

Listening differences in autistic individuals

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In this article **Erin Schafer**, **Lauren Mathews** and **Andrea Dunn** outline the common auditory issues that autistic individuals face in comparison with their neurotypical peers and highlight the need to move beyond the traditional audiologic test battery when working with this patient group.

Despite the presence of normal, pure-tone hearing sensitivity, many autistic children and adults exhibit performance differences on behavioural tests of auditory processing and report listening challenges, particularly in noisy environments [1-5]. Identification and mitigation of these auditory issues is critical because they are likely to impact speech understanding and communication in everyday environments including noisy school classrooms, restaurants, family and social events, and in the workplace.

What are the auditory issues faced by autistic individuals?

On questionnaires designed to document auditory sensory issues, parents, teachers, and autistic individuals report degraded auditory filtering and attention, over- or under-responsiveness to speech stimuli, and distractibility and dysfunction in the presence of background noise [1,5]. Listening issues in background noise are particularly concerning, given noisy situations are common in most learning, workplace, and social environments. Similar listening difficulties are documented on behavioural tests of auditory processing. As reported in our recent work [1], when compared to neurotypical peers, autistic children and young adults had significantly poorer parent or self-reported auditory sensory processing and classroom listening

abilities, sentence recognition in noise, binaural integration of dichotic digits and words, spatial stream segregation (i.e. benefit of spatial separation of speech/masker and different vocal cues on speech recognition), and several areas on a test of language processing and comprehension skills (i.e. word discrimination, phonological segmentation, number memory forward, and auditory comprehension). In addition to listening difficulties, communication challenges may also stem from commonly-reported comorbid conditions, including language and anxiety disorders as well as attention deficits.

How can we document listening difficulties in autistic individuals?

Hearing healthcare professionals have the training and tools to document the auditory issues faced by autistic children and adults; however, we must move beyond the traditional audiologic test battery. Any evaluation should begin by ruling out the presence of hearing loss or middle ear dysfunction with behavioural or objective tests (e.g. auditory brainstem response), but further sensitive, auditory behavioural test measures (Table 1) will need to be incorporated to document specific areas of auditory processing difficulty [1-4]. While other areas of auditory processing can be assessed in a listening evaluation, those listed in Table 1 are most commonly used in our clinic and are associated with remediations (e.g. auditory training and remote-microphone technology) designed for listeners with normal, pure-tone hearing sensitivity [2-4]. If a patient is unable to participate in behavioural testing, parent and teacher questionnaires may be used to document sensory and listening difficulties [4].

Conclusions

As we strive to provide holistic, patient-centred care, hearing healthcare professionals need to consider the individualised needs of each patient,

including the specific auditory needs and difficulties faced by autistic patients. A combination of parent, teacher, and self-report questionnaires and behavioural auditory test measures may be used to identify listening issues in autistic patients and inform evidence-based recommendations to remediate their difficulties, such as remote-microphone systems and auditory training. These interventions have been shown to significantly improve teacher and parent-rated auditory listening behaviours, self-perceived listening abilities, on-task classroom behaviours, acceptance of background noise, speech recognition in noise, and auditory comprehension [2-4].

References

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“A combination of parent, teacher, and self-report questionnaires and behavioural auditory test measures may be used to identify listening issues in autistic patients”

Table 1. Test measures to document listening difficulties in autistic individuals

Auditory area	Description of task and measures
Auditory filtering	<ul style="list-style-type: none"> - Ability to hear, function, and complete tasks in noisy conditions. - Often documented with parent, teacher, and self-report questionnaires.
Functional listening issues	<ul style="list-style-type: none"> - General issues including, but not limited to, auditory attention, distractibility, and over- or under-responsiveness to speech. - Often documented with parent-, teacher-, and self-report questionnaires.
Speech recognition in noise	<ul style="list-style-type: none"> - Ability to repeat words or sentences in the presence of background noise. - Documented with one of several commercially-available speech-in-noise tests with recorded stimuli.
Binaural integration	<ul style="list-style-type: none"> - Ability to repeat and combine different words or sentences presented to each ear at the same time. - Documented with one of several commercially-available dichotic tests that use digits, words, or sentences.



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