

The P.L.A.Y. Project

Phase I Study

Final Report

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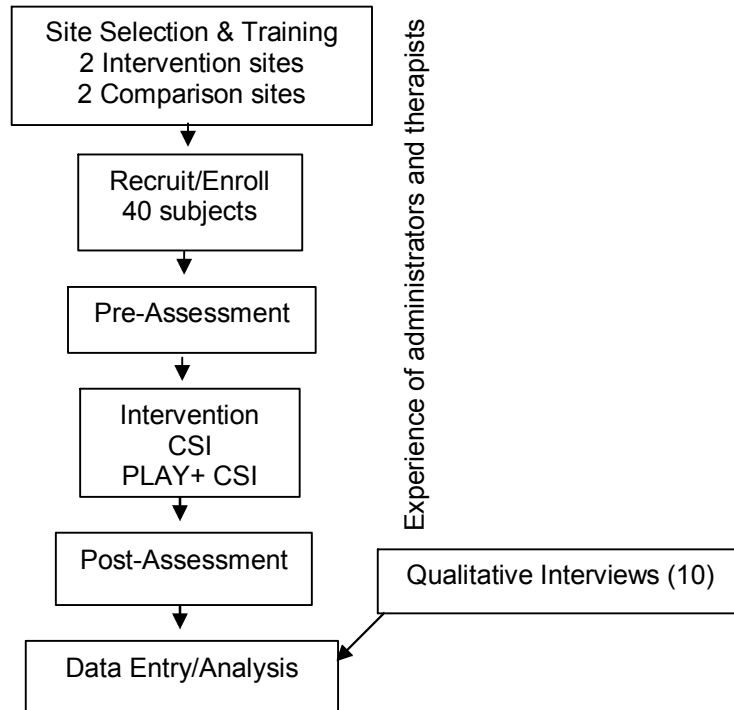
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Introduction

The PLAY pilot study was designed with the aim to recruit and enroll the community partners in a randomized controlled trial to compare ‘community standard’ intervention (CSI) with the PLAY Project intensive developmental intervention.

Fig 1. Research Plan-Pilot Study



The primary purpose of this Phase I study was to pilot processes and procedures in four Easter Seals sites and assess the feasibility of implementing a large-scale randomized trial as Phase II. In this report, we provide both results of the analysis of the outcomes data collected as part of the piloting process and of interviews with the Easter Seals staff who implemented the study.

Implementation Study

A primary goal of this study was to pilot processes and procedures in Easter Seals sites and assess the feasibility of implementing a large-scale impact study. To collect information about the effectiveness of the implementation processes from the perspective of the community organizations charged with putting the study into practice, telephone interviews were conducted with Easter Seals administrators and therapists. The purpose of these interviews was to understand the experiences of the four administrators and six therapists ($N=10$) during the training, recruitment and enrollment of families, collection of data and dissemination phases of research in order to improve the research process in the event of a larger-scale study being funded.

Methods

Participants

Each PLAY site team included an administrator and two therapists; one of the therapists provided the actual PLAY intervention while the other conducted assessments. Comparison group site teams included an administrator and one therapist, who conducted assessments. Interviews were completed with eight staff for a response rate of 80% (see Table x). One therapist and one administrator in the intervention group had left Easter Seals and could not be interviewed.

Table x. Interview Participants

	<i>PLAY sites (2)</i>	<i>Comparison sites (2)</i>	<i>Completed/Possible</i>
Administrators	1	2	3/4
Therapists	3	2	5/6
Total	4	4	8/10

Interview Protocol

In August 2008, the MSU evaluation research team conducted telephone interviews using a semi-structured interview protocol designed by one of the project investigators (Appendix A). Interview lasted 30 to 45 minutes. The interviews were audio-recorded; simultaneously, notes were taken by the interviewer and a debriefing form was filled out after the interviews. The interviews were transcribed and sent to the interviewer to be reviewed for accuracy and clarity. A senior researcher reviewed a selected set of initial interviews for quality assurance purposes.

The interview protocol addressed seven areas:

- 1) **Experience, motivation and expectations.** To understand their overall experience with the project, we asked staff about whether they were self-motivated or were asked by their supervisors to participate in the study, their overall experience of participating in this study and whether their expectations were met or not. We also asked them if there was something that could have been done differently to maintain their interest and involvement in the project.
- 2) **Training in Ann Arbor.** Staff reported on their experiences with the Ann Arbor training. We also asked them about the things that were most helpful as well as the things that needed

to be improved. The staff were also asked if they would recommend the same type of trainings for most Easter Seal sites.

- 3) **Recruitment and enrollment process.** Staff described what worked well and what did not work well in the recruitment and enrollment processes and indicated whether they were able to follow the racial and ethnic minority and eligibility criteria in the recruitment and enrollment process.
- 4) **Data collection and management process.** Staff reported on the kinds of data they collected and what worked well in the process, including the process of making FEAS videos and coordinating and mailing data to Ann Arbor. They were also asked if they had received data from Ann Arbor and what worked well in that process.
- 5) **Perceived effectiveness of intervention.** Although the quantitative analyses in this study were intended to assess the effectiveness of the PLAY intervention, we also asked the PLAY therapists about their perceptions of the effectiveness of PLAY.
- 6) **Parent satisfaction.** To better understand the quantitative results of the study, which suggested that parents who spent more time in at-home PLAY with their children were less satisfied with the outcomes of their children than parents who spent less time, a question about parents' satisfaction with the intervention was added to the interviews.
- 7) **General and specific recommendations.** We encouraged the staff throughout the interview to make recommendations for changes in implementation.

Analytic Approach

The transcribed interviews were coded manually and major themes were identified. As a general rule, we reported the themes mentioned by two or more staff. However, depending on the importance of information, some unique responses were also included.

Results

The following is a discussion of major themes identified within the administrators' and therapists' interviews. The discussion concludes with recommendations from the study staff for Phase-II staff.

Experience, Motivation and Expectations

Feelings about Participation

Staff described their overall experience as positive and exciting, and reported being proud of participating in a federally funded research study. They mentioned that they learned a lot about the PLAY intervention, autism and the research aspect of the study. However, some staff found it challenging in terms of the amount of time and work involved in the study.

Reasons for Participation

While participation was described as part of their job responsibilities, staff also indicated that that they participated out of a desire to learn about research, new assessment and intervention techniques, and the PLAY project as a whole, as well as to assist the autistic population. The therapists viewed their participation as an opportunity to learn about new assessment tools and to see if these tools could be incorporated into their regular practice.

Were Expectations Met?

All staff said that the project met all or most of their expectations, indicating that the study was very well organized and that overall it was a good learning experience, not only for them, but also for the families involved in the study. The staff were pleased with the project management in terms of having clear expectations for them from the beginning, the user-friendliness of the tools and instruments, and the follow-up communication. However, some staff did not anticipate the amount of time and work required by the study, and others were disappointed with what they perceived as inadequate test results to share with families in a timely fashion.

Recommendations for Sustaining Staff Interest and Involvement

Set more realistic expectations of time and work. Staff were surprised with the amount of work involved in the project throughout the year in addition to regular responsibilities. They mentioned the difficulties of having parents reschedule their appointments due to unavoidable circumstances. Staff said that it was often very difficult to meet the timelines. Many of them, especially the administrators, suggested that the amount of time they devoted to the project merited greater reimbursement.

More people per site. Staff at one comparison site mentioned that they were overwhelmed with having only two people for that site. They said that it would have been easier to have more than one therapist. In contrast, the administrator at the other comparison site thought that a team of two was fine, as it meant that only one therapist needed to be held accountable.

More ongoing feedback on work. Staff suggested incorporating a feedback meeting in the middle of the study to enable staff to give input on what was working well and what was not. One therapist mentioned that it would have been nice if she had been given regular feedback on her note-writing as she was new to the process.

More detailed data reports to share with families. Staff stated that families were very anxious to know more about the functional levels of their children. They said that it would have been better to have a narrative report explaining the changes in functional levels of children rather than simply receiving the results in the form of data scores. In the absence of narratives, the therapists had to interpret the data, and some of them did not feel competent at data interpretation.

Training

The three-day staff training, held over a weekend in Ann Arbor, included (a) training administrators on recruitment (with an emphasis on racial/ethnic minorities), enrollment, informed consent and data collection forms; and (b) training therapists on pre-and post-intervention assessments of children and caregivers. Training in the PLAY intervention occurred separately. Staff found the training a very positive experience.

What Worked

Administration. Staff found the training well organized and a good learning experience. They were appreciative of the facilitator, and found him very helpful during and after the training. The staff stated that the administrators of the project were very approachable and answered their questions promptly.

Project logistics. Staff mentioned that it was very helpful to know what was expected of them during the course of the study. After the training, they felt confident to move ahead with administrative processes and assessments. One of the administrators shared his experience enthusiastically with us:

I felt by the time I left that weekend and by the time we continued follow-up that the preparation, the binders, all of the information that we needed, the tools that we needed had all been well explained and put into place.

Networking. Staff, especially administrators, said the training was very helpful in getting an opportunity to meet other staff and the project administrators face-to-face and gave them the feeling of being part of a cohesive team. The interaction with other project members also helped them connect voices to faces, which they thought was helpful in future communication.

Training in assessment tools. The staff found their training in assessment tools very helpful, especially having the actual test run on last day of their training. They found it a very engaging experience as they were involved in providing feedback on the selection of the assessment tools. They mentioned that they felt valued when their feedback was taken into consideration:

We were allowed to give suggestions and stuff, “maybe this would work better” and “could we try this,” so it wasn’t quite as much as being told exactly what to do. It gave me a little bit more of a feeling of participation, I guess, involvement in the whole process versus just a little tiny piece of it.

On the last day, some assessment tools were rejected and others were selected on the basis of the feedback given by the staff. Some staff found this process very overwhelming, but agreed that it was a part of problem-solving process.

What STILL Works

The staff mentioned that they learned three important things in the training which were helpful to them even after the pilot study was over.

New assessment tools. Staff, especially therapists, mentioned that many assessments tools like Parental Stress Index, Center for Epidemiologic Studies Depression Scale, Autism Diagnostic Observation Scale, and Functional Emotional Assessment Scale were new to their clinical practice and had the potential to be incorporated into their daily practice.

Principles of PLAY. Some therapists mentioned that they still interacted with PLAY families at their clinics. They found their involvement in the PLAY pilot study very useful for them in terms of implementing PLAY principles with the families visiting their clinics.

Logistics of running a research project. Staff, especially administrators, felt more confident about participating in research after their PLAY involvement, reporting that knowing the logistics of running a research project at their sites was something that they could use in future to bring more research projects at their sites. One administrator said:

We are currently exploring a couple of other internal research projects, and I am much more comfortable about saying ‘Yes’ to administering those.

Recommendations

Training on tools could be more in-depth. Overall, staff thought the training was well-organized, but many thought that it was too much to absorb in three days, especially mastery of some of the assessment tools. They also agreed that not all the staff had the same experience with the tools and would benefit from more training. The suggestion was raised to conduct training

more than once. However, one therapists noted that although it was overwhelming for them to go through the process of selecting assessment tools, the problem-solving part was complete and that Phase II training would not need to devote as much time on selection of assessment tools.

Prepare for time commitment. As mentioned earlier, staff did not anticipate the amount of time required by the study. They felt that scheduling the families within their own schedules and juggling between regular job responsibilities and project responsibilities were very difficult to manage and that completing the assessments with families took longer than expected. The other responsibilities of the project were also time-consuming. They thought that it could have been made clearer in the training that the process would require huge time commitments.

Is This Training Model Feasible for Most Easter Seals Sites?

All staff felt this training model was appropriate and feasible for two reasons:

Face-to-face communication. Staff liked the face-to-face communication component of the training, as they got to know the other staff and it made them feel like members of a cohesive team. One staff mentioned that this training was better than any kind of webinar.

Right fit with the work. Staff mentioned that the training model was a good fit for the population many Easter Seals sites were already serving. It was also a good opportunity for the PLAY intervention sites to become acquainted with the new assessment tools.

Recruitment

The Ann Arbor Center developed a “grant in a box” for each site containing all forms and measures needed to run the grant. Materials were slightly different for PLAY and comparison sites. The box also included checklists to enable administrators and therapists to monitor the process for each family.

Who Recruited Families

At the comparison sites, administrators and therapists worked as a team to recruit families, which appeared to be harder at one site than the other. At the PLAY sites, the administrators were responsible for recruitment. Only one therapist at a PLAY intervention sites made recruitment phone calls.

What Worked

Sites disseminated information about the PLAY study in different ways throughout the community, including:

- ♦ Press releases
- ♦ Through early intervention service coordinators
- ♦ Through area-wide autism parent-support groups
- ♦ Local pediatricians and physicians
- ♦ Families already coming to Easter Seals

PLAY families. PLAY staff reported that they did not have any difficulty in getting a large pool of families interested in participation; they thought that the availability of PLAY intervention at no cost was the biggest attraction for them to participate in the study.

Comparison families. Staff at one comparison site mentioned that it was difficult for them to get enough families to participate in the study, but they were able to recruit the families by talking

with them about the availability of cost-free assessments for their children. They mentioned that they also persuaded families at comparison sites by encouraging the parents to be a part of research study that might eventually find an answer for their children. The families were also assured that the information obtained in the study would be shared with them to further assist their children in school and other clinical settings.

Recommendations for Recruiting Racial/Ethnic Minorities

Staff were disappointed at not getting the proposed number of racial/ethnic minority families in the study. Staff at one site reported a lack of diversity in their community, while an administrator at another site stated that his/her community was diverse, but that cases of autism were not appropriately diagnosed due to lack of access to resources for these families. Staff recommended:

- ♦ Go by the last name while making initial calls and call potentially racial/ethnic minority families first so as not to fill the quota prior to meeting the expected racial/ethnic minority numbers.
- ♦ Make the expectations for involving racial and ethnic minorities very clear during the Ann Arbor training and revisit these expectations prior to beginning recruitment.

Recommendations in General

Publicize the program community-wide. Both comparison site administrators felt that there should be more community wide publicity of the program by using flyers or other literature pieces explaining the benefits of the program, especially for the Phase II study, which would require more than 10 families.

Coordinate with other agencies. Staff suggested that other community-based agencies be contacted to access more families. They recommended coordinating the PLAY project with early childhood programs and the state autistic society.

Support from project. The staff mentioned improvements in recruitment support from the central project office. They viewed the whole recruitment process as very time consuming and mentioned that it would require even longer time if they needed to include more minorities. One staff suggested a sample script including the points that should be used while recruiting the families, so that the process would be more consistent and comprehensive throughout the Easter Seals sites. They also recommended that adequate reimbursement should be made for the amount of time used in the study.

Enrollment

All staff who were involved in the enrollment process said that they were able to follow the eligibility criteria during the process. Although they had to reschedule the appointments couple of times, overall, staff found that the families were very cooperative as well as excited to be a part of a federal research study.

What Worked

Be persistent. Staff mentioned that since some families rescheduled appointments repeatedly, staff needed to be flexible as well as persistent in their efforts to accommodate all families.

Take your time. Staff recommended giving families enough time to become comfortable with staff and the assessment process in order to avoid bias in the diagnostic tools.

Conduct the enrollment process at the Easter Seals site. Staff mentioned that it was useful to have families coming over to the center for the enrollment, enabling administrators as well as therapists to meet with them. As one staff member said:

We were able to show them our facilities and give them some comfort level that we were a reputable organization. There were a lot of initial questions and there was a lot of anxiety and nervousness on their part, and so I think bringing them to the center helped to relieve that.

Data Collection

What Worked

Training. The staff reported that their qualifications and the training in the assessment tools were very helpful in collecting the data from children and families.

Flexible schedules. Many staff mentioned that they had flexibility in their schedules to accommodate the fluctuating schedules of the families. Allowing sufficient time for families to talk about their children and developing the personal rapport with them also facilitated the data collection process.

Family cooperation. Many staff mentioned that the families involved in the study were very cooperative with the pre- and post-assessments. One therapist mentioned that she scheduled families for two or three visits to accommodate the children's low attention span, and reported that families were very cooperative with this approach.

Recommendations

Split the visit time if necessary. One comparison site reported that they divided the pre-assessment session into two to three visits, and found that most families were willing to visit more than once to complete the pre-assessments.

Reconsider the depression scale. One staff commented:

I don't think the depression scale was a useful tool; it was sometimes very overwhelming to parents, and many of my parents that I actually enrolled were already receiving some kind of counseling, so some consistent, some not consistent.

Data Management and Coordination

What Worked

Clear expectations and guidelines. Staff reported that having guidelines about the study process and clear expectations for timelines helped them immensely in data collection. They felt that the grant in a box was very helpful. They stated that Ann Arbor equipped them with enough supplies including envelopes, color coded folders, check-lists, and other material required during the process. The staff of one site added that they maintained the comprehensive folders for each family to share the information with them.

Recommendations

Use a team process. Many staff mentioned that they double-checked the material they sent to Ann Arbor in teams to ensure that it was correct. However, one administrator mentioned that he/she copied everything him/herself to maintain confidentiality.

Don't wait till the end. The staff recommended that data management processes (i.e., copying, filing, and sending the data to Ann Arbor) should be an ongoing process, and that sites not wait for all data to come in first.

Recommendations for the Video Process

Technology change and training. Some staff mentioned that they faced technology challenges in making copies of videos and using computers to type their notes simultaneously. Some mentioned that FEAS should be on DVDs rather than on VHS, as it was easy to make copies of DVDs. The staff at one site mentioned that their camcorder was not compatible with the type of cassettes required by the Ann Arbor office. They suggested that camcorders should be provided by Ann Arbor and be rotated among the teams. Another team suggested that using laptops would be a better option as they could watch the DVDs and make notes simultaneously. They thought that figuring out the technology wasted a lot of their time. Most participants recommended that consistent technology and the training on using technology would be helpful for future study.

Good organization. The staff thought that good organization with clear guidelines about the process of making videos was very helpful and should be kept as it was during the pilot grant.

Data Dissemination

What Worked?

Data was received. All staff mentioned that they received data from Ann Arbor. They thought that receiving the data was a big relief, as the families were constantly asking for reports on functional levels of their children.

Email attachments. Staff felt that receiving data as email attachments was effective. They printed the data report and put it in the families' folders.

Recommendations

Narrative reports. Most staff felt that sharing raw scores with families was difficult, as families were expecting narratives. They recommended that more in-depth information would be more helpful to share with families.

Training on data interpretation. Some staff thought that therapists should be trained to interpret results in Phase II. While some therapists said that they were able to interpret raw scores, others did not feel competent enough to interpret data, including FEAS results, for the families.

Perceived Effectiveness of PLAY

PLAY staff were asked about their perceptions of the effectiveness of the intervention.

Changes in Children

Staff felt there were definite positive changes in most children as a result of intervention, particularly in their communication skills and social interactions. Towards the end of the study,

they were reported to be more comfortable with other children in the PLAY setting. Many were able to maintain eye-contact with other children and adults. Many children made progress in their attention span. One therapist reported:

I had kids that went from running around the room, running out of the room screaming, standing in the corner, rocking, flapping kinds of things, to coming in and being able to sit down at the table and actually participate during like the Mullen, which is a 45-minute assessment—that's a really long time to expect any four-year-old to sit at a table and follow through with an assessment.

However, staff at one of the comparison sites also observed improvements in children. When asked about the reasons for these changes, they viewed the improvement as the result of the educational and community standard intervention the children were getting outside the PLAY. One staff suggested that this improvement might be attributed to children whose parents were involved in counseling.

Changes in Parents

PLAY staff reported that parents were excited to see the positive changes in their children. They became more confident about their children's functional abilities as a result of intervention. Due to the structure of intervention, the family interaction increased, and parents were more willing to spend time with their children. Staff also indicated that parents permitted their children greater independence, which they attributed to increased confidence in their children's functional abilities.

Satisfaction with PLAY

As reported above, parents who put in more hours tended to be less satisfied with the intervention compared to those who put in fewer hours. Staff suggested the following explanations.

Parents' expectations. Staff thought that parents who were less satisfied may have had higher expectations for the possible effects of PLAY than parents with lower expectations. Most staff mentioned that many parents mistakenly took the intervention as a cure and developed an attitude that it was going to "fix my child." Those parents subsequently became dissatisfied and even frustrated when they did not see immediate and large improvements. Staff also suggested that prior awareness of PLAY or similar interventions may have increased the expectations of these parents. One of the therapists shared:

I had one family who did not have a knowledge base at all. She was not playing with her child at all like this. So when she started, he made huge gains. So with somebody who maybe already had a background, they felt like they were already playing, their expectations were higher. They were like, now I am putting 40 hrs into this, the kid should be making that many more gains. But that's not necessarily how it works.

In addition, therapists said that parents who met the expectations of playing with their children two hours per day, five days per week may have felt that this would automatically result in large improvements and been disappointed in the magnitude of the changes.

Parent stress. Staff mentioned that parents were stressed in general, and that the combination of stress and high expectations for the effects of PLAY might have led to less satisfaction with the PLAY intervention.

General Recommendations

Logistics

Reimbursement. The staff, especially the administrators mentioned that they did not anticipate the amount of time required by the PLAY project. They thought that the time used in the study should be equitably and adequately reimbursed. One administrator shared his/her concern:

The administrator's role, I felt, I was shocked at how much time it took, and the reimbursement was very minimal considering the amount of time with the administrator by the time. I contacted the families and then I got the families enrolled and then I ended up copying everything when they brought it in. I could not believe how much time, it truly took. It was way more time than I thought it would be.

Train additional people. Administrators suggested that more people, especially therapists, should be trained because they thought that in a longer study there would be more chances of transitions and drop-outs.

Train on technology. Administrators remarked that not all people were technology savvy, so adequate training on using the technology should be given and more consistent material (tapes, camcorders, laptops) should be rotated among the sites.

Listserv. One staff recommended keeping the listserv, as she thought that it was a very helpful tool for answering questions and monitoring the progress of one's own site compared to the others.

Parents/Families

Set expectations with families. Therapists mentioned that the message that "PLAY is an intervention, not a cure" should be emphasized to families from the beginning and reiterated throughout the study, because they thought that this would help parents to develop a positive attitude about the program.

Timely and clear information for parents. Staff felt that families did not get timely information on change in the functional level of their children. Additionally, information that was disseminated was in form of raw scores, and many staff felt incompetent in interpreting the raw scores. Staff felt that data should be in the form of narrative reports and provided more quickly.

Support for parents. In the view of staff, parents who were involved in the study had high levels of stress. They suggested that it would be helpful in future to provide some type of intervention to these parents to enable them to be more effective interventionists. Some staff mentioned that they referred some parents to the services in the community but were not sure whether the parents used them. One of the staff shared her concern:

The parents were depressed, and we didn't have specific things to offer them when they came back. Some of the parents' stress levels were so high and they asked for referrals and we didn't really have anything to referring to, some sort of counseling, and, you know, I referred some of them to phone book, but it was not something that I could say, that was kind of a challenge.

Training and In-Service Support

Provide more extensive training on assessment tools. Staff mentioned that although the training conducted on assessment tools was very helpful, more time was spent on selecting the

appropriate measures to be used in the study. Some of them found the training on assessment tools very shallow due to lack of time and suggested that more time should be spent in training in the future. They also recommended more training on interpretation of results so that the information on test results could be shared appropriately with the families.

In-service support. Staff suggested that more ongoing feedback for implementing PLAY would be helpful. Due to variability in their experience, some therapists did not feel confident about the procedures they were following in note-writing, observation and other assessments. They suggested that it would be beneficial to have an ongoing feedback on their work by connecting less experienced therapists with more experienced therapists across sites or by having all staff come back to Ann Arbor once a year to share their experiences and expertise.

Set realistic expectations for staff. Staff practiced conducting assessments with actual families on the final day of training and reported that this hands-on experience was one of the most helpful components of the training. However, some staff later found that scheduling families and conducting assessments in real-life situations with autistic children and their stressed families were very different and time-consuming. Some staff mentioned needing to schedule the families more than twice because of the short attention span of autistic children and more time used in the initial assessments than planned for.

Additionally, two families stopped participating in the study after initial assessments. Staff mentioned that they were very frustrated about it after their investment of time and effort into these families. They were aware it was not something that they could have learned at the training, but staff should be informed that it is unlikely that every family will complete the full study.

Study Design

Bigger study. The sample size should be larger than 10 and the study should run for a longer time to see the significant progress in the children's functional level.

Take home environment into consideration. One therapist mentioned that she found that some of children of her site were spending more time watching TV at home, which she thought might have affected the results. She suggested that home environment should be taken into consideration in future studies.

Alternative assessments. One therapist suggested that qualitative indicators such as the process of completing a task by children should be taken into consideration. She provided an example as:

Sometimes the way the evaluations are set up, they look at whether or not you could stack up 10 blocks, but they don't look at whether not you are switching hands, whether or not your fingers are in right position, how distracted the child was, they were not looking necessarily at quality.

Outcomes Study

As part of the piloting process, data on child and parent outcomes were collected. Here, we present the results of analyses examining the extent to which outcomes changed in the intervention group compared to the comparison group. However, these results are highly preliminary, as they come out of the piloting process. Moreover, the intervention period in this Phase I study was truncated to five months rather than the recommended 12- to 24-month intervention period.

Methods

Participants

The PLAY pilot study was conducted at four sites, two intervention sites (Peoria, IL and Saginaw, MI) and two comparison sites (Youngstown, OH and Joliet, IL). Each site enrolled 10 children between 27 and 72 months of age who had been diagnosed with autism or autism spectrum disorder. Exclusion criteria included receiving intensive individual services for autism and significant medical conditions. Most children were diagnosed prior to study entry: 41% were diagnosed by a pediatrician, and the rest were diagnosed by neurologist, psychiatrist, psychologist or the personnel in an early intervention program or a school program. Two children presented without a diagnosis and were included after being screened using the Gilliam Autism Rating Scale (GARS; Gilliam, 1995). Diagnoses were subsequently confirmed at baseline using the Autism Diagnostic Observation Schedule (ADOS; Lord, Rutter, DiLavore, & Risi, 2001b). Two families, one from each comparison site, did not complete the follow-up assessments, resulting in a final sample of 38 children and their parents ($n = 20$ PLAY children, $n = 18$ comparison children).

Child Demographics

Overall and by group. Table 1 presents child demographics for the full sample and by the intervention and comparison groups. Groups did not differ significantly in child's gender, age at enrollment, or number of children of color. However, there was a significant difference in the age at diagnosis. The intervention group was, on average, 5.4 months older than the comparison group.

By site. Table 2 presents the child demographics for each of the four sites. Sites did not differ in the distribution of race, ethnicity, gender, or age at enrollment or diagnosis. However, there was a significant difference across sites in autism diagnosis; all children diagnosed with autism spectrum disorder ($n = 4$) were from the Joliet site.

Family Demographics

Overall and by group. Table 3 presents the family demographics overall and by group. Groups did not differ significantly in annual income or in the level of education of the fathers. The full range of income levels was represented and most of the parents had at least a high school diploma or GED. However, the intervention and comparison groups differed in the level of mother's education. While most mothers had graduated high school, comparison mothers tended to be more likely than PLAY mothers to have completed college.

Table 1. Child Demographics for Full Sample and by Intervention and Comparison Group							
Demographic characteristic	OVERALL (N = 38)		PLAY (N = 20)		COMPARISON (N = 18)		χ^2
	N	%	N	%	N	%	
Race							
White	33	87	19	95	14	78	$\chi^2(3, N = 38) = 3.66,$ ns
Black/African American	2	5	1	5	1	6	
Asian	1	3	0	0	1	6	
Other	2	5	0	0	2	11	
Ethnicity							
Hispanic/non white	4	11	1	5	3	17	$\chi^2(1, N = 38) = 1.37,$ ns
Not Hispanic	34	90	19	95	15	83	
Race (2 category)							
White	31	82	18	90	13	72	$\chi^2(1, N = 38) = 1.99,$ ns
Children of color	7	18	2	10	5	28	
Gender							
Male	32	84	16	80	16	89	$\chi^2(1, N = 38) = 0.56,$ ns
Female	6	16	4	20	2	11	
Diagnosis							
Autism	34	90	20	100	14	78	$\chi^2(1, N = 38) = 4.97^*$
Autism spectrum	4	11	0	0	4	22	
Age at enrollment (months)							
Range	27-71		32-69		27-71		t(36) = 0.40, ns
Mean (SD)	50 (14)		51 (13)		49 (15)		
Age at diagnosis (months)							
Range	18-48		24-48		18-42		t(36) = 2.30*
Mean (SD)	32 (8)		35 (8)		29 (7)		

* $p < .05$

Of the 32 families (84.2%) with regular full-time parental employment, 10 (31.3%) of them supplemented their income through regular part-time employment, self-employment or disability income. One family subsisted solely on unemployment income and supplemental security income.

Most children were cared for by their biological parents, with mothers being the principal caregivers and fathers taking the secondary role. Of the 36 mothers assuming the primary caregiving role, only one was an adoptive mother. The other two children in the study were cared for by their biological fathers. Significantly more PLAY mothers were married than comparison mothers. All but three mothers were native English speakers and all spoke English fluently.

Most children had one or two siblings under the age of 18 years, 3 (9%) had more than two and 8 (21%) had no siblings in their families. One family reported that they had another child diagnosed with mild/moderate autism, and three other families reported having another child diagnosed with autism-related conditions, i.e., developmental delay or speech delay.

By site. Table 4 displays family demographics for each site. Sites did not differ significantly in income levels or parents' education. There was a trend for site differences in mother marital status; all mothers at the Saginaw site were married while only 56% of the Youngstown mothers were married.

<i>Demographic characteristic</i>	<i>JOLIET</i> (<i>N</i> = 9)		<i>SAGINAW</i> (<i>N</i> = 10)		<i>PEORIA</i> (<i>N</i> = 10)		<i>YOUNGSTOWN</i> (<i>N</i> = 9)		<i>χ</i> ²
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	
Race									
White	6	67	10	100	9	90	8	89	$\chi^2(9, N = 38) = 12.32$
Black/African American	0	0	0	0	1	10	1	11	
Asian	1	11	0	0	0	0	0	0	
Other	2	22	0	0	0	0	0	0	
Ethnicity									
Hispanic/non white	3	33	1	10	0	0	0	0	$\chi^2(3, N = 38) = 7.21$
Not Hispanic	6	67	9	90	10	100	9	100	
Race (2 category)									
White	5	56	9	90	9	90	8	89	$\chi^2(3, N = 38) = 5.32$
Children of color	4	44	1	10	1	10	1	11	
Gender									
Male	7	78	8	80	8	80	9	100	$\chi^2(3, N = 38) = 2.23$
Female	2	22	2	20	2	20	0	0	
Diagnosis									
Autism	5	56	10	100	10	100	9	100	$\chi^2(3, N = 38) = 14.41^{**}$
Autism spectrum	4	44	0	0	0	0	0	0	
Age at enrollment (months)									
Range	27-68		33-69		32-69		28-71		$F(3,37) = 1.98$
Mean (SD)	47 (16)		52 (15)		50 (12)		51 (15)		
Age at diagnosis (months)									
Range	20-36		24-48		24-48		18-42		$F(3,37) = 0.98$
Mean (SD)	29 (5)		36 (8)		33 (8)		30 (8)		

***p* < .01

Measures

Below, we describe measures used to test the hypothesis that compared to community standard autism intervention, children and families receiving PLAY significantly improved in developmental, communication, interactional and functional outcomes. Table 5 presents measures, reporters, and time of collection, and Table 6 outlines the developmental areas targeted by outcome measures.

Autism Diagnostic Observation Scale (ADOS; Lord et al., 2001b)

The ADOS is a semi-structured assessment that allows one to observe social and communication behaviors in an individual being evaluated. The measure takes about 35 to 40 minutes to administer and yields three subscale scores: Communication, Social Interaction, and Circumscribed Interests. The ADOS distinguishes three levels of severity: autism, pervasive developmental disorder (PDD), and not autistic. The ADOS was used to confirm diagnosis and severity of symptoms.

Table 3. Family Demographics for Full Sample and by Intervention and Comparison Group							
Demographic characteristic	OVERALL (N = 38)		PLAY (N = 20)		COMPARISON (N = 18)		χ^2
	N	%	N	%	N	%	
Income level							
Less than \$20,000	5	13	2	10	3	17	$\chi^2(4, N = 38) = 3.12$
\$20,001-40,000	7	18	3	15	4	22	
\$40,001- 60,000	9	24	7	35	2	11	
\$60,001- \$100,000	11	29	5	25	6	33	
> \$100,000	6	16	3	15	3	17	
Mother's marital status							
Married	31	82	19	95	12	67	$\chi^2(1, N = 38) = 5.06^*$
Not married	7	18	1	5	6	33	
Parent(s) living with child							
Both parents/Adoptive	32	84	18	89	14	78	$\chi^2(2, N = 38) = 2.66$
Mother ^a	5	13	2	10	3	17	
Father ^a	1	3	0	0	1	6	
Mother's education							
Less than high school	1	3	0	0	1	6	$\chi^2(4, N = 37) = 8.90^{\dagger}$
High school or GED	4	11	2	10	2	11	
Some college/ Associates degree	19	50	12	60	7	39	
BA	9	24	2	10	7	39	
MA/ Professional degree/ PhD	4	11	4	20	0	0	
Missing	1	3	0	0	1	6	
Father's education							
Less than high school	1	3	0	0	1	7	$\chi^2(4, N = 34) = 4.93$
High school or GED	10	29	4	21	6	40	
Some college/ Associates degree	10	29	5	26	5	33	
BA	10	29	8	42	2	13	
MA/ Professional degree/ PhD	3	9	2	11	1	7	

[†] $p < .10$; ^a May include partner.

Mullen Scales of Early Learning (Mullen, 1995)

This is a measure of cognitive functioning for children with developmental levels between birth and 68 months of age. The test contains five scales: Gross Motor, Fine Motor, Visual Perception, Receptive Language, and Expressive Language. It is a well-standardized measure appropriate for the range in age and developmental level of the participants in this study (Griffith et al., 1999.). The Gross Motor Scale is for children from birth to 33 months and was, therefore, excluded in this study since only 6 (16%) of the children fit in this category. The administration of the instrument takes about 15 to 30 minutes. Due to flooring effect observed in the raw scores, developmental quotients (DQ) were computed in order that the functioning of the more delayed children could be examined ($DQ = \text{age equivalent}/\text{chronological age} \times 100$). The composite DQ is an average of the scale DQs.

Demographic characteristic	JOLIET (N = 9)		SAGINAW (N = 10)		PEORIA (N = 10)		YOUNGSTOWN (N = 9)		χ^2
	N	%	N	%	N	%	N	%	
Income level									
Less than \$20,000	0	0	0	0	2	20	3	33	$\chi^2(12, N = 38) = 14.55$
\$20,001-40,000	1	11	1	10	2	20	3	33	
\$40,001- 60,000	1	11	4	40	3	30	1	11	
\$60,001- \$100,000	4	44	3	30	2	20	2	22	
> \$100,000	3	33	2	20	1	10	0	0	
Mother's marital status									
Married	7	78	10	100	9	90	5	56	$\chi^2(3, N = 38) = 6.87^t$
Not married	2	22	0	0	1	10	4	44	
Parent(s) living with child									
Both parents/Adoptive	8	89	9	90	9	90	6	67	$\chi^2(6, N = 38) = 6.09$
Mother ^a	1	11	1	10	1	10	2	22	
Father ^a	0	0	0	0	0	0	1	11	
Mother's education									
Less than high school	0	0	0	0	0	0	1	11	$\chi^2(12, N = 37) = 13.73$
High school or GED	1	11	1	10	1	10	1	11	
Some college/ Associates	4	44	5	50	7	70	3	33	
degree	4	44	1	10	1	10	3	33	
BA	4	44	1	10	1	10	3	33	
MA/ Professional degree/ PhD	0	0	3	30	1	10	0	0	
Missing	0	0	0	0	0	0	1	11	
Father's education									
Less than high school	0	0	0	0	0	0	1	14	$\chi^2(12, N = 34) = 8.47$
High school or GED	3	38	2	22	2	20	3	43	
Some college/ Associates	3	38	2	22	3	30	2	29	
degree	3	38	2	22	3	30	2	29	
BA	1	13	4	44	4	40	1	14	
MA/ Professional degree/ PhD	1	13	1	11	1	10	0	0	

^t $p < .10$; ^a May include partner.

Receptive-Expressive Emergent Language Test-3 (REEL-3; Bzoch, League, & Brown, 2003)

The REEL-3 is a 15- to 45-minute caregiver norm-referenced valid measure used to uncover major language difficulties in children of up to 3 years of age. It is composed of two subtests that cover receptive and expressive language. Since it uses the behavioral observations of the child by the parents (caregivers), this measure has the advantage of not requiring cooperation by the child. Although most study children did not fall within the age range typically targeted by the REEL-3, it was deemed an appropriate measure because of the low language skills demonstrated by children with autism and autism spectrum disorder. DQs are reported here.

Sensory Profile (SP; Dunn, 1999)

The SP is a 48-item checklist completed by parents for children between the ages of 3 and 10 years. It takes about 20 minutes to complete the survey. It assesses children's responses to daily sensory experiences by sensory modalities: vestibular, tactile, proprioceptive, auditory, visual, and gustatory/olfactory. It evaluates sensory processing in children (i.e., sensation seeking, sensation avoiding, sensory sensitivity and low registration) by examining how they respond to sensory input. This is helpful in designing play-based interventions for children with autism since they exhibit individual differences based on their sensory motor profiles. The scale exhibited good internal consistency, showing Cronbach's alphas of .94 and .88 at pre- and post-testing, respectively. Raw scores are reported here.

Vineland Adaptive Behavior Scales – Survey Edition (Sparrow et al., 1984)

This parent interview measures age-based standard scores ($M=100$, $SD=15$), in four main areas: Communication, Daily Living Skills, Socialization, and Motor Skills. In addition to the standard scores, percentiles, and ability scores are also reported for the four domains. The instrument also yields raw scores, percentiles, ability scores and age equivalents for sub-domains: receptive, expressive and written (Communication), personal, domestic and community (Daily Living Skills), interpersonal relationships, play and leisure and coping skills (Socialization), and gross motor and fine motor (Motor Skills). With the exception of the Motor Skills scale, which is administered up to 6 years of age, the other scales can be administered up to the age of 19 years. A score for Maladaptive behavior (internalizing, externalizing) is also obtained for children over the age of 5 years (Fenton, D'ardia, Valente, Vecchio, Fabrizi & Bernabei, 2003). The standard scores (of the domains) are summed to give a composite adaptive behavior score (Newsom & Hovanovitz, 1997). DQ scores were calculated for analysis.

Functional Emotional Assessment Scale (FEAS; Greenspan & Degangi, 2001)

This is a norm-referenced, valid and reliable measure of reciprocal social interaction for children who are at the developmental levels of ages between 7 and 48 months. The child's primary caregiver was asked to play with the child for 15 minutes using a standard set of toys. Two raters blind to study protocols reviewed a videotape of the session and scored the child's behavior on 35 items and the caregiver on 32 items, on 6 Functional Developmental Levels (FDL): (a) self-regulation; (b) forming relationships and engagement; (c) two-way communication; (d) complex behavioral organization; (e) symbolic representational capacity; and (f) abstract representational organization. Subscale scores for caregiver and child were derived for each of the six levels. In turn, subscale scores were summed to provide total scores. Reliability coefficients for both the child and the caregiver instruments were high, with Cronbach's alpha of .87 and .92 at the first rating and .91 and .88 at the second rating, respectively. Intraclass correlation coefficients were used to measure the inter-rater reliabilities on the FEAS subscales and the entire scale. The child's scale showed substantial values of .78 and .71 at the first and second rating, respectively, whereas the parent's (caregiver's) scale yielded moderate values of .62 and .63 for the first and second rating. In addition to these two scales, a subscale of 19 interactional items identified by the study authors from item review of the parents' scale was created. This subscale had items capturing interactional skills and behaviors (i.e., those hypothesized to be most impacted by PLAY). Its internal consistency was high (Cronbach's alpha of .88 at initial rating and .86 at the second rating). The interrater reliabilities for this scale were moderate intraclass correlations of .54 and .51, respectively.

Clinical Functional Developmental Level Ratings

During the course of the study, therapists independently visited children in the intervention group and observed and videotaped their engagement with their parents as they played with the toys provided for the FEAS measure. Based on clinical criteria, each child's developmental level was assessed. Therapists assigned percentages to Greenspan's FDLs depending on the levels of skill exhibited by the children (e.g., 75% Level 1, 50% Level 2, 50% Level 3, etc). Clinically, the ratings were intended to provide a more detailed measure of progress than just the pre- and post-FEAS scores.

Maternal Behavior Rating Scale (MBRS; Mahoney & Kim, 2007)

The MBRS is a video coding system that assesses four scales: Responsive/Child Oriented; Affect/Animation; Achievement Orientation; and Directiveness. Factors are assessed by rating twelve (5 point Likert-scaled) items during a 7 ½ minute video of typical parent-child play with toys. Pre- and post-videos, taken by therapist, were coded by research assistants. Interrater reliability on 17 cases as measured by intraclass correlations was .94 for Responsive/Child Oriented, .97 for Affect/Animation, .92 for Achievement Orientation, and .99 for Directiveness.

Parental Stress Index (PSI; Abidin, 1995)

The PSI is a 120-item screening and diagnostic instrument designed to identify areas of stress in parent-child interactions. The characteristics of the child are measured on 6 subscales: distractibility/hyperactivity, adaptability, reinforces parent, demandingness, mood, and acceptability. Parent variables are contained in 7 subscales: competence, isolation, attachment, health, role restriction, depression, and spouse. Nineteen of the items measure life stress. In addition to the subscale scores, a total child score, total parent score and total scale score were obtained. The full PSI was used to assess parents' level of stress at pre- and post-assessment for both groups. A brief version of the PSI was also used during the intervention period for the PLAY group to help therapists know whether to refer families experiencing high levels of stress to appropriate mental health resources, such as psychologists, for counseling. The brief PSI is not included in analyses. The reliability coefficients at pre- and post-assessments were .82 and .81 for the child scale, .90 and .87 for the parent scale, and .89 and .87 for the total scale at pre- and post-assessment, respectively.

Center for Epidemiologic Studies Depression Scale (CESD; Radloff, 1977)

The CESD is a 20-item questionnaire used to assess adult depressive symptoms. A total score indicative of depressive symptomatology was obtained. The internal consistency was quite good, with an alpha of .92.

Baseline Inventory of Autism Services

This measure was developed by the researchers to assess the types and amounts of services received by children in the community prior to study entry. Parents indicated the numbers of hours per weekly that their children spent in occupational therapy, speech and language therapy, behavioral intervention, and social interaction with other children. They were also asked to indicate whether their children received any supplementary or alternative treatments such as diets, vitamin therapies, auditory integration therapies, etc.

Weekly Inventory of Autism Services

Across the course of the study, parents completed weekly logs indicating the number of hours weekly that children spent in community services. Parents in the PLAY group also reported on the number of hours that they engaged with their children using the PLAY model.

The Parents' Perception of Training & Implementation (PPTI) Survey

This 17-item questionnaire was developed by the researchers to assess parent satisfaction with the intervention in the PLAY group. The PPTI is divided into three sections: home consulting, training materials and feedback, and intervention and satisfaction. The PPTI reliability was .93.

Procedure

The study used a pre-post comparison group research design with an intervention time of 5 months. Family background measures and ADOS diagnosis were obtained at intake; all other measures were given at baseline and again at follow-up. The central study office in Ann Arbor organized a "grant in a box" method with completed test packets/measures for each site plus checklists to help the sites remember each item. This method enabled sites to accomplish all the study tasks.

Children were recruited by Easter Seals therapists from existing caseloads or from through community referrals. Upon identification of a potential participant, the site administrator scheduled an assessment visit with the family held at the Easter Seals clinic. He/she mailed a set of parent forms which parents were then asked to complete and bring to the clinic. Incomplete forms were reviewed and parents filled them out during the clinic visit. The administrator assessed whether the child met the criteria for the study, assessed the primary caregiver for ability to understand the intervention using the PPVT (a 6th-grade cut-off was identified as appropriate for understanding the intervention directions, and all parents met the criteria), and explained the study requirements and, for the PLAY group, the intervention. Parents provided informed consent at this time. At the time of enrollment, parents were also screened for depressive symptoms using the CESD. Their scores ranged between 0 and 41 points, with a median of 10.0 and mean of 12.3 ($SD = 10.3$). About one third of parents ($n = 12$, 31.6%) had a total scale score of 16 or more, the conventional clinical cut-off point for depression. There was no significant difference in the mean scores for the PLAY and the comparison groups in this measure. Parents with a CESD scores above the cut-off were provided with counseling references and monitored for ongoing depression.

Easter Seals therapists scheduled pre- and post-assessments at the Easter Seals center and conducted an interview to obtain demographics, the VABS, the REEL-3, and the Sensory Profile. Parents completed the other survey measures at the office or, in the case of the weekly services log, at home and gave them to the therapist. An outside psychologist was contracted to conduct the ADOS and the Mullen in the families' homes. The PPTI was given to PLAY families at the final assessment, and families sent it back to the Ann Arbor office directly. For the FEAS, the therapist videotaped the parent and child playing together. Videotapes were copied and sent to the Ann Arbor Center for coding by two raters blind to the group assignment of the family.

The Ann Arbor Center and MSU tracked data items and close communication was maintained about which items were missing. The Ann Arbor Center was responsible for reminding sites that a specific form was missing. Some families cancelled scheduled visits multiple times. Persistence by site administrators and therapists resulted in collection of all but one of the data elements (one weekly services log) for the 38 families that completed the study.

Results

Interventions Received

Baseline Community Standard of Care

Overall and by group. Table 7 presents the hours of the standard services offered by the community that children received before study entry. On average, children received less than 3 hours of total services, and no child received more than 10 hours of services per week. The comparison group tended to receive more occupational therapy services than the intervention group before study entry. Group differences for other services received did not approach significance.

<i>Demographic characteristic</i>	<i>Overall (N = 38)</i>	<i>PLAY (n = 20)</i>	<i>Comparison (n = 18)</i>	<i>t</i>
Occupational therapy				
Range	0-5	0-1.5	0-5	t(36)= -1.81 [†]
Mean (SD)	1.01 (.87)	.78 (.48)	1.27 (1.13)	
Speech and language therapy				
Range	.25-5	0-3	0-5	t(36)= -.63
Mean (SD)	1.27 (.88)	1.19 (.64)	1.37 (1.11)	
Other DIR/play-based interventions				
Range	0-1	0-1	0-1	t(36)= -.43
Mean (SD)	.07 (.24)	.05 (.22)	.08 (.26)	
Behavioral intervention				
Range	0-2	0-2	0	t(36)= 1.62
Mean (SD)	.11 (.39)	.20 (.52)	0	
Play dates with other children				
Range	0-1.75	0-1	0-1.75	(n = 20)
Mean (SD)	.19 (.40)	.16 (.32)	.22 (.48)	
Social skills				
Range	0-1.50	0-1.50	0	t(36)= 1.35
Mean (SD)	.07 (.29)	.13 (.39)	0	
Total hours of service/week				
Range	1-10	0-6	0-10	
Mean (SD)	2.72 (1.77)	2.51 (1.17)	2.95 (2.27)	t(36)= -.77

[†]p < .10.

By site. Table 8 summarizes the community intervention services received at baseline by site. An analysis of variance (ANOVA) showed a significant difference between the sites in occupational therapy, $F(3,34) = 4.52, p < .01$, and in speech and language therapy, $F(3,34) = 5.72, p < .01$. On average, the children in Joliet spent considerably more time on these services than children in any of the other sites. Though the average amount of time spent on any one intervention varied from site to site, only Saginaw children received any social skills intervention.

<i>Intervention</i>	<i>Joliet (n = 9)</i>	<i>Saginaw (n = 10)</i>	<i>Peoria (n = 10)</i>	<i>Youngstown (n = 9)</i>	<i>F</i>
Occupational therapy					
Range	.5-5	.33-1.5	0-1.5	0-1.5	F(3,37)= 4.52**
Mean (SD)	1.82 (1.35)	.88 (.42)	.67 (.53)	.72 (.44)	
Speech and language therapy					
Range	1-5	.5-1.5	.25-3	0-1	F(3,37)= 5.71**
Mean (SD)	2.07 (1.18)	1.03 (.35)	1.34 (.82)	.67 (.35)	
Other DIR/play-based interventions					
Range	0-1	-	0-1	-	F(3,37)= 1.11
Mean (SD)	.17 (.35)	-	.10 (.32)	-	
Behavioral intervention					
Range	-	0-2	0-1	-	F(3,37)= .83
Mean (SD)	-	.20 (.63)	.20 (.42)	-	
Play dates with other children					
Range	0-1	0-1	0-1	0-1.75	F(3,37)= .24
Mean (SD)	.25 (.40)	.23 (.34)	.10 (.32)	.19 (.58)	
Social skills					
Range	-	0-1.5	-	-	F(3,37)= 1.99
Mean (SD)	-	.25 (.54)	-	-	
Total hours of service/week					
Range	1.5-10	1-6	1-4	0-3.75	F(3,37)= 5.07**
Mean (SD)	4.32 (2.38)	2.60 (1.38)	2.41 (0.97)	1.58 (1.05)	

** $p < .01$.

Play Intervention

Parents in the PLAY sites were asked to play with their children for at least 2 hours each day for the duration of the project. On average, parents played with their children 12.1 hours per week (SD = 5.0), with a minimum of 2.9 hours and a maximum of 20.9 hours. This approaches the recommended dosage of 2 hours per day. The two PLAY sites did not show any significant difference in the amount of time that parents played with their children.

Group Differences in Outcomes

The main purpose of this study was to examine the feasibility of successful implementation of the PLAY program in the community. Consequently, it was carried out over a short period of time (5 months) with a small sample of 38 children and their families. As such, significant changes were not expected and outcome analyses were conducted primarily for exploratory purposes. Analyses were conducted initially using non-parametric methods suitable for small sample sizes. Parametric analyses that included covariates were then conducted; while this pilot study was not designed to have enough power to include these covariates, we felt it important to explore differences in outcomes while taking these variables into account to assess patterns of results that might suggest avenues to examine in the larger study.

Child Outcomes: Non-Parametric Analysis

Due to the small sample size ($n = 38$), data were initially analyzed through non-parametric methods. Although several advances have been made in non-parametric research methods over

the years, few parametric methodologies for small samples have found their equivalents in the field. Consequently, the results presented below are to be interpreted with caution, and more so in light of the limitations of the available statistical methods.

The Wilcoxon signed ranks test was used to assess changes in scores between the pre- and post-assessment for each group. In order to examine time by group interactions, change scores were computed (post score – pre score) and subjected to the Mann Whitney U test.

Table 9 shows the results of the Wilcoxon signed ranks tests for change over time for the child outcomes, and Table 10 shows the results of the Mann Whitney U test for differences in change scores between groups.

FEAS. Within-group scores showed a patterns of increase for both groups, with significant changes over time for symbolic representation and the total score in both groups and for complex behavior organization in the comparison group. Additionally, the PLAY group tended to improve in self-regulation. None of these changes were significant between the groups.

Functional developmental levels. Similar to the FEAS, FDLs showed a pattern of improvement over time in both groups, with significant change in the symbolic representation subscale for both groups and for the total score in the comparison group (and a trend for the PLAY group). An exception to the pattern was for complex behavioral organization in the PLAY group, which declined, although not significantly. No time x group changes were significant.

Mullen. Both groups showed a pattern of increased scores by the post-assessment except for receptive language in the comparison group. Within-PLAY group performance on visual reception and the composite score were significant and showed trends for the expressive language and fine motor subscales. and in all subscales except receptive language. No scales showed significant change in the comparison group. Differences between groups over time were not significant.

REEL-3. Children from both groups showed a pattern of improvement over time, although not significantly. No changes were significant between the groups.

VABS. The VABS results were quite mixed, making it difficult to infer patterns. In communication, both groups tended to decline in written language and the comparison group declined overall; there was a trend in favor of the PLAY group on the communication subscale. In daily living skills, the PLAY group showed a pattern of improvement and the comparison group showed a pattern of decline, and a trend in favor of the PLAY group overall. In socialization, the PLAY group declined significantly overall and in coping, and the comparison group showed a pattern of improvement, with the comparison group showing significantly greater improvement than the PLAY group. In motor skills, the PLAY group tended to decline and the comparison group tended to improve, but group differences were not significant. The clearest result was that both groups improved significantly in maladaptive behavior, with the PLAY group improving significantly more than the comparison group in maladaptive behavior overall and the externalizing subscale.

Sensory Profile. Scores increased in both groups. Significant increases were evident for both groups in low registration and in the PLAY group in sensation avoiding (there was a trend for low threshold). Even so, none of these changes were significant between the groups.

Table 9. Within-Group Change in Child Outcomes Over Time: Mean (SD) and Z						
Measure/Variable	PLAY			COMPARISON		
	Pre	Post	Z	Pre	Post	Z
FEAS						
Self regulation	12.68 (1.57)	13.60 (1.40)	1.90 [†]	12.11 (3.15)	12.53 (2.52)	0.78
Engagement	11.42 (2.80)	12.03 (2.40)	0.88	10.67 (3.86)	11.53 (3.73)	0.93
Two-way communication	5.84 (1.62)	6.13 (1.68)	0.89	5.14 (2.23)	5.53 (2.21)	1.12
Complex behavior organization	2.47 (0.98)	2.50 (1.03)	0.00	2.11 (0.99)	2.53 (1.02)	2.02*
Symbolic representation	3.16 (3.46)	5.98 (3.88)	3.15**	2.64 (2.46)	4.28 (3.19)	2.90**
Total	36.08 (10.13)	41.53 (10.98)	2.11*	32.75 (11.57)	37.19 (12.49)	2.08*
Functional Developmental Levels						
Self regulation	0.78 (0.26)	0.89 (0.21)	0.71	0.75 (0.33)	0.84 (0.24)	0.58
Engagement	0.66 (0.24)	0.72 (0.26)	1.41	0.69 (0.30)	0.72 (0.31)	0.38
Two-way communication	0.69 (0.31)	0.78 (0.26)	1.41	0.56 (0.35)	0.67 (0.41)	1.00
Complex behavior organization	0.83 (0.33)	0.73 (0.37)	-0.58	0.65 (0.41)	0.69 (0.43)	1.41
Symbolic representation	0.24 (0.42)	0.53 (0.44)	2.17*	0.16 (0.24)	0.39 (0.40)	2.53*
Total	2.74 (1.63)	3.33 (1.85)	1.94 [†]	2.31 (1.47)	3.03 (1.86)	2.22*
Mullen developmental quotient						
Receptive language	43.28 (20.88)	50.28 (23.26)	1.46	41.87 (26.55)	42.56 (20.66)	0.83
Expressive language	49.13 (18.79)	53.57 (20.08)	1.85 [†]	44.14 (21.39)	45.69 (21.53)	1.40
Visual reception	57.97 (20.00)	71.07 (27.84)	2.05*	51.05 (25.55)	53.43 (20.65)	0.64
Fine motor	54.15 (16.54)	58.72 (17.96)	1.81 [†]	50.72 (16.27)	52.14 (18.97)	0.40
Composite	50.99 (16.74)	58.41 (20.61)	2.74**	46.95 (21.02)	48.46 (19.03)	1.25
REEL-3 developmental quotient						
Receptive language	36.36 (15.36)	42.33 (19.97)	0.40	37.54 (23.39)	37.53 (18.32)	-0.11
Expressive language	39.44 (13.67)	40.41 (14.68)	0.24	39.22 (19.83)	41.42 (19.27)	0.94
Composite	37.90 (13.90)	41.37 (16.36)	0.56	38.38 (21.23)	39.48 (18.12)	0.59
VABS developmental quotient						
Communication (<i>std scores</i>)	70.55 (12.89)	73.89 (15.74)	1.59	68.28 (14.98)	67.61 (16.59)	-1.10
Receptive language	40.89 (22.42)	47.40 (22.27)	1.24	43.46 (28.56)	43.79 (21.93)	0.76
Expressive language	44.61 (17.11)	48.69 (22.13)	1.53	42.99 (21.39)	46.85 (24.13)	0.81
Written language	89.98 (22.25)	87.33 (27.21)	-1.31	72.17 (29.73)	71.55 (28.13)	-0.80
Daily living skills(<i>std scores</i>)	71.05 (10.85)	73.74 (13.06)	0.88	72.56 (14.90)	69.89 (15.49)	-1.29
Personal	54.26 (13.12)	57.65 (18.14)	1.13	55.83 (16.87)	54.22 (18.33)	-1.15
Domestic	50.93 (30.98)	57.30 (27.07)	1.37	60.23 (36.85)	55.28 (37.85)	-1.24
Community	57.31 (28.67)	61.68 (25.91)	0.60	48.90 (35.10)	47.85 (30.39)	-0.15
Socialization (<i>std scores</i>)	70.80 (8.00)	68.95 (8.24)	-2.09*	68.44 (10.21)	70.39 (8.29)	1.27
Interpersonal relationships	26.98 (17.69)	28.36 (19.36)	0.36	29.31 (21.01)	36.31 (19.02)	1.49
Play and leisure time	25.56 (15.60)	26.58 (17.52)	0.16	28.45 (15.47)	30.17 (16.34)	0.83
Coping skills	77.40 (26.07)	62.36 (19.27)	-2.78**	54.87 (31.76)	56.73 (27.94)	0.85
Motor skills (<i>std scores</i>)	78.10 (10.58)	77.05 (11.90)	-0.60	72.83 (11.53)	74.33 (10.56)	0.35
Gross	69.55 (17.97)	70.60 (19.26)	0.00	63.33 (13.34)	63.39 (18.93)	0.02
Fine	69.61 (17.75)	67.71 (18.27)	-0.04	57.86 (24.98)	63.97 (19.14)	1.24
Composite	59.70 (13.36)	60.00 (15.48)	0.04	53.72 (19.04)	55.70 (18.79)	0.63
Maladaptive Behavior (<i>v-scores</i>)	20.75 (1.84)	18.79 (2.07)	3.03**	19.00 (2.26)	19.94 (1.69)	1.98*
Internalizing (<i>v-scores</i>)	21.06 (2.05)	19.47 (2.27)	1.97*	19.75 (2.45)	19.75 (2.65)	0.41
Externalizing (<i>v-scores</i>)	18.19 (1.97)	17.05 (2.01)	2.16*	16.83 (2.33)	18.00 (2.45)	2.24*

Table 9. Within-Group Change in Child Outcomes Over Time: Mean (SD) and Z

Table 9. Within-Group Change in Child Outcomes Over Time: Mean (SD) and Z						
Sensory Profile raw scores						
Low registration	36.65 (7.24)	41.26 (6.40)	2.77**	36.61 (8.91)	41.11 (8.32)	2.49*
Sensation seeking	34.45 (7.43)	37.21 (10.09)	1.05	35.94 (10.00)	37.44 (6.84)	1.04
Sensation sensitivity	41.00 (7.79)	43.26 (7.30)	1.23	40.94 (9.26)	43.44 (7.79)	1.26
Sensation avoiding	36.50 (7.46)	39.37 (6.99)	2.38*	39.28 (9.68)	41.89 (7.68)	1.56
Low threshold	77.50 (13.73)	82.63 (12.21)	1.77 [†]	80.22 (18.15)	85.33 (13.48)	1.53

** $p < .01$; * $p < .05$; [†] $p < .10$.

Table 10. Between-Group Differences in Child Outcome Change Scores, *M* (SD)

Measure/Variable	PLAY	Comparison	Z statistic
FEAS			
Self regulation	0.92 (1.90)	0.42 (2.53)	1.38
Engagement	0.61 (2.84)	0.86 (2.74)	0.08
Two-way communication	0.26 (1.36)	0.39 (1.69)	0.15
Complex behavior organization	0.00 (0.97)	0.42 (0.84)	1.27
Symbolic representation	2.84 (2.90)	1.64 (1.92)	1.28
Total	5.45 (9.06)	4.44 (8.35)	0.43
Functional Developmental Levels			
Self regulation	0.06 (0.36)	0.04 (0.25)	0.28
Engagement	0.07 (0.18)	0.03 (0.32)	0.39
Two-way communication	0.07 (0.18)	0.07 (0.27)	0.06
Complex behavior organization	0.06 (0.30)	0.13 (0.23)	0.48
Symbolic representation	0.26 (0.44)	0.25 (0.32)	0.04
Total	0.61 (1.24)	0.72 (1.27)	0.03
Mullen developmental quotient			
Receptive language	6.99 (16.09)	0.69 (11.95)	0.66
Expressive language	4.06 (7.64)	1.55 (6.75)	0.65
Visual reception	13.32 (23.91)	2.38 (14.25)	1.41
Fine motor	4.69 (10.31)	1.42 (10.78)	1.19
Composite	7.29 (10.19)	1.51 (6.60)	1.47
REEL-3 developmental quotient			
Receptive language	5.74 (21.64)	0.00 (8.06)	0.18
Expressive language	0.20 (9.86)	2.19 (9.64)	0.46
Composite	2.97 (14.76)	1.10 (8.11)	0.09
VABS developmental quotient			
Communication (<i>std scores</i>)	3.79 (9.78)	-0.67 (9.97)	1.78 [†]
Receptive language	5.70 (19.87)	0.33 (16.67)	1.30
Expressive language	3.66 (11.57)	3.86 (12.01)	0.37
Written language	-2.39 (11.94)	0.80 (12.52)	0.70
Daily living skills(<i>std scores</i>)	2.21 (8.08)	-2.67 (11.91)	1.70 [†]
Personal	3.78 (11.69)	-1.61 (15.44)	1.43
Domestic	4.77 (17.70)	-4.95 (38.88)	1.95 [†]
Community	3.59 (24.56)	-1.05 (19.67)	0.76
Socialization (<i>std scores</i>)	-2.79 (5.03)	1.94 (6.40)	2.39*
Interpersonal relationships	0.19 (11.43)	5.77 (18.95)	1.16

Play and leisure time	0.37 (13.95)	1.86 (16.26)	0.81
Coping skills	-17.42 (21.22)	1.86 (17.48)	2.83**
Motor skills (<i>std scores</i>)	-1.05 (9.20)	1.50 (9.46)	0.76
Gross	0.33 (13.95)	0.06 (12.69)	0.21
Fine	-1.16 (15.06)	6.11 (19.09)	1.03
Composite	-0.09 (8.17)	1.98 (13.22)	0.49
Maladaptive Behavior (<i>v-scores</i>)	-2.13 (2.13)	0.75 (1.14)	3.66**
Internalizing (<i>v-scores</i>)	-1.73 (3.03)	-0.33 (2.15)	1.09
Externalizing (<i>v-scores</i>)	-1.27 (1.94)	1.25 (1.54)	3.04**
Sensory Profile raw scores			
Low registration	4.47 (6.36)	4.50 (6.36)	0.08
Sensation seeking	2.32 (9.85)	1.50 (7.63)	0.00
Sensation sensitivity	2.53 (7.89)	2.50 (6.78)	0.12
Sensation avoiding	3.05 (5.38)	2.61 (6.47)	0.50
Low threshold	5.58 (11.96)	5.11 (11.11)	0.20

** $p < .01$; * $p < .05$; † $p < .10$.

Clinical FDL. Clinical FDLs were assessed in the PLAY group only. As shown in Table 11, significant differences were seen by therapists on all scales except self regulation and abstract representation, the lowest and highest scales, respectively. In fact, 3 children (15%) had achieved abstract representation skills (the highest level) by the end of the study. Therapists from Saginaw¹ also noted improvements in the children, as evidenced by their rank orderings from the most improved to the least improved ($ICC = .72$).

<i>Measure/Variable</i>	<i>Pre</i>	<i>Post</i>	<i>Z</i>
Self regulation	72.50 (17.95)	76.32 (13.11)	1.16
Engagement	72.50 (21.31)	85.53 (15.17)	2.50*
Two-way communication	65.00 (27.39)	81.58 (18.34)	2.57*
Complex behavior organization	27.50 (28.45)	53.68 (34.71)	3.00**
Symbolic representation	11.50 (21.65)	21.84 (27.09)	2.82**
Abstract representation	3.00 (11.29)	6.58 (14.05)	1.73

** $p < .01$; * $p < .05$.

Parent Outcomes: Non-Parametric Analysis

Table 12 shows the results of the Wilcoxon signed ranks tests for change over time for the child outcomes, and Table 13 shows the results of the Mann Whitney U test for differences in change scores between groups.

FEAS. Both groups generally increased in the subscales, with the symbolic representation and total scales within-group increases being significant. Also, as initially hypothesized, the interactional scale score increase was significant for the PLAY group parents. These changes were not significant between groups.

MBRS. Although an increase in the MBRS scales was anticipated in all scales except directiveness, a pattern of decrease was evident for both groups in all scales, including.

¹ Rank ordering of children from the Peoria site could not be obtained.

Measure/Variable	PLAY			COMPARISON		
	Pre	Post	Z	Pre	Post	Z
FEAS						
Self regulation	10.61 (1.07)	10.55 (1.09)	0.29	9.50 (1.77)	9.56 (1.26)	0.06
Engagement	9.63 (0.55)	9.53 (0.53)	0.68	8.61 (2.14)	9.22 (0.94)	1.60
Two-way communication	10.11 (1.35)	10.95 (1.11)	1.86 [†]	8.94 (2.48)	9.75 (1.32)	0.94
Complex behavior organization	10.03 (1.84)	10.80 (1.78)	1.45	8.75 (2.63)	9.61 (1.98)	0.55
Symbolic representation	3.18 (3.13)	6.03 (2.70)	2.95**	3.19 (1.63)	4.67 (2.52)	2.83**
Total	44.05 (7.22)	48.70 (6.17)	2.48*	39.06 (9.47)	43.39 (6.68)	2.16*
Interactional items	24.00 (4.80)	26.88 (3.80)	2.22*	21.31 (5.30)	23.58 (3.68)	1.51
MBRS						
Responsiveness/child-oriented	3.19 (.94)	3.15 (.87)	-.05	2.63 (.53)	2.88 (.76)	-1.58
Affect/animation	3.13 (.48)	3.07 (.49)	-.60	2.73 (.47)	2.76 (.55)	-.56
Achievement orientation	2.83 (.45)	2.61 (.65)	-.79	2.63 (.70)	2.33 (.62)	-1.43
Directiveness	3.02 (.45)	2.85 (.75)	-.84	3.09 (.80)	2.97 (.69)	-1.41
Parent Stress Index (PSI)						
Child distractibility/hyperactivity	31.90 (7.17)	31.28 (5.41)	0.54	29.56 (6.04)	29.50 (5.77)	0.52
Child adaptability	33.65 (6.89)	32.56 (6.74)	1.61	35.39 (8.95)	33.83 (8.26)	0.95
Child reinforces parent	13.35 (4.68)	11.28 (2.95)	1.80 [†]	11.39 (3.62)	11.11 (3.94)	0.40
Child demandingness	26.35 (7.11)	25.11 (6.31)	1.02	26.00 (6.17)	25.33 (6.54)	1.17
Child mood	11.70 (4.34)	10.78 (3.08)	0.89	13.17 (4.00)	12.44 (3.90)	0.95
Child acceptability	20.60 (3.09)	19.11 (3.03)	1.52	20.17 (4.27)	19.28 (4.25)	1.22
Parent competence	30.85 (7.07)	29.89 (6.89)	0.64	29.00 (6.62)	28.11 (7.52)	1.17
Parent attachment	11.15 (2.98)	11.22 (2.76)	0.26	11.56 (1.89)	10.94 (2.01)	0.81
Parent role restriction	21.15 (5.94)	21.61 (4.33)	0.33	21.44 (5.88)	21.28 (5.35)	0.16
Parent depression	20.95 (4.89)	19.50 (4.09)	1.59	20.39 (6.33)	18.44 (6.56)	1.74 [†]
Parent spouse	19.05 (5.38)	19.44 (5.32)	0.68	19.39 (6.84)	20.67 (5.53)	1.31
Parent isolation	15.40 (3.84)	15.22 (3.57)	0.33	14.50 (4.90)	14.44 (4.40)	0.53
Parent health	14.15 (5.01)	15.11 (4.38)	1.04	13.67 (4.59)	14.11 (4.55)	0.88
Life stress	7.25 (6.18)	6.11 (5.08)	0.96	8.17 (6.94)	7.50 (8.00)	1.25
Child Total	137.55 (24.06)	130.11 (20.10)	1.63	135.67 (25.54)	131.50 (27.35)	1.07
Parent Total	132.70 (27.08)	132.00 (21.25)	0.11	129.94 (30.31)	128.00 (29.91)	1.18
Total	270.25 (45.68)	262.11 (32.66)	0.89	265.61 (42.26)	259.50 (46.08)	0.92

** $p < .01$; * $p < .05$; [†] $p < .10$.

directiveness. None were significant. The results suggest that these behaviors may decrease over time, but that PLAY had a protective function, diminishing the extent of the decline

PSI. Although overall both groups of parents showed a pattern of a slight decrease in stress, their total scores were still at or above the level of concern, and none of them showed a group by time effect. Stress attributed to the child was most likely to decrease in both groups. In addition, both groups exhibited a pattern of slight increase in stress on some of the parent scales, although it was not consistent and there were no group differences.

Child Outcomes: Parametric Analysis

In addition to *t*-tests and analysis of variance (ANOVA) tests, repeated measures analysis of covariance (ANCOVAs) were also conducted with time (between pre- and post-assessments) and

age at enrollment as within-subjects factors. Treatment group, autism diagnosis, and mother's marital status differed between the PLAY and comparison groups and were included as between-groups factors. The results are underpowered due to the small sample size and large number of variables, but give an estimate of the pattern of results when associated factors are controlled statistically.

Table 13. Between-Group Differences in Parent Outcome Change Scores, <i>M</i> (<i>SD</i>)			
<i>Measure/Variable</i>	<i>PLAY</i>	<i>Comparison</i>	<i>Z</i>
FEAS			
Self regulation	-0.08 (1.52)	0.06 (1.16)	0.15
Engagement	-0.13 (0.83)	0.61 (1.65)	1.37
Two-way communication	0.82 (1.96)	0.81 (2.83)	1.01
Complex behavior organization	0.71 (2.23)	0.86 (2.80)	0.63
Symbolic representation	2.95 (3.19)	1.47 (1.83)	1.52
Total	4.61 (8.26)	4.33 (8.14)	0.52
Interactional items	2.76 (5.52)	2.28 (5.05)	0.78
MBRS			
Responsiveness/child-oriented	-0.05 (1.08)	0.25 (0.59)	-0.61
Affect/animation	-0.06 (0.57)	0.03 (0.49)	-.091
Achievement orientation	-0.22 (0.86)	-0.30 (0.75)	-0.08
Directiveness	-0.16 (0.95)	-0.13 (0.34)	-0.70
Parent Stress Index (PSI)			
Child distractibility/ hyperactivity	-0.44 (5.80)	-0.06 (3.73)	0.18
Child adaptability	-1.67 (4.98)	-1.56 (5.84)	0.40
Child reinforces parent	-1.33 (2.87)	-0.28 (2.67)	1.19
Child demandingness	-1.72 (7.92)	-0.67 (4.46)	0.75
Child mood	-0.78 (3.95)	-0.72 (2.74)	0.10
Child acceptability	-1.50 (3.52)	-0.89 (3.38)	0.75
Parent competence	-0.50 (4.29)	-0.89 (3.48)	0.25
Parent attachment	0.33 (2.66)	-0.61 (2.48)	0.83
Parent role restriction	0.33 (4.13)	-0.17 (2.83)	0.22
Parent depression	-1.17 (3.11)	-1.94 (4.19)	0.10
Parent spouse	0.44 (4.88)	1.28 (3.97)	0.16
Parent isolation	-0.28 (4.03)	-0.06 (2.80)	0.10
Parent health	0.94 (3.62)	0.44 (2.20)	0.16
Life stress	-1.78 (7.52)	-0.67 (5.82)	0.70
Child Total	-7.44 (19.14)	-4.17 (16.40)	0.93
Parent Total	0.11 (18.40)	-1.94 (15.28)	0.08
Total	-7.33 (33.17)	-6.11 (23.38)	0.10

Note. Change scores = Time 2 score – Time 1 score. Positive scores indicate improvement.

Table 14 gives the estimated marginal means and standard deviations for the child outcomes. Although very few differences were significant, it is worth noting that overall, the general pattern of scores was encouraging since the PLAY group performed better than the comparison group; and only in very few instances did the comparison group perform better, though again, not significantly.

FEAS. To account for the parent level of interaction in predicting child FEAS scores, the equivalent parent subscale score was included as a within-subject factor. Because many parents scored a zero on the highest level, abstract representation, it was excluded from analyses. Overall, there was a pattern of increase in scores for both groups on most scales. In all but self

Table 14. Child Outcomes: Estimated Marginal Means (SE)					
Measure/Variable	PLAY		COMPARISON		TRT*TIME
	Pre	Post	Pre	Post	F(1,32)
FEAS					
Self regulation	14.37 (1.63)	15.07 (1.47)	13.87 (1.37)	14.07 (1.39)	0.56
Engagement	14.46 (2.95)	16.09 (2.48)	13.00 (3.44)	14.52 (3.41)	0.01
Two-way communication	7.59 (1.70)	7.51 (1.79)	6.99 (2.00)	7.25 (2.06)	0.25
Complex behavior organization	3.39 (1.03)	3.50 (1.08)	3.10 (0.90)	3.54 (1.00)	0.75
Symbolic representation	6.00 (3.59)	6.58 (4.07)	5.39 (2.60)	5.98 (3.19)	0.00
Total	0.63 (10.65)	1.58 (11.59)	0.29 (9.62)	1.22 (11.17)	0.00
Functional Developmental Levels					
Self regulation	0.74 (0.22)	1.07 (0.12)	0.83 (0.18)	0.94 (0.18)	3.00 [†]
Engagement	0.74 (0.25)	0.79 (0.23)	0.79 (0.26)	0.77 (0.24)	0.20
Two-way communication	0.65 (0.26)	0.70 (0.25)	0.68 (0.31)	0.63 (0.32)	0.70
Complex behavior organization	0.66 (0.31)	0.49 (0.36)	0.73 (0.32)	0.60 (0.32)	0.04
Symbolic representation	0.46 (0.42)	0.64 (0.38)	0.39 (0.37)	0.36 (0.40)	1.60
Total	3.24 (1.20)	3.68 (1.12)	3.42(1.14)	3.30 (1.28)	1.55
Mullen developmental quotient					
Receptive language	73.84 (20.88)	72.18 (23.26)	53.57 (26.55)	48.42 (20.66)	0.27
Expressive language	69.88 (18.79)	78.95 (20.08)	51.65 (21.39)	54.05 (21.53)	3.89 [†]
Visual reception	80.73 (20.00)	86.37 (27.84)	60.32 (25.55)	58.32 (20.65)	0.71
Fine motor	73.51 (16.54)	76.47 (17.96)	55.82 (16.27)	57.30 (18.97)	0.08
Composite	74.32 (16.74)	78.33 (20.61)	55.38 (21.02)	54.55 (19.03)	1.35
REEL-3 developmental quotient					
Receptive language	56.70 (15.36)	58.87 (23.39)	52.98 (19.97)	49.73 (18.32)	0.71
Expressive language	60.39 (13.67)	56.28 (19.83)	52.10 (14.68)	50.49 (19.27)	0.46
Composite	58.55 (13.90)	57.57 (21.23)	52.54 (16.36)	50.11 (18.12)	0.10
VABS developmental quotient					
Communication (<i>std scores</i>)	80.46 (13.66)	84.77 (16.98)	74.13 (15.42)	74.41 (17.17)	0.01
Receptive language	59.85 (22.42)	64.70 (28.56)	54.26 (22.27)	53.57 (21.93)	0.64
Expressive language	66.34 (17.11)	71.12 (21.39)	54.23 (22.13)	59.25 (24.13)	0.00
Written language	77.64 (22.25)	87.90 (29.73)	54.44 (27.21)	68.87 (28.13)	0.60
Daily living skills(<i>std scores</i>)	87.68 (10.63)	88.96 (13.09)	81.50 (16.02)	77.64 (16.83)	0.82
Personal	72.90 (13.12)	79.17 (16.87)	65.58 (18.14)	64.29 (18.33)	2.12
Domestic	92.93 (30.98)	87.18 (36.85)	81.07 (27.07)	71.76 (37.85)	0.09
Community	90.07 (28.67)	92.12 (35.10)	70.19 (25.91)	65.01 (30.39)	0.75
Socialization (<i>std scores</i>)	80.25 (8.31)	75.34 (8.47)	73.69 (10.75)	74.12 (8.75)	4.49*
Interpersonal relationships	44.90 (17.69)	43.40 (21.01)	42.97 (19.36)	45.81 (19.02)	0.56
Play and leisure time	30.82 (15.60)	33.84 (15.47)	29.53 (17.52)	33.54 (16.34)	0.03
Coping skills	105.36 (26.07)	80.38 (31.76)	72.04 (19.27)	69.57 (27.94)	8.23**
Motor skills (<i>std scores</i>)	88.52 (10.33)	86.04 (11.14)	77.65 (12.47)	79.35 (10.64)	0.99
Gross	82.47 (17.97)	87.86 (13.34)	70.48 (19.26)	72.47 (18.93)	0.42
Fine	89.30 (17.75)	80.27 (24.98)	66.60 (18.27)	71.06 (19.14)	4.29*
Composite	82.16 (13.36)	78.46 (19.04)	65.90 (15.48)	66.19 (18.79)	0.90
Maladaptive Behavior (<i>v-scores</i>)	21.49 (1.844)	18.74 (2.07)	18.77 (2.256)	19.03 (1.692)	11.44**
Internalizing (<i>v-scores</i>)	20.29 (2.048)	17.35 (2.27)	19.13 (2.454)	17.95 (2.646)	1.61
Externalizing (<i>v-scores</i>)	10.21 (3.973)	9.11 (3.505)	6.57 (4.029)	8.28 (4.004)	4.55*
Sensory Profile raw scores					
Low registration	37.17 (6.48)	42.05 (6.76)	40.02 (8.98)	44.80 (8.55)	0.00

Sensation seeking	33.38 (7.68)	38.24 (9.85)	38.06 (10.00)	38.93 (7.19)	1.19
Sensation sensitivity	41.26 (7.84)	43.36 (7.19)	41.91 (9.24)	45.61 (7.09)	0.27
Sensation avoiding	35.98 (7.05)	42.47 (6.99)	41.24 (9.53)	47.07 (7.31)	0.08
Low threshold	77.23 (13.07)	85.83 (11.75)	83.15 (17.80)	92.68 (11.74)	0.04

** $p < .01$; * $p < .05$; $p < .10$.

regulation, the comparison group appeared to perform better than the PLAY children. None of the results were significant.

FDLs. Theoretically, a child would show significant progress in development if he/she were engaged at his/her level of development. Consequently, since the FEAS assessed both the parents and the children, the FDL scores for parents were constrained by developmental levels of their children. To take into account the effect of this child-parent interaction, the equivalent parents' scores and those at one level higher were included as within-subject factors. Similarly to the FEAS analyses, the highest level was excluded from the analyses.

The pattern of results showed a tendency for PLAY group scores to increase and for comparison group scores to decrease. Apart from the complex behavior scale score, which decreased, all other scales showed modest increases for the PLAY group; with self regulation and symbolic representation having the largest rates of change. The comparison group showed a slight improvement only in the self regulation category. There was a trend for a time X group interaction on self regulation favoring the PLAY group.

Additionally, for the PLAY group only, FDLs rated by blind raters observing videotaped interactions were compared to FDLs rated by the therapists working with the family. Intraclass correlations between the two sets of ratings were not significant. Therapists were more likely to observe improvement between first and last ratings. This may be due to the therapists' investment in seeing positive outcomes; alternatively, therapists' ratings were likely to be influenced by interactions with and observations of the family across several visits, while those of the raters were based purely on the pre- and post- video recordings.

Mullen. In general, the PLAY children performed better than the comparison group. The largest difference was in expressive language category and the least in receptive language. There was a trend for a time X group interaction for expressive language, with the PLAY children manifesting a larger increase in expressive language skills over time than the comparison children. The PLAY children had modest increases in all the other subscales with the exception of the receptive language skills, where they showed a slight decrease.

REEL-3. The general pattern for both groups showed a decrease in scores except for an increase in the receptive language skills for the PLAY children. There was no significant group X time interaction.

VABS. Developmental quotients were computed for the adaptive behavior subscales except for the maladaptive behavior scales where age equivalent scores were not available, precluding calculation of developmental quotients. Instead, standardized v -scores ($M=15$, $SD=3$) were used in analysis of these scales. For the domains, since age equivalent scores were not obtained, standard scores ($M=100$, $SD=15$) were used instead. The results were quite varied with no clear overarching pattern. On the one hand, the PLAY group showed better rates of change in communication and specifically receptive language, in gross motor skills, and in the daily living skills domain and the associated subscales. On the other hand, the comparison group showed higher rates of change in expressive and written language (subdomains of communication), in

socialization, and in (fine) motor skills. As in the non-parametric analyses, there were significant time X group interactions in the socialization domain, coping skills subdomain (in favor of the comparison group) and maladaptive behavior, most notably externalizing behavior, in favor of the PLAY group.

Sensory Profile. None of the results for this measure were significant. However, there were considerable increases for both the PLAY and the comparison groups in all the subscales. The largest rates of change were observed in favor of the PLAY group in low registration, sensation seeking and sensation avoiding. The comparison group increased more rapidly in sensation sensitivity relative to the PLAY group.

Parent Outcomes: Parametric Analysis

Table 15 gives the estimated marginal means and standard deviations for the parent outcomes.

FEAS. Because few parents scored above a 0 on the highest level, abstract representation, it was not included in the analysis. A trend for a group X time interaction on symbolic representation emerged, with the PLAY group parents improving more rapidly than the comparison group parents. The general pattern of results was in favor of the PLAY group, but no other results approached significance.

MBRS. Although non-parametric tests indicated decreases for both groups, after controlling for autism severity, child age, maternal marital status, and time between assessments, all scores decreased for the PLAY group except for directiveness, as expected. In the comparison group, responsiveness and affect/animation increased about the same amount as the PLAY group, and achievement orientation and directiveness decreased. No differences between groups were significant.

PSI. The PSI total scores for both the PLAY and comparison groups ranged between 173 and 364. The average scores at both pre- and post assessment were above the cut off of 260, indicating that many of the parents were under high levels of stress. Although no time X group effects emerged, both groups decreased slightly in child total, parent total subscales and in the total PSI scores, indicating a decline in stress. Nonetheless, 53% and 63% of parents were above the clinical cut-off at pre- and post-assessments, respectively, emphasizing the high level of stress experienced by parents of children with autistic spectrum disorders. Although participation in the PLAY project did not significantly reduce parental stress, neither did it appear to exacerbate stress.

Satisfaction

PPTI. At the conclusion of the study, the PLAY parents were surveyed to find out their level of satisfaction with the program. Scores were obtained on three subscales: parent satisfaction with home consulting, parent satisfaction with training materials and feedback, and parent satisfaction with child outcomes. These subscale scores were summed to yield a total scale score. On average, parents were most satisfied with home consulting (M=4.46, SD=.58), followed by training materials and feedback, (M=4.40, SD=.53). The least satisfaction was experienced with child outcomes (M=4.10, SD=.72). Parents from Saginaw were more likely to continue with PLAY even after the project was completed than were parents from Peoria; $t(18)=2.21, p<.05$.

Parents who were satisfied with the training materials and feedback offered in the study were more likely to recommend the PLAY project to others than those who were less satisfied, $r(18)=.47, p<.05$. Similarly, those parents that were satisfied with their child's outcomes were most likely to continue with the project even after its completion, $r(18)=.47, p<.05$. Though not

Table 15. Parent Outcomes: Estimated Marginal Means (SE)					
Measure/Variable	PLAY		COMPARISON		TRT*TIME
	Pre	Post	Pre	Post	F(1,32)
FEAS					
Self regulation	10.40 (1.11)	10.42 (1.15)	9.84 (1.16)	9.44 (1.13)	0.67
Engagement	9.40 (0.57)	9.55 (0.50)	8.74 (0.97)	9.18 (0.78)	0.65
Two-way communication	10.07 (1.43)	11.37 (1.17)	9.62 (0.88)	9.86 (1.07)	1.99
Complex behavior organization	9.71 (1.92)	10.10 (1.90)	9.38 (1.47)	8.83 (1.56)	0.92
Symbolic representation	3.26 (3.19)	6.26 (2.74)	3.31 (1.56)	4.09 (2.47)	3.99 [†]
Total	43.24 (7.61)	48.32 (6.55)	40.88 (4.02)	41.73 (5.55)	1.84
MBRS					
Responsiveness/child-oriented	3.37 (0.29)	3.66 (0.32)	2.69 (0.25)	2.97 (0.27)	0.00
Affect/animation	3.14 (0.20)	3.28 (0.20)	2.77 (0.17)	2.81 (0.16)	0.68
Achievement orientation	2.46 (0.22)	2.78 (0.26)	2.75 (0.18)	2.31 (0.22)	2.68
Directiveness	2.98 (0.28)	2.82 (0.25)	3.23 (0.23)	2.93 (0.21)	0.03
Interactional items					
Parent Stress Index (PSI)	23.15 (5.06)	26.34 (3.99)	22.10 (2.53)	22.31 (3.13)	2.04
Child distractibility/hyperactivity	35.02 (7.13)	33.47 (5.11)	30.89 (6.24)	30.06 (6.00)	0.13
Child adaptability	37.22 (6.09)	35.56 (5.80)	34.79 (9.02)	33.98 (7.78)	0.13
Child reinforces parent	11.26 (4.92)	9.66 (2.94)	10.99 (3.81)	9.82 (3.89)	0.14
Child demandingness	29.84 (7.08)	29.21 (6.66)	26.79 (6.58)	27.11 (7.05)	0.12
Child mood	11.70 (4.38)	10.70 (2.87)	12.50 (3.87)	11.36 (3.59)	0.01
Child acceptability	19.48 (1.97)	18.58 (2.39)	19.19 (4.45)	17.80 (3.96)	0.12
Parent competence	35.90 (6.79)	33.53 (6.75)	31.77 (7.09)	29.78 (7.58)	0.05
Parent attachment	11.63 (3.00)	12.45 (2.45)	12.00 (2.00)	11.95 (2.19)	0.62
Parent role restriction	25.86 (5.643)	24.67 (4.438)	23.41 (5.93)	22.11 (5.44)	0.01
Parent depression	26.43 (4.73)	24.88 (4.32)	22.51 (6.45)	20.48 (6.66)	0.09
Parent spouse	23.62 (5.44)	21.76 (5.06)	22.29 (7.09)	22.32 (5.52)	1.34
Parent isolation	17.68 (3.44)	16.55 (3.31)	15.69 (5.31)	15.23 (4.63)	0.26
Parent health	17.11 (4.69)	18.48 (3.82)	15.26 (4.89)	15.77 (4.79)	0.43
Life stress	12.39 (6.26)	10.37 (5.32)	10.59 (7.15)	9.85 (8.67)	0.22
Child Total	144.52 (21.25)	137.17 (17.36)	135.15 (26.47)	130.13 (26.65)	0.09
Parent Total	158.22 (25.38)	152.31 (19.85)	142.92 (31.80)	137.64 (30.24)	0.01
Total	302.75 (40.88)	289.48 (31.69)	278.07 (46.39)	267.77 (50.42)	0.06

significantly, parents that played the most hours with their children were the least satisfied, and especially with child outcomes.

Parents of children who improved in their sensory profile's low registration subscale were more likely to be satisfied with the intervention overall, $r(18)=.63$, $p<.05$ as well as with the various components; home consulting $r(18)=.49$, $p<.05$, training materials and feedback, $r(18)=.70$, $p<.05$, and with child outcomes, $r(18)=.71$, $p<.05$. Parents with higher levels of depression were less likely to be satisfied with the intervention, $r(18)=-.47$, $p<.05$, as were those whose children's physical, intellectual and emotional improvements did not meet their expectations $r(18)=-.57$, $p<.05$, and those with children exhibiting high levels of affective dysfunction through frequent crying, depression and unhappiness, $r(18)=-.53$, $p<.05$.

Appendix A

PLAY Interviews

1. What was participating in the pilot research study like for you?
2. What motivated you to participate in the study?
3. Did you participate by choice?
4. Were you told by a supervisor that you needed to participate?
5. Did the experience meet your expectations? Why? Why not? What might have been done differently to sustain your involvement and interest?
6. Did you attend the training in Ann Arbor? If yes, how was that experience for you? What was most helpful? What needed to be improved? Do you think conducting training that way would work for most Easter Seals sites? Why or why not? Were there any things you learned at that training that can help you now that the pilot study is over?
7. Did you recruit participants? (If yes): What worked well in the recruiting process? What would you recommend to make the process better?
8. Did you enroll participants? (If yes): What worked well in the enrollment process? What would you recommend to make the process better?
9. Did you collect data from participants? (If yes): What worked well in collecting data from participants? What would you recommend to make the process better?
10. Did you coordinate copying, filing, and sending the data to Ann Arbor? (If yes) What worked well in this process? What would you recommend to make the process better?
11. Did you receive data reports back from Ann Arbor? (If yes) What worked well in this process? What would you recommend to make the process better?
12. (For PLAY intervention sites only) What kinds of changes, if any, did you see as a result of the PLAY intervention?
13. (For PLAY intervention sites only) We learned from the data results that on average, parents who did more PLAY activity with their children each week were actually less satisfied with their participation in PLAY. Do you have any ideas about why this might be?
14. What additional recommendations would you make if the study were implemented across many Easter Seals sites? What would you tell the administrators and therapists at those sites?
15. What other comments or observations do you have about the process of participating in the pilot study?