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# The effect of a parent-implemented imitation intervention on spontaneous imitation skills in young children with autism

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## Abstract

Children with autism exhibit significant deficits in their ability to spontaneously imitate the play actions and descriptive gestures of others. Reciprocal imitation training (RIT) is a naturalistic imitation intervention designed to teach spontaneous imitation skills during play. This study assessed the effectiveness of parent-implemented RIT using a multiple-baseline design across three young children with autism and their mothers. After an initial baseline, mothers were taught to implement RIT techniques with their child twice a week for 10 weeks in a clinic setting. Two mothers were taught to use RIT to teach object imitation. The third mother was taught to use RIT to target both object and gesture imitation in a multiple-baseline design across behaviors. Generalization was assessed in the families' homes at the end of treatment and a 1-month follow-up. Parents learned to use the intervention strategies and their children exhibited increases in spontaneous imitation. These findings replicate the results from previous studies, indicating that RIT is effective for teaching imitation skills to young children with autism in a naturalistic setting and extend the findings to parents.

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*Keywords:* Autism; Intervention; Parent training; Social communication; Imitation

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A growing body of literature has demonstrated the effectiveness of teaching parents to provide intervention to their children with autism. Parent training offers several important benefits for the child and family. First, researchers have found that parent-implemented intervention leads to better generalization and maintenance of skills than therapist-implemented intervention (Koegel,

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Schreibman, Britten, Burke, & O'Neill, 1982) and may lead to more child gains in overall (Drew et al., 2002). Second, parent training has been shown to improve the quality of life for the family by decreasing parental stress (Koegel & Schreibman, 1996) and increasing leisure and recreation time (Koegel et al., 1982). Third, parent training can increase parents' optimism about their ability to influence their child's development (Koegel et al., 1982), which may help them sustain their efforts with their child over time. Finally, parent training can be very cost effective because it requires fewer hours of direct service. This benefit cannot be understated given the significant cost required to educate this population (Jacobson, Mulick, & Green, 1998). Indeed, parent training is now considered to be an essential component of quality early intervention programs for young children with autism (National Research Council, 2001).

The majority of research on parent training for children with autism has focused on interventions which teach verbal language skills (e.g., Harris, 1986; Hemmeter & Kaiser, 1994; Koegel & Schreibman, 1996). Recently, there has been an interest in training parents to teach earlier emerging, non-verbal social-communication skills to their children (Drew et al., 2002; Mahoney & Perales, 2003). This interest has been driven by developmental research indicating a relationship between non-verbal social-communication skills, particularly joint attention, and later language development (e.g., Bates, 1976; Schertz & Odom, 2004). Imitation is non-verbal social-communication skill, which is significantly impaired in young children with autism (e.g., Smith & Bryson, 1994). Imitation also emerges early in development and plays a crucial role in the development of more complex cognitive and social skills (Stern, 1985; Uzgiris, 1981). In children with autism, research has shown imitation ability to be associated with language (Stone & Yoder, 2001), play (Stone, Ousley, & Littleford, 1997), and joint attention (Carpenter, Pennington, & Rogers, 2002). Given this association, researchers have suggested that targeting imitation in young children with autism may assist in the development of social communication more broadly (Carpenter et al., 2002; Rogers, 1999; Rogers & Bennetto, 2000).

Reciprocal imitation training (RIT) is a naturalistic intervention that targets generalized, spontaneous imitation skills in young children with autism during ongoing play interactions. Previous research has demonstrated that RIT is effective for teaching both object (Ingersoll & Schreibman, *in press*) and gesture imitation (Ingersoll, Lewis, & Kroman, *submitted for publication*; Ingersoll & Schreibman, 2004). Imitation skills generalize to novel settings, materials, and therapists and maintain over time. This intervention is especially promising because it also leads to changes in other social-communication skills including language, pretend play, joint attention (Ingersoll & Schreibman, *in press*), and spontaneous gesture use (Ingersoll et al., *submitted for publication*). Given the effectiveness of RIT for teaching a broad range of social-communication skills, it appears to be an appropriate strategy to teach parents to use with their young children with autism.

The aims of this study were to assess whether parents could be taught to implement RIT with their children with autism and to determine the effectiveness of the intervention for increasing spontaneous object and gesture imitation in young children with autism.

## 1. Method

### 1.1. Participants

Three young children with autism and their mothers participated. The children were diagnosed by an outside professional with expertise in autism. Diagnoses were confirmed by the

Table 1  
Participant characteristics at intake

| Child  | Chron. age (months) | Mental age (months) | Language age <sup>a</sup> (months) | Autism severity <sup>b</sup> (mild-mod) | Object imitation <sup>c</sup> (%) | Gesture imitation <sup>c</sup> (%) | Treatment phase |
|--------|---------------------|---------------------|------------------------------------|---|-----------------------------------|------------------------------------|-----------------|
| Conrad | 31                  | 15 <sup>d</sup>     | <8                                 | 33                                      | 13                                | 6                                  | I & II          |
| Alicia | 37                  | 15 <sup>e</sup>     | <8                                 | 31                                      | 19                                | 13                                 | I & II          |
| Luke   | 42                  | 22 <sup>e</sup>     | 17                                 | 32.5                                    | 88                                | 81                                 | I, II, & III    |

<sup>a</sup> MacArthur-Bates Communicative Development Inventory.

<sup>b</sup> Childhood Autism Rating Scale.

<sup>c</sup> Motor Imitation Scale.

<sup>d</sup> Mullen Scales of Early Learning.

<sup>e</sup> Bayley Scales of Infant Development, 2nd ed.

first author using DSM-IV-TR criteria (APA, 2000). At intake, the children were administered the Bayley Scales of Infant Development, 2nd ed. (Bayley, 1993) or Mullen Scales of Early Learning (Mullen, 1995) to determine developmental age and the Motor Imitation Scale (MIS; Stone et al., 1997) to determine imitation performance in a structured setting. The children's primary caregivers completed the MacArthur-Bates Communicative Development Inventory (CDI; Fenson et al., 1993) to determine expressive language age and the Childhood Autism Rating Scale (Schopler, Reichler, DeVellis, & Daly, 1980) to determine severity of autism (see Table 1). Participants were recruited via flyers and word of mouth from service providers in the area.

Conrad was 2 years, 7 months at intake. He had a mental age of 15 months on the Mullen and a language age of less than 8 months on the CDI. He did not consistently use sounds and relied mainly on hand-leading to make his needs known. On the MIS, Conrad received an object imitation score of 13% and a gesture imitation score of 6%. Based on his difficulty with imitation of actions with objects in a structured setting, Conrad's mother was taught to use RIT to target object imitation only (Phases I and II). Conrad lived with his older brother and parents. Conrad's mother had attended 2 years of college and was currently staying at home to raise her children. During his participation in this study, Conrad received 1 h of early intervention services in the home per week. Conrad's mother had not received any parent training prior to participation in this study. She received one individual coaching session in relationship development intervention (RDI; Gutstein & Sheely, 2002) from an educational specialist towards the end of treatment.

Alicia was 3 years, 1 month at intake. Her mental age on the Bayley was 15 months and her language age on the CDI was less than 8 months. Alicia communicated mainly through gestures and used several basic signs. On the MIS, Alicia received an object imitation score of 19% and a gesture imitation score of 13%. Based on her difficulty imitating actions with objects in a structured setting, Alicia's mother was taught to use RIT to target object imitation only (Phases I and II). Alicia lived with her older brother and parents. Alicia's mother was a registered nurse and returned to work part-time halfway through their participation in the study. During the study, Alicia received 10 h of early intervention services per week in a group setting. Alicia's mother had not received any parent training prior to or during the study.

Luke was 3 years, 6 months at intake. His developmental age on the Bayley was 22 months and his language age on the CDI was 17 months. Luke primarily communicated with single words to request desired items. On the MIS, Luke received an object imitation score of 88% and a gesture imitation score of 81%. Based on his ability to imitate actions with objects in a structured setting, Luke's mother was taught to use RIT to target both object and gesture imitation (Phases I,

II, and III). Luke lived with his parents and younger sister. His mother had received a Masters in social work, but stayed at home with Luke and his sister. At the conclusion of the study, she returned to work part-time. Throughout this study, Luke received early intervention services, which consisted of 10 h in a group setting and 1 h of private speech–language therapy per week. Luke’s mother had previously received coaching in DIR/Floor Time techniques (Greenspan & Wieder, 1998) from her son’s speech therapist.

### *1.2. Setting and materials*

All baseline and treatment sessions were conducted in a small treatment room at an intervention center specializing in the treatment of children with communication disorders or at a college research laboratory. Rooms had a one-way mirror through which treatment was filmed. Five to 10 pairs of toys were provided by the parent trainer for each session. Generalization sessions were conducted in the families’ homes with their own toys.

### *1.3. Procedure*

A single-subject, multiple-baseline design was conducted across participants (Hersen & Barlow, 1976). A multiple-baseline design was also used across behaviors (object imitation and gesture imitation) for Luke and his mother. Participants attended the research laboratory 2 days per week during baseline and treatment. Baselines lengths were chosen a priori and were 2, 4, or 6 weeks. Participants were randomly assigned to different baseline lengths, and then received 10 weeks of parent training in RIT. Participants were filmed in their home twice during baseline and treatment and at a 1-month follow-up to determine generalization and maintenance of skills.

### *1.4. Baseline*

During the baseline phase, caregivers were provided with pairs of identical play materials and asked to play with their child as they did at home for 10 min.

### *1.5. Treatment*

During the treatment phase, the parent trainer, who was the first author, worked with each parent–child dyad during 30–40 min sessions to teach the parents how to use RIT techniques. At the beginning of treatment, the parent was provided with a training manual, which outlined the individual techniques of RIT. At the beginning of each session, the parent trainer presented a treatment technique. When reviewing the technique the parent trainer described the rationale behind the technique, the critical elements of the procedures, how the technique could be used at home, and answered the parent’s questions. After presenting the technique, the parent trainer modeled the procedures with the child for 5–10 min while the parent watched. While modeling, the parent trainer described what she was doing and how the child responded. After watching the parent trainer for several minutes, the caregiver took over and practiced the techniques with her child. The parent trainer provided positive and corrective feedback to the parent while the parent practiced. As training progressed, the sessions consisted mainly of parent practice and feedback.

RIT includes strategies designed to increase parent–child reciprocity and to teach the child to imitate. The intervention was implemented in three phases. During Phase I, the parent was taught to use intervention strategies designed to increase reciprocity. These strategies included

contingent imitation, in which the parent was taught to imitate her child's actions with toys, gestures/body movements, and vocalizations, and linguistic mapping, in which the parent was taught to describe objects and actions that were the focus of her child's attention using simplified language.

In Phase II, which was introduced after one week of treatment, the parent was taught to use imitation training strategies to increase object imitation while continuing to use reciprocity strategies. The parent was taught to model an action with a toy related to her child's play every minute up to three times. Models were combined with a verbal marker that described the action. The parent was also taught to prompt her child to complete the action using physical guidance, a verbal command, or gestural prompt if her child did not spontaneously imitate after the third model. Finally, the parent was taught to praise her child after the child imitated and allow her child continued access to the toys. All parent–child dyads participated in Phases I and II.

Luke and his mother also participated in Phase III, which was introduced after 4 weeks of treatment. In this phase, Luke's mother was taught to use imitation training strategies for teaching gesture imitation while continuing to target object imitation. Strategies for teaching gesture imitation were similar to those for teaching object imitation. However, the parent modeled gestures directly related to the child's play. For example, if the child threw a ball, the parent might model a pointing gesture and say, "The ball went over there."

#### 1.6. *Generalization probes*

Twice during baseline and at the end of treatment, and once at a 1-month follow-up, sessions were conducted in the families' homes to determine generalization and maintenance of skills to the home environment. During these sessions, the parent was instructed to play with her child as she typically did at home for 10 min.

#### 1.7. *Dependent measures*

All sessions were videotaped for later scoring. For baseline and generalization sessions, the entire 10 min was taped without the trainer present. For treatment sessions, the parent trainer left the room after training was complete and taped the parent while she played with her child for 10 min. Videotapes were scored for the parents' use of the RIT strategies and the children's use of spontaneous imitation. Contingent imitation and linguistic mapping were scored using 30 s interval scoring. Modeling, prompting, and reinforcement, as well as the child's use of spontaneous object and/or gesture imitation were scored using frequency data. These data were converted to a rate per minute by dividing the number of behaviors by the number of minutes observed (see Table 2).

#### 1.8. *Reliability*

Reliability data were collected on 25% of the observations. Cohen's Kappa was used to calculate reliability for the measures using interval data. Reliability for contingent reinforcement was .58 and it was .62 for linguistic mapping. These Kappa scores are considered fair and good, respectively. Pearson's  $r$  was used to calculate reliability for measures using frequency data. All correlations were significant at  $p < .01$ . The correlation for object imitation was .64, gesture imitation was .99, imitation training was .81, modeling was .72, prompting was .73, and reinforcement was .81.

Table 2  
Behavioral definitions

|                      |   |
|----------------------|---|
| Parent behaviors     |   |
| Contingent imitation | The parent imitates the child's actions with toys, gestures/body movements, and vocalizations at the same time as the child   |
| Linguistic mapping   | The parent describes what the child is attending to and/or doing using simplified language (e.g., "Dog is walking") or sound effects  |
| Imitation training   | The parent implements all three imitation training strategies correctly within a single trial   |
| Modeling actions     | The parent models an action with a toy (or a gesture) related to the child's play up to three times. Actions are paired with a verbal marker that describes the action                                      |
| Prompting            | The parent uses physical guidance, a verbal command, or gestural prompt to encourage the child to imitate the modeled action if the child does not spontaneously imitate after the third model              |
| Reinforcement        | The parent praises the child after imitating and allows continued access to the toys  |
| Child behaviors      |   |
| Object imitation     | The child imitates the parent's model of an action with a toy without physical guidance, verbal command, or gestural prompt within 10 s of the model  |
| Gesture imitation    | The child imitates the parent's model of a gesture without physical guidance, verbal command, or gestural prompt within 10 s of the model. Gestures include conventional, descriptive, or affective actions |

Table 3  
Parent satisfaction survey results

|   |     |
|---|-----|
| Intervention was simple and easy to use           | 7.0 |
| Child's object imitation skills improved          | 6.7 |
| Child's social engagement improved                | 6.7 |
| Child's play/object interaction skills improved   | 6.3 |
| Child's communication/language skills improved    | 6.7 |
| Child enjoyed intervention                        | 6.7 |
| Parent enjoyed using intervention with child      | 6.7 |
| Parent used intervention at home on regular basis | 6.7 |
| Parent would recommend intervention to others     | 7.0 |

1 = Strongly disagree; 4 = neither agree nor disagree; 7 = strongly agree.

### 1.9. Social validity

Parents of the participating children were asked to complete a parent satisfaction questionnaire at the conclusion of treatment to assess their opinion of the effectiveness of the intervention for their child (see Table 3).

## 2. Results

### 2.1. Parent behavior

#### 2.1.1. Reciprocity strategies

During baseline, Conrad's and Alicia's mothers rarely used contingent imitation, while Luke's mother used a moderate amount. All three mothers used a moderate amount of linguistic mapping

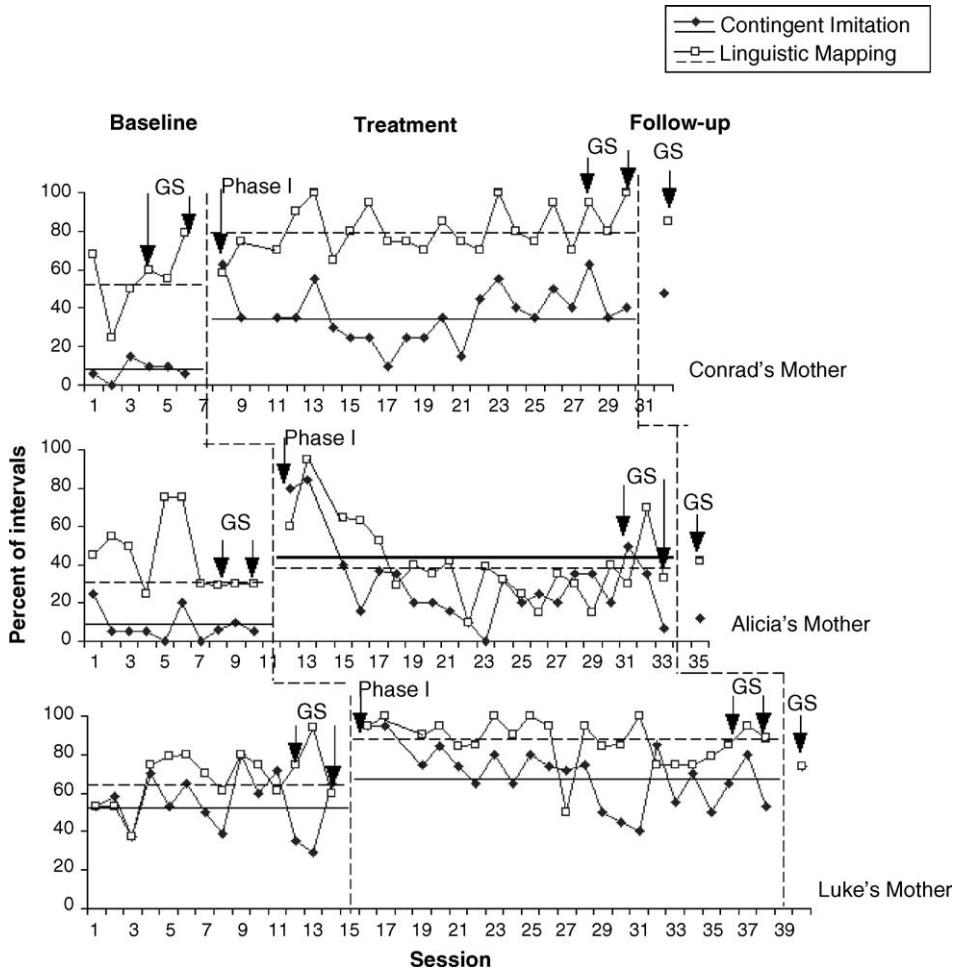


Fig. 1. Parents' use of reciprocity strategies. GS: generalization session.

prior to training. With the onset of Phase I of treatment, all three mothers increased their use of contingent imitation. Conrad and Alicia's mothers maintained this higher rate throughout treatment, while Luke's mother returned to baseline rates in Phase II. All mothers also increased their use of linguistic mapping. Conrad and Luke's mothers maintained this higher rate throughout treatment, while Alicia's mother returned to baseline rates of linguistic mapping in Phase II. At follow-up, Conrad's mother continued to use higher rates of contingent imitation and linguistic mapping, while Alicia's and Luke's mothers' use of these strategies fell between their baseline and treatment rates (see Fig. 1).

### 2.1.2. Imitation training

During baseline, Alicia's mother rarely implemented the imitation training procedure correctly. Conrad's and Luke's mothers did so at a low- to -moderate rate for object imitation. However, Luke's mother did not target gesture imitation at all. With the onset of Phase II, all



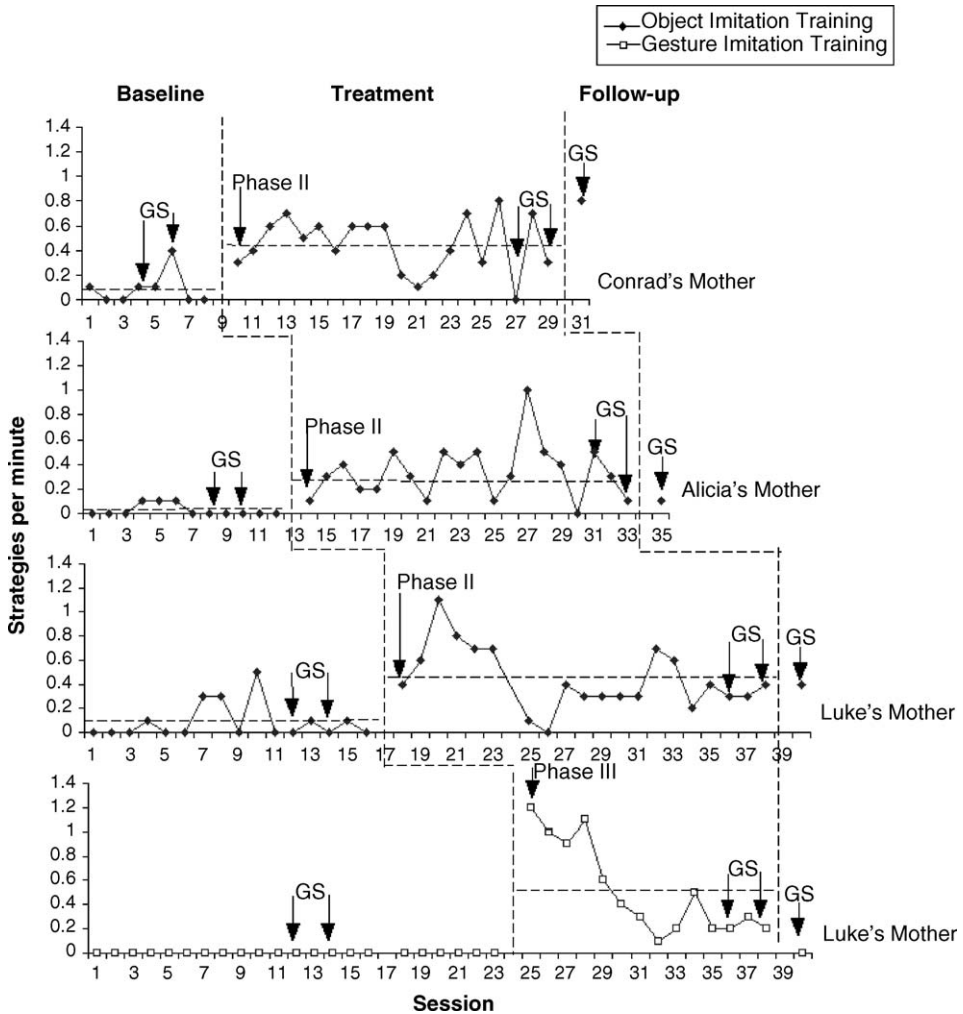


Fig. 2. Parents' use of imitation training procedure. GS: generalization session.

parents exhibited a substantial increase in their correct implementation of imitation training procedure for teaching object imitation (see Fig. 2). Alicia's mother showed a substantial increase in her use of all three individual strategies (see Fig. 3). Conrad's and Luke's mothers showed a substantial increase in their use of modeling and reinforcement and a smaller increase in their use of prompting.

With the onset of Phase III, Luke's mother increased her correct implementation of the imitation training procedure for targeting gesture imitation. During this time, she decreased her rate of object imitation trials as she focused on targeting gesture imitation. As Phase III progressed, her rate of gesture imitation trials decreased and her use of both types of trials became more balanced.

All three mothers generalized their use of the imitation training procedure to the home. Their use of the object imitation procedure maintained at follow-up; although, Alicia's mother's rate at



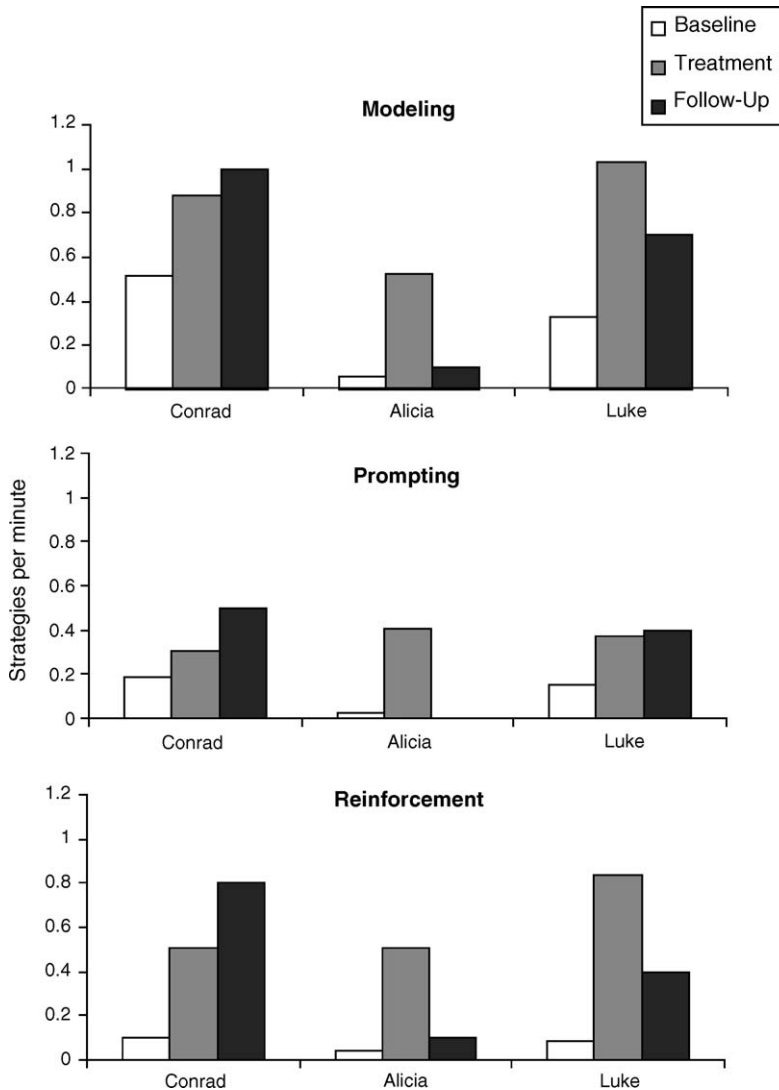


Fig. 3. Parents' average use of individual imitation training strategies for baseline, treatment, and follow-up.

follow-up was lower than that during the treatment. Luke's mother did not maintain her use of gesture imitation training at follow-up.

## 2.2. Child behavior

### 2.2.1. Object imitation

During baseline, all three children had low rates of spontaneous object imitation, imitating, on average, less than one action per 10 min session. With the onset of Phase II, all three children increased their spontaneous object imitation concurrent with their mothers' use of object

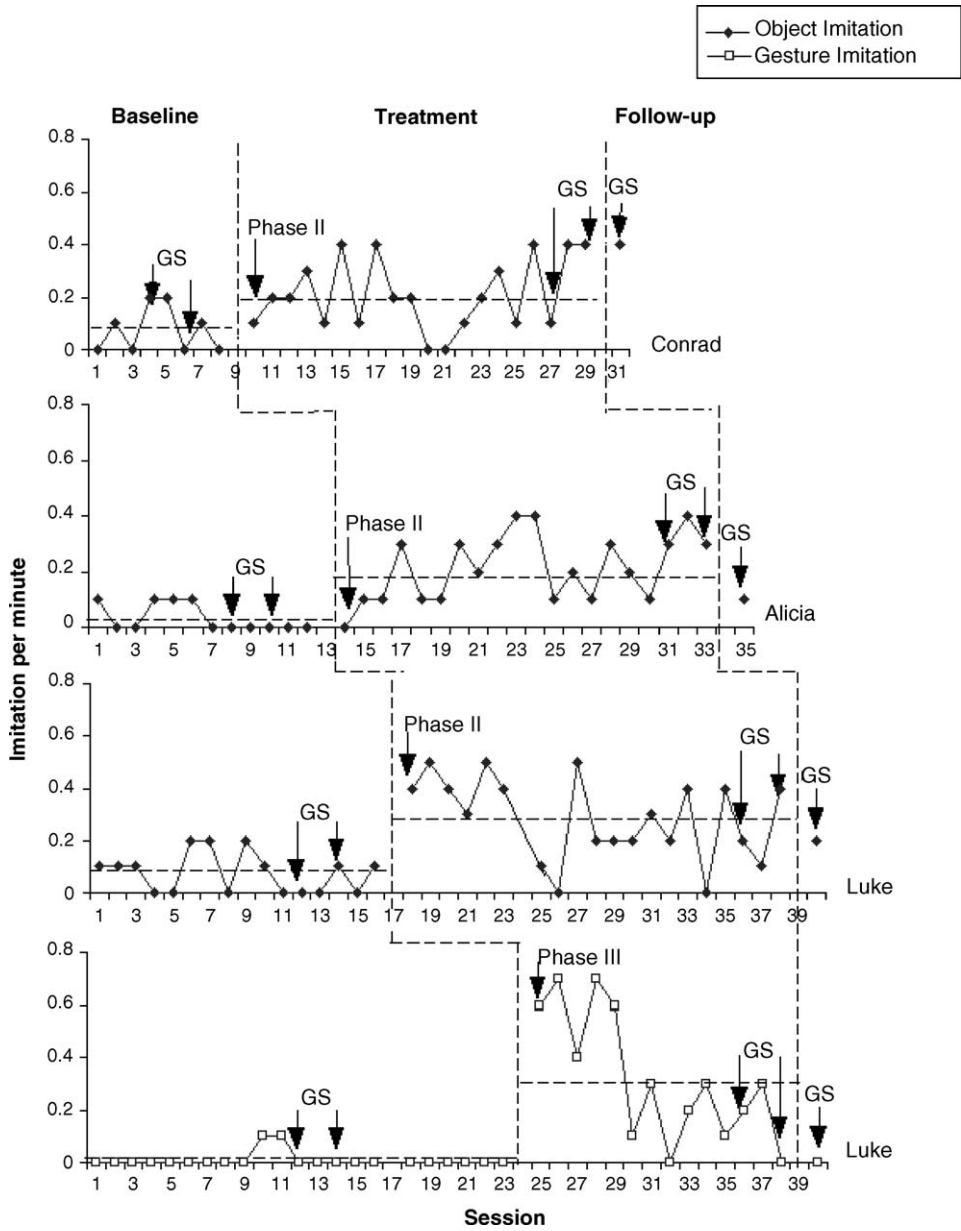


Fig. 4. Children's use of spontaneous imitation. GS: generalization session.

imitation training. All children generalized their object imitation skills to their homes and maintained their object imitation at follow-up.

### 2.2.2. Gesture imitation

Luke rarely imitated gestures during baseline or Phase II. During Phase III, when his mother was taught to use gesture imitation training, Luke increased his rate of gesture imitation

substantially. He initially exhibited a very high rate of gesture imitation concurrent with his mother's increased use of the gesture imitation training procedure. As treatment progressed and his mother began to balance her use of object and gesture imitation training trials, his spontaneous imitation with objects and gestures also became more balanced. Luke's use of gesture imitation generalized to the home during one treatment generalization session; however, it did not maintain at follow-up (see Fig. 4).

### *2.3. Parent satisfaction survey*

All three parents responded favorably on the Parent Satisfaction Survey, indicating that they found the intervention easy to use and enjoyable. They reported using the intervention at home and felt it improved their child's social-communication skills (see Table 3).

## **3. Discussion**

Parents of young children with autism can be taught to use RIT to enhance their children's spontaneous imitation skills. All parents increased their use of the intervention strategies in the clinic setting and the home, and maintained these skills at the 1-month follow-up. All children increased their object imitation and Luke increased his gesture imitation. The parents reported high levels of satisfaction with the outcomes of the intervention and the training procedure itself.

This study contributes to the parent training literature by providing additional support for parent-implemented interventions that target non-verbal social-communication skills. As improvements in diagnosis allow for earlier identification, interventions which are designed to teach earlier emerging social-communication skills are necessary. Imitation is a critical skill for young children with autism and may lead to broad improvements in social communication (Rogers, 1999). The parents in this study reported that the intervention led to positive changes in social engagement, play skills, and communication/language. Future research that demonstrates this finding empirically would provide additional support for the idea that parent-implemented RIT may lead to wide-ranging effects on social-communicative functioning.

In this study, object imitation was targeted before gesture imitation for several reasons. First, researchers have indicated that imitating actions with objects is substantially easier than imitating body movements or gestures, perhaps due to the limited range of movement that objects allow (DeMyer et al., 1972; Stone et al., 1997). Second, researchers have found that tasks which involve a direct response–reinforcer relationship are more motivating and thus easier to learn (Koegel, O'Dell, & Koegel, 1987). Imitation with objects is more likely to result in a direct response–reinforcer relationship, in that the modeled action involves the manipulation of an object and thus may be reinforcing in itself. In contrast, gesture imitation is less likely to result in such a relationship, since the modeled action does not involve an object directly. However, it is unknown whether targeting object imitation first confers any benefit over targeting object and gesture imitation simultaneously from the beginning or starting with gesture imitation. Future research should be designed to examine whether the pattern of introducing different targets affects learning outcomes for parents or children.

Although the children in this study made significant gains in their imitation skills, it is unknown whether parent-implemented RIT would lead to similar outcomes as therapist-implemented RIT. On one hand, parents spend substantially more time with their children and are thus able to implement the intervention throughout their daily interactions, increasing the number of learning opportunities. On the other hand, parents may prefer to engage in a variety of different

interactions with their child, which may, in turn, limit the number of imitation opportunities available. Indeed, the parents in this study used lower rates of reciprocity strategies and modeled fewer actions than therapists in previous studies of RIT (Ingersoll & Schreibman, in press). Future research should compare the effectiveness of RIT as implemented by trained therapists and parents to determine if one approach leads to better child outcomes.

There are several limitations to this research. First, only Luke's mother was taught to target gesture imitation due to the other children's difficulty with object imitation on the structured assessment. Thus, it is unknown whether the other mothers would have been able to learn the procedure or whether Conrad and Alicia would have been able to learn gesture imitation had it been targeted. This decision limits the conclusions that can be drawn regarding the effectiveness of parent-implemented RIT for teaching gesture imitation. Future research should examine the ability of children with different intake characteristics to learn both object and gesture imitation via RIT.

Second, although our findings indicate that generalization and maintenance were strong for object imitation, Luke's mother did not maintain her use of gesture imitation training after the treatment was discontinued. Consequently, Luke did not maintain his use of gesture imitation. This finding stands in contrast to a previous study on RIT which indicated that gesture imitation maintained over time when implemented by trained therapists (Ingersoll et al., submitted for publication; Ingersoll & Schreibman, 2004). This result may indicate that gesture imitation is more difficult for parents to implement in the natural environment or that gesture imitation requires more intervention than object imitation in order to maintain over time.

Third, given that this intervention has multiple components, it is unknown which aspects were necessary for teaching imitation. For example, during baseline, parents were instructed to play with their child as they do at home. Parents thus differed significantly in the number of actions they modeled during baseline. Once parents were taught to use RIT, they all increased the number of models they provided. This finding was especially true for Alicia's and Luke's mothers, who, during baseline, provided minimal opportunities to imitate actions with objects and gestures respectively. Therefore, it is possible that simply providing more opportunities may have increased imitation. Future research should examine which intervention components are necessary for improving imitation skills.

In conclusion, this research offers a promising intervention option that is simple and effective and can be implemented easily by parents of young children with autism. Clearly, additional studies involving more participants that represent a wider range of ages and abilities are needed to further validate the efficacy of this approach.

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## References

- American Psychiatric Association. (2000). *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision*. Washington, DC: American Psychiatric Association.
- Bates, E. (1976). *Language and Context: Studies in the Acquisition of Pragmatics*. New York: Academic Press.
- Bayley, N. (1993). *Bayley Scales of Infant Development* (2nd ed.). San Antonio, TX: Harcourt Brace & Company.
- Carpenter, M., Pennington, B. E., & Rogers, S. J. (2002). Interrelations among social-cognitive skills in young children with autism. *Journal of Autism & Developmental Disorders*, 32, 91–106.

- DeMyer, M., Alpern, G., Barton, S., DeMyer, W., Churchill, D., Hingtgen, J., et al. (1972). Imitation in autistic, early schizophrenic, and non-psychotic subnormal children. *Journal of Autism and Childhood Schizophrenia*, 2, 264–287.
- Drew, A., Baird, G., Baron-Cohen, S., Cox, A., Slonims, V., Wheelwright, S., et al. (2002). A pilot randomised control trial of a parent training intervention for pre-school children with autism: Preliminary findings and methodological challenges. *European Child & Adolescent Psychiatry*, 11, 266–272.
- Fenson, L., Dale, P., Reznick, S., Thal, D., Bates, E., Hartung, J., et al. (1993). *MacArthur Communicative Development Inventory*. San Diego, CA: Singular Publishing Group, Inc.
- Greenspan, S. I., & Wieder, S. (1998). *The Child with Special Needs*. Reading, MA: Addison-Wesley.
- Gutstein, S. E., & Sheely, R. K. (2002). *Relationship Development Intervention with Young Children: Social and emotional development Activities for Asperger Syndrome, Autism, PDD and NLD*. London: Jessica Kingsley Publishers.
- Harris, S. L. (1986). Parents as teachers: A four to seven year follow-up of parents of children with autism. *Child & Family Behavior Therapy*, 8, 39–47.
- Hemmeter, M. L., & Kaiser, A. P. (1994). Enhanced milieu teaching: Effects of parent-implemented language intervention. *Journal of Early Intervention*, 18, 269–289.
- Hersen, M., & Barlow, D. H. (1976). *Single Case Experimental Designs: Strategies for Studying Behavior Change*. New York: Pergamon.
- Ingersoll, B., Lewis, E., & Kroman, E. Teaching the imitation and spontaneous use of descriptive gestures in young children with autism using a naturalistic behavioral intervention, submitted for publication.
- Ingersoll, B., & Schreibman, L. (2004). Teaching the imitation and spontaneous use of gesture in young children with autism. *Slide presentation at the Annual Meeting of the International Meeting for Autism Research*.
- Ingersoll, B. & Schreibman, L.. Teaching reciprocal imitation skills to young children with autism using a naturalistic behavioral approach: Effects on language, pretend play, and joint attention. *Journal of Autism and Developmental Disorders*, in press.
- Jacobson, J. W., Mulick, J. A., & Green, G. (1998). Cost-benefit estimates for early intensive behavioral intervention for young children with autism: General model and single state case. *Behavioral Interventions*, 13, 201–226.
- Koegel, R. L., O'Dell, M. C., & Koegel, L. K. (1987). A natural language teaching paradigm for nonverbal autistic children. *Journal of Autism & Developmental Disorders*, 17, 187–200.
- Koegel, R. L., & Schreibman, L. (1996). Fostering self-management: Parent-directed pivotal response training for children with autistic disorder. In E. D. Hibbs, & P. S. Jensen (Eds.), *Psychosocial Treatments for Child and Adolescent Disorders* (pp. 525–552). Washington, DC: American Psychological Association.
- Koegel, R. L., Schreibman, L., Britten, K. R., Burke, J. C., & O'Neill, R. E. (1982). A comparison of parent training to direct child treatment. In R. L. Koegel, A. Rincover, & A. L. Egel (Eds.), *Educating and Understanding Autistic Children*. San Diego, CA: College-Hill Press.
- Mahoney, G., & Perales, F. (2003). Using relationship-focused intervention to enhance the social-emotional functioning of young children with autism spectrum disorders. *Topics in Early Childhood Special Education*, 23, 77–89.
- Mullen, E. M. (1995). *Mullen Scales of Early Learning: AGS Edition*. Circle Pines, MN: American Guidance Service.
- National Research Council. (2001). *Educating children with autism*. DC: Committee on Educational Interventions for Children with Autism Division of Behavioral and Social Sciences and Education National Academy Press.
- Rogers, S. (1999). An examination of the imitation deficit in autism. In J. Nadel, & G. Butterworth (Eds.), *Imitation in Infancy*. (pp. 254–279). Cambridge: Cambridge University Press.
- Rogers, S., & Bennetto, L. (2000). Intersubjectivity in autism: The roles of imitation and executive function. In A. Wetherby, & B. Prizant (Eds.), *Autism Spectrum Disorders: A Transactional Developmental Perspective* (pp. 79–107). Baltimore, MD: Paul H. Brookes.
- Schertz, H. H., & Odom, S. L. (2004). Joint attention and early intervention with autism: A conceptual framework and promising approaches. *Journal of Early Intervention*, 27, 42–54.
- Schopler, E., Reichler, R. J., DeVellis, R. F., & Daly, K. (1980). Toward objective classification of childhood autism: Childhood autism rating scale (CARS). *Journal of Autism & Developmental Disorders*, 10, 91–103.
- Smith, I., & Bryson, S. (1994). Imitation and action in autism: A critical review. *Psychological Bulletin*, 116, 259–273.
- Stern, D. (1985). *The interpersonal world of the infant: A view from psychoanalysis and developmental psychology*. New York: Basic Books Inc.
- Stone, W., Ousley, O., & Littleford, C. (1997). Motor imitation in young children with autism: What's the object? *Journal of Abnormal Child Psychology*, 25, 475–485.
- Stone, W. L., & Yoder, P. J. (2001). Predicting spoken language level in children with autism spectrum disorders. *Autism*, 5, 341–361.
- Uzgiris, I. (1981). Two functions of imitation in infancy. *International Journal of Behavioral Development*, 4, 1–12.