

LISTENING DIFFICULTIES IN NOISE

Sound Scouts includes three separate tests that are combined to give an overall result. One of the tests measures a child's ability to hear speech when there is background noise present. Children with permanent hearing loss and in some cases temporary hearing loss (caused by middle ear infection) are likely to perform poorly in this section of the test in addition to the other two tests within the game.

However, when there is no hearing loss (i.e. the child performs well in the speech in quiet test indicating that they can hear soft sounds in quiet as well as most people), a poor result in the speech in noise test is likely to be caused by something other than a hearing loss. There are several possibilities, and in some cases, it is difficult to distinguish them.

- An **auditory processing disorder** is a deficit in the way that the brain processes the signals delivered to it by the ears. There are various types of auditory processing disorders, and at least some of them can be completely fixed by suitable auditory training activities.
- A **developmental language delay** (also called a specific language impairment) refers to a deficit in the child's knowledge or use of language. In noisy places, we all use our knowledge of language to fill in the parts of speech that noise prevents us from hearing. We do this so easily we are usually not even aware we do it. If a child's language ability is behind that of his or her age peers, noise will affect speech understanding more than for other children.
- If the language used in the speech-in-noise test is the child's **second language**, then the child is likely to be less proficient in that language than they are in their first language. This is a type of language deficit, though one specific to just the language used in the test.
- An **attention deficit**, even if the deficit is not at a level that would be classified as an attention deficit disorder, can prevent the child understanding as much as they would if they were able to devote more attention to the task. Sound Scouts is usually very effective in engaging children's attention, but it may not achieve this for every child. Different tests and observations would be needed to determine if the low attention applied during Sound Scouts is a characteristic that the child displays in other situations, or was a one-off.
- A **working memory deficit** causes reduced ability to hold words previously heard in memory, and use their meaning to help understand other words in the sentence that are more fully masked by noise. Because the test items in Sounds Scouts are short, poor performance on the test is not likely to be caused by a working memory deficit.
- Children with **autism spectrum disorder** will often have reduced ability to perform auditory tasks, which might include understanding speech in challenging situations.

Please bear in mind that all the above are just possibilities. The first thing to do is to repeat the test, as the result might have been caused just by poor attention while doing the test, even if the child's attention is normally good.

One thing that is *not* the cause is the child being young! All children improve in their ability to listen in noise as they get older, and the Sound Scouts score is based on extensive data showing how well children of different ages can hear in noise. Provided the child is at least 4 years 9 months, the report from Sound Scouts automatically takes this information (normative data) into account when creating the report for each child.

Does Sound Scouts detect auditory processing disorder?

Auditory processing disorder is not a single thing, but rather an umbrella term that covers a range of deficits in the way a person processes sound. Consequently, there is no gold standard test for auditory processing disorder against which Sound Scouts can be compared. The most commonly reported and important consequence of an auditory processing disorder is excessively reduced speech understanding in challenging listening situations (like some classrooms). Because of the importance of this symptom, Sound Scouts includes a test of speech understanding in noise.

One of the best understood, and most diagnosable types of auditory processing disorders is ***spatial processing disorder***. This condition refers to an inability to focus on sounds coming from one direction while suppressing sounds coming from other directions. It is mostly caused by the child having prolonged or repeated middle ear infections during the first year of life. It is one of the auditory processing deficits that can be completely remediated, by giving the brain practice at focussing on spatially separated sounds. The training tool for this is called Sound Storm.