

Full Length Research Paper

Modeling the relationships between practitioner capacity-building practices and the behavior and development of young children with disabilities and delays

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The manner in which family-centered capacity-building practices and parenting efficacy beliefs were directly and indirectly related to parent-child interactions and child behavior and development was investigated using meta-analytic structural equation modeling. The participants were 6507 caregivers of young children with identified disabilities and developmental delays in 13 studies. Results showed that capacity-building practices were directly related to parenting efficacy beliefs and indirectly related to parent-child interaction mediated by belief appraisals; parenting efficacy beliefs were directly related to parent-child interactions and indirectly related to child social competence mediated by parenting practices; and parent-child interactions were directly related to both child behavior and child development. Results also indicated these relationships were not moderated by parents' education, severity of child disability, or frequency of practitioner-parent contacts. Implications for investigating the influences of social and family systems intervention practices on parent, family, and child outcomes of early childhood intervention are described.

Key words: Family-centered practices, capacity-building, parenting efficacy, parenting practices, child social behavior, child cognitive development.

INTRODUCTION

Early childhood intervention involves the experiences afforded infants, toddlers, and preschoolers with identified disabilities or developmental delays and children at-risk for poor developmental outcomes to influence child behavior and development (Groark et al., 2011). This type of intervention also includes the supports provided by young children's parents and other caregivers to promote child learning and development (Powell, 1988).

The latter type of parent involvement has been described as the "experiences and opportunities afforded infants, toddlers, [and preschoolers] by children's parents and other primary caregivers that are intended to promote children's acquisition and use of behavioral competencies to...influence prosocial interactions with people and objects" (Dunst, 2007: 162).

It is now generally recognized that this is best

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accomplished when practitioners use family-centered capacity-building practices that not only benefit young children but which also support and strengthen parenting confidence and competence (Dunst and Espe-Sherwindt, 2016). Family capacity-building practices are a particular type of family-centered help giving used by early childhood intervention practitioners to engage parents and other family members in informed decision making and actions to strengthen existing capabilities and promote acquisition of new capabilities (Dunst, 2010), including, but not limited to, parenting beliefs and practices to affect child learning and development (Powell, 2003). Family-centered capacity-building practices are described in the early childhood intervention literature as enabling practices (Summers and Jenkins, 2001), participatory practices (Dunst and Espe-Sherwindt, 2016), engaging practices (Buckingham et al., 2016), collaborative practices (Espe-Sherwindt, 2008), and empowering practices (Dunst et al., 1988) as well as by other terms (Dunst and Espe-Sherwindt, 2016).

Findings from meta-analyses and systematic reviews of family-centered practices studies indicate that these particular types of practices are related to a host of parent, family, and child outcomes (Dempsey and Keen, 2017; Dunst et al., 2008; Thompson et al., 1997). Dunst et al. (2008), in a comprehensive review of family-centered practices research, found that participatory help giving was related to parents' self-efficacy beliefs and both confidence and competence belief appraisals. These types of beliefs are personal judgments of one's ability to execute actions in order to achieve desired outcomes (Bandura, 1997).

Self-efficacy beliefs have been used widely as a measure of the consequence or outcome of capacity-building practices and experiences (Dunst et al., 2007; Hohlfeld et al., 2018). Findings from structural equation modeling studies indicate that these belief appraisals mediate the relationship between family-centered practices and parent and child outcomes (Dunst et al., 2007; Dunst and Trivette, 2009; Thompson et al., 1997). Investigators of these studies, however, did not separate out the effects of family-centered capacity-building practices and other types of family-centered help giving and therefore the results may be confounded. The study described in the paper is part of a line of research spanning almost 40 years. This research has focused on the relationships between family-centered practices and child, parent, and family outcomes, and the manner in which these relationships are mediated by intervening variables including, but not limited to, parents belief /appraisals about executing courses of action to achieve desired goals or outcomes (Bandura, 1997; Skinner and Greene, 2008). This research has included the systematic evaluation of the manner in which family-centered capacity-building practices are directly and indirectly related to outcomes of interest using social and family systems frameworks (Dunst, 2017) as frames of

reference for testing basic tenets of these systems frameworks (Bronfenbrenner, 1994; Emery, 2014; Friedman and Allen, 2010). The outcome of this research-to-practice line of research has been the identification of the pathways of influence of family-centered capacity-building practices on parenting practices and child behavior and development.

Hypotheses

The study focused on the investigation of the relationship between family-centered capacity-building practices and parenting efficacy beliefs, and the manner in which belief appraisals mediated the influences of capacity-building practices on parent-child interactions and child behavior and development. This was accomplished using meta-analytic structural equation modeling (MASEM; Cheung, 2015) where results from different studies were combined and the structural equation model (SEM) shown in Figure 1 was the focus of investigation. MASEM combines meta-analysis and structural equation modeling in order to build a dataset and test the fit of a hypothesized model to the relationships between the variables in the model (Cheung and Chan, 2009). The hypothesized pathways of influence are highlighted in Figure 1 where the pathways are informed from prior research on the relationships among the variables in the model (Trivette et al., 2010).

- (i) Family-centered capacity-building practices were expected to be directly related to parenting beliefs (Dunst and Dempsey, 2007; Dunst et al., 2007) and indirectly related to parent-child interactions mediated by belief appraisals (Dunst et al., 2008; Trivette et al., 2010).
- (ii) Parenting belief appraisals were expected to be directly related to parent-child interactions (Coleman et al., 2002; Guzell and Vernon-Feagans, 2004) and indirectly related to child behavior and development mediated by parents' interactional practices (Teti et al., 1996; Trivette et al., 2010).
- (iii) Parent-child interactions were expected to be directly related to both child behavior and development (Landry et al., 2001; Steelman et al., 2002).

In addition to testing both the direct and mediated effects of the variables in the SEM, a number of moderator effects of the relationships among the SEM variables were evaluated. The moderators were parent education, severity of child disability, and frequency of practitioner-parent contacts. The extent to which each of these variables moderated the relationship between (a) family-centered capacity-building practices and parenting efficacy beliefs and (b) parenting efficacy beliefs and parent-child interactions were the focus of investigation because previous research studies and reviews have yielded contradictory findings and conclusions (Bailey

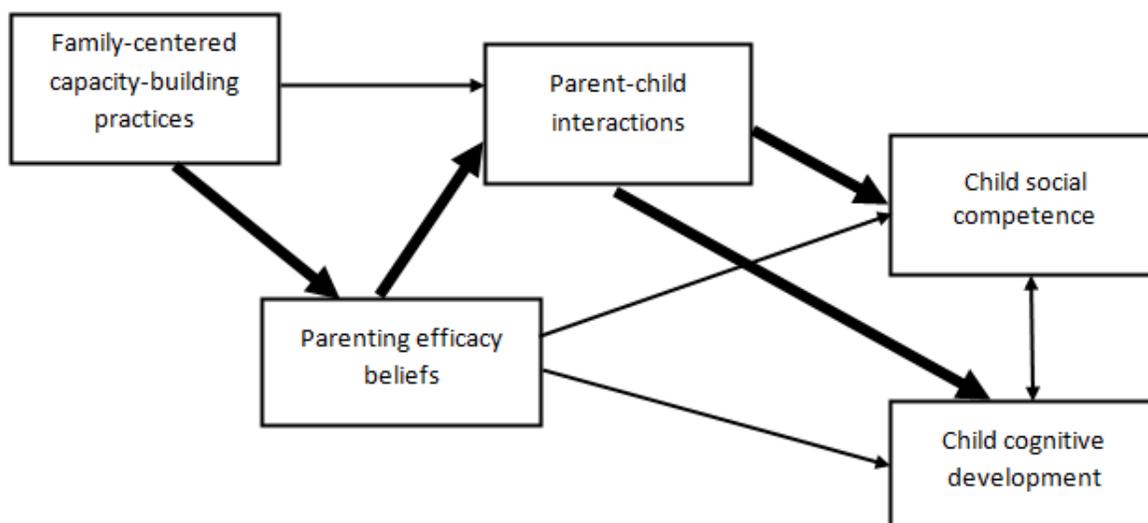


Figure 1. Hypothesized structural equation model for the relationships between the study variables.

et al., 2007; Crossman et al., 2018; Dempsey and Keen, 2008; Dunst et al., 2007; Dunst and Trivette, 2009; Nievar et al., 2010). The tests for moderator effects were expected to produce evidence to reconcile differences reported in previous research.

MATERIALS AND METHODS

Search strategy

Candidate studies were located using the search terms shown in Table 1 for each of the SEM constructs in a series of separate searches (e.g., family-centered AND capacity-building AND parenting efficacy AND early intervention; parenting efficacy AND parent-child interactions AND early childhood intervention). The names of specific scales and instruments that have been widely used to assess each of the Figure 1 constructs were also searched to identify candidate studies [e.g., *Family-Centered Practices Scale* (Dunst and Trivette, 2002); *Parenting Sense of Competence Scale* (Rogers and Matthews, 2004); *Maternal Behavior Rating Scale* (Mahoney et al., 1986); *Conners Child Behavior Rating Scales* (Conners, 1997); and *Bayley Scales of Infant and Toddler Development* (Bayley, 2006). More than 100 different combinations of search terms were used to identify candidate studies in each of the sources described next.

Controlled vocabulary and both keyword and natural language terms were used to search 12 different electronic databases (PsychInfo, ERIC, MEDLINE, Web of Science, CINAHL Plus, ProQuest Central, Academic Search Elite, Google Scholar, etc.). These searches were supplemented by examination of studies included in previous research syntheses and reviews as well as the reference sections of all located research papers. Unpublished and grey literature was located through searches of Dissertation Abstracts International, ProQuest Dissertations and Theses, Google, and 10 different grey literature databases (e.g., GreyNet International, Grey Literature Network Service, OpenGrey Database). Where possible, results were sorted by relevance in order to identify candidate studies where the results were examined until 25 consecutive research reports did not meet the inclusion

criteria described below. In cases where results could not be sorted by relevance, the first 100 results from each search were examined to determine if any of the studies included relevant data.

Inclusion criteria

No limitation was placed on candidate studies in terms of year of publication or type of research report. The abstracts of all located papers were examined to determine if the variables of interest were the focus of investigation. If no abstract was included or the relevance of the study could not be determined from the abstract, the methods section of the research reports were examined to determine if a study included the variables in Figure 1. Studies were included if at least 3 of the 5 variables of interest in Figure 1 were included, and the correlations among the measures were reported in the research reports. A unique feature of a MASEM is the fact that a study does not need to include all of the variables of interest as long as the correlations among the measures that were used are reported or can be computed (Jak, 2015). Studies that did not include all of the correlations between measured variables were excluded due to problems and concerns in estimating missing effect sizes (Cheung, 2015).

Search results

An initial pool of 157 studies was identified as candidate studies based on the review process described above. Each study was first examined to determine if three or more of the constructs of interest were the focus of investigation. Second, the studies were examined to determine if the correlations among the measures were included in the research reports. The majority of studies (69%) were excluded because they did not include measures of at least three of the relevant variables or no correlations were reported among the measures. Most of the studies were excluded because they did not include family-centered capacity-building and parenting efficacy belief measures and at least one other variable of interest.

The remaining studies were examined further to determine if they met the inclusion criteria. An additional 35 studies were excluded because they either did not include the correlations among all study

Table 1. Representative search terms used to locate candidate studies.

Construct	Examples of search terms ^a
Capacity-building practices	Family-centered, family-centred, helpgiving, help-giving, help giving, participatory, enabling, empowering, capacity-building
Parenting efficacy beliefs	Self-efficacy, parenting beliefs, parenting confidence, parenting competence, belief appraisals, parenting efficacy, parenting beliefs, personal control, effectiveness, parenting appraisals
Parent-child interactions	(Parent OR maternal OR caregiver) responsiveness, sensitivity, childrearing practices, parenting styles, skills, interactional, participation
Child social competence	(Infant OR toddler OR preschooler OR child) prosocial behavior, social behavior, emotional behavior, social-emotional behavior, affective behavior, adaptive behavior
Child development	(Infant OR toddler OR preschooler OR child) cognitive development, language development, intellectual development, mental development

^aIncludes controlled vocabulary, keyword and natural language terms. Note different combinations of search terms were used to locate candidate studies (e.g., “family-centered” and “parenting efficacy” and “maternal responsiveness”).

Table 2. Selected characteristics of the child participants.

Study	N	Child age (months)		Child condition (%)	
		Mean	Range	Identified disability	Developmental delay
Bailey et al. (2007)	2586	17	1-39	30	59
Bruder and Dunst (2006)	1003	27	7-36	35	59
Bruder and Dunst (2008)	346	25	5-40	68	30
Bruder et al. (2009)	118	42	15-79	-	-
Dunst (1999)	574	46	9-88	51	38
Dunst et al. (1998)	1110	39	4-60	45	42
Dunst et al. (2002)	45	30	15-41	58	15
Dunst et al. (2006) (Study 3)	48	28	6-54	39	4
Dunst et al. (2007)	205	27	5-37	52	28
Holdgrafer (1988)	138	27	2-60	83	7
Kolobe (2004)	62	12	9-14	0	33
Shonkoff et al. (1992)	190	11	1-27	69	31
Trivette et al. (1996)	82	26	3-60	39	29

measures or some correlations were missing or reported as non-significant. The decision to not include these studies was based on the fact that assumptions for estimating missing correlations were not met (Jak et al., 2013). The final sample of 13 studies included 6507 participants. The studies were located in eight journal articles (Bailey et al., 2007; Bruder and Dunst, 2008; Bruder et al., 2009; Dunst, 1999; Dunst et al., 2002; Dunst et al., 2007; Kolobe, 2004; Trivette et al., 1996), two monographs (Dunst et al., 2006; Shonkoff et al., 1992), two unpublished reports (Bruder and Dunst, 2006; Dunst et al., 1998), and one thesis (Holdgrafer, 1988). The average sample size in the studies was 500 (SD = 721; Range = 45 to 2586). All of the studies were conducted in the United States. Table 2 shows selected characteristics of the children receiving early childhood intervention. All but one study reported child diagnosis. The majority of children (78%) had either identified disabilities or

developmental delays. The average percent of children with identified disabilities was 47 (SD = 22; Range = 0 to 69) and the average percentage of children with developmental delays was 31 (SD = 17; Range = 4 to 59). The caregivers who were study participants were primarily the children's mothers (96%). Their average ages ranged between 27 and 42 years (Range = 13 to 69). The participants' average years of formal education ranged between 12 and 16 (Range = 0 to 22). Most of the participants (82%) were either married or living with a partner whereas the other participants were single, divorced, or widowed.

Coding scheme

A structured data collection form was used to code the variables in

each study and the particular scales, instruments, or methods used to measure each SEM construct. We had access to the raw data in all but one study (Kolobe, 2004). This permitted the use of different sets of study items to construct measures of a number of SEM variables where the correlations among measures could be computed. The primary variables of interest were family-centered capacity-building practices; parenting efficacy beliefs; responsive and sensitive parent interactional behavior; child social competencies; and child cognitive development.

Capacity-building practices

Family-centered capacity-building practices were assessed in terms of parent-reported practitioner use of help giving practices that involved informed family decision-making and active family involvement in acting on those decisions (Espe-Sherwindt and Serrano, 2016). Capacity-building was measured by the participatory help giving practices subscales on the *Family-Centered Practices Scale* (Dunst and Trivette, 2002), *Help-Giving Practices Scale* (Dunst et al., 1996), and investigator-developed measures. The latter included primarily subsets of items on existing family-centered practices scales that were administered to study participants.

Parenting efficacy beliefs

Parenting efficacy was assessed in terms of parents' judgments of their abilities to organize and execute parenting roles and responsibilities to have intended or expected child behavior consequences (Wittkowski et al., 2017). Parenting efficacy beliefs were measured by the *Parenting Experiences Scale* (Trivette and Dunst, 2004), *Personal Assessment of Control Scale* (Boyd and Dunst, 1996), *Confidence in Parenting Scale* (Bailey et al., 2007), and investigator-developed measures.

Parent-child interactions

Parenting practices were assessed in terms of caregiver behavior known to have development-enhancing characteristics and consequences (Richter, 2004; van IJzendoorn, 1995). This included primarily parenting sensitivity and responsiveness to child behavior initiations and interactions (Dunst and Kassow, 2008; Nievar and Becker, 2008). Parent-child interactions were measured by the *Nursing Child Assessment Teaching Scale* (Barnard and Kelly, 1990), *Parent-Child Play Scale* (Dunst, 1986), *Parent Behavior Rating Scale* (Dunst, 1990), and investigator-developed measures.

Child social interactive behavior

Child behavior competence was assessed in terms of prosocial behavior used by a child to initiate and sustain interactions with parents and other caregivers (Whiting et al., 1992). Prosocial child competence was measured using behavioral indicators of child interactive competencies in individual studies. This included, but was not limited to, the frequency of child positive affect, child behavior initiations, and affection toward others.

Child cognitive development

Child cognitive development was assessed using standardized measures of intellectual development (Ellingsen, 2016). This included the *Bayley Scales of Infant Development* (Bayley, 1993), *Griffiths' Mental Development Scales* (Griffiths and Huntley, 1996),

McCarthy Scales of Children's Abilities (McCarthy, 1972), and *Wisconsin Behavior Rating Scales* (Song et al., 1979). Each child's cognitive developmental quotient was computed as mental age divided by chronological age multiplied by 100.

Moderator variables

The moderators of the relationships between the variables in the SEM were mothers' education, frequency of parent-practitioner contacts, and child disability. Mothers' education was measured in terms of years of formal schooling. Frequency of contacts was coded on a continuum from 4 to 5 days per week to once every 2 or 3 months. Child disability was measured on a continuum from multiple disabilities to at-risk for poor outcomes for family socioeconomic reasons. Contrast coding (Cohen et al., 2003) was used to code child disability on a continuum from multiple disabilities to at-risk for poor developmental outcomes.

Data preparation

The correlations among the variables of interest in each candidate study were first examined to determine which correlations were reported for which variables or could be computed from available data. Matrices for variables missing at random were retained for further analysis, whereas studies with variables not missing at random were excluded from further analysis. Data is considered missing at random if one or more variables of interest were not the focus of investigation in a primary study. In this case, "the missingness of the effect sizes in considered missing at random; that is, the missingness may depend on observed data but not on unobserved data, and the proposed SEM approach is unbiased and efficient" (Cheung and Chan, 2009). In contrast, missing data is considered non-random when variables of interest were included in a study but the correlations are reported as non-significant or not reported at all.

Method of analysis

A two-stage SEM approach was used to produce a weighted pooled correlation matrix and to perform the SEM using the pooled matrix (Cheung and Chan, 2009). The analyses were performed using the metaSEM package in R (Cheung, 2014b). At Stage 1, the homogeneity of the correlations in the different studies was evaluated in order to produce a weighted pooled correlation matrix. At Stage 2, the Figure 1 SEM was fitted to the pooled correlation matrix where different fit indices (Kenny, 2015) were used to evaluate the adequacy of the fit of the model to the data and to obtain the standardized structural equation coefficients between the variables in the SEM to determine pathways of influence. The fit indices included the chi-square test of the SEM model, the root mean square error of approximation (RMSEA), the standardized root mean square residual (SRMR), the comparative fit index (CFI), and the Tucker-Lewis index (TLI). A non-significant chi-square test indicates an adequate fit of the SEM to the data. An RMSEA and SRMR close to zero, and a CFI and TLI close to 1.0, indicates an excellent fit of an SEM to the data.

Random-effects analyses were performed at both Stages 1 and 2 because a Stage 1 fixed-effects analysis indicated that the correlations between certain pairwise variables were heterogeneous across studies (see results below). A Stage 1 random-effects analysis takes into consideration both between study and within study variability in estimating a weighted pooled correlation matrix (Cheung, 2014a). At Stage 2, the random-effects pooled correlation matrix is used as the input where an SEM is fitted to the patterns of relationships among the variables in the model.

Table 3. Weighted pooled correlations among the study variables (above diagonal) and the indices of heterogeneity between the study variables (below diagonal).

Study variable	Study variables				
	FCB	PEB	PCI	CSC	CCD
Family-Centered Capacity-Building (FCB)	-	0.422****	0.171**	0.160***	0.148*
Parenting Efficacy Beliefs (PEB)	0.913	-	0.341***	0.218****	0.187**
Parent-Child Interactions (PCI)	0.000	0.911	-	0.271*	0.298****
Child Social Competence (CSC)	0.537	0.000	0.928	-	0.109
Child Cognitive Development (CCD)	0.000	0.000	0.831	0.000	-

* $p < 0.05$. ** $p < 0.01$, *** $p < 0.001$, **** $p < 0.0001$.

In instances where a Stage 1 fixed-effects analysis indicates a less-than-adequate goodness-of-fit between the correlations matrices in the different studies, a Stage 1 random-effects analysis is used to identify the sources of heterogeneity using the I^2 statistic which can vary between zero and 100, where values greater than 75 indicate inconsistency in the average sizes of effects between the correlation matrices in the different studies (Higgins et al., 2003). I^2 is "interpreted as the proportion of total variance that is due to differences between studies" (Jak, 2015: 27).

RESULTS

The results for both the Stage 1 and 2 analyses are described next to show how the pooled correlation matrix was computed and how the correlation matrix was used to fit the proposed structural model. The analyses illustrate how findings from different studies can be combined and used to investigate the relationships among the variables of interest using MASEM as a data analytic strategy for identifying those relationships.

Stage 1 analysis

The goodness-of-fit indices for the Stage 1 fixed-effects analysis was $\chi^2(27, 6507) = 153.84$, $p = 0.0000$, RMSEA = 0.10 (95% CI = 0.08, 0.11), SRMR = .08, CFI = 0.91, and TLI = 0.88. Because these fit indices are marginally adequate, a random-effects Stage 1 analysis was run in order to obtain the appropriate weighted pooled correlation matrix among the SEM variables. The Q statistic for the homogeneity of effect sizes was 171.69, $df = 27$, $p = 0.0000$, indicating that there was heterogeneity in the correlation matrices in the studies in the SEM. The SEM includes 10 pairwise correlations among the five primary variables of interest. Five of the pairwise correlations had $I^2 = 0$, one pairwise correlation had an $I^2 = 0.54$, and four pairwise correlations had I^2 values between 0.83 and 0.93. These results indicate heterogeneity among half of the study variables.

Table 3 shows the random-effects pooled correlations among the study variables above the diagonal. The I^2 between the pairwise correlations are shown below the

diagonal. The sizes of effects between the primary variables were generally as expected. The size of effect between family-centered capacity-building practices and the other SEM variables was largest for parenting efficacy beliefs. The size of effects between parenting efficacy beliefs and the other SEM variables was largest for parent-child interactions. The sizes of effects between parent-child interactions and the two child outcome measures were also as expected. The size of effect between child social competence and child cognitive development was the smallest and unexpected.

Stage 2 analysis

The goodness-of-fit indices for the fit of the Figure 1 SEM to the data were $\chi^2(2, 6507) = 2.62$, $p = 0.2695$, RMSEA = 0.01 (95% CI = 0.00, 0.03), SRMR = 0.03, CFI = 0.99, and TLI = 0.99. The results indicate an excellent fit of the model to the data. The standardized structural coefficients for the pathways of influence among the variables in the model are shown in Figure 2. The sizes of effects for the hypothesized pathways are $\beta = 0.43$, $p = 0.0000$, for the relationship between family-centered capacity-building practices and parenting efficacy beliefs; $\beta = 0.27$, $p = 0.0000$, for the relationship between parenting efficacy and parent-child interactions; and $\beta = 0.25$, $p = 0.0000$, and $\beta = 0.27$, $p = 0.0000$, for the relationships between parent-child interactions and child social competence and child cognitive development, respectively.

In addition to the hypothesized pathways in the SEM, parenting efficacy beliefs were directly related to child social competence, $\beta = 0.14$, $p = 0.0011$, but only marginally related to child cognitive development, $\beta = 0.10$, $p = 0.0700$. The only pathway in the model that did not approach statistical significance was between family-centered capacity-building and parent-child interactions, $\beta = 0.07$, $p = 0.2262$ (Figure 2).

Table 4 shows the effects decomposition for the direct, indirect, and total effects for the relationships among the variables in the SEM. The direct effects are the same as those in Figure 2. As expected, family-centered capacity-

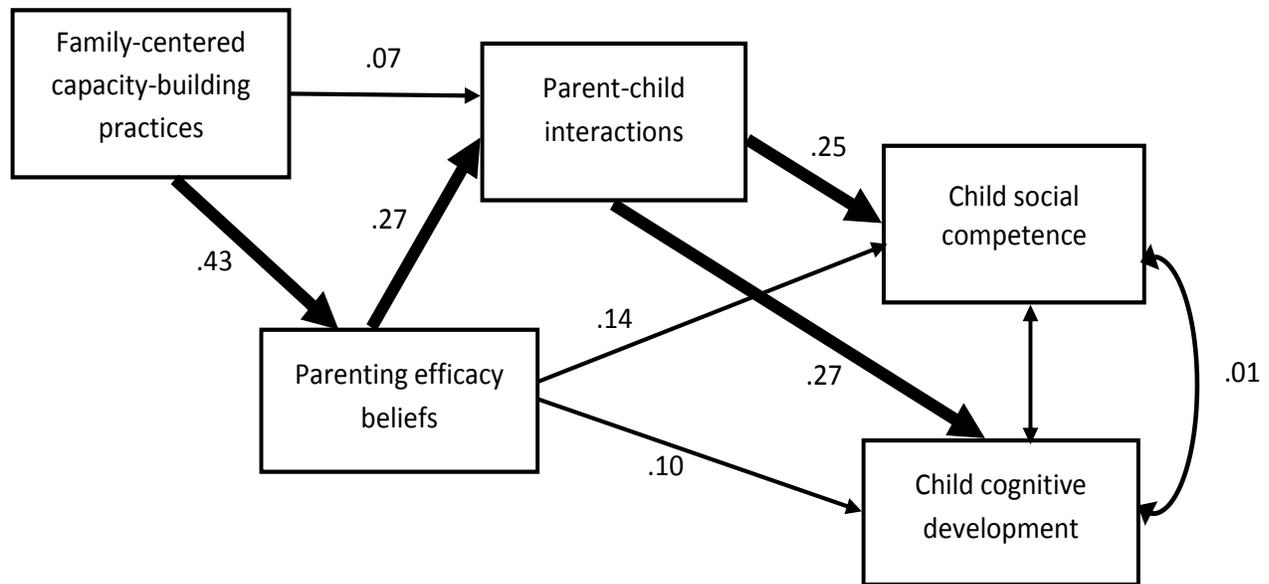


Figure 2. Standardized structural coefficients for the relationships among the MASEM variables.

Table 4. Effects decomposition for the relationships among the study variables.

Outcome variable	Predictor variables	Direct effects		Indirect effects		Total effects	
		β	<i>p</i> -value	β	<i>p</i> -value	β	<i>p</i> -value
Parenting efficacy beliefs	Capacity-building practices	0.43	0.0000	-	-	0.43	0.0000
Parent-child interactions	Capacity-building practices	0.07	0.2262	0.12	0.0281	0.19	0.0376
	Parenting efficacy beliefs	0.27	0.0137	-	-	0.27	0.0137
Child social competence	Parenting efficacy beliefs	0.14	0.0011	0.07	0.1251	0.21	0.0025
	Parent-child interactions	0.25	0.0245	-	-	0.25	0.0025
Child cognitive development	Parenting efficacy beliefs	0.10	0.0700	0.07	0.0694	0.17	0.0233
	Parent-child interactions	0.27	0.0002	-	-	0.27	0.0002

building was indirectly related to parent-child interactions mediated by parenting efficacy beliefs, $\beta = 0.12$, $p = 0.0281$. Contrary to expectation, parenting efficacy beliefs were not indirectly related to the two child outcome measures mediated by parent-child interactions. The results for the total effects for the relationships among the SEM variables indicate that a combination of direct and indirect effects best explain the patterns of relationships among the study measures. All of the β s for the total effects are statistically significant and highlight how the variables of interest are related in discernable ways consistent with the hypothesized patterns of relationships guiding the conduct of the MASEM.

Moderator analyses

The standardized structural coefficients from the tests of moderator analyses were all small and statistically non-

significant. The β s were all 0.06 or smaller. The results indicated that the relationships among the primary variables of interest shown in Figure 1 and Table 4 were not influenced by parent education, severity of child disability, or frequency of practitioner-parent contacts.

DISCUSSION

Results from the MASEM were consistent with the hypothesized relationships among the variables in the SEM. The effects of practitioner use of family-centered capacity-building practices were traced to variations in child social competence and child cognitive development through both parenting efficacy beliefs and responsive and sensitive parenting practices. The hypothesized patterns of results were confirmed by the sizes of effects between capacity-building practices and parenting efficacy beliefs; parenting beliefs and parent-child

interactions; and parenting practices and child behavior and child development (Figure 1). The effects decomposition showed that a combination of direct and indirect effects best explained the relationships among the study variables (Table 4). The MASEM is part of a line of research and practice on investigating the manner in which family-centered practices in general, and family-centered capacity-building practices in particular, are related to parent, family, and child outcomes (Dunst, 2012; Dunst and Trivette 2010). Previously completed SEM studies (Dunst et al., 2007, 2013), meta-analyses (Dunst et al., 2007; Dunst et al., 2008), and MASEMs (Dunst and Trivette, 2009; Trivette et al., 2010), however, included measures of different kinds of family-centered practices and measures of different kinds of self-efficacy beliefs. This was addressed in the present study by including measures of only family-centered capacity-building practices and measures of only parenting efficacy beliefs. This permitted a better determination of how these particular variables were empirically related.

As noted in the introduction, family-centered practices are a particular type of help giving used by practitioners (help givers) to support and strengthen help receiver competence and confidence (Dunst and Trivette, 1996; Dunst et al., 1988). Family-centered early childhood intervention practices include the help giving practices used by practitioners with parents of infants, toddlers, and preschoolers of children with and without disabilities and delays (Rouse, 2012; Tomasello et al., 2010). Capacity-building early childhood intervention practices are used by practitioners to both support and strengthen parents' abilities to (1) provide their children development-enhancing learning opportunities (Dunst and Espe-Sherwindt, 2016; Swanson et al., 2011) and (2) obtain the resources and social supports for carrying out parenting responsibilities (Dunst and Trivette, 2011; Dunst et al., 1994).

Family-centered capacity-building practices are how early childhood intervention practitioners promote parents' use of different kinds of intervention practices. The distinction between how and what continues to be misunderstood in the early childhood intervention literature (Dunst and Espe-Sherwindt, 2016). The difference between how and what was examined in the MASEM by differentiating between practitioner capacity-building (help giving) practices and parent interactional practices. The latter has been a primary focus of early childhood intervention for more than 50 years (Dyches et al., 2012) but without explicit consideration as to how practitioners support and strengthen parenting practices. Results from the MASEM indicated that family-centered capacity-building practices are indirectly related to variations in how parents interact with their children mediated by parenting efficacy beliefs. Stated differently, capacity-building practices bolster parenting beliefs, where belief appraisals, in turn, result in more effective use of parenting practices.

Implications for research

Meta-analyses of the sort described in this paper can be especially informative in terms of investigating the relationships among variables of interest. The MASEM, however, proved challenging for a number of reasons. Several are highlighted. First, only about a dozen studies were located that included at least 3 of the 5 variables that were the focus of investigation. As noted in the search results section, only 13 out of an initial pool of 150+ studies met the inclusion criteria. Second, studies that included measures of the variables of interest had quite different scales, instruments, and methods to assess the MASEM constructs. Examination of the correlation matrices in individual studies indicated considerable variability in the patterns of relationships among the study variables, contributing to the heterogeneity among the pooled correlations (Table 3). Third, the standard errors for several of the parameter estimates of the variables in the SEM were noticeably large for certain standardized structural coefficients. This would have likely suppressed the strength of relationships among measures.

The line of research and practice guiding the conduct of the MASEM is based on social and family systems theories where basic tenets have been used to formulate the hypothesized relationships among variables of interest (Bronfenbrenner, 1979; Emery, 2014; Friedman and Allen, 2010). These types of theories are used widely in early childhood intervention to build a case for systems intervention models and practices (Darling, 1989; Seligman and Darling, 2016; Sukkar et al., 2017). There is, however, a lag gap between these theories and research to support basic tenets as evidenced by the small number of studies that were located and used to conduct the MASEM. Early childhood intervention researchers interested in testing complex relationships among systems variables, and especially where variable of interest differ in terms of the focus of investigation (e.g., practitioner, parent, parent-child, and child), are advised to carefully consider which variables need to be included in a study and which measures are best suited for evaluating systems effects. Otherwise, explanatory paths of influence may be overlooked where results may not capture systems complexities.

At least two limitations of the MASEM need to be highlighted since they have implications for further research. First, the studies in the MASEM included primarily young children with identified disabilities and developmental delays. Whether the pattern of results would be similar or different for children without disabilities or delays needs to be independently established. There is, however, no reason not to expect similar results since meta-analyses of the same or similar variables are more alike than different (Brown et al., 2008; de Wolff and van IJzendoorn, 1997; Pinquart and Teubert, 2010). The second limitation has to do with the

fact that all the studies were conducted in the United States. Replication of the results would therefore need to be done in other countries to be assured the findings can be generalized to families in other countries and especially among families with diverse cultural backgrounds.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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REFERENCES

- Bailey DB Jr, Nelson L, Hebbler K, Spiker D (2007). Modeling the impact of formal and informal supports for young children with disabilities and their families. *Pediatrics* 120:992-1001.
- Bandura A (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Barnard KE, Kelly JF (1990). Assessment of parent-child interaction. In SJ Meisels JP Shonkoff Eds *Handbook of early childhood intervention*. New York, NY: Cambridge University Press pp. 278-302.
- Bayley N (1993). *Bayley Scales of Infant Development* 2nd ed. San Antonio, TX: Psychological Corporation.
- Bayley N (2006). *Bayley Scales of Infant and Toddler Development* 3rd ed. San Antonio, TX: Psychological Corporation.
- Boyd K, Dunst CJ (1996). *Personal assessment of control scale*. Asheville, NC: Winterberry Press.
- Bronfenbrenner U (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.
- Bronfenbrenner U (1994). Ecological models of human development. In T Husen, TN Postlethwaite Eds. *International encyclopedia of education* 2nd Ed. 3:1643-1647. Oxford, UK: Elsevier.
- Brown CH, Wang W, Sandler I (2008). Examining how context changes intervention impact: The use of effect sizes in multilevel mixture meta-analysis. *Child Development Perspectives* 2:198-205.
- Bruder MB, Dunst CJ (2006). *Birth to three intervention systems evaluation study (Unpublished study)*. Farmington CT: AJ Pappanikou Center for Excellence, University of Connecticut Health Center.
- Bruder MB, Dunst CJ (2008). Factors related to the scope of early intervention service coordinator practices. *Infants and Young Children* 21(3):176-185.
- Bruder MB, Dunst CJ, Mogro-Wilson C (2009). Child factors associated with enrollment in Part C early intervention among adopted children from China. *Journal of Early Intervention* 32:54-67.
- Buckingham SL, Brandt NE, Becker KD, Gordon D, Cammack N (2016). Collaboration, empowerment, and advocacy: Consumer perspectives about treatment engagement. *Journal of Child and Family Studies* 25(12):3702-3715.
- Cheung MW-L (2014a). Fixed- and random-effects meta-analytic structural equation modeling: Examples and analyses in R. *Behavior Research Methods* 46:29-40.
- Cheung MW-L (2014b). *metaSEM: An R package for meta-analysis using structural equation modeling*. *Frontiers in Psychology* 5:1521-1535.
- Cheung MW-L (2015). *Meta-analysis: A structural equation modeling approach*. Chichester, U. K.: John Wiley and Sons.
- Cheung MW-L, Chan W (2009). A two-stage approach to synthesizing covariance matrices in meta-analytic structural equation modeling. *Structural Equation Modeling* 16:28-53.
- Cohen J, Cohen P, West SG, Aiken LS (2003). *Applied multiple regression/correlation analysis for the behavioral sciences*. 3rd ed. Mahwah, NJ: Erlbaum.
- Coleman PK, Trent A, Bryan S, King B, Rogers N, Nazir M (2002). Parenting behavior, mothers' self-efficacy beliefs, and toddler performance on the Bayley Scales of Infant Development. *Early Child Development and Care* 172:123-140.
- Conners CK (1997). *Conners' parent rating scale*. North Tonawanda, NY: Multi-Health Systems.
- Crossman MK, Warfield ME, Kotelchuck M, Hauser-Cram P, Parish S (2018). Associations between early intervention home visits, family relationships and competence for mothers of children with developmental disabilities. *Maternal and Child Health Journal* 22(4):599-607.
- Darling RB (1989). Using the social system perspective in early intervention: The value of a sociological approach. *Journal of Early Intervention* 13:24-35.
- de Wolff MS, van IJzendoorn MH (1997). Sensitivity and attachment: A meta-analysis on parental antecedents of infant attachment. *Child Development* 68:571-591.
- Dempsey I, Keen D (2008). A review of processes and outcomes in family-centered services for children with a disability. *Topics in Early Childhood Special Education* 28:42-52.
- Dempsey I, Keen D (2017). Desirable outcomes associated with family-centred practices for young children with disabilities. In H Sukkar, CJ Dunst, J Kirkby Eds. *Early childhood intervention: Working with families of young children with special needs* (61-73). Abingdon, Oxfordshire: Routledge.
- Dunst CJ (1986). *Parent-child play scale: A rating scale for assessing parent-child play opportunities*. Asheville, NC: Winterberry Press.
- Dunst CJ (1990). *Parent behavior rating scale*. Asheville, NC: Winterberry Press.
- Dunst CJ (1999). Placing parent education in conceptual and empirical context. *Topics in Early Childhood Special Education* 19:141-147.
- Dunst CJ (2007). Early intervention with infants and toddlers with developmental disabilities. In Odom SL, Horner RH, Snell M, Blacher J Eds. *Handbook of developmental disabilities*. New York: Guilford Press pp. 161-180.
- Dunst CJ, Trivette (2010). *Family capacity-building in early childhood intervention: Effects on parent and child competence and confidence*. Presentation made at the 8th National Congress on Early Intervention with Young Children and their Families, Aveiro, Portugal. Retrieved from http://puckett.org/presentations/FamilyCapBuildEarlyChildInt_11_2010.pdf2010.
- Dunst CJ (2012). *Capacity-building family-centered practices: Characteristics and evidence base*. Presentation made at the National Council on Family Relations Annual Conference, Phoenix, AZ Retrieved from http://puckett.org/presentations/CapacityBldgFamilyCntrd%20Practices_Arizonapdf.
- Dunst CJ (2017). *Family systems early childhood intervention*. In H Sukkar CJ Dunst J Kirkby Eds *Early childhood intervention: Working with families of young children with special needs* (38-60). Abingdon, Oxfordshire: Routledge.
- Dunst CJ, Boyd K, Trivette CM, Hamby D (2002). Family-oriented program models and professional helpgiving practices. *Family Relations* 51:221-229.
- Dunst CJ, Brookfield J, Epstein N (1998). *Family-centered early intervention and child, parent and family benefits: Final report* Harrisburg, PA: Pennsylvania Department of Public Welfare, Office of Mental Retardation.
- Dunst CJ, Dempsey I (2007). Family-professional partnerships and parenting competence, confidence, and enjoyment. *International*

- Journal of Disability, Development and Education 54:305-318.
- Dunst CJ, Espe-Sherwindt M (2016). Family-centered practices in early childhood intervention. In B Reichow BA Boyd EE Barton SL Odum Eds Handbook of early childhood special education (37-55). Switzerland: Springer International.
- Dunst CJ, Hamby DW, Brookfield J (2007). Modeling the effects of early childhood intervention variables on parent and family well-being. *Journal of Applied Quantitative Methods* 2:268-288.
- Dunst CJ, Kassow DZ (2008). Caregiver sensitivity, contingent social responsiveness, and secure infant attachment. *Journal of Early and Intensive Behavior Intervention* 5:40-56.
- Dunst CJ, Trivette CM (1996). Empowerment, effective helping practices and family-centered care. *Pediatric Nursing* 22:334-343.
- Dunst CJ, Trivette CM (2002). Family-centered practices scale. Asheville, NC: Winterberry Press.
- Dunst CJ, Trivette CM (2009). Meta-analytic structural equation modeling of the influences of family-centered care on parent and child psychological health. *International Journal of Pediatrics* pp.1-9.
- Dunst CJ, Trivette CM (2010). Family-centered helping practices, parent-professional partnerships, and parent, family and child outcomes. In SL Christenson AL Reschley Eds Handbook of school-family partnerships (362-379). New York: Routledge.
- Dunst CJ, Trivette CM (2011). Capacity-building family systems intervention practices. In G Singer D Biegel P Conway Eds Family support and family caregiving across disabilities. New York, NY: Routledge pp. 33-57.
- Dunst CJ, Trivette CM, Deal AG (1988). Enabling and empowering families: Principles and guidelines for practice. Cambridge, MA: Brookline Books.
- Dunst CJ, Trivette CM, Deal AG (1994). Supporting and strengthening families: Methods, strategies and practices. Cambridge, MA: Brookline Books.
- Dunst CJ, Trivette CM, Hamby DW (1996). Measuring the helping practices of human services program practitioners. *Human Relations* 49:815-835.
- Dunst CJ, Trivette CM, Hamby DW (2006). Family support program quality and parent, family and child benefits. Asheville, NC: Winterberry Press.
- Dunst CJ, Trivette CM, Hamby DW (2007). Meta-analysis of family-centered helping practices research. *Mental Retardation and Developmental Disabilities Research Reviews* 13:370-378.
- Dunst CJ, Trivette CM, Hamby DW (2008). Research synthesis and meta-analysis of studies of family-centered practices. Asheville, NC: Winterberry Press.
- Dunst CJ, Trivette CM, Raab M (2013). Pathways of influence of early intervention on family, parent and child outcomes. Presentation made at the Division for Early Childhood 29th Annual International Conference on Young Children with Special Needs and Their Families, San Francisco. Retrieved from http://puckettorg/presentations/Pathway_%20Influ_Early_Interv_Family%20Parent_Child_Outcomespdf.
- Dyches TT, Smith TB, Korth BB, Roper SO, Mandlco B (2012). Positive parenting of children with developmental disabilities: A meta-analysis. *Research in Developmental Disabilities* 33:2213-2220.
- Ellingsen KM (2016). Standardized assessment of cognitive development: Instruments and issues. In A Garro Ed Early childhood assessment in school and clinical child psychology. New York: Springer Science+Business Media pp. 26-49. doi:10.1007/978-1-4939-6349-2_2
- Emery RE (2014). Families as systems: Some thoughts on methods and theory. In SM McHale P Amato A Booth Eds Emerging methods in family research. Switzerland: Springer International Publishing pp. 109-124.
- Espe-Sherwindt M (2008). Family-centred practice: Collaboration, competency and evidence. *Support for Learning* 23:136-143.
- Espe-Sherwindt M, Serrano AM (2016). It takes two: The role of family-centered practices in communication intervention. *Revista de Logopedia, Foniatría y Audiología* 36(4):162-169.
- Friedman BD, Allen KN (2010). Systems theory. In Brandell JR Ed Theory and practice in clinical social work 2nd ed (3-20). Thousand Oaks, CA: SAGE.
- Griffiths R, Huntley M (1996). Griffiths mental development scales-revised: Birth to 2 years. Oxford, England: Hogrefe.
- Groark CJ, Eidelman SM, Maude S, Kaczmarek L (2011). Early childhood intervention: Shaping the future for children with special needs and their families. Santa Barbara, CA: Praeger.
- Guzell JR, Vernon-Feagans L (2004). Parental perceived control over caregiving and its relationship to parent-infant interaction. *Child Development* 75:134-146.
- Higgins JP, Thompson SG, Deeks JJ, Altman DG (2003). Measuring inconsistency in meta-analyses. *British Medical Journal* 327:557-560.
- Hohlfeld AS, Harty M, Engel ME (2018). Parents of children with disabilities: A systematic review of parenting interventions and self-efficacy. *African Journal of Disability* 7:437-448.
- Holdgrafer MS (1988). The influence of social support on parent, family and child functioning (Unpublished master's thesis). University of Alberta, Edmonton, Canada.
- Jak S (2015). Meta-analytic structural equation modelling. New York: Springer.
- Jak S, Oort FJ, Roorda DL, Koomen HM (2013). Meta-analytic structural equation modelling with missing correlations. *Netherlands Journal of Psychology* 65(4):132-139.
- Kenny DA (2015). Measuring model fit. Retrieved from <http://davidakenny.net/cm/fit.htm>.
- Kolobe TH (2004). Childrearing practices and developmental expectations for Mexican-American mothers and the developmental status of their infants. *Physical Therapy* 84:439-453.
- Landry SH, Smith KE, Swank PR, Assel MA, Vellet S (2001). Does early responsive parenting have a special importance for children's development or is consistency across early childhood necessary? *Developmental Psychology* 37:387-403.
- Mahoney G, Powell A, Finger I (1986). The Maternal Behavior Rating Scale. *Topics in Early Childhood Special Education* 6(2):44-55.
- McCarthy D (1972). Manual for the McCarthy Scales of Children's Abilities. New York, NY: Psychological Corporation.
- Nievar MA, Becker BJ (2008). Sensitivity as a privileged predictor of attachment: A second perspective on De Wolff and van IJzendoorn's meta-analysis. *Social Development* 17:102-114.
- Nievar MA, van Egeren LA, Pollard S (2010). A meta-analysis of home visiting programs: Moderators of improvements in maternal behavior. *Infant Mental Health Journal* 31:499-520.
- Pinquart M, Teubert D (2010). Effects of parenting education with expectant and new parents: A meta-analysis. *Journal of Family Psychology* 24:316-327.
- Powell D (2003). Parenting beliefs and behaviors: What matters most. *Schools and Families* 6(1):1-4.
- Powell D (1988). Parent education as early childhood intervention: Emerging directions in theory, research and practice. Norwood, NJ: Ablex.
- Richter L (2004). The importance of caregiver-child interactions for the survival and healthy development of young children: A review. Geneva, Switzerland: World Health Organization. Retrieved from <http://apps.who.int/iris/bitstream/10665/42878/1/924159134X.pdf>.
- Rogers H, Matthews J (2004). The parenting sense of competence scale: Investigation of the factor structure, reliability, and validity for an Australian sample. *Australian Psychologist* 39(1):88-96.
- Rouse L (2012). Family-centred practice: Empowerment, self-efficacy, and challenges for practitioners in early childhood education and care. *Contemporary Issues in Early Childhood* 13(1):17-26.
- Seligman M, Darling RB (2016). Ordinary families, special children: A systems approach to childhood disability 3rd ed. New York: Guilford Press.
- Shonkoff J, Hauser-Cram P, Wyngarden-Krauss MW, Upshur CC (1992). Development of infants with disabilities and their families: Implications for theory and service delivery. *Monographs of the Society for Research in Child Development* 57:6 Serial No. 230.
- Skinner E, Greene T (2008). Perceived control: Engagement, coping, and development. In TL Good Ed 21st century education: A reference handbook. Newbury Park, CA: Sage Publications pp. 131-130.
- Song A, Jones S, Lippert J, Metzgen K, Miller J, Borreca C (1979). Wisconsin behavior rating scale. Madison, WI: Central Wisconsin Center for the Developmentally Disabled.
- Stelman LM, Assel MA, Swank PR, Smith KE, Landry SH (2002). Early maternal warm responsiveness as a predictor of child social skills:

- Direct and indirect paths of influence over time. *Applied Developmental Psychology* 23:135-156.
- Sukkar H, Dunst CJ, Kirkby J (2017). *Early childhood intervention: Working with families of young children with special needs*. Abingdon, Oxfordshire: Routledge.
- Summers N, Jenkins C (2001). Enabling practice: Investigation into the support of families with children with learning disabilities. *Journal of Intellectual Disabilities* 5:57-67.
- Swanson J, Raab M, Dunst CJ (2011). Strengthening family capacity to provide young children everyday natural learning opportunities. *Journal of Early Childhood Research* 9:66-80.
- Teti DM, O'Connell MA, Reiner CD (1996). Parenting sensitivity, parental depression and child health: The mediational role of parental self-efficacy. *Early Development and Parenting* 5:237-250.
- Thompson L, Lobb C, Elling R, Herman S, Jurkiewicz T, Hulleza C (1997). Pathways to family empowerment: Effects of family-centered delivery on early intervention services. *Exceptional Children* 64:99-113.
- Tomasello NM, Manning AR, Dulmus CN (2010). Family-centered early intervention for infants and toddlers with disabilities. *Journal of Family Social Work* 13(2):163-172.
- Trivette CM, Dunst CJ (2004). Evaluating family-based practices: Parenting experiences scale. *Young Exceptional Children* 7(3):12-19.
- Trivette CM, Dunst CJ, Hamby D (1996). Factors associated with perceived control appraisals in a family-centered early intervention program. *Journal of Early Intervention* 20:165-178.
- Trivette CM, Dunst CJ, Hamby DW (2010). Influences of family-systems intervention practices on parent-child interactions and child development. *Topics in Early Childhood Special Education* 30:3-19.
- van IJzendoorn M (1995). Adult attachment representations, parental responsiveness, and infant attachment: A meta-analysis on the predictive validity of the adult attachment interview. *Psychological Bulletin* 117:387-403.
- Whiting BB, Edwards CP, Ember CR (1992). *Children of different worlds: The formation of social behavior*. Cambridge, MA: Harvard University Press.
- Wittkowski A, Garrett C, Calam R, Weisberg D (2017). Self-report measures of parental self-efficacy: A systematic review of the current literature. *Journal of Child and Family Studies* 26:2960-2978.