CASE STUDIES FOR THE

# *Treatment of* Autism Spectrum Disorder

Patricia A. Prelock
Rebecca J. McCauley

Communication and Language Intervention Series

# Case Studies for the Treatment of Autism Spectrum Disorder

edited by

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# About the Editors

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Dr. Prelock is Provost and Senior Vice-President, University of Vermont. Formerly, she was the dean of the College of Nursing and Health Sciences at the University of Vermont for 10 years. She is also a professor of communication sciences and disorders and professor of pediatrics in the College of Medicine at the University of Vermont. Dr. Prelock has been awarded more than $11.9 million in university, state, and federal funding as a principal investigator (PI) or co-PI to develop innovations in interdisciplinary training supporting children and youth with neurodevelopmental disabilities and their families, to facilitate training in speech-language pathology, and to support her intervention work in ASD. She has more than 195 publications and 566 peer-reviewed and invited presentations/keynotes in the areas of autism and other neurodevelopmental disabilities, collaboration, interprofessional education, leadership, and language learning disabilities.

In 2019, she was named associate editor for the *Journal of Autism and Developmental Disorders*. Dr. Prelock received the University of Vermont's Kroepsch-Maurice Excellence in Teaching Award in 2000 and was named an ASHA Fellow in 2000 and a University of Vermont Scholar in 2003. In 2011, she was named the Cecil & Ida Green Honors Professor Visiting Scholar at Texas Christian University, and in 2015 Dr. Prelock was named a Distinguished Alumna of the University of Pittsburgh. In 2016, she received the ASHA Honors of the association, and in 2017, she was named a Distinguished Alumna of Cardinal Mooney High School. Dr. Prelock also received the 2018 Jackie M. Gribbons Leadership Award from Vermont Women in Higher Education. Dr. Prelock is a board-certified specialist in child language and was named a fellow in the National Academies of Practice (NAP) in speech-language pathology in 2018. She was the 2013 president for the American Speech-Language Hearing Association.

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Tom Buggey began research on self-modeling at Penn State in 1992, working with preschoolers with language delays. Following the urgings of two gifted graduate assistants, together they conducted their first research with children on the autism spectrum in 1995 with very positive results. Thereafter, children with autism became the focus of his research. Dr. Buggey was recruited to serve as the Siskin Chair of Excellence in the Special Education Department at UTC in 2007. The next 7 years were devoted to research on developing language and social skills with preschool-age children with autism. In his career as a researcher, he has conducted more than a dozen studies on the use of self-modeling, all which have appeared in major journals; published several book chapters of self-modeling and other aspects of early intervention; and published the only book on self-modeling, *Seeing is Believing* (Woodbine House, 2007), which is currently being translated and published in Russia.

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Sima Gerber, Ph.D., CCC, is a professor of speech-language pathology in the Department of Linguistics and Communication Disorders of Queens College, City University of New York. She has been a speech-language pathologist for more than 40 years, specializing in the treatment of children with ASD and other developmental challenges. Dr. Gerber has presented nationally and abroad (China, Italy, the Netherlands, South Africa, Israel, Georgia) on language acquisition and developmental approaches to assessment and intervention for children with language and communication disorders. Dr. Gerber is a Fellow of the American Speech-Language-Hearing Association.

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Jodi K. Heidlage is a special educator with expertise in behavioral and naturalistic interventions for children with autism and significant learning challenges. She has more than 10 years of experience providing direct services for young children with ASD and has served as a therapist and parent interventionist on several clinical trials. She currently is the project director for an early reading intervention for children with intellectual and developmental disabilities at Vanderbilt University.

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Dr. Jill Howard is a licensed psychologist and assistant professor at the Duke Center for Autism and Brain Development in the Department of Psychiatry and Behavioral Sciences. She specializes in conducting comprehensive diagnostic assessments and delivering intervention services to individuals and families affected by ASD. Dr. Howard's primary research interests involve the early identification of and evidence-based treatments for ASD, as well as the development of social attention and behavior. Dr. Howard is certified as an Early Start Denver Model therapist and trainer.

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Dr. Kasari received her Ph.D. from the University of North Carolina at Chapel Hill and was a National Institute of Mental Health postdoctoral fellow at the Neuropsychiatric

Institute at UCLA. Since 1990, she has been on the faculty at UCLA, where she teaches both graduate and undergraduate courses and has been the primary advisor to more than 60 doctoral students. She is a founding member of the Center for Autism Research and Treatment at UCLA. Her research aims to development novel, evidence-tested interventions implemented in community settings. Recent projects include targeted treatments for early social-communication development in at-risk infants, toddlers, and preschoolers with autism and peer relationships for school-age children with autism. She leads several large multisite studies, including a network on interventions for minimally verbal school-age children with ASD, and a network that aims to decrease disparities in interventions for children with ASD who are underrepresented in research trials. She is on the science advisory board of the Autism Speaks Foundation and regularly presents to both academic and practitioner audiences locally, nationally, and internationally.

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Brittany Lynn Koegel received her doctorate in education from University of California, Santa Barbara. She currently works doing research in Autism at Stanford University in the area of Pivotal Response Treatment. She also conducts Pivotal Response Treatment training all over the world.

**Lynn Kern Koegel, Ph.D., CCC-SLP,** Clinical Professor, Stanford University School of Medicine, California

Dr. Lynn Kern Koegel and her husband developed Pivotal Response Treatment, an intervention used worldwide for the treatment of ASD. She has published well over 100 articles and chapters, field manuals, and eight books, including *Overcoming Autism* and *Growing Up on the Spectrum* with parent Claire LaZebnik, published by Viking/Penguin and available in most bookstores. The Koegels have received many awards, including the first annual Children's Television Workshop Sesame Street Award for Brightening the Lives of Children, the first annual Autism Speaks award for Science and Research, and the International ABA award for enduring programmatic contributions in behavior analysis. Dr. Lynn Koegel has appeared on numerous television and radio shows discussing autism, including the Discovery Channel, and ABC's hit show *Supernanny*, working with a child with autism. The Koegels' work has also been showcased on ABC, CBS, NBC, and PBS, and they are the recipients of many state, federal, and private foundation gifts and grants for developing interventions and helping families with ASD.

**Amy C. Laurent, Ph.D., OTR/L,** Developmental Psychologist, Educational Consultant, Pediatric Occupational Therapist, Autism Level UP!, North Kingston, Rhode Island

Dr. Laurent specializes in the education of autistic children. Her work involves creating learning environments designed to facilitate children's active engagement

at home, in schools, and throughout their communities. She is a coauthor of The SCERTS Model and frequently lectures around the globe. She is passionate about neurodiversity and helping others to honor and understand the implications of "different ways of being" in relation to navigating the physical and social world.

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Dr. Meehan is a clinical assistant professor at the University of Kansas. She currently leads a team of clinical practicum students, which serves clients in a local school district as well as in the Schiefelbusch Speech-Language-Hearing Clinic. She teaches the Introduction to AAC class to speech-language pathology master's students. Her primary professional interests include improving the preservice education and training in the area of augmentative and alternative communication and issues of diversity, equity, and inclusion in the field of speech-language pathology.

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Lauren Moskowitz is an associate professor in the Department of Psychology at St. John's University. She earned her bachelor of science degree from Cornell University, her master's and doctorate in clinical psychology from Stony Brook University, and completed her clinical internship and postdoctoral fellowship at NYU Child Study Center. Her research focuses on behavioral assessment and intervention for problem behavior and anxiety in children with ASD and developmental disabilities, Dr. Moskowitz has coauthored several papers and book chapters; has presented at numerous international, national, and regional conferences; has taught several undergraduate and graduate courses covering ASD and developmental disabilities, applied behavior analysis, and positive behavior support, and has been on the editorial board for the *Journal of Positive Behavior Interventions* since 2013.

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Elizabeth began her training in Pivotal Response Treatment (PRT) as a research assistant at the Koegel Autism Center while completing her bachelor of arts in psychology at the University of California, Santa Barbara. After graduating, Elizabeth expanded her knowledge and skills pertaining to ASD and PRT by working as an interventionist. In 2009, she entered the Special Education, Disabilities and Developmental Risk Studies (SPEDDR) graduate program at the University of California, Santa Barbara, with Dr. Robert Koegel as her advisor. After receiving her master's degree in 2011, she went on to become a board-certified behavior analyst (BCBA) and has continued her work with individuals on the spectrum, with a focus on parent and professional education and training.

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Dr. Barry Prizant has 45 years' experience as a speech-language pathologist, author, researcher, and international consultant. He is an adjunct professor at Brown University and director at Childhood Communication Services, a private practice. Barry is a codeveloper of The SCERTS Model, an educational framework now being implemented in more than a dozen countries. His recent book is *Uniquely Human: A Different Way of Seeing Autism* (Simon & Schuster, 2015), which has received the Autism Society of America's Dr. Temple Grandin Award for the Outstanding Literary work in autism and is published in 16 languages.

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Kyle's research interest lies in the optimization of evidence-based interventions through the understanding of their active ingredients using quantitative methods—for example, understanding of the role of speech-generating devices within efficacious interventions for language learners with autism. He has been involved as a clinician in a number of recent intervention trials, implementing interventions for children with autism and developmental delays within schools and in home settings through parent training in the JASPER intervention model.

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Dr. Strong is a clinical psychologist and received her doctoral degree from the University of California at Santa Barbara. She worked with Drs. Robert and Lynn Koegel and has significant experience working with individuals with ASD across the life span.

**Shawnna Sundberg, M.A.,** Ball State University, Muncie, Indiana

Shawnna received a bachelor of arts degree in psychology from Purdue University in 2008, and a master's degree in special education with certifications in applied behavior analysis (ABA) and autism from Ball State University in 2015. Shawnna is a board-certified behavior analyst (BCBA) with more than 10 years of experience working in the mental health and ABA/verbal behavior (VB) field. Shawnna has worked as a child and adolescent home-based case manager, ABA/VB therapist, training specialist, parent-training coordinator, and behavior consultant.

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Dr. Wegner is a clinical professor and director of the Schiefelbusch Speech-Language-Hearing Clinic at the University of Kansas (KU). She directs the Pardee Augmentative and Alternative Communication Resource and Research Laboratory on the Lawrence campus of KU. Dr. Wegner directed numerous personnel preparation projects funded by the U.S. Department of Education, Office of Special Education Programs, including the Communication, Autism, and Technology Project and the Augmentative Communication in the Schools Project. She has authored numerous articles and book chapters on Augmentative and Alternative Communication. Dr. Wegner is a Fellow of the American Speech-Language-Hearing Association and served on the ASHA Ad Hoc Committee on Autism Spectrum Disorders that developed the ASHA policy documents for practice with people with ASD.

**Susan M. Wilczynski, Ph.D., BCBA-D,** Professor, Ball State University, Muncie, Indiana

Dr. Wilczynski is the Plassman Family Distinguished Professor of Special Education and Applied Behavior Analysis and the former executive director of the National Autism Center. Dr. Wilczynski has edited or written multiple books and published scholarly works in *Behavior Analysis in Practice, Journal of Applied Behavior Analysis, Behavior Modification, Focus on Autism and Other Developmental Disabilities*, and *Psychology in the Schools*. Dr. Wilczynski is a licensed psychologist and a board-certified behavior analyst.

CASE 1

# Finding a Voice

## *An Elementary Schooler With Autism Spectrum Disorder (ASD) and Down Syndrome*

Stephanie Meehan and Jane R. Wegner

**Gideon**

**Age 10**

**Autism Spectrum Disorder and Down Syndrome**

**Case 1 engages with the intervention approach and strategies discussed in Chapter 4, Augmentative and Alternative Communication Strategies (Wegner, 2021) in *Treatment of Autism Spectrum Disorder, Second Edition*.**

## INTRODUCTION

Gideon is a 10-year-old boy with autism spectrum disorder (ASD) and Down syndrome who attends his local elementary school.

### History

Gideon's mother reports that she had an unremarkable pregnancy and delivery. He was diagnosed with Down syndrome at birth. Gideon met several developmental milestones, including reaching for objects, independently holding his head up, and sitting unsupported. He first stood independently at age 3, walked unassisted at

age 4, and ran at age 5. As he grew, Gideon had recurring ear infections, seasonal allergies, and influenza. Gideon had pressure equalization tubes placed at age 5 to manage recurrent ear infections. Gideon's verbal language development was delayed; he spoke his first word at 14 months. Between 12 and 16 months, Gideon quickly learned to communicate using American Sign Language and knew approximately 40 signs, but there was a significant regression in that skill around the age of 3. It was around this time that Gideon received the diagnosis of ASD.

## Baseline Status

Gideon's baseline status includes his communication profile, social profile, and family and community context. Baseline status is an assessment of skills before intervention is implemented. Collecting baseline is critical to both identify the necessary features of a potential augmentative and alternative communication (AAC) device but also to develop appropriate goals. The speech-language pathologist (SLP) is interested in evaluating his expressive and receptive language skills; his cognitive skills specifically related to attention and memory; his fine and gross motor skills relevant to accessing an AAC device; any early literacy skills; and any sensory needs, specifically auditory and visual needs, that would impact his use of an AAC device. The SLP wants to find out more information about Gideon's communication partners and the environments where he spends most of his time.

***Communication Profile*** Gideon communicates with a few approximated signs, largely for his highly preferred items like DRINK with changes in the position and rate of the sign to indicate emphasis. He uses some vocalizations but largely communicates through bringing desired objects to his mother. Gideon sometimes expresses frustration through pushing objects or people away or escaping the situation as a result of his inability to communicate. He uses an Accent 1000 AAC device with the LAMP Words for Life user area. Gideon, now age 10, has been learning to communicate with his device since the age of 5. He most frequently communicates with his parents, peers at school, and his university clinic–based SLP. Before receiving his AAC device, Gideon and his mother used a no-tech communication book with pictures of some of his preferred items in it. Gideon was able to use the book to make choices but frequently did not choose to do so.

***Social Profile*** Gideon attends a local elementary school where he is included in the general education classroom with his peers. He is supported by a paraeducator the entire day. Gideon's peers are fond of him and eager to help and interact with him. It does not appear, however, that Gideon spends any time with his peers outside of the school day. Gideon most commonly interacts with his mother. They like to watch Barney videos together. Gideon enjoys his mother's singing and dancing along with the songs. Gideon claps his hands and vocalizes when they watch these videos. Gideon raises his hands as a request to clap or dance. He sometimes lightly pats his communication partner to indicate that he is having a good time. He pushes his communication partner to indicate the direction he wants him or her to move. Gideon demonstrates few other interests outside of Barney and home movies of himself.

He demonstrates interest in adults and peers by smiling and laughing at them. Gideon also waves hello and good-bye. He initiates with unfamiliar people in his environment by waving or touching and hugging them. Gideon tends to do so

indiscriminately and will approach people he does not know at all. He typically terminates interactions in an unexpected way, that is, by walking away from the person.

***Family and Community Context*** Gideon lives at home with his mother and father. He also has a significantly older half-brother whom he interacts with sporadically. Gideon's maternal and paternal grandparents live out of state and do not visit. Gideon attends his local elementary school and is included in the general education classroom but receives special education services all day. He receives speech-language therapy, occupational therapy, physical therapy, and music therapy. The school team is supporting the goal of his using the AAC device to spontaneously express core vocabulary words in a variety of settings throughout the day. The team is also working on greeting.

Gideon occasionally swims at the local indoor pool with his mother. He is supported through the local university speech-language-hearing clinic where he receives an hour-long intervention session once per week. See the ecomap in Figure 1.1 and genogram in Figure 1.2. The ecomap and genogram demonstrate a small familial support system, which is somewhat influenced by geographical distance. Gideon's mother is a strong advocate for her son and has access to a variety of resources, as depicted by the good relationships between her and Gideon's medical team. The strained relationship between Gideon's family and the school is significant and primarily driven by a value mismatch regarding the vision for Gideon.

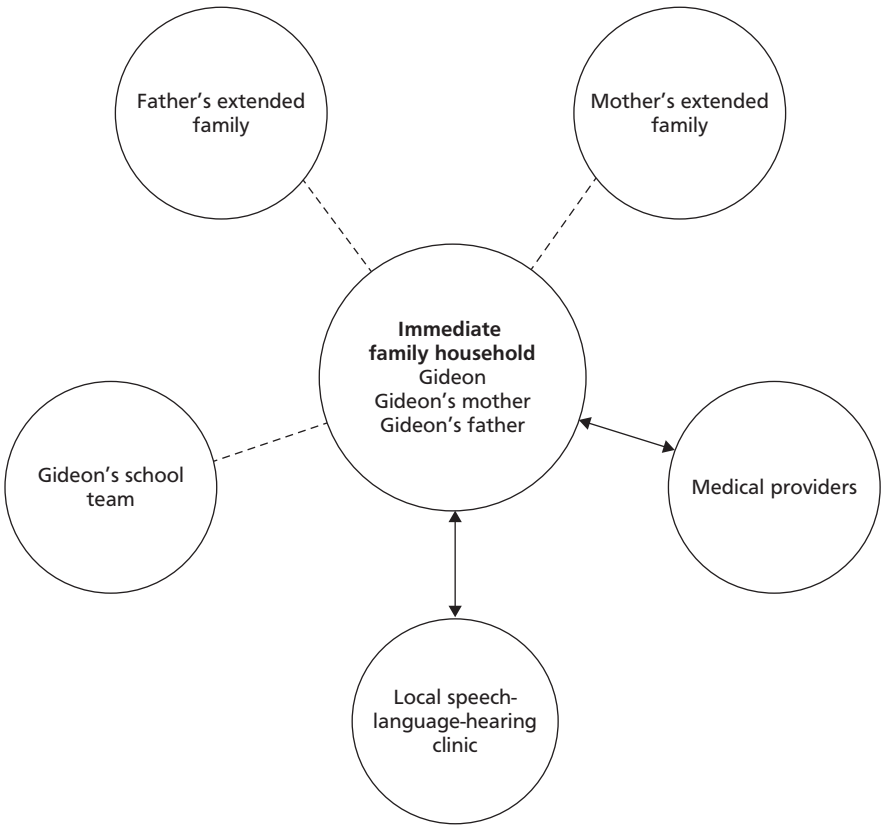


**Figure 1.1.** Gideon's ecomap.

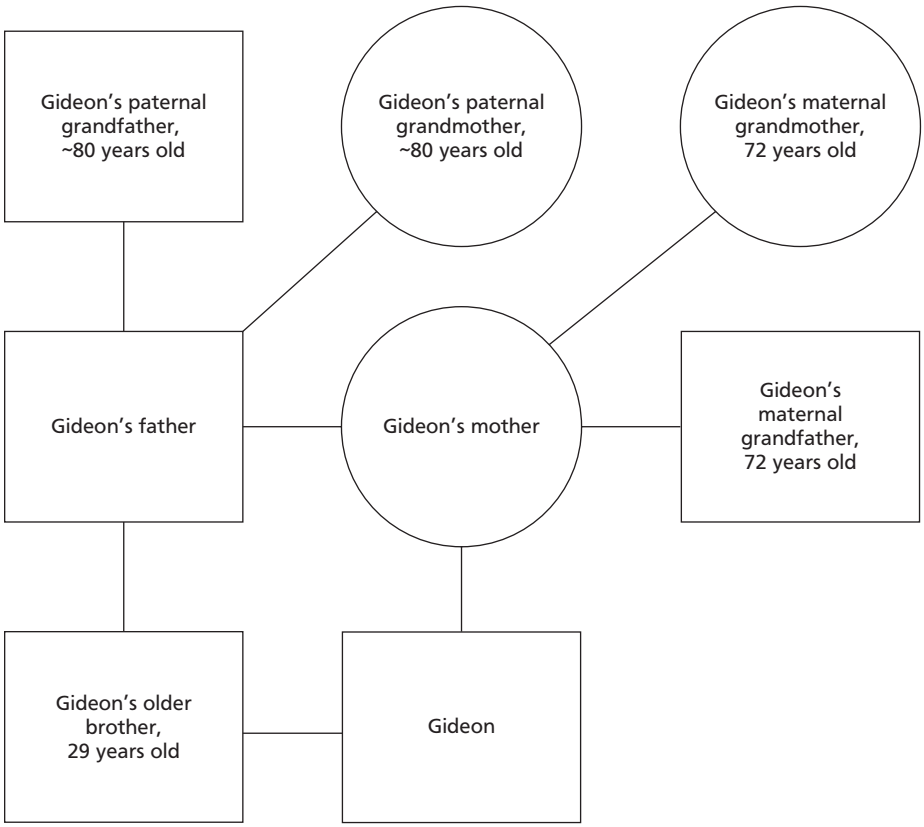


**Figure 1.2.** Gideon's genogram.

## Broader Profile

Gideon presents with the dual diagnoses of Down syndrome and autism. Dual diagnoses complicate the process of identifying needs and treatment targets. It is not always clear what is driving how Gideon interacts with his environment. Down syndrome and autism have some overlapping characteristics, but others are more divergent. For example, children with Down syndrome are often characterized as very social, whereas children with autism may be described as less interested in social connection. In addition, Gideon demonstrates needs in his fine and gross motor skills. He easily catches colds and other infections and is heat intolerant.

## Summary of Most Significant Needs

Gideon's most significant needs are related to his communication. He is unable to communicate urgent medical needs. He is often sick with the common cold, sinus infections, and so forth, and is unable to tell his mother when he feels ill. He has significant acid reflux for which he takes medication but is unable to report if the medicine is helping. In addition, he is unable to tell his communication partners that he has to go to the bathroom, which can cause accidents and an increased reliance on his care providers. Gideon's inability to communicate in meaningful ways inhibits his relationships with his peers, which, as he grows, could lead to social isolation and a reduced quality of life. In addition, Gideon can be expected to have a significantly

more difficult time developing literacy skills because of his communication needs. Without intervention, his complex communication needs may impact his ability to achieve equal opportunity, self-determination, full participation, independent living, and economic self-sufficiency.

## ASSESSMENTS FOR COMMUNICATION TREATMENT PLANNING

Shortly after the family moved to the area when Gideon was 6 years old, his mother requested an AAC assessment. Gideon had little functional verbal communication, and so an articulation assessment was not determined to be useful. The SLP also felt that, because of Gideon's complex communication needs and diagnoses, a standard language assessment would not be valid. Additionally, receptive and expressive language would be assessed throughout the AAC assessment.

The AAC assessment process is team based and should include all relevant stakeholders. Gideon's AAC assessment was planned on the basis of the Participation Model (Beukelman & Mirenda, 2013). The model outlines a systematic process for conducting an AAC assessment. The model also bases the intervention plan on the participation requirements of same-age peers who do not have disabilities. The Participation Model begins by identifying barriers to participation related to opportunity and access. Opportunity barriers are those that are external to the person with the disability and cannot be overcome by the person who has received the AAC device. Access barriers are related to the current capacity of the individual. During the AAC assessment, the SLP attempts to develop a profile that can be matched to specific features of various AAC systems, a strategy called *feature-matching* (Costello & Shane, 1994). To develop the profile, the clinician needs to examine four areas of potential constraints and capabilities: motor skills, cognitive/linguistic skills, literacy skills, and sensory/perceptual skills.

During the AAC assessment, Gideon was presented with several different toys and activities, including blowing bubbles, rolling a ball back and forth, crawling in and out of a toy bus, and watching Barney videos or home movies of himself. When Gideon's mother left the assessment room, Gideon waved good-bye to his mother and gave the clinician a hug.

Despite some fine motor concerns related to feeding and dressing, Gideon's mother reported that he was able to independently navigate a tablet to view videos on YouTube by using an isolated point, so there were few concerns about Gideon's ability to access the device through direct selection; as such, the team did not consider switch access and eye gaze. The SLP used the Exploration Wizard on Prentke-Romich's Accent device to identify the appropriate grid and symbol size for Gideon. Gideon was able to isolate his pointer finger to activate the buttons on the device and was able to activate the symbol up to a field of 45 buttons on a 10-inch screen.

The purpose of a cognitive/communication assessment relative to AAC is to evaluate how someone makes sense of their world and how best to support communication within this understanding (Beukelman & Mirenda, 2013). The areas of cognitive/communication development that are related to AAC include awareness, communicative intent, world knowledge, memory, symbolic representation, and metacognition. The SLP assessed Gideon's cognitive skills informally throughout the assessment process. Gideon demonstrated adequate awareness and communicative intent skills when he smiled and laughed at his SLP in response to a funny moment in a video and when he lifted his hands to clap with the SLP. Gideon made frequent eye contact with the SLP and his mother during the evaluation. He laughed and smiled at them. Gideon

used a triadic eye gaze and demonstrated joint attention. Gideon presented adequate memory by remembering where specific vocabulary words were on the devices. He clearly demonstrated his world knowledge and symbolic representation during a choice-making activity when searching for a picture of Barney in a no-tech communication notebook. There were several pictures of Barney in the notebook, but Gideon searched out the specific picture that represented the video he was requesting.

At the time of evaluation, Gideon presented with highly limited expressive language aside from two to three signs, which he used to make requests for highly preferred items, like JUICE and to request MORE. He laughed and smiled to express enjoyment, waved hello and goodbye.

Gideon's mother reported that Gideon understood more than he was able to express. She also noted that Gideon retrieved objects when asked to do so, for example, his preferred toys, his tablet, or his shoes and coat. Throughout the assessment Gideon demonstrated the following receptive language skills: he attended when spoken to, recognized his name, understood one- to two-part directions, and understood simple questions.

Gideon wears glasses to correct a fairly mild/moderate vision impairment. He kept his glasses on for the length of the assessment. Gideon did not present with a hearing loss, and his mother reported no concerns about his hearing. He passed a hearing test when he was 6 years old. He responded to both the SLP's voice and the synthesized voice of the AAC device at conversational loudness.

Gideon's mother reported that he had been exposed to the Picture Exchange Communication System (PECS) and had some experience with a low-tech AAC device. Three different devices were trialed during the evaluation: the Accent 800 by the Prentke-Romich Company with Unity software, the Tobii Dynavox Maestro, and the Tobii Dynavox T10. His expressive language was assessed through observation throughout the AAC assessment and through family report. Gideon was able to learn to use the words MORE and GO on the AAC devices during the assessment and used each word a few times to communicate with the clinician.

After the assessment was finished, the team decided on the Accent device with LAMP Words for Life. This device and language system was chosen primarily because Gideon's language was still developing. The Accent device and language systems are generative and supportive of novel utterance generation. The features of LAMP Words for Life were also well matched to Gideon's needs. Unique and consistent motor planning is a primary feature of the LAMP Words for Life system (Prentke-Romich Company), and the Center for AAC and Autism (n.d.) reports that vocabulary words are learned "by repeating the consistent motor movement rather than reading a word or interpreting a picture," which enables the person using the device to communicate quickly and efficiently. The motor planning helped Gideon remember where the words were, and the simple navigation of three button hits or fewer to any given vocabulary word would help reduce Gideon's frustration and decrease his cognitive burden as he was learning language. The Accent with LAMP Words for Life also made sense to Gideon's mother, who would be the primary communication partner.

## CLINICAL PROBLEM SOLVING TO IDENTIFY TREATMENT GOALS

The outcome of treatment identified in a family-centered process was that Gideon's mother wanted him to make choices and develop friendships. To achieve these outcomes, three goals were identified. The following goals were to be addressed during

1-hour individual intervention sessions at the local university clinic where Gideon's AAC assessment occurred:

1. By the end of the semester, Gideon will independently use the core vocabulary words YES, NO, STOP, HELP, LOOK, WANT, GO, I, LIKE, and LOVE within a meaningful context using his AAC device in 50% of opportunities during a 1-hour session at the clinic.
2. By the end of the semester, Gideon will use his device to independently produce utterances of two or more selections in length at least 10 times within a meaningful context during a 1-hour session at the clinic.
3. By the end of the semester, Gideon will use his device to independently communicate at least 10 total times across the semester for purposes other than requesting items/activities. The purposes may include choice making, commenting, requesting help, protesting, greetings/farewells, and so on.

Gideon's mother and the evaluator also agreed that providing training with Gideon's school team was important and vital to his success, so several training sessions were scheduled. The SLP met primarily with the paraeducators who would be supporting Gideon most frequently. The SLP and paraeducators met with and without Gideon present to practice and model appropriate teaching strategies (see description in next section) and work collaboratively to problem-solve through a variety of everyday scenarios at school. The SLP also met with Gideon's mother for an initial training session after Gideon's device was delivered and continued to support Gideon's mother as needed.

## INTERVENTIONS USED TO ACHIEVE MAJOR GOALS

Gideon attends speech-language intervention once per week for 1 hour at a university speech-language-hearing clinic. His therapy follows a social-pragmatic developmental approach that centers on Gideon and his primary interests. His interests include Barney, singing, drinking juice, and watching videos of himself. Within this context, the following teaching strategies were used: aided language stimulation, expansion, verbal modeling, pause time, and prompting.

### Aided Language Stimulation

Aided language stimulation (Sennott et al., 2016) is a teaching strategy in which the SLP verbalizes a word or utterance while simultaneously producing this utterance on Gideon's device. The SLP provides aided language stimulation consistently throughout each session and across activities. Aided language stimulation provides Gideon with exposure to verbal language and to the language system with which he is learning to communicate. This strategy supports Gideon's language comprehension and provides him with examples of how he can use his device to communicate for various purposes. During aided language stimulation, the communication partner does not need to model the verbal utterance verbatim; rather, the partner should communicate the intent of the message and include core vocabulary words. For example, if the SLP verbalizes, "Barney is dancing with them," he or she may simultaneously produce BARNEY IS DANCING on Gideon's device.

## Expansion

Expansion (Binger et al., 2010; Bunce & Watkins, 1995) is a teaching strategy in which the SLP repeats Gideon's utterances while adding grammatical and semantic detail. The clinician can expand Gideon's utterances while using aided input. For example, if Gideon says JUICE, the SLP expands his utterance by saying, "I want juice." The SLP seeks to provide input slightly above Gideon's current language level while maintaining the intent of his production.

## Verbal Modeling

Modeling (Bunce & Watkins, 1995) is a teaching strategy the SLP uses to demonstrate a target skill in order to provide an example prior to expecting Gideon to do so himself. The SLP uses modeling frequently when providing instruction on Gideon's AAC device. During modeling, the clinician provides an example of a communication skill, or the production of an utterance using the device, without additional verbal input. The SLP also uses modeling to demonstrate tasks and activities. The SLP models activity options before expecting Gideon to make a choice. For example, when presenting the activity option of coloring pictures of Barney, the SLP demonstrates the activity by briefly coloring to show Gideon what the activity choice would look like. The SLP uses modeling consistently across sessions, activities, and goals to encourage Gideon's use of his device.

## Pause Time

Pause time (Kozleski, 1991; Mathis et al., 2011) is a teaching strategy in which the SLP provides time for Gideon to respond or complete a task. Pause time allows Gideon time to process, formulate a response, produce the utterance on his device, complete a desired task, or make a choice. The SLP should provide pause time consistently throughout each session and across activities. Pause time of approximately 15–20 seconds is beneficial for Gideon. However, the amount of pause time necessary may depend on the task. Pause time is an important way to encourage Gideon to use his device to communicate. Often, Gideon waits until the SLP provides a desired activity or item before indicating his interest or making any communication attempts. Pause time places just enough pressure on Gideon to encourage him to communicate independently.

## Prompting

Prompting (MacDuff et al., 2001) is a teaching strategy in which the SLP encourages communication. Prompting may include verbal, visual, or physical cues. The SLP uses prompting consistently across sessions, activities, and goals to support Gideon in using his device to express himself and communicate for a variety of communication purposes. The SLP also uses prompting to support Gideon in expanding on his utterances. The SLP uses a least-to-most prompting hierarchy (Finke et al., 2017) with Gideon, which provides him with the necessary support while encouraging him to complete the task independently.

For example, the SLP might use a least-to-most prompting hierarchy to support Gideon in using his device to request juice. The prompting hierarchy would begin with an expectant pause. Gideon often produces a sign approximation for juice or reaches toward his cup. After this indication, the SLP should provide an expectant pause

(looking at Gideon, waiting with raised eyebrows) to allow Gideon to use his device if he wants to. Next, the SLP provides an indirect verbal prompt (i.e., "You could tell me on here"). If Gideon does not use his device, the SLP provides an indirect nonverbal prompt by a gesture or by moving Gideon's device closer to him. If that is not successful, the SLP provides a direct verbal prompt (i.e., "I know you are signing juice, but you can tell me on here"). To end the prompting hierarchy, the SLP could opt to move to a yes/no question or model the utterance on his device. For example, the SLP could ask, "Do you want juice?" and continue the hierarchy by requesting a response (i.e., "Do you want juice? You could tell me yes or no"). If the prompting hierarchy proceeds to modeling, the SLP models a complete utterance while providing aided input, avoiding hand-over-hand support or forcing Gideon to produce the utterance. It should always be Gideon's choice to access his device. If Gideon is not interested in accessing his device, the SLP should simply model the utterance for him.

## OUTCOMES

Gideon's progress on his three goals are reviewed in this section. His semester-long goals were described earlier under "Clinical Problem Solving to Identify Treatment Goals." They involved use of core vocabulary, independent production of utterances involving two or more selections, and independent use of his device for communicative functions other than requesting (e.g., commenting, choice making).

### Goal 1: Core Vocabulary Use

Throughout the semester, Gideon made progress toward his first goal, utilizing some of the target core vocabulary words, including *no, yes, want*, and *I*. Over the course of the semester, he produced multiple-word utterances with increasing frequency. It is also important to note Gideon made several productions that did not include the target core vocabulary words, including words like *juice, need, song, like*, and *love*. He demonstrated increased use of his device throughout the semester. Gideon received instruction on this goal primarily through modeling, aided input, and prompting. The SLP provided language input during the activities that she and Gideon were participating in. For example, while watching Barney videos, the SLP paused the video in order to model *stop* and *go*. When the video was paused, it presented the opportunity for Gideon to make a request and the SLP to model the use of the word *want*.

Occasionally, when Gideon made a request using a one-word utterance, the SLP utilized yes/no questions in order to clarify what he wanted. For example, Gideon drank juice during his sessions; when Gideon said JUICE on his device, the SLP asked, "Do you want more juice?" After asking the question, she provided pause time to allow him to respond. If no response was provided, she rephrased the question by asking, "Do you want more juice? You could tell me yes or no," while modeling on his device. This allowed the SLP to model the use of *yes* and *no* and helped Gideon understand that just because he says JUICE, it does not mean he is requesting more. In order to obtain the desired object, the SLP encouraged Gideon to be more specific in his requests.

### Goal 2: Increased Utterance Length

In addition to the target core vocabulary words, the SLP provided input on many other words on Gideon's device. This input also pertained to the activities she and Gideon completed as well as Gideon's interests. Although she did not understand

all of Gideon's utterances, or they did not relate to the immediate context, it was apparent that Gideon demonstrated communicative intent during these productions. In the utterances that were very long, Gideon continually selected items on his device in a way that indicated he might be unsure of where the words were positioned and he was searching for the vocabulary he would like to communicate. The SLP noticed that Gideon was very persistent, and it seemed as if he was searching for something. In addition, the SLP noted instances throughout the semester in which Gideon may have selected buttons that were not the intended selections. For example, in one instance, Gideon said GET on his device. Based on the activity that Gideon was engaged in (playing chase with his mother or the clinician in the hallway), the SLP suspected that Gideon was trying to select GO on his device. The folder for *get* and *go* are next to each other the homepage of the device. Verbs are always located in the same folder, so *get* and *go* were both in the top-left quadrant of the screen. After opening the folder, Gideon immediately selected the verb on the page. Through this automaticity, Gideon demonstrated his developing motor plan for the device. A motor plan is the memory of the sequence necessary to make productions on the device, which is central to the LAMP Words for Life system. Gideon's motor plan and motivation to communicate supported him in increasing his expressive vocabulary and proficiency with his device.

## Goal 3: Increased Use of the Device for Communicative Functions Other Than Requesting

Although Gideon did not communicate with the exact frequency stated in the established goal related to increased use of the device, he did increase use of his device for purposes other than requesting throughout the semester. Gideon used his device to communicate for the purposes of choice making, commenting, and protesting. The SLP targeted this goal through modeling and aided input during activities that pertained to Gideon's interests. The SLP modeled greetings and farewells during arrival and departure from the therapy room. During his sessions, the SLP also provided Gideon with activity options. All of the activities pertained to Gideon's interest in Barney. These activities provided Gideon with the opportunity to communicate to make choices. In addition, the SLP modeled the use of his device for choice-making and rejecting purposes. If Gideon was not interested in the alternative activities, the SLP presented the opportunity to watch more Barney. While watching Barney, the SLP modeled the use of Gideon's device for commenting. She commented on various aspects of the video (e.g., "They are dancing."). She also commented on Gideon's reactions and emotions (e.g., "You are happy. You like Barney.") and shared her own opinions (e.g., "I like this song"). The SLP often paused the Barney videos during Gideon's sessions in order to support Gideon in attending to the models. When Gideon was engaged in watching the videos, he did not attend to this language input. In addition, this interruption of the preferred activity provided Gideon with the opportunity to use his device to make requests.

Occasionally, the SLP incorporated props while she and Gideon were watching Barney videos. For example, during one session, she brought paper hats and recycled instruments. These props related to the content of the video that they were watching. The SLP introduced and utilized the props alongside the video. During this activity, she modeled the use of Gideon's device for a variety of communication purposes. For example, when the SLP put the hat on Gideon's head, he threw it on the floor. This presented the opportunity to model the use of his device in order to

protest. In addition, while using the props, the SLP rewound the video in order to incorporate the props more than once. This increased exposure to the activity and core vocabulary.

These activities as well as those described previously in which Gideon was asked to confirm that he was drinking juice rather than just using JUICE to request it are examples of the activities designed to encourage Gideon to use his device to communicate. The objectives of such activities is that, as Gideon receives input and instruction on using his device to communicate for purposes other than requesting, he will increase the number and frequency of these productions. The ability to communicate for a wider variety of purposes will support Gideon in advocating for himself and communicating across environments.

Currently, Gideon uses approximately 30 different words on his AAC device spontaneously and/or after prompting. At the beginning of the semester he was using only two to three words spontaneously. He primarily uses his AAC device to request preferred items or activities, but on occasion, he comments using the word *awesome*. Gideon selects two buttons to create a two-word utterance only occasionally and usually with verbal prompting.

Gideon's goals have evolved in the last 5 years. The target vocabulary words have changed on the basis of Gideon's acquisition of each word and his mother's priorities. Most recently, the goals have evolved to include a specific number of models for the SLP to use. In 2016, Sennott and colleagues published a systematic review of the effects of AAC modeling on the language development of people who use AAC. Modeling was found to influence growth in semantics, syntax pragmatics, and morphology. By intentionally targeting the AAC modeling that the SLP was doing, the team can better track Gideon's progress relative to the direct input from the clinician. The team is using the data-logging feature on the device to support increased use of the device by measuring the number of words modeled during his sessions.

## Learning Activities

1. What additional evaluation instruments can be used to identify treatment goals and track progress over time for children with ASD who are likely to benefit from an AAC device?
2. Discuss what adjustments might be made to the assessment plan if a child exhibits limited fine motor skills.
3. Given Gideon's age and year in school, how would his goals change if the primary service provider was the school-based SLP? Why?
4. With a colleague, discuss how an AAC device can be used across settings. What training would be important for family members to have to ensure effective use of the AAC device in the home?

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