

Expressive and Social Language Outcomes of Adults with Developmental Disabilities Who Use Augmentative and Alternative Communication Systems: A Systematic Review

Daniel Picetti, Sarah Smith, & Melissa Smith

Introduction

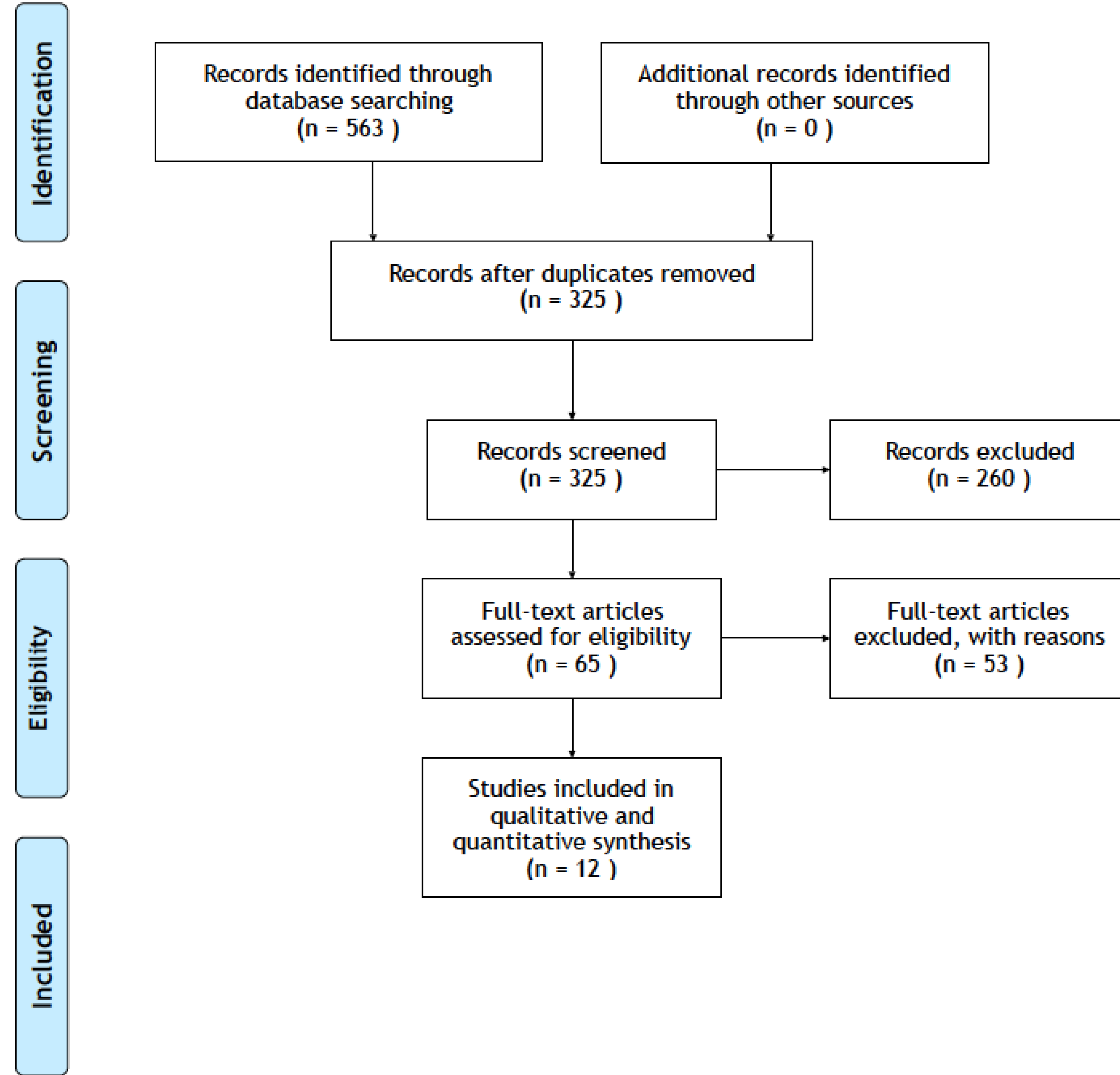
Research Question

In adults with developmental disabilities, how do low and high technological augmentative and alternative communication (AAC) systems and devices affect expressive and social language?

Background

Augmentative and alternative communication (AAC) is commonly implemented with children in the home and school setting; plenty of research exists to support its effectiveness with improving expressive and social language in children. However, there is limited research that addresses the efficacy of AAC with adults with developmental disabilities.

The present study systematically reviews the literature in order to determine how low and high technological AAC systems and devices affect expressive and social language of adults with developmental disabilities. This review may also have related quality of life implications.



Methods

The authors conducted a systematic review of peer-reviewed journal articles in English. The authors used the following databases in the search: CINAHL, ERIC, PsycInfo.

Search Terms:

- (Adult OR Adults)
- AND (autism OR autistic OR cerebral palsy OR Down Syndrome OR fetal alcohol syndrome OR spina bifida OR fragile OR autism spectrum disorder OR asperger OR asperger's OR pervasive developmental disorder not otherwise specified OR developmental disabilities OR developmental disability OR apraxia of speech OR apraxia OR intellectual disability OR intellectual disabilities)
- AND (PODD OR pragmatic organization dynamic display OR picture exchange communication system OR PECS OR voice output communication aid OR picture communication system OR augmentative communication OR alternative communication OR speech generating device OR augmentative alternative communication OR communication board)

Inclusion Criteria	Exclusion Criteria
At least one participant 18 years of age or over in study	No participants 18 years of age or older in study
Any developmental disabilities	Any non-developmental conditions (e.g. traumatic brain injury or stroke)
Results include a measure of expressive language	Participants who use solely signed language or other non-tech AAC
Social language or social engagement	Articles not in English
Any/all low and high tech AAC devices	non-U.S.A. or non-Canada studies
Articles published between 2008 and 2017	Non-peer reviewed
Peer-reviewed	Dissertations Systematic reviews Meta-analyses

Reliability

- Title and abstract reviews: double-reviewed 20.3% of 325 articles; inter-rater reliability 89.4%; yielded 65 articles.
- Full text reviews: double-reviewed 20% of articles; inter-rater reliability 92.3%; yielded 12 articles for final inclusion.

Study Types

- 5 single case designs
- 6 qualitative interview designs
- 1 pre-post intervention design

Quality

- The six qualitative interview designs were not appraised due to the nature of the design.
- Five out of the remaining six articles were rated as acceptable quality, with inter-rater reliability of 100% on one-third of the appraised designs.
- Reliability was determined using a quality indicator checklist and evidence appraisal of a single study from LEGEND.



Results

Title	Study Type	Participants	AAC Device(s)	Outcomes	Title	Study Type	Participants	AAC Device(s)	Outcomes
A Speech Generating Device for Persons with Intellectual and Sensory-Motor Disabilities	Single case design	3 adult males 29-44 y/o with multiple disabilities	Speech-generating device	The mean frequencies of communication events increased from zero or close to zero to 6, 8, 11 for the 3 respective participants.	Teaching Individuals to Signal for Assistance in a Timely Manner	Pre-post intervention	8 adults with severe multiple impairments	Adaptive switch	All participants learned how to use the adaptive switch, but only 50% learned to signal for help.
iPod Touch to Increase Functional Communication of adults with Autism Spectrum Disorder and Significant Intellectual Disability	Single case design	44 y/o male with autism, OCD, ID, ADHD; 31 y/o female with autism, ADHD, OCD, schizoaffective disorder; 33 y/o male with autism, ADHD	iPod Touch® with MyTalk Mobile® software	All participants increased independent manding from less than 1% to between 93.5% and 96.7%. One participant demonstrated a substantial increase in vocalizations as well.	Effects of Implementing the Picture Exchange Communication System (PECS) with Adults with Developmental Disabilities and Severe Communication Deficits	Single case design: a changing criterion design with a multiple baseline across participants	3 adults with severe communication problems, developmental disability (mental retardation, cerebral palsy, down syndrome); all 3 had no formal education.	PECS	All 3 participants increased from 0% independent communication initiations to over 80%. All 3 also decreased off-task target behaviors specific to each individual participant.
Using an adapted form of the Picture Exchange Communication System to increase independent requesting in deafblind adults with learning disabilities	Single case design	3 deafblind participants (2 male, 1 female) 30-39 y/o, all within the range of moderate to profound learning disability	PECS training (3 phases)	All participants increased independent requesting from 0% to between 80% and 100% mastery criteria.	Augmentative and alternative communication supports for adults with autism spectrum disorders	Qualitative study: semi-structured, in-depth interviews and thematic analysis	6 support workers and 2 family members of 6 men and women with autism spectrum disorders who had received low-technology communication	Non-Electronic Communication Aid Scheme (NECAS)	Coding of interviews found themes of benefits to AAC user, benefits for the communication partner, and inconsistencies on method of learning device and its use.
Social media experiences of adolescents and young adults with cerebral palsy who use augmentative and alternative communication	Online focus group	6 participants (3 males, 3 females) with CP, 18-21 y/o; 7th participant excluded from review due to age	Tobii, iPhone/iPad with apps, Dynavox, Accent 1000, ECO2	Coding themes identified from using AAC on social media sites: Advantages, Disadvantages, Barriers, Supports, Recommendations	The loneliness experiences of young adults with cerebral palsy who use alternative and augmentative communication	Qualitative study: interviews that were coded and analyzed. A constant comparison analysis used within and between codes	5 women and 1 man, 22-30 y/o with high support needs	SGD and/or low-tech AAC (communication boards)	The results suggest that support networks, AAC systems, and communication technologies are all important factors in mitigating the participants' experiences of loneliness.
"Social Media has Opened a World of 'Open communication.'" experiences of Adults with Cerebral Palsy who use Augmentative and Alternative Communication and Social Media	Online focus group	9 participants (7 males, 2 females) with CP; 23-67 y/o	Pathfinder, iPad with apps, Tobii, Eco, Dynavox, EzKeys for laptop, NOVA	Coding themes identified from using AAC on social media sites: Advantages, Disadvantages, Barriers, Supports, Recommendations	Wishing to go it alone: the complicated interplay of independence, interdependence, and agency	Qualitative study: interviews that were coded and analyzed alongside facilitated typing independence training sessions with typers and facilitators.	12 participant pairs: one individual who types to communicate and his/her facilitator, 11-47 y/o, self-identified as autistic; have limited verbal speech; rely on typing as their primary form of communication	Facilitated typing	Reduction in physical support is not equivalent to meaningful, open-ended communication, nor does it follow a straightforward progression. Emotional conversations often require differing levels and types of support. Gaining independence can be hindered by fears and agendas of facilitators. Developing communicative independence supports confidence and ability to exert life control.
Using a Speech Generating Device	Single case design	1 participant; female; 30 y/o; with moderate ID, severe expressive language disorder	Speech-generating device (dynamic display with categorical options)	Mean length of utterance, mean length of turn in utterance, % responding to question, % intelligible all increased by 2 years post-SGD. Daily living and socialization standardized scores also increased.	"I have Chosen to Live Life Abundantly": Perceptions of Leisure by Adults who use Augmentative and Alternative Communication.	Qualitative study: interview analysis	8 adult participants, diagnosed with cerebral palsy; 27-44 y/o; education ranging from high school diploma to undergraduate degree; literacy skills; computer and internet access; involved in leisure or community recreation	Pathfinder, Dynavox, direct selection, switch scanning	Themes: improved physical health, enjoyment, improved mental health, increased independence, enhanced social connections, education of society. Barriers to leisure participation: personal, social, communication, technology, financial, accessibility, safety, transportation, personal care attendants. Supports in overcoming barriers: personal, social, family, personal care attendants, AAC devices, other assistive technologies.

Discussion

- This systematic review serves as a foundation for evidence-based practice to determine the impact that AAC usage by adults with developmental disabilities can have on expressive and social language.
- Results of this review indicate that augmentative and alternative communication systems, when implemented well with adults with developmental disabilities, are effective and have positive outcomes on expressive and social communication by increasing independent manding and requesting, increasing independent typing, benefitting leisure participation, mitigating loneliness, decreasing negative social behaviors, and increasing quality of life.
- Many of the articles in this review have very low clinical significance due to the small sample size and the inability to generalize to the population. Despite the predominantly positive quantitative and qualitative language outcomes, more research is needed to replicate findings of the current studies on a larger and more representative scale.
- Future research must investigate more strategies for intervention and implementation of low-tech and high-tech AAC for adults with developmental disabilities, as current studies noted a high variability in this area.