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Increasing Playground Engagement in Special Education Students with Autism Utilizing an Aide-Mediated Social Skills Intervention

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A dissertation submitted in partial satisfaction of the

requirements for the degree Doctor of Philosophy

in Education

by

Christopher Robert Osborn

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ABSTRACT OF THE DISSERTATION

Increasing Playground Engagement in Special Education Students with Autism Utilizing an Aide-Mediated Social Skills Intervention

by

Christopher Robert Osborn

Doctor of Philosophy in Education

University of California, Los Angeles, 2015

Professor Connie Kasari, Chair

This study aimed to test the effects of a modified psychosocial intervention on peer engagement for children with autism spectrum disorder (ASD). Utilizing a multiple baseline single-subject design, the intervention was implemented during recess and lunch periods to three different children enrolled in special education classrooms at an urban, Title 1 elementary school. Each of the children were from a minority background, and were deemed economically disadvantaged by their school district. The intervention consisted of five coaching sessions with special education aides, providing tools and teaching components towards increasing peer engagement children with ASD. Each child enrolled in the study was engaged with peers less than 50% of the time on the playground at baseline. After the conclusion of the week-long set of coaching sessions, each child was significantly more engaged with peers on the playground when compared with baseline measures, with average engagement ratios of 80%, 93%, and 95%. Fidelity measures on aide behavior also indicate changes towards promoting increases in peer engagement. Aides consistently set up and participated in games and activities, and regularly monitored the target

children to ensure they were engaged socially with peers throughout the recess period. While this study has several limitations, these initial results suggest that a brief, aide-mediated intervention can be beneficial in increasing peer engagement for children with autism.

The dissertation of Christopher Robert Osborn is approved.

Thomas Weisner

Jeffrey Wood

Sandra Graham

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2015

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Curriculum Vitae

EDUCATION

University of California, Los Angeles
M.A. Education, Awarded 2014
Thesis: The Impact of One-to-One Paraprofessional Aides on Social Skills Outcomes in Students with Autism

University of California, San Diego
B.A. Psychology, Awarded 2008

EXPERIENCE

Autism Spectrum Therapies, Inc.
Title: Clinical Supervisor July 2014-Present

UCLA Graduate Division
Title: Graduate Student Researcher August 2011-June 2014

- Supervise and coordinate a team of research assistants who assess, conduct observations, and provide intervention for children with ASD in LAUSD elementary schools.
- Plan and implement social skills interventions for children and adolescents with ASD in LAUSD elementary, middle, and high schools.
- Train teachers and paraprofessionals in intervention techniques aimed at helping child with ASD.
- Analyze the effectiveness of paraprofessional aides and teachers in creating positive social opportunities for children and adolescents with ASD.

UCLA Culture, Brain, and Development Division
Title: Research Fellow March 2013-June 2014

- Developed and implemented a research project analyzing the inclusion of children with ASD in general education settings in New Delhi, India.
- Traveled to New Delhi to observe students with ASD in general education settings over a span of two months.
- Interviewed, educated, and trained Indian teachers in intervention techniques for students with ASD.

UCSD Human Development Department
Title: Staff Research Associate March 2010-August 2011

- Conduct neuropsychological tests pertaining to cognition, memory, and intelligence on both adults with ASD and typically developing control subjects.
- Collect qualitative data on the educational, diagnostic, and medical history of adults with ASD, as well as information on their current day to day life through questionnaires and semi-structured interviews with family members.

Autism Comprehensive Education Services, Inc.
Title: Lead Behavioral Interventionist August 2007-March 2010

- Assisted teachers and BCBA supervisors in creating behavior and education plans for children with developmental disabilities.
- Implemented behavioral interventions for children with ASD and Down Syndrome including Discrete Trial Training (DTT), TEACHH, Pivotal Response Training (PRT), and the Picture Exchange Communication System (PECS).
- Used additional behavioral applications to extinguish aberrant behaviors such as aggression, tantrums, escape, stereotypy, and self-injurious behaviors.
- Formally trained other interventionists in applied behavior analysis principles as well as behavioral interventions.

PUBLICATIONS AND PRESENTATIONS

Osborn, C.R. (2007). Proposed Causes and Treatment for Stereotypic Behaviors in ASD Spectrum Disorders: A Literary Review. *Presented to UCSD Psychology Department Faculty.*

Osborn, C.R. (2008). Social Decision-Making: Reinforcement vs. Punishment in Dilemma Games. *Presented to UCSD Psychology Department Faculty.*

Osborn, C.R. (2013). School Inclusion of Children with ASD in Urban India. *Presented at the Foundation for Psychocultural Research Meeting. Publication in Preparation.*

Osborn, C.R. & Kasari, C.L.(2014). The Impact of One-to-One Paraprofessional Aides on Social Skills: Treatment Outcomes in Students with ASD. *Presented at the UC Special Education, Disabilities, and Developmental Risk Conference in Santa Barbara, CA. Publication in Preparation.*

Increasing Playground Engagement in Special Education Students with Autism Utilizing an Aide-Mediated Social Skills Intervention

While impaired communication and restrictive and repetitive behaviors are core deficits in Autism Spectrum Disorders (ASD), it is impairment in social functioning that is often considered the hallmark of the disorder, as social deficits tend to still effect individuals with ASD that have minimal issues with language and stereotypic behaviors (Volkmar et al., 2005). Included in these social deficits are difficulties processing and integrating information from the social environment, establishing and sustaining relationships with others, and participating in new social environments. Specific deficits include a lack of orientation towards a social stimulus, poor use of eye contact, trouble interpreting both verbal and nonverbal social cues, inappropriate emotional response, and a lack of empathy towards others (Weiss & Harris, 2011).

Although social skills deficits are a central feature of ASD, few children receive adequate social skills interventions or programs. Hume, Bellini, and Pratt (2005) reported that out of a sample of nearly 200 families with a child with ASD, only 15.9% of the children on the spectrum received some type of support in social skills development. Most of the programs instead focused on Speech Therapy (89.2%) and Occupational Therapy (83.1%). This lack of intervention attention towards the development of social skills has created widespread consequences, as deficits in this area often lead to other detrimental effects including poor academic outcomes. While not with a population with ASD, Welsh, Parke, Widaman, and O'Neil (2001) utilized a longitudinal study to show a correlation between poor academic performance and a lack of social acceptance and prosocial tendencies in elementary school aged children.

Social failure and peer rejection from a lack of social skills can also lead to the emergence of a comorbid disorder. Several studies have also shown the link between ASD and other disorders including anxiety and depression. Bellini (2006) reported social anxiety in adolescents with ASD manifests through physiological arousal and a lack of adequate social skills. Through use of the Social Skills Rating System (SSRS; Gresham & Elliot, 1990), Bellini found a link between reported social skills and social anxiety. It is hypothesized that this link has a developmental pathway origin, that is, children with a temperament for high physiological arousal may withdraw from social situations, thus impeding the development of social skills. This creates a coercive cycle where children withdraw, fail to learn social skills, and then withdraw more due to negative peer interactions and social failure in the minimal interactions they experience.

With this coercive cycle continuing throughout childhood, depressive symptoms can emerge, and often do in adolescents with ASD. Several studies have examined depression in individuals with ASD, with early studies consisting mainly of case reports. Komoto, Usui, and Hirata (1984) described two cases of mood disorders in adolescents with ASD, one with symptoms of Major Depression and the other with bipolar symptoms. More recently, Ghaziuddin et al. (1992) recognized that depression was the most common psychiatric disorder in a sample of 64 children and adolescents on the spectrum. Reporting depression as the most common disorder at a 2% prevalence rate among those with ASD, the researchers actually believed the figure was likely an underestimate because direct interviews focusing on the presence of depression were not conducted. Given issues of self-reporting, rates of depression in higher functioning individuals or those with Asperger's are often higher than in lower functioning individuals. Wing (1981), for example, found depression to be the common psychiatric diagnosis

(30%) in a study of 34 adults with ASD. In a different study by Ghaziuddin et al. (1998), similar rates were found in a group with Asperger's that were assessed via semi-structured interviews, with 13 of 35 (37%) subjects identified with depression.

Because of this link between social development and comorbid disorders, it is clear social skills are critical to successful social, emotional, and cognitive development. With obvious deficits in social skills in children with ASD, effective interventions and programming needs to be an integral component of education and treatment planning.

Social Skills Treatments Review

Several research studies have implemented different types of social skills programs for children and adolescents with ASD. The different types tend to fall into one of three categories: environmental arrangement, child-assisted, and peer-mediated.

Environmental Manipulation

As the name suggests, environmental arrangement interventions manipulate the environment, either physically or socially in some way that will provide children with ASD more successful opportunities in socializing with peers. In an early study by Koegel, Dyer, and Bell (1987), the researchers were able to decrease social avoidance behavior (withdrawing from social situations) in children with ASD and intellectual disability (ID) between the ages of 4 and 13 by introducing a preferred activity to the child. When the preferred activity was present, the children engaged and played more with the present adult, thus the slight change in environment increased social exposure which would presumably increase social skills over time. However, it also suggests that there may not necessarily be a lack of social skills in the child, but instead an inability of people in the environment to provide appropriate support for the child.

Baker et al. (1998) took this concept of preferred interests to increase social experiences further by examining how these interests if incorporated into a game could facilitate peer engagement. In their multiple baseline design, children with ASD exhibited very low levels of social interaction during play periods in the baseline condition. Social interaction levels increased when special interests were incorporated into a game. For example, a tag game played on a giant outline of a United States map was utilized for a child who had interests in maps. Another child had a strong interest in Disney characters, thus the researchers created a follow the leader type game called "Follow the Mickey," where each child picked out and wore a Disney character hat or laminated emblem. The positive increases in social interaction maintained and generalized to other games at the conclusion of intervention.

In a different early study, McEvoy et al. (1988) utilized group "affection activities" to increase peer interaction among school aged children with ASD. These activities occur during group time and include discussions on the importance of friendship and showing affection. The activities targeted both isolated children and their peers, and were based on typical school games, songs, and materials. Furthermore, the activities required little teacher training and appeared to be fun for the participants. Each child in the studied experienced gains in the percentage of time they were engaged with peers during the affection activities.

Brown, Randland, and Fox (1988) used a more behavioral approach in attempting to increase positive social behaviors in children with ASD. The researchers utilized a model they called "group socialization procedures," which consisted of teachers using antecedent and consequent events to promote social interaction during children's games. During intervention, the children's teachers discussed friendship and then prompted and praised child to child social responding within the context of structured games. After intervention, target children increased

their rates of both prompted and unprompted social interactions with peers during the group games periods. Furthermore, in other play periods that were not included in the intervention, target children improved in both the rate and duration of their social responding with peers. Thus, it appears the intervention generalized across contexts.

Child-Assisted Interventions

In addition to manipulating the environment as a way of increasing social engagement, many interventions have directly targeted the child with ASD by creating child-specific interventions. These interventions have instructional procedures that are designed specifically to increase the frequency, skill, or quality of social behavior in children with ASD. Unlike environmental manipulation, the origins of these types of interventions are derived out of more traditional models of social skills development for other populations such as those for children with behavioral issues. These interventions contain several elements, including but not limited to general instructions aimed at increasing knowledge of social problems (e.g. social stories), reinforcement as a priming mechanism for social responding, adult-mediated prompting and reinforcement, direct social skills training, and an assorted number of generalization promotion techniques (McConnell, 2002).

The most basic form of a child-specific intervention is a program where social skills training is provided to the target child, and subsequent social interaction is prompted and reinforced in one or more social settings. Belchic and Harris (1994) conducted a study targeting four and five year olds with ASD, where the research team taught each child to initiate and maintain social interaction with typically developing peers. In the multiple baseline single subject design, the students' social growth generalized to the playground, an untrained child also on the autism spectrum, and to siblings at home.

Other child-specific interventions have used the concepts of self-monitoring and self-management to aid in learning and maintaining social skills. Koegel et al. (1992) attempted to teach self-management techniques to increase children with ASD's responsiveness to verbal initiations in a variety of settings. The potential benefit in learning techniques such as these is that they allow the child to manage their own behavior in the absence of a clinician, making them ideal for inclusive academic and community settings. In this particular study, the research group was able to increase child responses in generalized settings by teaching self management skills through reinforcement procedures paired with a wrist watch. This increase in correct responses also led to reductions in disruptive behavior without the need for an additional or specialized intervention in addition to the self-management technique. In addition to using behavioral strategies to teach self-monitoring, other studies have utilized reinforcement-based procedures as a way of creating behavioral momentum. Using a "high-probability request strategy," one research group was able to increase social initiation rates for children with ASD by switching between social behaviors already in each child's repertoire and new social behaviors, reinforcing both along the way (Davis, Brady, Hamilton, & McEvoy, 1994).

While many child-specific interventions utilize principles of behaviorism, there are several studies that have taken alternative approaches to teaching social skills, including those that are more didactic or instructional. In one such instructional study, researchers attempted to teach adolescents with ASD social skills via the SCORE Skills Strategy (Vernon, Schumaker, & Deshler, 1996) a manualized social skills program. The six and a half week long commercialized program was developed for use with children with learning disabilities. The program was examined with ten adolescents with high functioning ASD utilizing a multiple baseline design. The program included role-playing exercises as well as games to teach various social skills.

Concepts included idea sharing, complimenting, offering help, recommending changes, and exercising self-control. The intervention included a parent education session as well as two teacher training sessions. While significant findings were found at post-treatment in four of the five targeted skills, and the subjects increased in their ability to know when to use a correct skill (via pre and post survey measures), scores as reported by parents and teachers on the SSRS did not change, indicating the skills acquired did not generalize outside of the treatment setting (Webb et al., 2004), or alternatively, the SSRS as an outcome measure was too distant from the goals of the intervention program.

Another study examined the effectiveness of social stories to help specific deficits in three boys with ASD between the ages of 9 and 11. Each social story was based on a skill that needed to be worked on via parent and teacher interviews, as well as researcher observations of the targets during free time activities on the playground at school. The deficits across subjects varied, with Boy A having difficulties in team sports activities (yell at teammates, call them names), Boy B having troubles in sustaining a conversation, and Boy C having problems in initiating and joining group activities. Each social story was written in a book format and read twice a day to each boy by one of their parents, before and after school. The investigator's multiple baseline design evaluated total time spent engaged in positive interaction in targeted social behaviors during free play, with intervention staggered across subjects at weekly intervals. Significant increases in the use of positive targeted social skills behavior followed initiation of the intervention for two of the three boys (Sansosti & Powell-Smith, 2006).

In one of the few randomized experimental studies, 18 children between the ages of 8 and 12 with ASD were matched for age and IQ in a waitlist control design. They were either randomized to either a 20-week social skills training program or the waitlist condition. The

program took place over the span of ten weeks, with two 90-minute sessions each week. Among the skills taught were those pertaining to emotional awareness, friendship and conversational skills, and problem solving skills. In addition to the child teaching module, parent education groups ran concurrently with the social skills program, educating parents about the objectives of their child's treatment as well as a "problem-focused" approach to parenting. Weekly "Problem Behavior Logs" were kept by parents as a tool for training and discussion during weekly therapy session. Results form the study indicate success in some of the targeted learning objects. Compared with the waitlist control group, each of the targets in the social skills training group made significant improvement in emotional understanding in both children and adults, as measures by facial expression recognition. Significant gains were also made in the real life problem solving tests of the program. While a major strength of the study is its randomized design, the use of only one distant outcome measure of social skills (facial expression recognition) is a limitation of the study (Soloman, Goodlin-Jones, & Anders, 2004).

Peer-Mediated Interventions

Interventions involving peer-mediation procedures provide social skills training to other children (often neurotypical) that are designed to change the social interactions and skill of children with ASD. The primary theory behind peer-mediated interventions lie in the idea of social responsiveness, that is, peers can direct social behaviors such as initiations and interaction-sustaining responses towards children with ASD in order to create prolonged social engagement (Odom & Strain, 1984). Studies utilizing peer-mediated techniques include those that aim to increase peer social initiations and social and communicative interactions, as well as other instructional interventions that include peer buddy and peer tutoring approaches.

One study that examined and compared peer-mediation to child-specific interventions found that both strategies worked well in increasing social initiations in children with ASD. Utilizing an alternating treatment design, Odom and Strain (1986) compared these two types of procedures and found that the mean length of interaction between the child with ASD and a peer was comparable under both conditions. However, as one would expect, initiations varied based on the intervention, with the child with ASD initiating more in the child-specific condition, and vice versa for the peer-mediated condition. Overall, responses to initiations were less influenced by the type of intervention.

Other peer-mediated studies have attempted to increase social engagement in children with ASD through a peer buddy or peer tutoring approach. Laushey and Heflin (2000) investigated a peer buddy approach in two 5-year-old children with ASD, which involved assigning a child with ASD a buddy to stay, play, and talk with the child with ASD. Both children with ASD had some language and were considered higher functioning, but still experienced social difficulties. Using a reversal design, results indicated an increase in social interaction by 36% and 38% for the children with ASD during the treatment phase compared with the baseline phase. A peer tutoring approach has also showed some promise with higher functioning children with ASD. Using a complex single subject design (multiple-baseline-across-participants-with-reversal-design), Kamps et al. (1994) examined this approach in three 8- and 9- year olds with ASD. Each week, students were assigned to a different tutoring partner, providing the targets with exposure to several peers in their class. Results indicate an increase in interaction time, as well as improved academic achievement.

In a different study, the research group utilized a randomized control trial (RCT) to compare a child-specific intervention to a peer-mediated intervention (Kasari, et al., 2012). In

the 2 x 2 factorial design, there were four groups of children that received a different form of a social skills treatment, the child-specific group, peer-mediated, combo (both interventions), and control. A diverse sample was recruited, with sixty elementary school aged students from fifty-six classrooms in thirty schools comprising the study sample. Each intervention was six weeks long, with two sessions per week. In the child-specific condition, each child with ASD met with a trained interventionist during recess or lunchtime for 20 minutes for each session. The goal of each session was to help the child with ASD develop strategies to engage socially with peers via direct instruction. The intervention used playground observations, as well as parent and teacher report at baseline to assess each target child's social strengths and weaknesses. Specific goals were targeted for each child, and interventionists used didactic instruction, role playing, and practice to work on each area of need. This individualized approach was utilized because of the heterogeneity in social skill symptom presentation.

In the peer-mediated condition, three typically developing children from each target child's classroom were taught strategies for engaging children with social challenges on the playground. The researchers and teachers selected peer models based on the results of obtaining social networks of each target child's classroom. Once recruited, the three peers from each class met twice a week for 20 minutes during recess and lunch time in a group format. The focus of each session was to elicit ideas from the peers on strategies to help children engage on the playground, and then to problem solve how to accomplish this with target children on the playground. Skills taught by the interventionists included identifying isolated children on the playground, as well as how to get them engaged.

Results indicate children with ASD that received a treatment involving a peer-mediated component had significant improvements. These children received an increased number of

friendship nominations, improvements in social network salience, and increase in social skills in the classroom (as reported by teachers), and a decrease in isolation on the playground (Kasari, et al., 2012).

Summary

Hundreds of different types of social skills interventions have been tested and exhibited positive results. Through environmental manipulation, direct child coaching, and peer-mediated techniques, social skills changes have been exhibited in several contexts with different participants. While some studies have trained teachers to mediate social interactions between a child with ASD and peers, it is rare that paraprofessionals are used in helping children with ASD increase their social skills. The current intervention aimed to use paraprofessionals on the playground to increase these skills.

The School Environment and School Aides

Along with the reported increases in prevalence of ASD has come an increase in the number of students with ASD enrolled in the school system. Added to the Individuals with Disabilities Act (IDEA) in 1990, the available school services for children with ASD has grown immensely with children often receiving some combination of speech and occupational therapy plus some form of extra classroom support. In addition to these services offered for students with ASD, some children receive social skills treatments in the school, however, this is rare as multiple studies report less than 25% of children receive these types of interventions in the school (Thomas, Morrissey, & McLaurin, 2007; Hume, Bellini, & Pratt, 2005).

Instead of providing these services, children with ASD are instead often placed partially or fully in general education settings as one approach to intervention. While there is some debate about inclusion as an intervention, the general belief is that children with ASD can benefit from

immersion in environments with typically developing children, in part to model appropriate social behaviors, and to encourage the development of friendships (Mesibov and Shea, 1996). Studies examining the effects of inclusion on children's social relationships have been mixed.

Bauminger et al. (2008) found that children with ASD who have friendships with typically developing children (identified as mixed dyads) experience more durable and stable relationships than dyads between a child with ASD and a child with a disability (non-mixed). Additionally, children in mixed dyads were more responsive to one another, showed higher levels of positive social orientation and cohesion, and had more fun together. This evidence indicates an educational placement involving typically developing children would be ideal for some children with ASD.

However, other studies contradict this notion and argue that education for a child with ASD in an inclusive setting is unrelated to having peer relations (Orsmond, 2004). Furthermore, when integrated with typically developing peers in mainstream classrooms, children with ASD may be at increased risk for peer rejection and social isolation (Chamberlain, 2001). While the evidence is inconclusive, the placement of children with ASD in general education settings is an ever-increasing trend as a way to alleviate social deficits in children with ASD (U.S. Department of Education, 2000).

Despite the potential social growth in children with ASD mainstreamed in general education classrooms, many children with ASD including those that are considered high-functioning remain in special education classrooms. Because these children remain in these settings, they are not exposed to typical peers as often and thus may need a more robust social skills program. Furthermore, these children are likely enrolled in special education classrooms

because they possibly have behavioral issues, or simply need more structure and attention than a general education class can provide.

Some students with ASD who need this extra structure and attention are able to enroll in a general education classroom, if they are able to be assigned a one-to-one paraprofessional aide. One-to-one paraprofessionals assist children with disabilities in the areas of behavior management and academics, often have a background in special education classrooms, and are among the fastest growing personnel in education (Blalock, 1991). Preliminary research also indicates these aides are ideal candidates for implementing social skills interventions, as one study has shown that by merely observing a peer-mediated social skills intervention on the playground, aides can pick up tools and intervention techniques to aide in peer engagement (Osborn & Kasari, 2014).

The problem however, lies in the difficulty of obtaining a one-to-one aide in many school environments, as these aides are rarely seen in middle and lower income areas of the country. While principals want to be supportive of parent and teacher requests for paraprofessional supports, the dramatic increase in the number of children with disabilities enrolled in school and subsequent staff create an enormous amount of associated costs, thus creating pressure from other administrators and the district to limit aides that work with only one child (Giangreco et al., 2005). This creates a portion of the children within the ASD population that are higher functioning and in need of social skills training, but are limited to a special education class environment. In each of these classes, however, are paraprofessionals that have similar skill sets as one-to-one aides assigned to children in general education settings (Boomer, 1994).

Targeting Disadvantaged Populations

Early theorists believed ASD occurred more frequently in White upper middle class

families. However, while early researchers like Kanner and Asperger studied primarily Anglo children, current epidemiological evidence indicates ASD prevalence is no different across race or ethnicity (Fombonne, 2003). Regardless of the apparent uniformity of ASD across racial and ethnic groups, data suggests ASD is under-identified in racially and ethnically diverse children.

Mandell et al., (2002) examined potential racial differences in Medicaid-eligible children based on when they received a diagnosis of ASD. In a sample of 403 children in the Philadelphia metropolitan area, white children receiving a diagnosis of ASD on average a year and a half before African American children. Additionally, African American children often required more office visits before a formal diagnosis was provided, with a diagnosis occurring three more office visits over a period three times as long as white children (Mandell et al., 2002). In a different study by Mandell et al. (2009), a cross-sectional design examined over 2,500 eight year old children who met surveillance criteria for ASD all across the United States. Among those children assessed, 58% were diagnosed with ASD. However, African American children, Hispanic children, and other minority children were less likely than White children to have an already documented diagnosis of ASD. The results manifested in African American children regardless of IQ, and were concentrated for children with other ethnicities when IQ was lower than 70 (Mandell et al., 2009). In a different study by Donovan and Cross (2002), information obtained from the Office of Special Education Programs and the Office of Civil Rights partially corroborate Mandell et al.'s findings. In their findings, Hispanic and American Indian/Alaskan Native with ASD are underrepresented in the likelihood of special education eligibility relative to White students.

In addition to experiencing late diagnoses, it is assumed children with ASD from minority groups or from less educated parents likely receive fewer services in terms of both

quantity and quality. Thomas et al. (2007) reported racial and ethnic minority families had half the odds of using a case manager (0.48), and only a quarter the odds of using a psychologist (0.27) or developmental pediatrician (0.28) when examining treatment possibilities for their child with ASD. Additionally, when parents had a college or graduate degree, they had two to four time the odds of using a neurologist and other interventions including the Picture Exchange Communication System (PECS). Many researchers argue future ASD research needs to focus on minority families and those with less than a college education, low income, and a lack of health insurance. It is believed that many of these families do not augment school services, and instead rely solely on the school system for care and treatment (Thomas, Morrisey, & McLaurin, 2006).

With the school system often providing little to no social skills treatments for it's children on the autism spectrum, these disadvantaged populations likely have the greatest need in this realm of ASD intervention. This study has taken these previous findings into account, and aimed to test a social skills intervention targeting underserved populations in the ASD community, that is, minority children that are economically disadvantaged. Additionally, this study aimed to train special education aides from schools that provide little to no training in working with children with ASD, let alone training in increasing social skills in these children. With the model proposed in this study, it may be possible to tackle a glaring need via a low-cost solution in an already disadvantaged population.

Methods

Study Design

For the current study, a multiple baseline across-participants single subject design was used to examine the effectiveness of an aide-mediated playground intervention for children with ASD enrolled in special education classrooms. Single subject design is a common form of

methodology used in psychology and education, where each subject serves as their own control. For this particular study, a multiple baseline single subject design is ideal as it measures multiple subjects at baseline and after the implementation of intervention. The primary hypothesis of the proposed study was that children with low levels of engagement on the playground will increase their peer engagement due to an aide-mediated social skills treatment.

Single subject research design is an experimental research approach based on the notion of "baseline logic," where each subject serves as their own control (Sidman, 1960). Baseline logic refers to the repeated measurement of behavior under at least two adjacent conditions: baseline and intervention. If there is a measureable difference or change in behavior after the introduction of intervention, when compared with baseline measures, it is probable the introduction of the intervention is what is responsible for the change. Behaviors that are targeted by the intervention are repeatedly measured within the context of a specific type of single subject type design in order to evaluate and control for threats to internal validity. It is important to note that this research approach is not the same as a case study approach, where there is only one participant whose behavior is described, and it is in more of a qualitative manner (i.e. through field notes and interviews). Instead, single subject research is considered an experimental quantitative approach, however data is analyzed primarily using visual-analysis techniques rather than statistical analysis (Gast & Ledford, 2010).

This study will utilize a multiple baseline single subject design, as it allows intervention to be introduced across several individuals who exhibit similar behaviors, low peer engagement on the playground in this case. The same dependent measure was utilized for each participant to show that the intervention worked across participants. Peer engagement was measured under pre-intervention conditions until a stable trend and level was established for each student. Once an

acceptable level and trend were demonstrated with one student, the intervention was introduced. Engagement levels of other children continued to be measured as they remained in the baseline condition. When increased levels of engagement were reached in the first child across multiple sessions, intervention was introduced to the second child that displayed consistent baseline levels of engagement, while the last child remained at baseline and continued to be monitored. The systematic and sequential introduction of the intervention continued until all participants were introduced to the same intervention. The study design follows the evidence standards of the What Works Clearinghouse (WWC) panel of experts in single-subject design (Kratochwill, et al., 2010).

Participants and Recruitment

This study targeted children with ASD enrolled in a Title 1 elementary school (Jupiter Elementary) in the Los Angeles Unified School District. Title 1 elementary schools have been deemed disadvantaged by the U.S. Department of Education based on a student population that has a large portion of children who are living in poverty, have limited English proficiency, and/or have disabilities (McLaughlin, 1975). The student demographics for Jupiter Elementary are as follows: 77% Latino, 19% African American, 2% White (Not Latino,) and 1% American Indian. Additionally, 91% of the students are considered economically disadvantaged, with 37% of children being English language learners, and 11% of the students having a diagnosis of a disability.

Three children with ASD from different special education classrooms at Jupiter Elementary participated. Each child had participated in a previous study from the prior school year conducted by UCLA that targeted training teachers in effective classroom transitions. Parents of students from this previous study that indicated they were interested in future studies

were contacted via phone and were sent consents if interested. Autism diagnosis via ADOS scores and cognitive ability assessed through the Differential Ability Scales (DAS) from the previous study were used in the current study and are reported below. Each child came from a minority background, and each were enrolled in a special day class 100% of the day. After each child was consented and found eligible, paraprofessional aides from each child's class were recruited for the study. It was required that each aide have at least two years of experience working with children with ASD. Once each child and aide were consented, baseline observations commenced for each dyad. Child and aide information can be found in appendix I and II, respectively.

The first child recruited for the study was a seven year-old second grader by the name of Jake. His IQ was assessed prior to the start of the study, and came in below average with an FIQ score of 82. He also was deemed 'autistic' via the ADOS Module 2. He is of Latino ethnicity, and his family has an income of less than $25,000 per year, and receives both Medicaid and SSI (Supplemental Security Income). Jake is also enrolled in the free/reduced price lunch club at his school. Jake is an active, young boy who likes the be the leader of the group but would often fade away from peers on the playground. The chaos of a small play area along with a lack of equipment hindered Jake's ability to meaningfully engage with peers despite his language abilities and assertiveness. He was often seen just on the periphery of engagement, meaning with a little bit of structure and redirection, he could become fully engaged with the other children on the yard. The aide recruited from his classroom was a 29 year-old Latina named Maya, and she showed instant enthusiasm when the study was proposed to her. She reported that the district had provided little to no training to her and her colleagues even though she had been there a better

part of the decade and was excited about the opportunity to learn more about the intervention as she has a child on the spectrum herself.

The second child that enrolled in the study was an eight year-old third grader by the name of Ryan. His IQ was assessed prior to the start of the study, and came in below average with an FIQ score of 80. He also was deemed 'autistic' via the ADOS Module 2. He is of African American ethnicity, and his family has an income of less than $25,000 per year, and receives SSI (Supplemental Security Income). Ryan is also enrolled in the free/reduced price lunch club at his school. Much like Jake, Ryan was a personable young boy who seemed to be well liked by his classmates. He also had few language difficulties, but was often 'zoned out' while eating at the lunch tables while other peers ate and chatted. He also had some difficulties transitioning from the lunch tables to the playground and finding an activity quickly. A 26 year-old Asian female by the name of Amy was the aide recruited from Ryan's classroom. Amy was new to the school and the classroom at the beginning of the study, however had worked with children with ASD for three years at a previous school. She was also interested in the study and wanted to learn more about helping children with ASD socially as most of her training had been on dealing with maladaptive behaviors.

The third child enrolled for the study was a six year-old first grader by the name of Kareem. His IQ was assessed prior to the start of the study, and came in low with an FIQ score of 73. He also was deemed 'autistic' via the ADOS Module 2 and is of African American ethnicity. Though his parents did not indicate their household income, they did note they received both Medicaid and SSI (Supplemental Security Income). Kareem is also enrolled in the free/reduced price lunch club at his school. Unlike Ryan and Jake, Kareem started the study with more difficulties in both language and play skills. His teacher reported he was often solitary on

the playground, and engaged more in stereotypic behaviors than playing with other children. The aide recruited from Kareem's classroom was a 44 year old African American female by the name of Patty. She knew Kareem well at the start of the study, as she had been working with him since he started at the school. While she had been working in an SDC classroom for many years, she was happy to participate in the study and learn about the intervention.

Primary Outcome Measure and Fidelity

The primary outcome measure for the current study is a modified version of the Playground Observation of Peer Engagement (POPE). The POPE is a measure that examines children's interactions and play skills on the playground during recess and lunchtimes (Kasari, Rotheram-Fuller, & Locke, 2005). It examines the amount of time a child is engaging or playing with peers, as well as details regarding the quality of the interaction.

The version of the POPE for the current study takes ten minutes to implement, and has an interval for each minute the child is on the playground. For each minute, a trained coder determines if the child is engaged with other children, playing a game with peers, observing a game or form of engagement, playing parallel to peers, or is solitary. Additionally, for each interval, the number of verbal initiations, responses, and conversations are recorded. The POPE also allows an option for collecting qualitative data, in the form of open-ended comments, for each interval. This "comments" section was designed to capture additional information regarding the child's engagement state such as if there were any factors contributing towards or inhibiting engagement.

In addition to the POPE, fidelity measures were also implemented during each observation both at baseline and after the introduction of the intervention for each child and aide pairing. These measures assessed if the components of the intervention were being used, with

sections on assessing engagement on the playground, transitioning to an activity, setting up an activity, participating in an activity, fostering communication between peers, employment of peer-mediated components, and direct instruction of socials skills. For each of these sections, a 1-5 Likert scale was used to measure how well each component was being utilized.

Procedure

Baseline.

During Baseline, primary outcome data and fidelity were collected while each child participated in different recess and lunch periods at school. Per the WWC multiple baseline guidelines, after one child reached a minimum of three consecutive recess or lunch periods where observation data was stable, intervention began for that child while the other two children remained at baseline. The other two children were introduced to the intervention in a staggered approach after both showed stable data.

The Intervention

The intervention for the current study is a modified version of an empirically validated playground based intervention for students with ASD enrolled in general education classrooms (Kretzmann, Shih, & Kasari, 2014). This intervention, titled *Remaking Recess*, trains playground aides and paraprofessionals to target solitary children on the playground and get them involved in social activities, such as games, to increase their engagement with peers.

Throughout the intervention, aides are taught several strategies in how to create or increase engagement in children on the playground. The first of these strategies entails the aide learning how to correctly identify different engagement states and code them appropriately. The six engagement states aides learn are solitary, onlooker, parallel, parallel aware, joint engagement, and games with rules. Descriptions of these states are in appendix III.

In addition to learning about identifying engagement states, aides also learn how to set up and transition children to an engaging activity. Transition techniques (from lunch tables or classroom) to the playground include pairing peers together through a conversation topic, playing a game during the transition such as Follow the Leader or Simon Says, or having children pretend to be characters or animals as the group walks together. After transitioning, aides are taught to scan the playground and actively seek out the target child, or child with ASD, to see if they are experiencing any kind of difficulty. If the child with ASD is having trouble finding an activity or game, the aide is to start their own activity or game based on child choice.

By providing a child-driven, developmentally appropriate game or activity, it is ensured that the target child will be motivated to interact. It is important for the activity/game to build off of the child's strengths, not be over-stimulating for the child, and for the aide to show interest in the activity the target child selects. Once the activity/game is started, the aide is to participate directly until the game get rolling, modeling appropriate behavior (e.g. good sportsmanship, turn taking, etc.) throughout, while praising each child involved in the activity/game. As the game gets going, and the children are independently playing, the aide is to fade out and monitor the activity and step in as needed. If the target child fades out of the game, the aide can redirect them back to the activity or a new activity. The aide can either redirect the target child themselves, or use a peer to help get the target child back engaged in an activity. For example, the aide could say to a peer, "Hey, this would be a lot more fun if we had one more to play with us… go see if Jimmy wants to play with us."

In addition to creating a positive social environment for the target child through the activity/game, the aide also learns how to provide direct in vivo social skills instruction as needed. Deemed "instructionally ripe moments" by the creators of the intervention, the aide

helps mediate if the target child becomes aggressive towards other children, protests when he/she doesn't get their way, or participates in other inappropriate social behavior.

The components of *Remaking Recess* make it a comprehensive social skills intervention. It provides an aide-mediated element which helps with generalization and future social growth, a child-assisted component through its in vivo social skills lessons, has a peer-mediated component for when the target child fades out of engagement, and alters or structures the recess and lunch environment by providing popular, developmentally appropriate activities/games. These intervention pieces make *Remaking Recess* a strong intervention through its use of several empirically based social skills teaching techniques. Furthermore, the intervention is manualized, and preliminary studies show it can help increase levels of peer engagement in children with ASD that are fully included in general education classrooms (Kretzmann, Shih, & Kasari, 2014).

For the purposes of the current study, a modified version of *Remaking Recess* was utilized to help children with ASD enrolled in special education settings. While all of the components of the original intervention remained intact, the number of sessions and overall length of intervention were vastly shorter. The goal of the current study, through the use of single subject design methodology, was to show that the intervention can work immediately with this student and aide population. While the original intervention utilizes aides as well, many playground aides fail to have any knowledge or training of ASDs, let alone any experience in working with the ASD population. However, because the children targeted in this particular study are enrolled in special education classrooms, there were classroom aides that have knowledge and experience in working with children with ASD, including the understanding that these children tend to have social difficulties.

Because of this knowledge and experience, the intervention for the current study took place over a span of only five coaching sessions in one week compared with the original intervention that has sixteen sessions across two months. The agenda followed for each of the five coaching sessions is in appendix IV. It was hypothesized that each target child would immediately see an increase in engagement once the intervention coaching sessions were completed.

Results

Figure 1 shows the results of peer engagement for each child, for each session, at baseline and after the implementation of the intervention. Each child was considered engaged for an interval if they were playing a game with peers or jointly engaged (face to face talking) for the majority of an interval. Because there were ten intervals for each observation, the intervals were converted to a ratio (number of intervals joint engaged or playing a game over the total number of intervals) and plotted on the visual analysis chart.

Intervention did not start for any child until level stability was established, defined as 80% of the final 3-5 data points falling within a 20% range of the median data point (Gast & Ledford, 2010). The trend of the baseline data was also analyzed utilizing the split-finger method, which relies on middle dates and median ordinate values to estimate trend across a condition (White & Haring, 1980). Jake was the first child to exhibit stable levels of engagement, after three independent observations. Ryan had stable levels of engagement after five observations. Finally, after an initial spike in engagement during his third observation, Kareem's level of engagement became stable after seven observations. Both Jake and Kareem exhibited a zero-celerating trend (after their third and seventh observation, respectively), while Ryan actually presented with an decelerating trend (after his fifth observation). Additionally, while each child

had differing levels of language and play skills, none of the three children were engaged with peers for more than 50% of the time in any observation prior to the start of intervention, with mean engagement ratios of 43% (Jake), 36% (Ryan), and 13% (Kareem). Low engagement levels, level stability, and trend measurements allowed Jake to receive the intervention first, followed by Ryan, and then Kareem in the necessary staggered fashion for multiple baseline studies.

After the intervention coaching sessions were finished, Jake saw a significant increase in his peer engagement on the playground. There were eleven observations after coaching sessions concluded, with a mean engagement ratio of 95% and median engagement ratio of 90%, up 52% and 40% from baseline respectively. Additionally, the absolute level change (last data point in baseline subtracted from first data point post coaching sessions) was 50 for Jake. Furthermore, 0% of the data points from baseline and post-coaching sessions overlapped (PND). While all aspects of the intervention were taught to the aide, the primary focus was helping Jake transition to an activity with a peer, and redirecting him if he faded off. Because Jake's language and play skills enabled him to actively participate in different types of games and activities, priming techniques for transitions and monitoring once he was engaged were the primary task of the aide. For example, the aide would often ask Jake and peers around him what they wanted to play at recess as they lined up. Once a game was decided upon, the aide ensured Jake transitioned to the yard with a peer and the game was started, which for Jake his other classmates was typically pretend "fighting" type of game. She would then monitor from a far while sometimes setting up a different activity for other children, all while redirecting him if he strayed from the others in their pretend play scenario.

Ryan also saw a significant increase in his peer engagement following the coaching sessions. There were nine observations after coaching sessions concluded, with a mean engagement ratio of 93% and median engagement ratio of 90%, up 57% and 40% respectively from baseline. Additionally, the absolute level change (last data point in baseline subtracted from first data point post coaching sessions) was 40 for Ryan. Furthermore, 0% of the data points from baseline and post-coaching sessions overlapped. Again, while all aspects of the intervention were taught to the aide, simply setting up an activity for Jake and his peers proved to be the primary area of need in increasing his peer engagement. For example, when transitioning from the classroom to recess, the aide would bring some table top games provided by the research team. Once Ryan got started on the game, he needed little redirection and the aide was able to fade and monitor.

Finally, Kareem also saw a significant increase in peer engagement on the playground, with a mean and median engagement ratio of 80 across seven observations at the conclusion of the coaching sessions, up 67% (mean) and 60% (median) from baseline. Additionally, the absolute level change (last data point in baseline subtracted from first data point post coaching sessions) was 70 for Kareem. Furthermore, 0% of the data points from baseline and post-coaching sessions overlapped. Kareem primarily needed help in starting an activity on the playground, as he would often roam around solitary without any assistance. However, these activities were often different from those that Jake and Ryan were able to participate, as Kareem needed simpler activities and more adult assistance. For example, Kareem would often take turns rolling hula hoops back and forth with a peer, or simply bouncing a ball back and forth as other games such as kickball were a bit to complicated for him. He was also able to participate in

Carrom board games, but needed motor assistance from and prompting from the aide both on the rules of the game and to stay in the game.

Treatment fidelity was analyzed through aide behavior, that is, how each aide implemented components of the intervention. The following fidelity components were analyzed simultaneously during each peer engagement observation: assessing engagement on the playground, transitioning to an activity, setting up an activity, participating in an activity, fostering communication between peers, and employment of peer-mediated components. The percentage of intervention strategies/components each aide used during each observation is plotted in Figure 2. Upon visual analysis, it is clear that each aide started implementing components of the intervention after the conclusion of the coaching sessions, and that treatment fidelity was achieved. The implementation of these components also coincide with the increased levels of engagement seen in each child, indicating the intervention is likely the cause of increased peer engagement.

Discussion

Social skills treatments for children with ASD have been created, researched, and implemented extensively over the last two decades. The majority of these treatments have taken several approaches, including arranging the environment to suite the child with ASD's needs, teaching the child with ASD directly about social skills and how to handle social situations, and peer-mediated approaches where typically developing peers are taught to include the child with ASD in play activities. However, few interventions have utilized all of these components, and created a comprehensive treatment that provides various tools for interventionists to use in helping children with ASD socially. Additionally, the majority of interventions tested use a model where the research team works directly with the child with ASD, versus teaching parents

or school staff how to implement the intervention. Finally, few of these interventions have focused on recess and lunch periods, unstructured social periods that have recently been argued to be crucial and necessary for children's social development (Murray, et al. 2013).

Considering these factors, the aim of the current research project was to measure the effectiveness of a comprehensive, classroom aide-mediated social skills intervention for children with ASD on the playground during recess and lunch periods. While a version of this intervention has already had promising results in initial group studies, it had yet to target children enrolled in special education classrooms. These children represent a unique portion of the ASD population as they are high functioning enough to engage in social activities with peers on the playground, but are not included in general education settings. Additionally, former versions of the intervention had coaching sessions that were presented over the span of two months, with up to 16 coaching sessions. It was hypothesized that because each aide enrolled in the current study had experience in working with children with ASD, the intervention could be taught in only five coaching sessions across one week and yield immediate results.

As hypothesized, each child enrolled in the present study made significant gains after the conclusion of the coaching sessions. While each child had different strengths and weaknesses at baseline, the variety of components in the intervention allowed each aide to identify where their target child needed the most help in increasing their peer engagement. Whether it was help in transitioning to playground, the creation of a highly structured or basic game, or the use of peers, each aide was able to use some of the tools learned from the coaching sessions to increase peer engagement. These initial positive results across multiple participants speaks to the potential versatility and success of the intervention.

In addition to helping the three children enrolled in the current study increase their peer engagement, there may have also been some positive results with regards to other children from each participant's classroom. While the research team did not directly take data on peers, both the aides enrolled in the study and teachers reported that the other children in classroom enjoyed the new games on the playground. Additionally, aides reported anecdotally that they were using the strategies learned from the coaching sessions with other children. For example, while Jake primarily needed help in transitioning from the lunch tables to the playground with peers, Maya still consistently set up games for other children from her class (that had been tended to be unengaged prior to the coaching sessions) as they enjoyed and now participated with the structure of the new activities. While these anecdotes are positive, the research team is unable at this time to know if the intervention truly generalized to other participants as formal data was not collected for peers. That said, it is possible that by having an aide-mediated approach, it may be possible to see not only social growth in target children but in the peers around the target children as well.

While the intervention was able to yield positive results for each child involved, there were some limitations to the study. Firstly, there was only one measurement of social growth for the children, peer engagement. Other studies that have focused on the playground have utilized other measures to measure growth, including social networks in the classroom (Kasari, et al. 2012). Additionally, because of the small nature of the study, there was only one observer for both the primary outcome measure and fidelity measurements. Additionally, this observer was also the primary interventionist that worked with each aide and child. Attempts were made to teach a school aide not enrolled in the study how to accurately use each measure, however they struggled with learning the different engagement states and nuanced differences, thus inter-rater

reliability was not established after multiple weeks of training. Because of the lack of multiple observers and interventionists, there is the possibility that some bias may have been involved in the results. The primary goal of a future study would be to ensure multiple, blind observers are used at both baseline and post-coaching sessions. Additionally, these observers would ideally have no part in the coaching sessions or intervention process.

Secondly, while each aide started implementing components of the intervention after the coaching sessions, their implementation was sometimes inconsistent or were not executed well. However, this inconsistency did not seem to directly effect engagement as there were many instances where the aide would get the target child involved in an activity, but never set up or participate in an activity themselves, thus lowering the overall fidelity score. Another limitation is the recruitment of participants all from the same school. It could be argued that there may have been treatment bleeding with multiple aides being trained on the same campus. That does not appear to be the case, however, as the playground was broken in different zones where classes rotated each week. Each of the three child-aide pairs were never present in the same zone, at the same time, throughout both baseline and after the implementation of intervention.

Another limitation is that there was no follow up after the conclusion of the post-coaching session observations. In previous studies utilizing an intervention of this sort, follow up data was collected with less than promising results, as aides often utilized the intervention tools less over time. Thus, the model of five coaching sessions in this study may not be enough to adequately create change over time, and follow up sessions later in the school year may be necessary to ensure children continue to make social gains and that aides continue to utilize the different tools taught in the initial coaching sessions.

Finally, the last limitation lies in the methodology of the current study. While single subject design has been used in many published studies on increasing social skills in children with ASD, a group design is more desirable and is a future direction.

Despite these limitations, it is clear that the results of the present study may create an intervention model for increasing peer engagement on the playground in an efficient, and quick manner. Because of the intervention's comprehensive nature, the children with ASD enrolled in this study exhibited immediate improvements in playground engagement once the intervention's coaching sessions were completed. While their implementation of all of the components of the intervention were inconsistent, aides benefited directly from the intervention in several ways. Firstly, aides learned how important the unstructured social times of recess and lunch are for children with ASD and how to identify children that are solitary on the playground. Additionally, the intervention provided new tools and techniques for aides to utilize on the playground in increasing peer engagement. While there were several limitations to the current study, the findings may be best interpreted as an initial step towards laying the ground work for more research in utilizing an intervention of this nature. If future, more rigorous studies found similar results, the currently easy to deploy intervention may provide a low cost option for school districts aimed at helping children with ASD in the social realm.

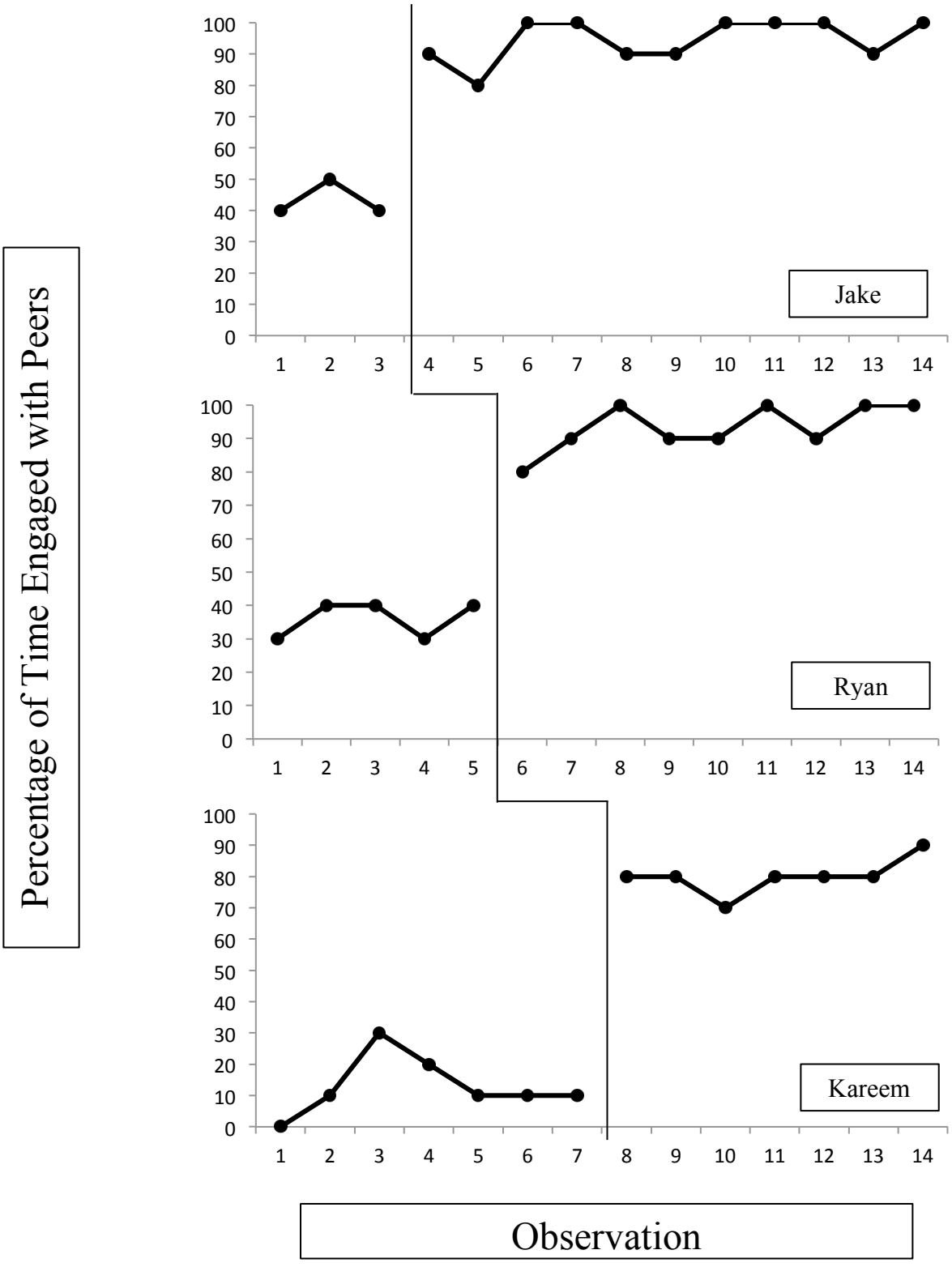

Figure 1. Percentage of time each child was engaged with peers on the playground.

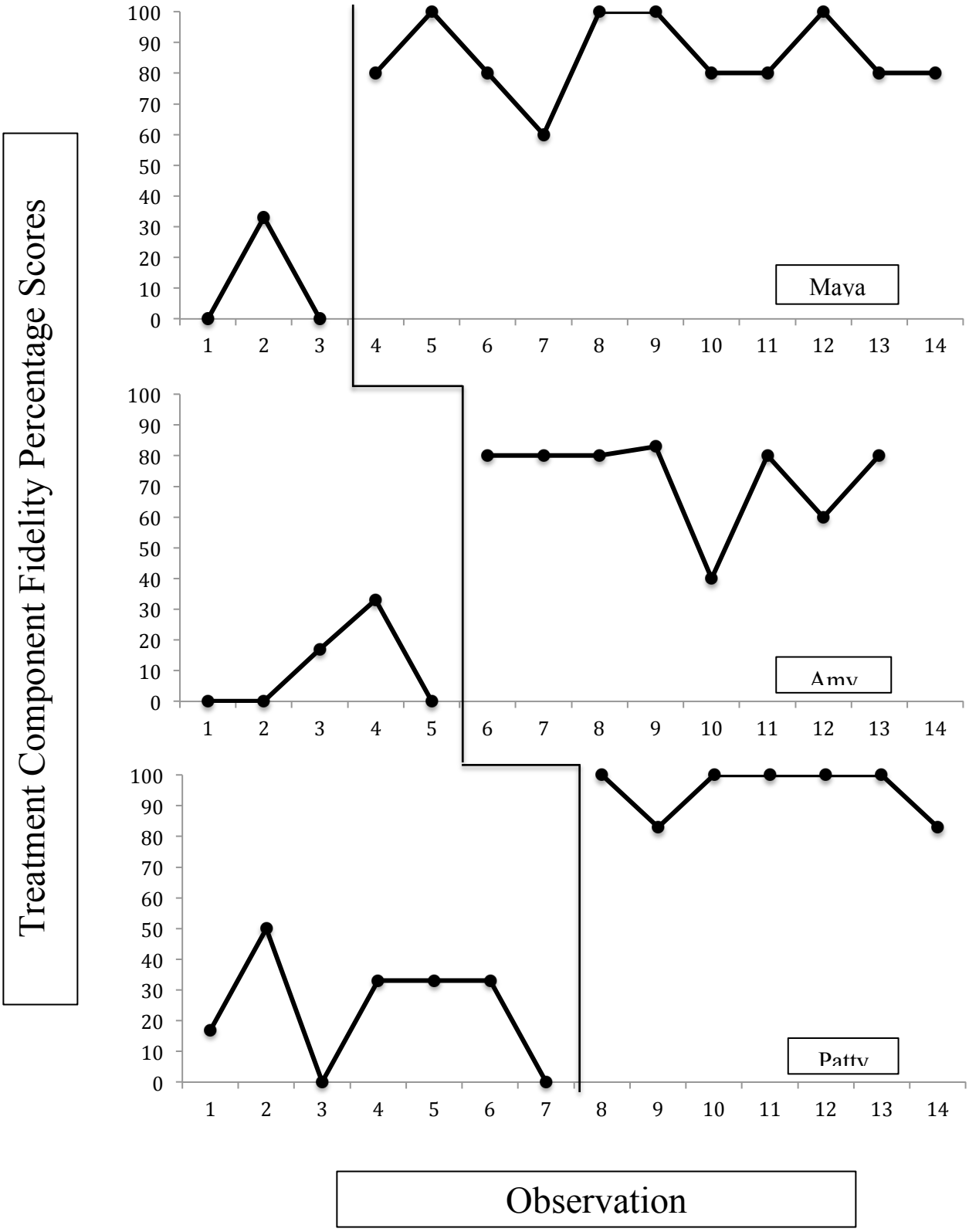

Figure 2. Fidelity scores based on aide behavior.

Appendix I.

Child Information

Child	**Age**	**Grade**	**Ethnicity**	**DAS II: FIQ**	**ADOS Diagnosis**
Jake	7 Y, 4 M	Second	Latino	82	Autistic (Mod 2)
Ryan	8 Y, 10 M	Third	African American	80	Autistic (Mod 2)
Kareem	6 Y, 11 M	First	African American	73	Autistic (Mod 2)

Appendix II.

Aide Information

Aide	**Age**	**Ethnicity**	**Experience working with Children with ASD**	**Experience with Target Child**
Maya	29	Hispanic	7 years	1 year
Amy	26	Asian/Caucasian	2 years	1 month
Patty	44	African American	10 years	1 year

Appendix III.

Playground Engagement State Definitions

Engagement State	Definition
Solitary	The child appears uninvolved with peers and plays alone with no other children.
Onlooker	The child has a one-way awareness of another child or group of children who is farther away than three feet.
Parallel	The child and peer are engaged in a similar activity but there is no social behavior.
Parallel Aware	The child and peer(s) are engaged in similar activity and mutually aware of each other.
Joint Engagement	The child and peer(s) direct social behavior with on another (e.g. the child and peer(s) offer objects, have a conversation, exchange turns in an activity like reading a comic book, drawing, origami, etc.).
Games with Rules	The child participates in an organized game with clear rules and/or engages in fantasy or pretend play with clearly defined roles set by the child or his/her peers. A game has to be with at least one other child.

Appendix IV.

Coaching Session Agendas

Session 1 - Treatment overview, imagining a child's trajectories based on different scenarios. Discussing the value of peer engagement on the playground and coding peer engagement.

Session 2 - Transitioning to an engaging activity, facilitating social positioning and peer conversations (in transition, at lunch, on playground).

Session 3 - Facilitating peer conversations, providing games and activities (learning popular developmentally appropriate games for the target child).

Session 4 - Providing games and activities, strategies to boost peer engagement (recruiting players, participating, employing peers to direct and re-direct).

Session 5 - Providing Games and Activities, additional strategies to boost peer engagement (fading out, circulating/scanning).

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