Help, I've Memorized the Word List!—Understanding Hearing Loss Speech Testing

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Question: Whenever I have my hearing tested, it seems the audiologist uses the same list of words each time. I can understand this for people who have never been tested before, but when I get my hearing tested regularly, isn't this sort of ridiculous? I mean, I've half-memorized the word list so I'm not getting fair test results, am I?—D. P.

Answer: I understand your concerns, but your questions reflect a fundamental misunderstanding of the whole audiometric testing process. When you go to your audiologist for a complete audiological evaluation, your audiologist performs a whole battery of tests. The speech audiometry portion of your audiological evaluation consists of not just one, but two "word" tests—the Speech Reception Threshold (SRT) test and the Speech Discrimination (SD) test. The SRT and the SD tests are entirely different tests—each with totally different objectives. Unfortunately, many people somehow "smoosh" these two tests together in their minds, hence the confusion and concern expressed in your questions. Let me explain.

Speech Reception Threshold (SRT) Testing

The purpose of the Speech Reception Threshold (SRT) test, sometimes called the speech-recognition threshold test, is to determine the softest level at which you just begin to recognize speech. That's it. It has nothing to do with speech discrimination.

Audiologists determine your Speech Reception Threshold by asking you to repeat a list of easy-to-distinguish, familiar spondee words. (Spondee words are two-syllable words that have equal stress on each syllable. You'll notice that when you repeat a spondee, you speak each syllable at the same volume and take the same length of time saying each syllable.) Here are examples of some of the spondee words used in SRT testing: baseball, cowboy, railroad, hotdog, ice cream, airplane, outside and cupcake.

When you take the SRT test, your audiologist will tell you, "Say the word 'baseball.' Say the word 'cowboy.' Say the word 'hotdog.'" etc. As she does this, she varies the volume to find the softest sound level in decibels at which you can just hear and correctly repeat 50% of these words. This level is your SRT score expressed in decibels (dB). You will have a separate SRT test for each ear.¹

If your SRT is 5 dB (normal), you can understand speech perfectly at 21 feet and still catch some words at over 100 feet. If you have a mild hearing loss—or example a SRT of 30 dB—you could only hear perfectly at 1 foot but could
still hear some words at 18 feet. If your SRT is 60 dB (a moderately severe hearing loss), you would need the speaker to be only 1 inch from your ear in order to hear perfectly and within 1 foot to still hear some of the words correctly.\(^2\)

Now, to address your concerns about memorizing the words in the word lists. For the record, you should be familiar with all the spondee words in the list before testing commences because this familiarization results in an SRT that is 4 to 5 dB better than that obtained if you didn't know them.\(^3\)

Bet you didn't know this, but there are actually two standardized spondee word lists—not just one. Each list consists of 18 words. These words are "phonetically dissimilar and homogeneous in terms of intelligibility."\(^3\) That is just a fancy-pants way of saying that all these words sound different, yet are equally easy to understand. Spondees are an excellent choice for determining your Speech Reception Threshold because they are so easy to understand at faint hearing levels.\(^3\)

Let me emphasize again, you are supposed to know these words. They are not supposed to be a secret. However, this doesn't mean that because you know a number of the words on this list, that you have memorized them. In fact, it would be difficult since there are two different SRT word lists, and your audiologist may go from top to bottom, or bottom to top, or in random order. Thus, although you are generally familiar with these words, and can even recite a number of them from memory, you still don't know the exact order you'll be hearing them so you cannot cheat. Thus, you can set your mind at rest. Your SRT scores are still perfectly valid even though the words "railroad," "cowboy" and "hotdog" are almost certainly going to be in one of those lists.

Why is knowing your Speech Reception Threshold important? In addition to determining the softest level at which you can hear and repeat words, your SRT is also used to confirm the results of your pure-tone threshold test. For example, there is a high correlation between your SRT results and the average of your pure-tone thresholds at 500, 1000, and 2000 Hz. In fact, your SRT and 3-frequency average should be within 6 dB of each other.\(^4\) Furthermore, your Speech Reception Threshold determines the appropriate gain needed when selecting the right hearing aid for your hearing loss.\(^4\)

**Discrimination Testing**

The purpose of Speech Discrimination (SD) testing (sometimes called word recognition testing) is to determine how well you hear and understand speech when the volume is set at your Most Comfortable Level (MCL).

To do this, your audiologist says a series of 50 single-syllable phonetically-balanced (PB) words. (Phonetically-balanced just means that the percent of time any given sound appears on the list is equal to its occurrence in the English language.\(^5\) For this test, your audiologist will say, "Say the word 'come.' Say the word 'high.' Say the word 'chew.' Say the word 'knees,'" and so on. You repeat back what you think you hear.

During this test, your audiologist keeps her voice (or a recording on tape or CD) at the same loudness throughout. Each correct response is worth 2%. She records the percentage of the words you correctly repeat for each ear.
For the best results, the Speech Discrimination word list is typically read at 40 decibels above your SRT level (although it may range from 25-50 dB above your SRT level, depending on how you perceive sound). Your Speech Discrimination score is an important indicator of how much difficulty you will have communicating and how well you may do if you wear a hearing aid. If your speech discrimination is poor, speech will sound garbled to you.

For example, a Speech Discrimination score of 100% indicates that you heard and repeated every word correctly. If your score was 0%, it means that you cannot understand speech no matter how loud it is—speech will be just so much gibberish to you. Scores over 90% are excellent and are considered to be normal. Scores below 90% indicate a problem with word recognition. If your score is under 50%, your word discrimination is poor. This indicates that you will have significant trouble following a conversation, even when it is loud enough for you to hear. Thus, hearing aids will only be of very limited benefit in helping you understand speech. If your speech discrimination falls below 40%, you may be eligible for a cochlear implant.

Incidentally, people with conductive hearing losses frequently show excellent speech discrimination scores when the volume is set at their most comfortable level. On the other hand, people with sensorineural hearing losses typically have poorer discrimination scores. People with problems in the auditory parts of their brains tend to have even poorer speech discrimination scores, even though they may have normal auditory pure-tone thresholds.

Unlike the SRT word lists (railroad, cowboy, hotdog, etc.), where everyone seems to remember some of the words, I have never come across a person who has memorized any of the words in the speech discrimination lists. In fact, as the initial questions indicated, people mistakenly think the SRT words are used for speech discrimination. This is just not true. In truth, the SD words are so unprepossessing and "plain Jane" that few can even remember one of them! They just don't stick in your mind!

For example, one Speech Discrimination list includes words such as: "are," "bar," "clove," "dike," "fraud," "hive," "nook," "pants," "rat," "slip," "there," "use," "wheat" and 37 others. How many of you remember any of these words?

One person asked, "Why aren't there several different word lists to use?" Then our audiologists would find out if we really heard them."

Surprise! This is what they already do. There are not just one, but many phonetically-balanced word lists already in existence. In case you are interested, the Harvard Psycho-Acoustic Laboratory developed the original PB word lists. There are 20 of these lists, collectively referred to as the PB-50 lists. These 20 PB-50 lists each contain 50 single-syllable words comprising a total of 1,000 different monosyllabic words. Several years later, the Central Institute for the Deaf (CID) developed four 50-word W-22 word lists, using 120 of the same words used in the PB-50 lists and adding 80 other common words. Furthermore, Northwestern University developed yet four more word lists (devised from a grouping of 200 consonant-nucleus-consonant (CNC) words). These lists are called the Northwestern University
Test No. 6 (NU-6). As you now understand, your audiologist has a pool of over 1,000 words in 28 different lists from which to choose, thus making memorizing them most difficult. (In actual practice, audiologists use the W-22 and NU-6 lists much more commonly than the original PB-50 lists.) In addition to choosing any one of the many speech discrimination word lists available to her, your audiologist may go from top to bottom, or bottom to top so you still don't know what word is coming next. Thus you can rest assured that your word discrimination test is valid. Your memory has not influenced any of the results.

In addition to determining how well you recognize speech, Speech Discrimination testing has another use. Your audiologist uses it to verify that your hearing aids are really helping you. She does this by testing you first without your hearing aids on to set the baseline Speech Discrimination score. Then she tests you with your hearing aids on. If your hearing aids are really helping you understand speech better, your Speech Discrimination scores should be significantly higher than without them on. If the scores are lower, your audiologist needs to "tweak" them or try different hearing aids.

**To Guess or Not To Guess, That is the Question**

One person asked, "Do audiologists want us to guess at the word if we are not sure what the word is? Wouldn't it be better to say what we really hear instead of trying to guess what the word is?"

Good question. Your audiologist wants you to just repeat what you hear. If you hear what sounds like a proper word, say it. If it is gibberish and not any word you know, either repeat the gibberish sounds you heard, or just say that you don't have a clue what the word is supposed to be. If you don't say anything when you are not completely certain of the word, you are skewing the results because sometimes you will hear the word correctly, but by not repeating what you thought you heard, you are deliberately lowering your discrimination score.

Another person remarked, "I remember a while back; when I was taking the word test, there was a word that sounded like the 4 letter word that begins with an 'F'. I knew it wasn't that word, and I would not say 'F***.'" In that case, if you are not comfortable repeating what you "heard," just say it sounded like a "dirty" word and you don't want to repeat it. You audiologist will know you got it wrong as there are no "dirty" words on the PB lists.

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**References**


"The wages of sin is death, but the gift of God is eternal life [which also includes perfect hearing] through Jesus Christ our Lord." [Romans 6:23]

"But know this, in the last days perilous times will come" [2 Timothy 3:1]. "For there will be famines, pestilences, and [severe] earthquakes in various places" [Matthew 24:7], "distress of nations, the sea and the waves roaring"—tsunamis, hurricanes—Luke 21:25, but this is good news if you have put your trust in the Lord Jesus Christ, for "when these things begin to happen, lift up your heads [and rejoice] because your redemption draws near" [Luke 21:28].

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