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Parent-Teacher Communication about Children with Autism Spectrum Disorder: An Examination of Collaborative Problem-Solving

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Abstract

Effective parent-teacher communication involves problem-solving concerns about students. Few studies have examined problem solving interactions between parents and teachers of children with autism spectrum disorder (ASD), with a particular focus on identifying communication barriers and strategies for improving them. This study examined the problem-solving behaviors of parents and teachers of children with ASD. Participants included 18 teachers and 39 parents of children with ASD. Parent-teacher dyads were prompted to discuss and provide a solution for a problem that a student experienced at home and at school. Parents and teachers also reported on their problem-solving behaviors. Results showed that parents and teachers displayed limited use of the core elements of problem-solving. Teachers displayed more problem-solving behaviors than parents. Both groups reported engaging in more problem-solving behaviors than they were observed to display during their discussions. Our findings suggest that teacher and parent training programs should include collaborative approaches to problem-solving.

Keywords

parent-teacher communication; problem-solving; autism spectrum disorder; autism

A successful family-school partnership includes at its foundation opportunities for parents and teachers to engage in collaborative efforts to address students' challenges across home and school (Mautone, Marcelle, Tresco, & Power, 2015; Sheridan & Kratochwill, 2008). Parent-teacher communication is an essential prerequisite for establishing and sustaining successful family-school partnerships (Cheatham & Ostrosky, 2011; Dunst, 2000). One aspect of effective communication is the ability of parents and teachers to problem-solve when presented with a student concern (Allen & Blackston, 2003). For children with autism spectrum disorder (ASD), the extent to which parents and teachers successfully problem-solve may be as important as any direct intervention (Dunst, Trivette, & Snyder, 2000;

McNaughton, Hamlin, McCarthy, Head-Reeves, & Schreiner, 2007). Few studies have examined communication in general, and problem-solving in particular, in parents and teachers of children with ASD.

FAMILY-SCHOOL PARTNERSHIPS

Family-school partnerships, including the quality of communication between parents and teachers, have been shown to have a substantial impact on students' success in and out of school (Cheatham & Ostrosky, 2011; Mautone et al., 2015). Communication has been widely recognized as both a facilitator of collaboration and a source of conflict in partnerships with families (Blue-Banning, Summer, Frankland, Nelson, & Beegle, 2004; McNaughton et al., 2007; Tucker & Schwartz, 2013). Although parents value regular and timely communication with teachers, districts struggle to create consistent, reliable, two-way communication systems (Lo, 2008; Tucker & Schwartz, 2013).

PROBLEM-SOLVING: DEFINITION, MEASUREMENT, AND OUTCOMES

Problem solving is one form of communication that underlies successful family-school partnerships (Amatea, Daniels, Bringman, & Vandiver, 2004; Swick, 2003). Based on the problem-solving behavioral consultation literature (Sheridan & Kratochwill, 2008), we define problem solving as a systematic, solution-focused process occurring in the context of parent-teacher interactions, wherein teachers and parents share their concerns and agree on strategies to address them. It is the primary method of designing, implementing and evaluating school-based interventions (Erchul & Martens, 2010). There are four thematic questions that underlie various problem-solving models: what is the problem?; why is it occurring?; what can be done about the problem?; and did the intervention work? (Tilly, 2002). The core elements of collaborative problem-solving are comprised of a structured process wherein teachers and parents identify a mutual concern, determine why it may be happening, plan an intervention to be implemented at home and at school, and evaluate the effectiveness of that intervention. In addition to these core components, successful problem-solving includes communicating in a clear and direct manner and understanding the demands placed upon the other person (Bergan, 1977; Bergan & Kratochwill, 1990).

Measuring problem-solving can be challenging because a widely accepted instrument has not been identified. A variety of direct observations, as well as self-report questionnaires, have been proposed to measure the extent to which parents and teachers demonstrate problem-solving. Coding of direct observations ranges in intensity from content analysis to likert scales to checklists. For example, Martens, Lewandowski, and Houk (1989) used content analysis during the problem identification stage and coded statements based on their content and function, as well as the source of the statement and how it controlled the conversation. Direct observations of problem-solving have also been coded using likert scales, such as the *Parent-Teacher Interaction Quality Scale*, which divides problem-solving into behavioral (e.g., defining the target concern) and psychological indicators (e.g., understanding the demands placed upon the other person) (Bergan & Kratochwill, 1990; Sheridan et al., 2009; Wilkinson, 2005). Other studies have developed checklists to code behaviors based on the occurrence or nonoccurrence of objectives corresponding to each

stage of the problem-solving process (Wickstrom, Jones, LaFleur, & Witt, 1998; Sheridan & Kratochwill, 2008; Garbacz & McIntyre, 2015). Finally, problem-solving has been measured using self-report questionnaires, such as the *Participation in Problem-Solving Scales* (Sheridan, Ryoo, Garbacz, Kunz, & Chumney, 2013).

According to Esquivel, Ryan, and Bonner (2008), parents want a problem-solving component included in their school-based team meetings. Several studies have shown that success in solving a mutually identified concern is linked to positive outcomes for students and greater satisfaction between parents and teachers. For example, Allen and Blackston (2003) noted positive outcomes in desired student behaviors following the implementation of intervention plans and scripts, which were developed using collaborative problem-solving. Parents and teachers of children with ASD rated their child's target behaviors, such as engaged time and compliance, as "somewhat" or "completely improved" following collaborative problem-solving sessions (Garbacz & McIntyre, 2015). Parents and teachers have also reported improvements in the quality of parent-teacher relationships after working collaboratively (e.g., Garbacz & McIntyre, 2015; Sheridan et al., 2012). Sheridan et al. (2012) suggested that improvements in parent-teacher relationships may partially mediate the effects of collaborative problem-solving on child outcomes, such as adaptive and social skills.

PROBLEM-SOLVING AND CHILDREN WITH DISABILITIES

It is particularly important to examine problem-solving behavior in parents and teachers of children with disabilities. When children receive special education services, parents are required by law to meet more frequently with teachers (Gregg, Rugg, & Souto-Manning, 2011; Tucker & Schwartz, 2013). Therefore, there are numerous opportunities for parents and teachers to problem-solve, including informal exchanges before and after school and formal meetings, such as parent-teacher conferences and individualized education planning (IEP) meetings (McNaughton et al., 2007). During conferences, parents and teachers are expected to evaluate the student's progress and develop strategies for areas in need of improvement (Pillet-Shore, 2015). Unfortunately, many families are dissatisfied with parent-teacher conferences and IEP meetings, especially among families of children with ASD (Lake & Billingsley, 2000). For example, Spann, Kohler, and Soenksen (2003) found that only 56% of parents of children with ASD reported even moderate levels of involvement in the IEP process. Accordingly, parents want to provide input on objectives and goals, as well as curriculum and instructional approaches (Tucker & Schwartz, 2013).

LIMITATIONS IN THE LITERATURE

Few studies examine the extent to which parents and teachers of children with ASD engage in problem-solving, and differences between parents and teachers in their problem-solving behaviors. However, prior research has examined parents' and teachers' communicative behaviors more broadly for children with ASD. For example, Tucker and Schwartz (2013) reported that parents were more comfortable providing input about behaviors than about academics. Additionally, Cheatham and Ostrosky (2011) found that during parent-teacher conferences, teachers spoke more often than parents. Other studies have confirmed that

parents' input on goal-setting and decision-making are frequently ignored (McNaughton et al., 2007).

Also unknown is the extent to which parents' and teachers' reports of problem-solving align with their actual problem-solving behaviors. It has been suggested that self-report measures may lead to reactive effects, with the respondent over- or underestimating his or her behaviors (Sanetti & Kratochwill, 2008). A series of studies in the late 1970's and 1980's documented discrepancies in teachers reported versus observed behavior. A review of 11 studies found no correspondence between teacher reports of specific classroom practices and observations of those classroom practices (Hook & Rosenshine, 1979). In one study, teachers reported that they had implemented an intervention, but direct observations of the teachers revealed no changes in the teachers' target behaviors (Robbins & Gutkin, 1994). Wickstrom et al. (1998) reported that mean teacher implementation of intervention was 4%; however, teachers reported a mean fidelity of 54%. Despite a fair amount of research since then, no recent research has explored congruence in teachers' or parents' self-reports and observed behaviors. Differences in reported problem-solving versus observed problem-solving may be important in revealing how a parent-teacher communication intervention may be optimally designed and implemented.

Our study builds on this literature in three ways. It examines the extent to which (1) parents and teachers demonstrate problem-solving behaviors when given an opportunity to discuss a student concern; (2) parents and teachers differ in their problem-solving behaviors; and (3) observed problem-solving behaviors differ from reported problem-solving behaviors for both parents and teachers. Examining parent-teacher communication, with a particular emphasis on problem-solving, is imperative for understanding the mechanism by which successful partnerships are established and sustained (Cheatham & Ostrosky, 2011).

Method

Participants and Recruitment

Participants were 39 parent-teacher dyads of children with ASD in 18 kindergarten-through-fifth grade autism support classrooms from 13 schools in an urban public school district. The school district is the eighth largest school district in the country, with 75% of students eligible for free or reduced-price lunches. The 13 schools in the present study included a racially and ethnically diverse sample of students: 65% African American, 9% White, 3% Asian, 14% Latino, .1% Pacific Islander, .06% American Indian, and 10% Other. In these schools, 6% of the students were English Language Learners and 17% were receiving special education services.

Recruitment of teachers took place with an email sent to all teachers who had participated in a larger randomized-controlled trial (reference blinded for review). Emails to 33 teachers in 22 schools were sent describing the project. Twenty-seven teachers from 18 schools expressed interest and subsequently consented to participate. Packets of information describing the study were sent home with the students of the consented teachers. Parents whose primary language was not English were excluded from the study. The study was limited to autism support classrooms only. Forty-six parents from 18 classrooms in 13

schools consented to participate. Each classroom contained a single consented teacher, but included between 1 to 6 parent participants (i.e., multiple parents signed up with the same teacher). In order to maintain consistency across dyads, only one parent was allowed to participate per child and parents were only allowed to participate with one child. Six parents were dropped from the study because they could not be contacted (e.g., phone number was no longer valid). One parent was dropped from the study because she was not interested in participating after she signed the consent form. Final recruitment numbers were 18 teachers and 39 parents from 13 schools. (Please note that number of teachers equals number of classrooms.) There were 39 parent-teacher dyads, where each included one parent, one teacher, and one child.

As seen in Table 1, a majority of the teachers were female (89%) with an average age of 36 years ($SD = 11.3$). No teachers identified themselves as Hispanic or Latino. Approximately 83% identified as White, 11% as African American/Black, and 6% as American Indian/Alaska Native. All teachers taught in autism support classrooms; a third taught in kindergarten-through-second grade classrooms. On average, teachers reported teaching special education for 10.3 years ($SD = 11.4$), and teaching children with ASD for 6 years ($SD = 3.4$).

Parents were primarily mothers (95%) who averaged 34.9 years of age ($SD = 6.2$). Thirteen percent identified themselves as being Hispanic or Latino, particularly of Mexican (5%) or Puerto Rican (8%) descent. Approximately 36% identified as White, 56% as African American/Black, 3% as American Indian/Alaska Native, and 5% as other. Most (69%) parents reported at least some college education and slightly over half (51%) were unemployed. Approximately 77% reported an annual income of \$45,000 or less; 36% were married. In 87% of the dyads, neither parent nor teacher reported being Hispanic/Latino; 36% of the dyads reported the same race.

The 39 students were on average 7.4 years old ($SD = 1.6$); 70% were males. Most children (95%) lived with their biological parents. They ranged in grade from kindergarten to fifth grade; 64% were in kindergarten-through-second grades and 74% were enrolled in free and reduced lunch programs. A majority of children received speech therapy (95%) or occupational therapy (77%).

Data Collection Procedure

All research activities were approved by the university's institutional review board and school district's research review committee. After obtaining proper consents, the first author contacted parents to briefly explain the study, answer any questions, and mail a packet of surveys, which included a self-report measure of problem-solving. The first author also scheduled a dyad observation of the parent and teacher to discuss a problem and potential solution; the observation was scheduled to conform to the parent's and teacher's availability. Both members were asked to bring their respective packet of surveys to the dyad observation session. All self-report measures were completed prior to the dyad observation, and therefore, these measures were not rating the same interaction. Parents and teachers received reminder phone calls and/or emails the day before the session.

Self-report of Problem-Solving—The *Parent/Teacher Participation in Problem-Solving (PPPS/TPPS)* (Sheridan et al., 2013) scales were used for self-report assessment of problem-solving. The PPPS and the TPPS scales asks participants to think about the most recent concern they brought up with their student’s parent or child’s teacher and answer the questions about that experience using a six-point likert scale that ranged from 1 (disagree very strongly) to 6 (agree very strongly). We collapsed “agreed” or “agreed very strongly” under the “agree” column in Table 2. Internal consistency for the PPPS was $\alpha=.88$ (Sheridan et al., 2013).

Dyad observation of Problem-Solving—To observe parent-teacher problem-solving, we asked parents and teachers to have a discussion about a shared concern regarding the student. Each dyad was meeting about one student only. Parents and teachers were given seven minutes to respond to the prompt, “Discuss a problem that [insert child’s name] has at home and at school. Provide a solution that can be used in both places.” All dyad observations were conducted in the school and videotaped for coding.

Videos were coded using the *Parent-Teacher Interaction Quality Scale (PTIQ)* (Mullaney, Gill-Hraban, Sheridan, Baker, Kwon, & Daro, 2009). The PTIQ was originally developed to assess parents’ and teachers’ behavioral and psychological involvement during problem-solving. Indicators of behavioral involvement included parents’ and teachers’ specific actions that demonstrated problem-solving, such as actively defining the target concern and sharing relevant information about students’ strengths. Indicators of psychological involvement included parents’ and teachers’ perceived attitudes and perceptions, such as expressing an understanding of the demands placed on each other. Independent observers rate each item using a five-point likert scale. Internal consistency for the PTIQ was $\alpha=.85$ for parent ratings and $\alpha=.89$ for teacher ratings (Mullaney et al., 2009).

The PTIQ was revised for the present study (referred to as PTIQ-R). Revisions were made to the PTIQ based on consultation with the developer of this measure and our experiences with coding, as well as for appropriate use with parents and teachers of children with ASD. All revisions to the measure were approved by the developer of the PTIQ. The following changes were made: (1) we used a dichotomous coding scheme (yes/no) instead of a five-point likert scale; (2) behavioral involvement was broken into two components – primary (reflecting active ingredients of problem-solving, such as defining a goal) and secondary (reflecting additional components that facilitate the problem-solving process, such as sharing information on the student’s strengths); (3) one item (i.e., respected the opinions of the parent or teacher) was removed because it consistently led to disagreement between coders; (4) some items were divided into two items (e.g., “provided relevant information regarding this student’s strengths or needs” was divided into “provided relevant information regarding this student’s strengths” and “provided relevant information regarding this student’s needs”); and (5) two additional items (“shared positive affect” and “provided praise to the parent or teacher”) were added because of the importance of these items in communication for ASD. The final PTIQ-R consisted of 23 items that yielded a total score on primary behavioral involvement, secondary behavioral involvement, and psychological involvement, as well as a combined score on behavioral and psychological involvement in problem-solving.

Two independent coders were trained on the PTIQ-R in a sequential process. First, both coders and the first author (as expert coder) watched videos together and discussed examples and non-examples of the codes. Second, coders were assigned practice videos to watch independently and then discuss together with the first author. Once the coders achieved familiarity with the codes, they were assigned a separate list of videos. Each coder obtained 80% reliability with the first author. Twenty percent of these tapes were coded by both the independent coders and the first author to maintain reliability standards. These tapes were first coded individually, discussed as a group, and then completed with consensus codes. Average percent agreement on these tapes was 86.9% after consensus discussion.

Data Analysis

We computed means (and corresponding standard deviations) to answer our first research question about the extent to which parents and teachers demonstrated problem-solving. For our second research question, we were interested in the extent to which parents and teachers differed in their problem-solving behaviors during the dyad observation. To answer this question, we ran paired sample t-tests to compare parents and teachers on their mean difference on the total score in primary behavioral involvement, secondary behavioral involvement, and psychological involvement, as well as combined total score. To account for the clustering in our data (i.e., multiple parents nested in a classroom), we ran paired t-tests using Complex Samples in SPSS. We also ran McNemar's tests on the individual items that comprised these total scores. McNemar's tests with clustered data are not available in SPSS, and therefore, we present these tests without regard to nesting. We ran the prior t-tests both with and without clustering and found no differences in the magnitude or statistical significance of our findings. Therefore we chose the latter, more parsimonious method (i.e., without nesting). We also calculated the percentage difference. We used percentages to address our third research question about the extent to which parents'/teachers' observed problem-solving behaviors differed from their reported problem-solving behaviors.

Results

For the present study, we were interested in three research questions. *First, to what extent do parents and teachers demonstrate problem-solving behaviors when given an opportunity to discuss a student concern?* Parents and teachers displayed low levels of primary behavioral involvement (mean of 1.8 and 2.5 out of 7 items, respectively), moderate levels of secondary behavioral involvement (mean of 3.6 and 4.5 out of 6 items, respectively), and moderate levels of psychological involvement (mean of 6.2 and 7.0 out of 10 items, respectively).

Second, to what extent do parents and teachers differ in their problem-solving behaviors when given an opportunity to discuss a student concern? Teachers ($M = 14.0$; $SD = 2.0$) displayed more behavioral and psychological involvement (i.e., total involvement) when communicating about a problem than did parents ($M = 11.6$, $SD = 2.4$; $t(38) = 5.9$, $p < 0.0001$). Figure 1 illustrated the percent difference calculation. Percent difference was calculated by subtracting the parent mean from the teacher mean, and then dividing this number by the parent mean. A percentage difference calculation suggested that teachers score on total involvement was 21% higher than parents score on total involvement.

Teachers ($M = 2.5$; $SD = 1.3$) also displayed more primary behavioral involvement during communication than parents ($M = 1.8$, $SD = 1.2$; $t(38) = 3$, $p = 0.005$). More specifically, teachers score on primary behavioral involvement was 39% higher than parents score on primary behavioral involvement. Figure 2 shows that a McNemar's test indicated a statistically significant difference in the proportion of teachers (44%) versus parents (15%) who "created or improved upon data collection/intervention plans," $p = 0.003$.

There also was a statistically significant difference between parents and teachers on secondary behavioral involvement. Teachers ($M = 4.5$; $SD = .8$) displayed more secondary behavioral involvement when communicating about concerns than did parents ($M = 3.6$, $SD = .8$; $t(38) = 5.6$, $p < 0.0001$). We found that teachers score on secondary behavioral involvement was 25% higher than parents score in secondary behavioral involvement. A McNemar's test indicated a statistically significant difference in the proportion of teachers (84.6%) versus parents (59%) who "provided information about students' strengths," $p = 0.002$. There also was a statistically significant difference in the proportion of teachers (59%) versus parents (13%) who "provided suggestions or feedback," $p < 0.0001$.

Finally, there was a statistically significant difference between parents and teachers on psychological involvement in problem-solving. Teachers ($M = 7.0$; $SD = 1.4$) displayed more psychological involvement during communication than parents ($M = 6.2$, $SD = 1.5$; $t(38) = 3.2$, $p = 0.003$). Consistent with our other findings, teachers score on psychological involvement was 13% higher than parents score on psychological involvement. A McNemar's test indicated a statistically significant difference in the proportion of teachers (92%) versus parents (54%) who "asked questions for clarification," $p < 0.0001$.

Third, to what extent do parents' and teachers' observed problem-solving behaviors differ from reported problem-solving behaviors? In general, parents and teachers reported engaging in more elements of problem-solving than they displayed. Specifically, we examined four items on the PPPS/TPPS that were very similar to the codes on the PTIQ-R. With regard to the target concern, Table 2 shows that 89% of parents reported that they "agreed" to defining a specific concern during their last parent-teacher interaction; compared to 95% of teachers. When observed, only 18% of parents and 18% of teachers defined a target concern. A summary of observed behaviors is presented in Table 3. Further, 86% of parents reported that they "agreed" to setting goals during their last parent-teacher interaction; compared to 72% of teachers. However, only 5% of parents and 8% of teachers were actually observed to define a goal during the dyad observation.

With regard to intervention strategies, 82% of parents reported that they "agreed" to developing and using specific strategies during their last parent-teacher interaction. Similarly, 82% of teachers also reported that they "agreed" to developing and using specific strategies during their last parent-teacher interaction. During the dyad observation, 72% of parents and 90% of teachers provided evidence about the use of intervention procedures. Finally, 71% of parents reported that they "agreed" to gathering information on measuring the child's progress, during their last parent-teacher interaction; compared to 69% of teachers. However, no parents and only 13% of teachers were actually observed to provide evidence about the use of data collection.

Discussion

We investigated the extent to which parents and teachers demonstrated problem-solving, differences in problem-solving between these two groups, and whether observed problem-solving differed from reported problem-solving. Parents and teachers displayed little of the core elements of problem-solving, but moderate levels of behaviors that facilitated the problem-solving process. Teachers displayed more problem-solving than parents. Both parents and teachers reported engaging in more problem-solving than were observed during their interaction.

One probable explanation for why parents and teachers displayed low levels of the core elements of problem-solving is that teacher preparation and parent training programs often focus on student-teacher and parent-child interactions, respectively. Therefore there may be little, if any, time dedicated to training parents and teachers on research-based practices for communication (Jivanjee, Kruzich, Friesen, & Robinson, 2007; Murray, Ackerman-Spain, Williams, & Ryley, 2011). However, failure to engage in the core elements of problem-solving inhibits the development and implementation of evidence-based interventions across home and school. Misunderstandings and frustrations may occur when parents and teachers are not defining a mutual concern or developing a specific goal. Without these essential components of problem-solving, it is unlikely that parents and teachers will develop a clear and precise targeted intervention that is subsequently implemented with fidelity across home and school.

We also found that teachers discussed data collection, intervention plans, and students' strengths more often than parents. Teachers also provided more suggestions/feedback and asked more questions. Our findings are consistent with prior investigations showing that teachers speak more frequently than parents during school-based interactions (Burke, 2012; Cheatham & Ostrosky, 2011). For example during IEP meetings, parent participation has been found to be as low as 6.5 minutes in a 41.5 minute discussion (Vaughn, Bos, Harrell, & Lasky, 1988). MaClure and Walker (2000) found a general structure to parent-teacher conferences in which teachers diagnose academic or behavioral problems and prescribe recommendations. Our findings are consistent with this general structure.

There are two possible reasons why teachers may demonstrate more problem-solving than parents. One explanation is that SES, racial/ethnic, and cultural expectations affect parent behaviors. For example, Cho and Gannotti (2005) reported that Korean-American mothers were dissatisfied with professionals who marginalized their viewpoints during IEP meetings, and contributed these difficulties to differences in cultural values. In a more recent study, teachers asked parents for goals by stating their goal followed by a pause for parents to respond. However, native Spanish speaking parents did not recognize these pauses as prompts for their contribution to goal setting (Cheatham & Ostrosky, 2011). Other research has shown that Mexican-American mothers wanted to be involved in the decision-making process for their children, but were silenced by overt and covert messages that indicated their input was not valued (Salas, 2004). Our study sample was composed primarily of Caucasian/White teachers and low-SES African American/Black parents. Prior research has shown that collaborative problem-solving about a behavioral concern is particularly difficult

when the student is African American and from a low-SES family (Knotek, 2003). For example, Weininger and Lareau (2003) reported that middle-class parents were more comfortable and offered more information to teachers than working class parents.

A related reason that teachers may display more problem-solving than parents is because of different opportunities based on role delineations. According to Burke (2012), parents often assume the listening/passive role during IEP meetings because of poor role delineations. Since parents are frequently presented with finished assessment reports and treatment plans during IEP meetings, there is often limited opportunity for their feedback (Tucker & Schwartz, 2013). A history of such one-sided interactions may automatically lead parents and teachers to assume advice-recipients and advice-givers roles, respectively, even in our short semi-structured discussion. The hierarchical relationship in which teachers assume greater control is likely an impediment to establishing collaborative relationships between parents and teachers (Cheatham & Ostrosky, 2011; Kalyanpur, Harry, & Skrtic, 2000).

The third finding was that both parents and teachers reported engaging in more problem-solving behaviors than was observed during their interaction. Prior research also has documented this discrepancy between reported and observed behavior. For example, Barnyak and McNelly (2009) reported that although teachers and administrators have strong beliefs about parent involvement and its importance, their practices were not congruent with these beliefs. The authors suggested that there is a mismatch between school personnel's beliefs and practices about parent involvement. This may also be the case for the parents and teachers in our study. It is likely that parents and teachers may value a problem-solving orientation, but may not have the skills to actually engage in collaborative problem-solving. Differences in parent and teacher report versus observed behavior may also be the result of social desirability (i.e., order to be viewed positively, parents and teachers report engaging in behaviors that they think others expect of them). These results are particularly striking given that teachers are trained professionals and parents are not. With their special education training, teachers should have some experience in communicating with parents. Unfortunately, teachers rate themselves highly on problem-solving, but they cannot implement these skills when interacting with parents. Parents may have no idea whether they are engaging in problem-solving without specialized training. It is important to note that our study asked parents and teachers to report on their problem-solving behaviors before engaging in the dyad observation. Prior research has shown that having teachers report on behaviors after observation yields more accurate information (Koziol & Burns, 1986).

Although there was a discrepancy between reported and observed problem-solving behaviors for both parents and teachers, there was one element of problem-solving in which both groups showed consistency. Specifically, both parents and teachers reported using interventions for children with ASD and were observed to communicate about using specific intervention strategies. This encouraging finding suggests that parents and teachers are consistent in their reported and observed behavior surrounding the use of interventions for children with ASD. It is likely that parents and teachers of children with ASD are accustomed to reporting about and discussing interventions, and therefore, there was more consistency in this problem-solving behavior. It is important to note that our observations and the self-report of this problem-solving behavior (i.e., the use of interventions) was very

broad. Other problem-solving behaviors of interest were observed and reported on more specifically (e.g., defining a goal related to a specific concern). This is noteworthy because self-reports are less accurate when they ask about very specific behaviors (Hook & Rosenshine, 1979). Nonetheless, without proper problem-solving behaviors prior to or after discussing interventions (e.g., defining a specific concern or developing a plan to evaluate the intervention), it is unlikely that intervention strategies will be developed, implemented, and evaluated effectively across home and school.

There are important limitations to note about the present study. First, we did not code for whether one person's speech affected the behavior of the other person. According to Pillet-Shore (2015), parent-teacher discussions have more positive outcomes when the parent is the first to articulate the student concern and the teacher subsequently confirms and elaborates on the concern. Second, our measures of observed and reported problem-solving were not identical (although very similar). Further, full psychometric information is still not available for these measures. Third, we used semi-structured seven minute videotaped interactions in schools, which may have affected the extent to which parents and teachers displayed problem-solving behaviors. It is unclear whether similar patterns would emerge with longer, naturalistic observations conducted outside of the school. Fourth, our limited sample size did not allow us to examine differences in speech based on the demographic makeup of the dyads. Prior research has shown that higher SES parents make more comments during IEP meetings (Jones & Gansle, 2010). Fifth, our study design did not include a sample of parents and teachers of typically developing children. It is unclear whether parents and teachers of children with ASD would engage in a different type of problem-solving compared to parents and teachers of typically developing children. Finally, parents and teachers rated themselves on their previous interaction, and then were observed in subsequent interaction. Therefore, the self-report and observations were not rating the same interaction. It is unknown how long ago parents and teachers had the previous interaction that they rated, and this could impact their ability to be accurate reporters. It is also possible that their previous interaction was considerably different than the interaction that was observed.

Despite these limitations, the present study has important implications for parent-teacher communication about children with ASD. Our findings indicate that further research is necessary to determine the extent to which problem-solving is related to outcomes for children with ASD. It is probable that certain components of problem-solving may be more important for children's outcomes, and it is those components that should be emphasized during teacher preparation programs and parent training programs (Tucker & Schwartz, 2013). It is particularly important to emphasize communication with parents in teacher preparation programs because not all parents can be expected to go to parent training, and subsequently engage in effective communication with their child's teacher.

Skills that may be important for teachers include active listening and negotiating, as well as engaging in positive exchanges early in the interaction. Similarly, parents may need preparation and coaching to effectively engage in problem-solving with teachers. Prior research has shown that when parents attend a mini-conference about the IEP process, teachers rated them as participating more during the IEP meeting (Jones & Gansle, 2010). These training programs should focus on the core elements of problem-solving, as these

elements were particularly low for both parents and teachers. A better understanding of how to support parent-teacher communication may empower family-school partnerships, and ultimately, outcomes for children with ASD.

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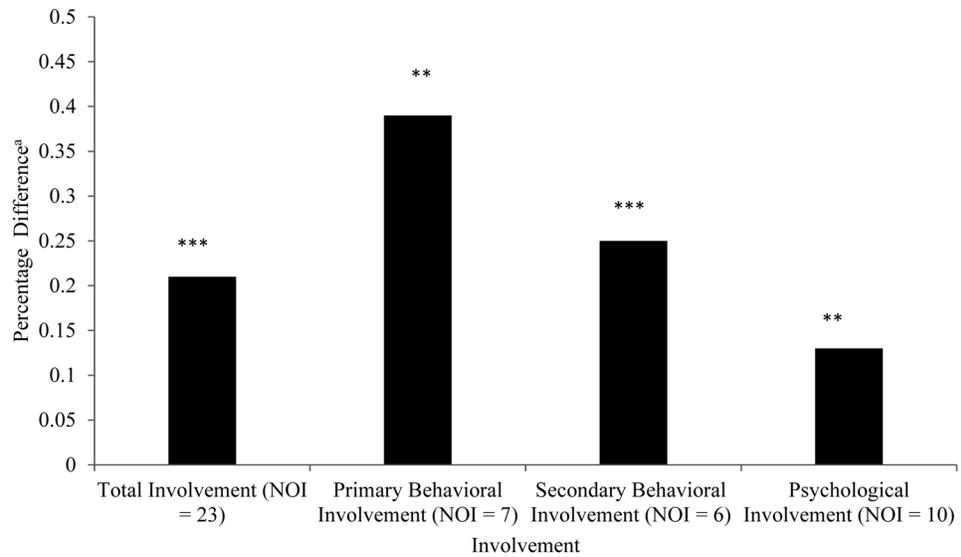


Figure 1.

Teachers' involvement relative to parents' involvement during dyad observations

Notes. NOI= Number of items. ^a Percentage Difference was calculated by subtracting the parent mean from the teacher mean, and then dividing this number by the parent mean.

** $p < .01$

*** $p < .001$

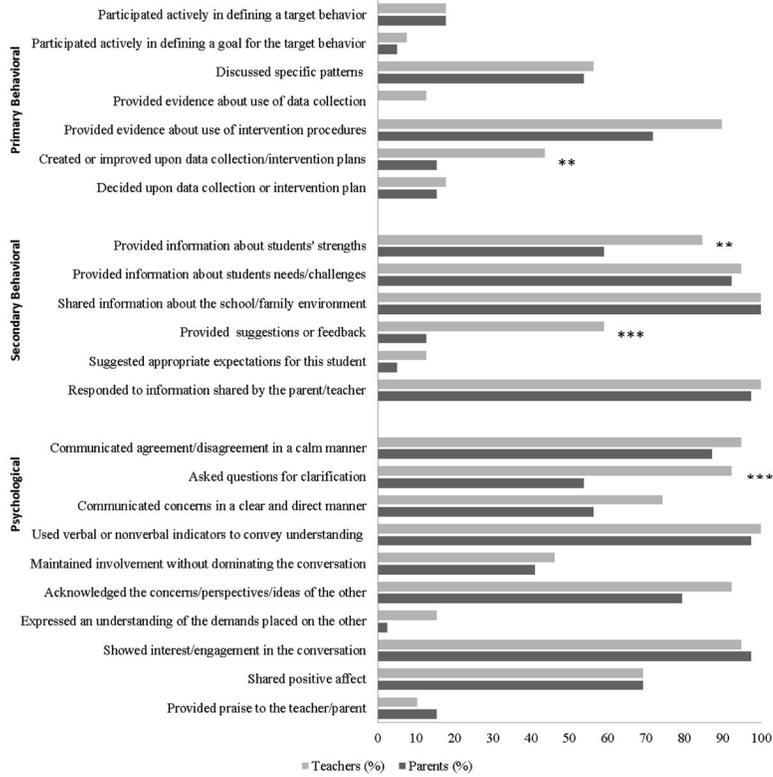


Figure 2.
 Differences between percentage of parent and teacher involvement (by items) during dyad observation
 **p < .01
 ***p < .001

Table 1

Demographic Characteristics of Teachers and Parents

Variable	Mean (SD) or Percentage
Teacher Characteristics	
Male	11.1
Female	88.9
Age (in years)	36.0 (11.3)
Caucasian/White	83.3
African American/Black	11.1
American Indian/Alaska Native	5.6
Kindergarten – First Grade	5.6
Kindergarten – Second Grade	33.3
Kindergarten – Third Grade	16.7
First Grade – Third Grade	5.6
Second Grade – Third Grade	5.6
Second Grade – Fourth Grade	11.1
Third Grade – Fifth Grade	22.2
Years Teaching in Special Education	10.3 (11.4)
Years Teaching Children with Autism	6.0 (3.4)
Parent Characteristics	
Fathers	2.6
Mothers	94.9
Other	2.6
Age (in years)	34.9 (6.2)
Caucasian/White	35.9
African American/Black	56.4
American Indian/Alaska Native	2.6
Other	5.1
Less than College	30.8
At least Some College or More	69.2
Annual Income of 45K or less	77.0
Annual Income of more than 45K	23.0
Unemployed	51.0

Table 2

Percentage of Parent and Teacher Reported Problem-Solving Behavior (i.e., components of Primary Behavioral Involvement) on the Participation in Problem-Solving Scale

	Parents (<i>n</i> = 39)	Teachers (<i>n</i> = 39)
	Agree (%)	Agree (%)
1. I defined a specific concern I have for my child.	89.2	94.9
2. I set goals for my child.	86.5	71.8
3. I developed and used specific strategies to help my child with a problem.	81.5	82.1
4. I gathered specific information to measure my child's progress.	71.0	69.3

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Table 3

Percentage of Parent and Teacher Observed Problem-Solving Behavior (i.e., components of Primary Behavioral Involvement) during the Dyad Observations

	Displayed by Parents (%)	Displayed by Teachers (%)
1. Participated actively in defining a target concern.	17.9	17.9
2. Participated actively in defining a goal for the target concern.	5.1	7.7
3. Provided evidence or verbal summaries about the use of intervention procedures.	71.8	89.7
4. Provided evidence or verbal summaries about the use of data collection.	0	12.8

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