AUGMENTATIVE AND ALTERNATIVE COMMUNICATION

CHARACTERISTICS OVERVIEW CHART

Verbal Skills	Grade Levels	Cognitive Level	Areas Addressed
☒Nonverbal	☒PK	☒Classic	☒ (Pre)Academic/Cognitive/Academic
☒Mixed	☒Elementary	☐High	☒Adaptive Behavior/Daily Living
☐Verbal	☒Middle/High	Functioning	☒Behavior
			☒Communication/Speech
			☒Social/Emotional

BRIEF INTRODUCTION

Individuals with autism have a wide variety of communication challenges or skill deficits. Augmentative and alternative communication interventions are employed in order to improve their ability to communicate successfully with others.

DESCRIPTION

Augmentative and alternative communication (AAC) is defined as the supplementation or replacement of natural speech and/or writing using aided and/or unaided symbols. In other words, it refers to the use of aided symbols that require a transmission device. It is also the field or area of clinical/educational practice designed to improve the communication skills of individuals with little or no functional speech (Hourcade, Everhart Pilotte, West, & Parette, 2004; Lloyd, Fuller, & Arvidson, 1997). Examples of AAC include:

Unaided AAC:

- Sign language (see Sign Language section)
- Gestures

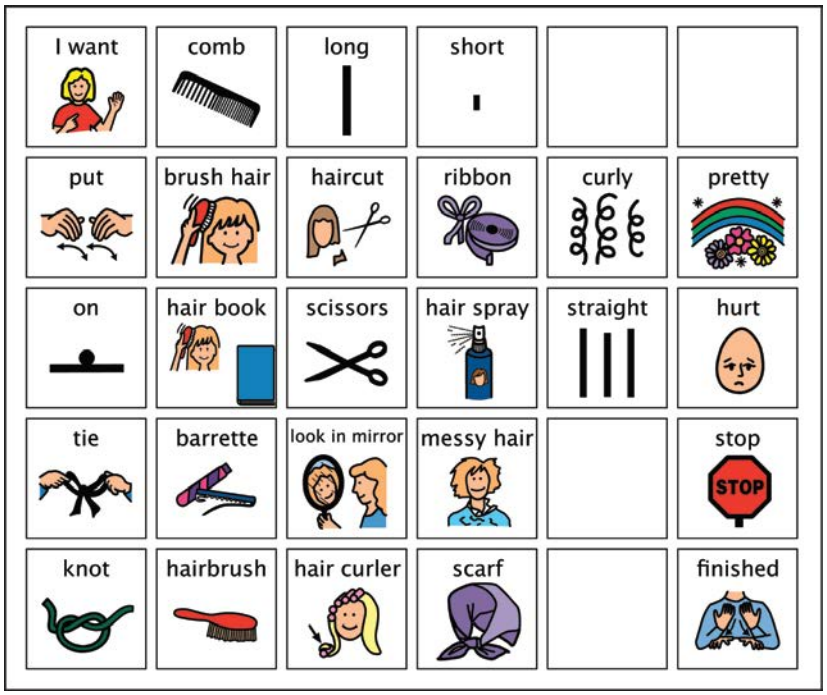
Aided AAC:

- Low Technology:

- *Communication symbols:* This is a series of symbols that represent various types of communication. This includes the Picture Exchange Communication System (PECS) (see Picture Exchange Community System in this document).
- *Picture Exchange Communication System* (see PECS).
- *Choice/communication boards* (see Choice Making, Visual Environmental Supports): These may be commercial or handmade and use a picture communication system (PCS) or other symbols, photographs, etc. Two or more symbols are placed on the board and the student uses this as a means of communication.

Note: Many of the visuals shown here use Boardmaker Symbols (Mayer-Johnson; www.mayer-johnson.com).

1-SAMPLE LANGUAGE BOARD

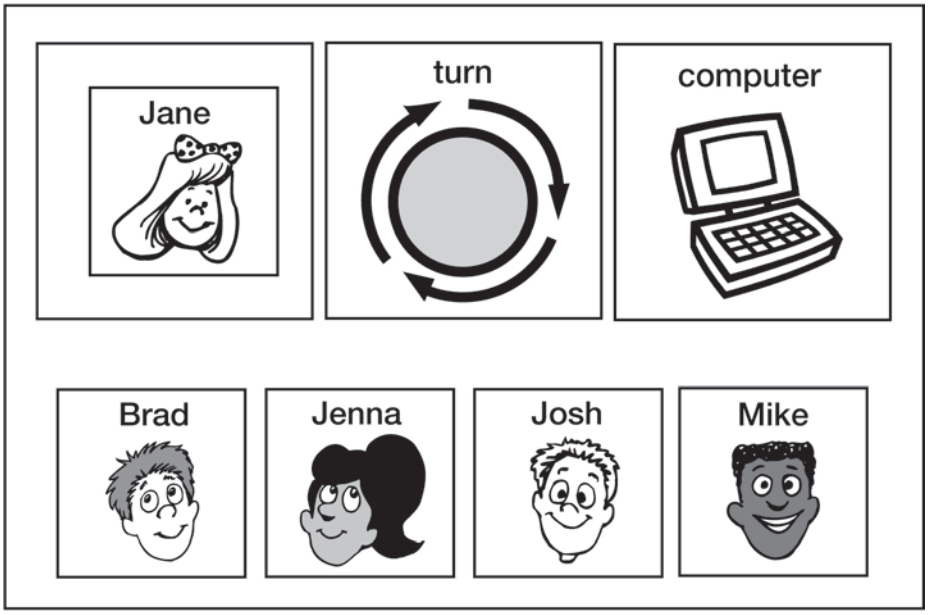


From www.joannecafiero.com. Used with permission.

2-SAMPLE COMMUNICATION SYSTEM

From Henry, S. Used with permission.

3-TURN-TAKING COMMUNICATION BOARD



- Light/Mid Technology:
  - *Static display voice output communication devices*: A static display electronic communication device contains a fixed set of pictographs and/or words. These

displays are usually called overlays and may be printed on paper or other material. The overlays are physically changed by the user or an assistant when a different display is required.

- *Single-message voice output communication devices*: These voice output devices (i.e., Big Mack) provide a singular message (i.e., voice output switches) and typically include an easy-to-use recording device.

- High Technology:
  - *Dynamic display voice output communication devices (VOCA)*: These dynamic, computer-based interfaces can include synthesized (computer-generated) speech to aid individuals who are unable to use natural speech to meet their communication needs. These electronic devices can generate printed and/or spoken text.

BRIEF EXAMPLE

Ginny, a 4-year-old girl with autism who has limited verbal skills was assessed by the school speech-language pathologist and other members of the multidisciplinary team, who determined that a natural aided communication board, might increase her initiations and responses with peers. Ginny and her peers were taught to use the communication board, and within six weeks of its introduction, Ginny's communication with peers had increased by 70%.

SUMMARY

A variety of AAC devices offer individuals who have limited or few communication skills opportunities to become more independent within their environments.

RESEARCH TABLE

Number of Studies	Ages (year)	Sample Size	Area(s) Addressed	Outcome
50+*	3-20	183	Functional language use, behavior change, skill acquisition, sound/symbol association, imitation, requesting, social interaction	+

**Note:* This number includes studies cited in integrated reviews of literature by Millar, Light, & Schlosser (2006) & Van Der Meer, L.A. & Rispoli, M. (2010), which reviewed some overlapping studies. See additional studies under Picture Exchange Communication System.

STUDIES CITED IN RESEARCH TABLE

1. Van Der Meer, L.A. & Rispoli, M. (2010). Communication interventions involving speech-generating devices for children with autism: A review of the literature. *Developmental Neurorehabilitation, 13(4),* 294-306.
   23 studies involving the use of speech-generating devices were reviewed. Only children between 3 and 16 with an ASD were included in the synthesis of results (51 children total). The authors reported that 86% of the studies showed a positive outcome (increased use of device, learning of communication skill, etc.), while 78% of studies used a convincing experimental design. The most commonly reported method of teaching the use of the devices was behavior-analytic instruction, followed by naturalistic procedures such as incidental teaching.

2. Adamson, L.B., Romski, M., Bakeman, R., Sevcik, R.A. (2010). Augmented language intervention and the emergence of symbol-infused joint engagement. *Journal of Speech, Language, and Hearing Research, 53,* 1769-1773.
   The researchers investigated whether 57 toddlers who had participated in an earlier study to teach either language or the use of a speech generating device would then generalize their increased use of those communicative activities to naturalistic interactions with their parents outside of therapy. Pre-post therapy observations indicated that children did increase their use of target communications in natural interactions, and that the amount on increase was positively associated with amount of improvement seen in last therapeutic session.

3. Carbone, V.J., Sweeney-Kerwin, E.J., Attanasio, V., Kasper, T. (2010). Increasing the vocal responses of children with autism and developmental disabilities using manual sign mand training and prompt delay. *Journal of Applied Behavior Analysis, 43(4),* 705-709.
   3 boys (2 with ASD) were taught to emit a vocal request in conjunction with a previously learned manual sign when requesting an item using a prompt-delay + vocal model + shaping procedure to reinforce successive approximations of a vocal request in a multiple-baseline-across-participants design. 1 of the 2 participants with ASD showed an increase in both unprompted and prompted use of the vocal request following the introduction of the

prompting and shaping procedures, while the other participant only showed a slight increase in prompted vocal requests.

4. Kagohara, D.M., van der Meer, L., Achmadi, D., Green, V.A., O'Reilly, M.F., Mulloy, A., Lancioni, G.E., Lang, R., Sigafoos, J. (2010). Behavioral intervention promotes successful use of an iPod-based communication device by an adolescent with autism. *Clinical Case Studies, 9(5),* 328-338.
   This article reports on the successful use of differential reinforcement and delayed prompting procedure to teach a 17-yr old male with ASD to activate the speech output feature of his iPod.

5. Banda, D.R., Copple, K.S., Koul, R.K., Sancibrian, S.L., Bogschutz, R.J. (2010). Video modeling interventions to teach spontaneous requesting using AAC devices to individuals with autism: a preliminary investigation. *Disability and Rehabilitation, 32(16),* 1364-1372.
   This study reported the evaluation of video modeling to teach requesting using a speech-generating device to two young adult participants with ASD (17 & 21). In a multiple-baseline-across-participants design one of the young men began making spontaneous requests with the SGD following the introduction of the video model intervention, but the second young man did not.

6. Lal, R. (2010). Effect of alternative and augmentative communication on language and social behavior of children with autism. *Educational Research and Reviews, 5(3),* 119-125.
   The purpose of the study was to evaluate the effect of the Makaton Vocabulary AAC program with a small sample of 8 children with ASD in India. Using a pre-post design and experimenter developed measurement surveys; the results suggest that following 12 sessions of interventions the 8 children showed higher ratings on both word recognition and social behavior scales.

7. Franco, J. H., Lang, R. L., O'Reilly, M. F., Chan, J. M., Sigafoos, J., Rispoli, M., & Franco, J. H. (2009). Functional analysis and treatment of in appropriate vocalizations using a speech-generating device for a child with autism. *Focus on Autism and Other Developmental Disabilities, 24*(3), 146-155.
   The purpose of this study was to extend the research on functional communication training by examining the use of a speech-generating device for a 7-year-old child with autism and no spoken language who demonstrated inappropriate vocalizations that served multiple functions. The child was taught to discriminate among multiple options on the device and then to choose an appropriate message in two generalization settings. When the device was available, the child reduced his inappropriate vocalizations across all settings and increased his engagement in appropriate activities and interactions with others.

8. Gregory, M. K. The influence of matching and motor-imitation abilities on rapid acquisition of manual signs and exchange-based communicative responses. *Journal of Applied Behavior Analysis, 42*(2), 399-404.
   Matching and motor imitation skills were assessed for six children with autism (7 to 17 years

of age), followed by training to request the same set of preferred items using exchange-based communication and manual signs. Three participants displayed both skills and rapidly acquired both communicative response forms. Three others displayed neither skill; 1 mastered exchange-based responses but not manual signs, and neither of the other 2 easily acquired either response form.

9. Johnston, S. S., Buchanan, S., & Davensport, L. (2009). Comparison of fixed and gradual array when teacher sound-letter correspondence to two children with autism who use AAC. *Augmentative and Alternative Communication, 25*(2), 136-144.
   The purpose of this study was to compare two conditions for teaching two children with autism (ages 4 and 5) who used augmentative and alternative communication (AAC) to point to the printed letter that corresponded to two spoken letter sounds. In one condition (gradual array), the printed letter was first presented in isolation and then distracter letters were gradually introduced. In the other condition (fixed array), the printed letter was immediately presented in combination with seven distracter letters. Results revealed that the fixed array condition resulted in a faster rate of acquisition of target skills for both participants.

10. Olive, M., Lang, R., & Davis, T. (2008). An analysis of the effects of functional communication and a voice output communication aid for a child with autism spectrum disorder. *Research in Autism Spectrum Disorders, 2*, 223-236.
    The purpose of this study was to examine the effects of FCT and a VOCA on the challenging behavior and language development of a 4- year-old girl with autism. The participant's mother implemented modified functional analysis (FA) and intervention procedures at home. A multiple probe design across activities was used to analyze intervention effectiveness. FCT with a VOCA successfully decreased challenging behavior and increased VOCA use. A secondary analysis revealed increased pronoun use.

11. Garrison-Harrell, L., & Kamps, D. (1997). The effects of peer networks on social-communicative behaviors for students with autism. *Focus on Autism and Other Developmental Disabilities, 12,* 241-255.
    This study investigated the effects of a peer network strategy on the duration of social interaction and social-communicative skills for three students with classic autism (ages 6 and 7). Typical peers received training on social skills. The target students with autism received training in the use of an augmentative communication system along with two training sessions in social skills with their peer network. Feedback and reinforcement for appropriate behaviors and interaction continued throughout the intervention phases. Results showed increased social interaction time and use of the augmentative communication system for the three students, with increased expressive language for three students.

12. Van Acker, R., & Grant, S. (1995). An effective computer-based requesting system for persons with Rett syndrome. *Journal of Childhood Communication Disorders, 16*, 31-38.

This study explored the use of a computer-based requesting system, employing animated graphics and touch-sensitive screen input, with three girls with Rett syndrome (characterized by severe motor disorder, impaired cognitive function, and language disorder). All three girls displayed increased item requesting when provided computer-based requesting instruction, and two exceeded training criteria.

13. Olive, M., de la Cruz, B., Davis, T., Chan, J., Lang, R., O'Reilly, M., & Dickson, S. (2007). The effects of enhanced milieu teaching and a voice output communication aid on the requesting of three children with autism. *Journal of Autism and Developmental Disorders, 37,* 1505-1513.
    Three 4- to 5-year-olds with autism participated in this study to determine whether instruction along with a voice output communication aid (VOCA) would improve their ability to make requests. All three participants showed substantial increases in their ability to request preferred items successfully using the combined interventions over the 12 sessions of the study.

14. Drager, K., Postal, V., Carrolus, L., Castellano, M., Gagliano, C., & Glynn, J. (2006). The effect of aided language modeling on symbol comprehension and production in two preschoolers with autism. *American Journal of Speech Language Pathology, 15*, 112-126.
    Two 4-year-olds with autism participated in this study to determine the efficacy of aided language modeling (ALM; PCS and natural language strategies) to improve their receptive language symbol comprehension and production. Results indicated that ALM was an effective intervention for increasing both symbol comprehension and production, and the effects were maintained over the 37 sessions of the study.

15. Millar, D., Light, J., & Schlosser, R. (2006). The impact of augmentative and alternative communication intervention on the speech production of individuals with developmental disabilities: A research review. *Journal of Speech, Language and Hearing Research, 49,* 248-264.
    This article reviewed 23 studies involving 28 participants, ages 2-18, to determine the effects of AAC on the speech production of individuals with developmental disabilities. While none of the studies showed a decrease in speech production, overall, the results were mixed, with some showing little or no gains.
    Note: Participants with exceptionalities other than autism and those over 21 years of age in the original study were not included here.

16. Preis, J. (2006). The effect of picture communication symbols on the verbal comprehension of commands by young children with autism. *Focus Autism and Other Developmental Disabilities, 21,*194-211.
    Five students with autism, ages 5-6 years, participated in this study to determine whether the introduction of pictures along with verbal directions would increase the rate of correct responses. Results showed no significant difference in the acquisition of commands with or without pictures; however, there were significant improvements in maintenance and generalization of the acquired commands with the use of pictures over 16 sessions.

17. Sigafoos, J., Drasgow, E., Halle, J., O'Reilly, M., Seely-York, S., Edrisinha, C., & Andrews, S. (2004). Teaching VOCA use as a communicative repair strategy. *Journal of Autism and Developmental Disorders, 34,* 411-423.
    Two students ages 16 and 20 years participated in this study to determine whether the use of voice output communication aids (VOCA) would repair ineffective communication interactions and initiate first communications. Over the 30 sessions of the study period, both participants showed effective use of VOCA to repair communication and also spontaneously began to use VOCA to initiate communication.

18. Cafiero, J. (2001). The effect of an augmentative communication intervention on communication, behavior and academic program of an adolescent with autism. *Focus on Autism and Other Developmental Disabilities, 16,* 179-189.
    One 13-year-old boy with autism participated in this study using communication boards, picture communication systems (PCS), and natural aided language by classroom staff to increase functional language. Results showed substantial increase in functional language as well as PCS over the 22-month study period.

19. Sigafoos, J., & Drasgow, E. (2001). Conditional use of aided and unaided AAC: A review and case demonstration. *Focus on Autism and Other Developmental Disabilities, 16,* 152-161.
    This study involved one 14-year-old with autism and other cognitive disabilities. The purpose was to determine whether or not the availability of voice output communication aids (VOCA) and PCS could individually or jointly increase requests. While the VOCA was the preferred methodology, there was rapid acquisition and use of both approaches to increase requests.

20. Schepis, M., Reid, D., Behrmann, M., & Sutton, K. (1998). Increasing communicative interactions of young children with autism using a voice output communication aid and naturalistic teaching. *Journal of Applied Behavior Analysis, 31*, 561-578.
    This study included four children diagnosed with autism between the ages of 4 and 5 years who received assistive technology supports over a five-year period in a public school environment. The study examined the effects of assistive technology support, specifically voice output communication aid (VOCA) and naturalistic teaching procedures in the context of established classroom routines. Data showed an increase in communicative interactions using VOCAs. Communicative behaviors remained stable during the two naturalistic teaching sessions measured (snack and play times). Results supported multiple communicative functions by the children using VOCAs, including requests, yes/no responses, statements, and social comments.

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RESOURCES AND MATERIALS

- AAC Institute: http://www.aacinstitute.org/
  This is a resource for all who are interested in enhancing the communication of people who rely on augmentative and alternative communication.

- AAC Intervention.com: http://www.aacintervention.com/
  This site provides free therapy and instructional tools and ideas from Dr. Caroline Musselwhite & Julie Maro.

- AAC Therapy Materials. At Home with Gail M. Van Tatenhove:
  http://www.vantatenhove.com/materials.php
  Free manual communication board resources.

- AT Basics. The Assistive Technology Training Online Project (ATTO):
  http://www.atto.buffalo.edu/registered/ATBasics.php
  The AT Basic Modules provide general assistive technology information on a variety of related uses for elementary students with disabilities. They include links to tutorials on the setup and use of several products as well as links to related resources.

- Augmentative and Alternative Communication (AAC). ASAT: Association for Science in Autism Treatment: http://www.asatonline.org/intervention/treatments/augmentative.htm
  This is a research summary of peer-reviewed research with strong scientific designs.

- Assistive Technology Internet Modules (ATIM): http://www.atinternetmodules.org/
  The modules when completed will provide educators, other professionals, families, persons with disability, and others a convenient platform to gain the assistive technology information they need. Relevant topics to be covered are: AAC for adults, AAC for Early Childhood, AAC for School age.

- Cafiero, J.M. (2005). *Meaningful exchanges for people with autism. An introduction to augmentative and alternative communication.* Bethesda, MD: Woodbine House.

- ISAAC: International Society for Augmentative & Alternative Communication: http://www.isaac-online.org/english/home
  This website offers articles and other valuable information.

- "Make It Yourself" Directions. Simplified Technology by Linda Burkhart: http://www.lburkhart.com/handouts.htm
  "Make it Yourself" directions for various items such as a talking switch, a mouse house, a switch mount with loc-line, etc. These are shared for the purpose of individual personal use. They are not intended for large scale duplication and distribution.

- The Learning Centre. Special Education Technology British Columbia: http://www.setbc.org/lcindexer/
  This online learning center contains tools and resources for implementing AAC in schools.

- Speech Generating Devices/VOCA. Evidence-Based Practice Brief. The National Professional Development Center on ASD: http://autismpdc.fpg.unc.edu/content/speech-generating-devicesvoca
  The NPDC has developed evidence-based practice (EBP) briefs for their identified EBP. Each brief contains an overview, step-by-step directions for implementation, implementation checklist, and evidence base.

General Resources

- Autism Internet Modules (AIM) www.autisminternetmodules.org
  The Autism Internet Modules were developed with one aim in mind: to make comprehensive, up-to-date, and usable information on autism accessible and applicable to educators, other professionals, and families who support individuals with autism spectrum disorders (ASD). Written by experts from across the U.S., all online modules are free, and are designed to promote understanding of, respect for, and equality of persons with ASD.

- The Autism Web Course: http://cdd.unm.edu/swan/autism_course/about/index.htm
  This web course was developed out of materials from the Interactive Collaborative Autism Network (ICAN). The Autism Programs at the University of New Mexico has updated and added information to this web course.
  - Characteristics
  - Assessment
  - Academic Interventions
  - Behavioral Interventions
  - Communication Interventions
  - Environmental Interventions
  - Social Interventions
  - Family Support Suggestions

- Indiana Resource Center for Autism (IRCA) http://www.iidc.indiana.edu/irca/fmain1.html
  The Indiana Resource Center for Autism staff's efforts are focused on providing communities, organizations, agencies, and families with the knowledge and skills to support children and adults in typical early intervention, school, community, work, and home settings.
  - IRCA Articles: http://www.iidc.indiana.edu/index.php?pageId=273

- Texas Statewide Leadership for Autism www.txautism.net
  The Texas Statewide Leadership for Autism in conjunction with the network of Texas Education Service center with a grant from the Texas Education Agency has developed a series of free online courses in autism. Please check the training page, www.txautism.net/training.html, for update lists of courses, course numbers and registration information. Current courses include the following:
  - Asperger Syndrome 101
  - Augmentative and Alternative Communication and the Autism Spectrum
  - Autism for the General Education Teacher
  - Autism 101: Top Ten Pieces to the Puzzle
  - Classroom Organization: The Power of Structure for Individuals with ASD
  - Communication: The Power of Communication for Individuals with ASD
  - Futures Planning for Students with Autism Spectrum Disorder
  - Navigating the Social Maze: Supports and Interventions for Individuals with ASD
  - Solving the Behavior Puzzle: Making Connections for Individuals with ASD