

COULD IT BE BOTH? DISTINGUISHING BETWEEN AUTISM AND CHILDHOOD APRAXIA OF SPEECH

Molly Beiting, PhD, CCC-SLP

Parents frequently ask how to distinguish between autism and childhood apraxia of speech (CAS), or how to determine if a child with autism could also have CAS. This can be difficult to determine if the child is showing signs of both—especially if they are not yet talking very much. So, what makes diagnosing CAS among an autistic child so difficult? Is a child more likely to have CAS if they also have autism (and vice versa)? Are these labels even important? How can I advocate for accurate diagnosis and appropriate treatment for my child? This article brings you answers based on the best available research evidence and personal clinical experience.

Note: Many individuals and families prefer different word choices in reference autism. This article uses person-first language (e.g., child with autism) and identity-based language (e.g., autistic child) to honor these different preferences. The terms "autism spectrum disorder" and "autism" are used interchangeably.

What Are the Signs?

There are many different reasons why some children have difficulty talking. Some of the signs associated with autism and CAS are listed below. Similar features commonly shared by both disorders are starred. Note that not all children will display all of these signs, and that no single sign is proof of either CAS or autism.

Signs associated with CAS [1-2]

- *In infancy, produces fewer word-like productions while babbling**
- *Late to begin talking**
- *Produces the wrong sounds or distorted sounds in words*
- *Sometimes says the same words differently*
- *More difficulty saying longer words than shorter words*
- *Places unusual stress on parts of words or words in sentences**

Signs associated with autism [3-4]

- *In infancy, low rate of babbling**
- *Does not respond to name by 9 months*
- *Uses few gestures (e.g., does not wave by 12 months, point by 18 months)*
- *Engages in little back-and-forth play or eye contact*
- *Late to begin talking**
- *Overuses words or phrases*
- *Unique voice (e.g., "sing-song," "robotic")*
- *Strong preference for the same routines*
- *Unusually sensitive to light, sound, or touch*
- *Engages in repetitive movements (e.g., rocking body, flicking hands)*
- *Difficulty interacting with others*

If your child displays some of the warning signs above, the next step is to get an evaluation from qualified professionals. Talk to a speech-language pathologist with experience in autism and CAS, as well as your pediatrician. Your child's pediatrician may refer you to a specialist for further evaluation.

Is CAS More Common Among Autistic Children?

Unfortunately, the most we can say based on current research evidence is “maybe.” There has just not been enough research conducted in this area, and the existing research tells a conflicting story. Depending on the study, estimates range from no greater likelihood of CAS among children with autism [5], to a very high rate of co-occurrence [6]. Reasons for the wide range of estimates most likely come down to the different methods used by the studies. The children involved in these studies were very different in terms of their speech, language, and cognitive skills, as well as how the researchers conceptualized and diagnosed CAS.

In one research report, surveyed speech-language pathologists suspected CAS in 1 in 6 autistic children on their caseloads [7]—far greater than the number of children generally thought to have CAS [8]. However, only about half of the children suspected to have co-occurring disorders were confirmed as having CAS [7]. This discrepancy highlights how challenging it can be to definitively diagnosis CAS among children with autism.



According to the most recent diagnostic criteria [9], speech or language delay is not a core characteristic of autism. Yet, many autistic children have delays in language and about a third are minimally verbal [11-13]. It is possible that speech production disorders such as CAS present a roadblock to early language development. However, it is very unlikely that there is just one reason why a particular child has difficulty acquiring language. Research has identified numerous foundational skills in addition to speech production ability that could influence language development, including attention, imitation, sensory-motor development, social motivation and cognitive skills [14-18].

Irrespective of the precise number of children who present with both autism and CAS, clinicians and researchers are sure that some children do have both disorders [19-20]. Given the potential risks, screening for autism and apraxia is highly recommended for children who show signs of either [6].

Why Might CAS Occur More Among Autistic Children?

Although research has not confirmed whether CAS is more common among autistic children, there are several ideas about why this could be the case. First, CAS and autism could share a common cause, such as genetic factors [21] or brain-related differences [22]. It is also possible that one disorder causes or influences the severity of the other. Some research has found a connection between early ability to produce speech sounds and later language outcomes for children with autism [23-25]. If a child is already struggling to develop verbal skills, difficulty with speech production may make this even more difficult. However, at this time we also cannot rule out the possibility that autism and CAS simply co-occur for unrelated reasons among some children. For many autistic children, speech skills are typical or even exceptional in comparison to their peers without autism [5].



What Makes Accurate Diagnosis Difficult?

CAS is diagnosed by a speech-language pathologist, based on how a child produces sounds, words, and sentences. Some characteristics of CAS overlap with those of other types of speech disorders (e.g., more difficulty producing longer/more complex words, making many sound errors).

Some of the characteristics that are relatively unique to CAS include [26]:

- **Inconsistent errors:** The same word/sound produced differently over repeated tries.
- **Lengthened or disrupted transitions between sounds and syllables:** Pauses between sounds, “stretched out” sounds, or “fumbling” between sounds.
- **Inappropriate prosody:** Atypical rhythm of speech, caused by placing emphasis on the incorrect parts of words, or incorrect words in phrases.

Importantly, the same characteristics that distinguish CAS from other speech disorders among children without autism are thought to be the same for autistic children [27]. Again, there is limited information on this topic, but so far researchers do not suspect that CAS looks differently among autistic children. However, some factors commonly associated with autism can interfere with a clinician’s ability to diagnose CAS.

It can be difficult to accurately diagnose CAS if a child...[28]

1. **does not yet use enough speech to judge articulation.** Although it is possible to *suspect* CAS among children who use very little speech, they must be able to produce at least a handful of words for the clinician to definitively diagnose CAS. Some autistic children use mostly self-directed speech. Self-directed speech may be quieter in volume, difficult to understand, or not generative in nature (e.g., repeating lines from a TV show; see below).
2. **has poor repetition skills or heightened repetition.** A common technique used in assessment and treatment of CAS is word imitation. Some autistic children have difficulty “tuning in to speech” which makes it difficult to listen to and repeat what is heard. Alternatively, other autistic children have excellent imitation skills. Some children use repetition in unexpected ways, (e.g., reciting lines from TV shows, overusing the same few phrases). Typically, imitated speech is produced more clearly than non-imitated speech. An assessment that consists of little non-imitated speech runs the risk of overestimating speech ability or potentially overlooking CAS.
3. **has difficulty understanding task demands or displays limited social motivation.** Some children with autism have reduced language skills, cognitive capabilities, and/or social motivation. Speech assessment is most effective if the child clearly understands what they are expected to do and are fully engaged in the assessment tasks.
4. **uses limited eye contact or demonstrates poor attention.** Word repetition is a common technique used for diagnosis and treatment of CAS. If a child is unable to focus on and gather information from the clinician’s face, they may need other ways of learning the correct movements needed to produce sounds and words.
5. **is more sensitive to touch.** Everyone has different preferences when it comes to touch, and some autistic children fall on the extremes, demonstrating hypersensitivity or very low sensitivity to touch. For children with heightened sensitivity to touch, it may be unable to tolerate an oral exam (which is needed to rule out potential oral structure problems). Likewise, hands-on cues are common in many assessment and treatment approaches for CAS. If these kinds of cues cause a child discomfort or distress, alternative methods will be needed.
6. **demonstrates interfering behaviors or decreased compliance.** Not all children with autism demonstrate behaviors that interfere with traditional speech assessment and treatment, but special consideration is often needed to ensure the demands, environment, and approach encourage participation and do not cause distress.
7. **uses atypical prosody.** Atypical prosody, or rhythm of speech, is associated with both autism and CAS. If an autistic child is observed to use unusual prosody but shows few other signs of CAS, careful consideration is needed to arrive at the correct diagnosis. Diagnosis of CAS should always be made based on a cluster of characteristics, rather than just one or two.

Do These Labels Even Matter?

Both autism and CAS require specialized approaches to support communication skills, with best outcomes when interventions are provided early in development. It can be uncomfortable or triggering when labels are used to describe your child, but, when appropriately used, these labels can help children gain access to specialized treatments. Labels like “autism” and “CAS” can also give those who work with your child greater understanding about their needs and abilities.

What Does CAS Treatment Look Like for Autistic Children?

Regardless of whether a child has autism, speech therapy will look different depending on individual needs. Autistic children often participate in many types of therapies and have important goals related to life skills, language, and behavior. Although therapy priorities may shift over time, it is important to keep working on communication skills and re-evaluate the therapy plan often to address changing needs. It is not uncommon for children with autism and CAS to participate in several therapy sessions per week or even multiple sessions each day.



For children who are working on foundational communication skills such as attention and engaging with other people, speech and language therapy will likely address these skills prior to working on saying specific words and phrases. For children who have a good grasp on foundational skills and are using some speech, therapy may work on building a core vocabulary of frequently words and phrases. As children are able to repeat more words and respond to feedback about how to correctly produce speech, therapy may begin dedicating more time to practicing specific speech movements within words and phrases.

A specialized, motor-based approach is thought to be most effective to improve speech skills among children with CAS. Unfortunately, there is little research about whether the evidence-based CAS interventions that are effective for children without autism will have the same results for autistic children. Some studies suggest adapting traditional CAS treatment to be more play-based and incorporating teaching strategies known to be effective for children who have autism [19]. Research also supports using approaches that allow for lots of speech practice and incorporating the child’s interests and strengths, such as music [20]. Clinical evidence is most important in making treatment decisions. If a treatment is not working, it needs to be adjusted!

Speech-language pathologists may also include augmentative and alternative communication (AAC) in the treatment plan. AAC is commonly used with children who have low verbal skills and either autism or CAS. Parents do not need to worry about this type of technology replacing or slowing down speech development; research shows that AAC provides important access to language and may actually facilitate spoken language development [29-30].

Overall, the most important thing about treatment for children with autism is that it changes as they develop more skills and display different needs. The goal of treatment should be communication—in whatever form is most appropriate for the child (e.g., spoken speech, sign language, speech generating device)

How Can I Advocate for Accurate Diagnosis and Effective Treatment for My Child?

Tips for Evaluation:

1. **Seek out an evaluation from an experienced speech-language pathologist and ask lots of questions.** Ask not only “Is it possible that my child has CAS?” but also “How do you know?” Ask the therapist about their specific experience with CAS and autism. Also ask your child’s pediatrician if referrals to other specialists might be helpful.
2. **Discuss the evaluation plan.** Ahead of the evaluation, ask the speech-language pathologist to discuss their plan with you. If you are specifically interested in whether your child has CAS, make this goal known ahead of time. Ask “What assessments will you use to evaluate my child’s speech?” “Do you expect to be able to collect enough data to make a diagnosis?”
3. **Share what your child needs to be most successful.** Children with and without autism may need different things for a therapist to get the most information from an evaluation. You know your child best, so speak up about the things you know about them. You might share that your child needs (1) testing completed over multiple, short sessions, rather than one long session, (2) observations and testing to be completed in a familiar place such as your home, or if not possible, extra time to get to know the therapist and the new setting, (3) lots of breaks during the evaluation, and (4) modifications to improve sensory regulation and engagement (e.g., sitting on a therapy ball or cushion, dimmed lights, breaks to jump on a trampoline). It is also helpful to share your child’s preferred activities and specific things that motivate them, as well as how they show when they are excited or frustrated.
4. **Expect to need follow-up evaluations.** As children grow older and develop new skills, it is common to re-evaluate speech and language needs. Language, reading, and learning problems commonly co-occur with both autism and CAS, so follow-up evaluations are also needed to monitor how these skills are progressing.

Tips for Treatment:

1. **Share with the therapist the goals that are most important to you and your child and ask how the treatment plan will address them.** For example, there might be certain words or phrases that are important to your child to say clearly (e.g., “no,” “see ya later, alligator,” favorite TV character). You might be concerned about rising frustration levels and want to make a plan for improving other communication strategies. You might also be interested in getting more involved in therapy, especially if there are special techniques or technologies that the therapist uses that you want to implement at home. The treatment process should be collaborative and address the goals most important to your child and your family.
2. **Decide for how progress will be monitored, how often you will meet to discuss progress, and what will be changed if progress is not happening as expected.** This is especially for children who are not yet talking very much or who have not received a specific diagnosis. If the treatment is not working, it needs to be adjusted! Asking these questions at the beginning of treatment helps everyone stay on the same page and course-correct more quickly if needed.
3. **Share your observations and experiences.** Are you noticing improvements? Are there important goals that have not yet been met? Have any problem behaviors emerged? It can be common for children with both CAS and autism to have difficulty carrying over skills learned in therapy to everyday life. The clinician needs to know how things are going outside of the therapy room in order to provide the best treatment.

References

1. Apraxia Kids (n.d.). What is Childhood Apraxia of Speech? Key Characteristics of CAS. https://www.apraxia-kids.org/apraxia_kids_library/what-is-childhood-apraxia-of-speech/
2. Mayo Clinic (n.d.). Childhood Apraxia of Speech: Symptoms and Causes. <https://www.mayoclinic.org/diseases-conditions/childhood-apraxia-of-speech/symptoms-causes/syc-20352045#:~:text=Those%20particularly%20associated%20with%20CAS,vowel%2C%20but%20saying%20it%20incorrectly>
3. Autism Speaks (n.d.). What Are the Symptoms of Autism? <https://www.autismspeaks.org/what-are-symptoms-autism>
4. Centers for Disease Control and Prevention [CDC] (n.d.). Signs and Symptoms of Autism Spectrum Disorder. <https://www.cdc.gov/ncbddd/autism/signs.html>
5. Shriberg, L. D., Paul, R., McSweeney, J. L., Klin, A., Volkmar, F. R., & Cohen, D. J. (2001). Speech and prosody characteristics of adolescents and adults with high functioning autism and Asperger syndrome. *Journal of Speech, Language, and Hearing Research*, 44(5), 1097-1115. <http://doi.org/dp4wqb>
6. Tierney, C., Mayes, S., Lohs, S. R., Black, A., Gisin, E., & Veglia, M. (2015). How valid is the checklist for autism spectrum disorder when a child has apraxia of speech? *Journal of Developmental & Behavioral Pediatrics*, 36(8), 569-574. <http://doi.org/f7txwz>
7. Dawson, E. J. (2010). Current assessment and treatment practices for children with autism and suspected childhood apraxia of speech: A survey of speech-language pathologists [Master's thesis, Portland State University]. PDXScholar. <http://doi.org/dvwg>
8. Shriberg, L. D., Aram, D. M., & Kwiatkowski, J. (1997). Developmental apraxia of speech: I. Descriptive and theoretical perspectives. *Journal of Speech, Language, and Hearing Research*, 40(2), 273-285. <https://doi.org/hsr8>
9. Autism Speaks (n.d.). Autism Diagnosis Criteria: DSM-5. <https://www.autismspeaks.org/autism-diagnosis-criteria-dsm-5>
10. Luyster, R. J., Kadlec, M. B., Carter, A., & Tager-Flusberg, H. (2008). Language assessment and development in toddlers with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 38(8), 1426-1438. <https://doi.org/dzsfbx>
11. Anderson, D. K., Oti, R. S., Lord, C., & Welch, K. (2009). Patterns of growth in adaptive social abilities among children with autism spectrum disorders. *Journal of Abnormal Child Psychology*, 37(7), 1019-1034. <https://doi.org/fatsqq>
12. Norrelgen, F., Fernell, E., Eriksson, M., Hedvall, Å., Persson, C., Sjölin, M., ... & Kjellmer, L. (2015). Children with autism spectrum disorders who do not develop phrase speech in the preschool years. *Autism*, 19(8), 934-943. <https://doi.org/f2487g>
13. Tager-Flusberg, H., & Kasari, C. (2013). Minimally verbal school-aged children with autism spectrum disorder: The neglected end of the spectrum. *Autism Research*, 6(6), 468-478. <https://doi.org/dvw2>
14. Gernsbacher, M. A., Sauer, E. A., Geye, H. M., Schweigert, E. K., & Hill Goldsmith, H. (2008). Infant and toddler oral-and manual-motor skills predict later speech fluency in autism. *Journal of Child Psychology and Psychiatry*, 49(1), 43-50. <https://doi.org/b8grh6>
15. Rogers, S. J., Hepburn, S. L., Stackhouse, T., & Wehner, E. (2003). Imitation performance in toddlers with autism and those with other developmental disorders. *Journal of Child Psychology and Psychiatry*, 44(5), 763-781. <https://doi.org/bg7qbb>
16. Siller, M., & Sigman, M. (2008). Modeling longitudinal change in the language abilities of children with autism: Parent behaviors and child characteristics as predictors of change. *Developmental Psychology*, 44(6), 1691. <https://doi.org/cjv46f>
17. Su, P. L., Rogers, S. J., Estes, A., & Yoder, P. (2021). The role of early social motivation in explaining variability in functional language in toddlers with autism spectrum disorder. *Autism*, 25(1), 244-257.
18. Thurm, A., Lord, C., Lee, L. C., & Newschaffer, C. (2007). Predictors of language acquisition in preschool children with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 37(9), 1721-1734. <https://doi.org/hssd>
19. Beiting, M., & Maas, E. (2021). Autism-Centered Therapy for Childhood Apraxia of Speech (ACT4CAS): A Single-Case Experimental Design Study. *American Journal of Speech-Language Pathology*, 30(3S), 1525-1541. <https://doi.org/hssj>
20. Chenausky, K., Norton, A., Tager-Flusberg, H., & Schlaug, G. (2016). Auditory-motor mapping training: comparing the effects of a novel speech treatment to a control treatment for minimally verbal children with autism. *PLoS One*, 11(11). <http://doi.org/dvwd>
21. Peter, B., Dinu, V., Liu, L., Huentelman, M., Naymik, M., Lancaster, H., ... & Schrauwen, I. (2019). Exome sequencing of two siblings with sporadic autism spectrum disorder and severe speech sound disorder suggests pleiotropic and complex effects. *Behavior Genetics*, 49(4), 399-414. <https://doi.org/hssn>
22. Conti, E., Retico, A., Palumbo, L., Spera, G., Bosco, P., Biagi, L., ... & Calderoni, S. (2020). Autism spectrum disorder and childhood apraxia of speech: Early language-related hallmarks across structural MRI study. *Journal of Personalized Medicine*, 10(4), 275. <https://doi.org/hssp>
23. Yoder, P., Watson, L. R., & Lambert, W. (2015). Value-added predictors of expressive and receptive language growth in initially nonverbal preschoolers with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 45(5), 1254-1270. <https://doi.org/f6856t>
24. Chenausky, K., Norton, A., Tager-Flusberg, H., & Schlaug, G. (2018). Behavioral predictors of improved speech output in minimally verbal children with autism. *Autism Research*, 11(10), 1356-1365. <https://doi.org/gfmm3j>
25. Paul, R., Chawarska, K., Cicchetti, D., & Volkmar, F. (2008). Language outcomes of toddlers with autism spectrum disorders: A two year follow-up. *Autism Research*, 1(2), 97-107. <https://doi.org/ff2r43>
26. American-Speech-Language-Hearing Association [ASHA] (2007). Childhood Apraxia of Speech [technical report]. <http://www.asha.org/policy>
27. Chenausky, K. V., Brignell, A., Morgan, A., Gagné, D., Norton, A., Tager-Flusberg, H., ... & Green, J. R. (2020). Factor analysis of signs of childhood apraxia of speech. *Journal of Communication Disorders*, 87, 106033. <https://doi.org/hsr>
28. Beiting, M. (2022). Diagnosis and Treatment of Childhood Apraxia of Speech Among Children with Autism: Narrative Review and Clinical Recommendations. *Language, Speech, and Hearing Services in Schools*, 1-22. <https://doi.org/hsst>
29. Schlosser, R. W., & Wendt, O. (2008). Effects of augmentative and alternative communication intervention on speech production in children with autism: A systematic review. *American Journal of Speech Language Pathology*, 17, 212-230. <https://doi.org/ds6jb4>
30. Oommen, E. R., & McCarthy, J. W. (2015). Simultaneous natural speech and AAC interventions for children with childhood apraxia of speech: lessons from a speech-language pathologist focus group. *Augmentative and Alternative Communication*, 31(1), 63-76. <https://doi.org/ds9c>