

Table 2. Parent fidelity of implementation by strategy.

Strategies	Individual techniques included	Pre-training M (SD)	Post-training M (SD)	F-value (1, 9) (p-value)
Follows Child's Lead	Lets child choose activity Face-to-face and at child's level Joins in child's play and imitates child Adjusts animation to child's needs	3.73 (0.46)	4.2 (0.51)	5.33 (p=0.046)
Models and Expands Communication and Play	Gives meaning to child's actions Adjusts language to child's developmental level Models communication/play around child's focus Models communication/play at child's developmental level Expand child's communication	3.26 (0.42)	3.98 (0.47)	81.0 (p=0.000)
Creates Opportunities for Child to Respond	Uses playful obstruction, balanced turns, and communicative temptations effectively Helps child anticipate interruption	2.65 (0.92)	3.23 (0.55)	5.79 (p=0.019)
Uses Direct Teaching Strategies	Prompts child for a more complex response Waits for child initiation before prompting Provides time for child to respond Provides immediate reinforcement for correct responding Withholds reinforcement for inappropriate/incorrect responses Adjusts prompt level to promote spontaneity	2.99 (0.60)	3.75 (0.35)	17.76 (p=0.002)
Paces the Interaction Successfully	Uses interactive techniques to keep child engaged Uses interactive techniques to provide initiation opportunities Uses direct techniques to increase skill complexity when child is motivated	2.77 (0.74)	3.6 (0.49)	12.10 (p=0.007)
Targets Goals	<i>Targets:</i> Social communication Language/communication Play/imitation	3.03 (0.64)	3.80 (0.39)	11.87 (p=0.007)
Manages Interactions	Sets up environment to facilitate regulation Modulates child's affect, arousal, and attention Overall attunement/engagement	3.30 (0.62)	4.13 (0.32)	11.87 (p=0.007)
Overall Fidelity	<i>Includes all categories</i>	3.13 (0.51)	3.77 (0.33)	22.57 (p=0.001)

The average fidelity score across parents for pre- and post-training in each of seven strategies. Individual techniques included in each of the strategies and absolute t-score values are also listed.

home (M=6.4; SD=0.84). While parents endorsed that they *used the intervention at home* (M=6.6; SD=0.52), the responses to whether they *understood how to use the strategies during everyday activities* were more moderate (M=6.1; SD=0.88).

In interviews, parents consistently highlighted the importance of their ability to integrate the approach into their daily lives. For example, one parent said,

I definitely like the fact that you're training the parents to use this in the day-to-day ... I get home at 7:00, so when am I supposed to carve out 20 minutes to play with him? It's really hard. So just how you can do it, when you're feeding him, if it's the two minute increments you can be successful just doing that throughout the entire day.

However, one parent commented that the activities used in the clinical setting were not translating to daily routines at

Table 3. Parent satisfaction survey results.

Question	Mean ^a (SD)	Range (minimum–maximum)
This is an acceptable intervention for my child's social communication skills	6.6 (0.52)	6–7
I enjoyed this program	6.8 (0.42)	6–7
I would suggest the use of this intervention to other parents	6.6 (0.70)	5–7
The parent coaching was clear, understandable, and helpful	6.6 (0.52)	6–7
The amount of training and support I received was sufficient for me to learn the intervention strategies	6.5 (0.71)	5–7
The trainers were knowledgeable	6.8 (0.42)	6–7
The goals of the intervention are important to my child's functioning at home	6.4 (0.84)	5–7
I use this intervention at home	6.6 (0.52)	6–7
I understand how to use the techniques at home during everyday activities	6.1 (0.88)	5–7
This intervention was a good way to teach social communication skills to my child	6.6 (0.51)	6–7
I understand which skills my child was working on and why	6.6 (0.52)	6–7
The homework assignments were clear and manageable	6.2 (0.92)	5–7
The intervention was effective in teaching my child's social communication skills	6.9 (0.32)	6–7
I feel my child improved her/his social engagement as a result of this program	6.5 (0.71)	5–7
The intervention will produce lasting improvement in my child's social communication skills	6.6 (0.52)	6–7
The intervention quickly improved my child's social communication skills	6.3 (0.67)	5–7
Other behaviors related to social communication were also improved by the intervention	6.2 (0.79)	5–7
Using the intervention not only improved my child's social communication skills at home but also in other settings (e.g. classroom, community)	6.0 (1.33)	4–7
I use the intervention with my child regularly	6.2 (0.92)	5–7

SD: standard deviation.

The satisfaction survey items and the mean scores across parents for each item, as well as the range of scores reported.

^aParents received the following instructions: A score of 1 indicates that you *Strongly Disagree* with the statement. A score of 7 indicates that you *Strongly Agree* with the statement. A score of 4 indicates you *Neither Agree nor Disagree* with the statement.

home or public family outings. She also noted that the materials (toys) included in the trainings were not interesting to her child and made it difficult to then take the techniques home.

The most useful component of the intervention identified by parents was learning to follow the child's lead (a developmental strategy). "I think that the most useful thing about the training was learning really how to follow your child's lead ... And really follow them and to get down on their level and to maintain face to face contact." They also felt successful at using this piece of the intervention. "I think I am much better able to follow her lead and to keep her engaged in a fun way in everyday activities."

Although most parents rated the intervention highly on the item "This intervention is a good way to teach social communication skills to my child" (M=6.6; SD=0.51), some identified specific challenges in the interview. Challenges specific to the intervention included getting comfortable using the techniques and parent concerns that not all strategies were appropriate for their child's abilities. For example, one parent indicated that she found it "uncomfortable and frustrating" to target verbal communication with her nonverbal child.

Treatment planning process

Overall, parents reported liking the treatment planning process of conducting an assessment and developing goals for themselves and for their child. On the survey, they indicated that they *understood which skills their child was working on and why* (M=6.6; SD=0.52). In the interview, one parent described the goal development process saying, "it really set the stage for what we were going to work on, and what we were targeting. Baby steps, realistic goals." Another said,

It was very helpful. We were able to talk about goal setting and see where he was at in terms of level of play and language and then we were able to review it at the end and see the progress he made.

Homework

Parents rated the survey item *Homework was clear and manageable* as moderate (M=6.2; SD=0.92) and parents' most critical comments about the intervention were related to homework. Specifically, a number of parents reported challenges finding time to practice the strategies and completing the homework and readings. Some also questioned the utility of the homework. One parent commented, "I

didn't see a lot of value in the homework to be completely honest with you. I felt it was busy work, and if you see my book, you'll see it's hardly filled out." Some parents commented that the handouts were confusing or redundant.

Logistics of the intervention format

Recommendations for improving the intervention generally addressed the logistical challenges reported. The most frequent requests surrounded increased flexibility in scheduling the therapy sessions, lengthening the session duration and improving the orientation to the intervention by including some background theory and before/after videos. Several parents also requested opportunities to meet other participating families as they go through the intervention.

Perceived effectiveness

On the survey, parents indicated strongly that the *intervention was effective in teaching my child social communication skills* ($M=6.9$; $SD=0.32$), *my child improved her/his social/engagement as a result of the program* ($M=6.5$; $SD=0.71$) and that they believed *the intervention will produce lasting improvement in my child* ($M=6.6$; $SD=0.52$). Scores were more moderate, in comparison, when asking about whether *The intervention quickly improved my child's social communication skills* ($M=6.3$; $SD=0.67$), *Other behaviors related to social communication were also improved by the intervention* ($M=6.2$; $SD=0.79$), and *Using the intervention has improved my child's social communication skills not only at home but also in other settings (e.g. classroom, community)* ($M=6.0$; $SD=1.33$). This final concern about generalization was consistent with one parent's comment that she could use, "more help in everyday activities (eating, playing outside, and getting dressed)."

Improved child social communication

Examples from parents of children with varying levels of communication abilities illustrate the effect of the intervention on both verbal and nonverbal communication and the spontaneous nature of both communication and play skills. "His communication skills have improved dramatically; he's using a ton of word approximations." and "He's signing more than he was, and he's doing it spontaneously. So he'll walk up to me now and sign that he's hungry, whereas he would never do that before." Another parent also talked about nonverbal skills, saying

... halfway through the training he started ... grabbing my hand and wanting me to go places and play with him. Before he used to kind of wander around the room by himself and not kind of include us. Like he didn't even know we were there.

Now he knows we're there and he wants to play with us, and he actually wants to play with us a lot.

Changes were reported in receptive communication skills as well. One parent describes her child's responsiveness: "A lot more eye contact, definitely responding to words, responding to his name, some directions he can respond to." Additionally, some parents specifically mentioned increased connections with their children. For example, after describing significant improvements in communication and play, one parent indicated

We owe a lot to the program just in being able to know how to play with our son and engage him and interact with him and through that, a definite bond has formed that I did not feel that I had with my son before we started the program.

Many parents mentioned that seeing their child's progress led to their ongoing use of the strategies after they had completed the program. "[My son] made a significant amount of progress and we're using the strategies with him now and we're seeing continued progress now." This may have led to some differences in how parents ranked use of the intervention regularly. Overall, the mean score was 6.2; however, three parents gave this item a 5, indicating some limited use.

Reduced parent stress

During the course of the interview, two-thirds of the parents mentioned that they felt reduced stress after the intervention. Parents who reported decreased stress often attributed to their increased comfort level in interacting with their child in ways that may facilitate development:

In the beginning when you get that diagnosis and you don't know a lot about it and you don't know what you can do and it's really scary. And after you go through the training you just feel like you can handle this. And there are things you can do to contribute. So I think that helps with the stress.

A reduction in behavioral problems as child skills increased also seemed to contribute to reductions in perceived stress for families. "I think it's [stress] decreased actually. Because I feel more comfortable with my expectations for what he should be doing and what he is doing. I just feel more comfortable about that."

Discussion

Findings in this study are unique in that we included the direct perspective of the parent experience using multiple methods (parent satisfaction assessment and an in-depth interview). Results of this study provide preliminary support for the successful implementation of a selected parent-mediated NDBI intervention that was applied using a

community-partnered approach. Specifically, findings from both qualitative and quantitative data indicate that parents had very positive perceptions of the feasibility, utility, and effectiveness of Project ImPACT when implemented by community EI providers. Furthermore, observational data indicate that parents were able to learn and implement the Project ImPACT strategies in the relatively brief 12-session intervention period. This study represents a unique method for determining the feasibility of implementing an evidence-based, parent-implemented treatment program in community settings.

This study demonstrates that community-based participatory research (CBPR) may be one effective way to increase the fit and feasibility of an evidence-based treatment for use in community practice. Although there are examples of research–community partnerships to implement evidence-based practices in community-based mental health services (Chorpita et al., 2002; Chorpita and Mueller, 2008; Southam-Gerow et al., 2009; Wells et al., 2004), this is the one of the first efforts to use a partnership model in the field of EI for ASD. Our earlier work describing partnership development demonstrated the proximal effects of the partnership in terms of partnership synergy (i.e. adhered to the participatory research elements outlined by Naylor et al. (2002) and had strong collaborative functioning), productivity (i.e. attainment of all initial goals and the large number of tangible products targeting multiple audiences), and sustainment of the partnership over time (Brookman-Frazee et al., 2012). The current study provides further support for the CBPR implementation process by documenting positive family-related outcomes of the intervention. Community providers were able to successfully teach parents the intervention strategies. Additionally, parents report some reduced stress, increased feelings of competence and support, and an improved parent/child relationship. They also reported that the intervention benefited their child and all parents reported believing in the approach. Information from community providers and parents will be used to adapt the program further to increase fit and feasibility and without CBPR this type of feedback may have been very limited. While these results are primarily qualitative, they provide preliminary support that can be confirmed in a larger study.

Understanding parent perspectives on intervention is crucial to support use and sustainment of an intervention and to ensure that the intervention does not negatively affect family well-being (Stahmer and Pellecchia, 2015). Unlike clinician-delivered interventions, the goal of parent-mediated intervention is for the child to benefit from continued, ongoing contact with the therapeutic strategies as implemented by the parent in their daily contact with the child. This can only occur if parents can learn the strategies and are willing to use them in an ongoing way. Attrition in parent-implemented intervention studies can be high, especially when low-resourced families are

involved (Kasari et al., 2014) and highlights the challenges of developing parent-implemented interventions that are feasible and sustainable over time. Qualitative and quantitative data indicate that parents implemented the intervention well with relatively brief training and that they were willing to use the intervention at home. They discuss using the intervention outside of the “therapy hour” and implementing the intervention in daily routines, although some parents continued to find the translation to the home environment challenging. Studies of parent-implemented interventions in autism suggest that participation may be enhanced by targeting increasing self-efficacy (Solish and Perry, 2008) and improving confidence that the intervention will produce meaningful outcomes (Moore and Symons, 2011). Whether or not inclusion of reflective practice training for providers may have facilitated parent empowerment in this project will be examined more explicitly in future projects. Parents in this project reported feeling more confident in their skills as they saw improved communication and social skills in their children. These perceptions may increase the likelihood that parents will use these strategies at home.

Additionally, although children in this project were very young and some had not yet received a diagnosis of ASD, parents were still willing to attend treatment sessions, learned the strategies well, and saw improvement in the children at this very young age. This provides additional support that parent coaching interventions are acceptable and feasible to community participants, even at young ages. This is important because new research has indicated that beginning intervention very early, even before a diagnosis is made, may reduce later ASD symptoms (Rogers et al., 2014). However, this also raises policy issues around services for children who do not yet have a formal diagnosis. Through Part C of Individuals with Disabilities Education Act (IDEA), EI services are provided to children. Some states will serve children “at risk,” but a large majority of states require significant delay or diagnosis before providing services. Because funders were included in our CBPR process, we were successful in obtaining public funding for a majority of families. This highlights the importance of addressing funding concerns of an intervention from the earliest stages of development. Additional data are needed on the long-term effects of early parent-implemented interventions to help guide funding and policy more broadly.

Although parents in this project could use the intervention and were satisfied with it, they also provided some comments that might suggest some modifications may make the intervention even more acceptable to very young children. For example, some parents reported frustration with a focus on verbal communication in their young, non-verbal children. Although we attempted to emphasize the importance of early gestures and vocalizations in the training, clearly more emphasis was needed for providers and

families. The materials, because they were developed for older children, included many verbal examples and several of the lessons specifically focused on language production. Providing written materials for providers and parents that include developmentally appropriate intervention targets for very young children and an increased emphasis on how to use the strategies before children have words may facilitate use of the techniques and feelings of frustration for parents whose children are not talking.

Parent feedback gathered in the study indicates the need for improved support for parent use of the intervention at home and in the community. Both quantitative and qualitative data indicate that the current format of written homework questions does not seem beneficial to parents. The written questions are designed to help the parents apply the techniques at home, increase independence with the strategies, and increase the likelihood of practicing at home (Ingersoll and Dvortcsak, 2010). It is possible that these goals could be better addressed without the need for the written responses from parents, thus removing the impression of “busy work.” Rather than requiring written responses, therapists could increase focus on collaboratively creating a detailed, specific plan for when the parent will practice the intervention with their child and what specific tools from the intervention they will implement with their child. The therapist could follow-up with the parent during the following session to see how the specific plan went, what was successful, and what was challenging (the current content of the written questions). This focus on actionable, specific, collaborative planning with detailed follow-up is a well-established method to support behavior change in the adult learning and self-management literature (Kiesler, 1971; Lorig et al., 2013). Parent-mediated interventions, including Project ImPACT should consider adopting this type of thorough planning with the parent in order to improve the likelihood of at-home practice and thus ultimately increase parent independence with the use of the strategies.

Limitations

The most significant limitation of this study is the small number of participants. This leads to concerns regarding selection bias, family demographic representativeness, and generalizability of results. Families were recruited after seeking care at one of the participating community agencies and agreed to participate on a voluntary basis. It is possible these families were more likely to access services than families from other populations and were ready to access services due to concerns about their child’s development. Future studies of parent-implemented interventions will need to solicit similar perspectives from families with a wider range of income, education, and cultural backgrounds to increase generalizability of the

findings. It is possible, and even likely, that adaptations will need to be made based on family characteristics.

In addition, the providers in the current study worked at agencies that participated in the selection of the intervention to be implemented (through the BRIDGE Collaborative). Although the providers themselves were not involved in the intervention selection, it is possible that their agencies were more invested that usual community agencies in seeing the program succeed. Additionally, these providers were willing to participate in a research study and had high levels of education and experience relative to some Part C program providers. Parent satisfaction may differ in programs where providers have more limited expertise in working with young children.

Finally, although expert raters were trained to code fidelity of implementation with a high degree of reliability (80%) before coding project videos, ongoing reliability data are not available for parent videos. Coders were blind to time in treatment, however.

Conclusion

These results indicate that implementing Project ImPACT is feasible when community providers are trained to teach parents in usual care to use the strategies. With appropriate modifications, such as revising or reducing the homework assignments and adapting the materials to fit the development level of a younger population, the intervention has the potential to be successfully implemented on a much broader scale. The use of the CBPR method of implementation of the intervention appeared to facilitate use in community practice, and ongoing modifications based on these data may be more likely to support sustainment. Future research should directly compare this implementation model to other methods.

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