INVESTIGATING THE EFFECTS ON PARALLEL PLAY BETWEEN SIBLINGS:
TEACHING CHILDREN WITH AUTISM TO EMIT SOCIAL PHRASES TO
THEIR TYPICALLY DEVELOPING SIBLING

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The focus of this study was three fold. First, modeling and feedback were investigated as a training package for social interactions between siblings. Second, the effects of social phrases taught to the sibling with autism were investigated. Third, the magnitude of these social phrases was measured by timing duration of parallel play. The experimental design is an A-B-A1-A2 design conducted in a clinic, with a probe for generalization in the home environment. This intervention was replicated across an additional sibling dyad to indicate its effectiveness. This study ascertained that the sibling with autism was a viable participant in learning new social skills that could function as a behavioral cusp and increase sibling interactions.
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CHAPTER 1
INTRODUCTION

“Autism Spectrum Disorder is a complex developmental disability that affects a person’s ability to communicate and interact with others” (Autism-Society, 2007). The behaviors that encompass autism impair a person’s ability to form meaningful relationships, even within the family. Kaminsky and Dewey (2001) showed that sibling relationships are characterized by less intimacy, prosocial behavior, and nurturance in families of children with autism than in those families with children diagnosed with other developmental disabilities. Cicirelli (1985) concluded that sibling interactions are essential and powerful components of socialization that foster the development of instrumental and affective relationship skills. This conclusion embodies the underlying concept of behavioral cusps. Behavioral cusps are defined as “a behavioral change that has consequences for the organism beyond the change itself… exposing the individual’s repertoire to new environments” (Rosales-Ruiz & Baer, 1997, p. 534).

Much social research has focused on peer interactions, and only a handful of such research has concentrated on family interactions – specifically, sibling interactions. Much of the past research dedicated to sibling interactions for children with autism has relied on teaching the typically developed sibling new behaviors to increase overall interactions with their sibling with autism (James & Egel 1986; Schreibman, O’Neil & Koegel, 1983; Trent, Kaiser & Woley 2005; Tsao & Odom 2006). Past research examining different types of play have focused on teaching solitary, functional, or symbolic play (Gudmundsdottir, 2002). Although this approach teaches appropriate leisure activities, it does not directly address the social aspect of play. Playing with toys by oneself, or engaging in functional solitary play (such as puzzles or video games) does not
necessarily lead to playing with others (such as sharing toys and reciprocal play like throw/catch).

One of the diagnostic criteria for autism spectrum disorders (ASD) is severely impaired social interactions. Maximizing the sibling relationship could function as a behavioral cusp for future social behavior with new people in new places. Teaching social behaviors to children with autism addresses the concept of the behavioral cusp, and meets the goal of overcoming impaired social interactions by involving the child’s typically developing sibling in practicing appropriate social interactions (since the sibling is a constant human connection in the child with autism’s life). This could allow for continuous opportunities for the child with autism to emit the behavioral skills that are learned.

Several studies in the field of behavior analysis have shown that teaching children with autism appropriate play skills is an effective way to promote language and social interaction (e.g., Goldstein & Cisar, 1992; Haring & Lovinger, 1989; Taylor, Levin, & Jasper, 1999; Thorp, Stahmer, & Schreibman, 1995). An alternative to this approach would be to teach the child with autism key functional language that could promote duration of appropriate play, specifically parallel play with the sibling.

The goal of this study was to determine if a child with autism could be taught verbal behavior, in the form of social phrases, which might directly increase the time that the typically developed siblings engaged in parallel play with the sibling who is autistic. This intervention sought to determine if teaching specific social phrases (personalized praise statement for Sibling Set A and exclamatory statements for Sibling Set B) would affect duration of parallel play between two siblings when one sibling from each dyad is typically developing and the other sibling has been diagnosed with ASD. This study addresses the question of “How does modeling
specific social phrases for a child with autism in turn affect the duration of parallel play between that child and his typically developing sibling?”
CHAPTER 2

METHODS

The experimental design is an A-B-A1-A2 design conducted in a clinical setting, with a probe for generalization in the home environment. The intervention phase was a modeling/feedback-training package. Therefore, during return-to-baseline phase the trainer was removed during playtime. The reversal design is a typical experimental design in the applied setting when demonstrating acquisition of a new skill (DeQuinzio, Townsend, Sturmey & Poulson, 2007; Porritt, Burt & Poling, 2006; Scherrer & Wilder, 2008), and it was replicated across an additional sibling dyad to demonstrate its effectiveness in this study.

Setting and Materials

The office designated for research was part of a clinic-based setting for children with autism. The room had a large window and was equipped with shelves of toys, a school desk with two child-sized chairs and a therapist’s desk with an office chair. The toys on the shelves were categorized by: cause and effect, functional manipulatives, imaginary play, fine motor activities and gross motor activities. A digital video camera on a tripod was located on the teacher’s desk in a far corner of the room, to record each session for later review and to calculate inter-observer agreement (IOA). The therapist had labeled golf counters to tally verbalizations made by each sibling and a stopwatch to time duration of sibling interactions of parallel play throughout the session.

Participants

A flyer was sent home to all parents who had a child attending Behavioral Innovations, Inc., a clinic for children with autism. Only four parents responded to the recruitment flyer. Of the four responses, two children were not selected to participate because one child was leaving
the clinic within the month, and another child had previously worked with the therapist who was to conduct the study (which may have led to biased results). The two remaining participants were considered “higher-functioning” because of their abilities to communicate using verbal language, and to stay engaged with a minimum of two activities in solitary play for a minimum of 10 minutes. Sibling Set A consisted of a 6-year-old boy with autism spectrum disorder (ASD) and his typically developing 3-year-old brother (this sibling was chosen because the only other sibling in the family was less than a year old). Sibling Set B consisted of a 6-year-old boy with ASD and his typically developing 4-year-old sister (these were the only two children of the family). Both families of Sibling Sets A and B were of upper middle class socio-economic status. Parents of these children were not trained in any of the intervention procedures, so there would not be any confounding variables, such as practicing the social interactions at home.

Procedure

One hour/week at the center was scheduled as the time for the siblings to be in the same room to participate in this study. The hour was divided into four 15-min segments to enable later review of the videotaped recordings measuring inter-observer agreement (IOA) on frequency of verbal exchanges. The trainer remained in the same room for the entire hour and conducted naturalistic observations of each session, collecting frequency measures for verbal exchanges and duration measures for parallel play. Additionally, staying within one room for the entire hour allowed for video-recording sessions to be reviewed later to measure inter-observer agreement. In accordance with Murdock, Cost and Tieso (2007), though direct observation is a time-consuming method of assessment, the information gathered was essential as a measure of specific behavioral gains or losses.

For baseline, the therapist guided the sibling set into the office, and instructed them to
“Go play.” All the sessions ran for 60 min. The therapist tallied requests, comments, personalized statements (i.e., use of sibling’s name), exclamatory statements (i.e., “Wow,” or “That’s cool!”) and recorded duration of play between siblings. During the first session of baseline for Sibling Set A, the child with autism ran back and forth around the room and did not engage in much functional solitary play nor parallel play. For the second session of baseline, for Sibling Set A, the therapist had to make some environmental arrangements, so that more toys were off the shelves and at child’s-eye-level prior to the siblings coming in to play. Before implementing the intervention, the therapist asked each typically developing sibling from both sibling sets what skill they wanted their brother with autism to learn.

For Sibling Set A the typically developing sibling wanted his brother to use his name when addressing him. There were zero occurrences of this event during baseline. For Phase 1 of intervention the therapist asked the children if she could play along with them. The therapist did not instruct which activities were to occur, but participated in the activities chosen by the siblings. She sat between them, and gained eye contact from the child with autism before she modeled the personalized statements for him to imitate. These were statements such as, “Your turn, Sammy,” “Here you go, Sammy,” and “Let’s play, Sammy.”

For Sibling Set B the typically developing sibling wanted her brother to recognize when she had done something exciting while she was playing. There were zero occurrences of this during baseline. For Phase 1 of intervention the therapist asked the children if she could play along with them. Again, she did not instruct which activities were to occur, but participated in the activities chosen by the siblings. She sat between them, and gained eye contact from the child with autism before she modeled the statements for him to imitate. The therapist modeled exclamatory statements such as, “Wow,” “Awesome,” and “That’s cool.”
Data Collection

Frequency measures were collected on social statements made by the sibling with autism. Since no occurrences of such statements were observed during baseline, the therapist modeled the specific social statements in an animated and exaggerated manner. This was to bring the children with autism’s attention to the desired targeted behavior. During intervention phase, the therapist recorded opportunities modeled as well as correct imitations (defined in measures section). Though calculating into percent correct may have better represented this measure, the therapist graphed all data as frequency of occurrence so the data would be consistent across all phases. Meaning, the child with autism was the sole determiner of how many opportunities he had to emit social statements once the therapist was no longer a part of play activities.

Duration data were collected on parallel play between siblings. The therapist had a stopwatch that ran while the siblings were engaged in parallel play, and could be stopped when they were engaged in solitary play. The total duration was logged each session.

Inter-observer Agreement

A second therapist (MS, BCBA level) observed 50% of all sessions via videotape. This therapist was given the behavioral definitions, and was given a data sheet for 1 min-interval-based recording to time duration of play. Therapists observed the videotapes at different times, so as to avoid observe drift by possible discussion of the activities as they were happening. As long as both therapists were within 10 s of each minute, then that interval was considered in agreement. The sum of agreements was divided by the total number of intervals and multiplied by 100%, resulting in agreement 98% for duration of parallel play.

Measures

The intervention consisted of a two-step behavior change. First the therapist had to
model social statements for the child with autism to imitate. Once that skill was acquired, the therapist recorded if using those social statements had any effect on the duration of parallel play between siblings. The group dependent variable was duration of parallel play between siblings. Baseline measures were collected on social statements until steady state behavior was observed. Phase changes were dependent on the social statements emitted, not the duration of parallel play. This was to determine if acquiring new social statements would have any effect on the duration of play. The independent variable for the behavior of parallel play was the dependent variables (social personalized statements or social praise statements) in the training package.

Parallel play is a term that was introduced by Mildred Parten in 1932 to refer to a developmental stage of social activity in which children play with toys like those the children around them are using but are absorbed in their own activity and usually play beside rather than with one another. For this intervention, parallel play is operationally defined as siblings playing side by side (no more than 3 ft apart). This requires proximity and spatial relation in reference to each other but allows for each child to play with his or her own toy of interest. The children can share the same toy or participate in the same activity, but it is not a requirement. However, solitary independent play where the children were farther than 3 ft apart from each other was not recorded as parallel play.

Because the distance between the siblings was the defining component of parallel play for this intervention, there were moments of gray areas for the children of Sibling Set B because they were roller-blading together and still interacting, but were farther than 3 ft apart. This type of play interaction more closely fits the developmental definition of cooperative play but was still included while recording the duration of parallel play because it is more in line (than solitary play) with the overall goal of increasing interactions between siblings.
The individualized dependent variable of social statements, where the independent
variable was the modeling/feedback training package, differed between sibling sets; for Sibling
Set A personalized statements were the dependent variable, and for Sibling Set B exclamatory
statements were the dependent variable. For the sibling with autism in Set A, the therapist
recorded the number of personalized statements delivered to the typically developing sibling in
Set A. For the sibling with autism in Set B, the therapist recorded the number of exclamatory
statements delivered to the typically developing sibling in Set B.

Personalized statements: These were defined as directing the use of the typically
developing sibling’s name to begin or conclude a statement. This definition included directing
use of the typically developing sibling’s name to initiate play, facilitate play, narrate during play
and to terminate a play interaction. Examples of personalized statements were “Your turn,
Sammy,” “This is cool, Sammy,” “Let’s play, Sammy” or “Sammy, I’m all done.” This
definition does not include use of the typically developing sibling’s name if the statements were
directed to the therapist and not directed to the typically developing sibling. Examples of
statements not included in the definition were “Sammy isn’t sharing” or “My brother’s name is
Sammy.”

Exclamatory statements: For the sibling with autism in Set B, the therapist measured how
many exclamatory statements were delivered to the typically developing sibling in Set B, as
chosen by the typically developing sibling. These phrases (specifically “That’s cool” and
“Awesome”) were defined by the use of excited inflection and prosody. The objective
measurements of such statements were tallied only if they were directed to the typically
developing sibling and immediately followed an antecedent attention-gaining statement provided
by the typically developing sibling. Examples of such attention gaining statements were, “Look
at this” or “Watch me.” Exclamatory statements were also recorded if the child with autism spontaneously directed them to the typically developed sibling while that sibling was engaged in a play activity, but had not verbalized an attention gaining statement.

An example would be if the typically developing sibling were building a tower with blocks, and the sibling with autism positioned his body in the direction of that play activity, engaged in joint attention with the sibling and the tower being built; then directed an exclamatory statement such as “That’s cool.” A non-example would be if the typically developing sibling were building a tower with blocks, and if the sibling with autism were looking at a book across the room, and then the child with autism said “Cool” but had not postured himself in a way to have observed his sibling’s toy creation.

The intervention was to determine if these statements could function as the independent variable for increased duration of parallel play. For both sibling sets, frequency measures were recorded rather than interval recording. The rationale for this is as follows: the trainer was recording verbal social statements, incorporated in but not specific to types of play. Furthermore, if types of play behavior had been tracked, Gudmundsdottir (2002) summarizes that although interval recording is easier for the therapist, it does not lend the most accurate depiction of participant’s behavior. “Frequency measures may suit the recording of play behavior better than interval recording. Play behaviors can vary in duration and therefore an interval system can either inflate or deflate the occurrence of the behaviors. Play materials affect the frequency of the play response, because responses with some materials such as action figures or blocks can be shorter than other responses like driving a car” (Gudmundsdottir, 2002, p. 11).

It is not possible to include a true return-to-baseline phase, because you cannot unlearn the behavior. For this experiment, return-to-baseline meant absence of the trainer. This was a
way to show the statements were truly learned, and did not just occur because of the presence of the therapist. Criteria to move from intervention to return to baseline phase were set at 5 immediate imitations of social statements across 2 sessions. This did not include a model that had to be repeated and was then imitated following a repeated model. Immediate imitation was defined as latency less than or equal to 3 s from the social statement modeled by the therapist until the social statement was imitated by the child with autism. Skill acquisition was defined as meeting these criteria.

Once the child with autism had acquired these social statements and could reliably imitate social statements, the child with autism had to display the skill independently 5 times/session over 2 consecutive sessions to be considered skill mastery. Meeting mastery criteria signaled a move from return-to-baseline phase to probe for generalization at home.

This was a way to demonstrate the statements were truly learned, and did not occur just because of the contrived environment at the clinic-based setting. The generalization probe occurred 1 mo after the skill was considered mastered at the clinic-based setting.
CHAPTER 3

RESULTS

The training package was expected to be an effective way to teach the children with autism to emit a few social statements to their typically developing siblings. Overall, there was a predicted increase in parallel play once social statements were taught to each child with autism. These social statements were predicted to function as reinforcers for the typically developed sibling’s behavior of parallel play based on prior research (Kodak, Northup & Kelley, 2007; Cote, Thompson, Hanley & McKerchar 2007).

Sibling Set A

Baseline for personalized social statements was at zero occurrences for two consecutive sessions. During the baseline sessions, the children engaged in parallel play for 8:02 min and 3:27 min, respectively. When the trainer implemented the modeling/ feedback training package, the child with autism met skill acquisition criteria within the first 2 weeks of intervention; during the first and second sessions of intervention the child with autism imitated 5 personalized social statements; during the first session the children engaged in parallel play for 25:23 min and during the second session they engaged in parallel play for 15:28 min (averaging about 20 min).

Once the child with autism demonstrated acquisition of the new social statements, the therapist no longer participated in the play sessions. Absence of the therapist did not affect usage of the personalized social statements. The child with autism was spontaneously able to use the personalized social statements at a higher rate than when the statements were modeled for him: emitting 7 spontaneous statements during the first session and 9 spontaneous statements during the second session. The children engaged in parallel play for 19:31 min the first session and 18:39 min for the second session (averaging approximately 19 min).
Results of the generalization probe showed duration of parallel play surpassed that during baseline measures, and was within the same range of during the intervention phase in the center-based setting at 21:08 min. However, no personalized statements were observed during this probe.

Sibling Set B

Baseline for exclamatory statements was at zero occurrence for two consecutive sessions. During the baseline sessions the children engaged in parallel play for 13:15 min and 9:19 min respectively. When the therapist implemented the modeling/feedback training package, the child with autism met skill acquisition criteria within 3 weeks of intervention: during Session 1, the child with autism did not emit any exclamatory statements; in Session 2 of intervention the child with autism imitated 5 exclamatory social statements; and in Session 3, the child with autism emitted 7 exclamatory statements, thus meeting skill acquisition criteria. During Session 1 of the intervention the children engaged in parallel play for 15:00 min; in Session 2 they engaged in parallel play for 18:20 min; and, in Session 3 of intervention the children engaged in parallel play for 32:33 min (averaging approximately 22 min).

Once the child with autism acquired the new social statements, the trainer no longer participated in the play sessions. Absence of the trainer did not have affect use of the exclamatory social statements. The child with autism was able to spontaneously use the exclamatory social statements at a higher rate than when the statements were modeled for him: emitting 15 spontaneous statements the first session and 9 spontaneous statements the second session. The children engaged in parallel play for 34:21 min the first session and 22:15 min for the second session (averaging approximately 28 min).

The results of the generalization probe showed duration of parallel play surpassed that of
baseline measures, and was within the same range of that during the intervention phase at the clinic-based setting; 29:26 min. However, no exclamatory statements from the child with autism were observed during this probe although his typically developed sibling emitted four attention-gaining statements directed to him.

**Figure 1.** Baseline, intervention, return to baseline & generalization probe of personalized social statements for Sibling Set A.

**Figure 2.** Duration of parallel play for Sibling Set A.
Figure 3. Related behaviors (comments) Sibling Set A.

Figure 4. Baseline, intervention and generalization probe for praise statements Sibling Set B.
Figure 5. Related behaviors Sibling Set B: Attention gaining statements from typically developing sibling.
CHAPTER 4

DISCUSSION

Modeling is an effective way to prompt when teaching new social skills. This form of antecedent manipulation makes clear what behavior is expected in the given situation. It is hard to differentiate if modeling the statements was a true independent variable for increasing praise statements or if maturation, and passage of time within a contrived setting evoked parallel play. By analyzing the data from the generalization probe, it was determined that the behavior of social statements did not generalize for either sibling set, but duration of parallel play for each sibling set exceeded baseline measures.

Although social statements did not generalize to spontaneous use within the home setting, introducing of specific social phrases functioned as behavioral cusps, because “play is an activity that brings children into social contact with their peer group” (Arntez, Halstadtrø, and Halstadtrø, 2003, p.367). The intervention fits the definition of behavioral cusp because these behaviors are crucial to what may happen in the future for these participants and their families.

Mastery criteria were set only for social verbalizations emitted by the sibling with autism, not for duration of parallel play. Because of applied implications, the modeling intervention was not introduced at the home setting. Future researchers may want to investigate the effects of such intervention in clinical and home-based settings (with more extensive training carrying over from the clinic to the home), and conduct a generalization probe in other familiar community settings.

Results of this study support the original predictions of the researcher. Once siblings with autism acquired praise statements into their repertoire, they were able to display them functionally while playing with their siblings in the clinic-based setting. Although these
statements were not emitted during the generalization probe, the typically developing siblings were still engaging with their sibling with autism more frequently and for longer durations than has been observed during baseline in the center-based setting. Future researchers may want to examine what the effects could be had peers or typically developing siblings provided the models during the intervention. Additional concerns for future researchers to consider are the gender of the siblings in each set, as well as the age differences between the siblings involved. These variables were not investigated here, but may have had some impact on the results due to the natural differences in gender development.

For both sibling sets probes in the home setting were conducted as in baseline at the clinic-based setting. The siblings were instructed to “Go play” and the observer sat in a far corner of the room with the children. During the home setting probes, the children were not confined to one room for the entire hour, so the observer followed them without engaging with them in any manner. For Sibling Set A both parents were home during the observation time, and for Sibling Set B, only the mother was home during the observation.

Parents of both sibling sets were instructed to carry on as if it were a usual day at home, and not necessarily to structure, facilitate or initiate play between the siblings anymore than they would on any other day. This was to determine if the newly acquired social statements were fluent enough to occur in the natural environment. The results of the generalization probe in the home settings show that there is an intermediate step that should take place between the center-based learning environment and the unstructured home setting. Some resemblance of the center based setting must carry over to the home environment for the behaviors to generalize to the home setting. This may require that future researchers implement the modeling-and-feedback-training package in a single room in the home setting. Then conduct a probe to determine if the
social statements generalize to a less contrived environment within the home.

Initially, the researcher scheduled 3 one-hour sessions to be conducted per week per sibling dyad. Due to individual family constraints, each family could only participate in the study 1 hour per week. Future researchers may want to replicate this study and increase the amount of time each sibling set is required to participate per session and per week.

The intervention anticipated many external variables, which are typically uncontrollable in an applied setting, further strengthening the social statements as behavioral cusps. Both sets of parents whose children did participate, asked if their children could continue to work on similar or advanced skills upon conclusion of the study. The study indicates that increasing positive sibling interactions can increase family cohesiveness and overall quality of life.
REFERENCES


