Methodology: Systematic Review and Meta-analysis of the AAC Literature for People with

Autism Spectrum Disorder or Intellectual Disabilities who have Complex Communication

Needs through 2020

Appendix E

Coding for Intervention Characteristics

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Authors Contribution Statements using Contribution Roles Taxonomy (CRediT)

Authors were listed alphabetical order by tier with an explanation of the contributions that are indicated for each tier by using CRediT (Allen et al., 2019).

Tier 1: Ganz, Pustejovsky, Reichle, Vannest (Principal Investigators)

Tier 2: Pierson, Wattanawongwan (Project staff)

Tier 3: Chen, Foster, Fuller, Haas, Hamilton, Sallese, Smith, Yllades (Additional staff or investigators who contributed substantively)

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Appendix E

Coding for Intervention Characteristics

(a) Characteristics of the intervention as described in the manuscript (i.e., social behavioral, functional behavioral)

Communication Intervention Type- Two general types of communication interventions were coded- *social pragmatic or functional behavioral.* To be coded as one of these types, an intervention should exhibit a majority of the characteristics associated with the intervention type. If it is a mix of these two types, a combination was coded.

Some Common Social Behavioral Indicators

- A number of teaching opportunities are child initiated; Adults are responsive to child communicative overtures
- Opportunities are often distributed across the learner's daily routine
- Intervention opportunities are embedded in functional activities
- Often adult is responsive to child- initiated opportunities
- A variety of different teaching situations, interventionists, teaching stimuli used to promote generalization
- The interventionist systematically arranged the environment (use of communicative temptations, such as enticing, having preferred materials in sight)
- Teaching usually occurs in authentic environments with another learners' present
- Intervention may be focused on establishing social relationships
- One to one instruction does not represent the primary method to deliver instructional opportunities.

Some Common Functional Behavioral Indicators

- Majority of teaching opportunities interventionist initiated
- Largely massed trial teaching opportunities during early instructional phases
- Primarily ONE TO ONE
- Distractions are minimized
- In early phases, continuous schedule of reinforcement
- Reinforcers often selected based on preference assessment
- Generalization often dealt with subsequent to acquisition
- Limited different teaching stimuli used during acquisition training; Generalization often dealt with subsequent to acquisition
- The interventionist systematically arranged the environment (use of communicative temptations, such as enticing, having preferred materials in sight)
- Preference/reinforcer assessment was conducted before or throughout intervention
- Activities used in training may be contrived
- Individuals coding articles were asked to create notes addressing the characteristics of the intervention as described in the manuscript.

(b) Instructional features (i.e., environmental arrangement, preference/reinforcement assessment, reinforcement, modeling, verbal prompting, physical prompting, prompt fading, graphic prompt)

- Environmental arrangement: The interventionist systematically arranged the environment (e.g. use of communicative temptations, such as enticing, having preferred materials in sight)
- Preference/reinforcer assessment was conducted before or throughout intervention

- Reinforcement provided to promote communication (e.g., social praise for speaking, providing items requested)
  - **Positive-** An item, event, or person provided to the learner contingent on a defined response for the objective of increasing the probability of a behavior.
  - **Negative-**An item, event or person that is aversive to the learner. A behavior is emitted to that is successful in avoiding or terminating the item, event or   person.
- Modeling of communication used (e.g., verbally demonstrating contextual words, demonstrating use of AAC to make a comment): Interventionist produces a behavior offering an opportunity for the learner to replicate the behavior. The dependent measure should specify whether the learner is required to produce an exact or partial replication.
- Verbal prompts were provided: Interventionist produces statements to direct a learner's behavior. Examples: "You might need to try it a different way," "Write your name". "What do you want?" "Say, '____'." "Let me know if you want anything." "Tell me if you need anything." A typical SD required to initiate the task is NOT a verbal prompt (e.g., "point to ___," "put the ball on ___," "choose/pick ___")
- Physical prompt: Interventionist comes in physical contact with the learner to help him/her produce a behavior being taught (e.g., hand-over-hand assistance to make an SGD selection; tapping a learner's hand to cue him/her to begin to pick up an object).
- Prompt fading strategies used in which the delivery of a prompt is delayed affording the learner a prespecified period of time in which to emit an independent target response (e.g., time delay, least-to-most prompt fading, most-to-least)
- Graphic prompt: Interventionists provide graphic stimuli (e.g., picture, printed word, product logo) that provide learners with information about how to engage in the target behavior (e.g., task analysis checklist, following a recipe transition picture card)

(c) Named/manualized intervention

A Common but Not Exhaustive List of Programs specifically listed by name

- Social Communication, Emotional Regulation and Transactional Support (SCERTS)
- Joint Attention, Symbolic Play, Engagement & Regulation (JASPER)
- Prelinguistic Milieu
- TEACCH (previously called Treatment and Education of Autistic and other Communication Handicapped Children)
- Picture Exchange Communication System (PECS)
- Applied behavior analysis (ABA)/Early Intensive Behavioral Intervention (EIBI)/Lovass
- Milieu/Enhanced Milieu
- STAR Curriculum
- Functional Communication Training (FCT)
- Pivotal Response Training/Intervention (PRT/PRI)
- LEAP
- Hanen
- Denver Early Start

Coding directions: Identify which intervention program(s)/technique(s) are being utilized for the current study.

Intervention Name	Definition
Applied Behavior Analysis (ABA)	Treatment approaches/techniques, that are based on principles of behavior and learning, used to teach/build new skills. E.g reinforcement, tolerance for delay, shaping/chaining. Select this code, if the intervention does not fall into a more specific ABA technique below.
Discrete Trial Training (DTT)	An ABA technique that utilizes one-on-one instruction during which skills are taught in small systematic steps. Each teaching opportunity is a discrete trial that occurs after a clear antecedent and is followed by a clear consequence (e.g. reinforcement).
Functional Communication Training (FCT)	An ABA technique that utilizes differential reinforcement (DR) procedures. The learner is taught an alternative response that results in the same class of reinforcement identified as maintaining problem behavior.
Incidental Teaching	A technique that incorporates principles of applied behavior analysis. Incidental teaching emphasizes naturally occurring teaching opportunities that are based on the child's interests. Learning opportunities are both child and interventionist initiated.
Pivotal Response Training (PRT)	PRT is a naturalistic intervention program based on ABA principles. Instead of focusing on individual behaviors, PRT targets 'pivotal skills' and areas of child development e.g. social initiations, motivation. PRT was formerly referred to as Natural Language Paradigm (NLP). PRT focuses on increasing language, social communication, and academic skills, as well as decreasing disruptive/self-stimulatory behaviors.
Milieu Training/teaching	Involves the manipulation and arrangement of stimuli within the environment to help facilitate the child to engage in the target behavior. The following four primary strategies are used: modeling, mand-modeling, incidental teaching, and time-delay.
Positive Behavior Supports (PBS)	An intervention approach rooted in the principles of applied behavior analysis that is designed to address problem behaviors and increase desired alternatives.. Interventions and support are dependent on having conducted a functional assessment (e.g. interview, direct observation and possibly a functional analysis) to identify variables that maintain the function(s) of problem behavior. Then, applies the following approaches: a) reinforcement of desired behavior, b) placing consequences on the undesired behavior, teaching self-regulation skills d) teaching functional alternative behaviors to problem behavior (e.g. FCT), e) make changes to the environment to decrease the probability of problem behavior.

Self-Management/ Regulation	A system of conscious personal management that involves guiding one's own behaviors to reach goals. Procedure that learners use to manage and organize their thoughts and convert them into skills used to learn. Self-regulation requires continuous monitoring progress toward an objective. Self-regulation requires that learners monitor their own thoughts and are motivated to actively participate in their own learning process (Zimmerman, 2001). Often self-regulation is thought of as including skills involving a) conflict resolution, b) perspective taking, c) self-regulation, d) problem solving, and e) time management.
Picture Exchange Communication System (PECS)	A manualized intervention program based on ABA principles. To be considered PECs, the program systematically implements the 6 phases of instruction. Individuals are taught to exchange graphic symbols with their communication partner.
Denver Model/Early Start Denver Model	A manualized intervention program based on ABA principles. Through play and joint activities language, social and cognitive skills are targeted.
Hanen Program	A manualized parent training program. Teaches parents to build on their child language skills during naturally occurring routines and activities. There are variations of the Hanen program, these include: More than words, Hanen I'm Ready, TalkAbility, Target Word, It Takes Two to Talk.
JASPER	The Joint Attention, Symbolic Play, Engagement & Regulation (JASPER) model is based on developmental and behavioral principles. Strategies are utilized to target foundation skills in social communication e.g. Joint Attention, play, and imitation.

(d) Functional Behavior Assessment

What type(s) of FBA/FA were conducted?

- FBA checklist
- FBA structured interview
- Direct observation (not systematic FA; includes ABC observation)
- Systematic functional analysis/FA (systematic manipulation of possible functions; may be called a brief FA or brief analysis)

What did the authors identify as the function of the challenging behavior via the FBA/FA?

- Attention
- Tangible (e.g., to obtain food, toy, mobile device)
- Escape
- Self-stimulatory/Alone/Automatic reinforcement
- Not specified

(e) Setting for intervention that was implemented

- Home (e.g., group home)

- Classroom (e.g., art classroom)
- Employment
- Clinic (e.g., therapy room, unused room in the school)
- Recreation (e.g., recess, gym, playground in the school)
- Other (specify in notes)