WAIS®5
Wechsler Adult Intelligence Scale®
FIFTH EDITION

Technical Report #1

Testing Individuals Who Are Deaf or Hard of Hearing

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Overview

The following information is intended to shed light on the complexity of assessment with members of the deaf and hard of hearing population, but it is not intended as comprehensive training in assessing this population. Examiners planning to administer and interpret the Wechsler Adult Intelligence Scale (5th ed.; WAIS-5; Wechsler, 2024) for members of the deaf and hard of hearing population should have sufficient training in, and knowledge of, potential language and cultural issues for this population, as well as an awareness of the steps necessary to ensure fairness in the assessment process.

Wechsler intelligence tests are commonly utilized for assessing the intellectual abilities of members of the deaf and hard of hearing population (e.g., Braden, 1994; Reesman et al., 2014; Wilkens, 2018). Obtaining valid and useful assessment results from the administration of the WAIS-5 with members of the deaf and hard of hearing population, however, is a complex issue that requires consideration of examiner qualifications, client factors, test administration, communication, interpreter use, normative data, and reliability and validity.

Examiner Qualifications and Client Factors

According to the *Standards for Educational and Psychological Testing* (American Educational Research Association [AERA] et al., 2014), ensuring fairness in testing requires consideration of test accessibility, which is the opportunity for test takers to demonstrate their true ability on the measured construct. Further, the American Psychological Association's 2022 Guidelines for Assessment and Intervention with Persons with Disabilities highlights the need to be familiar with how disability and related factors influence one's functioning (APA, 2022). To comply with these standards, examiners administering the WAIS-5 to members of the deaf and hard of hearing population must be aware of the heterogeneity of this population with regard to relevant factors, such as the age of onset of hearing loss, form(s) of communication, early language access, educational background, degree of hearing loss, use of assistive technology, and co-morbid conditions.

Approximately 40% or more of deaf children have some additional condition that affects their ability to function (Gallaudet Research Institute, 2013; Office of Research Support and International Affairs, 2014) and almost half of deaf college students have an additional disability (Bloom & Palmer, 2023). Adults with hearing loss often also have health concerns concurrent with their hearing loss (Kramer et al., 2002).

Comorbidity becomes increasingly prevalent with age, as aging affects the function of all primary organ systems, and aging is often associated with more chronic medical conditions (Steinhagen-Thiessen & Borchelt, 1999). The National Longitudinal Study on Hearing (NL-SH) found that of participants with hearing differences, 78.5 percent reported at least one chronic condition in addition to hearing loss. This proportion was larger than in the typically-hearing group (68.6 percent with one or more chronic conditions and 37.7 percent with two or more; Stam et al., 2014).

Given the diversity of the deaf and hard of hearing population, there is not a single assessment approach that works for all individuals. Rather, examiner knowledge about, and careful consideration of, the potential impact that each of the above factors has on the individual's functioning and performance is warranted.

Test Administration

Important considerations are necessary when testing individuals with hearing loss. With regard to the testing environment, both auditory and visual distractions should be kept to a minimum. Given that many deaf and hard of hearing individuals have some degree of residual hearing and/or use an assistive device, they may have access to sound, which can interfere with testing. Deaf individuals may be particularly vulnerable to visual distraction due to enhancements in peripheral visual attention (Dye et al., 2008). The physical space configuration must account for potential distractions in both the immediate and peripheral space. Careful consideration should be given to where the interpreter is seated during testing if the examiner communicates with the individual via a sign language interpreter.

Communication

Consideration of the individual's communication preferences is required to administer and interpret intellectual assessment measures. There is a wide variety of preferred language(s) and communication method(s) for deaf and hard of hearing persons (see the Language and Communication Considerations section of this report). Unless the individual's performance in an alternative language is relevant to the nature of the assessment, administration of the WAIS-5 should be conducted in an individual's preferred language (AERA et al., 2014; APA, 2017; Individuals with Disabilities Education Improvement Act of 2004). Examiners who are not fluent in the individual's preferred language should use a certified interpreter who is knowledgeable about assessment and can adapt to the examinee's mode of communication. Interpreters used for assessment should have appropriate certification for their interpretation skills (information about certified interpreters is available via the Registry of Interpreters for the Deaf at www.rid.org) as well as specific training and experience with interpreting in the assessment context. These accommodations, however, need to be balanced with the understanding that any modification of standardized testing procedures may alter the validity of the test and compromise results, and the examiner is ultimately responsible for ensuring accurate interpretation.

Interpreter Use

Considerations to keep in mind when working with sign language interpreters include understanding the impact that an interpreter can have on the testing process and ensuring that interpretation does not inadvertently provide a correct response, alter the task difficulty level, or change the intended nature of the task. It is also important to clarify whether the interpreter's role is to interpret the individual's exact response, modify the response to account for cultural differences, or fill in any gaps to clarify the response. Ensuring an appropriate review of this information likely requires meeting with the interpreter before the assessment begins and after administration is completed. Sign language interpreters/Cued Speech transliterators may also be helpful resources to serve as "cultural consultants" to understand discrepancies or notable patterns in performance. Although this information has not yet been examined for the WAIS-5, previous research on using an ASL-fluent clinician versus a sign language interpreter did not find significant differences in scores on the WISC–R for a large sample of deaf and hard of hearing individuals (Sullivan & Schulte, 1992). It should be noted that it is not appropriate to use a family member or friend as an interpreter nor is it appropriate to administer a test in spoken language if ASL or another form of sign language is the individual's preferred language.

Normative Data

Examiners must determine whether the general normative sample is an appropriate comparison group for the individual they are evaluating. While normative information for the general population is provided on the WAIS-5 to assist with the interpretation of scores, the normative sample did not include individuals with uncorrected/significant hearing loss. Thus, comparison of standard scores for some deaf and hard of hearing individuals with the normative population may be limited, particularly for those without corrected hearing loss and/or whose primary language is some form of signed communication and/or for those who have had hearing loss since childhood. In contrast, for deaf and hard of hearing individuals who utilize assistive technology (e.g., cochlear implants or hearing aids) and who are primarily spoken language users with typical language skills, a comparison with the normative sample *may* be appropriate, but the developmental history and language ability of the individual should be used to place the results in context. Literature on the cognitive functioning of the deaf and hard of hearing population suggests that nonverbal measures of cognition should be distributed in the same way as the general population (Hill-Briggs et al., 2007; Morere et al., 2012).

Reliability and Validity

Reliability and validity information regarding the use of the WAIS-5 with deaf and hard of hearing individuals is not yet available. Previous studies of nonverbal reasoning ability in deaf individuals have produced results similar to that of normative populations of hearing individuals (Braden, 1985; Morere et al., 2012; Vernon, 2005). Yet, quantitative and qualitative differences in cognitive performance also exist. For example, while deaf and hearing individuals have comparable working-memory resources, the capacity for linguistic items varies by modality. Signed languages are maintained in memory by submanual rehearsal, which is slower than auditory-based rehearsal, which is how spoken languages are maintained. (Boutla et al., 2004). Thus, spoken languages yield higher spans than signed languages. Additionally, deaf signers have been found to have enhanced visual attention to peripheral stimuli and reduced central attention when compared to hearing peers (Dye et al., 2008).

One important change on the WAIS-5 is the provision of a new ancillary Nonverbal Index (NVI) that offers a language-reduced measure of general intellectual ability. It is derived from the sum of six subtest scaled scores from tasks that do not require verbal responses. While this is likely to be a better estimate of overall functioning for deaf and hard of hearing individuals for whom the Verbal Comprehension subtests are not appropriate, it is important to keep in mind that there is still a language demand to comprehend subtest instructions, and the individual may be relying on language-based mediation or reasoning strategies.

Subtests from the Verbal Comprehension Index will not be a valid estimate of language-based reasoning skills for many individuals in this population because their experience of learning language is different than the experience of hearing individuals. This is particularly relevant for adults who have been deaf or hard of hearing from childhood as opposed to adults with hearing loss secondary to aging. Even for individuals who have access to sound via assistive technology and for whom spoken English is their primary language, opportunities for incidental learning and exposure to English may still differ in important ways from individuals in the normative sample. These individuals may miss or misunderstand auditory information. For individuals who communicate primarily through some form of signed language, even if Verbal Comprehension subtest items are appropriately translated, it remains unclear whether individual test items involve the same construct at the appropriate level of difficulty. Without standardized sign language versions, uncertainty about what constitutes a correct response is likely. Depending on the interpreter, test, and test item, items interpreted into ASL may be rendered more or less difficult than the English equivalent. Given the heavy English demand, the Verbal Comprehension Index (VCI) and Full Scale IQ (FSIQ) composite scores are not considered valid scores with certain deaf and hard of hearing individuals when used for the specific purpose for which these composite scores were originally developed.

Additionally, individuals who have been deaf and hard of hearing from childhood and who were not born into environments with an immediately accessible language, regardless of their current language/communication skills and experience with assistive technology, are likely to have experienced

varying levels of early language deprivation. Depending upon the degree to which language deprivation occurred and the long-term developmental effects of that deprivation, some individuals may present with what is now more widely recognized as "language deprivation syndrome," which may impact overall psychological functioning (Gulati, 2018). This underscores the importance of examiners having specific training in, and knowledge of, potential language and cultural issues for this population and interpreting test results in the context of the examinee's background information.

Language and Communication Considerations

As previously mentioned, the population of deaf and hard of hearing individuals is a dynamic group that includes individuals with a range of hearing differences, educational backgrounds, and language considerations.

For deaf and hard of hearing adults, the age of onset of hearing loss significantly impacts presentation and language history; those born with hearing differences or who have had hearing differences since childhood will have a markedly different presentation and history than those with hearing loss secondary to aging. Some deaf and hard of hearing individuals communicate using more than one language and/or method of communication, while others have a clearly identified preferred primary language and/or communication method. When the examiner is selecting instruments or subtests and planning accommodations for deaf and hard of hearing individuals, the individual's primary language(s) or preferred method(s) of communication should be considered the most critical issue, as opposed to the type or degree of hearing ability.

The following is a description of the modes of communication commonly used by individuals with hearing loss. It is critical to note that variability exists within each of these categories. The communication method used to administer the WAIS-5 may differ across languages and modalities, with gradations, combinations, and systems in between. Specific items on the WAIS-5 may be conveyed differently depending on the language or communication method used. An individual may use one or any combination of the language categories detailed in the following sections.

American Sign Language

ASL is a visual gestural language with its own grammar, idioms, semantics, pragmatics, and syntax and is a complete language system that differs from sign systems used to clarify English. ASL incorporates facial expressions as well as various hand shapes, dynamic movements, various locations on or near the body, and different orientations of the palm. Adults who primarily utilize ASL were likely educated in ASL-English bilingual education environments that aim to develop proficiency in both *signacy* (proficiency in ASL) and *literacy* (proficiency in English print). It should be noted that there are various sign languages across the world, and there are also regional and cultural variations within ASL. ASL also can be used in a tactile format for individuals who are deaf-blind but may need to be modified to convey visually based linguistic information.

Auditory/Oral Modalities

When an individual uses auditory modalities, spoken language is used without signs or gestures. Appropriate and consistently functioning technology that enables auditory access, such as hearing aids or cochlear implants, is integral to the success of this communication choice. When assessing an individual who utilizes hearing technology, the examiner should ensure that the device is working properly and the individual can detect speech sounds. Some individuals may also utilize an assistive listening device (ALD), such as a personal FM system. Consider the environment in this situation; for example, limiting background noise and reverberation (i.e., testing in a quiet room with soft surfaces). Individuals who use this system may rely on visual cues from speech reading (Auditory/Oral Method) or primarily depend upon their residual/amplified hearing skills without any visual or speechreading cues (Auditory-Verbal Method).

It should be noted that many older adults with hearing loss may not be appropriately amplified or identified, especially if the etiology of the hearing loss is associated with age rather than identified in childhood. Hearing loss is the third most prevalent chronic condition in elderly adults after hypertension and arthritis (Cruickshanks et al., 1998). Worldwide, 1.5 billion people have hearing loss, and 65% of adults over the age of 60 have some form of hearing loss with severity progression as age increases (GBD 2019 Hearing Loss Collaborators, 2021; Huang & Lin, 2024; World Health Organization, 2021). Hearing loss is underdiagnosed in the elderly population due to the gradual progression and the view that it may be seen as a typical part of aging (Yueh et al., 2003). Beyond the lack of identification, hearing loss is often undertreated. Only 25% of older patients with aidable hearing loss acquire hearing aids (Kochkin, 2005). Poor audibility of sound corresponds to a lack of an individual's ability to understand speech and may impact performance in an assessment setting.

Cued Speech

Cued speech is a sound-based visual communication system used to clarify spoken English by using hand cues to differentiate sounds of speech that look the same on the lips. Cued speech is not a language even though it is sometimes referred to as *cued language* or *cued English*. The system utilizes eight handshapes to distinguish consonant phonemes and four locations near the mouth to distinguish vowel phonemes. A specific handshape combined with a particular location will signal, or *cue,* a syllable. A combination of these hand configurations is coordinated with the natural movements of speech.

Total Communication

Total Communication (TC) refers to the use of a combination of some or all communication modes and language, as needed, depending on the situation and/or individual. This communication modality includes ASL as well as English-based systems of signing, which entail the use of signs in English word order, Signing Exact English, Sign-Supported Speech, and Conceptually Accurate Signed English. Total Communication may also include spoken English, mime, facial expressions, and gestures. Cued speech may also be included for an individual that uses TC. An individual who identifies as using TC may or may not use these methods of communication equally or at the same time. A common form of TC is simultaneous communication or *simcom*, which refers to the use of spoken words simultaneously with a signed version of the spoken utterance. TC may also include communication that combines ASL and English in forms known as *code switching*, which refers to moving between ASL and English, or sandwiching the languages, where the information is signed, spoken, and then signed again. The definition of TC is highly situational and should be clarified by the examiner. If an individual identifies the primary communication modality as TC, the examiner should take great care in determining what exactly this means for the individual.

When arranging for the assessment of a deaf or hard of hearing individual, great care should be taken to ensure that clear and accurate communication about the test session and the individual's needs takes place. Ideally, the examiner will possess the ability to communicate with the individual and administer items directly in the language/communication modality primarily utilized. When this is not possible, consultation with a psychologist familiar with this population is recommended. It should not be assumed that communication could occur effectively through lip reading or speechreading, a technique of understanding speech by visually interpreting movements of the tongue, lips, and face with information communicated by context, language, and residual hearing. Only 30% to 40% of sounds are distinguishable from sight alone. As noted, for administration purposes, an interpreter or transliterator may be necessary.

When interpreting test results of the WAIS-5, a strong understanding of the individual's language and communication competency is critical. Some individuals may demonstrate strong competency in one or more language and communication modes, while others may have limited/developing language in one or more modalities. It also is possible that if the individual has cognitive limitations or was identified late in development during childhood, they may not have a strong language foundation. Results should be understood and interpreted with an understanding of the language capabilities of the individual.

WAIS-5 Subtest Administration Across Language and Communication Modalities

Table 1 provides appropriateness ratings and modification considerations for the WAIS-5 subtests and scales for the four general modes of communication. These ratings are based on previous work by Steven Hardy-Braz, and extended by Lori Day and Elizabeth Adams Costa who served as the primary consultants on issues of assessment with deaf and hard of hearing individuals. Appropriateness ratings are valid for individuals who possess fluent and developed language abilities in the identified system or language as appropriate for their age and developmental level. The categorical ratings range from 1 to 5. Explanations of each category and of various notes relevant to modification considerations are shown in the note that appears below Table 1. Regardless of modality, instructions for each subtest must be presented in a way that is clear and fully understood by the individual.

Table 1. Subtest and Composite Score Appropriateness Ratings and Modification Considerations for Individuals Who are Deaf or Hard of Hearing, by Language/Communication Modalities

Subtest	ASL	Oral	Cued Speech	TC
Similarities	2DM	4	4	2DM
Block Design	5	5	5	5
Matrix Reasoning	5	5	5	5
Digits Forward	3M	4	4	3M
Digit Sequencing	3M	4	4	3M
Coding	5IT	5T	5T	5T
Vocabulary	2DM	4	4	2DM
Figure Weights	5I	5	5	5I
Visual Puzzles	5I	5	5	5I
Running Digits	3MI	4	4	3MI
Symbol Search	5T	5T	5T	5T
Information	1DM	4	4	2DM
Arithmetic	1DM	4	4	2DM
Digits Backward	3M	4	4	3M
Symbol Span	5I	5	5	5I
Naming Speed Quantity	5IT	5T	5T	5T
Comprehension	1DM	4	4	2DM
Set Relations	3I	4	4	3I
Spatial Addition	5I	5	5	5I
Letter-Number Sequencing	2M	4M	4M	3M

(*continued*)

Table 1. Subtest and Composite Score Appropriateness Ratings and Modification Considerations for Individuals Who are Deaf or Hard of Hearing, by Language/Communication Modalities (*continued*)

Scale	ASL	Oral	Cued Speech	TC
Full Scale	2DM	4	4	2DM
Verbal Comprehension (VCI)	2DM	4	4	2DM
Visual Spatial (VSI)	5IT	5T	5T	5T
Fluid Reasoning (FRI)	5IT	5T	5T	5T
Working Memory (WMI)	3M	4	4M	3M
Processing Speed (PSI)	5IT	5T	5T	5T
Verbal Expanded Crystallized (VECI)	1M	5	5	2M
Verbal Reasoning (VRI)	1M	5	5	2M
Expanded Visual Spatial (EVSI)	1DM	4	4	2DM
Expanded Fluid (EFI)	1DM	4	4	2DM
Quantitative Reasoning (QRI)	1M	4	4	2M
Expanded Working Memory (EWMI)	1DM	4	4	2DM
Auditory Working Memory-Registration (AWMI-R)	3MI	4	4	3MI
Auditory Working Memory-Manipulation (AWMI-M)	2M	4M	4M	3M
Expanded Processing Speed (EPSI)	5IT	5T	5T	5T
Motor-Reduced Processing Speed (MRPSI)	5IT	5T	5T	5T
Nonverbal (NVI)	5I	5	5	5
Nonmotor (NMI)	5IT	5T	5T	5T
General Ability (GAI)	2M	5	5	2M
Cognitive Proficiency (CPI)	3M	5M	5M	3M

Note. 1 = Administration not recommended due to significant administration and interpretation issues
2 = Administration is possible but problematic and interpretation may be difficult
3 = Administration is possible but interpretation may be difficult
4 = Administration is possible with caveats due to pronunciation/auditory detection demands on the examinee
5 = Administration is possible with little or no modification
D = Translation of items may impact item difficulty
I = Care with the administration of subtest instructions is required
M = Modification by modality may alter the task demand or introduce additional task demands
T = Timed nature may affect performance and interpretation

Items within a single subtest are often presented in order of increasing difficulty. As such, modification considerations may vary across the subtest item set. For example, the examiner needs to be aware that less difficult Arithmetic items are readily administered using sign language, but the more difficult items may require signing in an iconic fashion. *D* is noted if the translation of subtest items into a different modality may render individual items more or less difficult than the original item.

Some subtests may also require careful interpretation of linguistically complex subtest instructions to ensure comprehension of task demands. Such subtests are denoted with the letter *I*. Although subtest administration may be possible in a particular communication modality, using that modality may alter the cognitive task

demands and/or deviate from standard procedures used in collecting the normative sample. For example, if the examiner is using ASL to communicate test stimuli, Digit Sequencing will require visual working memory instead of auditory working memory, which changes the task demands (Morere, 2012). The average auditory span is greater than the average visual span (Boutla et al., 2004). The letter *M* indicates subtests that may be susceptible to altered cognitive task demands, indicating that modification by modality may affect the interpretive validity of the designated skill area(s).

The letter *T* denotes subtests where the timed nature may affect performance or interpretation. For example, on the Coding subtest, the individual may be unable to view the coding key while attending to the examiner's instructions, thus giving them less exposure to the coding key prior to the start of the subtest than individuals in the normative group.

While individuals who use auditory/oral modalities generally make use of spoken English, the individual's ability to access auditory information should be clarified. An individual who uses hearing aids or cochlear implants may have corrected hearing within the range of typical functioning but may still have difficulty discriminating between soft sounds (e.g., *C* vs. *3* in Letter-Number Sequencing). Further, the individual may be taxed in detecting and understanding the speech of the examiner due to a mild hearing difference. While Cued Speech does not alter the linguistic content of the information, the visual requirements of the language should be considered in the context of administration and interpretation of timed tasks. ASL and TC may significantly alter the test stimuli, as well as interpretation. Finally, test performance may be impacted by the individual's speech, regardless of the language modality used (if the individual utilizes spoken language).

In general, interpretation of all results should be approached with caution and understood within the context of the individual, his or her language abilities and exposure, developmental history, and modification of the test (if applicable). Examiners must remain cognizant of the possibility that the presence of even a minor hearing difference, regardless of communication modality, may result in environmental conditions that impede incidental learning. For example, compared to an individual with typical hearing, a deaf or hard of hearing individual may have more limited exposure and learning opportunities. This is especially relevant for individuals who were identified as having a hearing difference during childhood but after the period of critical language acquisition. It is important to distinguish between performance related to cognitive functioning and those aspects of performance that reflect the environmental circumstances of the individual.

Table 2 provides general caveats for the administration of the WAIS-5 subtests to individuals who are deaf or hard of hearing. However, the ultimate selection of the subtests, administration, accommodations, and interpretation of results are the responsibility of the individual examiner, as well as judgments regarding the reliability and validity of results. Due to the extremely diverse nature of this population, these suggestions are intended primarily as a guide.

Table 2. General Subtest Caveats for Deaf and Hard of Hearing Individuals

Subtest	General Caveats
Similarities	Interpretation of performance on this subtest is problematic for deaf and hard of hearing examines for several reasons. For deaf and hard of hearing examinees, regardless of their primary language, the assumption that examinees had similar access to the content being tested as the normative sample may not have been met. For individuals whose primary language is ASL or who utilize TC, translation of subtest items into equivalent signs or finger-spelled words may significantly modify items. Individual test items when translated into sign or finger-spelled words may be comparatively more or less difficult than the original English item. Some target words have a clear single sign that does not visually provide cues to the answer. Many other words, however, either provide a visual clue to the definition of the word, can be depicted by more than one sign depending on the context, or do not have a single corresponding sign or the sign can be interpreted into more than one English word.. For these words, administration requires fingerspelling the word rather than providing a single sign. While fingerspelling may be appropriate for some examinees, the examinee must first decipher the target word, thus adding new task demands. Scoring guidelines are not available for signed responses, which negatively impacts scoring reliability.

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Table 2. General Subtest Caveats for Deaf and Hard of Hearing Individuals (*continued*)

Subtest	General Caveats
Block Design	When instructions are appropriately provided in the examinee's preferred language, the communication modality should not significantly alter the construct being measured on this subtest. Examiners should be aware, however, that examinees using any type of visual communication cannot view the examiner's signs, cues, or lips and simultaneously view the stimulus items. Thus, appropriate instruction includes providing sufficient time for examinees to view the visual instruction and stimulus materials.
Matrix Reasoning	When instructions are appropriately provided in the examinee's preferred language, the communication modality should not significantly alter the construct being measured on this subtest. Examiners should be aware, however, that examinees using any type of visual communication cannot view the examiner's signs, cues, or lips and simultaneously view the stimulus items. Thus, appropriate instruction includes providing sufficient time for examinees to view the visual instruction and stimulus materials.
Digits Forward; Digit Sequencing; Running Digits; Digits Backward	Administering the items in these subtests to examinees who rely on cueing or speech reading requires clear visual access to the examiner's face. As the digits are provided with low context, individuals with limited access to auditory information may struggle and make errors due to the identification of the auditory stimuli. Further, auditory working memory tasks are more taxing cognitively for individuals with a hearing difference. Administering the items in these subtests in ASL or TC changes the cognitive demands of this subtest from auditory working memory to visual working memory. This modification significantly alters the construct being measured such that comparison to the normative sample is not appropriate. Care should also be taken to ensure that the instructions for the subtests, particularly Digit Sequencing, Running Digits, and Digits Backward are clearly understood.
Coding	When instructions are appropriately provided in the examinee's preferred language, the communication modality should not significantly alter the construct being measured on this subtest. Examiners should be aware, however, that this is a timed subtest in which the items are displayed as the directions are explained. This may be a disadvantage for individuals who must view the examiner's signs, cues, or lips instead of listening and simultaneously viewing the displayed items.
Vocabulary	Interpretation of performance on this subtest is problematic for deaf and hard of hearing examinees for several reasons. For deaf and hard of hearing examinees, regardless of their primary language, the assumption that examinees had similar access to the content being tested as the normative sample may not have been met. For individuals whose primary language is ASL or who utilize TC, translation of subtest items into equivalent signs or finger-spelled words may significantly modify items. Individual test items when translated into sign or finger-spelled words may be comparatively more or less difficult than the original English item. Some target words have a clear single sign that does not visually provide cues to the answer. Many other words, however, either provide a visual clue to the definition of the word, can be depicted by more than one sign depending on the context, or do not have a single corresponding sign or the sign can be interpreted into more than one English word. For these words, administration requires fingerspelling the word rather than providing a single sign. While fingerspelling may be appropriate for some examinees, the examinee must first decipher the target word, thus adding new task demands. The inclusion of the printed target word stimuli provides an additional opportunity for examinees to recognize target words, which may be beneficial for this population. But it is important to remember that providing the word in print does not necessarily provide access equivalent to the normative population given possible differences in decoding skills between the groups. Scoring guidelines are not available for signed responses, which may negatively impact scoring reliability.

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Table 2. General Subtest Caveats for Deaf and Hard of Hearing Individuals (*continued*)

Subtest	General Caveats
Figure Weights	When instructions are appropriately provided in the examinee's preferred language, the communication modality should not significantly alter the construct being measured on this subtest. Given the linguistic complexity of the instructions, however, examiners should be certain that the translation of instructions provides clear and accurate information. Examinees using any type of visual communication cannot view the examiner's signs, cues, or lips and simultaneously view the stimulus items. Thus, appropriate instruction includes providing sufficient time for examinees to view the visual instruction and stimulus materials.
Visual Puzzles	When instructions are appropriately provided in the examinee's preferred language, the communication modality should not significantly alter the construct being measured on this subtest. Given the linguistic complexity of the instructions, however, examiners should be certain that the translation of instructions provides clear and accurate information. Examinees using any type of visual communication cannot view the examiner's signs, cues, or lips and simultaneously view the stimulus items. Thus, appropriate instruction includes providing sufficient time for examinees to view the visual instruction and stimulus materials.
Symbol Search	When instructions are appropriately provided in the examinee's preferred language, the communication modality should not significantly alter the construct being measured on this subtest. Examiners should be aware, however, that this is a timed subtest in which the items are displayed as the directions are explained. This may be a disadvantage for individuals who must view the examiner's signs, cues, or lips instead of listening and simultaneously viewing the displayed items.
Information	Interpretation of performance on this subtest is problematic for deaf and hard of hearing examinees for several reasons. For deaf and hard of hearing examinees, regardless of their primary language, the assumption that examinees had similar access to the content being tested as the normative sample may not have been met. For individuals whose primary language is ASL or who utilize TC, translation of subtest items into a visual language may significantly modify items. Individual test items when translated into ASL may be comparatively more or less difficult than the original English item. Some items when translated into ASL provide a visual cue to the answer. Other items might require the use of fingerspelling and/or may have more than one way it can be accurately translated into ASL. Without a standardized ASL translation of each individual item, significant variability is likely to be introduced into the live translation of the items. Scoring guidelines are not available for signed responses, which negatively impacts scoring reliability.
Arithmetic	Interpretation of performance on this subtest is problematic for deaf and hard of hearing examinees for several reasons. For deaf and hard of hearing examinees whose primary language is spoken English and/or who utilize cued speech, full access to spoken language is necessary to ensure the examiner has full access to the test items. This subtest is problematic for individuals whose primary language is not spoken English because of heavy linguistic demands. Without a standardized ASL translation of each individual item, significant variability is likely to be introduced into the live translation of the items. Translation of the subtest items into sign may be comparatively more or less difficult than the original English item.
Symbol Span	The addition of a visually-based working memory task is a strength of this new edition; however, given the linguistic complexity of the instructions, examiners should be certain that the translation of instructions provides clear and accurate information. When instructions are appropriately provided in the examinee's preferred language, the communication modality should not significantly alter the construct being measured on this subtest. Examinees using any type of visual communication cannot view the examiner's signs, cues, or lips and simultaneously view the stimulus items. Thus, appropriate instruction includes providing sufficient time for examinees to view the visual instruction and stimulus materials.

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Table 2. General Subtest Caveats for Deaf and Hard of Hearing Individuals (*continued*)

Subtest	General Caveats
Naming Speed Quantity	Examiners should be aware that this is a timed subtest in which the items are displayed as the directions are explained. This may be a disadvantage for individuals who must view the examiner's signs, cues, or lips instead of listening and simultaneously viewing the displayed items. Additionally, normative information is not available for ASL or TC. Examinee response times in ASL or TC may not be equivalent to response times using spoken English, thus making normative comparisons difficult.
Comprehension	Interpretation of performance on this subtest is problematic for deaf and hard of hearing examinees for several reasons. For deaf and hard of hearing examinees, regardless of their primary language, the assumption that examinees had similar access to the content being tested as the normative sample may not have been met. For individuals whose primary language is ASL or who utilize TC, translation of subtest items into a visual language may significantly modify items. Individual test items when translated into ASL may be comparatively more or less difficult than the original English item. Some items when translated into ASL provide a visual cue to the answer. Other items might require the use of fingerspelling and/or may have more than one way it can be accurately translated into ASL. Without a standardized ASL translation of each individual item, significant variability is likely to be introduced into the live translation of the items. Scoring guidelines are not available for signed responses, which negatively impacts scoring reliability.
Set Relations	Examinees using any type of visual communication will be unable to view the examiner's signs, cues, or lips and simultaneously view the stimulus items. The early items on this subtest (prior to Item 8) have a heavy language demand. For individuals whose primary language is ASL or who utilize TC, translation of these items may significantly modify the item. For example, individual test items when translated into sign may be comparatively more or less difficult than the original English item. For the latter items (starting with Item 8), while the instructions are significantly simplified, the task demands still require deciphering of the stimulus words. For deaf and hard of hearing examinees, regardless of their primary language, the assumption that examinees had similar access to the content being tested as the normative sample may not have been met.
Spatial Addition	When instructions are appropriately provided in the examinee's preferred language, the communication modality should not significantly alter the construct being measured on this subtest. Given the linguistic complexity of the instructions, however, examiners should be certain that the translation of instructions provides clear and accurate information. Examiners using any type of visual communication cannot view the examiner's signs, cues, or lips and simultaneously view the stimulus items. Thus, appropriate instruction includes providing sufficient time for examinees to view the visual instruction and stimulus materials.
Letter-Number Sequencing	Administering the items in this subtest to examinees who rely on cueing or speech reading requires clear visual access to the examiner's face. Examiners should be aware of the difficulty discriminating between several letters via speech-reading (e.g., the letters *b* and *p*). Further, the task demand is higher, as auditory working memory is a more taxing cognitive task for individuals with a hearing difference. Administering the items in this subtest in ASL or TC changes the cognitive demands of this subtest from auditory working memory to visual working memory. This modification significantly alters the construct being measured such that comparison to the normative sample is not appropriate. Further, due several overlapping signs for letters and numbers (e.g., the number *9*, and the letter *f*), administration of this subtest is problematic.

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