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# How Depressive Symptomatology of Mothers of Children with Pervasive Developmental Disorders Relates to their Participation in Relationship Focused Intervention

## Abstract

*This descriptive, exploratory study investigated whether the depressive symptoms of mothers of young children with Pervasive Developmental Disabilities (PDD) was associated with their participation in a relationship focused intervention. Nineteen parent-child dyads received weekly Responsive Teaching (RT) intervention sessions for 10 months. Results indicated significant pre-post differences in parents' responsiveness with their children as well as children's development and social emotional functioning. Changes in mothers' responsiveness accounted for between 5 to 26% of the variance in intervention changes in children's development and social emotional functioning. While mothers' depressive symptoms were not associated with intervention changes in responsiveness, they were negatively associated with intervention changes in children's development and social emotional functioning. Results are discussed in terms of their implications for early intervention practice.*

*Keywords: Early intervention, Children with Autism Spectrum Disorders, Relationship, Focused Intervention, Parental Responsiveness, Parenting Depression*

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## How Depressive Symptomatology of Mothers of Children with Pervasive Developmental Disorders Relates to their Participation in Relationship Focused Intervention

Numerous investigations have reported that mothers of children with autism spectrum disorders (ASD) experience higher levels of depression than either mothers of typically developing children or mother of children with other disabilities (Abbeduto, et. al., 2004; Beck, et. al., 2004; Gupta, 2007; Singer, 2006). While many of these studies have been reported with mothers of school aged children, there is considerable evidence that depression is also experienced by mothers of toddlers and preschool aged children with autism as well. For example, a recent longitudinal study of 143 mothers of toddlers with confirmed diagnoses of autism (Carter, et. al., 2009) reported that 35% of the sample displayed clinical levels of depressive symptoms when children were less than 3 years of age, and 42% displayed clinical depressive symptoms two years later.

Despite the large number of investigations related to the psychosocial consequences of having a child with autism, there has been little, if any, research on how depression impacts both parents' ability to care for their children and their effectiveness at participating in parent-mediated early intervention. Presumably depression, particularly clinical levels of depression, has similar effects on mothers of children with autism as on mothers of any other children. That is, depression likely has a debilitating effect on mothers' general mood and quality of life (Zablotsky, et. al., 2013). In addition, it is also likely to have a negative influence on mothers' ability to interact with their children, not only making it more difficult to engage with them (Campbell, et. al., 1995; NICHD Early Child Care Research Network, 1999) but also interfering with their capacity to interact sensitively and responsively (Kurstjens & Wolke, 2001). Mothers who are highly depressed likely over-react or otherwise react negatively to their children's crying or acting out behaviors (Field, 2002; Murray, et. al., 1996), thereby exacerbating rather than calming or soothing their children.

While depression does not appear to affect parents' decision to seek early intervention (EI) (Feinberg, et. al., 2012), research has yet to be reported regarding how depression affects parents' ability to play a central role in EI. Yet, during the past 10 years federal legislation (Individuals with Disabilities Education Act [IDEA], 2004) has emphasized that EI professionals encourage all parents, including parents of children with autism, to be active participants in their children's intervention. Thus professionals are being encouraged to help parents learn and use intervention strategies that both enhance their ability to care for their children and increase their effectiveness at addressing their children's developmental needs, as opposed to providing direct services to children. This emphasis was derived from family centered service philosophy (Sandall, et.al, 2005) which entails a wide range of propositions including: promoting child development and welfare within the family unit and strengthening the capacity of caregivers to care for their children (Winton, et. al., 2008). It also reflects the accumulating evidence regarding the central role that parents play in the early

development of children, even when they have disabilities such as autism (Mahoney and Nam, 2011).

In this descriptive, exploratory study we examine how maternal depression is associated with the ability of mothers of children with Pervasive Developmental Disorders (PDD) to participate in a relationship focused early intervention called Responsive Teaching [RT (Mahoney & Macdonald, 2007). This manualized intervention curriculum is designed to enhance children's development by coaching parents to engage in frequent and highly responsive interactions with their children. This is accomplished by teaching parents to use responsive interaction (RI) strategies that emphasize one or more components of responsive behavior [e.g., Contingency: (e.g., Imitate my child's actions and communications); Reciprocity: (e.g., Take one turn and wait); Non-Directiveness: (e.g., Follow my child's lead); Affect: (e.g., Act as a playful partner); Quality of Stimulation (e.g., Expand to clarify my child's intention or develop my child's topic). (see [www.Responsiveteaching.org](http://www.Responsiveteaching.org) for a more detailed list of RI strategies)

Previous evaluations of RT, which have included children with PDD, have indicated that this intervention can be effective both at enhancing maternal responsiveness and promoting children's development and social emotional functioning (Mahoney & Perales, 2003; 2005; Kaaraslan et. al., 2013; Kaaraslan & Mahoney, 2013). Yet, in many of these evaluations there has been considerable variability in the degree to which mothers modified their interactions with their children, with as many as 30 percent of the mothers making no changes in responsiveness even after 12 months of intervention (e.g., Mahoney & Perales, 2005). This variability is a critical issue insofar as the impact of relationship focused intervention on children's development is associated with the ability of mothers to learn responsive interaction strategies. This has been demonstrated not only in RT (e.g., Kaaraslan, et. al., 2013, Mahoney & Perales, 2005) but in other similar interventions as well (Aldred, et. al., 2012; Coolican, et al., 2010). When parents do not increase their responsiveness while participating in relationship focused interventions, children make little or no improvements in their development or social emotional functioning.

In this study parents and children with PDD who were less than 3 years of age received weekly RT interventions over a 10 month period of time. The purpose was to investigate whether high levels of depressive symptoms might either compromise mothers' ability to learn RI strategies, or mitigate the effects of responsiveness on children's intervention outcomes. Consistent with previous RT research we hypothesized that the developmental and social emotional outcomes that children attained during intervention would be associated with intervention changes in mothers' responsiveness. In addition, because depression has been reported to have a negative impact not only on mothers mood, but also on the frequency and quality of their interactions with their children, we hypothesized that high levels of depressive symptoms would mitigate both the ability of mothers to enhance their responsiveness, and have a negative effect on children's intervention developmental and social emotional outcomes.

## Methods

### *Sample*

A convenience sample included 19 mother–child dyads in which children were suspected or recently diagnosed as having ASD and were under four years of age. Subjects were recruited through project flyers sent to physicians and other professionals who come in early contact with parents and children with ASD. Demographic characteristics of the mothers are presented in Table 1. Their average age was 33.3 years and most were Caucasian (84%) and married (95%). Sixty eight percent of the mothers had completed college, but less than one-half (37.2%) were working either part- or full-time. The majority (60%) came from families that had incomes greater than \$60,000 per year.

Parenting stress (Parenting Stress Index Short Form; PSI SF) and depression scores [(Center for Epidemiological Studies – Depression Index) CES D] which are reported in Table 1 indicated these mothers had high levels of psychological distress. The mean PSI SF Total Score was 4 points above the clinical cutoff, with 10 of the 19 mothers (53%) having scores in the clinical range. While the mean CESD score was below the clinical cutoff, 8 of the mothers (42%) had scores in the clinical range.

**Table 1.**  
*Characteristics of mothers*

<b>VARIABLE</b>	<b>Mean</b>	<b>SD</b>
Mothers' Age Time 1 (Years)	33.3	3.4
Mothers' Education		
High School	16%	
Associate Degree	16%	
Bachelor Degree	26%	
Graduate Degree	42%	
Marital Status (% married)	95%	
Race (% Caucasian)	84%	
Employed (%)		

<b>VARIABLE</b>	<b>Mean</b>	<b>SD</b>
Part Time	32%	
Full Time	5%	
Family Income Level		
Under \$40,000	16%	
\$40-60,000	21%	
Over \$60,000	63%	
Maternal CESD	13.3	8.6
Maternal PSI-SF Total	88.7	17.9

Children's demographic characteristics are presented in Table 2. Their average age was 2 1/2 years at the start of the study ( $M_{CA} = 30.3$  months) and almost three fourths (74%) were boys. Twelve of the children received preliminary diagnoses of ASD from physicians (i.e., developmental pediatricians and/or neurologists) while the others received ASD diagnoses from psychologists. Although children's diagnoses were not confirmed by assessments such as the Autism Diagnostic Observation Schedule, their level of social emotional functioning as indicated by their overall scores on the Temperament and Atypical Behavior Scale (TABS) (Bagnato, et. al., 1999) as well as their level of cognitive and communication functioning were highly compatible with the DSM-IV criteria for ASD (American Psychiatric Association, 2000). That is, children's average total score on the TABS was more than three standard deviations below the mean ( $M = 54.7$ ) indicating clinically significant social emotional or regulatory disorders. In addition, children's developmental and language quotients averaged approximately two standard deviations below the mean, indicating mild to moderate levels of developmental and communication delays.

**Table 2**  
*Characteristics of children*

<b>VARIABLE</b>	<b>Mean</b>	<b>SD</b>
Child's Age Time 1 (Months)	30.3	10.8
% Males	74%	
Developmental Quotient T1 <sup>1</sup>	69.3	22.5
Communication Quotient T1 <sup>2</sup>	72.5	12.9
Social Emotional Characteristics		
Detached <sup>3</sup>	17.5 <sup>a</sup>	20.9
Hypersensitivity/ Hyperactivity <sup>3</sup>	41.5 <sup>a</sup>	15.9
Under-reactive <sup>3</sup>	32.8 <sup>a</sup>	21.1
Dysregulated (TABS) <sup>3</sup>	42.2 <sup>a</sup>	16.5
Overall Atypical Behavior <sup>3</sup>	54.7 <sup>b</sup>	38.0

### *Procedures*

Subjects received individual parent-child intervention sessions which were based upon the RT curriculum (Mahoney & MacDonald, 2007). Sessions were conducted by RT certified interventionists and were provided either in family's homes or at a center based facility. Each session lasted approximately 45 minutes.

RT is organized around 16 pivotal behaviors that are used to enhance children's cognitive, communication and social emotional functioning (see [www.Responsiveteaching.org](http://www.Responsiveteaching.org) for a more detailed description). The pivotal behaviors that are targeted as intervention objectives are those behaviors that are most directly related to the child's developmental needs as indicated on their IFSPs or IEPs and/or as expressed by their parents. During RT sessions interventionists discussed the pivotal behaviors that were the intervention objectives for the child; introduced one or two RI strategies that parents could use to promote these behaviors; demonstrated the strategies

with the child; coached parents in their use of RI strategies: and developed a plan for parent follow through.

Dyads were scheduled to participate in one session each week for 10 months. However, due to vacations, sickness, and holidays they received an average of 28.2 sessions during the study.

### *Measures*

Child and family assessment data were collected before intervention and after completing 10 months of intervention.

Because several children were older than 42 months at the pre- assessment, two different tests were used to assess children's developmental ages (DA). DAs were converted to ratio developmental quotients using the formula  $[(DA/CA) * 100]$ .

The Bayley Scales of Infant Development, 2nd Edition (Bayley, 1993) was used to assess children who were less than 42 months of age. This scale is considered to be one of the most valid measures of infant development (Harris, et. al., 2005; Koseck, 1999) and has been used successfully in early intervention efficacy studies of young children with autism and other disabilities (e.g., Mahoney & Perales, 2005; Sallows, et. al., 2005). Average interrater reliabilities are .88, and test-retest reliabilities exceed .90. Studies of its predictive validity indicate that 2-year old Bayley scores are highly associated with preschool IQ scores.

The Battelle Developmental Inventory (Newborg, et. al., 1984) is an individually administered standardized measure of child development for preschool aged children up to 8 years of age. It measures five developmental domains: personal-social, adaptive, motor, communication, and cognition. It was standardized on a nationally representative sample of children and has high levels of test- retest and interrater reliability. The Battelle is highly correlated with the Bayley Scales of Infant Development ( $r_s = .81$  to  $.90$ ).

The Vineland Adaptive Behavior Scale, 2nd Edition (Sparrow, et. al., 2005) was used to assess children's communication. The Vineland is a parent report instrument that provides estimates of children's functioning across four domains: Communication; Daily Living; Socialization; and Motor Skills. Correlations between Vineland scores and other adaptive behaviors scales and intelligence tests range from .40 to .70.

The Temperament and Atypical Behavior Scale (TABS) (Bagnato, et. al., 1999) was used to assess children's social emotional functioning. This scale assesses problem behaviors of children between one and six years of age. It is a parent respondent instrument with 55 items that measure four factors: Detached, Hyper-Sensitive/Active, Under-Reactive, and Dysregulated. The corrected split-half reliability for the TABS is .95 for children with disabilities.

Following procedures that are commonly used to assess parent-child interaction (c.f., Mahoney & Nam, 2011), children and mothers were video recorded playing together for seven-minutes with a standard set of developmentally appropriate toys. Mothers' style of interaction was rated from these videotapes with the Maternal Behavior Rating Scale (MBRS) (Mahoney, et. al., 1986; Mahoney, 1992). The MBRS is a twelve item scale that assesses four dimensions of interactive style: Responsiveness, Affect, Achievement Orientation, and Directiveness. Research indicates that the MBRS assesses parenting characteristics associated with children's developmental growth; that ratings on the scale are stable over time for parents who are not involved in parenting interventions (Mahoney & Bella, 1998); and that this scale is sensitive to changes in interaction promoted through relationship focused interventions (Kaaraslan, et. al., 2013; Mahoney & Perales, 2005; Solomon, et al., 2014).

Two instruments were administered to assess the psychological status of mothers: the Parenting Stress Inventory -Short Form [PSI SF (Abidin, 1995 - 3<sup>rd</sup> Ed.)] and the Center for Epidemiologic Studies Depression Scale (CES-D) (Radloff 1977).

The PSI-SF is a 36 item self-report questionnaire that assesses the effects of children on parents and families. It has three subscales (parental distress, difficult child, and dysfunctional parent-child interaction) and a Total Stress Index. Internal consistency for the Total Stress Index is .91, and for the subscales are: (a) .87 for Parental Distress; (b) .80 for Parent-Child Dysfunctional Interaction; and (c) .85 for Difficult Child (Abidin, 1995).

The CES-D is a self-report scale designed to measure depressive symptomatology. It has 20 items that assess common behaviors associated with depression including: depressed mood, feelings of worthlessness and hopelessness, loss of appetite, poor concentration, and sleep disturbance. Cronbach's alpha is high, generally around 0.85 in community samples and 0.90 in psychiatric samples. Validity has been established by patterns of correlations with other self-report measures as well as by correlations with clinical ratings of depression.

Responsive Teaching Intervention Service Logs were used to document the services that each family received. After each intervention session, service providers completed logs indicating: (a) the strategies discussed during each intervention session; (b) Intervention Topics; (c) follow-up activities mothers were asked to implement at home; and (d) mothers' follow-through with suggestions from the previous week.

#### *Coding and reliability of mother-child observation*

Each mother-child video was coded independently by raters who had received 40 hours of training and had attained 80% agreement within one point on a five-point Likert scale. Pre- and post- intervention observations were coded at the same time to assure that the same criteria were used for pre-and post- intervention observations. Observations were randomly sorted so that pre- and post- observations would not be coded consecutively for any subject, and the order that pre- and post- observations were coded was counter-

balanced. A second rater coded a random selection of 20% of all observations to assess reliability. Interrater reliability for the MBRS as estimated using the Spearman correlation was  $r = 0.81$ . Raters attained 72% exact agreement and 99% agreement within one scale point.

## Results

Because of the limited power due to the small sample size significance levels were set at  $p < .10$  for the following analyses.

### Intervention changes in mothers' interactions

A repeated measures MANOVA indicated significant changes in mothers' style of interaction ( $p < .05$ ) (See Table 3). During intervention, mothers' Responsiveness and Affect increased by 17% and 7% respectively, while Achievement Orientation and Directiveness declined by 12% and 3%. Univariate analyses indicated that intervention effects were only significant for Responsiveness ( $p < .01$ ).

**Table 3.**  
*Before and after data on mothers' style of interaction*

	<u>Pre-Intervention</u>		<u>Post-Intervention</u>		
	<u>Mean</u>	<u>SD</u>	<u>Mean</u>	<u>SD</u>	
Maternal Behavior Rating Scale <sup>1</sup>					3.28**
Responsiveness <sup>2</sup>	2.9	0.7	3.4	0.6	7.35***
Affect <sup>2</sup>	2.8	0.4	3.0	0.5	1.91
Achievement <sup>2</sup>	2.6	0.8	2.2	0.7	1.42
Directiveness <sup>2</sup>	3.0	0.8	3.1	0.7	0.22

<sup>1</sup> MANOVA

<sup>2</sup> ANOVA

\* $p < .1$ ; \*\*  $p < .05$ ; \*\*\*  $p < .01$

Correlations were computed to examine the association of changes in mother's responsiveness with their parenting stress and depression scores at T1. Results from these analyses were not significant ( $r_{\text{Response Change} - \text{PSI}} = .08$ ;  $r_{\text{Response Change} - \text{CESD}} = .17$ ) indicating that mothers' psychological status was not associated with changes in responsiveness that occurred during intervention.

*Intervention changes in children’s development and social emotional functioning*

Pre- and post- developmental quotient scores are reported on Table 4. A repeated measures MANOVA indicated that the effects of intervention were significant ( $p < .05$ ). Univariate analyses indicated significant effects both for children’s development and communication ( $ps < .05$ ).

**Table 4.**

*Before and after data on children’s development and social emotional functioning*

<sup>1</sup> MANOVA

<sup>2</sup> ANOVA

VARIABLE	Pre-intervention		Post-intervention		F (Intervention)
	Mean	SD	Mean	SD	
Child Development <sup>1</sup>					3.70**
Developmental Quotient <sup>2 a</sup>	69.6	21.3	77.0	26.4	6.98**
Communication Quotient <sup>2 b</sup>	72.7	10.6	81.3	20.3	4.97**
TABS <sup>1 a</sup>					2.47*
Detached <sup>2</sup>	17.4	21.3	14.7	19.9	0.35
Hypersensitivity/ Hyperactivity <sup>2</sup>	41.7	15.9	42.6	15.8	0.05
Underreactive <sup>2</sup>	32.9	21.4	40.3	19.1	4.96*
Dysregulated <sup>2</sup>	45.6	27.2	42.1	16.1	0.01

<sup>a</sup> Bayley/Battelle Ratio Developmental Quotients

<sup>b</sup> Vineland Communication Quotients

<sup>c</sup> Temperament and Atypical Behavior Scale (Bagnato & Neisworth, 1999)

\* $p < .1$ ; \*\*  $p < .05$ ;

Table 4 also reports pre- post- data for children’s social emotional functioning as measured by the TABS. A MANOVA of the TABS indicated that the effect of intervention was significant ( $p < .10$ ). Univariate analyses indicated that intervention effects were significant only for Underreactive ( $p < .10$ ).

*Predictors of child intervention outcomes*

Multiple regressions were used to explore associations between mothers’ responsiveness and depression to intervention changes in children’s developmental and social emotional functioning. While there are no fixed rules for the lowest subjects to independent

variable ratios that should be used for small samples in exploratory regression analyses, Tabachnick and Fidel (2001) propose an absolute minimum of 5 subjects to 1 independent variable. Thus for the following analyses, only three independent variables were used resulting in a ratio of 6 subjects per independent variable. These included children's developmental scores at Time 1 and one variable each for mothers' depression and responsiveness. Because there were no significant changes in mothers' depression during intervention, CES-D scores at T1 were used as the measure of maternal depression.

The measure of mothers' responsiveness at T2 includes the changes in responsiveness promoted during intervention as well as mothers' level of responsiveness prior to intervention. A previous study of RT indicated that post intervention measures of parental responsiveness were significantly associated with the developmental improvements children made during intervention (Mahoney & Perales, 2005). As a result, responsiveness at T2 was used to explore the association of responsiveness to children's intervention outcomes.

Results from the regression analyses are reported on Table 5. For each analysis, child development scores at T2 were regressed on maternal depression at T1 and responsiveness at T2, controlling for the effects of children's development at T1. Results indicated the following. First, each of the three child development measures at T1 was significantly associated with T2 child development measures, with  $R^2$ 's ranging from .33 to .74. Second, mothers' responsiveness at T2 was significantly associated with children's intervention outcomes for all three child development measures, ranging from 5 to 26% of the variability of children's developmental changes. Third, mothers' CES-D scores were negatively associated with intervention changes in children's Developmental Quotient ( $p < .05$ ) and marginally associated with changes in their TABS scores ( $p = .108$ ) but was not associated with intervention changes in Communication quotient ( $p > .05$ ). Maternal depression accounted for 5% of the variability in Developmental Quotients and 6% of the variability in TABS scores

## Discussion

This exploratory study was conducted to examine how the depressive symptomatology reported by mothers of young children with PDD was associated with their effectiveness of participating in Responsive Teaching. For the most part, results observed in this study were consistent with our hypotheses.

First, as reported in numerous research studies, the mothers who participated in this study reported high levels of psychological distress. More than 50% had Parenting Stress scores that were above the clinical cutoff, and 44% had scores on the CES D which indicated clinical levels of depression.

**Table 5.**

*Relationship of maternal responsiveness and depression with children's developmental intervention outcomes*

<sup>1</sup> Bayley/Battelle Ratio Developmental Quotients

<sup>2</sup> Vineland Communication Quotients

<sup>3</sup> Temperament and Atypical Behavior Scale (Bagnato & Neisworth, 1999)

\*p < .1; \*\* p < .05; \*\*\* p < .01

Dependent Variable	Model	Beta	T Value	Significance	R <sup>2</sup>	R <sup>2</sup> Change
Developmental Quotient T2 <sup>1</sup>	Developmental Quotient T1	.867	7.18	.000	.74***	
	CES-D T1	-.243	-2.21	.042	.79***	.05*
	Responsiveness T2	.251	2.40	.030	.84***	.05*
Vineland Communication T2 <sup>2</sup>	Vineland Communication T1	.684	3.87	.001	.44**	
	CES-D T1	.013	0.07	.945	.44**	.00
	Responsiveness T2	.430	2.40	.030	.50**	.16*
TABS Total T2 <sup>3</sup>	TABS Total T1	.482	3.26	.005	.37**	
	CES-D T1	-.312	-1.70	.040	.43**	.06*
	Responsiveness T2	.575	-3.12	.007	.69***	.26**

Second, mothers who participated in RT made significant increases in their responsiveness with their children. However, there was considerable variability in the success with which mothers made these changes. Twenty-six percent either failed to improve or decreased their responsiveness during intervention; 47% made moderate changes of one Likert point or less; and 26% made changes that were greater than one Likert point.

Third, there were significant improvements in children's cognitive and communication development. At the completion of intervention children's had made an 11% improvement in their developmental quotients and a 12% improvement in their communication quotients. There were also marginally significant improvements in children's socio-emotional functioning, but this effect may have had limited clinical significance due to the fact that it was associated with significant changes in only one of four subscales of the TABS, Underreactivity.

Fourth, the developmental and social emotional outcomes observed across the three child development assessments used in this study were associated with the variability in mothers' responsiveness at Time 2. These findings are consistent with the logic model of RT which is predicated on the assumption that child development can be enhanced by encouraging parents to engage in more responsive interactions with their children (Mahoney & MacDonald, 2007). They indicate that the children who made the greatest developmental improvements tended to have mothers who had the highest levels of responsiveness at the end of intervention. The fact that responsiveness was associated with the intervention outcomes observed in this study adds to the accumulating evidence that parental responsiveness may be a causal influence on children's development (Aldred, et. al., 2012; Coolican, et. al., 2010; Kaaraslan, et. al., 2013).

Fifth, this study produced some mixed findings as to whether the effectiveness of RT was negatively impacted by mothers' psychological status. On the one hand, mothers' psychological status, as indicated both by their level of parenting stress and depression was not related to the changes in responsiveness they made during intervention. Although there was considerable variability in the changes in responsiveness observed among this group of mothers, results from correlational analyses indicated this variability was not associated with either mothers' depression or parenting stress. Thus, mothers' ability to learn RI strategies did not appear to be affected by their psychological distress.

On the other hand, results from this study indicated there was a negative association between mothers' depression with intervention changes in their children's development. Results from regression analyses indicated that high levels of maternal depressive symptoms were associated with diminished intervention effects on children's cognitive and social emotional functioning but not their communication.

Findings regarding the negative effects of maternal depression need to be interpreted in terms of the measures used to assess changes in responsiveness. Mothers' responsiveness was assessed from video recorded observations of them interacting with their children at the beginning and end of intervention. Previous studies have shown that the changes in responsiveness identified through this procedure are associated with intervention changes in children's development (Kaaraslan, et. al., 2013; Mahoney & Perales, 2005). In so far as parents' influence on children's development occurs in the context of daily routine interactions, such findings suggest that these brief observations of parent-child interaction at least partly reflect the manner that mothers typically interact with their children.

Nonetheless, with this procedure it is impossible to assess the extent to which mothers might have demonstrated patterns of interaction during the video recorded observation that were consistent with the focus of the intervention but not reflective of their general style of interacting with their children. Although it is possible that this may have accounted for the depression effects observed in this study, findings that mothers' psychological status did not diminish intervention effects on communication

development argue against this position. Rather, these results suggest that all mothers were able to integrate changes in responsiveness into their communicative interactions with their children regardless of their level of depression.

The question remains why maternal depression appeared to have a negative intervention effect on children's cognitive and social emotional development but not on their communication. While this question cannot be addressed with the data collected in this investigation, these findings are consistent with two previous research findings related to the effects of maternal depression on child development. Results from descriptive studies suggest that depression makes it difficult for mothers to interact with their children (Campbell, et. al., 1995; NICHD Early Child Care Research Network, 1999). Insofar as the effects of responsiveness depend upon mothers' frequency of interaction, the negative effects of depression are likely more pronounced in interactions which are more demanding or challenging. Communicative interactions require relatively little effort insofar as they can occur whenever mothers are caring for their children or in any other situation in which their children can both see and hear them. In contrast, cognitive interactions require considerable physical effort. They occur primarily in the context of playing with children, which often means interacting on the floor. Because play interactions are more physically demanding than communicative interaction, it is possible that depression lessens the frequency of mothers' play interactions more than their communication interactions, thus mitigating the effects of responsiveness on children's cognitive development more than their communication development.

Descriptive studies also suggest that depression may increase the tendency of mothers to react negatively to children's crying or acting out behaviors (Field, 2002; Murray, et. al., 1996). Parents who learn to become more responsive through intervention may have little difficulty integrating the style of interaction into routine social communicative interactions with their children. However, when children become highly distressed and resistant to soothing, highly depressed parents may react negatively to these types of behaviors. This may accentuate children's emotional upset and thus negatively impact their social emotional functioning.

Interest in the depression experienced with by parents of children with autism and other disabilities has been stimulated partly by the concern that high levels of depression may interfere with their ability to participate in interventions. This is the first parenting intervention study to describe such an effect. However, given the manner that the depressed mothers in this sample responded positively to intervention by learning RI strategies, maternal depression should not be used as a reason for excluding mothers from relationship focused interventions. Rather, results point to the need for interventionists to be cognizant of the psychological status of parents, and to recognize that referring parents with high levels of depressive symptomatology to appropriate services can have a positive influence on their ability to use parenting intervention strategies in a way that will maximize their children's developmental well-being.

Because of the exploratory and descriptive nature of this study, the findings need to be replicated with larger and more diverse samples as well as in studies that employ more rigorous research designs. It remains to be determined whether the effects of maternal depression only pertain to RT, or whether similar effects might occur with other parent mediated interventions. In addition, studies are needed to determine whether the effects of parental depression are unique to parents of children with autism, or whether they occur with parents of children with other types of developmental risks and challenges as well.

Despite the limitations of this study, the process of examining early intervention outcomes in relationship to parental depression is an important issue. The current emphasis on the use of parent-mediated intervention, particularly with children who are under three years of age, can be seriously compromised if professionals fail to understand how parental depression may affect such interventions.

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