Joint Attention and Joint Engagement Among Minimally Verbal Children With Autism:

A Review of JASTER and EMT for Preschoolers

A Thesis Submitted to the

University Honors Program

In Partial Fulfillment of the

Requirements of the Baccalaureate Degree

With Upper Division Honors

Department of

Allied Health and Communicative Disorders

By

Courtney Benson

Dekalb, Illinois

December 2015
University Honors Program

Capstone Approval Page

Capstone Title (print or type)
Joint Attention and Joint Engagement Among Minimally Verbal Children with Autism: A Review of JASPER and EMIT for Preschoolers.

Student Name (print or type) Courtney Benson

Faculty Supervisor (print or type) Danai Fannin

Faculty Approval Signature Danai Fannin

Department of (print or type) Allied Health and Communicative Functions

Date of Approval (print or type) 4/30/15
Abstract

Autism Spectrum Disorder (ASD) is a pervasive developmental disorder with core deficits that impair communication, emotional development, and joint attention skills (Landa, Gross, Stuart, & Faherty, 2013). Joint attention skills have been shown to relate to expressive language development, and usually emerge later in children with ASD when compared to typically developing children (Paparella, Goods, Freeman, & Kasari (2011). By completing a literature review of the JASPER and EMT treatment methods, as well as a quasi-experimental study of the implementation of a JASP + EMT treatment on a three-year old minimally verbal boy with moderate ASD, it was found that significant improvements could be made in the duration of the Person Engaged joint engagement state over the course of twelve sessions. These results suggest that younger children than previously thought can show improvement from this type of treatment, and provide information about the training requirements that are needed.
AUTHOR: Courtney Benson

THESIS TITLE: Joint Attention and Joint Engagement Among Minimally Verbal Children With Autism: A Review of JASPER and EMT for Preschoolers

ADVISOR: Danai Fannin

ADVISOR’S DEPARTMENT: Allied Health and Communicative Disorders

DISCIPLINE: Speech-Language Pathology

YEAR: 2015

PAGE LENGTH: 16

BIBLIOGRAPHY: Yes

ILLUSTRATED: No

PUBLISHED (YES OR NO): No

LIST PUBLICATION: N/A

COPIES AVAILABLE (HARD COPY, MICROFILM, DISKETTE): Hard copy, digital file

ABSTRACT (100-200 WORDS): Yes
Northern Illinois University

Joint Attention and Joint Engagement Among Minimally Verbal Children With Autism: A Review of JASPER and EMT for Preschoolers

A Thesis Submitted to the
University Honors Program
In Partial Fulfillment of the
Requirements of the Baccalaureate Degree
With Upper Division Honors

Department of
Allied Health and Communicative Disorders

By
Courtney Benson

Dekalb, Illinois
December 2015
Abstract

Autism Spectrum Disorder (ASD) is a pervasive developmental disorder with core deficits that impair communication, emotional development, and joint attention skills (Landa, Gross, Stuart, & Faherty, 2013). Joint attention skills have been shown to relate to expressive language development, and usually emerge later in children with ASD when compared to typically developing children (Paparella, Goods, Freeman, & Kasari, 2011). By completing a literature review of the JASPER and EMT treatment methods, as well as a quasi-experimental study of the implementation of a JASP + EMT treatment on a three-year old minimally verbal boy with moderate ASD, it was found that significant improvements could be made in the duration of the Person Engaged joint engagement state over the course of twelve sessions. These results suggest that younger children than previously thought can show improvement from this type of treatment, and provide information about the training requirements that are needed.
Autism is a neuropsychiatric disorder that affects more than one in sixty-eight children in the United States (Centers for Disease Control and Prevention, 2015). Autism Spectrum Disorder (ASD) is characterized by impairments in social interactions, communication, and patterns of behavior that are restricted and/or stereotyped (Volkmar & Pauls, 2003). Furthermore, ASD is recognized as a pervasive developmental disorder, and little is known about the onset or early behavioral developmental trajectory for children with ASD (Landa, Gross, Stuart, & Faherty, 2013). The cause of ASD is also unknown but some posit that heightened awareness of ASD, and evolving definitions of it have led to more diagnoses (Volkmar & Pauls, 2003). Evidence exists for a genetic contribution to the cause of ASD and research on potential environmental causes is ongoing (Shelton et al., 2014; Volk et al., 2014).

Although the etiology is not clear, the definition of ASD is supported by specific characteristics. Core deficits of ASD involve communication impairment, delays in emotional development, and impaired joint attention skills. According to Volkmar and Pauls (2003), joint attention and attachment, as well as delays in language development are hallmark clinical features of ASD, with delays in language being the most common complaint among parents. Paparella, Goods, Freeman, & Kasari (2011), have shown that joint attention skills relate to expressive language development, and usually emerge later in children with ASD when compared to typically developing children. Children with ASD also have fewer adaptive strategies, and the deficits in joint attention can be linked to self-regulation difficulties (Gulsrud, Jahromi, & Kasari (2010). The types of joint attention skills expected of children by 20 months of age include pointing, showing, coordinated looks between people and objects, following others’ eye gaze, and giving (Mundy et al., 2003; Paparella et al., 2011). Table 1 describes the timeline in which typically developing children will begin using these skills.
Given the fact that joint attention is related to so much of the communication that we do, it is considered a pivotal skill. Pivotal skills are those that are “of crucial importance” (Charman, 2003, p. 315). When discussing children with ASD and language impairments, the pivotal skill of joint attention helps children initiate non-verbal and gestural communication, which is usually delayed, but has great importance for communication with others (Charman, 2003). This type of pivotal skill has been targeted because it corresponds with core deficits specific to ASD, such as impaired communication, and can positively affect different language skills in a broader manner. By focusing on joint attention in a broader sense, more areas of language can be improved, rather than focusing treatment on just one aspect of communication or language. Thus, this pivotal skill has been targeted in treatment to address the limited expressive language and vocabulary that is characteristic of language disorders. By making a treatment that is more specific to ASD, and the impairments that commonly occur with it, like joint attention and joint engagement, more successful treatment outcomes can be reached.

Table 1

<table>
<thead>
<tr>
<th>Timeline for emergence of joint attention skills in typically developing children (Paparella et al., 2011)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Coordinated joint look</strong></td>
</tr>
<tr>
<td><strong>Non-verbal gestures to refer to objects with shared focus</strong></td>
</tr>
<tr>
<td><strong>Showing</strong></td>
</tr>
</tbody>
</table>
When describing the different types of joint attention behaviors, there are ones that are initiated by the child, as well as ones that are initiated by an adult. According to Mundy et al. (2003), “Pointing can be initiated by either the child or a parent, and involves clear articulation of the index finger to point to an object or person” (p. 20). Showing is usually “a brief bid directed to the face with the individual retracting the proffered object” (Mundy et al., 2003, p. 20). Coordinated joint looks are three-point object-person-object, or person-object-person looks (Mundy et al., 2003). Giving is usually directed to the hands or body, and involves maintained gestures until the adult retrieves the object, according to Mundy et al. (2003), which is not to be confused with a behavioral give, in which the child pushes, throws, or hands an object to the adult in order to request that they repeat an action, get rid of the object, or provide help. When a child follows a parent’s gaze, they focus on the parent’s eyes and then follow their gaze until both the child and parent are focused on the same object (Mundy et al., 2003). All of these behaviors are important for communicating with others, and must be targeted by treatment in order to help improve a child’s ability to continue developing their language abilities.

In addition to the various types joint attention skills that young children possess, there are also several joint engagement states in which a child and adult can participate. Joint engagement states are social interactions in which an object or referent is shared between a child and an adult (Bakeman & Adamson, 1984). Table 2 describes twelve joint engagement states.

<table>
<thead>
<tr>
<th>Eye gaze following</th>
<th>12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reaching and giving</td>
<td>13 months</td>
</tr>
<tr>
<td>Pointing with intent</td>
<td>16 months</td>
</tr>
</tbody>
</table>

Table 2

Eye gaze following | 12 months
Reaching and giving | 13 months
Pointing with intent | 16 months
### Joint Engagement States (Adapted from Bakeman & Adamson, 1984)

<table>
<thead>
<tr>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off task</td>
<td>Cannot get adequate view of child’s activities</td>
</tr>
<tr>
<td>Unengaged</td>
<td>Child is uninvolved with people, objects, events, or symbols</td>
</tr>
<tr>
<td>Symbols only</td>
<td>Child actively attends to symbols and appears uninvolved with people, objects, or events (Symbols can be words or gestures)</td>
</tr>
<tr>
<td>Onlooking</td>
<td>Child watches adult’s activity; child may be looking at adult or at the object that the adult is manipulating</td>
</tr>
<tr>
<td>Object</td>
<td>Child is exclusively engaged with objects</td>
</tr>
<tr>
<td>Object with symbols</td>
<td>Child is exclusively engaged with objects and there is evidence that the child is actively attending to symbols</td>
</tr>
<tr>
<td>Person engaged</td>
<td>Child is interacting only with adult</td>
</tr>
<tr>
<td>Person engaged with symbol</td>
<td>Child is interacting only with adult and there is evidence that the child is actively attending to symbols</td>
</tr>
<tr>
<td>Supported joint</td>
<td>Child and adult are actively involved with the same object or event, but the child is not actively acknowledging the adult’s participation</td>
</tr>
<tr>
<td>Supported joint with symbols</td>
<td>Child and adult are engaged with the same referent and there is evidence that the child is actively attending to symbols, but the child is not explicitly attending to the adult</td>
</tr>
<tr>
<td>Coordinated joint</td>
<td>Child and adult are actively involved with the same referent, and the child is actively and repeatedly acknowledging the adult’s participation by visually referencing the adult at critical junctures in the interaction</td>
</tr>
</tbody>
</table>


Coordinated joint with symbols
Child is coordinating his or her attention between adult and a shared referent; child is actively attending to symbols; child may indicate his or her attention to the adult by glancing toward them or talking to the adult

These states of engagement are significant, because it is within these states of being engaged with an adult that language is learned. Understanding these states of engagement is important for noting progress made by a child, as there is a hierarchical progression from unengaged to coordinated joint engagement states. This knowledge of joint engagement states, and the developmental trajectory for their use can help early interventionists, who use the brain’s neuroplasticity to their advantage, and target joint attention skills in young children with ASD (Wong & Kasari, 2012).

Treatments targeting joint attention have been used and one specific type of treatment is Joint Attention Symbolic Play Engagement and Regulation (JASPER), (Kasari et al., 2014). According to Kasari et al. (2014), JASPER s a naturalistic behavioral intervention that focuses on developing pre-linguistic gestures and play skills that can be used for joint engagement. Another type of treatment that can be used with individuals with ASD is Enhanced Milieu Therapy (EMT), which is a naturalistic model of early language intervention, according to Kaiser and Roberts (2013). This treatment model is designed to increase linguistic complexity and social communicative use of language through the use of environmental arrangement, responsive interaction, specific language modeling and expansions, and milieu teaching prompts (Kaiser & Roberts, 2013).
While both of these treatment methods have been effective on their own for preschool-aged children with ASD, interventions are now involving a hybrid blend of the two types of treatment models. According to Kasari et al. (2014), JASP + EMT is a blend of the two interventions. With evidence of efficacy for both treatments on their own (Goodes, Ishijima, Chang, & Kasari, 2013; Kaiser & Roberts, 2013; Olive et al., 2006), it seems likely that combining the two treatments will lead to even better outcomes for children with ASD at the preschool level. This hybrid intervention model has shown to increase communication in children with ASD who are minimally verbal, as shown by Kasari et al., 2014. According to Kasari et al. (2014), 25-30% of children with ASD remain minimally verbal after intervention. Minimally verbal children are an underrepresented population in ASD treatment studies, so the JASP + EMT study (2014) showing improvement in language for this population is promising.

It is because of the promising outcomes for this type of treatment that the current study was conducted. By implementing the JASP + EMT blended treatment on a minimally verbal child, the investigators hoped to see similar results on a younger population as was previously found in JASPER studies (Kasari et al., 2014). Though the original study was tested on minimally verbal children ages five to eight (Kasari et al., 2014), our study was completed on a minimally verbal child who was three years old. This was done to examine the effects of the treatment on a younger population, as it is important to begin an intervention as early as possible.

When the participant came to the NIU clinic, it was determined that he met most of the criteria for the receipt of JASP + EMT (i.e. minimally verbal, previous treatment, refusal of other communication modes such as picture systems and baby sign language, no diagnosis of cognitive impairment thus far). This client presented an opportunity to explore implementation science by observing treatment outcomes as a result of a graduate student clinicians administering JASP +
EMT in a setting away from the research lab. Redle (n.d.) stated that, “understanding as implementation science. According to Redle (n.d.), “understanding the best strategies for implementing change informs an individual on how to make changes and facilitates efficient use of resources” (p. 2). This is the purpose of implementation science and the current study’s aim is to measure the efficacy of a treatment (Redle, n.d.). Using implementation science to carry out a targeted intervention method allows for more well developed evidence and knowledge translation, or the “process through which new evidence is synthesized and adopted into clinical practice” (Redle, n.d., p. 2).

The current study was a single subject, quasi-experimental design assessing the baseline status of the child’s joint attention skills, and the joint attention and joint engagement levels after the treatment. All sessions for this study were held at the Northern Illinois University Speech-Language-Hearing Clinic in Fall 2014. The treatment was performed by a graduate student who had learned the JASP + EMT method from a treatment manual and guidance from a clinical supervisor familiar with research from the JASPER lab. The graduate student reviewed training materials and got information from the developers of the treatment, which was then implemented into our study.

The child receiving treatment was three years old and minimally verbal. Each week the child received treatment from the graduate student for 45 minutes. The frequency of joint attention gestures at the beginning and end of the 12-week treatment was analyzed, and the duration for each of these joint engagement states assessed. A coding system designed by the developers of the treatment was used (Gulsrud, Jahromi, & Kasari, 2010). This coding system allowed for the organization of data on joint attention frequency and joint engagement state duration. The purpose of this intervention was to determine if joint attention skills and joint
engagement states in a four-year-old child with moderate ASD could improve over the course of 12, weekly 45-minute sessions. The target of the intervention was emerging use of low-level symbols during joint engagement.

The participant was assessed and diagnosed by an interdisciplinary team at Children’s Memorial Hospital. Therefore, initial assessments and for cognition, autism, and language skills were not administered at NIU. Assessments on social communication, joint engagement, and a structured play were conducted instead to provide a baseline of skills from which the treatment targets were derived. The assessment of joint engagement was completed by coding the initiation of joint engagement interactions, and the duration of each joint engaged state (Adamson, Bakeman & Deckner, 2004). In addition, the Structured Play assessment (Ungerer & Sigman, 1981) was administered to determine the child’s play level. In the structured play assessment, the child is given different sets of toys at a table and functional and symbolic play acts are coded. The Early Social-Communication Scales (ESCS), (Mudy et al., 2003) was used to examine both initiations and responses to joint attention behaviors (coordinated looking, pointing and showing, follows points).

The graduate student administered JASP + EMT treatment through play with age appropriate toys, including bubbles, books, play-doh, dolls, wagon, etc. that were arranged in the room on the floor. Other items in the room included a table and chairs, as well as cameras for videotaping each session. Both an overhead camera and a portable digital camera were needed during treatment sessions to get a better view at different angles, due to the child’s continual moving. To provide support and encouragement for the child, the mother and baby brother sat in the treatment room and helped the graduate clinician gain the child’s attention when needed.
During treatment sessions, the graduate clinician and child also used a Speech Generating Device (SGD) in the form of an Apple iPad, using the TouchChat software designed for SGDs. During treatment sessions, the clinician encouraged the child to use the SGD by guiding the child’s hand and aiding him in pushing the button on the SGD if needed, and then gradually faded away. In addition, the graduate clinician used the SGD when he spoke to demonstrate the ability to communicate using the SGD. Each picture on the SGD was arranged to represent a word, and when the picture was pushed, the word would play on the SGD.

Once the data were gathered, a coding system was used to analyze the engagement states. Training for coding occurred through practice of non-study interaction DVD’s. Disagreements during coding were discussed in order to reach a consensus and ensure reliability. Once 90% agreement was established on practice cases, the investigators began independent coding of the two practice sessions of the study participant. Reliability was calculated on those two practice videos as: number of agreed time segments coded for Joint Engagement states/total number of agreed time segments coded for Joint Engagement states, resulting in a range of 89% reliability.

A paired samples t-test was conducted to compare the number of seconds spent in each engaged state in the first session analyzed, and the number of seconds spent in each engaged state at the twelfth session. There was a significant difference in the time spent in Person Engaged states at Time 1 (M= 9.46, SD= 11.93) and Time 2 (M= 2.08, SD= 7.49) conditions; t(12)= 2.48, p= 0.03. There were no occurrences of Symbol, Object with Symbols, Person Engaged with Symbols, Supported Joint with Symbols, Coordinated Joint, or Coordinated Joint with Symbols. In addition, none of the remaining engaged states of Off Task, Unengaged, Onlooking, Object, and Supported Joint showed significant differences between Time 1 and Time 2. These results suggest that the duration of time spent in a Person Engaged state can be
increased after twelve sessions of JASP + EMT, while several engagement states may not be attained. Furthermore, the twelve sessions of treatment in this case did not cause a change in the duration of time spent in other engaged states.

In order to explain these results, it is important to keep in mind the age of the child, in addition to the amount of treatment the participant received. In the case of this study, the participant was only three years old, so it was less likely that the higher levels of engagement would be achieved than if he had been older and exposed to more social interaction. In addition, the sporadic treatment delivery, which included breaks during the school year, prevented the graduate student from providing treatment for twelve straight weeks. Some treatment sessions were also missed due to the child being sick, so the inconsistent treatment delivery led to a lower expectation for the higher levels of engagement in only 12 weeks. With all of these breaks in treatment, the chronological time period for 12 sessions ended up being spread out over a longer period. Furthermore, it is important to note that sensory seeking children can often be more difficult to engage in a play routine or interaction compared to a typically developing child. Since the treatment method used in this study was play based, it was challenging to get the participant to engage at times. With these factors in mind, the results can be more adequately explained and applied to future treatment and research.

The limitations for this study are associated with the amount of time that the graduate student had to learn the JASP + EMT methods, and their inability to reach fidelity before implementation. As NIU is a teaching university, graduate students learn about and practice treatments as they progress through their clinical experiences, so fidelity may not always be reached at the initial treatment session. The way the graduate student administered the treatment, however, provides an example of how this treatment might be learned and implemented in a real-
life setting outside of a research lab, where interventionists are trained to fidelity before they even start the first treatment session. This study demonstrates that; (a), 45-minute sessions once a week, which deviates from the two hours a week in the research study, might not be a high enough dosage in duration and frequency; (b), it is possible for clinicians to learn the treatment without going through formal training, but they may need more time to practice implementing the treatment before starting with a client; and (c), a sensory seeking child might be more difficult to engage in a play routine or interaction than a child who is not.

Joint attention skills, as well as delays in language development, are hallmark clinical features of ASD, with delays in language being the most common complaint among parents (Volkmar & Pauls, 2003). Since joint attention skills relate to expressive language development, it is important to target these behaviors early on, as they often emerge later in children with ASD when compared to typically developing children (Paparella, Goods, Freeman, & Kasari, 2011). This study examined the effectiveness of a twelve-session treatment in which the joint engagement states of: off task, unengaged, symbols, onlooking, object, object with symbols, person engaged, person engaged with symbols, supported joint, supported joint with symbols, coordinated joint, and coordinated joint with symbols were targeted. The results indicated that there was a significant improvement in the duration of person-engaged states between the Time 1 treatment and Time 2 treatment. This suggests that improvement can be made through this type of intervention on children of a younger age than previously thought, though the duration of treatment may need to be of a higher frequency to elicit more positive results.
References


Volk, H. E., Kerin, T., Lurmann, F., Hertz-Picciotto, I., McConnell, R., & Campbell, D. B.
