Effects of Interventions that Include Aided AAC Input on the Communication of Individuals with Complex Communication Needs: A Meta-analysis

Tara O'Neill, MS, CCC-SLP, Doctoral candidate, Penn State University, Janice Light, PhD, The Hintz Family Endowed Chair in Children's Communicative Competence, Penn State University, Lauramarie Pope, Graduate Student, Penn State University

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Background

- The primary channel of language input provided to most individuals who use aided AAC systems is in the form of spoken language (Light, 1997)
- However, multimodal AAC is their primary channel of expression, resulting in an asymmetry between the input mode and the expected output mode (Smith & Grove, 2003)
- Aided AAC input occurs when a partner points to (or activates) aided AAC symbols while speaking with an individual who uses AAC

- Aided AAC input may rebalance input-output asymmetries by providing linguistic input using both speech and AAC (Light, 1997; Smith & Grove, 2003).
- Various names have been used to describe aided AAC input:
  - augmented input (e.g., Romski & Sevcik, 1996)
  - aided AAC modeling (e.g., Binger & Light, 2007)
  - aided language modeling (e.g., Drager et al., 2006)
  - aided language stimulation (e.g., Goosens', 1989)
  - natural aided language (e.g., Cafiero, 2001)

Goals of the current study:

- Determine the effect of interventions including aided AAC input on the expression and comprehension of individuals with developmental disabilities who use AAC
- Evaluate how effects may differ by variables related to participant, intervention, or outcome characteristics
- Assess the strengths and limitations of the existing evidence
- Consider clinical implications and directions for future research

Methods

Inclusion Criteria:
- Included participants with **developmental disabilities** who used **AAC**
- Included **aided AAC input** in isolation, or in combination with other intervention components
- Used an **experimental** or **quasi-experimental** design
- Reported outcome data on **comprehension and/or expression**
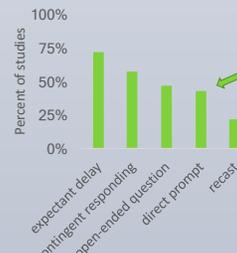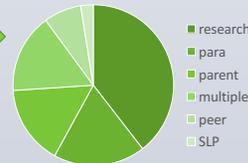- Published in a **peer-reviewed journal** or approved as dissertation of thesis
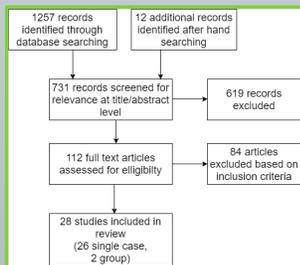
Results of Single Case Studies

The single case studies involved **88 participants**. The mean effect size (Tau-U) was **0.83** (range= -0.18- 1.0), indicating a **very large overall effect**. Below, results are summarized by participant, intervention, and outcome characteristics.

Effects by Participant Characteristics

	Number of cases	Tau-U	Level of effect
Age			
Toddler	6	0.90	Very large
Pre school	47	0.83	Very large
Elementary	58	0.87	Very large
Adolescent	4	0.86	Very large
Adult	7	0.37	Moderate
Diagnosis			
Autism	34	0.74	Large
Cerebral palsy	21	0.86	Very large
Down syndrome	19	0.90	Very large
Developmental delay	10	0.94	Very large
CAS	6	0.97	Very large
Other	11	0.88	Very large
Receptive language age			
6 to 24 months	10	0.68	Large
24 to 36 months	22	0.92	Very large
36 to 48 months	23	0.87	Very large
> 48 months	10	0.89	Very large

Legend: ASD, CP, IDD, DS, DD, CAS, other
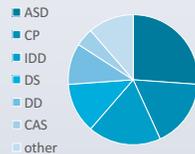
Effects by Intervention Characteristics

	Number of cases	Tau-U	Level of Effect
Partner			
Researcher	47	0.84	Very large
Para-professional	22	0.94	Very large
Parent	19	0.97	Very large
Multiple partners	19	0.52	Moderate
Peer	9	0.89	Very large
SLP	3	0.90	Very large
Aided AAC system			
SGD	56	0.88	Very large
Non-SGD	66	0.79	Large
Nature of input			
Keyword	88	0.84	Very large
Full phrase, multiple symbols	9	0.91	Very large
Full phrase, single symbol	13	0.72	Large
Intervention components			
Multi-component	102	0.84	Very large
Isolated	20	0.77	Large
Partner instruction			
Yes	60	0.88	Very large
No	62	0.78	Large
Time spent in intervention			
1 hour or less	32	0.91	Very large
1-2 hours	37	0.88	Very large
2-5 hours	19	0.87	Very large
>5 hours	15	0.54	Moderate

Legend: researcher, para, parent, multiple, peer, SLP

Chart categories: expectant delay, contingent responding, open-ended question, direct prompt, recast

Effects by Outcome Characteristics

	Number of cases	Tau-U	Level of Effect
Nature of outcome measure			
Expression	96	0.84	Very large
Comprehension	12	0.76	Large
Language domain			
Pragmatic	57	0.76	Large
Semantic	35	0.85	Very large
Morpho-syntactic	30	0.93	Very large

Legend: expression, comprehension

Results of Group Studies

Study	participants N (age) Dx	DV	Cohen's d	Level of effect
Kasari et al (2014)	61 (6;4), ASD	• number of spontaneous utterances	0.47	Medium
		• number of comments	0.50	
		• number of different root words	0.28	
Romski et al (2010)	42 (2;6); DD	• number of different spoken words	0.62	Medium

Discussion

Individuals with developmental disabilities and complex communication needs associated with various **diagnoses**, **ages**, and **language skills** can derive benefits in both **expression** and **comprehension** across the domains of **pragmatics**, **semantics**, and **morphosyntax** as a result of interventions that include aided AAC input.

Potential Limitations of the evidence:

- Very few studies examined outcomes related to comprehension
- Interventions were short term and targeted specific communication skills in specific contexts
- Few studies provided information regarding the rate of aided input
- Telegraphic models may guide production of specific target behaviors, but may potentially limit development of comprehension and advanced expressive skills

Limitations and Future Research

Limitations of this review:

- Considerable variability in the goals and delivery of aided AAC input across studies results in difficulty specifying best practices
- Only two comparison (group) studies
- Effect sizes were not calculated in context of maintenance and generalization
- AAC interventions that included *unaided* AAC input were excluded

Future research:

- Explore the impact of implementation factors associated with aided AAC input on communicative outcomes
  - frequency of intervention
  - intensity of models
  - uptake by various communication partners
  - use in multiple contexts
- Examine the use of aided AAC input to support comprehension of morphosyntax
- Investigate strategies to reduce demands on partners implementing aided AAC input
- Examine the effects of partner input (aided and unaided) on long term language development

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