

Interventions Supporting Mental Health and Positive Behavior in Children Ages Birth–5 Yr: A Systematic Review

Karrie Kingsley, Grace Sagester, Lindy L. Weaver

Importance: It is critical for providers to use evidence-based interventions to address mental health and behavioral barriers to occupational performance during early childhood.

Objective: To identify evidence-based interventions within the scope of occupational therapy practice to improve mental health and positive behavior for children ages 0–5 yr and their families.

Data Sources: PsycINFO, Cochrane, ERIC, MEDLINE, and OTseeker databases were searched for publications from 2010 through March 2017.

Study Selection and Data Collection: This review was completed in accordance with the Preferred Reporting Items for Systematic Reviews (PRISMA) guidelines. Risk of bias was assessed for each article using either A Measurement Tool to Assess Systematic Reviews (AMSTAR) or the Cochrane method. Articles meeting inclusion criteria were critically appraised.

Findings: Forty-six articles met inclusion criteria and were organized into three themes: touch-based interventions ($n = 9$), parent–child interaction therapy (PCIT; $n = 4$), and instruction-based interventions ($n = 33$). Statistically significant findings and overall risk of bias supported the use of touch-based interventions, PCIT, and parent training.

Conclusions and Relevance: The evidence indicates that touch-based interventions can improve infant self-regulation (strong), social behavior, and attachment (moderate) and reduce maternal stress, anxiety, and depression (low). Moderate-strength evidence supports PCIT to improve child behavior. The evidence indicates that parent training can improve parent behavior, maternal–infant attachment (strong), and parent mental health (moderate). Teacher training can improve mental health and behavior (moderate). Group-based parent training and sleep training have insufficient support (low).

What This Article Adds: Occupational therapy professionals working with children younger than age 5 yr can use the results of this systematic review to guide clinical decision making related to mental health and behavioral outcomes.

Experiences during infancy and early childhood can affect social, emotional, behavioral, and psychological development. Trauma, developmental disorders, and disruptions in attachment that occur in early childhood can predispose a child for later difficulties in forming relationships, self-regulation, and managing behavior. Approximately 9.85% of babies born in the United States in 2016 were preterm (Martin et al., 2018). Preterm birth is associated with infant mortality; developmental delays; and physical, social, and mental health issues (Kiechl-Kohlendorfer et al., 2009; Martin et al., 2018). In addition, preterm infants may exhibit reduced attention and responsivity that may affect a caregiver's ability to read and respond to their needs or to engage in typical infant–child social interactions (Ravn et al., 2011).

An estimated 45% of children experience or are exposed to at least one adverse childhood event (ACE), such as maltreatment, separation from family, violence, or substance use (Sacks & Murphey, 2018). ACE exposures are associated with cognitive and behavioral problems, maladaptive coping skills, and health risk behaviors during the developmental periods as well as into adulthood (Choi et al., 2017; Forster et al., 2017; Monnat & Chandler, 2015). In addition to preterm births and trauma exposure, approximately 7% of children in the United States live with a

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developmental disability (Zablotsky et al., 2017). Children with developmental disabilities are more likely to be diagnosed with a severe behavior disorder or mental health diagnosis than their typically developing peers (McIntyre, 2008). Preterm birth, early trauma exposure, and developmental disabilities can greatly influence children's psychological, emotional, and social trajectories, often placing them at risk for mental and physical health problems throughout childhood. In addition, research has shown that caregivers' psychological and physical health is strongly influenced by child behavior and caregiving demands (Raina et al., 2005), and a cyclical relationship exists between parental stress and attachment behavior and abuse and neglect of children (Stronach et al., 2013).

Taken together, the many early childhood mental health risk factors make it imperative to understand interventions that might support the social, emotional, and behavioral health of children and their caregivers. Infant and early childhood mental health interventions that facilitate skills for both parent and child include helping an infant or child form attachments with adults and peers, encouraging positive experiences and emotional regulation, and creating environments and supports for development and learning (Zero to Three, 2017). To maximize outcomes, parents are essential partners in supporting their child's social-emotional development and behavioral patterns. The objective of this systematic review was to answer the following question: What is the evidence for the effectiveness of interventions within the scope of occupational therapy practice to improve mental health and positive behavior for children ages 0–5 yr and their families?

Method

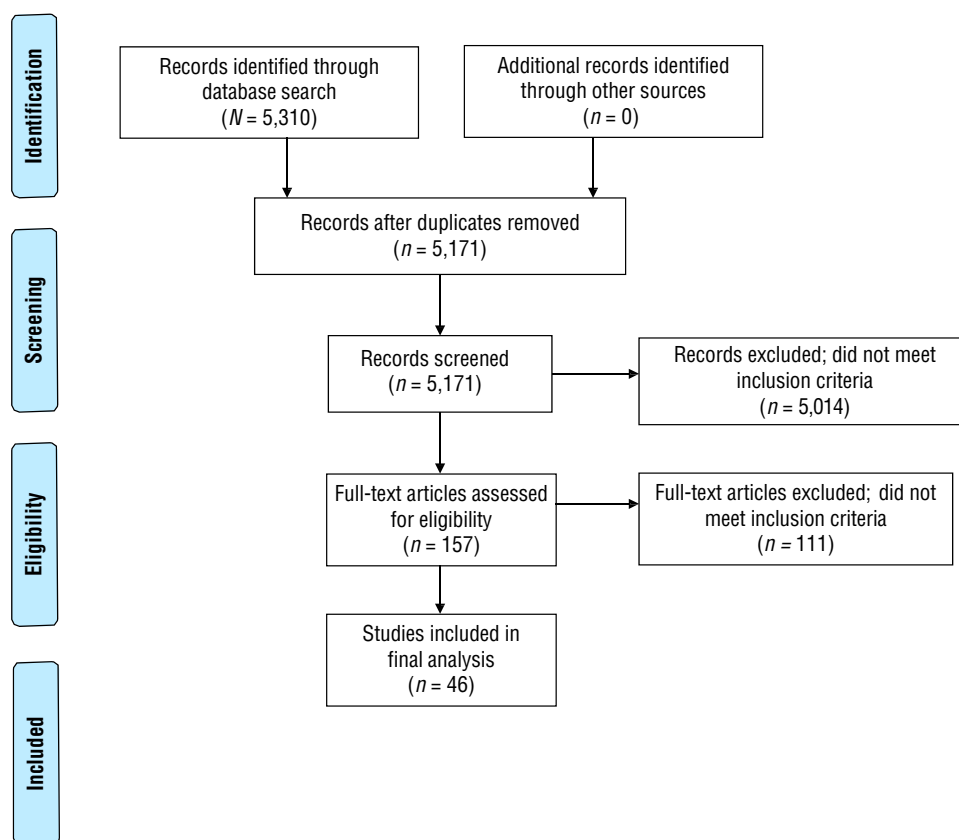
The search terms and strategy were developed by an AOTA research methodologist, a medical librarian, and an advisory group. A literature search captured various interventions (e.g., motor, social, cognitive, behavioral) for children ages 0–5. Databases searched were PsycINFO, Cochrane, ERIC, MEDLINE, and OTseeker; publication dates ranged from January 2010 to March 2017. The initial search returned 89,461 results. After initial screening by the AOTA methodologist, 5,310 results were eligible for inclusion in the systematic review (Figure 1). After removal of duplicates, all three authors of this review screened the article titles and abstracts according to the inclusion and exclusion criteria; at this stage, we provided a *yes*, *no*, or *maybe* rating to articles screened. We then engaged in iterative discussions to review ratings, resolved discrepancies, and agreed on final *yes* or *no* ratings for articles eligible for full-text review. In-depth review of full texts was completed at this stage, and articles that did not meet the inclusion criteria were eliminated.

Study Evaluation

We critically appraised each included article by extracting study design, participants, intervention and control groups, outcome measures, and results. We assigned level-of-evidence ratings to each study using the adapted ratings from Sackett (1989), and we assessed risk of bias across studies using A Measurement Tool to Assess Systematic Reviews (AMSTAR) and Cochrane methodologies. Finally, we conducted and wrote this systematic review according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) and AOTA evidence-based practice and research guidelines for strength of evidence assignment when discussing intervention themes. The strength of evidence is rated as *high* (2 or more Level I studies; consistent results from well-designed and conducted studies), *moderate* (at least 1 Level I high-quality study or multiple moderate-quality studies; evidence is sufficient but constrained by moderate methodological limitations and inconsistency of findings), or *low* (small number of low-level studies; significant methodological limitations and inconsistency in findings).

Inclusion and Exclusion Criteria

To be included, articles were required to be published in English in a peer-reviewed journal between January 2010 and March 2017, to include participants ages 0–5 yr, to examine interventions within the scope of occupational therapy, to include a mental health (e.g., anxiety, stress) or positive behavior (e.g., decreased aggression, social skills) outcome,

Figure 1. Flow diagram for inclusion and exclusion of peer-reviewed studies in the systematic review.

Note. Figure format from “Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement,” by D. Moher, A. Liberati, J. Tetzlaff, and D. G. Altman; PRISMA Group, 2009, *PLoS Medicine*, 6(7), e1000097. <https://doi.org/10.1371/journal.pmed.1000097>

and to provide Level I, II, or III evidence. We excluded articles that were dissertations, theses, presentations, or proceedings; that were published before 2010; that provided Level IV or V evidence; that focused only on adults (e.g., parental stress without any child outcome); that examined interventions that occupational therapy practitioners are not able to deliver; that included participants whose average age was >5 yr; that described interventions delivered in a kindergarten or primary school setting; and that were review articles in which participant age ranges were unclear.

Results

Forty-six studies were included in this systematic review (31 Level I, 8 Level II, and 7 Level III; [Tables A.1–A.3](#) in Appendix A). Thematic analysis resulted in the following themes: touch-based interventions, parent–child interaction therapy (PCIT), and instruction-based interventions.

Touch-Based Interventions

Nine studies examined skin-to-skin contact, kangaroo care (KC), or massage: 5 Level I studies with low to high risk of bias and 2 Level II and 2 Level III studies with high risk of bias. Five studies examined skin-to-skin contact or KC, and 4 studies explored the effectiveness of infant massage.

Skin-to-skin contact and KC provide direct contact between the infant’s and caregiver’s skin. Included studies measured a variety of outcomes, including indicators of physiological stability and parent and infant mental and

behavioral health. Overall, moderate strength of evidence supports the use of skin-to-skin contact and KC to address maternal stress, anxiety, and attachment. Low strength of evidence addresses skin-to-skin contact and KC to address maternal depression.

The use of lullaby music during KC sessions had a significant and large effect on decreasing maternal anxiety in a randomized controlled trial (RCT) conducted by [Lai et al. \(2006\)](#). Level II studies supported the use of skin-to-skin contact and KC interventions to increase maternal–infant attachment and to decrease maternal anxiety but had few or no significant effects on maternal depression ([Ahn et al., 2010](#); [Feldman et al., 2014](#)). In addition, a Level III study found a significant increase in maternal–infant attachment and reduction in maternal stress after three 30-min sessions of KC per week ([Cho et al., 2016](#)). Although the majority of studies focused on KC delivered by the mother, a study of KC from fathers found no significant difference in physiology or stress in the infants ([Srinath et al., 2016](#)).

Regarding massage, strong evidence supports its use to increase infant self-regulation, moderate-strength evidence supports its use in reducing parental stress and improving social behavior, and low-strength evidence supports its use to decrease maternal depression. Four Level I studies (2 systematic reviews with low risk of bias and 2 RCTs with moderate risk of bias) examined specific massage techniques including manualized protocols designed by study authors, Baby's First Massage, and qigong massage. Three studies found both statistically and clinically significant improvements on measures of infant self-regulation ([Bennett et al., 2013](#); [Juneau et al., 2015](#); [Silva et al., 2011](#)). The 2 systematic reviews also found improvements in social behavior and engagement in preterm and term infants ([Bennett et al., 2013](#); [Juneau et al., 2015](#)). In addition, the 2 RCTs found that caregivers providing massage to their infants reduced parental stress with significant effect sizes ([Oswalt & Biasini, 2011](#); [Silva et al., 2011](#)). Last, among mothers with HIV infection, providing Baby's First Massage to their infants reduced depression level with a large effect size ([Oswalt & Biasini, 2011](#)).

Parent–Child Interaction Therapy

PCIT is a manualized intervention that provides specific training to parents in how to interact with their child to support positive behaviors. The intervention includes two phases: child-directed interaction and parent-directed interaction. Four studies (2 Level I, 1 Level II, 1 Level III) examined the effectiveness of PCIT. All studies had high risk of bias because of lack of randomization, use of convenience samples, and high attrition rates. Outcomes of the studies included child behavior, parenting behaviors, and parental stress.

Moderate evidence supports the use of PCIT to improve child behavior. Several studies found that PCIT had a significant effect with large effect sizes on child behavior, including reducing externalized and challenging behaviors ([Bagner et al., 2016](#); [Fung et al., 2014](#); [Rodríguez et al., 2014](#); [Ros et al., 2016](#)). Low-strength evidence addresses PCIT targeting parenting behavior; 1 Level II study ([Bagner et al., 2016](#)) and 1 Level III study ([Fung et al., 2014](#)) found significant improvements in positive parenting behaviors, reductions in negative parenting behaviors, and improvements in parental discipline behavior.

Low-strength evidence with mixed results addresses PCIT's effects on parental stress. [Bagner et al. \(2016\)](#) found no significant effects on parental stress, but [Ros et al. \(2016\)](#) found that parents who completed more homework assignments from their PCIT program experienced decreased stress.

Instruction-Based Interventions

A total of 33 studies examined instruction-based interventions including parent training, group-based parent training, teacher (prekindergarten) training, and parent training for child sleep. The 33 studies included 26 Level I studies (5 systematic reviews, 21 RCTs), 4 Level II studies, and 3 Level III studies with low to high risk of bias.

Parent Training

Twenty studies (16 Level I, 2 Level II, 2 Level III) with low to moderate risk of bias examined parent coaching, consultative counseling, and structured parent training administered in the home, clinic, and hospital. These studies addressed the outcomes of parenting behavior, child behavior, parent mental health, child mental health, and maternal–infant attachment.

Parenting Behavior. Strong evidence from 9 studies supports parent training interventions to improve parenting behavior. Six Level I studies, 1 Level II study, and 2 Level III studies with moderate risk of bias found significant changes in parenting skills with large effect sizes.

A parent training program, Incredible Years (IY), educates and guides parents in developing parenting skills to address their child's social, emotional, academic, and behavioral needs. Two studies of IY found significant improvements in parenting skills, including positive parenting strategies and discipline consistency, and improved compliance after 10 weekly sessions (McMenamy et al., 2011, Level III; Perrin et al., 2014, Level I).

Two RCTs examined parent training groups. Solomon et al. (2014) used home consultation and training, 3 hr/mo for 12 mo, for parents of children with autism spectrum disorder, and Wu et al. (2014) evaluated clinic- and home-based training for parents of preterm infants that focused on parent–child interactions and infant behavior. Both studies demonstrated significant improvements in parent responsiveness and didactic interactive behavior.

An RCT by Kierfeld et al. (2013) found significant improvements in managing internalizing and externalizing behaviors after an 11-wk parent training program using a self-help book and weekly phone meetings. In a Level II study, Kusanagi et al. (2011) used a parent coaching program for two groups of mother–infant dyads and found that the mild intervention group made more significant and overall improvements than the intensive intervention group.

Child Behavior. Low-strength evidence from 12 studies (9 Level I, 3 Level III) with mixed findings and moderate risk of bias addresses the effect of parent training on child behavior. Five studies found significant effects on child behavior outcomes after parent-training interventions ranging from a self-help book to more structured training programs. In 2 RCTs, providing parents with a self-help book and weekly consultative meetings resulted in significant improvement in their children's internalizing and externalizing behaviors with large effect sizes (Ise et al., 2015; Kierfeld et al., 2013). Six studies found that parent training programs, such as individual Early Social Interaction, modified Mother–Infant Transaction Program (MITP), and IY, demonstrated significant improvements in child behavior outcomes, including fewer behavior problems, decreased child aggression, improved compliance, and improved social communication and socialization (Lakes et al., 2011; McMenamy et al., 2011; Michelson et al., 2013; Nordhov et al., 2012; Smith et al., 2015; Wetherby et al., 2014).

Four Level I studies found no significant difference between intervention and control groups or inconsistent results for child behavior (Homem et al., 2014; Oono et al., 2013; Spieker et al., 2012; Wu et al., 2014). A Cochrane systematic review from 2013 found no significant evidence of gains for child behavior from parent-mediated approaches because of inconclusive evidence and inconsistencies across studies (Oono et al., 2013). An RCT examining the IY program found no significant differences in children's social skills or aggressive and oppositional behavior after 14 120-min hospital-based parent training sessions (Homem et al., 2014). Another RCT evaluating the Promoting First Relationships program found significant group differences with medium effect sizes for child competence behavior (Spieker et al., 2012). Finally, an RCT of a clinic-based program for child–parent dyads resulted in no significant effects at 12 mo; however, lower rates of child internalizing behavior were found after 24 mo (Wu et al., 2014).

Parent Mental Health. Moderate evidence from 3 studies (2 Level I, 1 Level II) with moderate risk of bias supports parent training to improve parent mental health (Akbarzadeh et al., 2016, Level I; Komoto et al., 2015, Level II; Solomon et al., 2014, Level I). In an RCT, Akbarzadeh et al. (2016) provided 60- to 90-min education sessions on attachment behaviors to expectant mothers, which resulted in significantly decreased anxiety compared with a control group. Solomon et al. (2014) conducted an RCT of a home-based parent training program and found that parents who

received the intervention were significantly less likely to be depressed. A Level II study with a high risk of bias found that a clinic-based, mother–infant training session resulted in decreased parent-related stress with a moderate effect size (Komoto et al., 2015).

Child Mental Health. Low-strength evidence from 2 studies with a moderate risk of bias addresses the use of parent training to improve child mental health (Komoto et al., 2015, Level II; Ravn et al., 2011, Level I). Ravn et al. (2011) found significant improvements in child mental health outcomes, including improved mood and decreased child-related stress and anxiety, after 11 1-hr parenting training sessions using an MITP model. In contrast, a clinic-based mother–child attachment training intervention resulted in no significant differences for child-related stress (Komoto et al., 2015).

Maternal–Infant Attachment. Strong evidence from 6 studies (5 Level I, 1 Level II) with low risk of bias supports parent training to promote maternal–infant attachment. A systematic review found that parenting education focused on cue-based, responsive care with an average dosage of 7.5–10.0 hr over 8 wk improved the quality of the relationship with large effect sizes (Evans et al., 2014). A clinic-based mother–infant training intervention resulted in significant improvements in sensitivity to cues, response to child distress, and social–emotional growth (Komoto et al., 2015, Level II). An RCT examining the home-based Infant Behavioral Assessment and Intervention Program, which is focused on improving preterm infants’ self-regulation and development, found improved maternal sensitivity in interaction with preterm infants and no effect on the infants (Meijssen et al., 2010).

An RCT by Ravn et al. (2011) examined an MITP focused on facilitating first-time mothers’ understanding of their preterm baby’s characteristics and development and on fostering improved awareness and responsiveness to infant cues to establish positive interactions and enjoyment in 11 8-hr sessions. Significant improvements were found in maternal sensitivity and responsiveness and infant positive mood, which contributed to improved mother–infant interactions. Another RCT examined a parent training intervention that included 60-min in-home weekly sessions over 10 wk; the only significant caregiver outcome was improved sensitivity, with a medium effect size (Spieker et al., 2012). Finally, Kynø et al. (2012) found no significant group differences in an RCT investigating a semistructured MITP consisting of 11 60-min educational sessions.

Group-Based Parent Training

Low-strength evidence from 5 studies (4 Level I, 1 Level II) with moderate risk of bias addresses group-based parent training interventions, including facilitated and self-directed parenting groups (Barlow et al., 2016; Elizur et al., 2017; Finch et al., 2016; Herbert et al., 2013; Keen et al., 2010). A systematic review found that group-based parent training reduced emotional and behavioral problems in children ages 0–3 yr; however, findings were based on low-quality evidence, and the authors recommended using these interventions with caution (Barlow et al., 2016). An RCT by Finch et al. (2016) found that a group-based parenting intervention had a significant effect on child cognitive skills at age 4 yr, whereas a Level I study by Elizur et al. (2017) found that a group-based intervention mediated treatment effects on both effortful control and callous–unemotional behavioral traits.

The Parenting Your Hyperactive Preschooler Program, a group-based program that teaches parents behavioral techniques and socialization strategies, was associated with significantly decreased disruptive and hyperactivity–impulsivity behaviors, yet it had high performance and detection bias (Herbert et al., 2013). Finally, Keen et al. (2010) found no significant differences between facilitated and self-directed parent training groups regarding parenting sense of competence or parent-related stress; however, the self-directed group reported significantly decreased child-related stress.

Teacher (Prekindergarten) Training

Moderate-strength evidence from 5 studies (3 Level I, 1 Level II, 1 Level III) with moderate risk of bias examined teacher training to improve mental health and positive behavior for children ages 0–5 yr (Pears et al., 2015, Level I;

Stanton-Chapman et al., 2016, Level III; Ștefan & Miclea, 2012, Level II; Strain & Bovey, 2011, Level I; Vancraeyveldt et al., 2015, Level I). Two RCTs on training focused on individual teacher–child interactions in the classroom (e.g., conflict resolution, functional skills development, social interaction, adaptive behavior) found significant improvements in child behaviors with moderate to high effect sizes (Strain & Bovey, 2011; Vancraeyveldt et al., 2015). An RCT of a school readiness program that collaborated with children and their families to promote self-regulation skills and parental involvement at school found significant reductions in ineffective parenting and improvements in parental involvement (Pears et al., 2015). Two smaller studies examined teacher training workshops and coaching sessions focused on positive behavioral supports and social–emotional competencies, typically 60–90 min for up to 10 sessions; both found significant improvements in positive child behavior and reductions in aggression and noninteractive play (Stanton-Chapman et al., 2016; Ștefan & Miclea, 2012).

Parent Training for Child Sleep

Low-strength evidence from 2 Level I studies with mixed results and low risk of bias addressed parent training interventions for child sleep (Douglas & Hill, 2013; Gradisar et al., 2016). In an RCT by Gradisar et al. (2016), two intervention groups demonstrated a significant improvement in sleep latency; no significant differences between groups were found in maternal mood or infant stress, but the graduated extinction group, which involved placing an infant for sleep and returning at gradually longer intervals, had significantly lower cortisol levels at 1-mo follow-up. A systematic review by Douglas and Hill (2013) found that behavioral interventions for sleep in infants younger than 6 mo old were not effective in decreasing infant crying, preventing sleep and behavioral problems in later childhood, or protecting against maternal postnatal depression.

Discussion

The purpose of this systematic review was to examine the current evidence for interventions within the scope of occupational therapy that address mental health and positive behavior for children ages 0–5 yr and their families. Infancy and early childhood experiences are critical to brain development and provide a foundation for healthy attachment and positive mental health. The mental health of young children continues to gain attention as emerging research highlights the effects that attachment and trauma can have on the developing brain, including cortical structural differences associated with behavioral and regulation difficulties in young children. In addition, an infant's or child's social, behavioral, and emotional functioning can affect parental stress and well-being. Thus, caregivers are essential in supporting infants' and young children's mental health and positive behavior, and many are in need of assistance themselves.

The results of this review reflect these issues and explore important interventions that may support mental health and positive behavior in children and parents. All interventions included in this review were considered within the scope of occupational therapy, which means that occupational therapy practitioners either currently possess the requisite skills to administer the interventions or qualify to complete specific training to administer them. However, none of the studies explicitly included an occupational therapy practitioner as an interventionist.

Strong evidence supports the use of touch-based interventions to support infant self-regulation; evidence for their effectiveness in improving maternal stress and anxiety, social behavior, and attachment is of moderate strength. Low-strength evidence addresses their role in reducing maternal depression. Although the majority of evidence focuses on KC administered by the infant's mother, fathers should also be encouraged to participate in skin-to-skin contact to improve attachment and decrease parental stress and anxiety. In addition, the use of lullaby music during KC sessions may help decrease maternal anxiety. Manualized massage protocols, such as Baby's First Massage and qigong massage, can improve infant self-regulation and may also reduce parental stress and improve the child's social

behavior. Occupational therapy practitioners should provide touch-based interventions, including skin-to-skin, KC, and infant massage, to parents of children ages 0–5 yr with or at risk for mental health concerns.

Moderate-strength evidence supports PCIT to address child mental health and positive behavior. Occupational therapy practitioners should use PCIT to improve positive behavior in young children by reducing externalized and challenging behaviors; however, additional high-quality studies are needed to support the effectiveness of PCIT in improving positive parenting behaviors and decreasing parental stress.

A wide variety of instruction-based interventions are addressed in the literature. Strong evidence supports parent training to improve parenting behavior and maternal–infant attachment, and moderate-strength evidence supports its use to improve parent mental health; the evidence for its use to improve child behavior and child mental health is of low strength. Occupational therapy practitioners can use a variety of parent training models, such as parent coaching, consultative counseling, and structured parent training protocols, administered in weekly sessions in the home, clinic, or hospital setting or over the phone. For example, the IY program can be administered in 10 weekly sessions to improve positive parenting strategies and consistent discipline. Parent training interventions can also be used to improve parent mental health; educational sessions on attachment behaviors lasting 60–90 min can be used with expectant mothers to decrease maternal anxiety, and a home-based parent training program can be used to decrease parental depression.

Occupational therapy practitioners should use parent training, especially with first-time mothers, to promote maternal–infant attachment, including sensitivity to the infant's cues, response to the infant's distress, and understanding of social–emotional growth. It is unclear what dosage of parent training provides optimal efficacy for maternal–infant attachment; protocols ranged from 60 min to 8 hr per session over an average of 10 wk. Because of limited or conflicting findings, the evidence addressing the use of parent training intervention to influence child mental health, behavior, or sleep in infants younger than 6 mo old is of low strength.

The evidence for instruction-based interventions to improve child mental health and positive behavior is of low strength for group-based parent training, of moderate strength for teacher training, and of low strength for sleep training. Group-based parent training to promote mental health and positive behavior in early childhood should be implemented with caution because of methodological flaws in the current evidence. Teacher (prekindergarten) training focused specifically on individual teacher–child interactions in the classroom can be used to improve child behaviors. Moreover, teacher training interventions in which teachers collaborate with the child and family to promote self-regulation skills and parental involvement at school can be used to improve parenting behavior and involvement. Occupational therapy practitioners should consider conducting teacher training workshops and coaching sessions to improve child behavior in the school environment.

Limitations

Many studies relied heavily on self-report measures of child behavior, child mental health, and parent mental health. In many studies, caregivers were aware of their treatment condition when reporting. Additional well-controlled trials are needed that include systematic randomization, objective measures, and blinding of participants and personnel to reduce the risk of bias seen in many studies in this review. Studies are needed that include interventions designed specifically for occupational therapy practice or delivered by occupational therapy practitioners to increase their applicability to occupational therapy.

This review includes analysis and discussion only of studies that examined interventions within the scope of occupational therapy for children ages 0–5 yr that included a mental health or positive behavior outcome. In addition, only studies providing Level I, II, and III evidence were included because of their greater rigor and ability to control for confounding variables. These restrictions may have resulted in the exclusion of studies of other valuable interventions that were conducted in less controlled settings or with more variable populations; thus, other effective interventions to improve child and parent mental health may not have been included, and the applications of the review may be limited.

Implications for Occupational Therapy Practice

The results of this systematic review have the following implications for occupational therapy practice:

- Practitioners should coach caregivers to use massage to increase infant self-regulation, reduce parental stress, and improve child social behavior.
- KC or skin-to-skin contact should be used to address maternal stress, anxiety, and attachment.
- PCIT should be considered only to address child behavior.
- Practitioners should implement individualized parent or teacher training to promote child mental health and positive behavior.
- Occupational therapy educational programs should train practitioners to incorporate parent-mediated intervention to promote infants' and young children's positive mental health.

Conclusion

A variety of interventions within the scope of occupational therapy practice support the mental health and well-being of children and caregivers who may exhibit symptoms of or risk factors for social, emotional, or behavioral difficulties. Many of these interventions are taught to caregivers and teachers to promote positive mental health and behavior in the child, and others are focused on fostering personal connection and positive interaction between the adult and child. Individualized training given to parents and teachers appears to be the most effective way to engage these caregivers and produce positive results. ■

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Karrie Kingsley, OTD, OTR/L, is Associate Professor, Chan Division of Occupational Science and Occupational Therapy, University of Southern California, Los Angeles.

Grace Sagester, OTD, OTR/L, is Occupational Therapist, Division of Clinical Therapies, Nationwide Children's Hospital, Columbus, OH.

Lindy L. Weaver, PhD, MOT, OTR/L, is Assistant Professor, Division of Occupational Therapy, Ohio State University, Columbus; lindy.weaver@osumc.edu

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Appendix A

Evidence and Risk-of-Bias Tables

Table A.1. Evidence Table for Interventions Supporting Mental Health and Positive Behavior in Children Ages 0–5 Yr

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control	Outcome Measures	Results
Ahn et al. (2010)	Level II 2 groups, nonrandomized <i>N</i> = 20 mother–infant pairs Intervention group, <i>n</i> = 10 pairs (60% female; <i>M</i> age = 32.1 GA) Control group, <i>n</i> = 10 pairs (70% female; <i>M</i> age = 31.9 GA) <i>Inclusion Criteria</i> Premature infants, hospitalized in the NICU	<i>Intervention</i> KC <i>Control</i> Standard care	• Infants' body weight, height, and head circumference • Maternal attachment questionnaire • Edinburgh Postnatal Depression Scale	The KC group showed significant differences in height ($p = .013$) and head circumference ($p = .027$). KC mothers showed higher scores of attachment compared with control mothers ($p = .003$).
Akbarzadeh et al. (2016)	Level I RCT <i>N</i> = 190 pregnant women Intervention group, <i>n</i> = 96 (100% female; <i>M</i> age = 28.2 yr) Control group, <i>n</i> = 94 (100% female; <i>M</i> age = 27.7 yr) <i>Inclusion Criteria</i> Married women, between ages 18 and 40 yr, with a low-risk pregnancy with a GA of 28–34 wk	<i>Intervention</i> Education on attachment behaviors at 28–34 wk gestation, 60–90 min for 6 sessions <i>Control</i> Usual care	• Infant mental health index • STAI	Total <i>M</i> scores for infant mental health were significantly higher for the intervention group at birth ($p = .013$) and at age 3 mo ($p = .007$) compared with the control group. Differences between groups in item scores were not significant, except for crying intensity at birth ($p = .021$). Women in the control group had significantly higher anxiety levels at 3 mo ($p = .01$).
Bagner et al. (2016)	Level II RCT <i>N</i> = 60 mother–infant pairs (45% female; <i>M</i> age = 13.5 mo) Intervention group, <i>n</i> = 31 pairs Control group, <i>n</i> = 29 pairs <i>Inclusion Criteria</i> Infants ages 12–15 mo	<i>Intervention</i> Brief, home-based adaptation of PCIT, weekly 1–1.5-hr sessions for 5–7 wk <i>Control</i> Standard pediatric primary care	• ITSEA • DPICS–III • PSI	Intervention group infants were more compliant with maternal commands at 6-mo follow-up ($d = 0.54$) and displayed lower levels of externalizing and internalizing behavior (d s = 0.51 and 0.74, respectively). Intervention group mothers displayed a significantly higher proportion of positive behaviors and decreased negative behaviors with their infant during play. No significant group differences were found for parenting stress. (Continued)

Table A.1. Evidence Table for Interventions Supporting Mental Health and Positive Behavior in Children Ages 0–5 Yr (Cont.)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control	Outcome Measures	Results
Barlow et al. (2016)	Level I SR <i>N</i> = 24 studies <i>N</i> = 3,161 parent–child pairs (no combined gender and <i>M</i> age data provided)	<i>Interventions</i> Group-based parenting programs, including Incredible Years Basic Parenting Program, Triple P-Positive Parenting Program, cognitive–behavioral Stop Think Ask Respond program, videotape modeling, and teacher-included parent training to improve the emotional and behavioral adjustment of young children <i>Control</i> Waitlist and standard care control groups	<i>Emotional and behavioral problems</i> • Bayley Scales of Infant Development • Behavior Screening Questionnaire • CBCL • Pediatric Symptom Checklist <i>Externalizing problems</i> • Intensity subscale of the CBCL • Child Adjustment and Parent Efficacy Scale • Caregiver–Teacher Report Form • Kohn's Problem Checklist <i>Internalizing problems</i> • Behavioral Inhibition Questionnaire • Emotional subscale of the CAPES • Preschool Characteristics Questionnaire	Group-based parenting programs reduced overall emotional and behavioral problems (95% CI [–1.37, –0.25], 280 participants, low-quality evidence) on the basis of total parent-reported data assessed at postintervention. These results were not maintained when two quasi-RCTs were removed as part of a sensitivity analysis (95% CI [–1.43, 0.09], 221 participants).
	<i>Inclusion Criteria</i> RCTs and quasi-RCTs of group-based parenting programs, ≥1 standardized measure of emotional and behavioral adjustment, participants ages 0–3 yr, 11 mo		Results provide tentative support for the use of group-based parenting programs to improve the overall emotional and behavioral adjustment of children in the short term. Additional research is required for long-term effectiveness.	
Bennett et al. (2013)	Level I SR <i>N</i> = 34 studies <i>N</i> = 3,957 participants (no combined gender and <i>M</i> age data provided)	<i>Interventions</i> Infant massage to promote physical and mental health in low-risk population samples <i>Control</i> Standard care	Standardized outcome measures of infant mental or physical development, including physical outcomes (height, weight, growth, bilirubin levels, sleep, crying) • NCASF • Child Domain of the PSI • Colorado Child Temperament Inventory • Infant Behavior Questionnaire • Infant Care Questionnaire • Revised Infant Temperament Questionnaire	Findings did not support the use of infant massage with low-risk parents and infants because of the poor quality of available evidence.
	<i>Inclusion Criteria</i> Parent–infant dyads, full-term infants of either sex, ages ≤6 mo, no underlying health conditions other than colic; studies used ≥1 standardized measure of infant mental or physical development		Some studies found a significant effect for the intervention group on gross motor skills, fine motor skills, personal and social behavior, and psychomotor development; however, these studies had a high risk of bias.	
Cho et al. (2016)	Level III Quasi-experimental <i>N</i> = 40 infants Intervention group, <i>n</i> = 20 (65% female; <i>M</i> age = 30.1 GA) Control group, <i>n</i> = 20 (50% female; <i>M</i> age = 28.9 GA)	<i>Intervention</i> KC, 30 min 3×/wk for 10 sessions <i>Control</i> Usual care	Physiological functions: body weight, HR, RR, oxygen saturation, body temperature • Modified Maternal Attachment Inventory • Parental Stress Scale	The intervention group demonstrated a significant difference in RR (<i>p</i> = .02) compared with the control group, indicating stabilization.
	<i>Inclusion Criteria</i> Hospitalized preterm infants with corrected GAs >33 wk		The intervention group also demonstrated higher maternal–infant attachment scores and decreased stress compared with the control group at posttest (<i>p</i> < .001).	

(Continued)

Table A.1. Evidence Table for Interventions Supporting Mental Health and Positive Behavior in Children Ages 0–5 Yr (Cont.)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control	Outcome Measures	Results
Douglas & Hill (2013)	Level I SR <i>N</i> = 43 studies (no combined gender and <i>M</i> age data provided) <i>Inclusion Criteria</i> Infants age <6 mo	<i>Interventions</i> Behavioral interventions for sleep, applied by parents to infants, to improve maternal and infant outcomes <i>Control</i> Standard care	- Maternal and infant nocturnal sleep durations - No. of night wakings - Edinburgh Postnatal Depression Scale - Maternal depression and anxiety scales	Behavioral interventions for infant sleep were not shown to decrease infant crying, prevent sleep and behavioral problems in later childhood, or protect against postnatal depression.
Elizur et al. (2017)	Level I RCT <i>N</i> = 209 parent couples Intervention group, <i>n</i> = 140 Control group, <i>n</i> = 69 <i>Inclusion Criteria</i> Parent couples of children ages 3–5 yr with subclinical or clinical conduct problems	<i>Intervention</i> 14 scheduled sessions of coparent training groups <i>Control</i> Minimal intervention with referrals to local services as necessary	Pre- and postintervention questionnaires completed by both parents	Significant concurrent treatment effects were found for child conduct problems and either callous-unemotional traits or effortful control in parents. All effects were mediated by ineffective parenting.
Evans et al. (2014)	Level I SR <i>N</i> = 17 studies <i>N</i> = 1,940 participants with a GA of 24–37 wk (no combined gender data provided) <i>Inclusion Criteria</i> RCT or quasi-RCT that included parenting interventions for preterm infants (<37 wk) with no major congenital abnormalities	<i>Interventions</i> Parenting interventions to improve the quality of the mother–preterm infant relationship <i>Control</i> Standard care	Most measures were observational and self-report questionnaires (e.g., NCAFS, NCATS)	Eight interventions were found to improve the quality of the mother–preterm infant relationship. Heterogeneity of the interventions indicates the need for an integrated new parenting program focusing on cue-based, responsive care by mothers of preterm infants to improve the quality of the relationship. The most effective interventions demonstrated large effect sizes and were similar in intensity and duration: 7.5–10 hr over 8 wk.
Feldman et al. (2014)	Level II Case-matched randomized <i>N</i> = 146 mother–infant dyads Intervention group, <i>n</i> = 73 dyads (<i>M</i> age = 30.38 wk GA) Control group, <i>n</i> = 73 dyads (<i>M</i> age = 30.82 wk GA) <i>Inclusion Criteria</i> Neurologically intact infants raised in 2-parent families	<i>Intervention</i> KC, 1 hr/day for 14 days <i>Control</i> Standard incubator care	- RSA - Trier Social Stress Test for Children - Sleep–wake organization - BDI - STAI - PSI - Maternal attachment behaviors	The intervention group demonstrated significant RSA change ($p < .05$), improved sleep efficiency ($p < .05$) and stress reactivity ($p < .05$), and decreased wake bouts ($p < .05$) and maternal anxiety ($p = .048$). No significant group difference was found for maternal depression.

(Continued)

Table A.1. Evidence Table for Interventions Supporting Mental Health and Positive Behavior in Children Ages 0–5 Yr (Cont.)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control	Outcome Measures	Results
Finch et al. (2016)	Level I RCT <i>N</i> = 1,311 infants Enhanced nutrition only, <i>n</i> = 311 Response stimulation only, <i>n</i> = 354 Combination of response stimulation and enhanced nutrition, <i>n</i> = 315 Control group, <i>n</i> = 331 <i>Inclusion Criteria</i> Ages birth–2 mo Level III Within subjects, pretest–posttest <i>N</i> = 447 families (89.3% female; <i>M</i> age = 29.7 yr) <i>Inclusion Criteria</i> Met federal poverty criteria, had a child age <72 mo who was referred for a mental health concern	<i>Intervention</i> PEDS, consisting of early responsive stimulation and enhanced nutrition interventions delivered by community-based health workers <i>Control</i> No intervention	- HOME early childhood version - Adapted SDQ	After controlling for socioeconomic and individual factors, the quality of current home stimulation and measures of maternal scaffolding independently mediated the intervention effects on cognitive skills at age 4. The intervention had a significant direct effect on executive functioning and performance intelligence over and above significant family processes and other covariates.
Fung et al. (2014)	Level III Within subjects, pretest–posttest <i>N</i> = 447 families (89.3% female; <i>M</i> age = 29.7 yr) <i>Inclusion Criteria</i> Met federal poverty criteria, had a child age <72 mo who was referred for a mental health concern	<i>Intervention</i> In-home PCIT adapted from Parenting Young Children program, 60- to 90-min weekly sessions for 2 yr <i>Control</i> No control	- ECBS - PBC - PCPA - PCRS	Significant improvement was found in prosocial behavior ($p < .001$), parent discipline ($p < .001$), child play ($p < .001$), and parent–child relationship ($p < .001$). No significant changes were found in nurturing or parenting expectations on the PBC.
Gradisar et al. (2016)	Level I RCT <i>N</i> = 43 infant–parent dyads Intervention Group A, <i>n</i> = 14 dyads (61% female; <i>M</i> age = 10.8 yr) Intervention Group B, <i>n</i> = 15 dyads (69% female; <i>M</i> age = 11.8 yr) Control group, <i>n</i> = 14 dyads (58% female; <i>M</i> age = 9.61 yr) <i>Inclusion Criteria</i> Infants ages 6–16 mo	<i>Intervention</i> <i>Group A:</i> Graduated extinction training to delay parents' response to infant's cry to improve sleep <i>Group B:</i> Bedtime fading training to gradually limit infant's nocturnal sleep opportunity <i>Control</i> Sleep education	- DASS 7-day sleep diary - Infant ankle-worn activity monitor - Salivary cortisol for infant stress - Child–parent attachment - CBCL	Infant sleep latency and maternal stress improved significantly for both intervention groups compared with the control group. No significant group differences were found in infant waking after sleep onset, number of awakenings, total sleep time, maternal depressed mood and stress, and child–parent attachment.

(Continued)

Table A.1. Evidence Table for Interventions Supporting Mental Health and Positive Behavior in Children Ages 0–5 Yr (Cont.)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control	Outcome Measures	Results
Herbert et al. (2013)	Level I RCT <i>N</i> = 31 children (25.8% female; <i>M</i> age = 54.92 mo) Intervention group, <i>n</i> = 17 Control group, <i>n</i> = 14 <i>Inclusion Criteria</i> Preschool age, developmental delays	<i>Intervention</i> Parenting Your Hyperactive Preschooler program, 14 90-min group sessions <i>Control</i> Waitlist	• BASC-2 • DBRS • Emotion Regulation Checklist • Parenting Scale • Coping With Children's Negative Emotions Scale • Audiotaped assessment of mother-child interaction	The intervention group demonstrated significant improvements in externalizing behaviors ($p = .035$), attention ($p = .002$), hyperactivity-impulsivity ($p = .008$), ODD ($p = .039$), mothers' positive parenting ($p = .04$), and negative affect ($p = .039$). No significant group differences were found for internalizing behaviors, emotion regulation, overactivity, laxness, verbosity, child misbehavior, child negative affect, mothers' command frequency and quality, and mothers' distress reactions. Significant improvements were found in fathers' positive parenting practices and ratings of children's prosocial behaviors. The impact of symptoms on family functioning was significantly reduced.
Homem et al. (2014)	Level I RCT <i>N</i> = 36 father-child dyads Intervention group, <i>n</i> = 24 Control group, <i>n</i> = 12 <i>Inclusion Criteria</i> Children ages 3–6 yr with oppositional/defiant symptoms	<i>Intervention</i> Hospital-based Incredible Years Basic Parent Program, weekly 120-min sessions for 14 wk <i>Control</i> Waitlist	• PKBS-2 • PACS • Parenting Scale • PSOC	Significant improvements were found in fathers' positive parenting practices and ratings of children's prosocial behaviors. The impact of symptoms on family functioning was significantly reduced.
Ise et al. (2015)	Level I RCT <i>N</i> = 48 child-parent dyads (50% female; <i>M</i> age = 5.2 yr) Intervention group, <i>n</i> = 26 Control group, <i>n</i> = 22 <i>Inclusion Criteria</i> Children ages 3–6 yr	<i>Intervention</i> Self-help book for parents of children with behavioral difficulty and 11 weekly 20-min phone consultations reviewing chapter content <i>Control</i> Waitlist	• CBCL • ADHD symptom rating scale based on the <i>DSM-IV</i> • ODD symptom rating scale based on the <i>DSM-IV</i> • PPS	Significant improvements were found in child behavior and parent mental health. There were no significant changes from posttest to follow-up, indicating that gains achieved at posttest remained stable over time. The intervention did not lead to increased scores on a self-report measure of positive parenting.
Juneau et al. (2015)	Level I SR <i>N</i> = 14 studies <i>N</i> = 704 participants <i>Inclusion Criteria</i> Preterm and term infants ages birth–3 mo	<i>Interventions</i> Infant massage interventions <i>Control</i> Routine care	• Pain response • PCJ	The massage interventions varied in relation to timing and number of massages. The evidence was insufficient to support the use of massage for term and preterm infants, but the authors suggested that massage should be considered on a case-by-case basis. (Continued)

Table A.1. Evidence Table for Interventions Supporting Mental Health and Positive Behavior in Children Ages 0–5 Yr (Cont.)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control	Outcome Measures	Results
Keen et al. (2010)	Level II 2 groups, quasi-experimental <i>N</i> = 39 children	<i>Intervention</i> Group A: Supported intervention consisting of a workshop and 10 home visits <i>Group B</i> : Self-directed video-based intervention	• SIB-R • PSI • PSOC	Children in Intervention Group A with relatively low adaptive behavior scores at baseline showed greater improvements in adaptive behavior.
	Intervention Group A, <i>n</i> = 17 (<i>M</i> child age = 36.4 mo)	<i>Control</i> No control		Parents in Intervention Group A had reduced child-related parenting stress and increased parenting self-efficacy compared with Group B.
	Intervention Group B, <i>n</i> = 22 (<i>M</i> child age = 35.7 mo)			
	<i>Inclusion Criteria</i> Ages 2–4 yr, diagnosis of ASD			
Kierfeld et al. (2013)	Level I RCT	<i>Intervention</i> Self-administered, telephone-assisted behavioral intervention, including a self-help book on parenting strategies for children with hyperactivity and oppositional behavior, 11 wk <i>Control</i> Wait list	• CBCL • Rating scale for ADHD and ODD • Home Situations Questionnaire • PPS • PSBC • DASS • Questionnaire on judging parental strains • PPC	The intervention group demonstrated significant decreases in parent-reported externalizing and internalizing child problem behaviors and dysfunctional parenting practices. Parents reported decreases in parenting-related strains and parental depression, anxiety, and stress.
	<i>N</i> = 48 child–parent dyads			
	Intervention group, <i>n</i> = 26 (61.5% female; <i>M</i> age = 5.2 yr)			
	Control group, <i>n</i> = 22 (36.4% female; <i>M</i> age = 5.1 yr)			
Komoto et al. (2015)	<i>Inclusion Criteria</i> Children ages 3–6 yr	<i>Intervention</i> JEPP, a clinic-based intervention to foster mother–infant attachment, 60- to 90-min sessions over 12 mo <i>Control</i> Usual care	• JNCATS • CARE • Japanese PSI • WHO Subjective Well-Being Self-Report • CES-D • RSES	No significant group differences in general dyadic synchrony were found before or after the intervention. Mothers in the intervention group showed significantly improved ability to understand their infant's cues and respond promptly and reduced unresponsiveness to infants.
	Level II Quasi-experimental			
	<i>N</i> = 135 mother–infant dyads			
	Intervention group, <i>n</i> = 15 (100% female; <i>M</i> mother age = 33.9 yr)			
	Control group, <i>n</i> = 120 (100% female; <i>M</i> mother age = 32.8 yr)			
	<i>Inclusion Criteria</i> Infants ages 1–3 mo and their mothers			

(Continued)

Table A.1. Evidence Table for Interventions Supporting Mental Health and Positive Behavior in Children Ages 0–5 Yr (Cont.)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control	Outcome Measures	Results
Kusanagi et al. (2011)	Level II 2 groups comparison <i>N</i> = 51 mother–infant dyads	<i>Intervention</i> Group A: Intensive intervention before NICU discharge + weekly home visits until 40 wk corrected age <i>Group B</i> : Mild intervention group including home visit at 46 wk corrected age + home visit at 60 wk <i>Control</i> No control	- JNCATS - Barnard's SAR - PSI	The intensive intervention group demonstrated improved interaction scores and a lower frequency of night crying compared with the mild intervention group.
	Intervention Group A, <i>n</i> = 21 (10% female; <i>M</i> infant age = 32.6 wk GA)			
	Intervention Group B, <i>n</i> = 30 (17% female; <i>M</i> infant age = 32.0 wk GA)			
	<i>Inclusion Criteria</i> Infants with a preterm birth (<37 wk), low birth weight, and firstborn with no medical complications living in urban Japan			
Kynø et al. (2012)	Level I RCT <i>N</i> = 57 mother–infant dyads	<i>Intervention</i> MTP before hospital discharge, 11 60-min sessions <i>Control</i> Usual care	- ASQ:SE - CBCL - MSEL	The intervention had no effect on cognitive, motor, or behavioral development.
	Intervention group, <i>n</i> = 30 (40% female; <i>M</i> age = 33.6 wk GA)			
	Control group, <i>n</i> = 27 (41% female; <i>M</i> age = 33.1 wk GA)			
	<i>Inclusion Criteria</i> Preterm infants			
Lai et al. (2006)	Level I RCT <i>N</i> = 30 mother–infant dyads (<i>M</i> infant age = 33.8 wk GA)	<i>Intervention</i> Exposure to music during KC, 60 min/day for 3 consecutive days <i>Control</i> Routine care	- STAI - Infant oxygen saturation, HR, and RR - BSI - Behavioral states	The intervention group demonstrated significant improvements in maternal anxiety and infant quiet sleep ($p < .01$) and crying ($p < .05$) on Day 2 of the intervention. No significant group differences were found in infant oxygen levels, HR, RR, or behavioral state on Day 1.
	Intervention group, <i>n</i> = 15			
	Control group, <i>n</i> = 15			
	<i>Inclusion Criteria</i> Preterm infants			
Lakes et al. (2011)	Level III 2 groups, comparison <i>N</i> = 154 parents of preschool children (48% female; <i>M</i> age = 3.8 yr)	<i>Intervention</i> Community-based parent training program to reduce attention and behavior problems in preschool children, 10 wk <i>Control</i> Enrolled but did not participate in intervention	- Parenting Strategy Assessment - SDQ	The intervention group demonstrated significant improvements in 8 of 10 parenting behaviors. Improvements were seen in the use of transitional statements and planning ahead. All SDQ subscales reflected significant improvements in child behavior. Results should be interpreted with caution because not all analyses included the comparison group.
	Intervention group, <i>n</i> = 139			
	Control group, <i>n</i> = 15			
	<i>Inclusion Criteria</i> Concerns with child's attention and behavior			

(Continued)

Table A.1. Evidence Table for Interventions Supporting Mental Health and Positive Behavior in Children Ages 0-5 Yr (Cont.)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control	Outcome Measures	Results
McMenamy et al. (2011)	Level III 1 group, within-subjects <i>N</i> = 18 mothers <i>Inclusion Criteria</i> Children ages 2–3 yr	<i>Intervention</i> Incredible Years group parenting education program, 10 wk <i>Control</i> No control	- ITSEA - CBCL - PPI - PSI - PSQ - PedSQ	Participants reported improvements in parenting skills such as parenting stress ($p < .005$) and use of harsh discipline ($p = .02$). Inconsistent use of discipline declined, and use of positive parenting techniques ($p < .005$) increased. Participants reported a decrease in child aggression ($p < .005$) and an increase in compliance ($p < .005$). Participants and providers reported high levels of satisfaction with the intervention. Results partially supported the hypothesis that the intervention would increase maternal sensitivity ($p = .05$) in interaction with their preterm infants. The intervention group demonstrated more positive behavior ($p = .05$), but no main effects were found for the overall group. No effects were found on infant self-regulatory behavior or positive interaction behavior.
Weijssen et al. (2010)	Level I RCT <i>N</i> = 112 infants Intervention group, <i>n</i> = 57 (42.1% female; <i>M</i> age = 29.5 wk GA) Control group, <i>n</i> = 55 (54.5% female; <i>M</i> age = 30.1 wk GA) <i>Inclusion Criteria</i> Infants with GA <32 wk, birth weight of <1,500 grams, or both admitted to 1 of 7 hospitals, with parents living in Amsterdam.	<i>Intervention</i> Home-based IBAP designed to improve development of preterm infants <i>Control</i> Usual care	- Still-face procedure - ICEP - Maternal Sensitivity and Responsivity Scales	The intervention group demonstrated more positive behavior ($p = .05$), but no main effects were found for the overall group. No effects were found on infant self-regulatory behavior or positive interaction behavior.
Michelson et al. (2013)	Level I SR <i>N</i> = 28 studies <i>N</i> = 2,239 participants <i>Inclusion Criteria</i> RCTs that enrolled parents whose child was between ages 2 and 12 yr with problem behavior	<i>Interventions</i> Parent management training for the treatment of child disruptive behavior in different real-world contexts <i>Control</i> Usual care	- ECBI - CBCL - SDQ	Parent management training appeared to be an effective treatment to improve children's disruptive behavior problems. However, only 3 RCTs met all 4 external validity criteria and 7 met 3 criteria. Significant reductions in child disruptive behavior were found for all the outcomes assessed.
Vordhov et al. (2012)	Level I RCT <i>N</i> = 146 infants Intervention group, <i>n</i> = 72 (47% female; <i>M</i> age = 30.2 wk GA) Control group, <i>n</i> = 74 (47% female; <i>M</i> age = 29.9 wk GA) <i>Inclusion Criteria</i> Preterm infants, birth weight <2,000 g	<i>Intervention</i> Modified MITP, 1-hr sessions for 7 consecutive days <i>Control</i> Usual care	- CBCL - SDQ	Parents in the intervention group reported significantly fewer behavior problems at 5 yr compared with parents in the control group. CBCL scores showed small to moderate effect sizes, the largest of which was 0.56 on the Attention subscale.

(Continued)

Table A.1. Evidence Table for Interventions Supporting Mental Health and Positive Behavior in Children Ages 0–5 Yr (Cont.)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control	Outcome Measures	Results
Oono et al. (2013)	Level I	<i>Interventions</i>	• PSI	No statistical evidence of gains was found for most of the primary outcomes assessed, with findings largely inconclusive and inconsistent across studies. The evidence for positive change patterns in PCI was strong and statistically significant.
	SR	Parent-mediated early interventions for children with ASD and their parents	• PLS–IV	
	<i>N</i> = 17 studies	<i>Control</i>		
	<i>N</i> = 919 children with ASD (645 boys and 171 girls, with 3 studies not reporting gender data; between ages 17 mo and 6 yr, with no <i>M</i> age reported)	No treatment or treatment as usual		
Oswalt & Biasini (2011)	<i>Inclusion Criteria</i>			The intervention had a positive impact on maternal depression ($d = 1.0$, $p = .04$), parental distress ($d = 1.54$, $p < .001$), and infant growth. Infants in the intervention group were significantly heavier ($p < .01$) and longer ($p < .01$) at follow-up.
	RCTS of early intervention for children with ASD	<i>Intervention</i>	• BDI–II	
	Level I	Baby's First Massage program, daily for 10 wk	• PSI	
	RCT	<i>Control</i>	• Maternal Confidence Questionnaire	
Pears et al. (2015)	<i>Inclusion Criteria</i>			Teacher and observer reports indicated that the intervention had a positive effect on children's self-regulation in kindergarten. The intervention group demonstrated significantly reduced ineffective parenting before school entry, which affected parental involvement.
	HIV-infected mothers with infants	<i>Intervention</i>	• CBCL	
	Level I	Kids In Transition to School school readiness intervention program focused on children's self-regulation skills, parenting, and parental involvement in school	• Discipline Questionnaire	
	RCT	<i>Control</i>	• Social Competence Scale	
	<i>Inclusion Criteria</i>		• Parent and Teacher Involvement Scale	(Continued)
	<i>N</i> = 209 children	Intervention group, <i>n</i> = 107 (33% female; <i>M</i> age = 5.26 yr)	• WPPSI–III	
	Intervention group, <i>n</i> = 102 (33% female; <i>M</i> age = 5.28 yr)	<i>Control</i>		
	Families with children transitioning to kindergarten	Usual services		

Table A.1. Evidence Table for Interventions Supporting Mental Health and Positive Behavior in Children Ages 0–5 Yr (Cont.)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control	Outcome Measures	Results
Perrin et al. (2014)	Level I RCT <i>N</i> = 273 parents Intervention Group A, <i>n</i> = 123 (38% female; <i>M</i> age = 2.9 yr) Intervention Group B, <i>n</i> = 89 (37% female; <i>M</i> age = 2.7 yr) Control group, <i>n</i> = 61 (38% female; <i>M</i> age = 2.8 yr) Inclusion Criteria Parents of children whose child scored at 80th percentile or greater on the Infant–Toddler Social–Emotional Assessment Scale screener and had a diagnosis of pervasive developmental disorder or global developmental delay	Intervention Group A: Nonrandomized Incredible Years parent training group for 2 hr/wk for 10 wk Group B: Randomized Incredible Years parent-training group for 2 hr/wk for 10 wk Control Waitlist	• Parenting Scale • ECBI • Video-recorded observations of PCITs during standardized tasks	The intervention group demonstrated greater improvements in parenting practices and child behaviors compared with the control group (<i>p</i> < .05). No differences were observed between the randomized and nonrandomized intervention groups.
Ravn et al. (2011)	Level I RCT <i>N</i> = 93 mother–infant dyads Intervention group, <i>n</i> = 46 (50% female; <i>M</i> infant age = 33.3 wk GA) Control group, <i>n</i> = 47 (44.7% female; <i>M</i> infant age = 33.2 wk GA) Inclusion Criteria Mothers with moderately late preterm infants with a GA between 30 and 36 wk	Intervention MITP, 11 1-hr sessions Control Standard care	Coded video observations according to qualitative ratings for PCI at ages 3–15 mo	Mothers in the intervention group scored higher on maternal sensitivity and responsiveness (<i>p</i> = .05). Infants in the intervention group showed more positive mood (<i>p</i> = .04).
Rodríguez et al. (2014)	Level I RCT <i>N</i> = 28 mother–child dyads Intervention group, <i>n</i> = 14 (28.6% female; <i>M</i> mother age = 39.7 mo) Control group, <i>n</i> = 14 (28.6% female; <i>M</i> mother age = 36.5 mo) Inclusion Criteria Children born <37 wk gestation	Intervention PCIT Control Waitlist	• CBCL • Wechsler Abbreviated Scale of Intelligence • M-CHAT • ECBI	The interaction between global regulation and treatment group was significant (<i>p</i> < .05), suggesting that global regulation at baseline moderates the effect of PCIT on child externalizing behavior. Global regulation significantly interacted with treatment condition in predicting change in child disruptive behavior. (Continued)

Table A.1. Evidence Table for Interventions Supporting Mental Health and Positive Behavior in Children Ages 0–5 Yr (Cont.)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control	Outcome Measures	Results
Ros et al. (2016)	Level I RCT <i>N</i> = 48 parent-child dyads Intervention A, <i>n</i> = 22 children Intervention B, <i>n</i> = 26 children <i>Inclusion Criteria</i> Children with developmental delay or co-occurring, clinically elevated externalizing behavior problems	<i>Intervention</i> PCIT 1x/wk for ~1 hr. Families completed an average of 12 sessions. <i>Intervention A</i> : PCIT for children diagnosed with developmental disabilities between ages 36 and 70 mo <i>Intervention B</i> : PCIT for children born premature (<37 wk GA) between ages 20 and 60 mo <i>Control</i> Waitlist	• CBCL • Parent-reported homework completion (practice of treatment skills) • Parent rating of parenting stress	Parent homework completion significantly predicted changes in "do" skills ($p < .01$). Parent homework completion did not significantly predict changes in "don't" skills ($p > .05$); however, homework completion significantly predicted positive changes in parenting stress ($p < .05$).
Silva et al. (2011)	Level I RCT <i>N</i> = 47 children Intervention group, <i>n</i> = 28 Control group, <i>n</i> = 19 <i>Inclusion Criteria</i> Children with ASD, ages 3–7 yr	<i>Intervention</i> Parent-delivered Qigong massage training, 3-hr group training, and 7 30-min support meetings with trainer over 4 mo <i>Control</i> Waitlist	• Autism Behavior Checklist • Pervasive Developmental Disorders Behavior Inventory • Sense and Self-Regulation Checklist • PSI	The intervention was effective in improving measures of ASD. Teacher data on measures of ASD were confirmed by parent data.
Smith et al. (2015)	Level III Prospective <i>N</i> = 118 children (14% female; <i>M</i> age = 49.02 mo) <i>Inclusion Criteria</i> Children with ASD, ages ≤6 yr	<i>Intervention</i> Pivotal response treatment <i>Control</i> No control	• VABS-II • PLS-IV • CBCL • PSI • WPPSI • Clinical Evaluation of Language Fundamentals	No significant changes were found in parental stress. Decreased behavioral problems were seen only in the highest IQ group. Improvements were found in expressive language ($p < .001$), receptive language ($p < .001$), and global cognition ($p < .001$). Large treatment effects were found for PCI behaviors.
Solomon et al. (2014)	Level I RCT <i>N</i> = 128 children Intervention group, <i>n</i> = 64 (15.6% female; <i>M</i> age = 50.53 mo) Control group, <i>n</i> = 64 (20.3% female; <i>M</i> age = 49.85 mo) <i>Inclusion Criteria</i> Children with ASD, randomized into two 1-yr cohorts	<i>Intervention</i> PLAY Project Home Consultation, 3 hr/mo for 12 mo <i>Control</i> Usual community services	• ADOS • Maternal Behavior Rating Scales • MSEL • PSI • CES-D	No group differences were found for child language and developmental quotient. The intervention group improved in diagnostic categories on the ADOS; their caregivers experienced no increase in stress and decreased depressive symptoms.

(Continued)

Table A.1. Evidence Table for Interventions Supporting Mental Health and Positive Behavior in Children Ages 0–5 Yr (Cont.)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control	Outcome Measures	Results
Spieler et al. (2012)	Level I RCT	<i>Intervention</i> PFR: Manualized, in-home sessions including review of handouts and videotaped caregiver-child interactions, 60–75 min/wk for 10 wk <i>Control</i> EES: Monthly home visits connecting families to resources, 3 90-min visits	• NCATS • Indicator of PCI • This Is My Baby interview • Raising a Baby assessment • PSI • Toddler Attachment Sort-45 • Brief Infant Toddler Social and Emotional Assessment • CBCL • Bayley-III Screening Test	No significant group difference was found for infant security ($d = 0.16$, $p = .410$). Infants in the intervention group demonstrated greater improvement in competence ($d = 0.42$, $p = .031$). Caregivers in the intervention group demonstrated significant improvement in sensitivity ($d = 0.41$, $p = .024$) and understanding of toddlers ($d = 0.36$, $p = .042$). No other significant effects were found at postintervention.
	Level III Prospective cohort $N = 26$ parent-infant dyads (46.1% female; M infant age = 28 wk GA)	<i>Intervention</i> KC provided by mother or father for 60 min, then crossover to other parent on the basis of random parent availability <i>Control</i> No control	• Infant temperature, HR, blood pressure, oxygen saturation, and salivary cortisol • Parent HR, temperature, and salivary cortisol	No significant differences were found for KC administered by mothers vs. fathers on the basis of physiological data and salivary cortisol.
	<i>Inclusion Criteria</i> Neonates born <35 wk	<i>Intervention</i> PBIS teacher training, consisting of an orientation workshop, a workshop for each tier of intervention, and consultation supporting implementation fidelity <i>Control</i> No control	• SSRS • CBCL • Early Childhood Environmental Rating Scale-Revised • Classroom Assessment Scoring System	PBIS resulted in significant change in classroom organization. Students demonstrated significant increases in social skills and decreases in problem behaviors on the CBCL.
Stanton-Chapman et al. (2016)	Level III 1-group, pretest-posttest $N = 10$ teachers with 192 students (90% female; M teacher age = 28.8 yr)	<i>Intervention</i> PBIS teacher training, consisting of an orientation workshop, a workshop for each tier of intervention, and consultation supporting implementation fidelity <i>Control</i> No control	• SSRS • CBCL • Early Childhood Environmental Rating Scale-Revised • Classroom Assessment Scoring System	PBIS resulted in significant change in classroom organization. Students demonstrated significant increases in social skills and decreases in problem behaviors on the CBCL.
	<i>Inclusion Criteria</i> Teachers from Head Start programs, students across intervention Tiers 1–3	<i>Intervention</i> SEP prevention program, consisting of classroom activities, teacher training, and parent training <i>Control</i> Usual care	• Social Competency Screening for Preschoolers • Emotional Competence Screening for Preschoolers • Social Competence and Behavior Evaluation-Preschool Edition • Affective Knowledge Test • Social Problem Solving Test • SSRS-Preschool • PSI Short	High-social-risk participants in the intervention group demonstrated significant improvements compared with those in the control group on measures of classroom behavior. High-emotional-risk participants demonstrated improved behavior but showed little change in social skills. The intervention's effect on externalizing behaviors appeared to be a result of higher attendance rates at the parent training.
	<i>Inclusion Criteria</i> Preschoolers	<i>Intervention</i> SEP prevention program, consisting of classroom activities, teacher training, and parent training <i>Control</i> Usual care	• Social Competency Screening for Preschoolers • Emotional Competence Screening for Preschoolers • Social Competence and Behavior Evaluation-Preschool Edition • Affective Knowledge Test • Social Problem Solving Test • SSRS-Preschool • PSI Short	High-social-risk participants in the intervention group demonstrated significant improvements compared with those in the control group on measures of classroom behavior. High-emotional-risk participants demonstrated improved behavior but showed little change in social skills. The intervention's effect on externalizing behaviors appeared to be a result of higher attendance rates at the parent training.
Ștefan & Miclea (2012)	Level II Quasi-experimental $N = 158$ children	<i>Intervention</i> SEP prevention program, consisting of classroom activities, teacher training, and parent training <i>Control</i> Usual care	• Social Competency Screening for Preschoolers • Emotional Competence Screening for Preschoolers • Social Competence and Behavior Evaluation-Preschool Edition • Affective Knowledge Test • Social Problem Solving Test • SSRS-Preschool • PSI Short	High-social-risk participants in the intervention group demonstrated significant improvements compared with those in the control group on measures of classroom behavior. High-emotional-risk participants demonstrated improved behavior but showed little change in social skills. The intervention's effect on externalizing behaviors appeared to be a result of higher attendance rates at the parent training.
	Intervention Group, $n = 89$ ($n = 16$ at high social risk, $n = 17$ at high emotional risk)	<i>Intervention</i> SEP prevention program, consisting of classroom activities, teacher training, and parent training <i>Control</i> Usual care	• Social Competency Screening for Preschoolers • Emotional Competence Screening for Preschoolers • Social Competence and Behavior Evaluation-Preschool Edition • Affective Knowledge Test • Social Problem Solving Test • SSRS-Preschool • PSI Short	High-social-risk participants in the intervention group demonstrated significant improvements compared with those in the control group on measures of classroom behavior. High-emotional-risk participants demonstrated improved behavior but showed little change in social skills. The intervention's effect on externalizing behaviors appeared to be a result of higher attendance rates at the parent training.
	Control group, $n = 69$ ($n = 11$ at high social risk, $n = 12$ at high emotional risk)	<i>Intervention</i> SEP prevention program, consisting of classroom activities, teacher training, and parent training <i>Control</i> Usual care	• Social Competency Screening for Preschoolers • Emotional Competence Screening for Preschoolers • Social Competence and Behavior Evaluation-Preschool Edition • Affective Knowledge Test • Social Problem Solving Test • SSRS-Preschool • PSI Short	High-social-risk participants in the intervention group demonstrated significant improvements compared with those in the control group on measures of classroom behavior. High-emotional-risk participants demonstrated improved behavior but showed little change in social skills. The intervention's effect on externalizing behaviors appeared to be a result of higher attendance rates at the parent training.

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Table A.1. Evidence Table for Interventions Supporting Mental Health and Positive Behavior in Children Ages 0–5 Yr (Cont.)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control	Outcome Measures	Results
Strain & Bovey (2011)	Level I RCT <i>N</i> = 50 classrooms	<i>Intervention</i> Teacher training and coaching to fidelity in the LEAP preschool model, 23 full days over 2 yr	• CARS • MSEL • PLS–IV • SSRS	Students in the intervention group demonstrated significant improvements on measures of cognitive, language, social, and problem behavior and autism symptoms compared with the control group after 2 yr.
	Intervention group, <i>n</i> = 27 (<i>M</i> age = 50.1 mo)	<i>Control</i> LEAP manuals, videos, and PowerPoint modules		Teachers in the intervention group viewed the procedures and outcomes favorably.
	Control group, <i>n</i> = 23 (<i>M</i> age = 50.7 mo)			
	<i>Inclusion Criteria</i> Enrolled children with ASD			
Vancraeyveldt et al. (2015)	Level I RCT <i>N</i> = 175 preschool boys	<i>Intervention</i> Playing-2-gether, consisting of 1:1 play sessions addressing teacher–child interactions, 2×/wk for 15 sessions	• Student–Teacher Relationship Scale • SDQ	The intervention group demonstrated larger decreases in teacher–child conflict, child conduct problems, and child hyperactivity and inattention.
	Intervention group, <i>n</i> = 82	<i>Control</i> Usual teaching		All positive effects were visible after the first intervention component; no further reductions in teacher–child conflict, child conduct problems, and hyperactivity and inattention occurred during the second component.
	Control group, <i>n</i> = 93			Children in Intervention Group 1 showed a faster rate of improvements in social communication compared with those in Group 2.
	<i>Inclusion Criteria</i> Ages 3 yr, 9 mo–5 yr, 9 mo			Children in Intervention Group 1 demonstrated improvement or stability in communication, daily living, and social skills, whereas those in Group 2 worsened or showed no significant change.
Wetherby et al. (2014)	Level I RCT <i>N</i> = 82 children	<i>Intervention</i> <i>Group 1:</i> Individual ESI parent training offered 2–3×/wk at home or in the community for 9 mo	• Social Communication and Symbolic Behavior Scales • ADOS • VABS–II • MSEL	(Continued)
	Intervention Group 1, <i>n</i> = 42 (19% female; <i>M</i> age = 19.64 mo)	<i>Group 2:</i> Group ESI parent training offered 1×/wk in a clinic for 9 mo		
	Intervention Group 2, <i>n</i> = 40 (7.5% female; <i>M</i> age = 19.6 mo)	<i>Control</i> No control		
	<i>Inclusion Criteria</i> Ages 16–20 mo, diagnosis of ASD			

Table A.1. Evidence Table for Interventions Supporting Mental Health and Positive Behavior in Children Ages 0–5 Yr (Cont.)

Author/Year	Level of Evidence/Study Design/Participants/Inclusion Criteria	Intervention and Control	Outcome Measures	Results
Wu et al. (2014)	Level I RCT <i>N</i> = 161 preterm infants Intervention Group 1, <i>n</i> = 54 (46% female; <i>M</i> age = 30 wk GA) Intervention Group 2, <i>n</i> = 56 (45% female; <i>M</i> age = 29.9 wk GA) Control group, <i>n</i> = 51 (53% female; <i>M</i> age = 29.3 wk GA) <i>Inclusion Criteria</i> Preterm infants	<i>Intervention</i> Group 1: Clinic-based intervention addressing child developmental skills, feeding support, massage, parent support and education, and mother–infant interaction, delivered by a nurse and PT, 5 NICU sessions and 8 clinic visits Group 2: Home-based intervention addressing child developmental skills, feeding support, massage, parent support and education, and mother–infant interaction, delivered by a PT, 5 NICU sessions and 8 home visits <i>Control</i> Standard developmental care, delivered by a neonatologist, 5 NICU sessions and 8 clinic visits	• Bayley–III • CBCL • Free-play procedure with video coding for maternal interactive behavior and infant response behavior • Toy-behind-barrier procedure with video coding for infant stress and regulation	At 12 mo, Intervention Group 1 showed marginal effects for mother–infant interaction, emotional regulation, and maternal and dyadic interactive behavior. At 24 mo, Intervention Group 1 had higher cognitive scores than the control group. Intervention Group 2 had significantly fewer sleep problems and lower rates of internalizing problem behavior on the CBCL.

Note. ADHD = attention deficit hyperactivity disorder; ADOS = Autism Diagnostic Observation Schedule; ASD = autism spectrum disorder; ASQ:SE = Ages and Stages Questionnaire: Social Emotional; BASC-2 = Behavior Assessment System for Children; Bayley–III = Bayley Scales of Infant and Toddler Development–Third Edition; BDI = Beck Depression Inventory; BSI = Behavior Stage Instrument; CAPES = Child Adjustment and Parent Efficacy Scale; CARE = Child–Adult Relationship Experimental Index for Infants; CARS = Childhood Autism Rating Scale; CBCL = Child Behavior Checklist; CES-D = Center for Epidemiologic Studies Depression Scale; CI = confidence interval; DASS = Depression Anxiety Stress Scale; DBRS = Disruptive Behavior Rating Scale; DPICS-III = Dyadic Parent–Child Interaction Coding System–Third Edition; *DSM–IV* = *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.); ECBI = Eyberg Child Behavior Inventory; ECBS = Early Childhood Behavioral Screen; EES = Early Education Support; ESI = Early Social Interaction; GA = gestational age; HOME = Home Observation for Measurement of the Environment Inventory; HR = heart rate; IBAIP = Infant Behavioral Assessment and Intervention Program; ICEP = Infant and Caregiver Engagement Phases; ITSEA = Infant–Toddler Social and Emotional Assessment; JEPP = Japanese Early Promotion Program; JNCATS = Japanese Nursing Child Assessment Teaching Scale; KC = kangaroo care; LEAP = Learning Experiences Alternative Program; *M* = mean; M-CHAT = Modified Checklist for Autism in Toddlers; MTP = Mother–Infant Transaction Program; MSEL = Mullen Scales of Early Learning; NCAFS = Nursing Child Assessment Feeding Scale; NCATS = Nursing Child Assessment Teaching Scale; NICU = neonatal intensive care unit; ODD = oppositional defiant disorder; PACS = Parental Account of Childhood Symptoms; PBC = Parent Behavior Checklist; PBIS = Positive Behavioral Interventions and Supports; PCI = parent–child interaction; PCIT = parent–child interaction therapy; PCPA = Parent–Child Play Assessment; PCRS = Parent–Child Relationship Scale; PEDS = Pakistan Early Child Development Scale–Up; PedSQ = Pediatric Satisfaction Questionnaire; PFR = Promoting First Relationships; PKBS-2 = Preschool and Kindergarten Behavior–Second Edition; PLAY = Play and Language for Autistic Youngsters; PLS–IV = Preschool Language Scales, Fourth Edition; PPC = Parent Problem Checklist; PPI = Parenting Practices Interview; PPS = Parent Practices Scale; PSBC = Problem Solving and Behavior Checklist; PSI = Parenting Stress Index; PSOC = Parenting Sense of Competence Scale; PSQ = Parent Satisfaction Questionnaire; PT = physical therapist; RCT = randomized controlled trial; RSA = respiratory sinus arrhythmia; RSES = Rosenberg Self-Esteem Scale; SAR = Sleep Activity Record; SDQ = Strengths and Difficulties Questionnaire; SEP = Social–Emotional Prevention; SIB–R = Scales of Independent Behavior–Revised; SR = systematic review; SSRS = Social Skills Rating System; STAI = State–Trait Anxiety Inventory; VABS–II = Vineland Adaptive Behavior Scales–Second Edition; WHO = World Health Organization; WPPSI = Wechsler Preschool and Primary Scales of Intelligence.

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Table A.2. Risk-of-Bias Table for Intervention Studies

Citation	Selection Bias		Performance Bias: Blinding of Participants and Personnel	Detection Bias			Attrition Bias: Incomplete Outcome Data	Reporting Bias: Selective Reporting
	Random Sequence Generation	Allocation Concealment		Blinding of Outcome Assessment: Self-Reported Outcomes	Blinding of Outcome Assessment: Objective Outcomes			
Ahn et al. (2010)	-	-	-	-	?	+	+	
Akbarzadeh et al. (2016)	+	-	-	?	?	+	+	
Bagner et al. (2016)	+	-	-	+	+	+	+	
Cho et al. (2016)	-	-	-	-	-	+	+	
Elizur et al. (2017)	+	+	-	-	-	+	+	
Feldman et al. (2014)	-	-	-	-	-	-	+	
Finch et al. (2016)	+	-	-	-	-	+	-	
Fung et al. (2014)	-	-	-	-	-	-	?	
Gradisar et al. (2016)	+	-	?	-	+	-	-	
Herbert et al. (2013)	+	-	-	-	-	-	-	
Homem et al. (2014)	?	-	-	-	-	-	?	
Ise et al. (2015)	+	+	-	-	-	-	-	
Keen et al. (2010)	-	-	-	-	-	-	-	
Kierfeld et al. (2013)	-	-	-	-	-	+	+	
Komoto et al. (2015)	-	?	-	-	-	?	?	
Kusanagi et al. (2011)	-	-	-	-	-	-	?	
Kynø et al. (2012)	+	-	-	-	-	-	-	
Lai et al. (2006)	+	+	+	-	+	-	-	
Lakes et al. (2011)	-	-	-	-	-	+	?	
McMenamy et al. (2011)	-	-	-	-	-	+	+	
Meijssen et al. (2010)	+	+	-	+	+	+	+	
Nordhov et al. (2012)	+	+	-	-	+	+	+	
Oswalt & Biasini (2011)	+	+	-	-	+	+	+	
Pears et al. (2015)	+	-	-	-	+	+	+	
Perrin et al. (2014)	+	-	-	+	+	+	+	
Ravn et al. (2011)	+	+	-	+	+	+	+	
Rodríguez et al. (2014)	+	-	-	-	+	+	+	
(Continued)								

(Continued)

Table A.2. Risk-of-Bias Table for Intervention Studies (Cont.)

Citation	Selection Bias		Performance Bias: Blinding of Participants and Personnel	Detection Bias		Attrition Bias: Incomplete Outcome Data	Reporting Bias: Selective Reporting
	Random Sequence Generation	Allocation Concealment		Blinding of Outcome Assessment: Self-Reported Outcomes	Blinding of Outcome Assessment: Objective Outcomes		
Ros et al. (2016)	+	-	-	-	+	+	+
Silva et al. (2011)	+	-	-	-	-	-	-
Smith et al. (2015)	-	-	-	-	-	-	-
Solomon et al. (2014)	+	-	-	-	-	+	-
Spieker et al. (2012)	+	?	-	-	-	-	?
Srinath et al. (2016)	-	-	-	-	-	-	-
Stanton-Chapman et al. (2016)	-	-	-	-	-	+	-
Ștefan & Miclea (2012)	-	-	-	-	-	-	-
Strain & Bovey (2011)	+	+	?	?	?	-	-
Vancraeyveldt et al. (2015)	-	-	-	-	-	-	-
Wetherby et al. (2014)	+	?	+	+	+	-	-
Wu et al. (2014)	+	?	+	+	+	-	?
<i>Note.</i> Categories for risk of bias are as follows: + = low risk of bias; ? = unclear risk of bias; - = high risk of bias. Risk-of-bias table format adapted from “Assessing Risk of Bias in Included Studies,” by J. P. T. Higgins, D. G. Altman, and J. A. C. Sterne, in <i>Cochrane Handbook for Systematic Reviews of Interventions</i> (Version 5.1.0), by J. P. T. Higgins and S. Green (Eds.), 2011, London: Cochrane Collaboration. Retrieved from http://handbook-5-1.cochrane.org . Copyright © 2011 by The Cochrane Collaboration.							
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Table A.3. Risk-of-Bias Table for Systematic Reviews

Citation	A Priori Design Included?	Duplicate Study Selection/Data Extraction?	Comprehensive Literature Search Performed?	Status of Publication as Inclusion Criteria?	List of Included/Excluded Studies Provided?	Characteristics of Included Studies Provided?	Quality of Studies Assessed and Documented?	Quality Assessment Used Appropriately?	Methods Used to Combine Results Appropriate?	Likelihood of Publication Bias Assessed?	Conflict of Interest Stated?
Barlow et al. (2016)	+	+	+	+	+	+	+	+	+	+	+
Bennett et al. (2013)	+	+	+	-	-	+	+	+	+	-	+
Douglas & Hill (2013)	+	+	+	-	-	+	-	N/A	+	-	-
Evans et al. (2014)	+	+	+	+	-	+	-	-	+	+	+
Juneau et al. (2015)	+	+	+	-	+	+	+	+	N/A	-	-
Michelson et al. (2013)	+	+	+	+	-	+	+	+	+	-	+
Oono et al. (2013)	+	+	+	+	+	+	+	+	+	+	+

Note. Categories for risk of bias are as follows: + = yes; - = no. N/A = not applicable because of study design. Risk-of-bias table format adapted from "Development of AMSTAR: A Measurement Tool to Assess the Methodological Quality of Systematic Reviews," by B. J. Shea, J. M. Grimshaw, G. A. Wells, M. Boers, N. Andersson, C. Hamel, . . . L. M. Bouter, 2007, *BMC Medical Research Methodology*, 7, 10. <https://doi.org/10.1186/1471-2288-7-10>. Copyright © 2007 by Springer Nature.

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