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Determining the Effectiveness of Reciprocal Imitation Training on Imitation Skills of Children with Autism Spectrum Disorders

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Imitation, which is one of the social communication skills such as language, play, and joint attention during early childhood period, has a learning function as letting children learn new skills and information as well as starting from infancy it has a social function as socially and emotionally making children participate in communicational give and take with a communication partner (Ingersoll, 2008). It is known that children with ASD have limitations in using imitation skills compared to their peers with typical development and children with developmental delays (Charman et al., 1997; Curcio, 1978; Dawson, Meltzoff, Osterling & Rinaldi, 1998; Heimann, Ullstadius, Dahlgren & Gillberg, 1992; Ingersoll, 2008; Libby, Powel, Messer & Jordan, 1997; Rogers, Hepburn & Stackhouse, 2003; Rogers & Pennigton, 1991; Smith & Bryson, 1994; Stone, Ousley & Littleford, 1997; Turan & Ökçün-Akçamuş, 2014). When the development of imitation skills of children with ASD is examined, it can be seen that they have limitations in imitation skills, especially the limitations in exhibiting actions with objects and gesture imitation (, Ousley & Littleford, 1997; Ingersoll, 2008, Rogers, Hepburn & Stackhouse, 2003, 2003). In addition to that, it is apparent that play skills are highly correlated with the object imitation which is one of the imitation skills as well (Ingersoll & Meyer, 2011a; Rogers, Hepburn & Stackhouse, 2003, 2003; Toth, Munson, Meltzoff & Dawson, 2006) and object imitation is the most powerful predictor of play skills (Stone, Ousley & Littleford, 1997); as well as gesture imitation is highly correlated with the expressive language skills (Ingersoll & Meyer, 2011a) and use of gestures (Curcia, 1978). Therefore, when the limitations in imitation skills of children with ASD are considered, it becomes necessary to teach imitations of actions with objects and gesture imitation skills.

When the role of the imitation skills of children with ASD play in development of other social communication skills (Ingersoll, 2008; Ledford & Wolery, 2011) are considered, in addition to supporting imitation skills in supporting language, communication, and other social interactional skills in the early development period, in planning early intervention for children with ASD the imitation as a target skill plays a critical role. It is known that imitation skills have different levels of

relationships with language, communication, and other social communication skills (i.e., joint attention, and play) (Ingersoll & Meyer, 2011b). This level of relationship has reflections in the literature of teaching imitation skills to children with ASD. It is emphasized in the studies in which the relationship of imitation skills with the social interaction and communication skills in children with ASD are examined (e.g., Luyster, Kadlec & Tager-Flusberg, 2008; Stone, Ousley & Littleford, 1997; Toth, Munson, Meltzoff & Dawson, 2006) that imitation skills might play a critical role in supporting language and communication skills and other social interaction skills in children with ASD. This role has accelerated in terms of its reflection on increasing social communication skills as RIT studies showed that before and after RIT sessions, object imitation skills (Cardon & Wilcox, 2011; Ingersoll & Shreibman, 2006); gesture imitation skills (Ingersoll et al., 2007), actions with objects and gesture skills (Ingersoll, 2010, 2012; Ingersoll & Lalonde, 2010) which are presented with RIT, increased other imitation skills such as motor imitation (Cardon & Wilcox, 2011; Ingersoll, 2010; Ingersoll & Shreibman, 2006) and *verbal imitation* skills (Ingersoll & Lalonde, 2010) as well as *joint attention skills* (Ingersoll & Shreibman, 2006; Ingersoll, 2012), communicational behaviors and vocabulary levels (Ingersoll & Shreibman, 2006), *play skills* (Ingersoll & Shreibman, 2006; Ingersoll, 2010), and *contextually appropriate language and communication skills* (Ingersoll & Lalonde, 2010; Ingersoll et al., 2007). However, since RIT is an effective teaching method in planning an early intervention for children with ASD with the purpose of supporting imitation skills as well as language, communication, and other social interactional skills, to strengthen the findings which show its effectiveness, further research studies become necessary (e.g., Ingersoll & Lalonde, 2010).

The purpose of this study was to firstly examine the effectiveness of Reciprocal Imitation Training (RIT) on a) acquisition of object and gesture imitation skills, b) spontaneous use of these skills, and c) maintenance of these skills of children with Autism Spectrum Disorders (ASD).

Method

The study group consisted of three children with ASD who were 26 to 42 months old. They were attending a private special education center. The design of this study was "Multiple Baseline Design Across Subjects." In order to assess the acquisition levels and spontaneous use of object and gesture imitation skills of children, Imitation Skills Observation Form was used. This form was coded by watching the video recordings of the researcher-child interactions in order to assess acquisition levels and spontaneous use of imitation skills. In this study, the experimental process was implemented in four phases. These were baseline, implementing RIT, post intervention assessments, and follow-up. Data

collected to show the effectiveness of the training was graphically demonstrated at the end of the study and was visually analyzed.

Findings

Firstly, having completed the RIT, the acquisition levels of children in the study group showed that at the end of the implementation all three children had critical increases in acquisition levels of object and gesture imitation skills when compared to the baseline phase. In the follow up sessions, however, there were decreases in the acquisition levels of object and gesture imitation skills for all three subjects 2 and 4 weeks after the intervention. Moreover, the findings showed that teaching object and gesture imitation skills by RIT was effective on spontaneous use of object and gesture imitation skills. In the follow up sessions there were decreases on the skills of the subjects 2 and 4 weeks after the intervention. Social validity data which was collected from parents showed that having intervention by RIT increased imitation skills, acquisition skill levels of object and gesture imitation and spontaneous use of these imitation skills of children. These findings suggest that RIT is effective for teaching object and gesture imitation skills to young children with autism. Findings were discussed in the framework of related literature about teaching imitation skills to children with ASD during early childhood period.

Discussion

In this study, as a result of RIT, at the end of the training three children in the study group have increased acquisition and spontaneous use of object imitation and gesture imitation compared to the baseline level. When the research studies in which the effectiveness of RIT on object imitation and gesture imitation for children with ASD in the early childhood were examined (Cardon & Wilcox, 2011; Ingersoll, 2010, 2012, Ingersoll & Lalonde, 2010; Ingersoll, Lewis & Kroman, 2007; Ingersoll & Schreibman, 2006), the results of them show that it was effective for increasing acquisition and spontaneous use of object imitation and gesture imitation. Therefore, the findings of this study strengthen the idea that RIT is effective on the acquisition and spontaneous use of imitation skills of children with ASD in early childhood. In addition to that, the results of this study show that RIT is effective on the acquisition and spontaneous use of imitation skills of children with ASD in the early childhood whose native language is Turkish. Therefore, these results are crucial that RIT is effective on the acquisition and spontaneous use of imitation skills of children with ASD whose native language is different than English and who are from a different culture and that it is also practical for Turkish children with ASD.

In this study, RIT was implemented using the techniques such as imitation, language mapping, modeling, cueing, and natural reinforcement likewise it was implemented in previous studies (Cardon & Wilcox, 2011; Ingersoll, 2010, 2012; Ingersoll & Gergans, 2007; Ingersoll & Lalonde, 2010; Ingersoll et al., 2007; Ingersoll & Schreibman, 2006; Ingersoll et al., 2013; Taylor, 2014; Zaghlawan & Ostrosky, 2015). In one of the studies in which the effectiveness of RIT, which consisted of imitation and language mapping techniques, was examined on acquisition of object imitation skills (Ingersoll & Schreibman, 2006), it was found that beginning with the first sessions of RIT implementation, there was an increase in imitation skills likewise it was seen in this study. It was suggested that this finding was due to using imitation and language mapping techniques and due to using these techniques in intervention sessions might have increased the possibility of children respond by accelerating imitative language use. In this regard, in terms of its reflection on teaching imitation skills, using imitation techniques might contribute to accelerating responding directed at imitation. Therefore, in this study contingent imitation technique which is included in RIT might have facilitated and maintained response rates directed at imitation. Hence, in this study, using imitation and language mapping, modeling, providing responses, and reinforcement together might have played a role in eliciting increases in the acquisition and spontaneous use of imitation skills. In previous studies related to RIT, all RIT techniques were used together that supports the viewpoint that RIT teaching significantly increases imitation skills. These findings also support the idea that presentation of RIT techniques have sensitive systematics in increasing acquisition and spontaneous use of imitation skills. In future studies, the effects of the use of modified and unmodified RIT techniques on the acquisition and spontaneous use of imitation skills can be comparatively examined.

Significant increases in the acquisition and spontaneous use of imitation skills must also be discussed in terms of types of imitation skills taught in this study. In the literature, RIT is implemented on object and gesture imitation skills (e.g., Ingersoll & Schreibman, 2006; Ingersoll et al., 2007). As a result of implementing RIT, an increase in the skills are reported in studies, and it is stated that object imitation skill facilitates the direct response-reinforcer relationship and allows for natural reinforcement (Ingersoll & Gergans, 2007), and by providing inner motivation, it increases acquisition of imitation skills (Ingersoll, 2010). Therefore, in this study especially during the implementation, the increase in the acquisition and spontaneous use and the significant increases in succeeding sessions, might have played a role in that the actions with objects and gesture imitation were chosen as target imitation skills.

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