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**THE EFFECT OF PEER-COACHING ON SOCIAL SKILLS PERFORMANCE
OF MIDDLE SCHOOL STUDENTS WITH HIGH FUNCTIONING
AUTISM SPECTRUM DISORDER**

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A DISSERTATION

Submitted in Partial Fulfillment of the

Requirement for the Degree of

Doctor of Psychology

(in School Psychology)

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April, 2014

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AUTISM SPECTRUM DISORDER

By John Potter

Dissertation Advisor: Dr. Mark Steege

An Abstract of the Dissertation Presented
In Partial Fulfillment of the Requirements for the
Degree of Doctor of Psychology
(in School Psychology)
April 2014

Students with high functioning Autism Spectrum Disorder (ASD) often face significant social challenges in the middle school setting. For example, as students move beyond elementary school social interactions between peers typically become more complex and less predictable. When social demands begin to exceed the performance levels of students with autism in middle school, students may become isolated and experience increased behavioral and mental health issues. In middle schools, class-wide interventions are often not individualized enough for students with this condition and adult-mediated, office-based, interventions show low generalization to other settings (Reichow & Volkmar, 2010). The current study researched peer-coaching, an alternative method that has shown promising effects with elementary school students with significant social deficits. A non-concurrent multiple-baseline across subjects design targeted social interaction of three middle school students diagnosed with ASD. Following baseline, treatment included structured peer-coaching, including careful selection of coaches, initial training for subject and coach, goal-setting, monitoring and feedback for the subject, and contrived reinforcement for social interaction. Subsequent

maintenance probes were used to demonstrate effects. Results showed that treatment contributed to increased social interaction in a socialized school setting and inconsistent maintenance.

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Chapter 1: Introduction and Literature Review

Academic coaching has been demonstrated as an effective intervention for improving academic performance in students (Dawson & Guare, 2012). The academic coaching model is based on research supporting goal-directed persistence (Barkley, 1997), correspondence training (Machalicek et al., 2009), goal-setting (Locke & Latham, 2002), and self-regulation (Raffaelli, Crocket & Shen, 2005). Using an athletic coaching model, the academic coach is played by the teacher who carefully guides the student toward specific academic goals. Peer-coaching is built on these same principles but replaces the adult coach with a supervised peer coach. Academic peer-coaching is practical for larger classrooms where individual teacher attention can be limited. When set up correctly and implemented with fidelity, it provides more frequent individual attention, monitoring, and feedback. Academic peer-coaching steps are as follows: (a) an academic expectation is stated by the peer coach and the subject, (b) prompting occurs, (c) evaluation and feedback follow performance, and (d) contrived reinforcement is delivered to the subject for meeting goals.

While effective at improving academic performance, peer-coaching methods that embed the above principles have also been effective at improving social skills of students with Attention Deficit Hyperactivity Disorder (ADHD) who exhibit social skill and executive functioning deficits (Plumer & Stoner, 2005; Plumer, 2007). Plumer and Stoner (2005) demonstrated the positive effects of class-wide peer tutoring and individual peer-coaching on social skills in elementary students with ADHD. Subsequently, Plumer used just individual peer-coaching as a single treatment to demonstrate positive effects on the social skills of two of three elementary students with ADHD (Plumer, 2007). Plumer

employed a highly structured approach with systematized student training, supervision, establishing and setting of goals, correspondence training, self-regulation, as well as targeted reinforcement for achieving social goals.

Other peer-mediated treatments have improved social skills of students with ASD (Chan et al., 2009; Chung et al., 2007; Flynn & Healy, 2012; Labbe-Poisson, 2009; Sperry, Neitzel, & Engelhardt-Wells, 2010). Studies have applied various forms of peer-mediated treatment to improve and maintain social skills of younger students with ASD. Harper, Symon, and Frea (2008) utilized a concurrent multiple baseline across subjects design to show the positive effects of peer-mediated intervention for increasing social interaction of two elementary school students with ASD during recess. They reported positive generalization results and suggested that it was due to utilizing peer groups (versus one peer) and to intervening in a highly naturalistic setting. Petursdottir, McComas, and McMaster (2007) demonstrated that peer-mediated intervention with play-related common stimuli increased social interaction during peer tutoring and free play for a young student with ASD. Labbe-Poisson (2009) utilized pivotal response training (PRT), a peer-mediated intervention, and self-management training to demonstrate social behavior change, maintenance, and behavior generalization of three elementary school students with ASD.

The current study extends previous research in several ways. First, it contributed to the limited amount of research on social performance treatments for middle school students between eleven and fourteen years of age with ASD who confront increased and more complex social demands (Reichow & Volkmar, 2010). The study offers a naturalistic alternative to class-wide social interventions and to adult-mediated, office-

based methods. Without effective support, middle school students with ASD are at risk for isolation, interpersonal problems, behavior problems and psychological pathology, and may subsequently be at risk for self-harm and suicide (Hannon & Taylor, 2013). Second, the treatment targeted executive functioning deficits often experienced by students with ASD that increase with age relative to the normative population (Rosenthal et al., 2013). ASD students with deficits in self-regulation and novel problem solving can become overwhelmed by social demands in the less structured, more complex middle school environment.

By combining elements of peer-mediated methods demonstrated as effective for students with ADHD with those for students with ASD, it was proposed that the treatment effect for middle school students with ASD would be increased. More specifically, naturalistic elements were combined with established behavioral principles of goal-directed persistence, correspondence training, goal-setting, and self-regulation (i.e., Dawson & Guare, 2012 and explained below) to increase the likelihood that middle school students with ASD would improve and maintain social performance among peers. The current study replicated many elements of Plumer's study (2007), however, it was modified for middle school students with ASD.

Embedded behavioral principles included Barkley's (1997) goal-directed persistence, which includes setting a goal, making a plan to achieve the goal, remembering the goal, and sustaining attention while working on that goal. Students with ASD often struggle with persisting on long-range goals, for example, making a friend. Correspondence training requires a student to verbalize behavior he or she will perform in the future, provides opportunities to perform that behavior, and reinforces

successful performance (Machalicek et al., 2009). Studies have shown that an explicit statement on performing a behavior (the *say-do* approach) increased the likelihood it will occur. Goal-setting directs *attention* to a goal, increases *effort* toward the goal, increases *persistence*, and results in use of pertinent *knowledge* to reach the goal (Lock & Latham, 2002). Lastly, self-regulation refers to internal self-control and self-direction of behavior and emotions (Raffaelli et al., 2005). Students with ASD are often sensitive to their environment and have trouble self-regulating extreme responses to adverse situations. Self-regulation helps manage these responses and enables more access to positive experiences, such as social interaction.

By including established principles that target executive functioning, treatment addressed the social performance deficits of students with higher functioning ASD. Barkley (1997) noted in the ADHD literature that students with social challenges often struggle more with consistent performance than with absence of skills. This is consistent with students with higher functioning ASD who often possess basic social skills, but are not independent with performance of these behaviors in the natural setting. Such students often withdraw or become dependent on adults to support them in complex social settings with peers. By addressing performance deficits, treatment proposed to increase independence in natural, unstructured social settings.

Hypotheses

The first hypothesis of the current study was that social performance of middle school students with ASD would improve with peer-coaching treatment that combined naturalistic elements from peer-mediated treatments with research-based behavioral principles that support executive functioning. By improving performance, treatment

would narrow the gap in social performance that often exists between students with ASD and typical middle school students. The second hypothesis was that the treatment would result in maintenance of social performance.

Chapter 2: Method

Participants

Subjects in this study were two sixth grade students and one eighth grade student at a large public middle school in the Northeast United States. Each was diagnosed as a student with ASD and was supported by an Individualized Education Program (IEP), which had at least one social skill goal. Selection criteria required average cognitive abilities and evidence of significant social deficits. Selection was based on student records, teacher nomination, checklists, and student preference assessment. All study procedures were reviewed and approved by a University Institutional Review Board (IRB).

After nomination of students (Appendix A), classroom teachers completed the Social Skills Improvement System (SSIS) rating scale for each of the nominated students. Results indicated that each subject was approximately one standard deviation below same-aged peers on the measure's Social Skill domain. Teachers reported that each subject was socially isolated and largely disengaged from the majority of classmates, presented as socially reserved, and struggled with basic social skills such as eye contact, nonverbal awareness, and social initiation.

After identification of possible subjects through teacher nomination and SSIS ratings, final selection resulted from a forced-choice preference assessment completed by the nominees (Table 1). The students responded to questions that were categorized under five potential functions: peer approval, adult approval, competitive approval, consumable rewards, and independent rewards. Students valuing peer attention were considered better candidates for this intervention due to the nature of the peer-mediated treatment.

Table 1

Forced-Choice Preference Assessment Results

Preferences	<u>Affirmative Responses</u>		
	Kelly	Billy	Mike
Adult Approval	14*	6	16*
Competitive Approval	8	6	7
Peer Approval	10*	10*	2
Independent Rewards	3	5	6
Consumable Rewards	5	12*	10*

Note. Data reflect number of affirmative responses by subjects to corresponding preference questions.

*Denotes most preferred choices for each subject based on highest number of affirmative responses.

The coaches were two sixth grade and one eighth grade student and were selected from the subjects' team of 115 students. Teachers completed a social skills Likert scale and rated possible coaches' communication skills and compassion for peers. Students selected as coaches placed in the top 15% among their peers in these areas. Prospective coaches were contacted and interviewed, and gender-matched coaches from among those that showed interest in participating were selected. The subjects and coaches were enrolled in the study once parent permission and student assent were obtained.

Billy¹ was a sixth grade student of average cognitive ability, based on formal school assessments, with a diagnosis of ASD. He had attended the school for four months and had not exhibited any significant disruptive behavior during that time. Billy's IEP, however, identified significant challenges with social interaction with peers. He conversed well with adults and students in structured settings but was isolated from peers in unstructured settings, such as the cafeteria. Billy's attempts to interact were sometimes inappropriate and reflected his challenges with impulsiveness and social pragmatics, as documented by his IEP.

¹ All student names are pseudonyms.

Mike was a sixth grade student of average cognitive ability and with a diagnosis of Asperger's Disorder (now recognized as mild ASD). He was supported by an IEP with targeted speech and language services for social pragmatics. Mike's academic performance was strong and school records showed that he earned mostly A's, and was successful verbally interacting with teachers on topics related to class work. He was reported by teachers as socially awkward when informally approached by teachers and in unstructured social settings with peers, such as the cafeteria, gym, and recess.

Kelly was an eighth grade student of average cognitive ability with a formal diagnosis of Pervasive Developmental Delay, NOS (PDD, NOS, now recognized as mild ASD). Improved social performance was a goal on her IEP and she was described as having difficulty interacting with her same-age peers, especially in unstructured settings. Kelly rarely interacted with peers in class, the cafeteria, gym or free time. Kelly's social interaction with peers was also impulsive and reflective of challenges with social pragmatics. In a 1:1 setting with an adult, however, she was conversant, able to share information, and able to show appropriate affect. She self-reported a strong desire to make friends and was involved in several extracurricular activities.

Setting

Training and weekly supervision sessions for subjects and their coaches occurred in the primary researcher's office at the middle school. The office had a table, a couch, and three chairs and was quiet and private. Training also occurred in the cafeteria, when other students were not present, at the table where coaches and subjects sat during treatment.

All treatment sessions occurred in the school cafeteria during lunch periods, considered a social environment with frequent meaningful opportunities for social interaction among peers. The environment was unstructured with minimal direct adult supervision. The cafeteria space accommodated two groups of approximately 100 students at a time. The student seating areas were physically divided by the central kitchen and food distribution area. This study occurred during separate sixth grade and eighth grade lunch periods. During intervention sessions, the subject and coach sat at the same round lunch table with between three and seven other students. Three familiar adults monitored each group of 100 students. The primary researcher was present for all coaching sessions and appeared as an additional lunch monitor.

Materials

The peer coaching intervention included the procedures described in the Peer Coaching for Social Skills Manual developed by the researcher (Appendix B). This manual described all of the expectations of the coach and peer as well as parent notification, the rating system, and student rewards. Training materials included the above manual and the Steps to Success and Peer Coaching Steps guides (Appendix C). An iPod® Touch was used to videotape all peer-coaching sessions and to videotape three typical peers as part of a field test. A three inch by four inch holder was created that fit into the researcher's breast pocket and held the iPod® Touch in position for filming all sessions. Video required only one observer and was used to lower reactivity effects and increase the probability that the subjects' change in behavior was due to treatment (Kazdin, 1982). Field test videos were also used for training the second observer; the

primary researcher and the second observer watched each field test video in an office setting to practice interobserver agreement.

Procedure

The researcher served as supervisor and conducted all training sessions for the subject and coach, periodic check-ins during the week, and weekly review and monitoring of participants' ratings and rewards. The initial training for each subject and coach pair lasted approximately one hour and included a review of the peer coaching manual (Appendix C), description of roles for each participant, role playing in the empty cafeteria, and overview of daily goal-setting and monitoring procedures. Training included: (a) identifying a social goal (b) practice prompting and reviewing the goal prior to lunch, (c) practice with delivery of verbal or nonverbal reinforcement (attention) by the coach immediately after a subject demonstrates the goal, and (d) practice completing a post-lunch, social performance rating sheet. The pre-treatment forced-preference assessment showed that each subject rated some form of approval/attention as preferred. Mike rated consumable and adult approval as most valuable, Billy rated peer approval and consumable rewards as most valuable, and Kelly rated adult and peer approval as most valuable (refer to Table 1).

Prior to baseline and treatment, six field test videos of typically developing students were obtained to create a normative sample. Three typical students were observed on two occasions each at lunch and data on the percentage of social interactions were obtained. Data for the field test were gathered using a 10s partial interval recording procedure. Results of the field test showed a social interaction average of 37% when typical students were among other students at a round table during lunch. During

treatment sessions, environmental variables were consistent with field test and pre-treatment conditions, including the same lunchroom, total number of students in the cafeteria, a round lunch table, and number of students (3-7) at the table.

The subjects were each exposed to identical baseline procedures and then to identical treatment procedures. Data collection during baseline and treatment began once subjects sat down at the lunch table. Data for both phases were gathered using a 10s partial interval recording procedure. Baseline data on social interaction (e.g., initiating with peer, facing speaker, responding to peer, sharing with peer) were collected until a stable trend was shown. The treatment phase then began the day after the peer and coach completed training, including integrity checks (Appendix D).

During treatment sessions, the coach first reviewed the goal with the subject at his or her locker and then sat at the subject's table for lunch. The coach was instructed not to initiate verbal interactions with the subject during lunch but to attend to him or her when he or she was speaking, to respond naturally to him or her and to initiate and interact openly with others at the table. The coach was permitted to interact with the subject if he or she initiated interaction. Each time that the subject emitted a verbal utterance, the coach provided immediate reinforcement. Reinforcement included immediate verbal or nonverbal social attention from the coach following target behaviors, intermittent natural attention from other students at the table during lunch, and weekly tangible rewards based on the self-monitoring/points system. Immediately after each coaching session, the subject and coach completed the daily self-monitoring rating form. Ratings were based on a four point Likert scale (e.g., 1= never, 2= sometimes, 3 = often, and 4= almost always). If the subject and coach ratings were within two points of each other for the

session, the coach's rating was documented. A separation of more than two points resulted in a score of 1 for the session. If raters independently reported the same level, indicating consistency, then an extra bonus point was added to the daily score. This discouraged inflated reporting by the subject.

Each week, the coach and subject ratings were averaged separately by adding the scores and dividing by the number of days rated. A weekly average was obtained and used for weekly distribution of tangible reinforcement. During initial training, the subjects and coaches generated individual reward menus from which they organized a list of increasingly desirable weekly rewards (for example, \$5 game credit, candy, basketball cards, pencils, stickers) that correlated with their weekly ratings. These tangible rewards were given to both the subjects and coaches at the end of each week. The subject's parents received weekly reports about his or her child's social progress.

Maintenance sessions, during which the subject was presented with conditions identical to baseline, were conducted with each subject at two and four weeks post intervention. A 10s partial interval recording procedure was used. During all sessions, the researcher collected data on the subjects' social interactions in the cafeteria. The researcher remained approximately 10-15 feet from each subject while video taping behaviors using an iPod® Touch that was concealed in the researcher's breast pocket. Data coding was done after each lunch session in a quiet office setting using a MacBook Pro® laptop computer. Each video session was coded using the Data Collection Form for Peer Coaching Social Skill Intervention (Appendix E). The number of each subject's target social behaviors was recorded on the form and the total for the session counted. The percentage of target behaviors for each session was calculated by dividing the

number of intervals during which the target behaviors were observed by the total number available during the session

The percentage of intervals showing target behaviors was graphed and visually displayed. Additionally, pre- and post- indirect assessment of social skills was completed by each subject's teacher using the SSIS behavior checklist (Social Skill domain) and results are visually presented. Several treatment integrity measures were conducted to increase probability that behavior change was attributable to the treatment package. Mastery of performing and observing the targeted behavior skills and procedure was established during training, periodic integrity checks were conducted during treatment, and each subject and coach completed a one-page protocol questionnaire (see Appendix D). During treatment, participants submitted their weekly data sheets, which were monitored for computation accuracy by the researcher throughout the study. Participants were periodically asked by the researcher to reiterate procedural steps, such as prompting, reinforcing, and rating. In addition, the researcher observed all sessions while collecting video and answered periodic questions and provided feedback to participants immediately after sessions.

Dependent Variables

Each subject's classroom teacher completed the SSIS both pre- and post-treatment to document global changes in subjects' social behaviors. The primary dependent variable was the percentage of social interaction exhibited by each subject during a 20-minute lunch period in the school cafeteria. Social interaction was defined as any instance of verbal or nonverbal initiation, sharing, facing the speaker, and verbal or nonverbal responding to a peer. It did not include interaction with an adult or subject

interaction that was initiated by the peer coach. A 10s partial interval recording procedure was used to measure social interaction behavior.

Experimental Design

A non-concurrent multiple baseline across subjects design (MBD) was used to evaluate the effects of peer-coaching on social interaction of three middle school students with significant social skill deficits. The non-concurrent MBD was used in this applied setting for practical and theoretical reasons, as supported by Watson and Workman (1981). It afforded greater flexibility for a single researcher in a school setting than a concurrent MBD across subjects and was theoretically more appropriate for measuring change in percentage of targeted social behavior than a reversal design, which would be susceptible to irreversibility.

It should be noted that, while technically nonconcurrent, the study met most criteria for a *concurrent* MBD as outlined by Johnston and Pennypacker (1980). Treatment conditions were almost identical across subjects, as all sessions occurred in the same cafeteria, at identical round tables, with three to eight students and four monitoring adults. Sessions each occurred mid-day, during one of three lunch periods and each lasted for approximately 20-minutes. Baseline and treatment phases for two subjects occurred concurrently on overlapping days, while the third subject's baseline phase began two weeks after completion of the first two. This overall consistency strengthened the study and increased the plausibility that effects across subjects were the result of treatment.

Inter-observer Agreement

A master's level paraeducator employed at the middle school completed ratings of 36% of the videotaped treatment sessions. Using a 10s partial interval recording procedure, an agreement was scored if both observers identified the occurrence or non-occurrence of the target behavior; disagreements were scored when only one observer recorded the behavior. Each session's total agreements was divided by agreements plus disagreements and then multiplied by 100 to compute the percentage of inter-observer agreement for each session. The average agreement percentage across all co-scored sessions was 86%.

Treatment Integrity

Integrity checks of coaches were conducted by the same master's level paraeducator employed at the middle school who reviewed 10% of the videotaped sessions. Specifically, video of treatment sessions was observed to determine coach adherence to the treatment protocol using 10s whole intervals. Protocol included sitting at least one seat away from the subject, not initiating conversation with the subject, reinforcing the subject's social interaction and providing verbal and nonverbal praise. Treatment integrity was identified to be 94% across all three coaches. Mike's coach demonstrated the most lapses in treatment integrity by initiating conversation with Mike. This occurred intermittently throughout treatment, even though he was reminded by the researcher to wait for Mike's initiation. Each participant also completed a one-page treatment protocol questionnaire (Appendix D) prior to the start of treatment and earned a score of 100%.

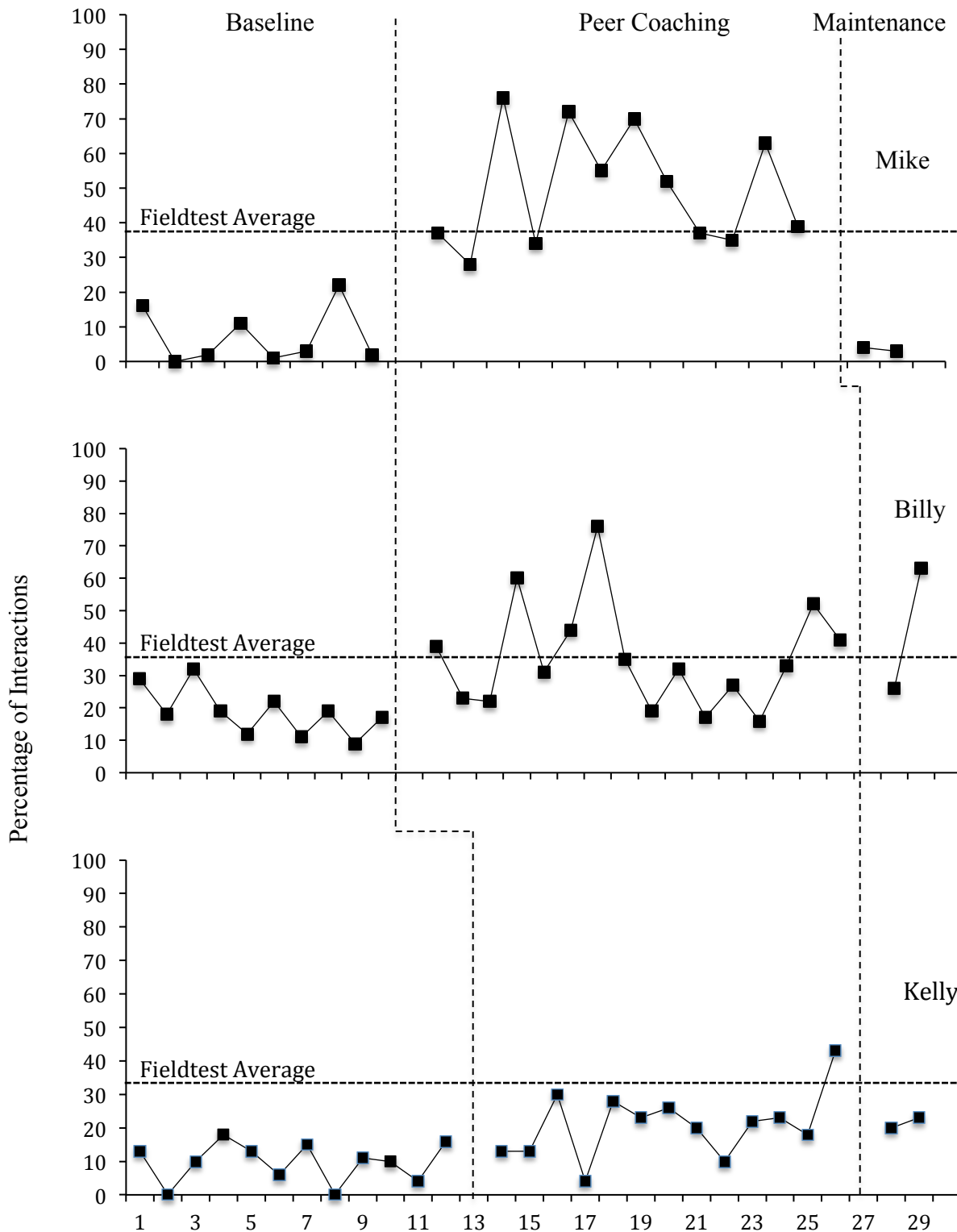
Chapter 3: Results

Three subjects with ASD received an intensive, short-term peer-coaching treatment package in their middle school cafeteria. These subjects each demonstrated increased percentages of targeted social behavior (Figure 1). During baseline, each subject's observed percentage of target social interactions was below the field-tested percentage of 37%, represented by a horizontal line across all phases.

When comparing averages of social interaction, Mike demonstrated the largest increase in social interaction from a 7% average during baseline to a 50% average during treatment. His percentage range during baseline was 0%-22%; his range during treatment was 28%-76%. Billy demonstrated the second largest increase from a 12% average at baseline, to a 34% average during treatment. His percentage range during baseline was 9%-32%; his range during treatment was 16-76%. Kelly showed the least amount of change and increased from a 10% average at baseline to a 21% average during treatment. Her percentage range for social interaction during baseline was 0-18%; her range during treatment was 4%-43%.

Importantly, all three subjects closed the social performance gap between themselves and typical peers. Mike's average percentage of social interaction during treatment (50%) was above the average percentage (37%) of the field test normative group. Billy's average percentage (34%) was just below the field test average. Kelly's average percentage (21%) was below, but she demonstrated improvement and a peak of 43%, indicating the potential to interact socially in a highly socialized environment at a level above the average of typical peers.

Figure 1. *Percentage of subjects' social interactions across sessions.*



Treatment effect was also evaluated by analyzing the percentage of non-overlapping data points (PND). Using this method, the highest baseline point was identified and then a percentage of treatment phase data points above that point was determined (Scruggs, Mastropieri, & Casto, 1987). A PND of 90% and above generally indicates a highly effective treatment; PND of 70-90% indicates a moderately effective treatment; PND of 50-70% indicates a minimally effective treatment, while a PND below 50% equates to an ineffective treatment. Mike's PND was 100%; Billy's PND was 50%; Kelly's PND was 62%. Based on PND, these results indicated that treatment effects ranged from minimally to highly effective. Mike showed the greatest response (highly effective) to treatment while Billy showed the least amount of change from baseline (minimally effective). Using this comparison, Billy's response to treatment appeared lower than Kelly's. However, his PND was impacted by greater variability in performance during treatment (Billy's range 16-76%, Kelly's range 4-43%).

As demonstrated visually (Figure 1), the percentage of social interaction during maintenance sessions was much less than during treatment. Maintenance for two subjects was above baseline levels. While only two maintenance probes were conducted, Billy's percentage of social interaction maintained or increased at the two week (26%) and four week (63%) checks. Data suggested that performance was effectively maintained by natural contingencies at one session. His social interaction maintained at a percentage average (45%) above the field test group.

Kelly's average percentage of social interaction also showed maintenance by natural contingencies at the two week (20%) and four week (23%) checks. While still

below the field test average, these percentages were consistent with her 21% average during treatment and above her average of 10% during baseline.

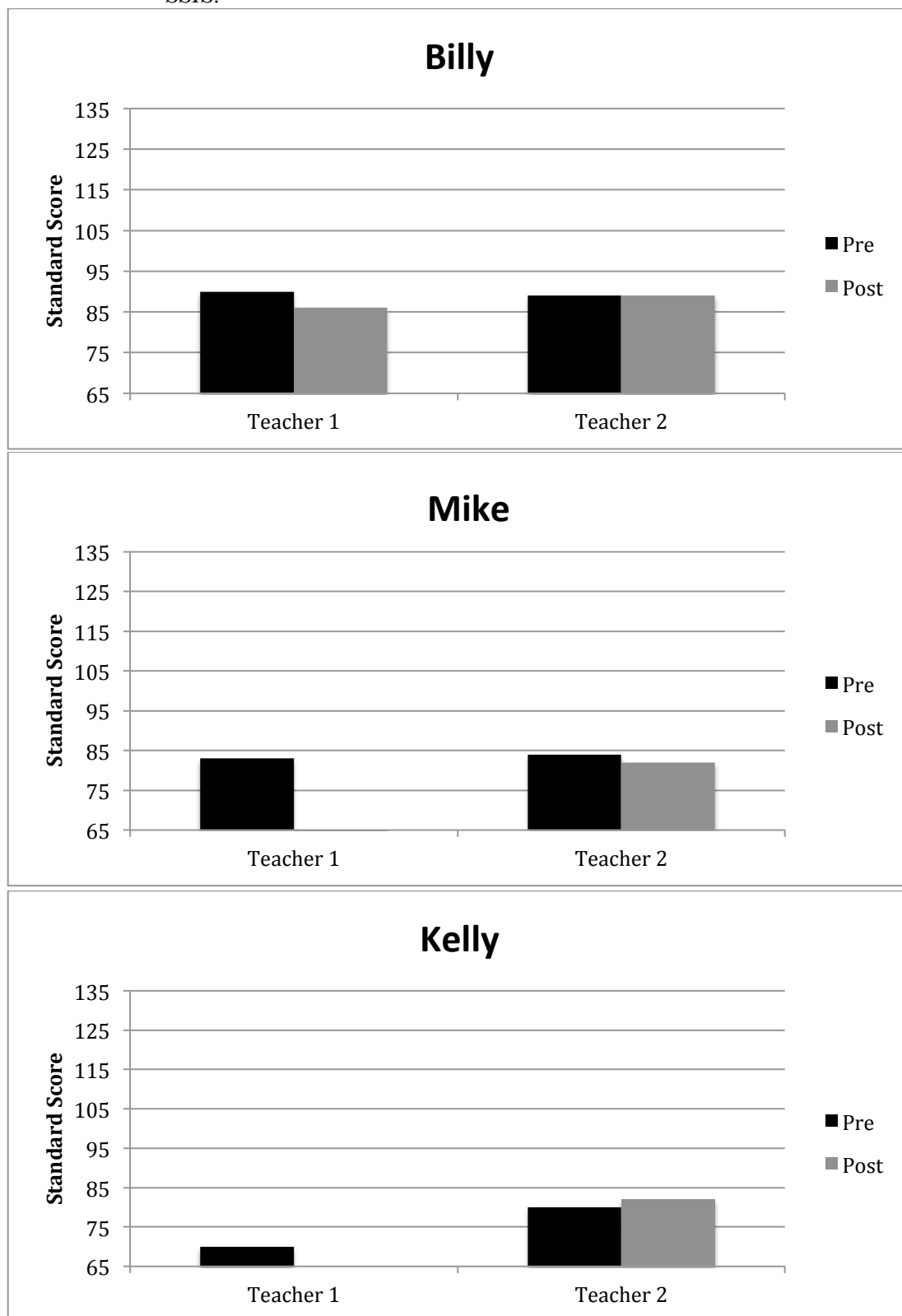
Conversely, Mike's average percentage of social interaction declined significantly at both the two week (4%) and four week (3%) probes. His average of 4% during maintenance was well below his average during treatment (50%). This showed that once the peer-coaching contingencies were removed, social interaction was not maintained by natural contingencies, including natural peer attention.

Pre- and post-intervention teacher ratings using the Social domain of the *Social Skills Improvement System* (SSIS) did not indicate significant changes for Mike and Billy after treatment. Kelly demonstrated moderate change, based on the reporting of one teacher. Her standard score on the Social Domain of the SSIS improved 10 points, which is considered a relative, but not statistically significant increase, of broad social behavior (Figure 2).

Social Validity

Social validity was measured through a field test normative sample that used identical observation coding procedures. This contributed to understanding the social importance of outcomes. Results showed that typical middle school students engaged in social interactions with each other during lunch about 37% of the observed intervals. The 37% average interaction was used as a general indicator of how much social interaction might be expected of the subjects. The obtained results (Figure 1) showed that the subjects' social interaction percentages were close to or above the average demonstrated by the normative sample during treatment.

Figure 2. *Pre- and Post-Treatment Standard Score Results on the Social Domain of SSIS.*



Note. A post-treatment standard score was not available for Mike and Kelly by teacher 1.

Social validity was also measured anecdotally. During the study, three of the six participants were formally recognized by their team of teachers as “Student of the Month” for exemplary community participation. These awards are based on evidence that the student helps others and contributes to the welfare of the school. Two peer coaches and one subject were recognized during their participation in this study. Follow-up with the teachers indicated that the two peer-coaches were rewarded for their compassionate commitment to this study and the welfare of a fellow student; teachers admired their commitment during the highly valued lunchtime period. The subject who received this award was recognized for her significantly increased engagement in school; teachers specified her increased social interaction with peers, academic progress, and appropriate verbal contributions in class.

It is worth noting that one subject, Mike, was more receptive of this treatment than several prior attempts at treatment in an office setting. Mike had previously refused all special education services in an office setting, possibly due to disruptions to his routine. His willing participation in the study may have been because it did not disrupt his daily schedule. Except for the one hour initial training and a weekly 15-minute meeting, Mike was not pulled from classes or activities and the process was discreet. Except for the subject, coach, and the primary researcher, other students and teachers were unaware of the ongoing treatment.

Chapter 4: Discussion

The purpose of this study was to examine the effects of a modified peer-coaching treatment for increasing social interaction of middle school students with ASD in a school cafeteria. A secondary purpose was to examine maintenance of the treatment effects. Results varied across three subjects, but indicated that the treatment was moderately to highly effective for increasing social performance to levels equal to typical middle school students in a cafeteria setting. Maintenance results were mixed across subjects; two subjects showed evidence of some maintenance while one did not.

During treatment, Mike demonstrated the most significant increase in social interaction. He quickly became socially engaged at his table and demonstrated percentages of social behaviors above most peers, based on comparison with the field test group. His increased social interaction suggests that his previous social withdrawal from peers was indeed a performance, and not a skill, deficit. However, Mike did not maintain these social interactions in the absence of treatment, without the peer coach and contrived reinforcements, his social interactions returned to baselines levels. Importantly, Mike's preference assessment showed that adult attention and consumable rewards were much more preferred than peer approval (Table 1). He rated peer approval far lower than the other subjects. Once contrived adult attention and tangible reinforcement (e.g., candy and gift cards), along with other variables, were removed post-treatment, his social interactions during lunch returned to baseline levels. He did not access naturally maintaining contingencies. This suggests that students like Mike who have lower preference for peer attention and approval are not likely to access natural contingencies and maintain treatment effects, and may not be ideal candidates for this treatment.

Billy demonstrated moderate increases in social interaction during treatment. His social interaction average was just below the average of typical peers. However, Billy showed a spiked response, during the maintenance phase. His maintenance data show an initial response comparable to baseline and a second data point greater than most of the treatment phase data points. While Kelly did not reach performance levels equal to typical peers during treatment, treatment data indicate she improved from baseline. Kelly's maintenance data were similar to her treatment data. Maintenance data suggest she was accessing natural contingencies after treatment.

During the current study, a functional relationship was established between the independent variable (e.g., peer-coaching) and the dependent variable (e.g., percentage of social interactions with peers). As depicted in the data (Figure 1), Mike showed significant increases, Billy showed steady increases, and Kelly showed minimal increases in social interaction in response to treatment. The results suggest that the treatment methods -- which included established behavior principles -- successfully targeted these students' social performance deficits. Overall, these results indicate that this method of peer-coaching is an effective treatment to improve the social performance of middle school students with ASD.

Although the subjects showed improvements during treatment, there were several antecedent modifications in place intended to increase access to natural contingencies. First, antecedents prompted subjects to access valued reinforcement. For example, the subjects met with their coaches just before entering the cafeteria each day to review their goal. It served as a reminder that they would receive reinforcement for engaging in social interactions. In addition, the subject and peer coach met weekly with the researcher to

review their goals and access rewards. As a result, the subjects had a consistent schedule of contrived and natural reinforcement in the form of immediate peer attention, delayed adult attention, and access to valued tangibles in relation to their social engagement during certain lunch sessions. Findings suggest that when antecedent modifications and a peer coach who is trained to support a student are present, students with ASD can increase their social interactions with other peers.

Additional antecedent modifications were based on established behavioral principles. In this study, consistent with Barkley's *goal-directed persistence* principle, subjects were prompted to select a goal (e.g., social interaction), to follow a broad plan to achieve the goal, and to sustain attention through constant presence of the coach at the lunch table. *Correspondence training* occurred just prior to lunch and consisted of establishing a correspondence between a statement and a behavior followed by frequent opportunities to practice that behavior in the cafeteria at a round lunch table with three to seven peers. Subjects participated in *goal-setting* by setting a goal during initial training and revisiting that goal prior to each lunch session. In doing so, as established by Locke and Latham (2002), they increased their attention, effort, persistence, and use of relevant knowledge to achieve their goal. *Self-regulation* was increased through the subject's awareness of constant monitoring by the coach and researcher at lunch, by self-rating scales immediately after each lunch session, and by weekly self-rating of performance prior to earning rewards. Findings suggest that these antecedent modifications also contributed to the increased social interaction of students with ASD.

While treatment effects were favorable, maintenance effects of this treatment were inconsistent. Access to naturally maintaining contingencies were proposed to

increase the likelihood of maintenance (Stokes & Baer, 1977). Like an athletic coach, the peer coach supported the subject's interaction with other peers through a structured treatment, increasing his or her access to naturally maintaining contingencies. After treatment, many variables remained consistent, for example, familiar peers, setting, and time of day. The treatment was also delivered at the point of performance in a natural setting, an element suggested as vital for success when implementing treatment for social skills deficits (DuPaul & Stoner, 2003). In addition, a strong temporal relationship between the target behavior and natural consequences increased the likelihood that a functional relationship would be established and maintained (Cooper, Heron, & Heward, 2007). Peer attention was delivered intermittently by familiar peers at the table.

Despite structure and access to naturalistic elements, maintenance data were not as strong as treatment data. Data indicated that subjects did not access equal levels of naturally maintaining contingencies after treatment. The removal of antecedent modifications that explicitly signaled access to reinforcement and that supported executive functioning may have been premature and weakened access to natural contingencies. Overall, subjects may have benefited from longer treatments or needed gradual transition to independent practice in order to maintain their social performance. For example, the treatment phase might have been extended in a modified format with decreasing access to the peer coach and to contrived reinforcement. In addition, the two candidates who rated peer approval as preferred during preference assessment showed significantly higher levels of maintenance than the subject who did not rate peer approval as preferred. This should be considered when setting selection criteria. This is consistent

with the intention of this treatment, which is to expose students to natural peer attention that was previously inaccessible.

The current treatment differed from class-wide and adult-mediated social skill treatments in its natural delivery of reinforcement and its adherence to a range of established behavioral principles (e.g., goal-directed persistence, correspondence training, goal-setting, self-regulation). Class-wide treatment, as the name suggests, focus less on the individual at the point of performance and offer leaner or delayed schedules of reinforcement. Adult-mediated treatments include situations in which an adult supports the student by offering prompts in specific settings. It is suggested that the former treatment may reach more students, but not be intensive enough to improve social performance of students with ASD to the level of typical students. It is suggested that the latter treatment may be intensive and specific enough to increase social performance, however, it may lack access to natural contingencies and limit maintenance within the natural setting. Findings from the current study support peer-coaching as an alternative treatment that school clinicians could use as an effective resource to increase pro-social behavior of students with ASD in large, public school settings.

Limitations

In this study, the training of peer coaches was limited to approximately one hour. It is possible that the coaches would have benefited from increased practice and more direct feedback from the researcher to strengthen integrity of the technique. For example, if more coach training had been provided, it is possible that the coaches would have eliminated social initiations with their peer and been more consistent with their delivery of positive reinforcement at the lunch table. Occasionally, coaches were inattentive or

preoccupied and did not respond to a subject's interactions with other students. It is possible that more coach training or increased coach incentives might have resulted in better prompting and delivery of reinforcements by the coaches.

Another limitation is that the subject selection methods relied on assumptions about each subject's foundational social skills necessary for social interaction. It is possible that the subjects in this study did not have the prerequisite skills needed for the lunch session interactions. Future researchers are advised to closely assess subjects' performance of foundational skills during the selection process. As needed, future studies can strengthen necessary skills that are lacking, for example, facing the speaker or verbal initiation. Treatments could then be applied that build toward higher-level performance, such as social interaction. Alternatively, the goal setting process could be revised to ensure that each subject's actual deficit areas are accurately targeted for intervention.

The video recording of sessions did present some limitations that may have resulted in an underestimate of treatment effects. Since the iPod® Touch was concealed in the researcher's breast pocket and not at the eye, it was sometimes difficult to focus on the subject and to include surrounding context. Other factors that impacted the clarity of video were excessive window light, interruption of the researcher by passing peers and adults, and sudden movement of the subject. Data collection was also difficult if the subject was positioned in a manner that made video recording difficult. It is possible that additional training in the use of videography, and an improved device might increase accuracy of data collection.

Lastly, implementing treatment in a largely uncontrolled cafeteria environment of 100 students likely increased the risk of confounding variables and threats to treatment integrity. There were naturally occurring interruptions to the schedule, interfering peers, and student absences that occurred. Subjects and coaches were not monitored outside the cafeteria environment and unknown changes (such as an argument with a peer or a change in medication) may have impacted their daily social performance. It is suggested that treatment effects could have been improved with increased control of environmental variables.

Future Research

The subject selection process could be revised to prioritize the preference assessment. In this study, the preference assessment indicated that peer attention was not preferred by Mike, however, the selection protocol did not limit his participation. It is suggested that future studies include more stringent selection criteria to ensure that peer attention, a primary component to a peer-coaching treatment, is highly valued by all participants.

Future research on peer-mediated intervention should continue to focus on the social performance of middle school and high school students with ASD who confront more complex social demands. It is suggested that both populations would benefit from additional support to improve social interactions and to reduce the stigma associated with certain behaviors and diagnoses. Following the peer-coaching model, further research could focus on more advanced social performance in order to meet increased demands, including, managing complex classroom situations, social conflict, and close interpersonal relationships.

Future peer-mediated intervention research could also focus on settings other than the school environment to promote positive social transitions from school to the community after graduation. For example, peer-coaching could be used to improve social performance of older students during leisure activities and structured extracurricular activities. Functional social skills also could be targeted, such as those needed for shopping or other functional activities. Rather than stop treatments after basic skills are obtained, it is suggested that future research consider peer-mediated methods to improve performance of more complex social skills in various settings. Finally, the present study measured the quantity of social interactions. Future research could focus on identifying, defining, and recording both quantity and quality of social interactions.

Chapter 5: Summary

The current study contributed to research on peer-mediated social skill treatment for students with ASD. It combined traditional elements with elements based on established behavioral principles. While most research on peer-mediated interventions has focused on elementary school students, the current study targeted middle school students with ASD who typically experience more complex social demands among adolescents in larger school settings. Subjects' response to treatment was variable across subjects but generally indicated that social performance improved to the level of typical peers when a peer coach was present. Two of three subjects performed consistently with a field test normative sample of typical peers. Maintenance effects were less established and suggested inconsistent access to natural contingencies to maintain behavior. Overall, findings suggest that there may be a relationship between a peer-coaching treatment that combines traditional elements with established behavioral principles and the social performance of middle school students with ASD.

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Appendix A

Subject Recruitment Script/Form

To team teachers:

“Please identify roughly the bottom 10% of your 115 students (roughly 11 students) in the area of verbal and nonverbal social engagement with grade level peers in both classroom and non-classroom environments.”

- | | |
|----|-----|
| 1. | 7. |
| 2. | 8. |
| 3. | 9. |
| 4. | 10. |
| 5. | 11. |
| 6. | |

For each of these 10-11 students, teachers will complete the following Likert scale:

Engages verbally with peers:

1	2	3	4	5	6	7	8	9	10
Never				Sometimes					Very Often

Engages nonverbally with peers:

1	2	3	4	5	6	7	8	9	10
Never				Sometimes					Very Often

Social isolation from peers:

1	2	3	4	5	6	7	8	9	10
Very isolated				Somewhat isolated					Not isolated

Coach Recruitment Script/Form

To team teachers:

“Please identify roughly the top 10% of your 115 students (roughly 11 students) in the area of verbal and nonverbal social engagement with grade level peers in both classroom and non-classroom environments.”

- | | |
|----|-----|
| 1. | 7. |
| 2. | 8. |
| 3. | 9. |
| 4. | 10. |
| 5. | 11. |
| 6. | |

For each of these 10-11 students, teachers will complete the following Likert scale:

Engages verbally with peers in a healthy manner:

1	2	3	4	5	6	7	8	9	10
Never				Sometimes					Very Often

Engages nonverbally with peers in a healthy manner:

1	2	3	4	5	6	7	8	9	10
Never				Sometimes					Very Often

Social isolation from peers:

1	2	3	4	5	6	7	8	9	10
Very isolated				Somewhat isolated					Not isolated

Compassion for fellow students with social challenges:

1	2	3	4	5	6	7	8	9	10
Not compassionate				Somewhat compassionate				Highly compassionate	

Appendix B

Peer Coaching for Social Skills Manual

Introduction to Peer Coaching

In a private office setting, the supervisor explains roles to the peer coach and the subject

A specific social goal will be identified for the subject and explicitly defined and modeled by the supervisor for both participants

Students will be instructed that they will work together for approximately 10-12 weeks to master the social goal during their lunch period

They are not required to be friends

The role of the peer coach is to remind the subject of his goals before lunch, observe the subject during lunch, and to provide direct feedback after lunch

Peer Coach and Subject Training of Daily Requirements

After introducing the process, discussing their roles, and establishing the subject's social goal, the peer coach and the subject will:

- practice prompting the subject to the social goal by having the peer coach initial the Daily Goal Form just before lunch
- review the seating arrangement and expectations in the cafeteria
- practice reinforcing the subject for target social skill during lunch
- practice scoring the Daily Goal Form; the peer coach will circle his or her score first and cover the answer. The subject will then circle his or her rating.
- practice determining an average rating for the week
- development of a rewards menu
- demonstration of procedural mastery will be achieved by students independently modeling the peer coaching steps: prompting by the coach, identifying seats in the cafeteria, completing rating on Daily Goal Form, computing weekly average on Weekly Goal Table, identifying reward, as well as scoring 100% on a review questionnaire

Concrete Directions for the Peer Coach and Subject

The forms that will accompany this manual describe the Peer Coaching process for both of the students

The Peer Coach's form is called "Peer Coaching Steps" and the form for the subject working toward a daily goal is called "Steps to Success!"

Laminated copies of these forms will be kept in the students' desks. Copies will also be included in the Peer Coaching Binder that will be located in the teacher's room. Both students will use the same Daily Goal Form.

Notification of Parents

Parents of both the peer coach and the subject will be notified weekly of their child's progress during the week and whether they earned their reward

Rating System

As indicated on the Daily Goal Form, four points will be considered Always Demonstrates, three points will be considered Often Demonstrates, two points will be Sometimes demonstrates and one point will be Rarely or never Demonstrates.

If the scores are within one point of each other, the student receives the peer coach's score for his or her "Points for the Day." If both students circle the same number, a bonus point gets added to the score they circled. If the scores are two or more points from each other, the student receives a score of one for that day. The students will then record the "Points for the Day," transfer this information to the Weekly Goal Table, located in the Peer Coaching Binder in the teacher's room.

Rewards

At the end of each week that Peer Coaching is implemented, the students may earn rewards for their performance.

Both the Peer Coach and the student working toward the goals receive a reward if the student earned a certain point average throughout the week. The students will compile a list of three possible weekly rewards and complete the Reward Menu during the training session.

The weekly scores will be based on the average score for the week, rounded to one decimal place. The point ranges are the following: Reward 3: average of 3.0-3.9 points, Reward 2: average of 4.0-4.9 points, Reward 1: 5 points.

The Reward Menu will be completed during the training by conducting a preference assessment and gaining approval from teachers

During the Peer Coaching process, at the end of the week, the students will meet with the supervisor and calculate their average score for the week on the Weekly Goal Table.

Once the students have determined which reward they have earned, they will then show the supervisor the Average Score, and tell the supervisor which goal they have achieved.

The supervisor will complete the information on the "Letter to Families" form and will send the letter home with the students at the end of the week.

Appendix C**Steps to Success!**

For: _____(subject)_____

1. I will meet with my peer coach each day and review my Daily Goal form just before lunch.
2. I will sit at the same table with my peer coach each day, but not immediately next to him.
3. I will focus on my social goal throughout lunch.
4. After lunch, I will circle my self-rating and then cover up my rating so my peer coach can circle his rating.
5. I will meet with my peer coach and my supervisor each week to review my rating and receive my reward.

Peer Coaching Steps

For: _____(Coach)_____

1. I will meet and prompt my peer each day by asking to review his Daily Goal form just before lunch and then initialing it (“Let’s look at your daily goal before we go to lunch”).
2. I will sit at the round lunch table with my peer each day and always have at least 1 student between me and my peer.
3. When my peer displays his target social skill, I will establish eye contact with a smile, give him the thumbs up, or provide verbal praise (“Nice job!”)
4. I will not start conversation with my peer at lunch but I can start a conversation with other peers and I can respond to my peer’s and other’s questions and comments.
5. After lunch, I will revisit the Daily Goal form and circle my peer’s social skill rating after my peer circles his rating. I will provide praise when my peer earns a high rating (“Nice job with your goal today at lunch”)
6. I will meet each week with our supervisor to review my peer’s progress and determine if we have earned a reward.

(Student) Daily Goal Form

Social Goal:

Prompted by Peer Coach (signature): _____

How Often Did I Show My Skill at Lunch?

(Subject's) rating: (circle one)

Rarely or Never
1

Sometimes
2

Often
3

Almost Always
4

(Coach's) rating: (circle one)

Rarely or Never
1

Sometimes
2

Often
3

Almost Always
4

Points for the Day: _____

Date: _____

Appendix D

Treatment Integrity Form

Subject

1. Met with peer coach and reviewed Daily Goal form just before lunch.
2. Sat at the same table with peer coach each day, but not immediately next to him.
3. After lunch, circled self-rating and then covered up rating so peer coach could circle his rating.
4. Met with peer coach and supervisor each week to review social skill rating and receive reward.

 / 4 = %

Peer Coach

1. Met and prompted peer by asking to review his Daily Goal form just before lunch and then initialing it (“Let’s look at your daily goal before we go to lunch”).
2. Sat at the round lunch table with peer with at least 1 student in between peer and coach.
3. When peer displayed his target social skill, established eye contact with a smile, gave him the thumbs up, or provided verbal praise (“Nice job!”)
4. Did not start conversation with peer at lunch. Started conversation with other peers and responded to peer’s and other’s questions and comments.
5. After lunch, revisited the Daily Goal form and circled peer’s social skill rating after peer circled his rating.
6. Provided praise when peer earned a high rating (“Nice job with your goal today at lunch”)
7. Met each week with supervisor to review peer’s progress and determine reward.

 / 7 = %

Treatment Integrity Questionnaire for Student Participants

1. What do I do with my coach/peer just before lunch?
 - a. Discuss what other students are doing at lunch
 - b. Discuss the rating from the previous day?
 - c. Check the Daily Goal form and initial it with my partner.

2. Where do I sit at the lunch table?
 - a. Next to my peer/coach
 - b. At least one person away from my peer/coach
 - c. At a different table than my peer/coach

3. What is the social skills goal we are working on in the cafeteria?
 - a. Looking at the speakers at the table
 - b. Speaking with students at the table
 - c. Interacting with people at the table
 - d. All of the above

4. What I do immediately after lunch is over?
 - a. Say goodbye to my coach/peer
 - b. Avoid other peers and go back to my pod
 - c. Go with my peer/coach to the team room and circle a rating for the our social skill

5. What does the coach do when *the peer* interacts with people at the table?
 - a. Ignores him/her
 - b. Makes eye contact and gestures “good job” with a nod, thumbs up, or words of encouragement.
 - c. Sings happy birthday

6. What is the main goal of the peer at the lunch table?
 - a. To be silent
 - b. To interact with others by talking, listening and sharing
 - c. To see what others are eating

Appendix E

Data Collection Form - Peer Coaching Social Skill Intervention

Student:
Location:
Observer:

Video Dates:
Video Start Time (Min/secs):
Total intervals:

Target Behavior: Social Interaction (speaking, eyes on a speaking peer, sharing)

Tx behavior recorded using 10" partial intervals.

√ = occurred — = did not occur
/ = if student not present on screen or obstructed and behavior has not been observed during the interval

Target Behavior Data

Total intervals _____ / _____ = _____ %

Interobserver Agreement:

$\frac{\text{Agreements}}{\text{Agreements} + \text{Disagreements}} \times 100 =$

Biography of the Author

John Potter was born and grew up in Concord, NH and attended St. Paul's School. He earned a B.A. degree from Dartmouth College, a M.Ed. from Boston University, and a CAGS in school psychology from University of Massachusetts-Boston. John has worked as an educator for 22 years with a variety of student populations. He has worked as a certified school psychologist for the past 14 years in Exeter, NH. He is a candidate for the Doctorate of Psychology Degree in School Psychology from The University of Southern Maine.