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# Maternal depression moderated by family resources when children have developmental disabilities

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**ABSTRACT:** Children with developmental disabilities require extensive parental involvement in intervention, but parents with depression may be less able to intervene effectively. We examined prevalence of depression symptoms and predictors among 131 mothers of children with disabilities enrolled in early childhood special education. Participants completed several self-report measures of depression and child and family functioning. Children were directly evaluated using the Battelle Developmental Inventory. One year later, 68 mothers repeated self-report measures. Participants (30%) reported elevated depression symptoms across time. Depression scores were correlated with parental stress and family resources. An interaction between higher maternal depression and higher child functioning with lower family resources was found across time. When family financial resources are strained, mothers of children with moderate developmental disabilities may have higher risk for depression symptoms than when the child has severe disabilities. Results suggest that early childhood professionals should not overlook financial and mental health supports for mothers whose children have moderate disabilities.

**Keywords:** *parenting, depression, early intervention, developmental disabilities, parental distress, family resources.*

## Introduction

Early intervention systems worldwide (e.g., Individuals with Disabilities Education Act [IDEA], 2004; Morgan, 2014; Sihvonen, 2018; World Health Organization [WHO] & United Nations Children's Fund [UNICEF], 2012) partner with parents to identify and enhance the development of young children. Specifically, early intervention (EI) seeks to support family members and caregivers with the goal of enhancing their capacity to facilitate their child's learning and development (Dunst, 2011; Guralnick, 2017; McWilliam, 2010; Woods & Kashinath, 2007). Of particular interest are families with low resources (e.g., Dawson-McClure et al., 2017; IDEA, 2004; Kohli-Lynch et al., 2019), who are also at-risk for family disruption and mental health concerns (e.g., Reiss, 2019). EI appropriately focuses on the child's needs, but it is often necessary to evaluate and provide support for caregivers, particularly mothers, who are less able to participate effectively in EI when they experience conditions such as depression (e.g., Wachs et al., 2009). This research study examined how maternal symptoms of depression interact with child and family circumstances in EI settings. Specifically, this study sought to inform the research literature by conducting a longitudinal examination of the extent to which maternal depression is associated with parenting distress, severity of child disability, family support, and family resources.

Prior research has found that children of mothers who experience persistent depression have impaired health outcomes (Strobino et al., 2016; Surkan et al., 2011; Weissman et al., 2016), cognitive and psychological outcomes (Feurer et al., 2016; Prado et al., 2021), and educational outcomes (Conners-Burrow et al., 2014; Ringoot et al., 2015). Although many studies of maternal depression have been conducted, very few have been specific to mothers of children with disabilities receiving EI (Alvarez et al., 2015; Feinberg et al., 2012; Harmon et al., 2021). Specifically, mothers of children found to have impairments in physical functioning, learning, and/or language have distinct parenting circumstances that should be considered (e.g., Smith et al., 2001).

Maternal depression is more likely in families with children who have disabilities, with rates reported in the 20%–30% range (Bailey et al., 2007; Singer, 2006) or even higher (Hayes & Watson, 2013; Singer, 2006; Taylor & Warren, 2012). One study found that very high initial rates of maternal depression at time of child diagnosis (79%) decline but nevertheless remain high over one year later (29%; Taylor & Warren, 2012). Overall, these prevalence rates are much higher than the estimated 5–7% worldwide rates of depressive symptoms for women (Substance Abuse and Mental Health Services Administration [SAMHSA], 2015; WHO, 2017). However, the fact that approximately two-thirds of the mothers of children with disabilities do not report depression suggests the

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possibility of protective and moderating factors. Our study sought to evaluate factors that may influence maternal depression in EI settings, with an aim to improve both mother participation in interventions and outcomes for children (Alvarez et al., 2015; Conners-Burrow et al., 2014).

Participation in EI services may be affected by maternal depressive symptoms (e.g., Feinberg et al., 2012; Shaw et al., 2009). Data regarding mother dispositions and associated family resources are therefore important for policymakers to consider in improving child and family outcomes in EI and also in Early Childhood Special Education (ECSE). Specifically, ECSE has tended to focus more on direct child services than on parent and family supports, yet maternal influence remains important after a child turns three and transitions from EI to ECSE. Efforts to integrate the care of maternal depressive symptoms (adult services) into both EI and ECSE have been called for to not only relieve the suffering of mothers but to improve eventual outcomes for children (e.g., Alvarez et al., 2015; Husain et al., 2021).

Prior research has identified four consistent predictors of maternal depression that IE/ECSE professionals can consider. First, parenting stress affects depressive symptoms, as confirmed in a review of 28 studies (Lee, 2013). Second, that same review and other research has identified low emotional/family supports and difficult life changes as exacerbating maternal depression. Findings replicating these first two points have been reported among Latina mothers, mothers in the United Kingdom, South Asian mothers, and Swedish mothers (Eisenhower & Blacher, 2006; Emerson et al., 2006; Hatton & Emerson, 2009; Olsson & Hwang, 2008). Third, family resources and corresponding financial hardships have been established as strong predictors of maternal depressive symptoms (Bailey et al., 2007; Emerson et al., 2006; Olsson & Hwang, 2008). For instance, financial barriers to treatment correlated with increased symptoms of depression over time (Taylor & Warren, 2012). Thus, research specific to EI/ECSE should evaluate family resources in interactional models (Casto & White, 1993). Fourth, as stated previously, maternal depressive symptoms are related to child disability, but it is important to note that this association tends to be attributable more to child behavior problems than to the severity of the child's disability (Estes et al., 2009; Zeedyk & Blacher, 2017). Although mothers with children with disabilities are known to report high rates of depression, it is unclear whether child level of developmental functioning explains less of the variance in maternal depression than the other three types of predictors. It is also possible that the higher overall rates of maternal depression could be partially explained by an interaction between the level of child functioning and the other predictor variables, with child developmental status moderating those associations.

A major gap in the literature is that these four types of predictors of maternal depression have rarely been examined simultaneously; few multivariate longitudinal studies have been conducted to clarify effects (Zeedyk & Blacker, 2017). Because the four types of predictors of maternal depression overlap (e.g., parenting stress, family supports and life changes, socioeconomic factors, child developmental level, and access to healthcare and EI/ECSE all intersect), the early childhood education literature can benefit from an examination of all four predictors in the presence of one another. This research study sought to bridge that gap in the literature by evaluating multiple aspects of child and family functioning in the context of EI/ECSE.

Specifically, this study evaluated three hypotheses informed by prior research and by the gaps in that research: (a) Mothers of children with moderate to severe developmental disabilities will report high levels of maternal depression, with those levels statistically significantly diminishing after one year of their child receiving EI/ECSE; (b) While accounting for child developmental functioning, the variables of parenting stress, family support, life changes, family resources will all statistically significantly predict maternal depression at both study initiation and one year later; (c) Child level of developmental functioning will moderate the associations specified in the prior hypothesis, as demonstrated by statistically significant interactions with parenting stress, family support, life changes, and family resources when predicting maternal depression. Our target group was mothers and their children with disabilities receiving EI/ECSA who reside in suburban areas of the central United States.

## Method

### Participants

The present study involved 131 mother-child dyads whose young children were enrolled in EI/ECSE programs in Des Moines, Iowa ( $N = 75$ ) and Salt Lake City, Utah ( $N = 56$ ) in the United States. Both locations provided free public services that were administered half-day, 5-days-per-week services, with classrooms of 9 to 12 children receiving both group and individual instruction from a certified special education teacher and two trained paraprofessional aides. Instruction based on assessments and Individual Education Plans (IEPs) included motor, speech/language, self-help, cognitive, and social skills, with teachers determining the activities and curricula. All fathers and mothers were offered weekly training meetings providing conceptual and hands-on experience in child development, with the mothers attending meetings invited to participate in the research.

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The mothers averaged 32.6 years of age (ranging from 20 to 49,  $SD = 5.7$ ), with an average of 12.7 years of education ( $SD = 2.3$ ). Most mothers were married and residing with their spouse (76%); 69% were unemployed, with those employed averaging 23.4 hours of work each week. Of the 55 mothers reporting annual household income, 12 (22%) were below the federal poverty line, with 25 (45%) between the 20th and 50th percentiles and 11 (20%) above the 50th percentile compared to U.S. Census data. Although the mothers tended to be stay-at-home parents from the lower middle class, their backgrounds varied, and they had no clearly identifiable risk factor for depression other than having a young child enrolled in early childhood special education.

The children were an average of 55 months old at the beginning of the study (ages ranging from 24 to 78 months,  $SD = 13.7$ ); 56 (43%) were male. All children received services for developmental disabilities, with 48% having cognitive and language impairments, 21% with Down syndrome, 13% with cerebral palsy, and the others showed additional forms of motor and sensory impairment. The average developmental quotient on the BDI was 62.1 ( $SD = 15.1$ ; standard score average of 100 based on normative samples), with children predominantly in the moderate to severe range. Most children were White/European American (81.7%), with 7.6% identifying as unspecified ethnic minorities, and 10.7% not reporting ethnicity.

## Instruments

The Center for Epidemiological Studies Depression Scale (CES-D) was developed to study depressive symptoms in the general population (Radloff, 1977). This instrument allows individuals to rate the occurrence of 20 cognitive and behavioral symptoms of depression in terms of frequency during the previous week. This was done on a 4-point scale (0–3), with more frequent symptom occurrence receiving higher scores (i.e., 0 = *less than one day per week*, 3 = *five to seven days per week*). Scores at or above 16 are considered to indicate clinical depression (Radloff, 1980). Evidence of acceptable reliability (.85–.90 internal consistency, .45–.70 test-retest, depending on fluidity of current symptoms) and validity (correlations of .49–.71) has been provided for the scale (Smarr & Keefer, 2011). Its original normative sample included Black and White adults (both sexes) across socioeconomic groups in Maryland and Missouri, United States. A meta-analytic review of the CES-D (28 studies) found the CES-D to have acceptable screening accuracy for the presence of depression symptoms (Vilagut et al., 2016).

Four additional self-report measures were used that had evidence of validity and internal consistency reliability. The Family Support Scale (FSS; Dunst et al., 1984) is a measure created to identify support services and parent satisfaction with those support services. The 19-item questionnaire asks parents to rate the helpfulness of different supports on a

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5-point Likert scale (0 = *Not at All* to 4 = *Extremely Helpful*) inclusive of Kinship, Professional Services, and Social Organizations. Reliability (Cronbach's  $\alpha = .77-.80$  for total score) and validity (significant correlations from .18-.40) are reported by the authors as acceptable. The original normative sample included 139 parents of preschool children with intellectual and other disabilities and children developmentally at-risk, all were enrolled in EI (Dunst et al., 1984).

The Parenting Stress Index, Second Edition (PSI-2; Abidin, 1986) is a self-report measure of stress in parent-child systems. It is a 101-item questionnaire (expanded to 120 with the addition of 19 Life Stress yes/no questions) that looks at both a Parent domain and a Child domain for interpretation. Most questions (91) are Likert-type on a scale of Strongly Agree to Strongly Disagree, with 10 specific multiple-choice questions. Ample and consistent evidence for the reliability and validity of the PSI and its subsequent revisions has been provided in the literature. Total Score (not including the 19 Life Stress items) reliability coefficients range from .65-.96. Validity is established in various populations, including clinical, nonclinical, diverse, and parental depression, and correlations between versions range from .85-.99. The original normative sample was 534 (mostly mothers) from Virginia. Correlations across versions are high (Abidin, 1986, 1995, 2012). The PSI has been found to be reliable in families with children who have developmental and other types of disabilities (Abidin, 1995).

The Family Inventory of Life Events and Changes (FILE; McCubbin et al., 1983) measures the accumulation of stressful life events as experienced by the family in the past year. The FILE asks 71 Yes/No questions about events and changes affecting any member of the family within the last year. The FILE was derived from data collected on a sample including 322 families of children with myelomeningocele or cerebral palsy. Nine scales are produced, including Intrafamily Strains, Marital Strains, Pregnancy and Childbearing Strains, Finance and Business Strains, Work-Family Transitions Strains, Illness and Family "Care" Strains, Losses, Transitions "In and Out," and Legal. Overall Reliability was .72, with subscale reliability between .30 and .73. Validity proved highest for Intrafamily Strains and Total Scores (McCubbin et al., 2013).

The Family Resource Scale (FRS; Dunst & Leet, 1985) is a self-report measure utilized to evaluate the adequacy of available resources in a household with children. The 30-item scale is predictive of family functioning and allows practitioners to assess what intervention strategies would be appropriate. The measure and its revisions have acceptable internal consistency and criterion-related validity. Using 30 items, a 5-point scale question asks if resources ranging from basics (e.g., food and shelter) to luxury items (e.g., vacations and entertainment) are "not at all adequate" (1) to "almost always adequate" (5). The FRS was designed for use in an early intervention clinical population,

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and has been found to have good reliability and validity in families with children who have disabilities including emotional and behavioral disorders across income levels (Brannan et al., 2006).

The last measurement utilized in this study was a normative measure of child developmental status, the Battelle Developmental Inventory (BDI; Newborg et al., 1984). This was not a parent-report measurement but is directly administered on an individual basis to children. There are 341 items across five domains: Communication, Cognitive, Motor, Adaptive, and Personal/Social. Original reports of inter-rater reliability (.70–1.0) and test-retest reliability (.71–.99) were based on an age-stratified normative sample including 800 children without disabilities, from birth to 95 months. Content, construct, and concurrent validity with similar scales was moderate to high and positive, suggesting the adequacy of criterion validity beyond the original sample (Snyder et al., 1993). Snyder and colleagues (1993) further examined reliability of the BDI in a sample of 73 children with severe disabilities (e.g., Down syndrome, cerebral palsy, spina bifida, autism, seizure disorders, William's syndrome, and severe visual impairment). Their results suggested caution in interpreting the five domain scores independently, as the original BDI five-factor structure was not maintained in this analysis. Boyd (1989) also indicated caution is warranted regarding scores obtained near age cut-off points used in BDI norms. In our analysis, total scores and exact birthdates were utilized.

## **Procedure**

Institutional review board approval was obtained prior to participant recruitment. All mothers signed statements of informed consent for themselves and informed assent for their children prior to participating in the study. Mothers received a small financial incentive for participation in the study, but participation was completely voluntary with no penalty for withdrawal. All data collected were de-identified; the researchers only have access to a database without participants' identity. All procedures performed in this study were in accordance with the ethical standards of the institutional research committees, U.S. federal guidelines, and with the 1964 Helsinki declaration and its later amendments.

At the first of two assessment periods, five self-report instruments were administered to the entire sample to measure a broad range of variables relevant to the functioning and well-being of the family. These measurements were the CES-D, FSS, PSI, FILE, and FRS. To assess the level of child functioning, the BDI was then administered by credentialed diagnosticians who were unaware of the purpose of the study.

To verify that the results were consistent over time and to examine the longitudinal predictors of maternal depressive symptomatology, a second assessment was conducted

one year later at the Des Moines site (follow-up data were unavailable at the Salt Lake City site). At this follow-up assessment, 68 mothers (91%) from the Des Moines sample completed the same battery of self-report questionnaires that had been administered previously. To ascertain the association among the several variables, we conducted Pearson correlations with the data from each assessment separately. Regression was used to predict CES-D scores at the first and second assessments using the data from the first assessment. To investigate the possibility that the developmental status of the child moderated the results, we entered the interaction between the child developmental status and the other family functioning variables in a second set of regression models. Significant interaction terms would indicate a moderating relationship.

## Results

Means and standard deviations for all measures are shown in Table 1. Our first research hypothesis addressed the severity of symptoms of depression reported by the mothers. At the first assessment, the average score on the CES-D was 12.2 ( $SD = 10.6$ ), with 30% of the participants in the “clinical” range of scores ( $\geq 16$ ). CED-D scores remained relatively high at the second assessment ( $M = 11.3$ ,  $SD = 9.8$ ), with 30.9% of the participants in the clinical range. These values are approximately one-half of a standard deviation higher (Cohen’s  $d = .53$  and  $.43$  respectively) than the mean scores of women evaluated by the CES-D author (Radloff, 1980).

TABLE 1 Descriptive statistics of measures of child and family functioning

<i>MEASURE</i>	<i>M</i>	<i>SD</i>	<i>Kurtosis</i>	<i>Skewness</i>
Battelle Developmental Inventory	62.1	15.1	-0.1	0.3
Family Inventory of Life Events	10.8	6.9	1.1	1.4
Family Resource Scale	116.0	17.5	-0.1	-0.5
Family Support Scale	28.9	10.9	0.2	-0.4
Parenting Stress Index (Child)	119.3	19.8	0.2	-0.1
Parenting Stress Index (Parent)	133.1	25.7	0.1	-0.3
CES-Depression Scale	12.2	10.6	1.2	1.2

Mothers’ CES-D scores at the first and second assessments were correlated at  $.54$  ( $p > .001$ ), indicating some consistency in self-reported symptoms of depression over time. At the second assessment, mothers’ CES-D scores had decreased only to a very small degree (Cohen’s  $d = .15$ ) that did not reach statistical significance in a paired-sample  $t$ -test ( $t = 1.32$ ,  $p = 0.19$ ). Thus, the data did not support our first hypothesis. Although mothers with

children with disabilities tended to report elevated symptoms of depression, participation in IE/ECSE did not diminish symptoms reported one year later.

Our second research hypothesis concerned the associations of child and family functioning with mothers' reported symptoms of depression. As a preliminary step, we computed bivariate correlations between the CES-D and measures of child developmental status and family functioning (Table 2). The correlations between the CES-D and the measure of child development status (the BDI) were very low and not statistically significant. However, correlations between the CES-D and the measures of family functioning were generally much higher and statistically significant. The correlations between the CES-D and the measures of family resources, stressful life events, and parenting stress were moderate to high. Notably, child-related stress did not correlate as highly with the CES-D as did other sources of stress, as measured by the PSI.

TABLE 2 Correlations of CES-Depression scores and measures of child and family functioning

<i>MEASURE</i>	<i>CES-D Assessment #1 (N = 131)</i>	<i>CES-D Assessment #2 (N = 68)</i>
Battelle Developmental Inventory		
Personal/Social	-.01	-.21
Adaptive Behavior	-.01	-.12
Motor	.15	.01
Communication	-.07	-.15
Cognitive	-.04	-.23*
TOTAL	.01	-.16
Family Inventory of Life Events	.36***	.46***
Family Resource Scale	-.40***	-.49***
Family Support Scale	-.28**	-.10
Parenting Stress Index		
Child Domain	.31***	.30*
Parent Domain	.60***	.52***

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

Having ascertained the univariate associations among variables, we directly tested our second research hypothesis by conducting a series of hierarchical regression models to predict symptoms of maternal depression. Since the mothers in this study reported higher CES-D scores than normative samples, we needed to account for the contribution of child developmental status, so we entered the total age-adjusted score from the BDI in the first step of the model. To avoid problems associated with multicollinearity, we used the total

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BDI score rather than the BDI subscales (e.g., adaptive behavior, personal-social behavior, communication, cognition, motor skills), which also have lower measurement reliability than the more commonly used total score. In a second step, we added the family functioning variables simultaneously (FILE, FRS, FSS, and PSI) while still accounting for child developmental status. With the data collected at the first assessment with the full sample (top half of Table 3), the children's developmental status scores explained minimal variance in their mothers' CES-D scores (adjusted  $R^2 = .01$ ,  $F = .1$ ,  $p = .93$ ), but the combination of variables added in the second step explained a large percentage of the variance in CES-D scores (adjusted  $R^2 = .35$ ,  $F = 11.9$ ,  $p < .0001$ ). As seen in Step 2 at the top of Table 3, the only predictor variable that reached statistical significance in the presence of the other variables was the PSI parent domain.

TABLE 3 Regression weights for variables associated with CES-Depression scores, first and second assessments

<i>MEASURE</i>	<i>B</i>	$\beta$	<i>p</i>
<u>Assessment #1 (N = 131)</u>			
Step 1			
Battelle Developmental Inventory Total	.01	.01	.93
Step 2			
Battelle Developmental Inventory (BDI) Total	.04	.06	.43
Family Inventory of Life Events	.08	.05	.57
Family Resource Scale	-.08	-.16	.08
Family Support Scale	-.10	-.09	.26
Parenting Stress Index, Child Domain	-.04	-.07	.45
Parenting Stress Index, Parent Domain	.22	.50	.001
<u>Assessment #2 (N = 68)</u>			
Step 1			
Battelle Developmental Inventory Total	-.10	-.16	.19
Step 2			
Battelle Developmental Inventory Total	-.08	-.13	.24
Family Inventory of Life Events	.31	.20	.16
Family Resource Scale	-.12	-.23	.08
Family Support Scale	.10	.09	.45
Parenting Stress Index, Child Domain	.03	.06	.60
Parenting Stress Index, Parent Domain	.12	.29	.05

When the same set of child and family variables was entered in a second regression model, this time predicting symptoms of depression at the second assessment (one year later), similar results were achieved (shown in the bottom half of Table 3). The child BDI scores entered in the first step explained minimal variance in CES-D scores (adjusted  $R^2 = .01$ ,  $F = 1.7$ ,  $p = .19$ ), but the combination of variables added in the second step explained a large percentage of the variance in CES-D scores (adjusted  $R^2 = .32$ ,  $F = 6.1$ ,  $p < .001$ ). As before, the only predictor variable that reached statistical significance in the presence of the other variables was the PSI parent domain. Thus, the data did not support our second research hypothesis that all variables in the model would predict maternal depression. Only parent-specific parenting stress remained statistically significant.

Our third research hypothesis concerned possible moderation effects, interactions of the family functioning variables with the developmental status of the child. We therefore simultaneously entered the interaction terms in two subsequent regression models for the first and second assessment data (Table 4). With data from the first assessment, the resulting model explained 38% of the adjusted variance ( $F = 15.7$ ,  $p = .0001$ ). As seen in the top half of Table 4, the interaction of child developmental status with both measures of parenting stress (PSI Child- and Parent-related stress) and with the measure of family resources (FRS) reached statistical significance. Subsequent examination of participants' scores indicated that parents with higher functioning children actually had significantly higher CES-D scores than those with lower functioning children when their perceptions of parenting stress were high and when their perceptions of family resources were low.

When the same set of variables were used to predict CES-D scores at the second assessment, the resulting model explained 25% of the adjusted variance ( $F = 5.5$ ,  $p = .001$ ). However, this time only the interaction of child functioning with the measure of family resources (FRS) remained statistically significant (bottom half of Table 4). Nevertheless, the trend was in the same direction, with parents of children with relatively less severe impairments reporting more symptoms of depression when they perceived fewer family resources. Thus, the data did not support our third hypothesis that the association between all family functioning variables and maternal depression would be moderated by child developmental status. In the presence of the other variables, only the interaction with the FRS remained consistently associated with maternal depression.

TABLE 4 Regression of interaction terms associated with CES-Depression scores, first and second assessments

<i>MEASURE</i>	<i>B</i>	$\beta$	<i>p</i>
<u>Assessment #1 (N = 131)</u>			
Family Inventory of Life Events x BDI	.01	.03	.77
Family Resource Scale x BDI	-.01	-.48	.001
Family Support Scale x BDI	-.01	-.12	.23
Parenting Stress Index, Child Domain x BDI	-.01	-.35	.04
Parenting Stress Index, Parent Domain x BDI	.01	.97	.001
<u>Assessment #2 (N = 68)</u>			
Family Inventory of Life Events x BDI	.01	.17	.28
Family Resource Scale x BDI	-.01	-.58	.003
Family Support Scale x BDI	.01	.09	.60
Parenting Stress Index, Child Domain x BDI	-.01	-.03	.88
Parenting Stress Index, Parent Domain x BDI	.01	.35	.14

*Note.* BDI = Battelle Developmental Inventory, a normative measure of child functioning.

## Discussion

In this research study, we examined the severity of symptoms of depression reported by mothers of children with disabilities participating in IE/ECSE. We also evaluated the extent to which family functioning variables predicted maternal depression, as well as whether that association was moderated by child developmental status. The data did not support our three research hypotheses. Nevertheless, the data provided useful information relevant to all three hypotheses.

First, the data confirmed elevated levels of symptoms of depression among mothers of children with disabilities. In this sample of families with children receiving EI/ECSE services, rates of maternal depressive symptoms in the “clinical” range were high (about 30%). By comparison, 5–7% of women worldwide report symptoms indicative of depression (WHO, 2017). More directly comparable studies of North American middle-aged women have reported rates of 9–17% above the clinical cut-off on the CES-D (e.g., Knight et al., 1997), one-third to one-half as much as the rates observed in this study. Similar high rates have been reported in prior studies (Feinberg et al., 2012; Hayes & Watson, 2013; Taylor & Warren, 2012). Clearly, professionals should consider the

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emotional experiences of mothers of children with disabilities (e.g., Goodman, 2007; Lee, 2013).

We anticipated that EI/ECSE services could reduce maternal symptoms of depression over the course of one year, but the observed decrease was very small and did not reach statistical significance. The mothers in this study tended to remain consistent in their reported symptom levels. Several relevant considerations will need to be examined in future research, including ways to integrate parent support with EI/ECSE services for the child. Although both intervention sites in this study provided regular parent meetings, those meetings provided child development information and experiential parenting skill training rather than explicit emotional support. Scholars have advocated for a more holistic integration of parenting concerns, particularly targeting stress and depression (e.g., Feinberg et al., 2012). Future research can evaluate the extent to which an explicit emphasis on emotional support in EI/ECSE programs provides greater mental health benefit to parents.

Second, this study yielded notable findings regarding predictors of symptoms of maternal depression. In our analyses, parenting stress specific to the parent was more predictive of maternal depression than parenting stress attributable to the child – or to other aspects of family functioning. Although many aspects of family functioning, such as mutual emotional support and difficult life events, may be important contributors to maternal depression, how a mother experiences and interprets stress when parenting explains more variance in symptoms of depression than other family or child factors (e.g., Smith et al., 2001).

Third, we found that although symptoms of maternal depression were unrelated to the child's overall level of functioning, child functioning did interact with other predictors. When the child had moderate rather than severe developmental disabilities, maternal depressive symptoms were higher when high levels of parenting stress existed and, more consistently over time, perception of low levels of resources were present. This finding identifies a population of families who may be overlooked because of the relatively higher functionality of the children when agencies are considering additional supports and referrals for assistance (e.g., by expanding resource-intensive services beyond children with severe disabilities). For instance, intensive interventions provided to families with children with severe disabilities can address financial difficulties and inability to maintain employment (Chen & Newacheck, 2006; Kogan et al., 2008; Viner-Brown & Kim, 2005) and barriers accessing transportation and respite care (Thompson & Emira, 2011). Similar supports can be provided and evaluated with families with children with moderate disabilities.

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Our findings of elevated levels of maternal depressive symptoms when a child has less severe disability are also consistent with at least two previous studies finding this same counter-intuitive pattern (Hodgman et al., 1979; Manuel et al., 2003). The findings of higher maternal depressive symptoms related to parenting stress levels are also consistent with a prior study (Bailey et al., 2007), as are correlations with perceptions of low financial resources (Emerson et al., 2006; Olsson & Hwang, 2008). The conclusion that we assert has been missing from these prior studies was connecting the dots between these findings to indicate a persistent need for increased financial supports for families with children whose disabilities are in the moderate range.

Calls in the literature for incorporating parent treatment into EI/ECSE systems have been made (Alvarez et al., 2015). Cross-over between adult and child services may be an effective answer to long-standing challenges (e.g., Husain et al., 2021). The findings of this study also imply that a third system – financial and resource support – can also be considered to address the resource limitations that are associated with maternal depressive symptoms when children have developmental disabilities.

### **Strengths and limitations**

This study makes several key contributions to the literature but is also characterized by multiple limitations. A strength of the study was the extensive data collection of factors related to family functioning. Prior research has typically evaluated only one to three aspects of family functioning, limiting our understanding about which variables remain influential in the presence of the others. Our examination of longitudinal associations with family functioning was particularly valuable contribution to the literature as well. This study was intentionally designed to meet a need previously identified in the research literature to evaluate EI/ECSE services across time (Casto & White, 1993). Another strength of the study was the direct evaluation of children's ability levels by credentialed professionals blinded to all other aspects of the study.

A primary limitation of our study is that the data should not be generalized to other populations and settings. This restricted external validity stems not only from the geographical and contextual specificity of the study conducted in the U.S.A. but also from the relatively small sample of participants. Our initial data collection years ago consisted of individuals at two sites, but we were unable to obtain follow-up data from the smaller Salt Lake City sample. Similar losses have been reported in other longitudinal studies (e.g., Carter et al., 2009), but optimally research involves very large sample sizes (e.g., Smith et al., 2001) to reduce the adverse impact of data loss.

In this study we evaluated mothers previously enrolled with EI/ECSE services because these parents had already demonstrated the inclination to interact with professionals and to seek out child services. Although these parents fit our target population, they likely differ from those not participating in EI/ECSE services. For now, the finding by Feinberg and colleagues (2012) that early intervention access for children is unrelated to maternal depressive symptoms provides some evidence that our sample may not have been unduly biased in relation to our research questions.

Another set of limitations of this study concerns issues of measurement. The dependent variable in this study, the CES-D, is not a diagnostic tool. It measures 20 self-reported symptoms of depression and has limitations associated with any self-report instrument. Nevertheless, the CES-D is widely used in research when clinical interviews by mental health professionals would prove too time intensive and costly. All other measures in this study besides the BDI were also self-report and had similar limitations.

The data collected on the BDI deserves separate consideration. In young children with highly variable behaviors in testing environments, reliability and validity of scores are dependent on the characteristics of the normative sample for standardization and how similar that sample was to our sample. In our regression models, the standard scores of child functional levels were relative to one another within the sample. Hence our data were relative levels of functioning; entirely different findings could have occurred had children with mild disabilities not receiving IE/ECSE been included. Furthermore, some distortion of actual child abilities can occur on the BDI, as illustrated by Boyd (1989) when the child's age crosses an age division in the normative data.

### **Directions for future research**

Future research will be needed to replicate, refute, and/or refine our findings. We invite inquiry on the possibility that mothers with young children with moderate rather than severe disabilities are more at risk for maternal depressive symptoms when perceived resources were low. In our data, parent-specific parenting stress was also more predictive of maternal depression than child-specific parenting stress. Although this finding is intuitive, it therefore follows that future research should distinguish between aspects of parenting stress (e.g., reporting subscales). Future research may also benefit from evaluating parent-child interactions (Smith et al., 1993), parent interventions (Dyches et al., 2018), and positive parenting practices (Dyches et al., 2012).

Our study used a correlational design, so future research will be needed to experimentally test considerations directly relevant to practice. For instance, researchers can evaluate EI/ECSE professionals' likelihood of offering referrals for financial support of care and

depression treatment, as well as parents' inclinations to act on those referrals, in light of stress and depression symptoms. Research that helps practitioners to find and assist parents who do not seek out interventions for themselves, perhaps because of depressive symptoms, is a research challenge deserving of attention.

In terms of research to inform policy, a more in-depth exploration of the resource deficits in families with children in the moderate range of disability can inform both local and national policies guidelines and thresholds for receipt of intensive support services. Most qualification criteria are based on a child's ability or accumulation of deficits or disadvantages in the family. Appropriate attention to families with severe disabilities may have unintentionally minimized support for families with children with moderate disabilities. Although support funds are limited, future research on the cost-effectiveness of augmenting resources for families in the middle range of disability can specifically investigate benefits deserving of investment by policy makers.

### **Implications for early childhood professionals**

With the prevalence of depression symptoms so high, it is likely that about 1 in 3 families in an EI/ECSE agency are affected with maternal depression. EI/ECSE professionals can initiate outreach to other agencies to coordinate benefits and timely resolution of financial barriers to treatment for both children and their mothers. If individual psychological treatment options do not exist, parent emotional support groups may be an appropriate service to offer all families, especially when engaging diverse stakeholders in implementation (Molina et al., 2020). When designing such broad initiatives, a focus on fostering resilience may be optimal, given that approximately 70% of mothers with children with disabilities do not report elevated symptoms of depression.

Partnering with agencies to provide financial resource supports is already part of many EI/ECSE agencies or units. Strengthening and broadening these partnerships and options can be considered part of appropriate care for the children. The need for mothers to be functioning well enough (with reduced symptoms of depression) can be considered crucial to the development of the child (e.g., Husain et al., 2021; Shaw et al., 2009). Emphasis on timely supports can be advocated for, given the immediate window of critical development for the child. The key role of the parent's involvement in treatment in the EI/ECSE systems can be emphasized when seeking supports. During treatment, professionals can explicitly consider and reinforce the emotional resilience of the caregiver when discussing the child and home routines.

Finally, transition processes for children aging out of EI into ECSE can include plans for maternal mental health services and financial supports in addition to the educational

planning for children. With increased rates of depression among families with less severe impact from disability, the families who need maternal mental health support may be the least likely to be considered for intensive services. They nevertheless need additional ongoing supports.

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