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JOINT ATTENTION AS A PRIMARY TARGET FOR
INTERVENTION IN A YOUNG CHILD WITH ASD

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Joint Attention as a Primary Target for Intervention in a Young Child with ASD

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Scenario

Autism spectrum disorders (ASD) is a category of neurological disorders with deficits in three areas: social interaction, communication and repetitive, and restricted attention and interests. Recent research (Kogan et al., 2009) supported by initial data collected by the Center for Disease Control (CDC) indicates that ASD is on the rise, with 1 in 91 children between ages 3 and 17 years diagnosed with ASD. One of the early nonverbal communication behaviors that accompanies verbal interaction is *joint attention*—the ability to collaboratively engage another individual in oral and social communication.

School-based speech-language pathologists (SLPs) will have more children with ASD on their caseloads as a result of earlier identification. To best serve these children, school-based SLPs must know the behaviors associated with ASD and be able to implement the best intervention practices available. SLPs will play an integral role in educational teams, determining intervention goals that target the student's language deficit and the social communication core deficits of autism.

Case Study

J.A. is a 4-year-old boy with an ASD diagnosis of autism. He recently transferred from another school district to Sunshine Elementary School, where he was placed in the pre-kindergarten, varying exceptionalities classroom. J.A. has an individualized education plan (IEP) from his previous school district with four communication goals:

- using a carrier phrase (i.e., I want, I see),
- using pronouns,
- labeling classroom vocabulary, and
- stating the function of objects.

Sandra, Sunshine Elementary school's SLP, was concerned that the current IEP language goals did not include social language (i.e., pragmatic language) goals, despite social language being a core deficit of autism.

J.A.'s teacher invited Sandra to observe J.A. to assess his current language use and social interaction. Upon entering the class, Sandra noted J.A. was playing by himself at the train center. He was playing with two trains, using the dialogue from his favorite episode of a popular train television show and re-enacting the television show with the trains. Sandra immediately observed that J.A. was not initiating joint attention with peers or adults. She went over to the train center, picked up the crane, and said, "Wow! Look at this crane," J.A. responded to joint attention after 7 seconds and looked at the crane. J.A. was inconsistent in his response to joint attention. When two other children came over to the train area and initiated joint attention about the tunnel through words J.A. did not respond. Sandra attempted to engage one more response to joint attention from J.A. about the green train through gesture and words, with no response. J.A. continued to repeat the television show dialogue with his two trains. During a 30-minute observation, J.A. had no initiations for joint attention and only demonstrated one response to joint attention.

Clinical Questions

In thinking about her observations of J.A., Sandra remembered an article presented in her district-sponsored, quarterly discussion group on joint attention. The article by Wetherby and Prizant (2002) indicated that joint attention is a core and distinguishing deficit in ASD and, therefore, a possible target for intervention. To determine if joint attention was an appropriate goal and before deciding on an intervention strategy for J.A., Sandra decided to conduct a literature review to answer the following critical questions:

1. What is the definition of joint attention and its effects on social communication function?

2. Does intervention improve joint attention behavior?
3. Does intervention improve social language and other communicative functions?
4. Is teaching joint attention educationally relevant and critical for J.A.?

With a clearer understanding of the definition and nature of joint attention, and its relationship to language and social communication skills, Sandra began searching for research evidence that would assist her in deciding how to implement a joint attention treatment program for J.A.

Background

Definition of Joint Attention

Children engage in joint attention to interact with another person about an object or event in their environment (Mundy & Crowson, 1997), conveying the message, "Look with me at this interesting object or event." This interaction involves the adult commenting about the object or event (e.g., "Yes, that's a doggy!") and looking with the child at the object. Jones, Carr, and Feeley (2006) defined joint attention as "when two people, for example a young child and his or her parent, share attentional focus on interesting objects and events in their environment" They argue that this ability to share attention to an object or event is particularly social in character and when children engage in this activity, they are directing the other person to join in a communicative exchange.

Authors and scholars typically describe two types of joint attention, (1) response to joint attention (RJA) and (2) initiation of joint attention (IJA) (Mundy, Sullivan, & Mastergeorge, 2009; Jones, Carr, & Feeley, 2006; Menezes & Perissinoto, 2008). According to Mundy et al., infants are able to demonstrate RJA by following a line of gaze, gestures, or head posture of the other person. Infants also are able to demonstrate their use of IJA by indicating to the listener that there is a common point of reference or event to attend to in the environment. Mundy et al. pointed out that RJA and IJA emerge by age 4 to 6 months. These two joint attentions are part of a system, which integrates one's visual attention with the external information of another person's visual attention. The types of attention are viewed as core skills in the development of interactive social skills.

Effects of Joint Attention on Language and Other Social Communicative Functions

Mundy and Crowson (1997) suggested that joint attention is pivotal and that increases in joint attention may lead to secondary and indirect changes in increases in language ability and social skills, and decreases in abnormal behaviors. Menezes and Perissinoto (2008) argued that joint attention is foundational to language development in general. In addition, several authors have demonstrated associations between joint attention and later language ability in typically developing children (Mundy & Gomes 1996; Carpenter et al., 1998). Shumway and Wetherby (2009) have shown that for children 18 to 24 months with a diagnosis of ASD the most compelling predictor of verbal performance is the rate of acquisition of joint attention behaviors. Taylor and Hoch (2008) suggested that a greater response to joint attention was associated with higher levels of receptive language. Joint attention has also been moderately correlated with nonverbal cognitive level (Shumway & Wetherby, 2009), the development of symbolic and pretend play, and object imitation (Whalen & Schriebman, 2006).

When assessing the predictability of joint attention for later language use, Mundy, Sigman, and Kasari (1990) found that the level of joint attention skills the child exhibited at 3 years 9 months was positively associated with their language ability one year later. No other behavior (i.e., social interaction, requesting, and language ability) was associated with language at follow-up. Similarly, Sigman and Ruskin (1999) and Bono, Daley, and Sigman (2004) concluded that response to joint attention was positively associated with gains in expressive language at age 12 years. These studies indicated that joint attention behaviors measured at 4 years old were associated with social and peer group behaviors at 12 years old.

Searching for Evidence of Intervention Improving Communicative Functions

Study Inclusion Criteria

Studies included in the review had to meet the following criteria: (a) joint attention, (b) children with autism, (c) intervention or treatment, and (d) language outcomes. These terms were used in various combinations for all database searches. Sandra began her literature review using

a variety of resources available to her to find and evaluate the necessary information. These resources included:

- internet sources (e.g., Google Scholar, PubMed),
- the local university's on-line library system,
- the *Journal of Autism and Developmental Disorders* (J.A.DD) that she subscribed to from the years 2007-2009, and
- articles from the local Center for Autism and Related Disabilities.

When Sandra conducted her online literature search, she limited it to studies published between 2004 and the present. She obtained 271 potential citations from Google Scholar and 157 citations from PubMed. Sandra collected full text copies of all articles that were specific to intervention for improving joint attention in children. From the full-text articles, Sandra identified six studies that fit her criteria of treatment of joint attention for children with ASD. Five of the studies were single subject and one was a randomized controlled trial (RCT).

Evaluating Quality of Evidence

Sandra needed to assess the quality of the six studies to determine their scientific value and benefit in

answering her questions. Sandra searched the American Speech Language Hearing Association (ASHA) website for information on how to evaluate the evidence. Her search brought her to the National Center for Evidence-Based Practice in Communication Disorders (N-CEP), and a recommendation for using the Scottish Intercollegiate Guidelines of Hierarchies of Levels of Evidence (SIGN) for evaluating research evidence for clinical practice. Using the SIGN standards, Sandra rated the six included studies for research quality according to the criteria presented in Table 1.

In analyzing the six studies, Sandra rated the Kasari, Freeman, and Paparalla, (2006) as a level Ib, indicating a well-designed randomized study, the strongest of the types of research design. This study, as a result, could receive greater weight in Sandra's decision-making process as it meets a higher standard of research design that increases her level of confidence in the reported outcome(s). The remaining five studies were level III studies, indicating well-designed, non-experimental studies. These five studies were all single-subject designs. The results could not be generalized to the population of interest. A summary of the six studies is presented in Table 2.

Table 1. Scottish Intercollegiate Guidelines of Hierarchies of Levels of Evidence (SIGN)

Evidence Type	Design Standard
Ia Well-designed meta-analysis of >1 randomized controlled study	Meta-analysis includes the quantitative summary of two or more randomized controlled trial studies in which post-treatment results are combined.
Ib Well-designed randomize controlled study	A randomized controlled study is a study in which the participants are assigned to treatment or control groups immediately prior to implementation of the intervention.
IIa Well-designed controlled study without randomization	A comparison post-treatment and control group study in which participants may have been randomly selected but are assigned to groups on a non-random basis.
IIb Well-designed quasi-experimental study	Quasi-experimental studies include those studies in which participants are selected and assigned to treatment or control groups in a manner other than randomization.
III Well-designed non-experimental studies, (i.e., correlational and case studies)	Non-experimental studies would include pre-post single group design, single subject design, case study, or a correlational study.
IV Expert committee report, consensus conference, clinical experience of respected authorities	Expert evidence may include non-quantitative opinions, decisions, or summaries by individuals or groups representing a professional position.

Note: The SIGN Guidelines of Levels of Evidence (2009) is adapted and reprinted with permission from the Scottish Intelligence Guidelines Network website: <http://www.sign.ac.uk/methodology/index.html>.

Table 2. Summary of Six Studies

Name of Study	Type of Study	Number of Participants	Level of Evidence	Treatment	Outcome
Whalen & Schreibman, 2003	Single subject, multiple baseline design across participants	<i>n</i> = 11 (5 with autism and 6 typical) Ages 2:4–4:4	III	Behavior modification	Parent training is beneficial in teaching and generalizing joint attention
Whalen, Schreibman, & Ingersoll, 2006	Single subject, multiple baseline design was used across all participant	<i>n</i> = 10 Ages 2:4–4:4	III	10-week joint attention training program	Increase in: social initiations imitation play spontaneous speech
Ingersoll & Schreibman, 2006	Multiple baseline design across all participants	<i>n</i> = 5 Ages 2:4–4:5	III	Naturalistic behavioral technique for teaching object imitation	Increase in: imitation skills generalized skills to novel environments language pretend play joint attention
Jones, Carr, & Feeley, 2006	A multiple baseline probe design across the two joint attention skills (respond and initiate)	<i>n</i> = 5 Ages 2 to 3 yrs	III	Discreet Trial Training and Pivotal Response Training	Increase in: IJA and RJA expressive language social-communicative behaviors Peer-based joint attention instruction might be another promising avenue to pursue.
Kasari, Freeman, & Paparalla, 2006	Randomized, controlled intervention study	<i>n</i> = 56 Ages 3 to 4 yrs	Ib	Applied behavior analysis and developmental procedures of responsive and facilitative interactive methods	Increase in: IJA and RJA Generalization to home Play group increase in: Play skills and schemas Generalization to home
Schertz & Odom, 2007	Mixed methods research design	<i>n</i> = 3 Ages 1:8–2:4	III	A parent-mediated, developmentally grounded, researcher-guided intervention model. (Activities from the Joint Attention Mediated Learning [J.A.ML] manual)	Increase in: IJA/RJA 75% had repeated performance in IJA/RJA
Taylor & Hoch, 2008	Multiple baseline design across all participants	<i>n</i> = 3 Ages 3–4 yrs	III	Verbal behavior program including a series of prompts and reinforcement procedures	Specific instruction required for teaching IJA and coordinating gaze shift between an object and a person

According to N-CEP, an important measure of intervention study quality is the degree to which an intervention is implemented in an appropriate and replicable manner. That is, the experimenter actually carried out and reported the intervention method in the way described in the study, a concept sometimes referred as *implementation fidelity*. Sandra found that the “Introduction to Critical Appraisal: Training Notes” on the ASHA website provided the guidance she needed to assess the implementation fidelity. She then posed three broad questions that she found within the training notes.

1. Are the results valid?
2. What are the results?
3. How will these results help me work with my patients?

Though five of the six studies resulted in scores less than three out of three, Sandra thought these studies merited further appraisal because the majority of studies reported for the field of autism typically used a single-subject design. Table 3 presents a summary of the level of evidence for these studies.

Sandra reached a preliminary conclusion that if she targeted joint attention directly and then language, social and peer group behavior could be positively impacted. Creating a communication goal specific to joint attention on an IEP for J.A. would be educationally relevant and

pivotal for future language and social skills development.

Teaching Joint Attention to Children with ASD

Sandra needed to combine her knowledge of the child, her newly acquired knowledge of joint attention, the available evidence, and the ASHA guidelines for diagnosis, assessment, and treatment of autism spectrum disorders to determine if joint attention was an educationally relevant and evidenced-based, primary intervention target for J.A.

When looking at educational relevance, Sandra reviewed her observations of J.A. Sandra determined that J.A. had a definite deficit in joint attention. His social skills were also negatively affected. Consistent with the findings of Bono, Daley, and Sigman, (2004), Sandra learned from the included studies that joint attention is a pivotal skill domain, which supported her idea that targeting joint attention directly would indirectly affect social and language skills. She concluded that creating goals that increase RJA and IJA would be educationally relevant.

ASHA guidelines indicate that the most critical domain for prioritizing intervention goals should be derived for the core deficits of ASD and the core challenges that affect social adaptive functioning reflected in aspects of joint attention. In examining the data from

Table 3. Summary of Levels of Evidence and Implementation Fidelity Score

Name of Study	Level of Evidence	Are Results Valid?	What are the results?	Application to Patients
Whalen & Schreibman, 2003	III	3/7	4/4	Yes
Schertz & Odom, 2007	III	3/7	4/4	No
Whalen, Schreibman, & Ingersoll, 2006	III	3/7	4/4	Yes
Taylor & Hoch, 2008	III	3/7	4/4	No
Ingersoll & Schreibman, 2006	III	3/7	4/4	Yes
Jones, Carr & Feeley, 2006	III	3/7	4/4	Yes
Kasari, Freeman, & Paparalla, 2006	Ib	7/7	4/4	Yes

the four studies that were relevant to J.A., all four studies showed functional increases for individual children on the following measures of social communication:

- responding to joint attention
- initiating joint attention
- generalization of joint attention with caregivers
- positive collateral changes in
 - social initiations,
 - imitations,
 - play, and
 - spontaneous speech

Kasari, Freeman, and Paparalla (2006) also found that content of the treatment seemed to be more important than that of hours of treatment, re-confirming the importance of joint attention as a pivotal skill domain.

The Evidence-Based Decision

Sandra's evidenced-based decision to include joint attention as an intervention goal within J.A.'s IEP was educationally relevant. She located sample intervention goals for joint attention reported on the ASHA website, along with guidelines for diagnosis, assessment, and treatment of autism spectrum disorders.

As a result of Sandra's search for the scientific evidence that might drive her clinical decision, she learned that (1) research has an important place in understanding the clinical practice of an SLP, (2) the quality of the research produced in the profession is important in guiding clinicians' decision making about interventions, (3) numerous tools are readily available outside the university and professional publication arena that can help an SLP make the needed connections between research and practice, and (4) her experience enabled her to close the research-practice gap.

Though Sandra obtained a degree of support for her clinical decision, she recognized that more experimental research on the causal interpretation of joint attention training for children with autism is needed for clinicians to make high quality professional-clinical evidence based decisions.

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