

Feasibility of Responsive Teaching With Mothers and Young Children With Autism in Saudi Arabia

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Abstract

A randomized controlled trial was conducted to assess the feasibility of Responsive Teaching (RT) with a sample of 28 Saudi Arabian preschool-aged children with diagnoses of autism and their mothers over a 4-month period of time. RT is an early intervention curriculum that attempts to promote children's development by encouraging parents to engage in highly responsive interactions. Subjects were randomly assigned to treatment conditions: the Control group received standard community services; the RT group received weekly RT parent–child sessions in addition to standard services. Consistent with the focus of the intervention, RT mothers made significantly greater increases in Responsiveness and Affect than Control group mothers. There were also significant group differences in pre- and posttreatment measures of children's language and social and fine motor developmental scores. On average, the developmental improvements observed for RT children were 44% greater for social development, 37% greater for language development, and 24% greater for fine motor development than the improvements observed for Control group children. Implications of these findings for providing early intervention services for young children with autism and are discussed.

Keywords

early intervention, relationship-based intervention, parental responsiveness, developmental learning

Introduction

Responsive Teaching (RT) is a fully manualized Relationship-Based Intervention (RBI) curriculum which was published in 2007 (Mahoney & MacDonald, 2007). Similar to other RBI curricula, RT was derived from research on parental influences on child development. As observed with typically developing children, parental responsiveness, as indicated by contingent responding (Siller & Sigman, 2002, 2008; Yoder & Warren, 1999), reciprocity (Beckwith & Rodning, 1996), affect (Haeley, Gopin, Grossman, Campbell, & Halperin, 2010; Kim & Mahoney, 2004), and interactive match or quality of stimulation (Landry, Smith, Miller-Loncar, & Swank, 1997;

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Landry, Smith, Swank, & Miller-Loncar, 2000; Mahoney, 1988), is associated with the developmental functioning of children with disabilities. Children whose parents display high levels of responsiveness have been reported to have higher levels of cognitive (Landry, Smith, Swank, Assel, & Vellet, 2001; Mahoney, Finger, & Powell, 1985), communication (McDuffie & Yoder, 2010; Siller & Sigman, 2002, 2008), and socioemotional functioning (Kochanska, Aksan, & Carlson, 2005). These findings have been reported for children with a range of disabilities including autism (McDuffie & Yoder, 2010; Siller & Sigman, 2002, 2008).

Based on the assumption that these studies may be describing causal parental influences on child development, RBI interventions postulate that developmental functioning can be enhanced by encouraging parents to engage in highly responsive interactions with their children during daily activities and routines (Kinard et al., 2017). Most RBIs accomplish this by using Responsive Interaction (RI) strategies to coach parents on how to engage in highly responsive interactions with their children. RI strategies are suggestions for parents to accentuate various components of responsiveness including contingency (e.g., *Respond immediately to little behaviors*); reciprocity (e.g., *Take one turn and wait*); affect (e.g., *Interact for fun*); and match (e.g., *Do what my child can do*). (For a more complete list of RI strategies, go to ResponsiveTeaching.org). RBIs are similar to Natural Developmental Behavioral Interventions insofar as they emphasize parents' use of RI strategies but differ from these interventions insofar as they do not encourage parents to use incidental behavioral teaching strategies to help children learn targeted developmental behaviors and skills (Karaaslan & Mahoney, 2015; Mahoney & Solomon, 2016).

RT is a fully manualized curriculum that was designed specifically for use in early intervention programs for children with autism and other disabilities (Mahoney & MacDonald, 2007). It provides detailed descriptions of 63 RI strategies and 120 Discussion Topics that professionals can use to teach parents how to promote their children's cognitive, communication, and social emotional functioning. Six studies involving more than 200 children with developmental risks and disabilities and their parents have reported that RT is effective at both enhancing the quality of parents' interactions and improving the developmental and social emotional functioning of preschool-aged children with autism and other disabilities (Karaaslan, Diken, & Mahoney, 2013; Karaaslan & Mahoney, 2013; Mahoney, Nam, & Perales, 2014; Mahoney & Perales, 2003, 2005; Mahoney, Wiggers, Nam, & Kralovic, 2014). While the majority of these studies were conducted with parents and children from the United States, two that were conducted with Turkish mothers and children by Karaaslan and colleagues produced similar results related to parent interaction and child development, as did studies in the United States pointing to the viability of this intervention with non-Western, Muslim parents and children.

The purpose of this investigation was to assess the feasibility of RT with Saudi Arabian mothers and their preschool-aged children with autism. At least three factors had the potential to interfere with these mothers using this intervention. First RT requires parents to assume the role of the primary agent of their children's developmental intervention. Because this is not a common focus of early intervention services currently offered in Saudi Arabia, parents could have viewed this as an unnecessary burden. Second, RT focuses on modifying parents' style of interacting with their children. Not only is this an extremely personal and sensitive intervention activity that many parents find disconcerting, parents might view RT as promoting a style of parenting that is incompatible with traditional Saudi Arabian norms. Third, the child development theories which are the foundations for RT contrast with the developmental theories which underlie the behavioral instructional procedures commonly used in Saudi Arabian rehabilitation clinics and special education programs. As such, parents may view RT as not being relevant to their children's developmental needs.

To assess the feasibility of RT, a sample of Saudi Arabian preschool children with autism and their parents were randomly assigned to either an RT Treatment group in which children and parents received weekly individual RT sessions for 4 months or a No RT Control group in which

Table 1. Demographic Characteristics of Mothers and Children at Start of Intervention.

Variables	Responsive Teaching (n = 13)		Control group (n = 15)		Total sample (n = 28)		Statistics
	M	SD	M	SD	M	SD	
Mothers' characteristics							
Age (years)	38.5	3.9	37.3	4.3	37.9	4.0	0.35 ^a
Education level							1.76 ^b
Elementary	23%		7%		14%		
High school	15%		27%		21%		
Bachelors	62%		67%		64%		
Marital status (% married)	100%		87%		93%		1.87 ^b
Number of children in family	4.2	2.3	3.7	1.6	3.9	1.8	0.64 ^a
Mothers' psychosocial functioning							
Parenting stress index	278.7	12.2	270.2	31.0	273.7	25.1	0.67 ^a
% Clinically stressed	100%		87%		93%		0.48 ^b
Beck Depression Index	40.5	11.7	22.0	14.4	30.6	16.0	13.56 ^{a***}
% Clinically depressed	76.8%		13.3%		42.8%		24.3 ^{b***}
Children's characteristics							
Age (years)	3.5	0.5	3.9	0.9	3.7	0.8	1.30 ^a
% Males	84.6%		73.3%		78.6%		0.54 ^b
ADOS Total ^c	19.0	2.7	17.5	1.9	18.2	2.4	3.13 ^a
% Developmental delay ^d							
Social	70%	9	68%	15	69%	13	0.11 ^a
Language	72%	19	76%	12	74%	15	0.36 ^a
Fine motor	65%	11	59%	15	62%	14	0.15 ^a
Gross motor	28%	13	31%	16	29%	13	0.29 ^a

Note. ADOS = Autism Diagnostic Observation Scale.

^aAnalysis of variance.

^bChi-square.

^cAutism Diagnostic Observation Scale.

^dDenver Developmental Age/Chronological Age.

* $p < .05$. ** $p < .01$. *** $p < .001$.

parents received standard community services. Assessments were conducted to evaluate the effects of RT on mothers' style of interaction as well as on children's social, language, and motor functioning. This study was designed to address two questions. First, would RT mothers attain higher levels of responsive and affective interactive behaviors with their children than No RT Control group mothers? Second, would preschool children with autism in the RT group attain greater improvements in their social and language development than preschool children with autism in the No RT Control group?

Method

Subjects

Twenty-eight children with autism and their mothers were the subjects for this evaluation. As indicated in Table 1, children ranged in age from 3 to 5 years at the start of intervention. According to standard procedures, all children received a diagnosis of autism from their local health department. Diagnoses were confirmed by results from the Autism Diagnostic Observation Scale (ADOS) that was administered by a certified ADOS examiner.

Subject selection criteria. In addition to a confirmed diagnosis of autism, subjects needed to meet the following criteria to participate. Children (a) could not have any known health or physical problems that might interfere with their participating in this project and (b) could not be currently enrolled in any type of intensive behavioral early intervention program. In addition, parents were required to agree with two other conditions: (a) participate in all required child or parent intervention activities for the group to which they were assigned and (b) participate in all required assessments, including child and psychosocial assessments as well as observations of parent–child interaction. To assure that the sample would be representative of the range of children diagnosed with autism, every parent–child dyad that met the criteria specified above was eligible to participate regardless of the severity of the child’s developmental functioning.

Subject consent. This project was approved by the Institutional Review Board of King Faisal Hospital. Parents interested in participating contacted the project coordinator for additional information. Research staff described the study and discussed the benefits and risks, the tasks involved, and parents’ rights to refuse or discontinue participation without negative consequences. Parents who were eligible to participate in the study were asked to sign an informed consent letter.

Subject recruitment. Subjects were recruited from the special education and private centers for autism in Riyadh, Saudi Arabia. The main research site was Prince Nasser Center. This site had access and connection with state-sponsored and private special education centers throughout Riyadh and received applications from these centers for services. Of the 60 dyads that met subject selection criteria, 32 agreed to participate, including seven girls and 25 boys.

Parents who met eligibility criteria but refused to participate reported that they either did not have the time required to participate or did not have adequate transportation. Of the 32 subjects who participated in the study, one dropped out from the Control group and four dropped out from the RT group. Subjects who dropped out of the RT group included one family who moved to another city, one mother who developed a serious health problem, and two mothers who refused to participate in RT intervention sessions.

As indicated in Table 1, the average age of the mothers in this study was 38 years; 64% had completed college; most were married (93%); and the average number of children per family was 4. Ninety-three percent of the mothers reported clinical levels of parenting stress symptoms, and 42% reported clinical levels of depression symptoms. Most of the parents were not receiving any other intervention services for their children or themselves but were on waiting lists for services in other centers.

The mean age of the children who participated in the study was 3.7 years, and 79% were male. On average, children had moderate to severe delays in social, language, and fine motor development but only mild delays in gross motor development. In addition, children met the ADOS criteria for autism, with scores substantially above the cutoff.

Randomization procedures. Randomization was conducted with the complete sample of 32 eligible subjects. Each subject was assigned a unique identification number, and the project coordinator used a table of random numbers to assign subjects to the RT Treatment or Control groups. As reported on Table 1, group comparisons indicated no significant differences in the demographic characteristics of mothers or in the ADOS and developmental scores of the children. Group differences in the percentage of mothers reporting clinical levels of parenting stress were not significant, but there were significant differences in the percentage of mothers reporting clinical levels of depression ($p < .001$).

Intervention Procedures

Responsive Teaching. Weekly RT sessions were conducted either in parents' homes or at a center-based setting for a 4-month period of time. Intervention sessions were conducted with the parent and child together and lasted approximately 1 hr. Following the procedures prescribed in the RT manual (Mahoney & MacDonald, 2007), each session addressed one intervention objective that was related to the child's developmental concerns. The interventionist explained the objective for the session and used one to two sets of RT Discussion Points to explain how these objectives were related to the child's developmental concerns. Parents were then taught one to three RI strategies. Interventionists (a) modeled how to use these strategies while playing with the child, (b) provided coaching or feedback while parents attempted to use the strategy, and (c) occasionally used videotaped observations to provide the parents opportunities to observe themselves using strategies. At the completion of the session, interventionists collaborated with parents to develop a Family Action Plan that parents could use to follow through with intervention content at home.

Standard treatment. Parents in the Standard Treatment Control group received no RT sessions but participated in all of the required assessments at the same time as the RT group. The majority of these parents were not receiving any other intervention services for themselves or their children but were on waiting lists for services in other centers.

Training of interventionists. Three interventionists provided RT. All interventionists had bachelor's degrees, two were working in agencies for children with disabilities, and one was a mother of a child with autism. Interventionists received 2 weeks of training from one of the developers of RT related to (a) RT rationale, (b) use of RT strategies, and (c) procedures for working with parents to learn and implement RT strategies. After these training sessions, the RT Intervention Session Guide (see Mahoney & MacDonald, 2007) was used to evaluate a series of video-recorded practice intervention sessions that were conducted over a period of 6 months both to provide detailed feedback about interventionists' use of RT and to help them gain the level of proficiency that enabled them become Certified RT providers.

Prior to initiating the treatment phase of this project, interventionists received one additional week of onsite RT practicum training to address any questions they had about RT as well as to conduct preintervention evaluations of interventionists' fidelity of implementing RT.

To ensure that RT intervention sessions were fully compliant with all procedures specified in the RT Curriculum manual, interventionists were required to implement a structured sequence of RT session plans that had been translated into Arabic. These plans provided detailed instructions for addressing RT intervention objectives, RI strategies, and discussion topics. In addition, at the end of each month of the project, interventionists sent a videotaped observation of one of their intervention sessions to the RT program developers. These sessions were rated with the RT Intervention Session Guide to monitor fidelity of implementation. Prior to and throughout the project, all interventionists were rated as attaining 90% of the 24 criteria listed on the RT Intervention Session Guide.

Data Collection

Data collected for this investigation included standardized assessments of mothers' interactive behaviors with their children and child development. Child development measures were collected prior to intervention and 1 month after the completion of intervention. Assessments of mothers' interactive style were conducted 1 month after the completion of intervention only. The following describes each of the instruments used in this investigation.

Autism diagnosis. The Arabic version of the ADOS (Lord et al., 2000) was used to confirm children's diagnoses of autism. The ADOS assesses social and communication behaviors that are typically observed among children with autism spectrum disorders. Because none of the children were using phrase speech or otherwise speaking fluently, all were assessed with Module 1. The ADOS was administered by a Psychological Services assessor who had been certified by Western Psychological Services and had 6 years of experience with the ADOS.

Mothers' style of interaction. While all of the mothers had signed subject consent forms that indicated they agreed be video-recorded with their children, the majority of mothers expressed extreme reluctance after the start of the study to participate in this aspect of the study for cultural reasons. As a result, the Parenting Interactions With Children: Checklist of Observations Linked to Outcomes (PICCOLO™) developed by Roggman, Cook, Innocenti, Jump Norman, and Christiansen (2013a) was used to rate live observations of mother-child play in their homes at postintervention only.

The PICCOLO was developed and standardized for use with 2,000 parents of at-risk and typically developing children from the United States who were between 10 to 47 months of age. It assesses 29 developmentally supportive parenting behaviors in four domains—Affection (seven items), Responsiveness (seven items), Encouragement (seven items), and Teaching (eight items) from 0 (*not observed*) to 2 (*consistently observed*). Internal consistency within each of the four subscales as indicated by Cronbach's alpha averages .78, ranging from .75 to .80. Estimates of interrater reliability are reported to average $r = .74$ across all four subscales (Roggman et al., 2013b).

Although none of the children who participated in this study had developmental ages that exceeded the chronological ages of the children in the PICCOLO standardization sample, about 42% were older than 48 months. As a result, PICCOLO raw scores, rather than standardized scores, were used to assess mothers' parenting behaviors in each of the four domains.

This assessment was administered by an observer who was blind to group assignment. This observer used the PICCOLO training DVD, which includes 14 clips of parent-child interaction to establish interrater reliability. Mothers' style of interaction was rated immediately after a 20-min live observation of unstructured parent-child play.

Child development. Because standardized child development instruments are not currently available in Arabic, the Denver Developmental Screening Test II (DDST) was used to assess child development. Two previous evaluations of RT conducted in Turkey reported that the DDST was sensitive to developmental changes that occurred after 6 months of intervention (Karaaslan et al., 2013; Karaaslan & Mahoney, 2013). The DDST is a developmental screening tool for children from birth to 6 years of age. It was originally developed by Frankenburg and Dodd in 1967 and revised in 1990. It was translated and adapted for Saudi children by Al-Ansari and Bella (1998). Correlations of DDST developmental ages with mental age scores obtained from the Stanford Binet, Yale Developmental Schedule, and Bayley Scales of Infant Development range between .86 and .97 (Frankenburg, Camp, & van Natta, 1971).

The DDST consists of 125 tasks or items. It assesses four developmental domains. These include Social (getting along with people and caring for personal needs) Language (hearing, understanding, and use of language), Fine Motor (Eye-hand coordination, manipulation of small objects, and problem solving), and Gross Motor (sitting, walking, jumping, and overall large muscle movement).

A certified examiner who was blind to subjects' group assignment administered the DDST. The examiner completed most test items through direct observation of the child, although parents were asked to be informants for test items that the examiner was not able to observe.

Table 2. Postintervention Ratings on PICCOLO by Group.

PICCOLO	RT (n = 13)	Control (n = 15)	F (Group)	Effect size ^a
	M (SD)	M (SD)		
Parenting behaviors			12.39*** ^b	
Responsive	10.8 (3.5)	3.4 (3.0)	25.07*** ^c	2.01
Affect	9.8 (4.6)	5.4 (4.6)	4.76* ^c	0.93
Encourage	9.7 (4.6)	3.1 (3.3)	17.35*** ^c	1.39
Teach	7.7 (3.9)	1.6 (2.3)	23.17*** ^c	1.70

Note. PICCOLO = Parenting Interactions With Children: Checklist of Observations Linked to Outcomes;

RT = Responsive Teaching.

^aHedges's *g*.

^bMultivariate analysis of covariance.

^cAnalysis of variance.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Parent psychosocial functioning. Self-report assessments of Parental Stress and Depression were administered at the beginning of the intervention to assess mothers' psychosocial functioning.

Parenting stress. The Parenting Stress Inventory (Abidin, 1995) is a parent-report questionnaire that assesses the effects of children on parents and families. The Arabic translation of the Parenting Stress Inventory (Alabalwi, 1988) that was used in this study is a 101-item test that measures two sources of stress: Stress Related to Parent–Child Interaction and Stress Related to the Child “Difficulty.”

Depression. Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996) is a 21-question multiple-choice self-report inventory. It is one of the most widely used psychometric tests for measuring the severity of depression according to the criteria of the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*; American Psychiatric Association, 1994). The BDI-II is designed for individuals aged 13 years and over and is composed of items relating to symptoms of depression such as hopelessness and irritability, cognitions such as guilt or feelings of being punished, as well as physical symptoms such as fatigue, weight loss, and lack of interest in sex. Participants are asked to rate the severity with which they experienced each symptom on a 4-point Likert-type rating scale. The Arabic version of the BDI-II used in this study was standardized by Gharib Abdel Fattah from Egypt. Test–retest reliability is $r = .90$.

Results

Analyses were conducted to examine group differences on both mothers' style of interaction and children's development.

Mothers' Style of Interaction

Table 2 reports mothers' mean raw scale scores for each of the four subscales of the PICCOLO at postintervention. A multivariate analysis of covariance (MANCOVA) was used to assess group differences at posttest controlling for children's chronological age. Results indicated highly significant group differences in mothers' interactive behavior with their children ($p < .000$). Univariate analyses indicated that RT mothers had significantly higher scores on all four PICCOLO subscales including Responsive ($p < .001$) and Affect ($p < .05$) as well as Encourage

Table 3. Pre–Post DDST Developmental Ages by Group.

Denver Developmental Screening Test	Responsive Teaching (<i>n</i> = 13)				Control group (<i>n</i> = 15)				<i>F</i> (Time)	<i>F</i> (Time × Group)	Effect size ^a (Time × Group)
	Pre		Post		Pre		Post				
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
DDST									1.35	44.58*** ^b	
Social age	13.0	4.8	19.8	5.2	14.0	5.8	15.1	6.8	0.65	51.11*** ^c	2.44
Language age	12.2	9.4	18.1	9.5	11.1	6.8	12.3	6.9	0.57	47.77*** ^c	2.58
Fine motor age	15.1	6.0	19.3	7.6	18.3	5.9	19.1	5.1	1.16	8.90*** ^c	1.14
Gross motor age	30.2	4.1	31.2	4.9	30.1	4.2	32.0	5.3	1.15	0.01 ^c	0.10

Note. DDST = Denver Developmental Screening Test.

^aHedges's *g*.

^bMultivariate analysis of covariance.

^cAnalysis of variance.

p* < .05. *p* < .01. ****p* < .001.

and Teach (*ps* < .001) than did Control mothers. Intervention effect sizes as measured by Hedges's *g* were in the large range for Encourage and Affect and the very large range for Teach and Responsive.

Child Development

DDST developmental age scores from both pre- and postintervention are reported on Table 3. A repeated measures MANCOVA controlling for children's chronological age was used to assess the overall effects of Treatment on children's DDST scores. Repeated measures analyses of covariance (ANCOVAs), which controlled for children's chronological age, were used to assess group differences on each of the four DDST subscales.

Results from the MANCOVA indicated that RT children made significantly greater improvements on the DDST than Control group children (*p* < .001). Results from the ANCOVAs indicated further that RT children made significantly greater improvements than Control group children on the Social, Language (*ps* < .001), and Fine Motor (*p* < .01) subscales but not on the Gross Motor subscale (*p* > .05). Intervention effect sizes as measured by Hedges's *g* ranged from very large for Language and Social development to large for Fine Motor. On average, the developmental improvements observed for RT children were 44% greater for Social development, 37% greater for Language development, and 24% greater for Fine Motor development than the improvements observed for Control group children.

Discussion

The purpose of this investigation was to assess the feasibility of RT with Saudi Arabian mothers and their preschool children with autism. In the introduction, we described three factors that might interfere with the ability of Saudi Arabian mothers to implement RT. These included mothers' (a) reluctance to assume the primary role of their child's interventionist, (b) discomfort with the RT focus on responsive parenting, and (c) skepticism regarding the theoretical foundations of RT.

Yet, despite these potential impediments, results from this investigation indicated that RT was extremely effective with both mothers and children. First, RT was highly effective at encouraging mothers to modify their style of interacting with their children. On average, postintervention PICCOLO ratings of mothers' interactive style were more than 3 times greater for RT mothers

than for Control group mothers. More importantly, RT encouraged mothers to make substantial improvements in their responsive and affect behaviors, which are arguably the two most important parenting qualities that impact the developmental well-being of young children with autism (Kinard, Sideras, Watson, et al., 2017).

Second, there were dramatic improvements in the social, language, and fine motor development for children in the RT group. Results regarding children's social and language development are particularly noteworthy because these improvements directly address two of the core developmental deficits associated with autism. Even though this study involved a brief intervention, lasting only 4 months, RT children made average improvements across these developmental domains that were 40% greater than the improvements made by Control children. Furthermore, improvements in social development occurred for all RT children, while improvements in language development occurred for all but one.

Comparison With Other RT Studies

Results observed in this study were remarkably similar to results from two randomized controlled trials (RCTs) conducted with preschool children with disabilities in Turkey (Karaaslan et al., 2013; Karaaslan & Mahoney, 2013). Similar to this study, these RCTs were conducted over a 4- to 6-month time period and used the DDST to assess child development intervention effects. However, this study differed from the Turkish studies in terms of the disabilities of the children (e.g., autism vs. Down syndrome, autism and general developmental delay) as well as the measures and procedures used to assess mothers' interactive style. Yet similar to findings reported by Karaaslan and colleagues, this study reported robust RT effects on mothers' style of interaction, particularly associated with increases in responsiveness and affect. Furthermore, RT effects on children's language and social development that were observed in this study were even greater than the developmental effects observed in the Turkish studies.

It should also be noted that this study is the first RCT of RT conducted solely with children with autism. Yet similar to results from a quasi-experimental evaluation of RT that was conducted with a sample that included 28 children with Pervasive Developmental Disorders (Mahoney & Perales, 2005), this study reported large RT effects on children's language and social development competence.

Adopt Versus Adapt

When this research project was initiated, a major question was whether RT could be implemented with Saudi Arabian mothers and children in the same way that it was implemented in the United States, or whether RT procedures or intervention objectives needed to be adapted to the unique cultural and child rearing traditions of these parents.

We were unaware of any published research describing parenting with young children in Arabic societies using observations and ratings of parent-child interaction similar to those employed in this investigation. Yet surveys of adolescents from several Arabic countries, including Saudi Arabia, indicated that Arabic parents tended to use an authoritarian style of parenting (i.e., Baumrind, 1975). Arabic adolescents reported that their parents were strong regulating authorities in their lives who focused on restricting their autonomy and rarely used affection, praise, or words of comfort with them (Dwairy, Achoui, Abouserie, & Farah, 2006; Dwairy, Achoui, Abouserie, Farah, Ghazal, et al., 2006). While it is unclear how this general approach to parenting might translate to Arabic parents' style of interacting with younger children, we were concerned that the mothers who participated in this study might have viewed RI strategies, especially those that encouraged them to display high levels of warmth and affection as well as to let their children make their own decisions and regulate their own activities, to be promoting a style

of interaction that was incompatible with traditional Saudi Arabian parenting practices. However, the large effects of RT on the parenting style of the mothers who completed this intervention provided support for the notion that this intervention could be adopted in Saudi Arabia in its original format.

Nonetheless, the fact that two of the four parents who dropped out of this study refused to participate in RT sessions, as well as the fact nearly one half of the parents who were eligible for the study refused to participate after receiving additional information about RT, raises the question as to whether these parents either agreed with, or understood, the notion that they could play a major role in their children's intervention.

To the extent this might be true, we believe that this problem is neither unique to RT nor to Saudi Arabia, but rather may be a common reaction to parent-mediated intervention, especially in countries or regions in which professionally implemented interventions prevail. Although early intervention services in the United States have been strongly associated with the concept that parents can, and do, play a major role in supporting their children's development, this notion has only recently gained widespread acceptance in services for children from birth to 3 years of age and is only a minor focus of services for preschool-aged children (Mahoney, Wheeden, & Perales, 2004). Clearly, parent-mediated interventions such as RT are likely to attain widespread acceptance only if early intervention service systems make concerted efforts to provide parents and professionals resources that help them understand the logic and benefits of this type of intervention.

Limitations and Implications

There were a number of limitations of this study that must temper enthusiasm regarding the outcomes reported above. First, the sample was relatively small and unrepresentative of the general population of parents and young children with autism in Saudi Arabia. This limitation was attributable both to the difficulty of identifying subjects who were interested in participating in the study and to the limited resources the study had to actually conduct the intervention.

Second, there was a 24% attrition from the RT group as well as a 7% attrition from the Control group. Although there were no significant demographic differences between the parents and children in the RT and Control groups who completed this study, subject attrition may still have compromised the integrity of our randomization procedures.

Third, the study was conducted for only a 4-month period of time. It is important to examine the long-term outcomes of this intervention. At this time, we cannot be confident that findings reported from this investigation would sustain over longer periods of time. This is a crucial consideration because the purpose of early intervention is to produce long-term, as opposed to short-term, effects on the developmental functioning and well-being of children.

Fourth, there were a number of methodological limitations that call into question the reliability of our results. These included (a) live rather than video-recorded observations of parent-child interaction that were conducted at postintervention only, (b) the use of a child development screening instrument as opposed to a standardized measure of child development, and (c) limited assessments of fidelity of implementations. As a result, results from this study must be considered to be "suggestive" rather than "conclusive" and as such do not support the efficacy of RT. Yet given the fact that subjects were randomly assigned to treatment and control groups, and that RT intervention effects were robust and paralleled those reported in other studies, findings from this study clearly support the "feasibility" of RT, at least with certain populations of Saudi Arabian mothers and their preschool children with autism.

Yet insofar as findings from this study might be replicated in future investigations with better research methods as well as larger and more diverse samples of parents and children, such results would have major implications for young children with autism and their parents in Saudi Arabia

as well as other countries that are striving to develop their early intervention service systems. RBIs such as RT can be implemented at a fraction of the costs of Intensive Behavioral interventions (Solomon, Van Egeren, Mahoney, Huber, & Zimmerman, 2014) primarily because they require considerably fewer professional personnel. In fact, the average cost of RT per child in this study was approximately \$1,500. Future evidence to support this relatively inexpensive intervention would increase the likelihood that Saudi Arabia and other countries that do not yet provide universal early intervention services would be more willing to make the financial commitment needed to realize this critical goal.

Declaration of Conflicting Interests

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