Stanford BINET Intelligence Scales

Stanford-Binet Intelligence Scales, Fifth Edition
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Accommodations on the *Stanford-Binet Intelligence Scales, Fifth Edition*

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This bulletin is designed to help examiners of the Stanford-Binet Intelligence Scales, Fifth Edition *(SB5) (Roid, 2003a) make appropriate decisions for whether, when, and how to accommodate individuals with disabilities. Purposes for accommodations and the related principles, along with some suggested accommodations, are presented. This bulletin is meant to provide general guidance to examiners regarding accommodations on the SB5.*

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Purposes of Accommodation

There are three reasons why examiners using the SB5 must consider accommodating clients who have, or who are suspected of having, disabilities: (a) laws, litigation, and regulations requiring accommodations; (b) ethical codes of conduct; and (c) enhanced validity of assessment. A discussion of each of these reasons follows.

Laws

Federal civil rights laws provide individuals with disabilities the legal rights to accommodations. Title VI of the Civil Rights Act (1964), Title IX of the Education Amendments (1972), and Title II of the Americans with Disabilities Act (1990) mandate access for individuals with disabilities in a variety of assessment processes and settings. Furthermore, federal legislation requires entities receiving federal funds to provide access and accommodations to individuals with disabilities (e.g., Section 504 of the Rehabilitation Act of 1973), and the Individuals with Disabilities Education Act (IDEA) (1997) provides protections to individuals with disabilities in the assessment process. Together, these laws provide a clear mandate to require accommodations for individuals with disabilities in assessment processes, whether those processes occur in public or private settings (Office of Civil Rights, 2000). Furthermore, the right to accommodations extends to all individuals with disabilities (i.e., children and adults). Therefore, examiners must consider testing accommodations when assessing individuals who have or who are suspected of having a disability.

Ethics

Most professional organizations promulgate ethical standards to guide appropriate conduct in professional practice. Psychological ethics standards (e.g., American Psychological Association, 2002; National Association of School Psychologists, 2000) provide some general principles to guide practice (e.g., responding to clients' unique needs including sensitivity to disabilities). The ethical standards clearly state that examiners must consider accommodations for individuals with disabilities and must use accommodations appropriately when assessing an examinee with a disability. Unfortunately, these standards are not specific in addressing issues related to testing accommodations.

Fortunately, these same ethical standards usually direct professionals to consult the *Standards for Educational and Psychological Testing* (Standards) (American Educational Research Association, American Psychological Association,

National Council on Measurement in Education [AERA, APA, NCME], 1999) for more specific guidance related to assessment practices. The Standards outline specific guidelines for assessing individuals with disabilities (see Chapter 10, AERA, APA, NCME) by directing clinicians to consider a range of accommodations and by distinguishing between test accommodations and test modifications. The information contained in this bulletin supplements discussions in the other SB5 manuals (Roid, 2003b, 2003d) by clarifying the distinction between test accommodations and test modifications.

The Standards (AERA, APA, NCME, 1999) list six general ways in which examiners can change an assessment to accommodate examinees with disabilities. Examiners must consider changes in the following assessment features:

1. *Presentation format*. Altering the medium for presenting test items or directions (e.g., using American Sign Language to give directions to a deaf examinee)
2. *Response format*. Altering the way in which the individual responds to test demands (e.g., allowing the examinee to point out rather than name a response option)
3. *Timing*. Modifying the duration or intervals associated with test administration (e.g., allowing extra time between tests, testing across multiple days)
4. *Portions of the test*. Selecting portions of a test based on the individual's disability (e.g., using the Verbal scale with a visually impaired examinee)
5. *Test setting*. Changing the physical features or location of a test setting (e.g., using wheelchair-accessible furniture)
6. *Substitute tests or alternate assessments*. Administering a test in lieu of a standardized procedure, or using a specialized instrument (e.g., giving items in a dynamic test-teach-test condition)

Although the Standards (AERA, APA, NCME, 1999) provide options for accommodations, they do not provide specific guidance to examiners on how to choose among these accommodation options. Test publishers play an important role in helping examiners choose among accommodation options, and this bulletin is intended to provide guidance on whether, when, and how to select among an array of accommodation options.

Assessment Validity

The need to maintain the validity of the assessment outcome is the final and most compelling reason for examiners to consider and use appropriate accommodations for administering the SB5. As noted in the Standards (AERA, APA, NCME, 1999) and the SB5 Technical Manual (Roid, 2003d), validity is not a characteristic of a test; rather, validity is the characteristic of a test outcome or score. When an examiner calculates SB5 scores for an examinee who has a disability, the examiner must assign meaning to those scores. For example, do low scores indicate limited cognitive abilities or the effects of the examinee's disability? Examiners must ensure that test scores retain their validity for examinees who have disabilities. Therefore, examiners must use test accommodations to ensure test outcomes are valid indicators of an examinee's cognitive abilities.

The preceding review demonstrates that laws, ethics, and sound assessment science require examiners to consider accommodations when administering the SB5 and other tests to examinees with disabilities. Laws and ethical codes, however, do not provide guidance to examiners regarding how to accommodate or when accommodations are appropriate or inappropriate. Principles for making appropriate accommodations decisions are reviewed in the following section.

Principles for Test Accommodations

The primary purpose of test accommodations is to retain or ensure the validity of test scores. When accommodations are necessary and done well, examiners can interpret the results of their assessment as accurate indications of the constructs they sought to assess. A second purpose of testing accommodations is to protect the rights of the examinee by providing a fair and appropriate assessment. With respect to the SB5, the examiner uses accommodations to ensure that test scores reflect the examinee's cognitive abilities, rather than reflecting the effects of limited vision or hearing, fatigue, limited motor coordination, or other conditions brought about by an examinee's disability.

Validity Issues in Assessment

Examiners must ensure that examinee disabilities do not invalidate assessment results. Messick (1995) identified two sources of invalidity within assessment: construct underrepresentation and construct-irrelevant variance.

Construct Underrepresentation

All assessment devices seek to assess one or more constructs. To the degree that the assessment (i.e., test items, directions, activities) elicits those cognitive abilities, the assessment results will represent those abilities. The SB5 seeks to measure general cognitive ability and five domains of cognitive ability consistent with Cattell-Horn-Carroll (CHC) theory (see Carroll, 1993; Schrank & Flanagan, 2003). To ensure that test scores adequately represent cognitive abilities, the SB5 uses multiple ways to assess intelligence, and its subtests are designed to elicit cognitive processes consistent with CHC theory. Using a single subtest to estimate general cognitive ability would lead to construct underrepresentation (e.g., general intelligence, CHC factors) for the constructs the SB5 intends to represent. Therefore, tests must adequately represent the construct they intend to measure, and examiners should avoid changes to the test that reduce or underrepresent those constructs.

Construct-Irrelevant Variance

The second source of assessment invalidity occurs when the assessment results reflect the influence of factors that are not intended to be represented in the assessment. Within the SB5, assessment results contain construct-irrelevant variance when scores are meaningfully influenced by noncognitive factors. For example, Verbal Scale items are intended to assess cognitive abilities that are mediated in English but not intended to assess exposure to, or proficiency in, English. If an examiner gives the Nonverbal Scale items to an examinee with limited vision, the scores may reflect the examinee's inability to see items more

than they would reflect the examinee's cognitive abilities. Therefore, those scores would have significant construct-irrelevant variance that would invalidate their meaning (i.e., they would not represent cognitive processes because they are influenced by visual acuity). Therefore, examiners must make testing accommodations when administering the SB5 to reduce or eliminate construct-irrelevant variance as an influence on test scores.

Legal Issues in Assessment

Writing from a legal perspective, Phillips (1993, 1994) argued that examinees with disabilities must have appropriate access to assessments. To ensure access, examiners must provide examinees with appropriate accommodations. Although early litigation and legal responses focused on issues such as physical access to testing accommodations (e.g., college test companies must provide wheelchair-accessible furniture when administering tests), the discussion has expanded to balance the rights of test takers against the obligations of test providers to ensure accommodations are fair and equitable. To guide these decisions, Phillips draws a distinction between two types of skills that assessments require: access skills and target skills.

Access Skills

Assessment conditions require or assume that examinees have certain skills. For example, reading achievement tests require examinees to be able to see test items (visual acuity skills), sit upright throughout the test session (gross motor skills), indicate correct answers (fine motor skills), and work on test items throughout the testing interval (attention, stamina skills). These skills are not the focus of the assessment; rather, they are skills required to access the test items and content. Therefore, these skills are considered access skills. Accommodations to address access skills level the playing field for examinees with disabilities because they remove the barriers these examinees have and allow examinees to show their true skills. Furthermore, examinees with disabilities have the right, and test administrators have the obligation, to adapt the testing situation to minimize the effects of these access skills on test outcomes. Therefore, testing accommodations should address access skills so that examinees are afforded appropriate access to assessments.

Target Skills

In contrast to access skills, target skills are the skills that assessments are intended to measure or reflect. Examinees with disabilities do not have the right to accommodations that address target skills because such accommodations would be unfair (i.e., they would incorrectly inflate the examinee's scores relative to those who did not have accommodations). To return to the example of a reading achievement test, some of the target skills in the test would be the ability to decode text (word reading), understand text (comprehension), and apply previous knowledge to information in the text (evaluate and extend meaning). Providing a large print version of the test to an examinee with a visual impairment would be appropriate (i.e., the accommodation addresses the access skill of visual acuity), but reading the test aloud to the examinee would not be appropriate (i.e., it changes the target skill—decoding text—by substituting a different skill—listening comprehension). Accommodations that alter target skills are inappropriate and are likely to

violate the rights of other test takers by providing an unfair advantage to examinees with disabilities. However, accommodations that address access skills are not only allowed but are required because they protect the examinee's right to gain the same access to the test afforded to examinees without disabilities.

There are strong parallels between validity and legal perspectives on testing accommodations. Both approaches direct examiners to ensure that assessment accommodations retain adequate construct representation (i.e., do not affect target skills) and concurrently reduce construct-irrelevant variance (i.e., reduce or eliminate the influence of access skills).

Accommodations Versus Modifications

Contemporary research (e.g., Thurlow, Elliott, & Ysseldyke, 1998) and the Standards (AERA, APA, NCME, 1999) concur in drawing a distinction between test accommodations and test modifications. Test accommodations are changes to the testing situation that retain construct representation (i.e., do not affect target skills), while reducing construct-irrelevant variance (i.e., address access skills). In contrast, test modifications are changes to testing that affect the construct or target skills of the test (e.g., providing easier items, substituting tests of other skills). Therefore, test accommodations are legally mandated and appropriate to ensure validity, whereas test modifications are neither mandated nor desirable because they are likely to alter validity.

Conclusions

Historically, cognitive assessment research and practice addressing the needs of disabled examinees have approached the issue of accommodations in an intuitive manner (Braden, in press). Clinicians, and the ethical standards and practices they have developed, have been intrinsically more concerned with reducing construct-irrelevant variance than with ensuring adequate construct representation. That is, fairness in response to client concerns has received greater attention than ensuring adequate breadth in assessments. However, advances in cognitive theory have increased the degree to which clinicians can identify, and thus adequately include, construct representation in cognitive assessments (Braden).

Contemporary legal and ethical developments also provide a mandate for testing accommodations. Moreover, scientific and legal perspectives provide principles that examiners can use to guide decisions about whether, when, and how to accommodate examinees with disabilities in assessments. The next section of this bulletin reviews the literature on assessment accommodations to provide a background for the recommendations that follow.

Assessment Accommodations Research

The key question driving assessment accommodations research is whether the scores with and without accommodations are comparable (Phillips, 1994). In effect, do scores from nonstandard test administrations mean the same thing as scores from standard test administrations? Test standardization is the traditional method for making test results among examinees comparable (McDonnell, McLaughlin, & Morison, 1997). Standardization, however, may reduce the

comparability of scores for students with disabilities because the disability itself biases the score by creating construct-irrelevant variance in the score (McDonnell et al., p. 173). Therefore, the use of accommodations reduces that variation in score caused by a disability but precludes standardization because accommodations, by their very nature, change the standard administration of the test. The essential questions are: At what point does the change from standard test administration intended to improve score comparability actually change the task and harm score comparability? and How does an examiner know whether the tasks and resulting scores are no longer comparable?

Interestingly, most of the research addressing these questions has been undertaken in assessment contexts not involving intelligence tests. That is, the majority of research focuses on the inclusion of test takers with disabilities in nonclinical assessments, such as large-scale achievement testing, college entrance exams, or employment tests. Research in contexts other than intelligence testing is reviewed first, and then a review of available research using previous editions of the Stanford-Binet and other clinical tests of intelligence is presented.

Decisions About Score Comparability: The Role of Different Research Designs

Tindal (1998) proposed three models for making decisions about task comparability. These models are descriptive (model 1), comparative (model 2), and experimental (model 3) in nature. The focus of all three models is to determine whether the construct that is being measured changes as a result of testing accommodations. The models represent a continuum of evidence for task comparability from the weakest evidence (descriptive) to the strongest (experimental).

In Tindal's (1998) descriptive model, evidence about task comparability relies on current policy for decision-making. Many testing accommodation policies provide descriptive evidence because they do not offer explanations or justifications of why judgments about accommodations in policy are made. Instead, policies can be created based on external information (e.g., the policies of other states) or may offer simple procedural recommendations for selecting and using accommodations without stating a rationale for doing so. As part of their policies, school districts may track the implementation of various accommodations to understand how frequently accommodations are selected and used for certain tasks. This tracking may provide further descriptive evidence about the relationship of tasks to one another when accommodations are provided.

The comparative model moves beyond descriptive information by relying on multiple sources of data to judge comparability (Tindal, 1998). These data provide retrospective information about the use of accommodations, judgments about their appropriateness, and performance outcomes to make relational statements about accommodations and performance. However, because of its post-hoc nature, cause and effect relationships between accommodations and outcomes cannot be inferred. Threats to internal validity, such as selection bias, participant maturation, or lack of comparison groups, exist that compromise the utility of this approach for making meaningful and appropriate decisions about task comparability.

Some of the aforementioned threats to validity can be avoided by establishing a research design prior to the collection of data; this is the hallmark of the experimental model for determining task comparability (Tindal, 1998).

Experimental models include research designs and technically sound measurements to enhance the likelihood that meaningful inferences about outcomes can be made. Both large-group and single-case designs fall under the realm of the experimental model. To be informative, these designs must provide inferences about cause and effect on the general population with statistical conclusions. In large-group designs, groups of students are compared with themselves or with other groups under varying test-taking conditions. In single-case designs, the performance of the same student under varying test-taking conditions is compared. The results of experimental studies are likely to provide the best evidence for task and score comparability because these studies account for the limitations encountered by descriptive or comparative methods.

Of course, most educators or assessment professionals are unlikely to undertake an experimental approach to determine if a testing accommodation is effective and valid. They most often will be confronted with the need for and use of testing accommodations during a referral or individualized education plan (IEP) meeting and may need assistance in selecting, planning, and implementing testing accommodations. Research suggests that most educators and assessment professionals will benefit by using a structured process to make these decisions (Elliott, Kratochwill, & Schulte, 1999). Phillips (1994) suggested the following five questions that assessment professionals might consider when looking at departures from standard testing conditions:

- Will the skills measured be altered by changes to the format or testing conditions?
- Will scores mean the same thing for examinees depending on whether they obtained them under standard or accommodated testing conditions?
- Would receiving the same accommodation benefit nondisabled examinees?
- Might the examinee with the disability be able to adapt to the conditions of standard test administration?
- Do procedures of limited reliability and validity affect either the evidence of the examinee's disability or the policy for testing accommodations?

Phillips argued that an accommodation might be inappropriate if the answer to any of these questions is "yes." However, the assessment specialist will always be in a somewhat difficult position, balancing the need to maintain a valid (and as much as possible, standard) assessment activity versus the rights of examinees with disabilities. As Phillips put it, "the goals of providing maximum participation in society for the disabled and maintaining the validity of the testing program may be at odds" (p. 104).

Testing Accommodations: What Does the Research Literature Tell Us?

Elliott, Kratochwill, and McKevitt (2001) conducted a study designed to (a) describe the nature of information on testing accommodations listed on students' IEPs, (b) document the testing accommodations educators actually use when assessing students via performance assessment tasks, and (c) examine the effect accommodations have on the test results of students with and without disabilities. Participants in the study included 218 fourth-grade students from

urban, suburban, and rural school districts. Of the 218 participants, 145 students did not have disabilities, and 73 had disabilities in a variety of categories (including learning disabilities, speech and language impairments, etc.). The researchers asked teachers to list accommodations that would be helpful for each student who had a disability. Teachers used the *Assessment Accommodations Checklist* (AAC) (Elliott, Kratochwill, & Schulte, 1999), a list of accommodations often used in classroom and testing situations. Project staff and teachers then administered a set of math and science performance tasks to the students using an alternating treatments design, over the course of four, 1-hour sessions.

These performance tasks were designed to draw on a full range of knowledge from each content area, were shown to have known psychometric values, and were found to be nearly equivalent and nonbiased among a group of over 200 students with disabilities. Trained project assistants using established criteria scored the tasks on a five-point continuum from "inadequate" to "exemplary." All students with disabilities performed half of the tasks with accommodations and half of the tasks without accommodations. Students without disabilities were separated into three groups by accommodation status: no accommodations, standard accommodations, and teacher-recommended accommodations. Students in the no accommodations group did not receive accommodations on any of the performance tasks. Students in the standard accommodations group received a standard set of accommodations. The alternating treatments design allowed for both intraindividual and intergroup comparisons without the need for baseline conditions. An individual's performance during the accommodated condition could be compared with his or her performance during the nonaccommodated condition. Also, the effect of accommodations on students with disabilities could be compared with the effect of accommodations on students without disabilities. The researchers used effect sizes to make comparisons both within individuals and between groups.

The Elliott, Braden, and White (2001) study indicated that the most common accommodations recommended by teachers were "verbal encouragement" and "read the directions," followed by "simplify language," "reread subtask directions," and "read test questions and content." Teachers typically recommended packages of between 10 and 12 accommodations for each student. The average effect size between accommodated and nonaccommodated conditions for students with disabilities was .88, approximately double the comparable effect size for students without disabilities. On an individual level, accommodations had medium to large positive effects for 78% of students with disabilities and 55% of students without disabilities. Accommodations had small effects or no effect on 10% of students with disabilities and on 32% of students without disabilities, and they had negative effects on 12% of students with disabilities and on 13% of students without disabilities.

The results of this study indicate that accommodations tend to be recommended in packages for students, rather than independently. Accommodation packages have moderate to large effects on performance assessment scores for most students with disabilities and for some students without disabilities. This increase in scores for students without disabilities raises questions about the validity of the accommodations.

Schulte, Elliott, and Kratochwill (2001) conducted a study to determine whether accommodations on standardized achievement tests would affect students with disabilities differently than they affect students without

disabilities. The authors predicted that accommodations would significantly improve the test scores of students with disabilities but would not significantly improve the test scores of students without disabilities. Participants in the study were 86 fourth-grade students, including 43 students with disabilities (entitled students with mild disabilities) and 43 students without disabilities. The students' performances were measured on two equivalent versions of the mathematics test of the *TerraNova* CTBS™ Multiple Assessments (CTB/McGraw-Hill, 1994–2000), designed to align with the Standards of the National Council of Teachers of Mathematics (1989).

Teachers of participants who had disabilities reviewed their IEPs to determine which accommodations the research team would use. Each student who did not have a disability was paired with a student who did have a disability, and the research team administered the *TerraNova* CTBS Multiple Assessments (CTB/McGraw-Hill, 1994–2000) to the students in pairs. Both students in each pair received the accommodations outlined on the IEP of the student who had the disability. All students participated in a practice session to become familiar with the testing procedures and accommodations, and all students took one version of the test with accommodations and one version of the test without accommodations. The researchers randomly assigned the order of accommodated and nonaccommodated conditions as well as the pairs of students. The key independent variables in the study were testing condition (accommodated versus nonaccommodated) and disability status (with disability versus without disability). The dependent variables in the study were the scores from the *TerraNova* CTBS Multiple Assessments. The results showed that both groups improved significantly when the accommodated condition was compared to the nonaccommodated condition. However, students with disabilities benefited more from accommodations on multiple-choice questions, and both groups benefited equally on constructed-response questions. For multiple-choice questions considered alone, students with disabilities yielded an effect size of .41 between accommodated and nonaccommodated conditions, while students without disabilities yielded an effect size of 0. On constructed-response questions alone, those effect sizes were .31 and .35, respectively. On an individual level, there was essentially no difference between the effects of accommodations on students with disabilities and the effects of accommodations on students without disabilities. Twenty-seven out of 43 students with disabilities, and 29 out of 43 students without disabilities, achieved higher scores on the test when accommodations were available. Seventeen out of 43 students with disabilities, and 16 out of 43 students without disabilities, achieved higher proficiency levels on the test when accommodations were available. Twenty out of 43 students with disabilities, and 21 out of 43 students without disabilities, experienced no change in proficiency levels on the test when accommodations were available.

The finding that both groups of students experienced benefits from testing accommodations indicates that the changes in test procedure may be affecting *both* construct-relevant and construct-irrelevant variance. The differential interaction between accommodation group and question type could indicate that constructed-response questions are more difficult for all students, and that accommodations remove barriers to these questions that are not present in multiple-choice questions. These findings reinforce the notion that research on testing accommodations must take an individual perspective, and that all

students in such research should take the tests in both accommodated and nonaccommodated conditions, to determine whether accommodations truly help performance.

In a study conducted by Elliott and Marquart (in press), the use of an "extended time" accommodation on a mathematics achievement test was examined. Elliott and Marquart predicted (a) that students with disabilities, but not students without disabilities, would score significantly higher in the extended time condition than in the standard time condition, (b) that students with low math skills, but not students with higher math skills, would score significantly higher in the extended time condition, and (c) that all student groups would perceive the extended time condition as helpful in reducing anxiety by allowing them to exhibit what they know and increasing their motivation to finish tests. Participants in the study included 69 eighth-grade students, 14 of their parents, and 7 of their teachers. Among the students, 23 were classified as having disabilities, 23 were classified as educationally at-risk in the area of mathematics, and 23 were classified as students performing at grade level. Teachers completed the *Academic Competence Evaluation Scales* (ACES) (DiPerna & Elliott, 2000), a rating scale to classify students without disabilities as at-risk or performing at grade level. Student participants completed the mathematics test of the *TerraNova* CTBS Multiple Assessments (CTB/McGraw-Hill, 1994–2000), as well as a survey about the effects of the extended time accommodation. Each testing session included students from each of the three groups. Elliott and Marquart randomly assigned the order of conditions (accommodated and nonaccommodated) in which each student performed the test. When performing in the accommodated condition, students had up to 40 minutes to complete the test. When performing in the nonaccommodated condition, students had 20 minutes to complete the test. Parents and teachers of students in the study also completed the survey about the effects of the extended time accommodation.

Elliott and Marquart (in press) found that the effect of the extended time accommodation was not significant for students without disabilities, who yielded an effect size of .34. The accommodation was not significant for students with disabilities either, as their effect size was .26. The three groups (students with disabilities, at-risk, and grade level) did not differ significantly in their amount of change between accommodated and nonaccommodated conditions. When students without disabilities were considered as at-risk and grade level groups, the students in the at-risk group experienced an effect size of .48 between accommodation conditions, and students in the grade level group experienced an effect size of .20. However, according to the survey, most students perceived the following advantages in the extended time condition: they felt more comfortable, were more motivated, felt less frustrated, thought they performed better, reported the test seemed easier, and overall preferred taking the test under the extended time condition. Although most teachers held a similarly positive view of the extended time condition (88% indicated that a score from an accommodated test would be as valid as one for the same test without accommodations) few parents (21%) shared that view. Many parents (43%), but no teachers, believed that the score from an accommodated test would be less valid, and some members from both groups (36% of parents and 12% of teachers) were uncertain. Most members of each group (63% of teachers and 56% of parents) believed that if accommodations are used on a test, those accommodations should be reported with the test results.

McKevitt and Elliott (in press) studied the effects of testing accommodations on standardized reading test scores and the consequences of using accommodations on score validity and teacher and student attitudes about testing. While read-aloud accommodations are considered invalid by the testing policies in many states, to date there have been no published studies that actually analyzed their effects on reading test performance. To test the effects of the read-aloud accommodation, the reading performance of 79 eighth-grade students was tested on the *TerraNova CTBS Multiple Assessments Reading Battery–Research Version (Form A)* (CTB/McGraw Hill, 1999). Forty of those students were diagnosed with an educationally defined disability and received special education services in the area of reading and/or language arts. The other 39 students were general education students used for comparison purposes. Four special education teachers and one general education teacher participated by recommending testing accommodations for these students using the *Assessment Accommodations Checklist* (Elliott, Kratochwill, & Schulte, 1999). They also rated students' reading achievement levels using the *Academic Competence Evaluation Scales* (DiPerna & Elliott, 2000). An additional 43 teachers and all tested students completed surveys about their perceptions of and attitudes about testing accommodations and standardized testing.

Once students were identified, they were divided into two groups (students with disabilities and students without disabilities). Within those groups, students were then divided into two test conditions (students receiving teacher-recommended accommodations and students receiving teacher-recommended accommodations plus a read-aloud accommodation). Students in each group and each condition completed two alternate parts of the reading test—one with accommodations (either teacher-recommended accommodations or teacher-recommended accommodations plus read-aloud accommodations) and the other without accommodations. The part of the test that was accommodated was determined by random assignment. This design yielded a repeated measures ANOVA with effect size calculations used to test the predictions. The results showed that teachers selected accommodations they considered valid and fair for use on a standardized test. They did not recommend using a read-aloud accommodation, as this accommodation would interfere with the purpose of the test (i.e., to measure reading ability) and thus would invalidate resulting test scores. Next, the accommodations that teachers recommended did not significantly affect test scores for either group of students. However, the read-aloud accommodation, when used in addition to those recommended by the teacher, did positively and significantly affect test scores for both groups of students. There was no differential benefit from the read-aloud accommodation, indicating overall score boosts for both groups of students, rather than the boost only for students with disabilities that was predicted.

Interestingly, there was much individual variability in the accommodation effects. As indicated by effect size statistics, the accommodations positively affected the scores for half of all students with disabilities and 38% of all students without disabilities. Furthermore, neither group of students scored significantly higher when the test was read aloud to them as compared to the groups that received other accommodations. While the read-aloud method helped both groups compared to their own performance without accommodations, using the read-aloud method did not produce a significant effect when groups receiving the method were compared to those receiving only the teacher-recommended accommodations.

Finally, McKevitt and Elliott (in press) found that students and teachers had mixed feelings about the accommodations. Students were generally positive about their use, but they expressed some concern that the read-aloud accommodation was too difficult to follow. Likewise, teachers felt positive about the use of accommodations for students with disabilities but also were concerned about how accommodations would affect test score validity. Teachers reported they rely primarily on professional judgment when making accommodations decisions, rather than on their own empirical testing of accommodations effects. Therefore, it is important to ensure teachers are knowledgeable about the use and effects of testing accommodations.

In summary, the McKevitt and Elliott (in press) study contributed to the increasing evidence that accommodations may have either positive or negative effects for individual students with and without disabilities. It also lends support to the popular belief that reading aloud a reading test to students as an accommodation invalidates test scores. The lack of differential boost (i.e., the finding that both groups of students profited from a read-aloud accommodation) observed in the study is one piece of evidence that the read-aloud accommodation has an invalidating effect. But the lack of differential benefit alone may not be sufficient to conclude invalidity of scores resulting from the use of accommodations. In the case of the students receiving the teacher-recommended accommodations alone, a differential boost also was not observed, and scores did not improve significantly for either group. However, a conclusion cannot be drawn just by this evidence that the accommodations were invalid. The accommodations still may have served to remove a disability-related barrier for the student tested but may not have had a significant effect on scores. Thus, evidence to support the validity of accommodations needs to come from multiple sources, examining student factors, test factors, and the accommodations themselves.

Clinical Assessment Research

Previous versions of the Stanford-Binet were popular with clinicians for assessing the intelligence of clients with disabilities (e.g., Braen & Masling, 1959). Hayes (1950) recommended a set of adaptations for clients with visual impairments, which became known as the Perkins-Binet (see Genshaft & Ward, 1982 and Ward & Genshaft, 1983 for reviews). Sattler (1972a, 1972b) conducted research with the Stanford-Binet with children who had mental retardation, cerebral palsy, speech difficulties, and no known disabilities. He concluded that the Stanford-Binet was useful for assessing the intelligence of these individuals. Sattler also recommended specific alterations in procedures and materials (i.e., accommodations and modifications) for low-performing and young children, but he noted that such modifications were inappropriate for higher-performing children. One outcome of this research (reviewed by Harrington, 1979) was to recommend a nonverbal set of tests selected from the Stanford-Binet and Wechsler Scales for low-performing children with disabilities. Katz (1956, 1958) recommended examiners use a modified pointing procedure in which clients were allowed to direct their movements through commands and gestures, as an accommodation for testing. Finally, Bloom, Klee, and Raskin (1977) investigated the impact of abbreviated and complete versions of the Stanford-Binet with

children with developmental delays, and concluded that abbreviated forms, although correlating well with complete forms, missed essential features of performance that could lead to misclassification. Such findings probably influenced the design of the SB5 (Roid, 2003a), in which each of the five factors measured by the instrument incorporates both a verbal and a nonverbal subscale, resulting in the nonverbal index providing a comprehensive, composite measure of ability.

Unfortunately, most of this research is descriptive, with little effort to validate assessment accommodations and modifications through experimental means. Exceptions to this conclusion include work by Sattler (1972a, 1972b) and Handy (1996). Sattler included multiple measures of intelligence, and Handy systematically varied pantomimed and standardized administration of the *Stanford-Binet Intelligence Scale: Fourth Edition* (Thorndike, Hagen, & Sattler, 1986) and the Wechsler Scales among both students with mild hearing impairments and those with no impairments. Both these researchers concluded that accommodations made small differences in test outcomes, although where differences occurred, scores were higher in accommodated versus nonaccommodated conditions.

More commonly, researchers have conducted a logical or rational analysis and simply made recommendations. Occasionally recommendations are supplemented by reporting whether changes in test conditions affect test scores. These procedures are inadequate for validating accommodations, as the effect of such changes on nondisabled populations are not known. Also, the literature on assessment accommodations in intellectual assessment uniformly ignores the need to retain construct representation. This is problematic, as many recommended accommodations and practices involve eliminating items or subtests from clinical batteries (e.g., Brauer, Braden, Pollard, & Hardy-Braz, 1997). The lack of attention to construct representation has been exacerbated by poor specification of cognitive abilities and the assumption that general intellectual abilities are adequately represented by virtually any portion of an intelligence test battery (McGrew, Keith, Flanagan, & Vanderwood, 1997). However, as test publishers and clinicians increasingly understand and apply cognitive frameworks, such as the CHC theory that drives the SB5, it will be possible to more accurately specify the constructs tests intend to measure and ensure accommodations adequately retain construct representation (Braden, in press).

Identifying Appropriate Accommodations on the SB5

Making decisions about appropriate accommodations requires professional judgments. These judgments are influenced directly by knowledge of the client, recognition of general access skills for most tests, knowledge of the content and demand characteristics of the test and respective subtests, and a well-grounded understanding of test score validity. In some cases, it is only as a result of testing a client that an examiner becomes aware of key factors that influence accommodation decisions. However, with some planning and knowledge of the role that test accommodations can play in testing, assessment results can be more meaningful.

Know the Client

Examiners should become familiar with the client's physical, emotional, and cognitive abilities and disabilities prior to testing. The SB5 is designed to measure a wide range of cognitive abilities but not physical or emotional abilities. Of course, these domains of abilities are correlated to some degree. Therefore, it is quite challenging for an examiner to select appropriate accommodations. This challenge is reduced, however, when the examiner observes the client in his or her natural setting (school, work, etc.) and interacts with the client *before* testing to get a clear understanding of his or her motor and sensory skills and ability to regulate emotions. Examiners should also interview others who know the client well to gain a good understanding of client attributes and essential skills needed to meaningfully access and respond to test items.

Recognize Key Access Skills

In theory, there are hundreds of potential skills needed to access and respond to an item on a test like the SB5. Based on a comprehensive understanding of the constructs targeted by the SB5, there are a number of general access skills that clients need to facilitate accurate measurement of their cognitive abilities. These can include:

- Attending
- Listening to and understanding language
- Seeing
- Sitting still for an extended period of time
- Reading
- Writing
- Following directions
- Manipulating materials
- Tracking examiner's movements and related materials
- Processing information in a timely manner
- Working for a sustained period of time
- Communicating personal needs
- Asking questions when they do not understand.

Whether or not a skill is an access skill is determined by the purpose of the test. In other words, some skills may be access skills for one subtest but not for another subtest because that subtest includes the skill or construct in the construct it intends to assess (i.e., target skills).

Know the Test Content and Administration Procedures

There is no substitution for knowing the content of a test when making decisions about appropriate accommodations. If examiners have a comprehensive understanding of the knowledge and skills targeted by the test, they can deduce many of the necessary skills needed to access and respond to the test content.

Familiarity with the test and the related underlying cognitive abilities measured by the test provides the foundation for making professional judgments about appropriate accommodations for any client. An initial analysis of the cognitive abilities targeted by SB5 scales and subtests is included in this bulletin along with suggestions for appropriate accommodations. Inappropriate modifications to the subtests are also identified.

Built-In Accommodations

By incorporating adaptive testing, extra time, and the availability of verbal vs. nonverbal scales, many concerns regarding accommodation have already been addressed and built into the administration procedures of the SB5. In adaptive testing, the examiner gives items that are relevant to the particular examinee and avoids items irrelevant to estimating the examinee's ability level (i.e., items that are too difficult or too easy). The SB5 incorporates adaptive testing by using routing tests so that subsequent testing is adapted to the examinee's ability level.

Extra time is perhaps the most common assessment accommodation (Elliott, Braden, & White, 2001). Fortunately, few SB5 subtests have any time limits, and most time limits are merely to avoid examinee frustration and fatigue. The examiner can generally ignore those time limits when judgment indicates that the benefits to the examinee exceed the costs of fatigue or lost attention. Finally, the availability of language-loaded (verbal) and language-reduced (nonverbal) scales that comprise all five of the cognitive factors assessed on the SB5 allow examiners to adapt the assessment to different language abilities without significantly sacrificing construct representation. For example, most other cognitive ability batteries use exclusively verbal subtests to measure Knowledge and exclusively nonverbal subtests to measure Fluid Reasoning. On these batteries, examiners must decide whether to omit these tests for some clients (e.g., clients who are deaf, hard of hearing, or visually impaired) and sacrifice construct representation, or whether to include them and consequently threaten results due to construct-irrelevant variance. The SB5 provides examiners with the means to use either a language-reduced or language-loaded approach to testing without sacrificing construct representation.

Scale and Subtest-Specific Information to Guide Accommodations

This section provides specific suggestions for accommodations on the SB5.

It is assumed that examiners will address noncognitive access skills in SB5 administration. For example, examiners routinely provide wheelchair-accessible furniture, allow communication devices (e.g., speech synthesizers, keyboards) used by examinees to express themselves, provide adequate breaks or rest to reduce physical fatigue, and so forth. However, it is not possible to anticipate all of the physical accommodations that examinees might require, and examiners are encouraged to consider carefully whether the change in the test setting, timing, presentation, or response characteristics affects the target skills (construct representation) of the examination. If not, examiners should be flexible, practical, and welcoming as they consider assessment accommodations, while critically evaluating potential accommodations to ensure that they do not invalidate

assessment outcomes. For example, using an assistant or interpreter who coaches, encourages, or provides hints to an examinee may replicate the support available in other settings, but it is also likely to invalidate the results of the SB5 assessment.

The following tables provide information to help examiners understand the intended target skills of each SB5 subtest and to select appropriate accommodations while avoiding inappropriate modifications. Table 1 provides information for the SB5 nonverbal subtests and their activities. Information for the verbal subtests and their activities is listed in Table 2. The suggested list of appropriate and inappropriate accommodations are illustrative, not exhaustive. There may be other accommodations that would appropriately minimize the influence of access skills while assessing target skills, and other modifications that would inappropriately influence target skills or fail to address access skills. These tables are intended to provide guidelines to examiners, not to define the universe of acceptable and unacceptable accommodations for the SB5.

Conclusions About Selecting Appropriate Accommodations

Making decisions about appropriate accommodations for a client requires examiners to make professional judgments based on sound knowledge of the client's physical and emotional abilities, a comprehensive understanding of the content tested, and a command of sound testing practices and conditions. With this knowledge, examiners can consider the skills needed to access and respond to the test content. In many cases, this information can and should be obtained prior to testing. However, on occasion, examiners will discover client disabilities and issues during testing.

To ensure the validity of the SB5 and other test accommodations, examiners should (a) know the test and the client before testing, (b) use informed judgment to make appropriate and effective decisions that reduce the influence of access skills (construct-irrelevant variance) without reducing or changing the target skills (construct representation) of the test, and (c) if previously unknown concerns (e.g., unidentified disabilities) are detected during the assessment, use those discoveries to guide additional assessment and the interpretation of test results. Examiners are encouraged to interpret test results in light of accommodations and to document those accommodations so that future examinations are likely to result in a more effective and equitable use of accommodations.

Table 1

Nonverbal Subtest/Activity Target Skills, Appropriate Accommodations, and Inappropriate Modifications

Object Series/Matrices	
Target Skills	*Fluid reasoning, induction, general sequential reasoning, visual memory,* visualization of abstract stimuli, attention to visual cues, concentration for long periods, systematic visual scanning, search strategies, mental review of potential answers, visual discrimination, tracking visual sequences, pattern recognition, and mental verbal mediation
Appropriate Accommodations	Allow extra time, allow vocal response in lieu of motor response or vice versa to indicate selection, allow any modality for presenting directions (signing, writing, speaking)
Inappropriate Modifications	Allow additional or nonstandard cuing or feedback on errors (except on starting items as indicated), reduce number of alternatives for any item, create manipulative materials for matrix items
Procedural Knowledge	
Target Skills	*Crystallized abilities/knowledge, general information, oral production and fluency,* visualization of meaningful stimuli, freedom from visual neglect, toleration of ambiguity, search strategies, and visual discrimination
Appropriate Accommodations	Allow extra time, allow vocal response in lieu of motor response to indicate selection, allow any modality for presenting directions (signing, writing, speaking), allow tactile contact with materials, allow examinee to "guide" examiner to respond (but do not suggest alternatives)
Inappropriate Modifications	Allow additional or nonstandard cuing or feedback on errors (except on starting items as indicated), offer examinee a finite set of alternatives (e.g., "This way or that way?")
Picture Absurdities	
Target Skills	*Crystallized abilities/knowledge, general information, oral production and fluency*, visualization of meaningful stimuli, freedom from visual neglect, toleration of ambiguity, search strategies, and visual discrimination
Appropriate Accommodations	Allow extra time, allow motor/gestured or vocal response (i.e., do not require both gestures and vocalization as long as the examinee provides unambiguous, scoreable responses), allow any modality for presenting directions (signing, writing, speaking) that does not describe the problem depicted in the item
Inappropriate Modifications	Allow additional or nonstandard cuing or feedback on errors (except on starting items as indicated), use nonstandard query (e.g., "Yes, that's silly, but there's something even sillier.")
Nonverbal Quantitative Reasoning	
Target Skills	*Quantitative reasoning, mathematical knowledge,* concentration for long periods, and production of conventional answers
Appropriate Accommodations	Allow extra time, allow vocal response in lieu of motor response or vice versa to indicate selection, allow any modality for presenting directions (signing, writing, speaking) but do not use gestures that clearly indicate correct answer (e.g., *bigger* must be represented symbolically via voice, print, or sign), allow examinee to vocalize or "guide" examiner to respond (but do not suggest alternatives), provide scratch paper or calculator to assist in mental calculations
Inappropriate Modifications	Allow additional or nonstandard cuing or feedback on errors (except on starting items as indicated), reduce number of alternatives for any item, provide a calculator for calculations
Form Board	
Target Skills	*Visual-spatial processing, spatial relations,* visualization of meaningful stimuli, inspection of objects by touch, freedom from visual neglect, precision of movement, tracking visual sequences, and retention span
Appropriate Accommodations	Allow extra time, allow vocal response in lieu of motor response or vice versa to indicate selection, allow any modality for presenting directions (signing, writing, speaking), allow examinee to "guide" examiner to respond (but do not suggest alternatives)
Inappropriate Modifications	Allow additional or nonstandard cuing or feedback on errors (except on starting items as indicated), reduce the number of items pieces (i.e., presentation in sequence rather than all at once)

Table 1 (Continued)

Nonverbal Subtest/Activity Target Skills, Appropriate Accommodations, and Inappropriate Modifications	
Form Patterns	
Target Skills	*Visual-spatial processing, spatial relations, closure speed,* visualization of meaningful stimuli, inspection of objects by touch, freedom from visual neglect, precision of movement, tracking visual sequences, and retention span
Appropriate Accommodations	Allow extra time to execute response, adjust precision rules for scoring if examiner concludes examinee's motor skills (not visual-spatial processing) caused poor placement of pieces, allow examinee to vocalize or "guide" examiner to respond (but do not suggest alternatives)
Inappropriate Modifications	Allow extra time to consider or plan response, provide options and ask examinee to select "best" response, allow drawing response
Delayed Response	
Target Skills	*Working memory, memory span*, impulse control, freedom from distractibility, patience with difficult tasks, speed of movement, precision of movement, tracking visual sequences, and retention span
Appropriate Accommodations	Allow extra time, allow vocal response in lieu of motor response or vice versa to indicate selection, allow any modality for presenting directions (signing, writing, speaking)
Inappropriate Modifications	Allow additional or nonstandard cuing or feedback on errors (except on starting items as indicated)
Block Span	
Target Skills	*Working memory, memory span, visual memory, serial perception*, impulse control, freedom from distractibility, patience with difficult tasks, speed of movement, precision of movement, tracking visual sequences, and retention span
Appropriate Accommodations	Allow extra time, allow vocal response in lieu of motor response or vice versa to indicate selection, allow any modality for presenting directions (signing, writing, speaking), adjust precision rules for tapping if examiner concludes examinee's motor skills (not working memory) caused misplaced strike, allow examinee to vocalize or "guide" examiner to respond (but do not suggest alternatives)
Inappropriate Modifications	Allow additional or nonstandard cuing or feedback on errors (except on starting items as indicated), repeat items, slow or speed up presentation, vocalize block numbers or provide other auditory or linguistic cues

Note. Italicized target skills are drawn from Stratum I narrow cognitive abilities listed in Table 1.3 of the SB5 Interpretive Manual (Roid, 2003c). Unitalicized target skills are drawn from cognitive abilities (processes) listed in Table 1.5 of the same manual.

Table 2

Verbal Subtest/Activity Target Skills, Appropriate Accommodations, and Inappropriate Modifications	
Early Reasoning	
Target Skills	*Fluid reasoning, general sequential reasoning, oral production and fluency, visual memory,* attention to verbal cues, mental review of potential answers, verbal fluency, rapid retrieval of words and explanations, and production of creative answers
Appropriate Accommodations	Allow signed, oral, and written presentation of directions and examinee responses; Level 2—Accept gestured responses that clearly explain/extend (rather than merely represent) the picture; Level 3—Allow examinee to identify groups of three using words or pointing if accompanied by verbal or abstract (not necessarily vocal) description of category
Inappropriate Modifications	Allow additional or nonstandard cuing or feedback (except as indicated), Level 2—Accept a simple representation (e.g., drawing, gestured tableau) of stimulus (rather than explanation or extension), Level 3—Accept clusters without explicitly naming or indicating the characteristic that members share within groups
Verbal Absurdities	
Target Skills	*Fluid reasoning, induction,* attention to verbal cues, mental review of potential answers, verbal fluency, rapid retrieval of words and explanations, and production of creative answers
Appropriate Accommodations	Allow signed, oral, and written presentation of directions and examinee responses; allow gestured query by the examiner to the examinee (e.g., folds hands, brings hands to body to encourage an elaborated response)
Inappropriate Modifications	Gesture to present items, represent items as pictures, provide finite responses and invite examinee to select response

Table 2 (Continued)

Verbal Subtest/Activity Target Skills, Appropriate Accommodations, and Inappropriate Modifications

Verbal Analogies	
Target Skills	*Fluid reasoning,* attention to verbal cues, mental review of potential answers, verbal fluency, rapid retrieval of words and explanations, and production of creative answers
Appropriate Accommodations	Allow signed directions, items, and responses
Inappropriate Modifications	Gesture to present items, represent items as pictures, provide finite responses and invite examinee to select response
Vocabulary	
Target Skills	*Crystallized abilities/knowledge, lexical knowledge, language development,* fund of general information, and rapid retrieval of words and explanations
Appropriate Accommodations	Allow signed or written directions, items, and responses; allow gestured responses that explain or extend picture items
Inappropriate Modifications	Allow gestured responses that simply mimic or copy correct answers (e.g., "Put your finger on your nose."), provide synonyms or act out the meaning of words, translate words to more or less common alternatives (e.g., such as through signing), provide finite responses and invite examinee to select response
Verbal Quantitative Reasoning	
Target Skills	*Quantitative reasoning, mathematical knowledge,* concentration for long periods, and production of conventional answers
Appropriate Accommodations	Allow extra time, allow any modality for presenting directions and for responding (signing, writing, speaking), allow examinee to tap (the number of objects) or gesture (hold up fingers, use hash marks), or write answers to counting items, provide scratch paper to assist in mental calculations
Inappropriate Modifications	Allow examinee to use calculator for arithmetic items, create visual cues to reduce mathematical complexity (e.g., drawing out story problems, writing down key facts, providing partial solution), provide scratch paper for visual items unless otherwise allowed
Position and Direction	
Target Skills	*Visual-spatial processing, visualization,* attention to verbal cues, and recognition and evaluation of parts
Appropriate Accommodations	Allow signed or written directions, items, and responses; use simplified directions that emphasize key phrases or words (e.g., *on, bottom*); allow vocal or pointing response; allow examinee to "guide" examiner to respond (but do not suggest alternatives)
Inappropriate Modifications	Allow gestured responses that simply mimic or copy correct answers (e.g., "Put the ball on the table."), provide synonyms, act out the meaning of words, use gestured presentations that indicate the correct placement or response, accept pointing response to indicate routes on a map in lieu of directions (i.e., answers must be given from the perspective of the people in the map, not the map reader), provide pencil and paper to allow trial and error responses to last two items
Memory for Sentences	
Target Skills	*Working memory, memory span, language development,* impulse control, freedom from distractibility, patience with difficult tasks, wide auditory attention span, and retention span
Appropriate Accommodations	Cue examinee that item is about to be presented; allow time to respond; allow responses in writing or signs (only after the item is presented); present items in signs while using a single, unique sign for each word in the sentence
Inappropriate Modifications	Present items in writing, repeat items, segment items into phrases, suggest or model retention strategies, allow examinee to write or record items during item presentation
Last Word	
Target Skills	*Working memory, memory span, language development,* impulse control, freedom from distractibility, patience with difficult tasks, wide auditory attention span, and retention span
Appropriate Accommodations	Cue examinee that item is about to be presented; allow time to respond; allow responses in writing or signs (only after the item is presented); present items in signs while using a single, unique sign for the last word in each question
Inappropriate Modifications	Present items in writing, repeat questions, emphasize last word in each question, suggest or model retention strategies, advise examinees to ignore question, allow examinee to write or record items during item presentation

Note. Italicized target skills are drawn from Stratum I narrow cognitive abilities listed in Table 1.3 of the SB5 Interpretive Manual (Roid, 2003c). Unitalicized target skills are drawn from cognitive abilities (processes) listed in Table 1.5 of the same manual.

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