

The context and development of the early relational health screen

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Abstract

Early relational experiences are key drivers for developing social emotional capacities, educational achievement, mental health, physical health, and overall wellbeing. The child health sectors are committed to promotion, prevention, and early intervention that optimize children's health and development, often employing evidence-based screening as foundational practices. Despite a variety of validated parent-infant observational assessment tools, few are practical within busy practice settings, acceptable with all racial and ethnic groups and ready for universal adoption. In response to this need, a team of clinicians, early childhood educators, researchers and infant mental health specialists collaborated to develop and test a novel video-based, dyadic relational screening and monitoring tool, the Early Relational Health Screen (ERHS). This tool uniquely focuses on the early parent-child relationship (6–24 months), within the construct of early relational health (ERH). Initial testing demonstrated that the ERHS is a valid, reliable, feasible, and useful screening and monitoring tool for clinical applications. The ERHS was further developed within a population-based, prospective research study and adapted with brief video feedback for parents in the home visiting and child health sectors. The ERHS and its adaptations appear to advance ERH and equity within the transforming child health and public health care systems of today.

KEYWORDS

early childhood, Early relational health, infancy, parent-child interactions, social-emotional development

1 | INTRODUCTION

The significance of early parent-child relationships, especially during the first 1000 days of life, to the future health and well-being of people across the lifespan is supported by findings from several decades of research in neuroscience, epidemiology, infant mental health, child devel-

opment, trauma studies and pediatrics (Belsky & de Haan, 2011; Committee on the Psychosocial Aspects of Child & Family Health et al., 2012; Felitti & Anda, 2008; Gleason, 2009; Hertzman & Boyce, 2010; Larkin et al., 2012; National Scientific Council on the Developing Child, 2004, 2007; World Health Organization, 2004). Neurodevelopmental and infant mental health researchers have established that

early relational experiences become embedded within the interconnected systems of the brain and body, influencing an individual's life course health broadly, including the social-emotional capacities of social engagement, stress regulation, executive function and attention, and social and learning skills (Julian et al., 2017; Leblanc et al., 2017; Luby & Rogers, 2013; National Scientific Council on the Developing Child, 2004; Porges, 2011; Thompson & Haskins, 2014).

Within the context of the family's experiences and community, the fundamental capacities that arise from moment-to-moment interactions and relational patterns between infants, toddlers, and parents/caregivers play key roles in establishing the trajectories for behavioral, emotional, and social health across the lifespan (Center on the Developing Child at Harvard University, 2016; Halfon et al., 2013; Kärtner, 2018; Nelson, 2013). Child and parent/caregiver relationships encompass complex interactions comprising numerous elements, including serve-and-return patterns, dyadic facial and eye gaze, attunement of affective states, emotional connections, intersubjectivity, safety and reassurance, complex sensory and explorative experiences, positive social referencing, and reward and teaching from others (Abraham et al., 2016; Greenspan & Shanker, 2007; Greenspan et al., 1998; Klin et al., 2015; Marrus et al., 2015; National Scientific Council on the Developing Child, 2012). In turn, these elements are essential for developing the social wellbeing and health of the child and are observable within subsequent relationships with both other adults and peers within child health care, public health, and early childhood program settings.

2 | EARLY RELATIONAL HEALTH (ERH) AS AN EMERGENT AND EXPANDING CONCEPT

Noting the centrality of relationships to health, we promote the adoption of the umbrella term, *ERH*, to focus attention, practice innovations, and research on these foundational relationships for the health and development of infants and young children. ERH is not a new field, but rather an intentional focus on the foundational relationships that drive the development of lifelong health, success in school and work, and overall well-being (Frameworks Institute, 2020; Willis & Eddy, In, Review). Complementing the field of infant mental health, the concept of ERH emphasizes the promotion of strong parent-child relationship building and the prevention of relational challenges and is specifically targeted to bring enhancements to the child health and public health systems. The coordinating center for

STATEMENT OF RELEVANCE TO THE FIELD OF IECMH

In the development of the ERHS, an intentional, iterative strategy was used to translate the knowledge and principles of infant mental health into an acceptable approach within child health and public health sectors to accelerate universal promotion, prevention, and early identification activities. This tool brings characteristics of simplicity, validity, reliability and acceptability for clinicians and families and offers new opportunities to advance the social-emotional wellbeing of infants and children through use in research and practice.

KEY FINDINGS

- The Early Relational Health Screen (ERHS) is a video-based and interview-based, dyadic early relational screening and monitoring tool developed for use within the child health and public health sectors to advance universal efforts of promotion, prevention, and early intervention.
- In preliminary studies, the ERHS has demonstrated validity, reliability, feasibility, and utility when applied within a prospective cohort design research study, and clinical applicability, acceptability, and adaptability within practice settings from parent and provider input.
- The ERHS offers unique opportunities to advance early relational health (ERH) and promote family engagement and equity within a transforming child health and public health care systems.

ERH at Center for the Study of Social Policy has adopted the following definition:

ERH is defined as a foundational, culturally embedded and developing set of positive, responsive, and reciprocal interactions from birth that nurture and build emotional connections between caregivers, infants and young children and result in emerging confidence, competence, and emotional well-being for all.

This unifying terminology addresses a longstanding gap in a common language, framing and alignment across related disciplines, and contributes to a more unified emphasis on the research, policy and innovative practices that promote healthy relationships for all families (Frameworks Institute, 2020).

3 | ERH SCREENING: WHY ANOTHER SCREENING AND MONITORING INITIATIVE?

The primary care child health system seeks to promote the optimal physical, mental, and social health and wellbeing of all children. Our nation's child health system is the only universal platform in the U.S. developed for such a purpose and uniquely offers a venue where a young child and their primary caregiver are seen together during the earliest years of life (Bruner, 2012; Donoghue et al., 2016). As such, the child health system provides the obvious setting for developing and scaling innovative "two generational" practices that promote healthy early relationships for all families.

The importance of such opportunities is well articulated in the recently updated American Academy of Pediatrics' (AAP's) *Bright Futures Guidelines for Health Supervision of Infants, Children, and Adolescents* (Hagan et al., 2008, 2017), the nation's guide for quality child health care standards. Here, AAP recommends an expanded focus on strengthening positive, supportive parent- and caregiver-child relationships while simultaneously addressing multi-generational contextual factors (i.e., social determinants of health, mental health, screen time, early literacy support) as a core component of early childhood preventive efforts. Despite the many excellent recommendations described within *Bright Futures* such as family history taking, observing parent-child interactions, and providing anticipatory guidance for positive parenting, a significant gap exists in terms of carrying out these ideas in practice. In particular, universal ERH promotion, screening, and monitoring tools for use within the context of the day-to-day work of pediatric practice do not exist, and these are needed to further objectify and advance the AAP recommendations.

Social-emotional development delays are being reported in shockingly large numbers of young children as they come to kindergarten. Some states report that only 60%–79% of kindergarteners show "social-emotional skills" expected of 5-year-olds (Bettencourt et al., 2018; Washington Office of Superintendent on Public Instruction, 2020). National surveys have shown that as many as one in four children through the age of 5 years are at moderate or high risk for developmental, behavioral, or social delays (CAHMI, 2012). These numbers are expected

to be even higher post-COVID given the extreme stress and challenges that young families have been experiencing over the past year and a half (Fisher et al., 2020).

Despite a decade of efforts within the child health sector to advance developmental promotion, surveillance and universal identification of developmental delays with standardized developmental screening (Beers et al., 2017; Council on Children With Disabilities et al., 2006), universal screening rates remain low (Data Resource Center on Child & Adolescent Health, 2018) and far too many children are still entering school with undetected delays in their kindergarten readiness skills (Isaacs, 2012). The antecedents to these delays begin in the earlier years when children and their families are being seen frequently at well-child visits. The child health system must develop new tools that are useful during such visits, that are built from solid scientific evidence, and that are focused on strengthening the parent-child relationships that promote social emotional wellbeing. Further, these tools must accurately identify those families who need early interventions, before their young children enter school.

Fortunately, there is a growing commitment by pediatricians within the child health sector to play a role in identifying and managing children's mental health challenges (American Academy of Pediatrics, 2010; Perrin, 2020). We know that as many one in six U.S. children aged 2 to 8 years old (17.4%) have a diagnosable mental, behavioral or development disorder, a finding that clearly points to how early prevention efforts must begin (Center for Disease Control & Prevention, 2013). Screening for the risks to future mental health challenges (e.g., trauma, neglect, attachment disturbances) and monitoring the trajectories of developmental, social-emotional skills are important preventative approaches. The wellbeing of the parent-child relationship is key. New screening and monitoring tools for observing and monitoring ERH within the child health system provides opportunities to ensure that the child health system becomes more effective in preventing the development of child mental health problems and promoting well-being.

4 | THE DEVELOPMENT OF THE EARLY RELATIONAL HEALTH SCREEN(ERHS)

In response to the long-standing need for an ERH measure intended for broad application within practice, a team of clinicians, early childhood educators, researchers, and infant and early childhood mental health specialists from the U.S. and Norway began a 2-decade long journey in the

research, development, and application of a novel video- and interview-based, dyadic relational screening and monitoring tool, the ERHS. From the beginning, the team sought to design a tool and approach that would be universal within child health care and applicable for all young children and their parents and other caregivers (Shonkoff & Fisher, 2013; Zuckerman, 2016). The fundamental idea was to create a reliable and valid tool that would shift the focus from individual child screening to a focus on the observable interactions of the parent-infant/toddler dyad as they develop during infancy and toddlerhood. This approach was intended to bring objectivity and consistency to the observation of early development, capitalizing on the opportunity for the early detection of relational challenges and opening a window to the protective role that strong relationships might bring for resiliency and healing. Since attachment patterns can be predictive of later psychosocial capacities (Barlow et al., 2016; Fearon & Roisman, 2017; Thompson, 2008), the team sought to bring the identification of relational patterns into a standardized monitoring and screening process within child health care. This early identification of relational strengths and vulnerabilities could then be paired with science- and practice-based promotion, guidance, assessment and early interventions activities in the child health and public health sectors.

Conceptually, Zeanah and colleagues were some of the first to describe a model for relational assessment in infant and early childhood mental health (IECMH) that addressed ERH for clinical and naturalistic settings, noting that any relational tool must address the multidimensional and dyadic construct of ERH in infancy (Zeanah et al., 1997). Complex and well-researched video-based tools do exist but are typically intended for research and/or intensive clinical interventions and generally regarded as too complicated and expensive for replication, training, and scalability within a busy pediatric practice (Comfort et al., 2006; Kennedy et al., 2017). Other tools within the early childhood field for observing and monitoring parent-child interactions and parenting have often been developed within the contexts of their own programs and for specific research needs [e.g., Ainsworth Maternal Sensitivity Scale (Ainsworth et al., 1974); NCAST Parent-Child Interaction Scale (NCAST Parent-Child Interaction (PCI) Feeding and Teaching Scales, 2021); Keys to Interactive Parenting Scale [KIPS] (Comfort Consults, 2021); DANCE (Olds et al., 2013); CHEERS (LeCroy & Milligan Associates, 2017); TAS-45 (Spieker et al., 2001); PICCOLO (Roggman et al., 2013)].

Parent-child interaction measures are certainly related to relational health but often do not focus on the developing relational patterns themselves. Most were not created from a complex, multidimensional ERH development frame, but rather, are limited to a focus on parent inter-

action skills or focused on scoring the observed individual skills—often by video—of the caregiver or of the child. Newer, more simplified early relational screening tools for primary care [e.g., WECS (Frosch et al., 2019)] are in development and do include a relational focus, but, they too have not been fully tested in nor broadly adopted by primary care settings.

A recent development for the field is a centralized, regularly updated web-based repository of early childhood measures at EC PRISM, that includes an analysis of these and other parent-child interaction measures (Center for Translational Neuroscience, 2021). In fact, using their IMPACT Measures Tool Scoring System, EC PRISM recently identified seventeen possible ERH measures, 12 observational tools and 5 survey tools. Given that useability is the most important factor in considering the implementation of an ERH tool in the context of pediatric care, they discovered no ERH observational tools that met reasonable useability requirements for the clinical context. More importantly, no tool scored even moderately on a cultural relevance score—the extent to which measures are developed with different communities in mind and the steps taken to prevent or address measurement bias (Barker et al., 2021)—nor was any tool found to be scaled for use in the general population with careful attention to family acceptability, equity, and cultural perspectives. Clearly, there is work to be done.

4.1 | The origins of the ERHS: 2002–2011

The Portland team embarked in 2002 on the development of an early relational screening tool that balanced rigor, validity and reliability with scalability, replicability, and sustainability. The work was informed by a number of existing clinical practice and research tools including the NCAST instruments (Barnard, 1978; Huber, 1991), the Greenspan Functional Emotional Assessment Scale (DeGangi & Greenspan, 2000; Greenspan et al., 2001), parent-child social interaction research (Belsky & de Haan, 2011; Bernier et al., 2016; Feldman et al., 2010; Finger et al., 2009; Roggman et al., 2013), video-based parent training and video feedback (Kennedy et al., 2017; Mendelsohn et al., 2007; Rusconi-Serpa et al., 2009; Svanberg et al., 2013) and clinical experience (Comfort et al., 2006; Crittenden et al., 2007; Shah et al., 2015). The emerging tool was dubbed the Behavioral Health Screen (BHS).

The constructs assessed in the BHS are sequential and developmental and explicitly address key areas of relational functioning: parent and infant/toddler affective states; mutual attunement, sensitivity and responsiveness; serve-and-return patterns; the child and caregiver's developing dyadic capacities for social interaction, initiative,

imitation, communication, inter-subjectivity and representational thinking; and the later capacities for cooperation and recovery from a stressful challenge. Drawn from the research literature and clinical experience, these constructs were hypothesized to broadly represent the developmental sequence of positive parent-child interactions and predict healthy psychosocial, health, developmental, and educational outcomes (Perrin et al., 2016; Shah et al., 2015; Weisleder et al., 2016).

The original BHS was conceptualized and developed through a series of small scale, iterative pilot studies. Designed to be a user-friendly, one-time screen or an ongoing monitoring tool, the protocols were developed for capturing dyadic interactions at 6, 12, 18 and 24 months, corresponding to important developmental periods and the recommended well child visit periodicity in *Bright Futures* (Hagan et al., 2008, 2017). The initial work occurred between 2008 through 2011, with study protocols and procedures reviewed, approved, and monitored first by the Legacy Emanuel Medical Center Institutional Review Board and later by the Oregon Social Learning Center's Institutional Review Board.

After the tool had been developed, piloted, and refined on a small scale, 90 families with children 6, 12, 18 and 24 months were recruited from a child development center to participate in parent-child interaction tasks that were recorded. The team conducted a series of BHS scoring sessions with both experienced early childhood professionals and with naïve college students. Randomly selected sessions were scored twice. A second interaction task was conducted with 18-month dyads ($n = 45$) to examine the stability of ratings. High correlations (e.g., $r = .89$, $p < 0.001$) were found between both professional and student scores and the BHS research team "master rater" scores. Test-retest reliabilities were significant ($p < 0.01$) for both groups of scorers. Additional studies on the BHS indicated good internal coherency as demonstrated by uniformly high intercorrelations for 10 of the 12 items (i.e., $r = .70$ to $.84$). Based on clinical experience, cut-off scores were developed to sort the dyads into three groups for the purpose of comparisons between BHS score and rater judgment ("Pass", "Need More Information", "Evaluate/Refer"). Acceptable agreement for these categories was found for 87 of the 90 tapes. A follow-up study with the Ages and Stages: Social-Emotional (ASQ:SE) questionnaire found a small but statistically significant relationship between the BHS score at 18 months and subsequent ASQ:SE scores administered at age 4 to 5 years of age, suggesting preliminary predictive validity (Willis et al., 2008). Hence, our initial studies demonstrated that the BHS was simple to use, had promising reliability. Further, in discussions with the professionals involved in the initial work, the tool was viewed as face valid and of favorable utility.

4.2 | The ERHS proof of concept study: 2011–2017

Building from the original work, in 2011, Condon and a community of home visiting (HV) practitioners conducted the *ERHS Proof of Concept Study* (Condon, 2017). This project was a 2-year, qualitative, participatory action research study to assess the feasibility and experiences of incorporating the BHS into a Healthy Families America (HFA) home visiting team. A phenomenological design was used to try to understand the various HFA staff and family perspectives as they adopted the BHS, including those of supervisors, family support workers, HFA administrators, IECMH consultants and parents and caregivers. The study was an iterative developmental process that captured their experiences of staff with BHS screening and monitoring, discovered language and practices that would engage families and family support workers, tested the feasibility, acceptability, and utility of BHS in practice, and created opportunities for integrating the ERHS into the HFA model.

Data were gathered from 80 one- or two-parent families, all with a firstborn infant, from 14 family support workers and HFA Intake Specialists, from 6 HFA administrators, and from the program's IECMH consultant. As participatory action research is an iterative process, themes, insights, and discoveries that emerged during the use of the BHS were important for further tool development. For example, the team discovered the need for clear subjective and objective criteria for judging overarching affect within the relationship (see Table 2). Also, greater clarity was needed in the detailed descriptions of the BHS relational skills that are now understood as mutual capacities in the relationship.

As the home visiting team gained greater experience and confidence with the approach, they recommended renaming the tool to better reflect the relational nature of this approach. Given that the BHS focuses primarily on early relational patterns, the team recommended shifting the frame of reference of the emerging tool from "behavioral health" to "early relational health", which we endorsed as an important contribution along with the other recommendations. Thus, in subsequent revisions of the BHS, rating affect were added as was a scoring rule, and the tool was renamed the ERHS. An ERHS scoring manual was created including the first generation of training modules (see Appendix 2 for example of Scoring Criteria for mutual capacities at 18 months and Table 3 for ERHS 4.0 Mutual Capacities). In addition to observations and ratings of overarching affect and mutual capacities—both facets of ERH—the team also discovered the importance of a third facet of ERH: the thoughts and opinions of the people in the relationship about their own relationship

TABLE 1 Facets of early relational health and aspects of the ERHS (Condon, 2017)

Facet of ERH	Aspects of ERHS
Overarching affect or emotional tone <u>within</u> the relationship	Criteria for rating overarching affect or emotional tone within the relationship as “clearly positive,” “positive,” “unclear or neutral,” “not positive” or “clearly not positive” during brief live or videotaped parent-child interactions
Observable patterns of behaviors and interactions <u>of</u> a relationship	Criteria for rating mutual capacities of the relationship during the same brief live or videotaped parent-child interactions
Thoughts and opinions that individuals describe <u>about</u> their relationship	<p>Brief interview after videotaping/observing the parent-child interaction, asking parents to:</p> <ul style="list-style-type: none"> • Rate whether samples of interactions were “typical” or “not typical” • Share thoughts and opinions about: <ul style="list-style-type: none"> ○ Their experiences during interactions with their child ○ Their beliefs about their child’s experiences during interactions ○ Positive, surprising and/or bothersome aspects of their relationship ○ Questions and concerns about their ERH ○ Desired supports for ERH and follow-up

(see Table 1). The current version of the ERHS (version 4.0) includes brief interview questions to address this third facet.

The *ERHS Proof of Concept* study significantly advanced the development of the ERHS and demonstrated the utility and desirability of ERH screening in clinical practice. The study also revealed feasibility issues that organizations need to consider and address when using the tool in diverse contexts, such as workflow, inter-agency collaboration, access to on-going reflective supervision and consultation, and protections for undocumented families. Feasibility influences desirability. After the completion of this work, Condon went on to work with other early childhood-focused teams to explore equity, parent voice, acceptability, utility, and reflective conversations with an

ERHS approach, including her most recent work described within this Special Section on ERH (Condon et al., 2022).

4.3 | The *Little in Norway* (LiN) study: 2011–2020

During the same period as the above work, Moe and Smith adopted the ERHS as a relational health measure within a population-based longitudinal research project, the *Little in Norway* (LiN) study. This provided the first opportunity to conduct large scale feasibility, reliability, and validity studies of the ERHS (Moe & Smith, 2010). LiN is a prospective cohort research study designed to investigate pre- and postnatal risk and protective factors influencing development from pregnancy to age 18 months (Moe & Smith, 2010). Data were collected from nine different well-baby clinics across Norway at seven longitudinal time points: pregnancy, birth, 6 weeks, 6, 12, and 18 months, and 3 years.

Today, the study includes 1036 mothers and 884 participating fathers recruited at first inclusion in pregnancy, with 1017 first babies (including 10 twin pairs) born during the project. Mother–infant and father–infant interactions were video-recorded when the child was the age of 6, 12 and 18 months, and subsequently were coded utilizing the protocols of the ERHS. A total of 3000 ERHS video recordings of the study’s 1000 dyads were collected at the three-time points. ERHS coding teams of five to six psychology students were trained, monitored, and supervised by ERHS-experienced researchers. On average, each coder required about training of about 10 hours a week of coding across a period of 8 weeks to adhere properly to the coding rules. Once a coder was reliable, to avoid drift and reduce scoring bias, weekly sessions during each cohort’s coding period were arranged to discuss scored videos with low inter-rater reliability, those difficult to assess or those considered highly atypical. Additionally, since affect is a key facet of the ERHS construct, coders assessed affect prior to scoring individual dimensions to ensure that the scorers kept the emotional tone of the dyads in focus.

The scoring teams demonstrated acceptable inter-scoring reliability with the ERHS at both at 6 and 12 months. Namely, the inter-rater agreement, with weighted quadratic Kappa with collapsed scores yielded agreement at 6 months ($K = .67$) and 12 months ($K = .76$). Weighted Kappa with collapsed scores gave $K = .80$ at 6 months and at 12 months. The 18-month videos remain available for future coding and analysis (V. Moe, personal communication, September 2020).

The LiN research team has demonstrated that the ERHS is a user friendly and practical relational measure within the research context with the dimensions of the ERHS

TABLE 2 ERHS 4.0 criteria for rating overarching affect in the interactions

	Positive Overarching affective tone in the relationship	Less than positive Overarching affective tone in the relationship
Subjective indicators Observers may experience the following as they watch the interaction unfold...	<ul style="list-style-type: none"> • A sense that there is safety in the relationship • Observers find themselves relaxed, smiling, nodding, maybe even feeling delight or pleasure while watching the interaction unfold • Observers find themselves exclaiming, “Nice” or “beautiful” or “sweet” or “heartwarming” (mentally or aloud) 	<ul style="list-style-type: none"> • Observers have a sense of ill ease, worry or sadness while watching the interaction unfold • Observers find themselves tensing, holding their breath, shaking their heads, looking away or watching the interaction unfold with worried expressions on their faces • Observers find themselves not knowing what to think about the interaction • Observers feel uncertain about the emotional tone in the relationship
Objective indicators Observers may see or hear the following as they watch the interaction unfold...	<ul style="list-style-type: none"> • Smiles and pleasant expressions on the faces of both the parent and child • Caresses and/or snuggling • Gentle touches by both the parent and child toward the other • The parent and child lean towards one another • The postures of both the parent and the child are relaxed • The parent and child use positive words, gestures, and tones of voice with one another • The child is readily soothed—the parent uses self and reassurance to comfort the child 	<ul style="list-style-type: none"> • Crying that is not readily soothed • The parent uses objects or scolding instead of warmth, self, or reassurance to comfort the child • Flat facial affect and expressions • Frowns, grimaces, sad or angry expressions on the faces of the parent and/or child • The parent or child use rough touch, hitting or slapping at the other, ducking or dodging the other’s movements as if expecting a hit • The bodies of the parent or child are tense or oriented away from each other most of the time • The child stays out of the parent’s arm’s reach most of the time • The parent or child avert gaze • The parent expresses anger, impatience, irritation, or helplessness towards the child • The parent speaks sarcastically or critically to the child or about child • The parent attributes negative intents to the child’s actions or expressions

Abbreviations: ERH, early relational health; ERHS, Early Relational Health Screen.

being both developmental sensitive and clinically meaningful. With over 2100 ERHS recordings coded, an acceptable inter-rater reliability was obtained both at 6 and 12 months. Further reports on the LiN have been published elsewhere (Drugli et al., 2017; Fredriksen et al., 2016; Moe et al., 2019; Olafsen et al., 2018; Sanner et al., 2016; Skjothaug et al., 2015). In this Special Section of the IMHJ, two papers from the LiN research team document the validation, utility, and applicability of the ERHS to various questions of importance to the field (Fredriksen et al., 2017; Sigveland et al., 2008).

4.4 | The ERHS 4.0: 2017 to present

The ERHS 4.0 is the current version of the tool. It can serve as a one-time screen, an ongoing surveillance and monitoring system, or the foundation for an ERH promotion

effort with video feedback and reflections with parents. The ERHS 4.0 scoring protocol includes general instructions (Appendix 1), a small set of prescribed toys / per age (Appendix 1) and criteria for observing (scoring) at 6, 12, 18 and 24 months (Appendix 2.1) including additional criteria for rating overarching affect in the relationship (Table 2); a brief interview to tap parents’ thoughts, opinions or questions about their child, and their relationship or concerns; and scoring rules and a worksheet including a decision tree for next steps after screening. (Appendix 2.2).

The ERHS 4.0 is designed to capture key aspects of dyadic interactions taken from observations of standardized parent-child play opportunities. The protocol calls for 3 to 4 minutes of interaction at 4 months of age, for 5 minutes of interaction at 6 months, and for up to 12 minutes of interaction at 18- and 24-months. Interactions can take place in a clinical setting or in the home. The subsequent interview can take 2 to 6 minutes depending on the length

TABLE 3 ERHS 4.0 mutual capacities

6 months	12 months	18 months	24 months	Mutual capacities
X	X	X	X	Mutual engagement
X	X	X	X	Mutual enjoyment
X	X	X	X	Mutual responsiveness
X	X	X	X	Mutual pacing
X	X	X	X	Mutual attention
	X	X	X	Mutual initiation
	X	X	X	Mutual imitation
	Simple	Complex	Complex	
		X	X	Shared goal
		X	X	Mutual cooperation
		X	X	Sensitivity to one other's feelings
		X	X	Mutual response to a challenge
		Simple	Simple	
			X	Mutual problem solving
			X	Shared pretend play
			X	Mutual, complex communication

Abbreviation: ERHS, Early Relational Health Screen.

of parent responses and the extent to which the screener probes for more information. The ERHS videotape review and ratings of affect and capacities require no more than 5 to 8 minutes, although, with experience, an observer can learn to score in real time (Rosenblum et al., 2008). The ERHS observer can also select a short segment to watch with families for reflective video review.

5 | DISCUSSION

Focusing greater attention to ERH within child health care requires new scalable strategies and practices that objectify and simplify approaches for pediatric practice to promote and strengthen parent-infant relationships. Innovations that create objective measures of ERH can be important additions to the current focus in child health care on anticipatory guidance, positive parenting, risk identification and developmental screening (National Institute of Child Health Quality et al., 2016; Sparrow, 2011; Weisleder et al., 2016). Our decades long journey to develop the ERHS has targeted to meet this need with a user friendly, video- and interview-based relational screening and monitoring tool.

Preliminary studies with the ERHS have thus far shown face-validity, feasibility, and test-retest and inter-rater reliability and warrants further study. There are many additional tool characteristics to explore, not the least of which are deeper studies of its construct validity and the discriminating and predictive power of individual scored items. The ERHS tool needs further validation by demonstrat-

ing the concurrent validity of the ERHS to other standardized observational tools of parent-child interaction, such as the PICCOLO, the Parent Child Early Relational Assessment (PCERA), the NICHD measures, and others. Studies within population health, public health and life course health are needed to explore the predictive validity of the ERH patterns, as identified by the ERHS, over time.

Key questions include the following. What do the ERHS patterns predict for later social-emotional development or kindergarten readiness? What do the patterns of ERH mean for future mental health? This tool applied to longitudinal data, as demonstrated in the LiN Study, has the potential to answer such questions, and more importantly, point to the opportunities for early intervention and prevention activities, measured with longitudinal outcomes.

As for the utility of the tool in clinical pediatric and home visiting practices, we need to learn more about the most reliable and valid way to train lay coders and for lay coders to score families under typical clinic conditions (e.g., live or from videotape). Answers to key questions about usability, feasibility, reliability, and acceptability within the wide variety of populations that are served in practice within the U.S. are essential to find before wide-spread adoption by clinicians. Work in this regard is proceeding. For example, the Center for the Study of Social Policy has been commissioned by the Parents Supporting Parents Funder Coalition to examine how best to advance the adoption, acceptability, and value to parents and practitioners of a small set of activities, including the ERHS, to promote and measure ERH in pediatric primary care.

As a stand-alone tool, the ERHS has already demonstrated its initial merit for use in community research and for its meaningful adoption within home visiting. Yet, we recognize the many hurdles and challenges to be overcome to advance the ERHS in child health care: implementation and acceptability complexities in clinical practice; financing and sustainability solutions beyond piloting; staff training for implementation and scoring reliabilities; and, of greatest importance, the engagement of families to determine its true value and meaning of ERHS for them.

Furthermore, as emphasized through the recent racial justice awakening, it is evident that new initiatives to advance ERH and ERHS must be mindful of being anti-racist, equity focused, and co-developed with parents. In strong partnerships with families, the ERHS can become one part of a relationally centric equity strategy to enhance the promotion and supporting approaches for families who face known risks (e.g., racism, poverty, ACE's) that can disrupt healthy relationships. The ERHS has the potential to move beyond its screening function alone to contribute to promising brief interventions by ERHS video review with parents that promoting positive parenting and parent self-reflection in the pediatric medical home (Dozier & Bernard, 2017; Kennedy et al., 2017; Mendelsohn et al., 2007; Vik & Hafting, 2006).

5.1 | Limitations

The most obvious limitation of this work relates to limited cultural and equity perspectives and co-development. The ERHS was developed 2 decades ago by white dominant-culture clinicians and researchers and the initial validation efforts were limited to the Nordic populations. As such, the use of the current ERHS in clinical practice in the U.S. comes with true risks of racial bias, white dominant perspectives, and inappropriate judgments of parents and parenting practices. These vulnerabilities challenge innovators who seek to advance the ERHS to partner with families, listen deeply to the family perspective, embed discussions of ERH within promotion activities, provide clinic wide racial bias training, reflective supervision, and consultation for clinic staff with infant mental health consultants, and create opportunities for family leadership and the co-development of applications and various approaches to the use of the ERHS. Clinics and programs who wish to advance ERHS might engage families of various ethnic groups in ongoing and regular co-construction conversations with clinic staff along their own journey with ERHS.

Additional concerns have been raised about the validity and reliability of the ERHS and its interpretation after such

brief relational observations within the medical home. The ERHS is solely a brief observation that occurs in-the-moment and is intended as a screening and monitoring tool to celebrate observed strengths, ensure a positive, nurturing parent-child relationship, and to identify families where greater support or intervention might be needed. Screening results at a single point in time are surely not sufficient to establish a diagnosis and may have limited utility in predicting future outcomes. The ERHS is meant simply to be one observational tool that can be used to assist in the monitoring of ERH during the first 1000 days of life and was not designed to be a thorough assessment or evaluation on its own. Further, it is not intended to be a tool for forensic use.

Beyond the well-known privacy concerns related to videotaping, record keeping and misinterpretation, many innovators are exploring ways for parents to “own” their own video data, including parents capturing the video data on their own smart phones or the “making of a movie” with families within the clinic for discussion, then deleted from any record keeping. There are clearly many opportunities within the ERHS paradigm to positively impact children and families, as well as many challenges. As the experience with video as a medium to advance ERH grows, many of these challenges will likely be solved.

6 | CONCLUSIONS

Early relational experiences between parents and infants are foundational and promote both physical health and the social-emotional development of the child. ERH promotes future physical, developmental, and mental wellbeing and, as such, is an expanding focus of innovation within child health care and public health. The promotion of ERH will require new scalable strategies and practices that assist in understanding, monitoring, and strengthen parent-infant relationships.

We describe an approach to address the complex multidimensional constructs of ERH in the first 1000 days of life with a user-friendly video- and interview-based, dyadic relational screening and monitoring tool, the ERHS. The ERHS has been designed, tested, and preliminarily validated for use in child health, parent education, home visiting and research. This report describes the context and development of the ERHS tool, and the beginning studies of proof of concept, feasibility, reliability, and validity of the tool. Work is needed to address equity, cultural adaptations, and acceptability by families and clinicians. Yet, we propose that the ERHS, and all that has been learned, has the potential to advance ERH within pediatric practices, home visiting, prevention programs and research, and warrants further study.

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CONFLICT OF INTEREST

The authors have indicated that they have no conflict of interest to disclose.

AUTHOR CONTRIBUTIONS

David W. Willis, MDa, Marie-Celeste Condon, PhDb, Vibeke Moe, PhDc, Leslie Munson, PhDd, Lars Smith,

PhDc, and J. Mark Eddy, PhD.e. All authors contributed to the development, conceptualization, revision, and adaptation of the ERHS and were substantially involved in development, review, and approval of this manuscript. All the authors approved of this final manuscript as submitted and agree to be accountable to all aspects of the work. The unique contributions of each author are noted as follows. Dr. Willis provided vision, conceptualization and leadership for Early relational health promotion, the development of the original Behavioral Health Screen (BHS) and its evolution to the Early relational health Screen (ERHS). Dr. Condon advanced the development from the original BHS into the Early relational health Screen (ERHS), conducted the ERHS Proof of Concept study, and demonstrated the feasibility, reliability, and utility the ERHS within a Healthy Families America home visiting programs. Dr. Smith and Dr. Moe adopted the BHS as a parent-infant relational measurement tool within their Little in Norway (LiN) studies and provided further refinements and validities for the ongoing development of the ERHS as a tool with research feasibility, validity, and reliabilities. Dr. Munson was on the original BHS Portland team in conceptualizing, piloting, and testing of the BHS. Dr. Eddy provided ongoing expert consultation, guidance, and collaboration throughout the years of development of the BHS and the ERHS.

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REFERENCES

- Abraham, E., Hendler, T., Zagoory-Sharon, O., & Feldman, R. (2016). Network integrity of the parental brain in infancy supports the development of children's social competencies. *Social Cognitive and Affective Neuroscience*, *11*(11), 1707–1718. <https://doi.org/10.1093/scan/nsw090>
- Ainsworth, M. D. S., Bell, S. M., & Stayton, D. (1974). Infant-mother attachment and social development. In: M. P. Richards ed. *The introduction of the child into a social world*. Cambridge University Press; pp. 99–135.
- American Academy of Pediatrics, Task Force on Mental Health. (2010). Addressing mental health concerns in primary care: A clinician's tool kit. <https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/Mental-Health/Pages/Addressing-Mental-Health-Concerns-in-Primary-Care-A-Clinicians-Toolkit.aspx>
- Barker, T., Champagne, C., Mattek, A., & Fisher, P. (2021). A review of early relational health measures for use in pediatric care. *EC PRISM*, Center for Translational Neuroscience. University of Oregon.
- Barlow, J., Schrader-McMillan, A., Axford, N., Wrigley, Z., Sonthalia, S., Wilkinson, T., & Coad, J. (2016). Review: Attachment and attachment-related outcomes in preschool children—A review of

- recent evidence. *Child and Adolescent Mental Health*, 21(1), 11–20. <https://doi.org/10.1111/camh.12138>
- Barnard, K. (1978). *NCAST teaching scale manual*. In: NCAST Publications.
- Beers, L. S., Godoy, L., John, T., Long, M., & Biel, M. G. (2017). Mental health screening quality improvement learning collaborative in pediatric primary care. *Pediatrics*, 140(6), e20162966. <https://doi.org/10.1542/peds.2016-2966>
- Belsky, J., & de Haan, M. (2011). Annual research review: Parenting and children's brain development: The end of the beginning. *Journal of Child Psychology and Psychiatry*, 52(4), 409–428. <https://doi.org/10.1111/j.1469-7610.2010.02281.x>
- Bernier, A., Calkins, S. D., & Bell, M. A. (2016). Longitudinal associations between the quality of mother–infant interactions and brain development across infancy. *Child Development*, 87(4), 1159–1174. <https://doi.org/10.1111/cdev.12518>
- Bettencourt, A., Gross, D., Ho, G., & Perrin, N. (2018). The costly consequences of not being socially and behaviorally ready to learn by kindergarten in Baltimore City. *Journal of Urban Health*, 95(1), 36–50. <https://doi.org/10.1007/s11524-017-0214-6>
- Bruner, C. (2012). Medical homes and young children: State policy opportunities to improve children's healthy development as part of early childhood systems building. BUILD Initiative and Child and Family Policy Center. Unpublished work.
- Center for Disease Control and Prevention (CDC). (2013). Mental health surveillance among children—United States, 2005–2011. *MMWR*, 62(Suppl 2) <https://www.cdc.gov/mmwr/preview/mmwrhtml/su6202a1.htm>
- Center for Translational Neuroscience. (2021). IMPACT Measure Repository, <https://ctn.uoregon.edu/projects/impact-measures-repository>
- Center on the Developing Child at Harvard University. (2016). From best practices to breakthrough impacts: A science-based approach to building a more promising future for young children and families. https://46y5eh11fhgw3ve3ytpwxt9r-wpengine.netdna-ssl.com/wp-content/uploads/2016/05/From_Best_Practices_to_Breakthrough_Impacts-4.pdf
- Child and Adolescent Health Measurement Initiative (CAHMI). (2012). National survey of children's health. <http://childhealthdata.org/learn/NSCH>
- Comfort Consults. (2021). Keys to Interactive Parenting Scale. <https://www.kipscoaching.com/>
- Comfort, M., Gordon, P. R., & Unger, D. G. (2006). Keys to Interactive Parenting Scale: A window into many facets of parenting. *Journal of Zero to Three*, 26(5), 37–44. EJ808221.
- Condon, M., Charlot-Swilley, D., & Rahman, T. (2022). Sitting at the feet of the storytellers: Early relational health conversations. *Infant Mental Health Journal*.
- Condon, M.-C. (2017). Early relational health: Infants' experiences living with their incarcerated mothers. *Smith college studies in social work*, 87(1), 5–25. <https://doi.org/10.1080/00377317.2017.1246218>
- Council on Children With Disabilities, Section on Developmental Behavioral Pediatrics, Bright Futures Steering Committee, & Medical Home Initiatives for Children With Special Needs Project Advisory Committee. (2006). Identifying infants and young children with developmental disorders in the medical home: An algorithm for developmental surveillance and screening. *Pediatrics*, 118(1), 405–420. <https://doi.org/10.1542/peds.2006-1231>
- Crittenden, P. M., Claussen, A., & Kozłowska, K. (2007). Choosing a valid assessment of attachment for clinical use. *Australia New Zealand Journal of Family Therapy*, 28(2), 78–87.
- Data Resource Center for Child and Adolescent Health. (2018). Title V National Performance Measures (NPMs) across state comparison table, 2017–2018 NSCH. <https://www.childhealthdata.org/browse/multiple-indicators/title-v-national-performance-measures-nsch-2017-2018>
- DeGangi, G., & Greenspan, S. I. (2000). Functional Emotional Assessment Scale. In (G. DeGangi Ed.), *Pediatric disorders of regulation in affect and behavior (Appendix B)*. Academic Press. ISBN: 9780128098776.
- Donoghue, E., Glassy, D., DelConte, B., Earls, M., & Lieser, D. (2016). The Pediatrician's role in optimizing school readiness. *Pediatrics*, 138(3), <https://doi.org/10.1542/peds.2016-2293>
- Dozier, M., & Bernard, K. (2017). Attachment and Biobehavioral Catch-up: Addressing the needs of infants and toddlers exposed to inadequate or problematic caregiving. *Current Opinion in Psychology*, 15, 111–117. <https://doi.org/10.1016/j.copsyc.2017.03.003>
- Drugli, M. B., Solheim, E., Lydersen, S., Moe, V., Smith, L., & Berg-Nielsen, T. S. (2017). Elevated cortisol levels in norwegian toddlers in child care. *Early Child Development and Care*, 188(12), 1684–1695. <https://doi.org/10.1080/03004430.2016.1278368>
- Fearon, R., & Roisman, G. (2017). Attachment theory: Progress and future directions. *Current Opinion in Psychology*, 15, 131–136. <https://doi.org/10.1016/j.copsyc.2017.03.002>
- Feldman, R., Gordon, I., Schneiderman, I., Weisman, O., & Zagoory-Sharon, O. (2010). Natural variations in maternal and paternal care are associated with systematic changes in oxytocin following parent–infant contact. *Psychoneuroendocrinology*, 35(8), 1133–1141. <https://doi.org/10.1016/j.psyneuen.2010.01.013>
- Felitti, V., & Anda, R. (2008). The relationship of adverse childhood experiences to adult health, well-being, social function and health-care. In (L. a. Vermetten Ed.), *The hidden epidemic: The impact of early life trauma on health and disease*: Cambridge University Press.
- Finger, B., Hans, S. L., Bernstein, V. J., & Cox, S. M. (2009). Parent relationship quality and infant–mother attachment. *Attachment & Human Development*, 11(3), 285–306. <https://doi.org/10.1080/14616730902814960>
- Fisher, P., Lombardi, J., & Kendall-Taylor, N. (2020). Why households with young children warrant our attention and support during (and after) the COVID-19 pandemic. <https://medium.com/rapid-ec-project/why-households-with-young-children-warrant-our-attention-and-support-during-and-after-the-b7cee9b76184>
- Frameworks Institute (2020). Building relationships: Framing early relational health. Washington, DC. <https://www.frameworksinstitute.org/wp-content/uploads/2020/06/FRAJ8069-Early-Relational-Health-paper-200526-WEB.pdf>
- Fredriksen, E., Von Soest, T., Bekkhus, M., Svendsrud, H., Smith, L., Siqueland, T., & Moe, V. (2017). The role of mothers' and fathers' attachment styles for interactional quality and parental leave practices: A longitudinal study. *Infant Mental Health Journal*, .
- Fredriksen, E., von Soest, T., Smith, L., & Moe, V. (2016). Patterns of pregnancy and postpartum depressive symptoms: Latent class trajectories and predictors. *Journal of Abnormal Psychology*, 125(2), 173–183. <https://doi.org/10.1037/abn0000246>

- Frosch, C. A., Fagan, M. A., Lopez, M. A., Middlemiss, W., Chang, M., Hane, A. A., & Welch, M. G. (2019). Validation study showed that ratings on the Welch Emotional Connection Screen at infant age six months are associated with child behavioural problems at age three years. *Acta Paediatrica*, *108*(5), 889–895. <https://doi.org/10.1111/apa.14731>
- Committee on the Psychosocial Aspects of Child and Family Health, Committee on Early Childhood, Adoption, and Dependent Care, Section on Developmental-Behavioral Pediatrics, Garner, A. (2012). Early Childhood adversity, toxic stress, and the role of the pediatrician: Translating developmental science into lifelong health. *Pediatrics*, *129*(1), e224–e231. <https://doi.org/10.1542/peds.2011-2662>
- Gleason, M. M. (2009). Relationship assessment in clinical practice. *Child and Adolescent Psychiatric Clinics of North America*, *18*(3), 581–591. <https://doi.org/10.1016/j.chc.2009.02.006>
- Greenspan, S., & Shanker, S. (2007). The developmental pathways leading to pattern recognition, joint attention, language and cognition. *New Ideas in Psychology*, *25*(2), 128–142. <https://doi.org/10.1016/j.newideapsych.2007.02.007>
- Greenspan, S. I., DeGangi, G. A., & Wieder, S. (2001). The functional emotional assessment scale (FEAS) for infancy and early childhood: Clinical and research applications: Interdisciplinary Council on Developmental and Learning Disorders Bethesda, MD. ISBN -10: 0972892516.
- Greenspan, S. I., Wieder, S., & Simon, R. (1998). *The Child with Special Needs: Encouraging Intellectual and Emotional Growth*. Perseus Books. ISBN 0201407264.
- Hagan, J., Shaw, J. S., & Duncan, P. M. eds. (2017). *Bright futures: Guidelines for health supervision of infants, children and adolescents*, (4th ed.). American Academy of Pediatrics.
- Hagan, J. F., Shaw, J. S., & Duncan, P. M. eds. (2008) *Bright futures: Guidelines for health supervision of infants, children, and adolescents* (3rd ed.). American Academy of Pediatrics.
- Halfon, N., Larson, K., Lu, M., Tullis, E., & Russ, S. (2013). Lifecourse health development: Past, present and future. *Maternal and Child Health Journal*, *1–22*, 344–365. <https://doi.org/10.1007/s10995-013-1346-2>
- Hertzman, C., & Boyce, T. (2010). How experience gets under the skin to create gradients in developmental health. *Annual Review of Public Health*, *31*(1), 329–347. <https://doi.org/10.1146/annurev.publhealth.012809.103538>
- Huber, C. J. (1991). Documenting quality of parent-child interaction: Use of the NCAST Scales. *Infants & Young Children*, *4*(2), 63–75.
- Isaacs, J. (2012). Starting school at a disadvantage: The school readiness of poor children. https://www.brookings.edu/wp-content/uploads/2016/06/0319_school_disadvantage_isaacs.pdf
- Julian, M., Lawler, M., & Rosenblum, K. (2017). Caregiver-child relationships in early childhood: Interventions to promote well-being and reduce risk for psychopathology. *Current Behavioral Neuroscience Reports*, *4*, 87–98. <https://doi.org/10.1007/s40473-017-0110-0>
- Kärtner, J. (2018). Beyond dichotomies — (m)others' structuring and the development of toddlers' prosocial behavior across cultures. *Current Opinion in Psychology*, *20*, 6–10. <https://doi.org/10.1016/j.copsyc.2017.07.040>
- Kennedy, H., Ball, K., & Barlow, J. (2017). How does video interaction guidance contribute to infant and parental mental health and well-being? *Clinical Child Psychology and Psychiatry*, *22*(3), 500–517. <https://doi.org/10.1177/1359104517704026>
- Klin, A., Shultz, S., & Jones, W. (2015). Social visual engagement in infants and toddlers with autism: Early developmental transitions and a model of pathogenesis. *Neuroscience & Biobehavioral Reviews*, *50*, 189–203. <https://doi.org/10.1016/j.neubiorev.2014.10.006>
- Larkin, H., Shields, J., & Anda, R. (2012). The health and social consequences of adverse childhood experiences (ACE) across the lifespan: An introduction to prevention and intervention in the community. *Journal of Prevention and Intervention in the Community*, *40*(4), 263–270.
- Leblanc, É., Dégeilh, F., Daneault, V., Beauchamp, M. H., & Bernier, A. (2017). Attachment security in infancy: A preliminary study of prospective links to brain morphometry in late childhood. *Frontiers in Psychology*, *8*(Article2141), <https://doi.org/10.3389/fpsyg.2017.02141>
- LeCroy & Milligan Associates, I. (2017). Healthy Families America CHEERS check-in: Validation of an observational measure of parent-child interactions.
- Luby, J., & Rogers, C. (2013). Maternal support and brain development: neuroscience validation for the importance of early caregiving relationships. *Zero To Three*, *34*(1), p. 12–15.
- Marrus, N., Glowinski, A. L., Jacob, T., Klin, A., Jones, W., Drain, C. E., & Constantino, J. N. (2015). Rapid video-referenced ratings of reciprocal social behavior in toddlers: A twin study. *Journal of Child Psychology and Psychiatry*, *56*(12), 1338–1346. <https://doi.org/10.1111/jcpp.12391>
- Mendelsohn, A. L., Valdez, P. T., Flynn, V., Foley, G. M., Berkule, S. B., Tomopoulos, S., Fieman, A. H., Tineo, W., & Dreyer, B. P. (2007). Use of videotaped interactions during pediatric well-child care: Impact at 33 months on parenting and on child development. *Journal of Developmental and Behavioral Pediatrics*, *28*(3), 206–212. <https://doi.org/10.1097/DBP.0b013e3180324d87>
- Moe, V., Fredriksen, E., Kjelleve, M., Dahl, L., Markhus, M. W., Stormark, K. M., von Soest, T., Olafsen, K. S., Vannebo, U. T., & Smith, L. (2019). Little in Norway: A prospective longitudinal community-based cohort from pregnancy to child age 18 months. *BMJ Open*, *9*(12), e031050. <https://doi.org/10.1136/bmjopen-2019-031050>
- Moe, V., & Smith, L. (2010). Little in Norway: A longitudinal population study of infant vulnerability and plasticity from pregnancy to age 18 months. <https://bmjopen.bmj.com/content/9/12/e031050>
- National Institute of Child Health Quality (NICHQ), Einhorn Family Charitable Trust and Ariadne Labs (2016). Promoting young children's (Ages 0–3) socioemotional development in primary care. <https://www.nichq.org/sites/default/files/resource-file/Promoting%20Young%20Children%27s%20Socioemotional%20Development%20in%20Primary%20Care%20%282016%29.pdf>
- National Scientific Council on the Developing Child (2004). Working paper #1: Young children develop in an environment of relationships. <https://46y5eh11fhgw3ve3ytpwxt9r-wpengine.netdna-ssl.com/wp-content/uploads/2004/04/Young-Children-Develop-in-an-Environment-of-Relationships.pdf>
- National Scientific Council on the Developing Child (2007). Working paper #5: The timing and quality of early experiences combine to shape brain architecture. https://46y5eh11fhgw3ve3ytpwxt9r-wpengine.netdna-ssl.com/wp-content/uploads/2007/05/Timing_Quality_Early_Experiences-1.pdf

- National Scientific Council on the Developing Child (2012). Working paper #12: The science of neglect: The persistent absence of responsive care disrupts the developing brain. <https://46y5eh1lfhgw3ve3ytpwxt9r-wpengine.netdna-ssl.com/wp-content/uploads/2012/05/The-Science-of-Neglect-The-Persistent-Absence-of-Responsive-Care-Disrupts-the-Developing-Brain.pdf>
- NCAST Parent-Child Interaction (PCI) Feeding & Teaching Scales (2021). <https://www.pcrprograms.org/parent-child-interaction-pci-feeding-teaching-scales/>
- Nelson, C. A. (2013). Biological embedding of early life adversity. *JAMA Pediatrics*, *167*(12), 1098–1100. <https://doi.org/10.1001/jamapediatrics.2013.3768>
- Olafsen, K. S., Ulvund, S. E., Torgersen, A. M., Wentzel-Larsen, T., Smith, L., & Moe, V. (2018). Temperamental adaptability, persistence, and regularity: Parental ratings of Norwegian infants aged 6 to 12 months, with some implications for preventive practice. *Infant Mental Health Journal*, *39*(2), 183–197. <https://doi.org/10.1002/imhj.21697>
- Olds, D., Donelan-McCall, N., O'Brien, R., MacMillan, H., Jack, S., Jenkins, T., Dunlap, W., O'Fallon, M., Yost, E., Thorland, B., Pinto, F., Gasbarro, M., Baca, P., Melnick, A., & Beeber, L. (2013). Improving the nurse–family partnership in community practice. *Pediatrics*, *132*(Supplement 2), S110–S117. <https://doi.org/10.1542/peds.2013-1021I>
- Perrin, E. C. (2020). Promotion of mental health as a key element of pediatric care. *JAMA Pediatrics*, *174*(5), 413–415. <https://doi.org/10.1001/jamapediatrics.2020.0020>
- Perrin, E. C., Leslie, L. K., & Boat, T. (2016). Parenting as primary prevention. *JAMA Pediatrics*, *170*(7), 637–638. <https://doi.org/10.1001/jamapediatrics.2016.0225>
- Porges, S. W. (2011). *The polyvagal theory: Neurophysiological foundations of emotions, attachment, communication and self-regulation*: W.W. Norton & Company, Inc. ISBN-10:0393707008.
- Roggman, L. A., Cook, G. A., Innocenti, M. S., Jump Norman, V., & Christiansen, K. (2013). Parenting interactions with children: Checklist of observations linked to outcomes (PICCOLO) in diverse ethnic groups. *Infant Mental Health Journal*, *34*(4), 290–306. <https://doi.org/10.1002/imhj.21389>
- Rosenblum, K., Riggs, J., Freeman, S., Shah, P., & Muzik, M. (2008). In-the-moment ratings on the early Relational Health Screen: A pilot study of application in home visiting and primary care. *Infant Mental Health Journal*, .
- Rusconi-Serpa, S., Sancho Rossignol, A., & McDonough, S. C. (2009). Video feedback in parent-infant treatments. *Child and Adolescent Psychiatric Clinics of North America*, *18*(3), 735–751. <https://doi.org/10.1016/j.chc.2009.02.009>
- Sanner, N., Smith, L., Wentzel-Larsen, T., & Moe, V. (2016). Early identification of social-emotional problems: Applicability of the infant-toddler social emotional assessment (ITSEA) at its lower age limit. *Infant behavior and development*, *42*, 69–85.
- Shah, R., Sobotka, S. A., Chen, Y.-F., & Msall, M. E. (2015). Positive parenting practices, Health disparities, and developmental progress. *Pediatrics*, *136*(2), 318–326. <https://doi.org/10.1542/peds.2014-3390/>
- Shonkoff, J. P., & Fisher, P. A. (2013). Rethinking evidence-based practice and two-generation programs to create the future of early childhood policy. *Development and Psychopathology*, *25*, (25th Anniversary Special Issue 4pt2), 1635–1653. <https://doi.org/10.1017/S0954579413000813>
- Siqveland, T., Fredriksen, E., Wentzel-Larsen, T., Smith, L., & Moe, V. (2008). Mother-infant and father-infant interaction patterns at infant age 12 months in a community sample: The possible role of child gender. *Infant Mental Health Journal*.
- Skjothaug, T., Smith, L., Wentzel-Larsen, T., & Moe, V. (2015). Prospective fathers' adverse childhood experiences, pregnancy-related anxiety, and depression during pregnancy. *Infant Mental Health Journal*, *36*(1), 104–113. <https://doi.org/10.1002/imhj.21485>
- Sparrow, J. (2011). Pediatricians' role in supporting parents as they care for infants and young children. *Current Problems in Pediatric and Adolescent Health Care*, *41*(7), 207–209. <https://doi.org/10.1016/j.cppeds.2011.02.007>
- Spieker, S., Nelson, E. M., & Condon, M. C. (2001). Validity of the TAS-45 as a measure of toddler-parent attachment: Preliminary evidence from Early Head Start families. *Attachment & Human Development*, *13*(1), 69–90.
- Svanberg, P. O., Barlow, J., & Tigbe, W. (2013). The Parent–Infant Interaction Observation Scale: Reliability and validity of a screening tool. *Journal of Reproductive & Infant Psychology*, *31*(1), 5–14. <https://doi.org/10.1080/02646838.2012.751586>
- Thompson, R. (2008). Early attachment and later development: familiar questions, new answers. In (J. a. S. Cassidy, Phillip Ed.), *The handbook of attachment, second edition: Theory, research and clinical applications* (pp. 348–365): The Guilford Press.
- Thompson, R. A., & Haskins, R. (2014). Stress and child development. *Future of Children*, *24*(1), 41–59. <https://doi.org/10.1353/foc.2014.0004>
- Vik, K., & Hafting, M. (2006). Video interaction guidance offered to mothers with postnatal depression: Experiences from a pilot study. *Nordic Journal of Psychiatry*, *60*(3), 234–238. <https://doi.org/10.1080/08039480600636593>
- Washington Office of Superintendent on Public Instruction, (2020). WaKIDS 2019–2020 results. https://www.k12.wa.us/sites/default/files/public/wakids/materials/pubdocs/WaKIDS1920OnePageFinal_20200714.pdf
- Weisleder, A., Cates, C., Dreyer, B., Berkule Johnson, S., Huberman, H. S., Seery, A., Canfield, C., & Mendelsohn, A. (2016). Promotion of positive parenting and prevention of socioemotional disparities. *Pediatrics*, *137*(2), e20153239. <https://doi.org/10.1542/peds.2015-3239>
- Willis, D., & Eddy, J. M. (2022). Early relational health: Innovations in Child Health for Promotion, Screening, and Research. *Infant Mental Health Journal*.
- Willis, D., Munson, L., & Gillespie, K. (2008). Results of pilot studies of the BHS. Unpublished work.
- World Health Organization (2004). The importance of caregiver-child interactions for the survival and healthy development of young children: A review. <https://apps.who.int/iris/bitstream/handle/10665/42878/924159134X.pdf;jsessionid=BA74B60DF94BAFB80A43158E27219683?sequence=1>
- Zeanah, C. H., Boris, N. W., Heller, S. S., Hinshaw-Fuselier, S., Larrieu, J. A., Lewis, M., Palomino, R., Rovaris, M., & Valliere, J. (1997). Relationship assessment in infant mental health. *Infant Mental Health Journal*, *18*(2), 182–197. [https://doi.org/10.1002/\(SICI\)1097-0355\(19972\)18:2<182::AID-IMHJ7>3.0.CO;2-R](https://doi.org/10.1002/(SICI)1097-0355(19972)18:2<182::AID-IMHJ7>3.0.CO;2-R)

Zuckerman, B. (2016). Two generation pediatric care: A modest proposal., *137*, 1.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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<https://doi.org/10.1002/imhj.21986>