An Evaluation of Classroom Based Sensory Strategies for Preschoolers with Autism Spectrum Disorder: Preliminary Pilot Data

K. A. Kroeger,

Natalie Justice and Megan E. Carlton

Cincinnati Children's Medical Center, University of Cincinnati College of Medicine

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ABSTRACT

Autistic children face daily challenges with sensory processing that can impact their focus and learning. The current pilot study examines the effects of a sensory intervention involving joint compressions (scheduled application of firm pressure on the child's joints) on outcomes of engagement with a preschool-aged child diagnosed with ASD. This multielement single-case design demonstrates the effects of a joint compression intervention and additional element of reinforcement. Procedures were implemented by a multi-disciplinary team within a hospital-based preschool-type setting utilizing principles of applied behavior analysis and sensory strategies. Data were collected and analyzed for one target participant, Seth, and one control participant. Results for the target indicate positive gains for averaged pro-learning behaviors in treatment phases and reduced gains during return to baseline phases. Results for the control expected consistently high rates of pro-learning behaviors, demonstrating the need for intervention for the target participant. Results provide evidence on the effectiveness of sensory intervention involving joint compressions at improving learning behaviors of appropriate sitting, appropriate motor activity, and engagement with teaching tasks and learning material. Implications for practice in educational settings and limitations to the current study and areas of future research are addressed in the discussion.

Keywords: autism, preschool, sensory, intervention

A comprehensive treatment program for individuals diagnosed with autism spectrum disorder (ASD) is comprised of a variety of services including educational, speech and language, occupational therapy, and behavioral services (Schaaf, 2011). Early Intensive Behavioral Intervention (EIBI) is evidence-based practice for preschool-aged children diagnosed with ASD that is based on principles of applied behavior analysis (ABA; Smith & Iadarola, 2015). EIBI programming follows systematic teaching methods and involves techniques such as natural environment teaching, discrete trial teaching, prompt fading, and positive reinforcement. Targeted instruction is developed to support social skills, play skills, pre-academic skills, language and communication, and activities of daily living. Instruction is individualized and provided in the form of whole-group or one-on-one learning. Supportive strategies are implemented to target additional areas such as behavioral disruptions, rigidities, or complex sensory patterns that impact quality of life.

Assessment, evaluation, and data-based decision making are at the core of implementing effective instruction and intervention for autistic children, especially when considering their diverse and complex needs. Meta-analyses indicate a large effect size for IQ change and moderate effect size for adaptive behavior when provided EIBI, further supporting intensive early intervention for autistic children (Eldevik et al., 2009). Now a widely accepted and empirically supported framework, early intensive intervention has become the standard of care for young children with ASD (Larsson, 2013). Additionally, there is support for the implementation of EIBI across learning environments, including home, preschool, kindergarten, and community settings (Eikeseth, Klintwall, Jahr, & Karlsson, 2012; Waters, Dickens, Thurston, Lu, & Smith, 2020).

Due to the DSM-V inclusion of sensory differences in ASD criteria, increased interest has focused on sensory processing research. Sensory processing refers collectively to the intake of sensory information and the behavioral manifestation of output in processing that information. Sensory processing differences in ASD individuals are highly prevalent and are demonstrated across all modalities including auditory, visual, somatosensory, gustatory, olfactory, and vestibular systems (Baranek, Little, Parham, Ausderau, & Sabatos-DeVito, 2014). Sensory symptoms are early markers of ASD and are theoretically predictive of social-communication deficits and repetitive behaviors in childhood (Robertson & Baron-Cohen, 2017). Families report that behaviors associated with difficulty processing and integrating sensory information create social isolation for them and their child and can impact social engagement and daily living activities (Schaaf, 2011).

According to sensory processing theory, sensory features in autistic individuals result from difficulty simultaneously filtering and processing incoming sensory information from multiple modalities (Baranek et al., 2014). Educational settings are typically comprised of complex sensory environments, such as multiple children and staff in one room, visual items plastered on walls, auditory buzz of overhead fluorescent lights and smells of cleaning products. While this sensory experience is often referred in classroom settings, few researchers have systematically studied the sensory responses of children with ASD on emotional, behavioral, and educational outcomes within a classroom setting (Ashburner, Ziviani, & Rodger, 2008), and even fewer studies exist systematically examining the individual techniques developed to target sensory intervention effects. Interventions to address difficulty processing sensory information, including occupational therapy using sensory integration, are frequently requested by parents of autistic children or children with sensory difficulties (Schaaf et al., 2014), despite a common core of technique repository or evidence base.

Occupational therapy interventions should be participation-focused and multifaceted to meet the needs of children with sensory processing difficulties (Reynolds et al., 2017). That is, a sensory-based approach focuses on improving child participation in activities through the use of individualized sensory motor activities (Schaaf, 2011). Working within an EIBI framework, OTs might function to develop individualized sensory-motor support plans and activities based on areas of need that target helping to intake sensory information and process it for appropriate behavioral output. Often, OTs collaborate with teachers and other staff to support student engagement via implementation of sensory-motor support plans. These plans range from comprehensive sensory integration (Smith, 2019) to scheduled "sensory diets," (Lang et al., 2012) to technique specific, behavior-matched interventions, such as joint compressions or oral-motor input (Lang et al., 2012). According to sensory processing theory, proprioception (or body awareness) is our body's "information from muscles and joints" that facilitates understanding of where the body is in relation to itself and surrounding objects and too much or too little sensory input results in observable behavior change (Blanche, Reinoso, Chang, & Bodison, 2012). Due to current gaps in the literature, there is insufficient evidence on the effectiveness of incorporating specific sensory techniques into preschool classroom routines for autistic children (Bodison & Parham, 2018).

Purpose of the Present Study

The current study sought to examine the effects of an individualized sensory-integrative intervention on behavior specific outcomes of student engagement within an early intervention classroom-type setting. The goal was to improve participation and appropriate motor activity for an autistic preschooler using a targeted sensory intervention; namely, "joint compressions," where systematic pressure is delivered to the child's body joints at predetermined time intervals. This single-case design study using multiple elements was collaboratively implemented by allied professionals and support staff in an early intervention setting. It was hypothesized that implementation of joint compressions would increase engagement and decrease off-task behaviors during learning.

Method

Participants

Two children participated in the study, one who was the recipient of the intervention and the other child served as a treatment control. The children were enrolled in an early intervention ABA program conducted at a local children's hospital and they were selected as a sample of convenience. The children attended sessions four days per week for three hours each day, nine months out the year, with subsequent summer programming provided on a weekly, but less intense schedule. During the intensive portion of the school year, the children received individualized and group-based occupational therapy services where the OT participated for the duration of a group session (three hours once per week) and conducted individual work sessions with each child during that session (ranging from 15-30 minutes on average weekly). The children were self-selected to participate in the EIBI program, and the OT services were evenly distributed as a service line offered in the EIBI program.

The target participant, "Seth," an African American boy, was 4 years, 4 months at the initiation of the intervention protocol. Seth received a diagnosis of ASD from a multidisciplinary team in an autism clinic at a local children's hospital at the age of 2 years, 7 months. Seth scored in the "Moderate to Severe" range on the *Toddler Module of the Autism Diagnostic Observation Schedule, Second Edition* (ADOS-2; Lord et al., 2012). On the *Preschool Language Scale-5* (PLS-5; Zimmerman, Steiner, & Pond, 2011), he scored a standard score of 57 for auditory comprehension, 64 for expressive communication, and 58 for total language (X SS=100, SD=15). At the time of intervention, a *Sensory Processing Measure-Preschool* (SPM-P) home form (Ecker & Parham, 2010) and school form (Miller-Kuhaneck, Henry, & Glennon, 2010) were both completed, by parents and teachers respectively. Seth did not score within a typical range (T-score 40-59) on any domains on either measure. He scored in the "some problems" range (T-score 60-69) on social, hearing, touch, body awareness, balance and motion, and total systems domains on the parent form. He scored "definite dysfunction" (T-score 70-80) on all domains of the school form and on the visual and planning and ideas domains on the parent form. Seth used the Picture Exchange Communication System (PECS; Frost & Bondy, 1994) where he was communicating in Phase IV (sentence construction) at the time of intervention.

Penny, a Caucasian girl who was 4 years, 1 month at the initiation of intervention was the treatment control. Penny was diagnosed with ASD in the same autism clinic at the children's hospital at the age of 1 year, 11 months. Penny scored in the "Moderate to Severe" range on the *Toddler Module of the Autism Diagnostic Observation Schedule, Second Edition* (ADOS-2; Lord et al., 2012), On the *Preschool Language Scale-5* (PLS-5; Zimmerman, Steiner & Pond, 2011), she scored a standard score of 77 for auditory comprehension, 85 for expressive communication, and 80 for total language (X SS=100, SD=15). On the *Vineland Adaptive Behavior Scale* (VABS–II; Sparrow, Cicchetti, & Balla, 2005) her composite score was 73 (X=100, SD=15). Scores on the *Mullen Scales of Early Learning* (Mullen, 1995) were: visual reception (T=47), fine motor (T=37), receptive language (T=20), expressive language (T=<20). At the time of intervention, a *Sensory Processing Measure-Preschool* (SPM-P) home form (Ecker & Parham, 2010) and school form (Miller-Kuhaneck, Henry, & Glennon, 2010) were both completed, by parents and teachers respectively. Penny scored within a typical range (T-score 40-59) on the visual, touch, and body awareness domains on the school form and on the social domain on the parent form. She scored in the "some problems" range (T-score 60-69) on the social, hearing, and total systems domains on the school form and visual, hearing, touch, body awareness, balance and motion, planning and ideas, and total systems domains on the parent form. She scored "definite dysfunction" (T-score 70-80) on balance and motion and planning and ideas domains on the school form. Penny was functionally verbal (one to three word phrases), but supplemented communication using PECS, where she was communicating in Phase V (attributes) at the start of intervention and transitioned to an augmentative and alternative communication (AAC) device using TouchChat© by the end of the intervention period. Penny was selected as the control subject because she also had elevations on the SPM-P, but did not display corresponding disruptive-to-learning behaviors, as did Seth. Despite assessment significance, these sensory processing differences did not manifest in her behaviorally at the time of study.

The study was conducted in a preschool-style classroom setting within a children's hospital. The treatment room was a large room with an attached, private bathroom and adjacent smaller treatment room, as well as an attached observation deck outfitted with one-way audio speaker and mirror. The room was equipped with academic and social play materials and designed to allow both whole-group and one-on-one instruction. Direct intervention was provided daily by a team of Behavioral Health Specialists (BHS; 3:6 per child ratio). Weekly direct intervention and ongoing indirect consultation was provided by an interdisciplinary team composed of clinical psychologist, occupational therapist, and speech pathologist. Intervention employed applied behavioral analytic teaching strategies and was comprehensive in targeting academic, social-communicative, and cognitive skill building, activities of daily living, as well as disruptive-to-learning behavior reduction. Intervention was designed to be provided four days per week, three hours each session for nine months consecutively. The study was delivered as part of ongoing intervention, to which the participants' parents consented to treatment (assumed informed consent). Permission to publish deidentified data was obtained (overt informed consent). The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the Ethics Committee of (removed for blinded review) on (date).

Data collection and interobserver agreement

Data were collected continuously throughout baseline and intervention phases. For Penny, baseline data were collected across 35 sessions. Penny did not receive intervention. For Seth, baseline and intervention data were collected across a total of 40 sessions. In the following order: baseline data were collected for 11 sessions and then joint compression intervention data were collected for 5 sessions. Data were collected during a return to baseline phase for four sessions and then a two-minute reinforcement phase for 16 sessions. Next was a phase combining the joint compressions intervention with the two-minute reinforcement in which data were collected for five sessions. Across all phases, data collection was conducted via momentary time sampling in which the data collector marked occurrences and non-occurrences of target behaviors across one-minute intervals. Interobserver agreement (IOA) data were collected in which trained observers rated and recorded the children's target data according to set time intervals. Reliability was assessed during 9 total sessions of baseline for Penny and 8 total sessions of baseline and intervention for Seth. IOA during baseline and intervention (calculated using the exact agreement method) was 97.9% for Penny and 93.3% for Seth. Fidelity checklists were completed by the OT showing 98% intervention accuracy across active OT intervention treatment phases (i.e., phases I and IV).

Operational definition of target behaviors

Data were collected on target behaviors of engagement and active participation including appropriate motor activity and in-seat behavior (defined below). Engagement was defined as any instance of responding to directions after a directive is given (including individual and group directives). Responses include the following: joint attention, attending to task/materials or instructor, providing a verbal or motor response, and appropriately directing eye gaze. Engagement was recorded as a behavioral response upon any directive given within five seconds before or after the one-minute interval and marked as positive (+) for occurrence or negative (-) for non-occurrence. If a directive was not given during the interval, the data collector marked 'N/A'.

Active Participation included appropriate motor activity or in-seat behavior. Appropriate motor activity was defined as any instance of motor activity directly related to the assigned task and was recorded as positive (+) for occurrence of appropriate motor activity. Data were also collected as any instance of motor activity not directly related to the assigned task and recorded as negative (-) for non-occurrence, or as inappropriate motor activity. Responses of appropriate motor activity include appropriately engaging in motor activity related to the academic task such as hand-raising, dancing, or singing along, clapping hands, and page-turning. Responses of inappropriate motor activity include engaging in motor activity not related to the academic task or engaging in inappropriate verbalizations or stereotypies. In-seat behavior was defined as the child's body positioned in the seat in an upright manner, with feet on the floor, facing forward or toward the instructor/task and the chair was located within the designated task area. Data were recorded for in-seat behavior as positive (+) for occurrence or negative (-) for non-occurrence. Responses coded as negative (-) included child sitting in chair while bent forward, head between legs, body turned away from task, or child pushing chair away from task or designated area. Data for active participation were recorded for behavior according to the same method as engagement: occurrences were recorded according to one-minute momentary time sampling intervals, upon any directive give within five seconds before or after the one-minute interval. If a directive was not given during the interval, the data collector marked 'N/A.'

Joint compressions sensory strategy

Following clinical observations, the OT chose sensory strategies tailored to the specific needs of the target child in attempt to affect positive behavior change in the home/classroom setting, as according to Schaaf guidelines (2011). The sensory system addressed during this preliminary study was the proprioceptive system (the system in-taking touch and orientation-of- body-in-space sensory information). During clinical observations made by the classroom OT, Seth demonstrated behaviors consistent with desire to seek additional proprioceptive input (e.g., leaning forward in seat, falling out of seat, running into classroom furniture, and climbing on classroom materials and wall mounts). Items noted as "frequent" or "always" on the SPM-P included: using too much or too little force with objects and others, bumping into peers/others, jumping excessively or seeking out crash landings, driven to activities that involve pushing, pulling dragging, lifting, or jumping, and being unsure of how far to raise or lower his body during movement (Ecker & Parham, 2010; Miller-Kuhaneck, Henry, & Glennon, 2010). Because Seth's observed behaviors were consistent with assumed under responsiveness to proprioceptive input, joint compressions, an intervention to provide proprioceptive input, was chosen.

Joint compressions are a sensory-based technique administered by an OT or trained professional and involve applying deep pressure to various joints. Joint compressions provide proprioceptive input to the body and are an appropriate technique for children with ASD experiencing related sensory processing challenges. Under the direction of a trained OT, staff administered joint compressions with "quick, firm inward pressure and rhythmic technique" and used a "firm grasp to stabilize both sides of the joint being compressed," based on standard intervention practice. Staff additionally were trained on reasons to stop joint compressions, such as signs of pain or discomfort.

Joint compressions were administered by an OT or trained staff member upon Seth's entry to the classroom each day. Joint compressions were completed a second time two hours later, per the recommendation from the guideline cited above. Joints compressed included the following bilaterally: shoulder, elbow, wrist, hand, fingers, hips, knees, ankles. For example, when compressing the shoulder, staff placed one hand on top of the child's shoulder and their other hand under the elbow, creating a 90-degree angle. Staff used firm pressure to push from their bottom hand (on the elbow) into the shoulder joint.

Procedure

Consent was obtained from the children's caregivers prior to collection of baseline data and intervention implementation. The procedure used, a specific sensory intervention, was developed according to anecdotal-based sensory strategy evidence for treatment of autistic children or other neurodevelopmental disorders. Intervention implementation occurred twice a day, two hours apart, four days per week within the children's typical learning environment. Daily videos were recorded of the children during opening circle time, one of their daily work sessions (one-on-one individual work), and group music time for data collection purposes. Reliability data were collected by staff, as well as a graduate student trainee.

Experimental design and baseline. This study collected data across two participants, one control and one test participant, according to a multielement single-case design (Kennedy, 2005). The baseline phase involved data collection during the child's typical academic and social programming according to his/her daily school schedule. The intervention phase involved data collection during implementation of the sensory intervention which supplemented the child's daily school schedule.

Joint compression intervention and components. During all phases, an unobtrusive camera was set up facing Seth and Penny during whole-group opening activities (e.g., greetings, calendar and weather conversation), one-on-one individual works, and whole-group music time. During baseline, intervention was not conducted and participants received their typical classroom programming. Data were coded subsequently by watching the video recordings and scoring participant behavior according to operational definitions of target behaviors as described above.

During the first phase of intervention, joint compressions were administered to Seth according to the procedures outlined above. A timer was set for two hours, at which point joint compressions were administered again. A trained OT observed staff implementing joint compressions approximately once per week and completed a fidelity checklist during each phase of intervention. Penny continued in baseline. Data were collected consistently with the previous phase.

During the return to baseline phase, Seth's programming returned to baseline procedures. These procedures consisted of the removal of the joint compressions intervention and continuation of typical classroom programming. Penny continued in baseline. Data were collected consistently with the previous phases.

Following the return to baseline phase was an intervention phase consisting of reinforcement for target behaviors. This intervention phase involved presentation of reinforcement for behavior according to two-minute time-sampling in which staff wore a silent timer set at two-minute intervals that indicated the start of each interval with a vibration. At the start of each interval, contingent on Seth engaging in target behaviors according to operational definitions, Seth received an edible reinforcer (e.g., fruit snack) paired with verbal praise (e.g., "I love how you are sitting in your seat."). If Seth was not engaging in any observable, appropriate behavior at the start of the interval, reinforcement was not provided during that interval. Penny continued in baseline. Data were collected consistently with the previous phases.

The final phase was an intervention phase consisting of a combination of joint compressions and reinforcement as given in previous phases. Joint compressions were administered as described in the first intervention phase and reinforcement was continued as in the previous phase according to two-minute time-sampling for target behaviors. Penny continued in baseline. Data were collected consistently with the previous phases.

Results

Figure 1 illustrates average daily percentages of each positive learning behavior target for Seth (intervention participant) across baseline and treatment phases. The initial baseline phase lasted 11 sessions, the joint compression treatment phase ("JC") lasted 5 sessions, followed by a return to baseline for 4 sessions. Following the return to baseline, the reinforcement treatment phase ("2 min R+") was implemented for 16 sessions and the final treatment phase of multielement joint compressions and reinforcement combined treatment ("JC and 2 min R+") was implemented for 4 sessions. Based on visual analysis of the data, positive gains for averaged pro-learning behaviors are noted in treatment phases, and reduced gains are noted during return to baseline phases, with some variation for in-seat behavior, appropriate motor behavior, and engagement across phases. Data show a decreasing trend during the second baseline phase, demonstrating effectiveness of treatment on improving the target behaviors, despite a non-significant jump in behaviors from baseline to joint comprehension treatment phase ("JC"). Data continue to follow a similar pattern for each target behavior during the reinforcement treatment phase ("2 min R+") and final treatment phase ("JC and 2 min R+). In the final sessions of intervention (sessions 35 through 40) within the reinforcement treatment phase ("2 min R+") and final treatment phase ("JC and 2 min R+"), behavioral responding maintained at higher levels as compared to both baseline phases.

Figure 1. *Average Daily Percentages of Behavior for Seth*

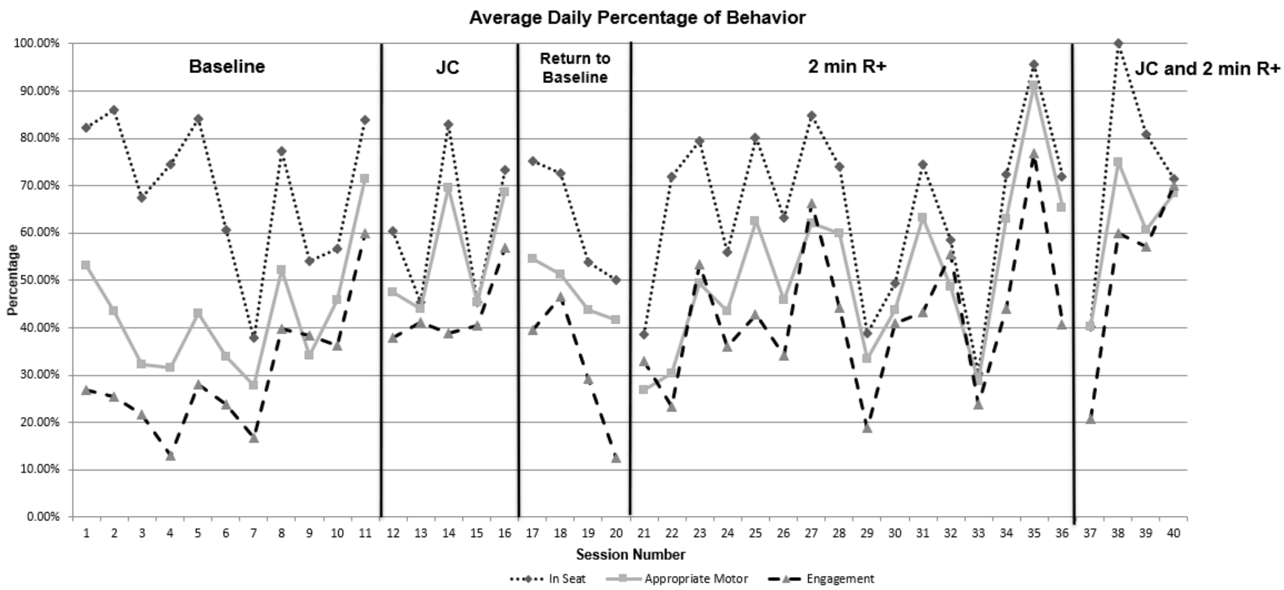

Figure 2 illustrates average daily percentages of each target behavior for Penny (control participant). In alignment with the design, the control participant did not receive treatment. Thus, data are representative of behavior during the typical learning environment (i.e., the same environment as baseline phases for target participant, Seth). Data were collected across 35 sessions for Penny due to continued establishment of a clear pattern of responding. Based on visual analysis of the data, Penny's results remain at high levels, with a steady trend and little variability for each target behavior. Similar to Seth, Penny's results demonstrate a clear pattern in responding for each behavior, supporting the notion that each behavior is aligned during learning activities.

Figure 2. *Average Daily Percentage of Target Behavior for Penny*

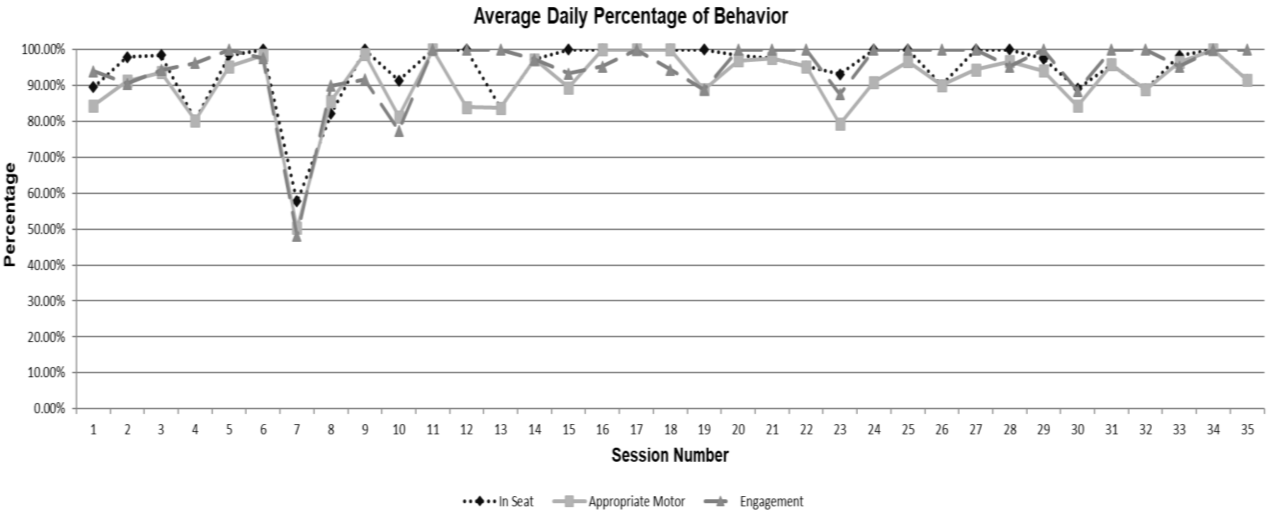

Table 1 outlines average percentages of behavior per phase for Seth. As displayed in the averages per phase, when treatment was withdrawn and the second baseline phase was implemented, in-seat behavior and appropriate motor behavior both decline to lower levels than the first baseline phase and the first treatment phase. Additionally, the final treatment phase involving joint compressions plus reinforcement displays higher levels of in-seat behavior, appropriate motor behavior, and engagement as compared to baseline levels. This further supports the claim that the treatment was effective at improving behavioral outcome. Table 2 displays Penny's average percentage per behavior during the same periods of time as Seth. Since no interventions were implemented with Penny, this illustrates her stability and provides information to conclude that other factors were not an influence in Seth's behavior change.

Table 1. *Average Percentages of Behavior per Phase for Seth*

Phase	In-Seat	Appropriate Motor	Engagement
Baseline (Time Series 1)	69.5	42.6	29.9
Joint Compressions (Time Series 2)	61.6	55.1	53.8
Baseline	62.9	47.8	31.9

(Time Series 3)			
Reinforcement (Time Series 4)	64.9	49.2	42.3
Joint Compressions + Reinforcement (Time Series 5)	73.1	61.4	51.9

Table 2. *Average Percentages of Behavior per Phase for Penny*

Phase	In-Seat	Appropriate Motor	Engagement
Time Series 1	88.0	84.9	88.8
Time Series 2	95.0	89.6	93.8
Time Series 3	99.4	97.3	96.0
Time Series 4	96.1	92.1	97.0
Time Series 5	96.6	96.0	100

Discussion

Results from this pilot data suggest that the sensory intervention strategy of joint compressions is therapeutic in increasing classroom readiness, or "pro-school" behaviors, including appropriate sitting and motor activity, as well as engagement with teaching tasks. While the effect observed is not hugely vast from treatment to baseline phases, it is indeed consistent and systematic with noticeable change. This would imply that the child was having difficulty attending and learning pro-school behaviors, assumedly due to difficulty processing proprioceptive input stimuli, and when a targeted intervention was applied, the behavior improved. Additionally, the changes in treatment effect behaviors were consistently observed across observers and such similar effects were not noted to occur in the control participant. The control participant's data showed steady improvement over time, indicating typical acquisition of pro-school behaviors. That is, the longer a child is in school, the better s/he should become at "doing" school behavior. One of the main aims of intensive early intervention is to increase a child's school readiness behaviors (in order to participate in the least restrictive classroom setting) and these data contribute to growing evidence that the sensory intervention of joint compressions improves such behaviors in children with autism.

As noted earlier, a comprehensive treatment program for autistic individuals is comprised of a variety of services including educational, speech and language, occupational therapy, and behavioral services (Schaaf, 2011). Working within an EIBI framework, OTs might function to develop individualized sensory-motor support plans and activities based on areas of need that target the intake and processing of sensory information for appropriate behavioral output. Often, OTs collaborate with teachers and other staff to support student engagement. In the current study, it is important to note that the sensory strategy was evaluated by the OT and matched to the assumed proprioceptive deficit/excess based on individual presentation. This procedure did not involve universally applying an intervention, but rather assessing skill deficit, collecting corresponding data, and matching an intervention based on individual need using an ABA format to implement and evaluate progress. This study highlights the importance of conducting multi-disciplinary work and providing individually tailored services. This is especially important in that anecdotal reports of sensory interventions in special education classrooms are often reactive rather than proactive. That is, behavior plans often note that sensory strategies should be applied after a negative behavior occurs, rather than on a schedule or to proactively prevent problematic behavior from occurring. This study highlights the importance of delivering systematic intervention, matched to target prosocial behavior given the sensory stimuli deficits, as an effective strategy that employed minimal time and effort, supporting in-school implementation.

The current study is limited by control of design. Ideally, a return to baseline phase would have been inserted between the reinforcement and combined intervention phases. While limiting, it highlights many real-world constraints on such interventions in applied settings. The design study final phases did not include a return to baseline as the academic year was coming to an end and the team aimed to maximize intervention in order to provide a developed treatment plan to the target participant's next classroom the following year. In educational settings, often intervention strategies are stopped or started due to uncontrolled limitations (e.g., winter break, end of school year, staff out on extended leave) and while these are naturally occurring events, they should be accounted for when restarting an intervention and/or evaluating intervention utility and effectiveness. Additional studies should focus on further manipulating the study design and delivery of interventions at random rotations in order to ascertain that the treatment effects were indeed reliably due to the treatment.

This study is also limited in its generalization of found effects. While a control participant was enrolled in order to demonstrate that a child who demonstrates "pro-school" behaviors tends to maintain those behaviors over time, in comparison to a child who is supported in developing "pro-school" behaviors with sensory and behavioral strategies that increase with intervention and decrease with the removal of intervention (return to baseline phases), the limited sample size does not allow for generalization of similar sensory supports for all children with ASD and similar sensory profiles. However, this single case study is important in that it begins to build the foundation for implementing sensory supports to increase positive behaviors in classroom settings for young autistic children, and more so, provides a model for how to begin to systematically build treatment plans that are multidisciplinary for increased and continued success, as well as how to monitor for effectiveness of those treatment effects ongoing. Such prescribed and controlled interventions in school settings open the potential to support autistic children in classroom settings with reduced levels of restriction while increasing access to learning.

Conclusion

Overall, the current study contributes to sensory integrative literature for preschool-aged, autistic children and provides practice implications for special education and early intervention services. The yielded results indicate preliminary support for joint compressions in an educational setting to increase pro-learning behaviors in a young child with ASD and these treatment effects are assumed to be due to the intervention, when compared to the control participant. Future research will further the field by investigating additional study designs with manipulation of treatment strategies, as well as increased sample sizes to determine generalizability to the overall early intervention ASD population.

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