and cutoff scores are necessary to do this, just as classroom teachers must choose cutoff scores to determine which students merit a particular letter grade (see Macmann & Barnett, 1999).

This approach to G/LD assessment, using IQ scores and absolute low achievement, is conservative in that it is far less likely to overdiagnose students than current practices are. Admittedly, conservative diagnostic procedures also have costs, one of which is the risk of underdiagnosis. Insisting on strict criteria for inclusion in the G/LD category will mean that fewer students will make the cut—including some who may benefit from services. But, as we discussed earlier, it is difficult to identify a group of students who would *not* benefit from the interventions recommended by G/LD advocates, and so it is just as difficult to think of a set of diagnostic criteria that would not exclude students who could benefit.

The advantages of this conservative approach extend far beyond a single child's immediate educational programming. Although the LD classification has no doubt helped many children, others may have been unintentionally harmed. As Sternberg and Grigorenko (2004) noted, "Once children are labeled as 'LD,' a complex set of mechanisms is put into effect that renders it likely that the label will be become a self-fulfilling prophecy" (p. 25). When we are, instead, hesitant to place a disability label on a child, we are more likely to look at specific environmental factors that are causing poor academic functioning in children and more open to potential remedies that are not modeled on the current conceptualizations of LD.

We conclude on this practical note: We do not doubt that G/LD students exist, in the sense that no matter how high the IQ score cutoffs and how low the achievement cutoffs are, some children will meet criteria for both giftedness and specific LD. Nor do we deny that some of these children are in need of assistance and should be classified to receive services. However, we are skeptical that G/LD students constitute a large, hidden population whose gifts and disabilities mask each other and who could benefit uniquely from targeted interventions. Pending data that support these claims, current G/LD identification and intervention practices appear to be poorly targeted, lumping together children who have nothing in common other than their meeting criteria based on little more than clinical lore. Only empirical work can remedy this state of affairs and lead to evidence-based practices for the identification and education of gifted students with LD.

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