Educators apply new teaching strategies despite initial attributions of autistic students' controllability of their behaviors

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Autistic children are less likely to be jointly engaged with a play partner than nonautistic children, negatively impacting social communication development. Promoting joint engagement during play can be an important target for educators of autistic students, but educator perceptions of autistic students may affect their interactions with students. This secondary data analysis investigated educator perceptions of the behaviors of their autistic students, their relationship on educator behavior, and their relationship on the implementation of an intervention promoting joint engagement. Participants included 66 autistic preschool students, and twelve educators from six preschools. Schools were randomized to educator training or a waitlist. Before training, educators rated their students' controllability over autism related behaviors. To observe educator behavior, they were filmed playing for ten minutes with students, before and after receiving training. Ratings of controllability were positively correlated with cognitive scores, and negatively correlated with ADOS (Autism Diagnostic Observation Schedule) comparison scores. Furthermore, educator ratings of controllability predicted joint engagement strategies used by educators during play. Educators tended to use strategies promoting joint engagement for students perceived as more able to control their autism spectrum disorder behavior. Among educators that received JASPER (Joint Attention, Symbolic Play, Engagement, and Regulation) training, ratings of controllability did not predict changes in strategy scores after training. Educators were able to learn and implement new joint engagement strategies despite their initial perceptions.

Keywords: autism; attribution theory; educator training; JASPER; joint engagement; preschool

Introduction

Challenges with social communication are a core tenet of autism, and most evident during times of joint engagement. Moments of joint engagement occur when an individual shares a topic or activity with a social partner. During these moments, we expect to see joint attention, through expressive language, eye contact, and gestures, indicating that the people involved are indeed sharing the topic or activity together. Considering the challenges autistic individuals face with social communication, it should come as no surprise that joint engagement presents a challenge as well. These challenges appear early in development, as young autistic children are less likely to be jointly engaged during play with their caregivers when compared to nonautistic peers (Adamson *et al.* 2009, Adamson *et al.* 2019). This can have important developmental consequences, as joint engagement is predictive of later expressive language development, and joint engagement is even more impacted for children that are not yet speaking (Adamson *et al.* 2019). Expressive language development is one of the strongest predictors influencing quality of life into adulthood (McCauley *et al.* 2020).

Considering the critical role joint engagement plays in development, it is potentially an important target for early intervention. Joint Attention, Symbolic Play, Engagement, and Regulation (JASPER) is one example of an intervention model that specifically targets joint engagement. JASPER is a naturalistic developmental behavioral intervention (Schreibman *et al.* 2015) that uses behavioral techniques within a developmental framework to target core challenges of autistic children, like joint engagement. Evidence suggests that improvements in joint engagement through intervention are related to later expressive language development (Shih *et al.* 2021). JASPER has been shown to improve joint

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engagement among autistic children through one on one therapy (Kasari *et al.* 2006), caregiver mediated therapy (Kasari *et al.* 2010, Kasari *et al.* 2014), and through educator training (Chang *et al.* 2016, Shire *et al.* 2017). School based educator training is an especially important target for early intervention, providing an opportunity for consistent support throughout early childhood and beyond.

In terms of the social experience in the school environment, autistic students face many challenges. In school settings, autistic students experience more loneliness and lower quality friendships (Locke *et al.* 2010). This can extend beyond peers into complicated interactions with educators as well (Humphrey and Lewis 2008). Reports from inclusion educators indicate that their feelings of tension with autistic students are often associated with issues of social and emotional understanding (Emam and Farrell 2009). These issues highlight the importance of professional development and educator training to support autistic students. While researchers continue working to improve conditions for autistic students, recent reports suggest that successful research strategies are not reaching school community settings as quickly as we would hope (Iadarola *et al.* 2015, Nahmias *et al.* 2019).

To examine the complex relationships between educators and their autistic students, it may be helpful to look through the lens of attribution theory, which provides a framework for determining why people do what they do, and how others may respond (Weiner 2005). In this framework, educators make causal attributions about the outcomes or behaviors of their students based on three causal domains, locus, controllability, and stability. Locus refers to the cause of the behavior as being internal to the individual or external. Internal factors included things like natural aptitude or amount of effort, and external factors including things like home environment or educator bias. Controllability refers to the degree to which the cause of the behavior is willfully alterable by the individual. Stability refers to the likelihood of the behavior maintaining over time, and is influential in beliefs about the future. In education, understanding how educators attribute the behaviors of their students may help better understand the actions and strategies they use. In terms of future academic success, teacher attributions of behavior can shape their expectancies for their students (Clarkson and Leder 1984, Peterson and Barger 1985). Causal attributions can also significantly affect how teachers respond to students that are struggling in school. For instance, when low achieving students are perceived to have low ability (internal, uncontrollable, and stable), teachers tend to behave towards the student with more pity and less anger. However, if low achieving students are perceived to have low effort (internal, controllable, and unstable), teachers tend to behave with more anger. This is important because teachers that displayed anger were also likely to give-up efforts to help low achieving students improve (Georgiou *et al.* 2002). Importantly, the domains of controllability and stability seemed to play important roles in how teachers responded to low achieving students. Early work in causal attributions highlights the importance of perceived controllability in that attributing student failure to uncontrollable factors elicits sympathy from teachers, motivating them to commit to helping the failing student (Graham 1984). Similarly, evidence suggests that if a failing student is perceived of having low ability (uncontrollable and stable), teachers are more likely to display behaviors of encouragement or willingness to assist (Wang and Hall 2018). However, other researchers found contradictory evidence where attributing student failure to a controllable factor, such as low effort, may lead educators to expect them to do better in the future, leading to more willingness to help (Rodriquez and Tollefson 1987). Assessing controllability may be an important factor in determining how educators respond to their students.

Research in teacher attributions about autistic students is limited. Early work in educator attributions of behavior found that educators considered autism to be the result of emotional factors (internal), which may lead to attitudes of blaming and guilt towards autistic students (Stone and Rosenbaum 1988). Looking beyond autism specific research, educators assessing causal attributions for student problem behaviors attribute them to student factors (internal) and less so with school related factors (Mavropoulou and Padeliadu 2002). When educators assess the causal attributions of poor performance among students with learning disabilities they emphasize internal factors, such as ability, as opposed to external factors, such as teaching methods (Wang and Hall 2018). Taking these findings altogether, understanding how an educator attributes the behaviors of autistic students can help us understand their willingness or motivation to engage in helping behavior.

In the current study, we further explored the influence of causal attributions on educator behavior with their autistic students. Specifically, we were interested in how educators assess the controllability of ASD related behaviors among their autistic students, and how those views relate to strategies they use when interacting with them. Evidence is not clear on how attributions of controllability influence positive behaviors towards students. To explore this, we examine the causal attributions of controllability teachers make about the autistic students they work with, and how they related to strategies known to promote joint engagement. We hypothesized that there would be a positive relationship between attributions of controllability with cognitive skills, and educators would be more likely to use strategies that promote joint engagement if they perceived

the student as being more in control of their behavior, thus more likely to change. Our exploratory aim examined the relationship between causal attributions of control and implementation of joint engagement strategies after receiving training in JASPER.

Method

Design

The current study is a secondary data analysis of a study that implemented JASPER in special education preschool classrooms (Chang *et al.* 2016). Data from all participants in the original study were included in the current analysis. The original study recruited schools with ASD specific preschool classrooms. Preschool educators and support staff were trained to implement JASPER during classroom organized instructional stations that focused on free play (block and dress up stations). Included students were between three and five years of age and had a diagnosis of autism spectrum disorder, which was confirmed by the research team using the Autism Diagnostic Observation Schedule − 2 (ADOS − 2; Lord *et al.* 2012). Students and educators were assessed prior to the start of the intervention, and again after completing the intervention phase. For the current study, we utilize demographic information collected by parent report, pre-intervention measures of causal attributions from educators, baseline student cognitive measures, and educator strategy use before and after training.

Participants

Participants (Table 1) included 66 preschool students with ASD, 89% male, and from diverse ethnic backgrounds (12.1% African American, 31% Caucasian, 21% Latino, 16% Asian, and 19% other). Twelve educators from six ASD-specific preschool classrooms located around the Los Angeles area participated. The educators were 92% female and from diverse backgrounds (42% Latino, 25% Caucasian, 17% African American, 8% Asian, and 8% other). On average, educators entered the study with 6.7 years of special education experience (SD = 5.06).

The intervention – JASPER

JASPER (Kasari *et al.* 2006) is a naturalistic developmental behavioral intervention (Schreibman *et al.* 2015) that uses behavioral techniques within a developmental framework to target joint engagement, social communication, play, and language development in autistic children. Children are assessed to determine their individual developmental levels, and targets are individualized based on their current abilities in play and social communication. JASPER sessions utilize toys and play routines matched to the child's developmental level to establish the context for joint engagement and opportunities for social communication. Chang *et al.* (2016) adapted JASPER to be implemented by classroom teachers and paraprofessionals with autistic children during small group instruction. JASPER specialists worked in the classroom with special education preschool educators to implement JASPER within their classroom instruction. Training included didactic introduction to JASPER concepts, followed by 8 weeks of in-vivo coaching. Coaching sessions lasted a total of 30 minutes, daily in the first four weeks, then were reduced to two or three sessions a week for the final four weeks. See Table 2 for a more specific description of JASPER strategies and adaptations made for classroom small group instruction.

Table 1. Participant demographics.

Demographics	Mean	SD
Chronological age (months)	50.26	6.38
ADOS comparison score	6.97	1.30
MSEL developmental quotient	0.71	0.22

Measures

ADOS − 2 (Lord *et al.* 2012): The ADOS is a standardized semi-structured assessment used to evaluate individuals for ASD. The participant is engaged in a variety of activities designed to elicit social and communication behaviors. Research reliable assessors administered the ADOS to all children to confirm diagnosis. The ADOS also provides comparison scores to indicate the presence of autism related behaviors, relative to others on the spectrum.

Attribution Questionnaire: The attribution questionnaire was developed specifically for this study, and based on Weiner's (2005) attribution theory. It follows a similar format as attribution questionnaires developed by Whittingham *et al.* (2006, 2008) where respondents read a series a scenarios followed by attributional statements, and rate how much they agree with the attributional statements. The attribution questionnaire presented educators with four scenarios, each describing a domain of behaviors associated with ASD: social interaction, non-verbal communication, repetitive interests/behaviors, and sensory seeking (see Table 3). Following each scenario was a statement about the student's effortful control of the described behaviors. Educators then rated how much they agree with the statement of control with a score of one indicating they strongly disagree, and a score of five indicating they strongly agree. Internal consistency for the controllability rating was high ($\alpha = .931$). The attribution questionnaire was completed prior to the intervention phase. Scores across all four domains were totaled to create a composite score representing educators' ratings of each student's ability to control ASD related behaviors with higher scores indicating more controllability over the behaviors ($M = 10.56$, SD = 4.82) (Table 3).

Table 2. JASPER strategies for joint engagement (Chang *et al.* 2016).

Strategies	Description	Small group adaptation
Basic strategies	Appropriately matching child's pacing and affect during tplay; Appropriately applying behavioral strategies when the child is unengaged or dysregulated	Vary strategy to engage all children in the group (e.g. person engagement)
Setting up the environment	Setting up the environment to facilitate joint engagement including environmental arrangement, selecting developmentally appropriate toys and placing them within reach and view of the child, and facing the child at eye level	Selecting a toy set that is developmentally appropriate for all children; arranging the environment so children can be face to face with each other (e.g. sitting across from each other or in a triangle)
Following child's lead	Following the child's interest during the interaction by imitating and modeling at appropriate times	Imitate and model for all children in the group by presenting the object in their attentional focus
Establishing play routines	Establishing a clear play routine/sequence of steps that is developmentally appropriate	Ensure each child has an active role in the play routines (e.g. actively taking turns)
Expanding play routines	Adding timely and developmentally appropriate steps to existing play routines or following a child's appropriate expansion	Pacing expansions appropriately for all children in the group who may be playing at different levels and rates
Joint attention and requesting skills	Modeling and creating opportunities for requesting and joint attention, and responding to the child's joint attention and requesting bids	Supporting initiations and response to peer-peer requests and joint attention
Language strategies	Talking at the child's level, leaving space to communicate, responding to the child's communication, and expanding communication	Recognizing and responding to bids from all children and supporting children's initiations and responses to their peers

Table 3. Behavioral descriptions of autism related behavior.

Behavioral domains	Behavioral scenarios
Social interaction	Some children have difficulty interacting socially with others. They may have trouble appropriately initiating interactions and/or maintaining interactions. They may have difficulty with back and forth conversations. Some children may not initiate social interactions with others at all. They may also have difficulty developing and maintaining relationships with peers, showing an apparent lack of interest in people or difficulty sharing imaginative play.
Non-verbal communication	Some children have difficulty using body language to communicate with others. This can include difficulty maintaining eye contact. They may also struggle understanding and using facial expressions and other gestures to communicate with others.
Repetitive interests/behaviors	Some children display repetitive behaviors. These can include repetitive speech, motor movements (i.e. hand-flapping), or repetitive use of objects. Children may also become fixed on certain routines or patterns, and are resistant to change. They may display ritualistic behaviors, insist on specific routines or food, ask repetitive questions, or tantrum in response to small changes in routine. They may also become unusually fixated on specific interests, such as objects (i.e. fans, doors, certain toys, etc.) or topics (i.e. trains or dinosaurs).
Sensory seeking Behaviors	Some children have unusual reactions to sensory input from their environment. This can include high tolerance for pain, becoming upset in response to certain sounds or textures, excessively smelling/touching objects, and fascination with lights or spinning objects.

Mullen Scales of Early Learning (MSEL; Mullen, 1995): The MSEL is an assessment of early intellectual development and school readiness. It is normed for the ages from birth to five years eight months. Child development is assessed across five domains; gross motor, visual reception, fine motor, expressive language, and receptive language. Scores from visual reception, fine motor, expressive language, and receptive language were used to calculate a developmental quotient (DQ) as a measure of overall development. The MSEL was administered before the start of the intervention phase.

Educator child interaction: Educators were filmed for 10 minutes during play rotations with their students. The interaction followed the existing structure of the classroom curriculum, and educators played with varying amounts of students (one on one up to small group). Videos were coded for the use of JASPER strategies to promote joint engagement. Coding included 31 items divided among the seven main components of JASPER (see Table 2). Each item was rated on a scale of zero to five. A score of zero indicated the lack of or incorrect strategy use. A score of three indicated mixed strategy

use, and a score of five indicated accurate and developmentally appropriate strategy use. Item scores were summed and divided by the total number of possible points to calculate a percentage indicating implementation of joint engagement strategies. Graduate students, blind to condition, were trained to rate teacher strategies on practice videos until reliability was established at 80%. Three reliable raters scored educators' joint engagement strategy use ($\alpha = 0.963$).

Analysis

Primary analysis included pre-intervention data collected from the entire sample (intervention and waitlist groups). Correlation analysis was used to explore the relationship between educator ratings of controllability and student ability, as measured by the MSEL and ADOS. Multiple regression analyses were used to explore the relationship between educator ratings of controllability with use of joint engagement strategies during play. We were also interested in how ratings of controllability affected educators receiving JASPER training. To explore this, we analyzed data collected from the intervention group. Change scores in strategy use after receiving JASPER training were used in multiple regression analyses to explore their relationship with pre-intervention ratings of controllability.

Results

Ratings of controllability, DQ, and ADOS comparison scores

Educator ratings of their students' effortful control over behaviors associated with ASD (controllability) ranged from five to nineteen ($M = 10.56$, SD = 4.82). Correlation analysis showed a significant, positive relationship between controllability and DQ ($r = .59$, $p < .001$), and a significant, negative relationship with ADOS comparison scores ($r = -0.27$, $p = .03$). Students that were rated higher in controllability tended to have higher DQ's and lower ADOS comparison scores (Table 4).

Ratings of controllability and joint engagement strategies

Educator use of joint engagement strategies prior to receiving intervention was coded from 10 minute play interactions with their students. Regression analysis was used to explore the relationship between controllability scores and joint engagement strategies. To account for DQ and ADOS comparison scores, two separate models were run to control for each factor. Models were compared for significant improvements to the model. Adding DQ and ADOS comparison scores to the model did not result in significant improvements ($F(2,52) = 0.07$, $p = 0.93$). Therefore, DQ and ADOS comparison scores were left out. In our final model, controllability scores significantly predicted educator's use of joint engagement strategies during play ($\beta = .007$, $p = .04$). Educators tended to use more joint engagement strategies for the students they rated as having more control over their ASD related behaviors.

Table 4. Correlation matrix of study variables.

	1	2	3
1. Developmental quotient	–		
2. ADOS comparison scores	−0.33*	–	
3. Controllability rating	.59*	−0.27*	–

*$p < .05$.

Ratings of controllability and educator training

Chang *et al.* (2016) reported a significant time by treatment interaction for educators that received JASPER, improving in joint engagement strategy use compared to the waitlist group ($F(1,53) = 41.33$, $p < 0.001$). Based on these findings, we examined the relationship between change scores in use of joint engagement strategies and controllability scores. Controllability scores did not significantly predict joint engagement strategy change scores in educators that received JASPER training ($\beta = .005$, $p = .39$). Regardless of initial controllability scores, educators trained in JASPER were able to learn and implement more joint engagement strategies.

Discussion

Causal attributions can play a significant role in how educators interact with their students, and especially for students with disabilities, such as ASD. Previous research in causal attributions of students with behavior problems, learning disabilities, and ASD consistently attributed their challenges to student factors, such as ability (Stone and Rosenbaum 1988, Mavropoulou and Padeliadu 2002, Wang and Hall 2018). Our findings expanded on this idea by demonstrating a significant relationship between the perceived controllability of ASD related behaviors and students' cognitive development, as measured by DQ. We also demonstrated a relationship between perceived controllability and ADOS comparison scores. Educators tended to view their students with higher cognitive scores and lower ADOS scores as being in more control of their autism related behaviors. According to Attribution Theory, attributing behavior to internal and uncontrollable factors (like cognitive ability or ADOS comparison score) results in a more stable behavior (Weiner 2005). For students with lower cognitive scores and higher ADOS scores this may be interpreted as behavior that is more resistant to change. Conversely, a student whose behavior is seen as internal, but controllable, may be more amenable to change. It may be that educators view students with higher cognitive scores and lower ADOS

scores as having more learning potential, due to better behavioral control and inhibition.

Our findings connected the causal attributions of educators with strategies they used when playing with their students. Educators in our sample were more likely to use strategies that encourage joint engagement during play for students they perceived as having more control over their ASD related behaviors. This can potentially have significant consequences for students experiencing more profound delays. Previous research shows that joint engagement is a core challenge for autistic children, and even more so for children not yet speaking (Adamson *et al.* 2019). Considering the critical role that joint engagement plays in early development, students experiencing the most delays would stand to benefit the most from strategies to encourage more joint engagement.

Previous research shows that educators tend to attribute problem behaviors and poor performance amongst students with disabilities to student factors, placing less emphasis on school-related factors (Mavropoulou and Padeliadu 2002, Wang and Hall 2018). This may be an indicator of the need to emphasize the benefits of improving school-related factors to address problem behaviors and poor performance. School-based studies of JASPER have demonstrated consistent changes in educator strategies and subsequent improvements in joint engagement with their students (Chang *et al.* 2016, Shire *et al.* 2017). JASPER emphasizes the importance of environmental factors in the classroom, such as peer grouping, toy choice, and visual supports. Shifting the focus from student factors to school-related factors may be an important goal in developing ways to support autistic students. Although difficult to know for sure from null findings, our findings do suggest that while causal attributions are related to educator behaviors, they did not prevent educators from effectively implementing new evidence based strategies. While educators did improve their strategies, we did not collect controllability scores after JASPER training, so it is unclear if the training also changed educator perceptions. Discussion of causal attributions was not a part of the training and changing them was not considered a goal of the training.

One possible explanation for the success of JASPER training was the emphasis on understanding child development in order to individualize targets and goals for each student. This framed each students' abilities as malleable, and able to be changed. As an NDBI (Schreibman *et al.* 2015), JASPER training involves a developmental framework that provides educators with strategies to identify the child's current abilities, and scaffold them to learn new skills. This included changing the educators' role in supporting joint engagement for their students.

Limitations

A limitation of our study was the lack of controllability scores collected after JASPER training. Considering the relationship controllability scores had on strategies before training, it would be interesting to know if the training also resulted in changes to the controllability scores.

Another limitation of our study was the focus on internal causal attributions. Our questionnaire asked specifically about effortful control, but did not ask about potential external factors associated with ASD behaviors. While previous research suggests that educators tend to make student focused causal attributions, changes in educator training and better understanding of disability may have also changed educator perspectives on students with disabilities and their behaviors. Another area that may be important to explore are the attributions educators make about themselves and self-efficacy. We also focus primarily on how educator perceptions influence their own behavior, but do not explore how student factors may influence educator behaviors. That reciprocal interaction is an important factor to consider in examining educator student relationships.

Conclusion

Educators play a pivotal role in the lives of autistic students. A better understanding of how educator perceptions about their students can influence their behavior is an important step in preparing educators. Education and awareness about disabilities like ASD can help educators better understand the varied needs of their students. As researchers continue to identify and refine ways to support autistic students, educators will play a critical role in providing support and education for autistic students.

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