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Special Issue Article

The Future of Developmental Psychopathology: Honoring the Contributions of Dante Cicchetti

Caregiving relationships are a cornerstone of developmental psychopathology

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Abstract

The interdisciplinary field of developmental psychopathology has made great strides by including context into theoretical and empirical approaches to studying risk and resilience. Perhaps no context is more important to the developing child than their relationships with their caregivers (typically a child's parents), as caregivers are a key source of stimulation and nurturance to young children. Coupled with the high degree of brain plasticity in the earliest years of life, these caregiving relationships have an immense influence on shaping behavioral outcomes relevant to developmental psychopathology. In this article, we discuss three areas within caregiving relationships: (1) caregiver–child interactions in everyday, naturalistic settings; (2) caregivers' social cognitions about their child; and (3) caregivers' broader social and cultural context. For each area, we provide an overview of its significance to the field, identify existing knowledge gaps, and offer potential approaches for bridging these gaps to foster growth in the field. Lastly, given that one value of a scientific discipline is its ability to produce research useful in guiding real-world decisions related to policy and practice, we encourage developmental psychopathology to consider that a focus on caregiving, a modifiable target, supports this mission.

Keywords: Caregiving; caregiver context; caregiver social cognition; everyday interactions

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Introduction

The field of developmental psychopathology has experienced tremendous growth and acceptance over the past 50 years. It has been interdisciplinary from the start, pushing against long-standing beliefs about the origin of mental illness (Rutter & Werker, 2021). Though there are many aspects that differentiate the field and approaches of developmental psychopathology from related disciplines (e.g., child clinical psychology, child and adolescent psychiatry), perhaps one of the most important distinguishing aspects is the explicit focus on an individual's context as a key feature in shaping the onset and progression of psychological difficulties (and thriving) (Cicchetti, 1993). From Cicchetti's perspective, developmental psychopathology has also led in efforts to consider how context shapes an individual's development (Cicchetti & Curtis, 2006; Cicchetti, 2002; Masten & Cicchetti, 2010).

Given the importance of context, as well as its broad nature, the question is what "context" most merits our attention. Bronfenbrenner's ecological systems theory (1977) outlines a method to consider individual development within interconnected environmental systems (for a brief review of additional theories regarding contextual influences on development, see Cicchetti & Aber, 1998). However, it is plausible that greater weight may be given to those systems that, on average, have the greatest influence on psychopathology and thriving over time. Here, we argue that the context with the greatest potential for impact is caregiving relationships. This stance is far from controversial. Given the plasticity of the developing brain early in life and the reliance of infants and young children on their adult caregivers (often, though not exclusively, their biological parents) for survival, it stands to reason that relationship quality (and quantity) should be a central feature of future research in developmental psychopathology.

Related fields more clearly embrace this target. For example, in the interdisciplinary field of infant and early childhood mental health (IECMH) (Zeanah & Zeanah, 2018), their primary diagnostic manual (DC: 0–5; Zero to Three, 2016) allows for diagnoses to be made at the level of the relationship. In fact, DC: 0–5 includes a diagnostic category termed "Relationship Specific Disorder of Early Childhood" in order to capture psychopathology that is evident within a specific caregiver–child pair and not present when the child is with other caregivers. Diagnosing pathology that exists "between" individuals, rather than "within" the child, is unique to DC: 0–5 relative to other diagnostic manuals (e.g., Diagnostic and Statistical Manual of Mental Disorders [American Psychiatric Association, 2013]; International Statistical Classification of Diseases and Related

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Health Problems [World Health Organization, 2019]) and may stem from the developmental and theoretical perspectives of the IEMCH field on caregiving relationships. Such an approach acknowledges that caregiving relationships are (1) critically important to children, (2) can be pathological, and (3) are specific to the relational partners involved.

Most developmental psychopathologists would not be comfortable categorizing disorders on the basis of their hypothesized etiology (e.g., originating from within an individual or from a specific relationship), given that etiology is typically considered as an ongoing transaction between genetic and environmental factors (Cicchetti & Lynch, 1993). The degree to which children evoke caregiving behaviors typically considered to be promotive of positive outcomes and risk factors for negative outcomes has been documented in both genetically informed (Cheung et al., 2016; Harold et al., 2013; Klahr et al., 2013; Tucker-Drob & Harden, 2012) and experimental research (Pelham et al., 1997). Considering characteristics and behaviors of the caregiver, the child, and of their interactions across time is ideal for studies examining mechanisms and pathways to, and from, psychopathology. However, if we believe that understanding risk and resilience is more than just an academic exercise, our work should strive to inform practice and policy. Considering levers of change may take priority over explanation, if a goal is to translate research to real-world decision to promote adaptive child and family functioning, especially with regard to what to do, when, and with whom. As such, prioritizing specific targets that encompass a transactional element most open to change (i.e., caregiving) may be a more practical approach for a field seeking to both understand and aid the subjects of study.

The knowledge of the role of caregiving relationships, particularly in the early developmental stages of infants and children, stems from extensive research conducted over decades. This research is interdisciplinary, drawing insights from IECMH, developmental science, neuroscience, human development, family studies, and developmental psychopathology. These fields are now enriched through collaborations with specialists in computer science, electrical engineering, and artificial intelligence, all of which offer innovative tools to test and refine theoretical frameworks. With this, the execution of this research often presents complex challenges. These include working with unique populations, conducting comprehensive longitudinal studies, designing and implementing interventions, employing diverse assessment methodologies, and coordinating information from various sources associated with each child. Often, research studies integrate several of these challenging elements.

We are grateful for the collective research efforts that amassed the evidence that demonstrates that caregiving is a cornerstone of developmental psychopathology. This research establishes a basis for further investigation that could clarify the factors influencing children's developmental trajectories and pinpoint effective interventions to nurture the conditions that allow children and their caregivers to thrive. A focus on caregiving is also relevant for those specifically concerned with adversity and trauma, given that caregivers are the most commons perpetrators of child maltreatment (U.S. Department of Health & Human Services, 2023) and that caregiving behaviors that promote secure attachment relationships mitigate the risk for psychopathology following exposure to traumatic events (Feldman & Vengrober, 2011). A note before proceeding: although relationships with our caregivers are important throughout development, the physical dependence on caregivers in early life makes infancy and early childhood stages particularly important. Thus, we consider the first years of life (e.g., prenatal through the preschool-age years) to be the ideal target for this focus of research. In this article, we discuss three areas pertinent to the advancement of developmental psychopathology (for a conceptual model, see Figure 1):

1. Assessment of caregiver–child interactions in naturalistic settings – "in the wild," or the environments where children reside and grow, such as homes and community spaces. This approach allows us to examine both the quality and frequency of caregiving interactions within the context of the child's daily life.
2. Understanding caregivers' social cognitions, particularly regarding their perceptions of their children's mental states, their own roles as caregivers, and the dynamics of their relationship with the child. These cognitive frameworks are critical and malleable factors that influence caregiving behaviors in daily interactions.
3. Influences of caregiver context on functioning. Caregivers possess multiple roles and identities beyond their connection to the child and are shaped by various factors such as partner relationships, the robustness of social networks, government and workplace policies, and culture. We consider how these contextual elements inform caregiver cognitions and behaviors, which are essential considerations in developmental psychopathology.

For each domain, we provide a concise overview of its essence and significance to developmental psychopathology, identify existing knowledge gaps, and propose approaches to bridge these gaps.

Assessment of caregiver–child interactions in naturalistic settings

Definition and value of everyday interactions

Early caregiving experiences set the foundation for developmental processes that unfold across the lifespan (Bowlby, 1982). According to attachment theory and the organizational perspective on development, everyday interactions between a caregiver and child have cascading effects on attachment and other developmental processes (Doyle & Cicchetti, 2017). Specifically, *everyday interactions* are characterized as social exchanges between the caregiver and child, and include the frequency, duration, and quality of these exchanges. Interactions occur over short bursts of time (e.g., microlevel interactions occurring within seconds) or can be characterized as long-standing patterns that accumulate over years (macrolevel) (Ram & Gerstorf, 2009). Assessing everyday interactions enables researchers to gain a snapshot of microlevel interactions that, over time, may represent the longer-term macro view of the relationship.

Laboratory assessments of caregiver–child interactions are the field standard, given the complexity of naturalistic environments and value of standardizing assessment methods. In laboratory assessments, the observations tend to be relatively brief in duration (~5-45 minutes) and either feature behavioral instructions for the caregiver to act in a prespecified manner (e.g., be non-responsive to the infant during episodes of the Still Face Paradigm; Tronick et al., 1979) or to play with their child as they typically would (e.g., during "free play" interactions where a set of toys are made available to a caregiver–child pair; see Baldwin et al., 1982). One value of these highly controlled settings is that variations in caregiving interactions are observed free from other external distractions that can influence the engagement of the participants (e.g., preparing meals, phones and tablets, other children). In addition, laboratory tasks allow researchers to conduct experiments that test specific research questions (e.g., how do caregiver–child dyads navigate more challenging tasks, including observing how caregivers instruct

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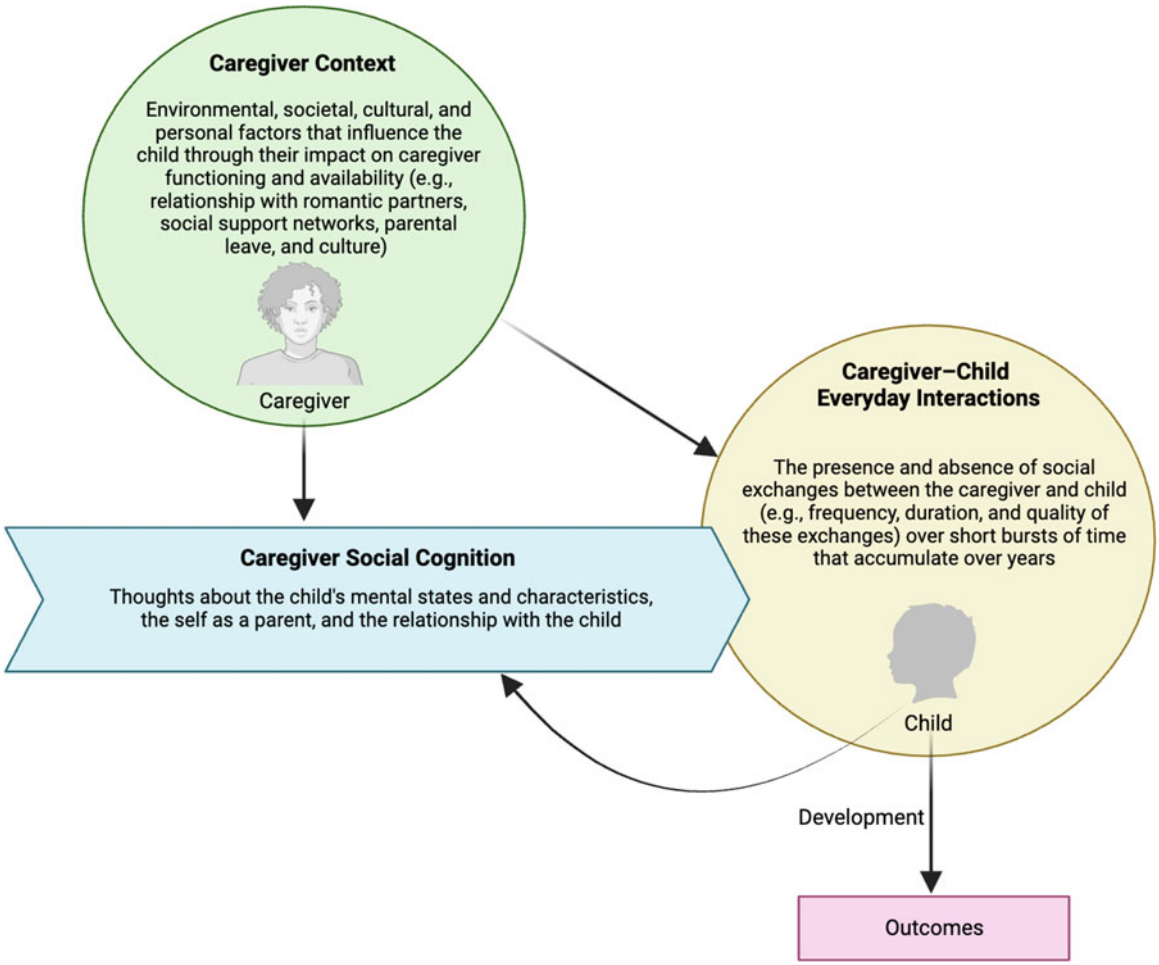

Figure 1. A conceptual model of relevant domains for the study of caregiving relationships. *Note*. While we acknowledge domains are bidirectional in influence, single headed arrows were selected in order to indicate the hypothesized direction of most interest. The child's effect on caregiver social cognitions is proposed to be not static, but rather change as a function of experiences with the child and the child's growing competencies and individual characteristics. Figure created in BioRender.com.

and support children to independently "clean up" appealing toys [see Kochanska & Aksan, 1995], or how the dyad responds to a brief separation [see Ainsworth et al., 1978; Crowell & Feldman, 1988]). Highly controlled lab paradigms have provided profound insight into developmental processes, including identifying the quality of interactions that precede the development of secure attachments (e.g., Braungart-Rieker et al., 2014).

Knowledge gaps

As with any method, there are limitations to what can be gained via laboratory observations. First, behaviors observed in the laboratory capture the child's experience with that caregiver under very specific confines. The caregiver is often acutely aware of being observed either in real-time by members of the research team or through cameras recording the interactions. Further, the removal of the necessary household tasks, phones, and other children that may otherwise pull the caregiver's attention are likely meaningful moderators of the behaviors observed in the laboratory (e.g., McDaniel, 2019), which may constitute the caregiver's "best case scenario" of behavior. In addition, the observation is brief, and the degree to which the quality of behavior can be maintained over time is not typically tested, as social interactions are taxing energetically. In a study of mothers with and without sleep disturbances, those with poor sleep continuity demonstrated a notable decline in sensitivity across a 10-minute free play with their 18-week-old infants (King et al., 2020). Further, this higher effort during observations is evident from comparisons of caregiver behavior in these settings compared to daylong observations. Caregivers are likely to speak to their infants throughout the entire duration of a laboratory task, however 20–30% of everyday activities that infants engage in do not contain any adult speech (Cristia et al., 2021; Tamis-LeMonda et al., 2017). Taken together, although we know that laboratory assessments can provide insight into developmental processes, it is still unclear the degree to which the behaviors observed in the lab map on to what the child experiences in terms of caregiving in their everyday life. Although there is some recent work examining the role of caregiving "in the wild" in developmental processes (e.g., Madden-Rusnak et al., 2023; de Barbaro et al., 2023), we know little about the level (and impact) of variation in caregiving (e.g., at home vs. at daycare; during meals vs. at bedtime; with mom vs. dad vs. when both are present; and in other combinations) on children's functioning.

Recommendations for next steps

Infants' daily experiences encompass a wide array of interactions with various objects, individuals, and activities across settings. The

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deployment of tools to document these experiences can significantly enhance our understanding of how actions, proximity, tactile engagements, and exposure to varying environments influence child development (de Barbaro & Fausey, 2022). Researchers may pursue these questions by considering first-person recordings in naturalistic contexts. Advances in wearable technology, such as the Looxcie 2 camera, which fits over one of the adult wearer's ears – in this case, the caregiver – like a pair of glasses (e.g., Jayaraman et al., 2015; Teti et al., 2010), offer innovative ways to record infants' interactions without the discomfort associated with traditional head-mounted devices. Audio recording tools like the Language Environment Analysis system (Xu et al., 2009), in which the device is typically housed in a wearable vest, gathers audio data from the infant's environment, including speech and background sounds. Their "black box" algorithms produce estimates of adult words, conversation turns, and child vocalizations, offering the potential to use the data to obtain information such as which conversational partner initiated a conversation, and whether a greater number of adult- vs. infant-initiated conversations better explain children's later expressive and receptive language (Salo, King et al., 2022). Open-source tools that allow investigators to explore and manipulate the algorithms used are ideal for promoting collaboration and allowing for innovations that improve measurement.

Advances in wearable technologies also allow for new areas of inquiry. Specifically, physical proximity is an important aspect of the caregiver–child relationship (see Barnett et al., 2022), and can be recorded via touch and proximal distance recordings (Brzozowska et al., 2021; Salo, Pannuto et al., 2022). Such recordings provide valuable data on infants' movement, spatial relations, and tactile interactions. Our team developed the TotTag (run using the SociTrack platform [Biri et al., 2020]), which employs time-of-flight technology to record continuous distance measurements between all individuals in a network. Importantly, this means that each pairwise relationship (not only mother–infant, for example) is captured. For example, in the case of TotTags worn by all members of a family of five, proximity information is produced for ten pairwise relationships. Data analysis options include examining combinations of close contact and considering the family unit's patterns of proximity as a network. Critical aspects of caregiver–child relationship dynamics, including the duration of close proximity, frequency of caregiver–child "check-ins," and which actor initiates interactions using the on-board accelerometer, may be important for evaluating differences between families, changes in behaviors across development, risk for developmental delays, and assessments of intervention success. Moreover, it can detect periods when a caregiver is out of the child's range, providing insights into the physical (with implications for emotional) availability and responsiveness of the caregiver (for an example using another method to assess availability, see King et al., 2021). Being able to include these details about everyday interactions may be essential for better understanding how caregiver physical contact influences whether and when children meet various developmental goals (e.g., establishing independence, providing children with feelings of security) and what may be the most effective behaviors to target for intervention.

Research to date has begun to exemplify how understanding physical proximity can support targeted intervention. For instance, studies highlight the potential impact of physical touch on the formation of secure attachment (Williams & Turner, 2020) and demonstrate how an infant's physical location within their environment can influence their exposure to language (Malachowski et al., 2023; Mireault et al., 2018) – all of which are vital to their developmental trajectory. This is only the tip of the iceberg in terms of important areas for research into everyday interactions, however. For example, research examining emotion socialization, or the ways in which caregivers respond to children's emotions, which subsequently teach children how to understand and regulate their own emotions (Eisenberg et al., 1998; Eisenberg, 2020), has suggested that supportive emotional responses from caregivers (e.g., emotion labeling) have been associated with the development of self-regulation (P. Tan et al., 2020), sympathy for others (Curtis et al., 2020), lower levels of behavior problems (Perry et al., 2020; Zhang et al., 2020), and greater well-being (Brown & Fredrickson, 2021). However, the degree to which caregiver emotion socialization measured in the laboratory or via questionnaires extends to everyday experiences – and the degree to which caregiver physical proximity is a prerequisite for these experiences – is unknown.

Pursuit of these questions will be enhanced by the use of better software and analytic approaches now available for the rich data discussed here. Machine learning and computer vision technologies are revolutionizing the analysis of video data, enabling researchers to rapidly detect and analyze faces, objects, and movements within video frames (e.g., Bambach et al., 2018). These advancements significantly decrease the time and effort needed to analyze extensive video recordings. As a result, video coding, known for its time and labor intensity, becomes more accessible to researchers who lack the resources for hiring and training coders, as well as those seeking to access large volumes of recording. Moreover, advancements in the widespread availability and ease of ecological momentary assessment (EMA) provide an opportunity to advance work pertaining to everyday interactions and capturing caregiving in moments of heightened interest (e.g., during emotionally charged situations). These approaches would support further understanding of lingering questions surrounding in-the-moment caregiving. For example, in the case of emotion socialization, EMA can be applied to obtain information in shortened timescales (e.g., children's emotions during the last 2 hours compared to longer timeframes specified in questionnaires). This would provide more accurate insight into how caregivers' own emotions and behaviors in response to their children's different affective states impact caregiving quality, potentially identifying targets to help support families in more challenging moments.

Compared to traditional laboratory observations, advances in statistical approaches and software, proximal distance recordings, and wearable technologies (i.e., camera and audio recorders) enable a more comprehensive and precise portrayal of early experiences that occur daily and in naturalistic contexts. Bridging the gap between laboratory observations and real-world experiences better captures the subtleties of daily life that contribute to infant and child development. Specifically, with these tools researchers can more accurately measure the quality and impact of caregiver–child interactions in broad and specific naturalistic contexts, paving the way for interventions that support healthy developmental processes in everyday life.

Understanding caregivers' social cognition

Definitions and value of caregiver social cognition

Mind-mindedness and parental reflective functioning

One compelling explanation for why caregivers differ stems from their awareness of, and attunement to, their children's own mind,

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thoughts, and emotions. In adults, the extent to which one thinks about self and others' cognitions and emotions (i.e., mental states), including their child's, is suggested to be crucial for everyday behaviors and healthy relationships (Fonagy et al., 2002). This may be especially important within the caregiver–child relationship, such that caregivers who envision and consider their child's own internal world are more likely to have developmentally-appropriate expectations and be attuned and responsive when interacting with their child (King et al., 2021).

Over the past two decades, researchers in this area turned to several approaches to examine caregivers' *ability* and *tendency* to perceive, consider, and reflect upon infants' affective and cognitive experiences (e.g., mentalizing, empathy, intentionality, insightfulness, and representations). Constructs related to the general capacity for mentalizing (Fonagy et al., 2002), including parental reflective functioning (Sharp & Fonagy, 2008; Slade, 2005), mind-mindedness (Meins et al., 2001), and parental embodied mentalizing (Shai & Belsky, 2011), have often been studied in the context of caregiving relationships. First, parental reflective functioning refers to a caregiver's *ability* to think about and envision their child's mental states and attribute meaning to their own experience as caregivers (Slade, 2005). Historically measured using interviews (Slade et al., 2003) and, more recently, questionnaires, the operationalization of parental reflective functioning measures a controlled and conscious process of thinking about children's mental states. Second, mind-mindedness refers to caregivers' *tendency* to attribute mental states to their children (Meins et al., 2001). Measured by the frequency of appropriate mental states language in observations during caregiver–child interactions or speech samples (Meins et al., 2001; Meins, 1998), the operationalization of mind-mindedness is suggested to tap into a less explicit yet more "in action" reflective process than most assessments of parental reflective functioning (Rosenblum et al., 2008). Finally, a new approach to implicitly assess caregiver mentalizing (i.e., parental embodied mentalizing) has been suggested to assess the construct beyond verbal and semantic measures (Shai & Belsky, 2017). This approach acknowledges parental mentalizing through the bodily movements and gestures that demonstrate how caregivers adjust to infants' mental states (e.g., a caregiver who gently rocks their baby after they show slight signs of distress).

Empirical studies consistently reinforce the notion that a caregiver's capacity to perceive and consider their child's mental and emotional states are fundamental to responsive caregiving (see reviews by Camoirano, 2017; McMahon & Bernier, 2017; Zeegers et al., 2017). For instance, meta-analytic evidence indicates there are moderate-size associations of both parental reflective functioning and mind-mindedness with caregiver sensitivity (Zeegers et al., 2017). Similarly, an important body of literature documented prospective associations between better parental reflective functioning, embodied mentalizing, or mind-mindedness, and attachment security (Fonagy & Target, 2005; Gagné et al., 2021; Zeegers et al., 2017).

Caregiver representations of the child

Caregivers differ in the internal working models, or mental representations (hereafter: representations) that they hold about their child (Bowlby, 1982), which shape their interpretations of, expectations for, and behaviors towards their child. Caregiver representations are typically coded in caregiver semi-structured interviews and are characterized across a number of dimensions such as richness of perceptions and acceptance, as well as categorized into balanced, disengaged, distorted (Zeanah & Benoit, 1986; Zeanah, 1996), or disrupted (Crawford & Benoit, 2009) classifications. Rather than focusing on a caregiver's ability and tendency to reflect upon their child's mental states, representations refer to caregiver's mental constructs of how well they know, tend to enjoy, and accept their child and their relationship with that child, among other aspects.

The way caregivers represent their role as a caregiver (i.e., that part of their identity and what it means to be a caregiver to this child) may shape the way they think and feel about caring for their child (Bornstein, 2015). In that regard, balanced caregiving representations (i.e., coherent, relationship- and child-focused, rich in details) are linked to higher levels of sensitivity to infants' needs and cues (Vreeswijk et al., 2012). Positive and balanced representations are in turn associated with better child development (Dollberg et al., 2010; Hall et al., 2015; Madigan et al., 2015). Infants with caregivers who had balanced, in contrast with distorted, representations, were more able to regulate their frustration (Feldman et al., 2011) and demonstrated better attentional skills (Korja et al., 2010).

Representations are also linked to caregiver–child outcomes (Benoit et al., 1997; Huth-Bocks et al., 2011; Rosenblum et al., 2002), such that non-balanced (disengaged [i.e., more distancing or intellectualized, lacking in richness] or distorted [i.e., some inconsistencies, not child-focused]) caregiving representations are associated with more difficulties within the dyad. For example, previous work demonstrates that mothers classified as having distorted mental representations were more likely to exhibit atypical caregiving behaviors such as intrusive, withdrawn, or hostile behaviors than mothers with balanced representations (Schechter et al., 2008). A recent study reported that prenatal disrupted representations of the child were prospectively associated with atypical caregiving behaviors at infant age 12 months and socioemotional functioning at 24 months (Guyon-Harris et al., 2022), suggesting that the representations that develop during gestation are a salient risk factor, and one that is potentially causal, in the development of psychopathology.

Knowledge gaps

Although promising, there are several gaps in our current understanding of caregivers' social cognitions. First, despite theoretical support for the idea that social cognitions unfold over time with caregiver and child development, empirical studies focusing on the reciprocal development between caregivers' cognitions and children's functioning and development remain very limited. As children advance through different stages of development, the synchrony in the mental engagement between caregiver and child – this "meeting of the minds" – is likely to transform (Sharp & Fonagy, 2008). Thus, it is reasonable to propose that as children acquire new abilities, the nature and elaborateness of the caregiver's social cognitions would plausibly adapt in response to these developmental progressions. Yet which changes or cues signal to caregivers that the child is capable of more mature considerations is not clear.

Congruently, recent studies have focused on the progression of caregivers' mind-mindedness (Bigelow et al., 2023; Foley et al., 2023). These studies have found a degree of consistency, as well as some variability, in caregivers' comments about their child's mental world from the prenatal and newborn phases to three to four months postpartum. Specifically, one study found an uptick in mothers' attuned mind-minded remarks toward their infants over

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the initial three months, while non-attuned comments remained unchanged (Bigelow et al., 2023). Despite these findings, the field predominantly treats reflective functioning as a stable characteristic. Whether social cognitions are truly fixed or subject to change in response to a child's developmental progress remains an area poised for further exploration. For instance, caregivers communicate differently with infants as a function of whether they have achieved certain motor milestones (Schneider & Iverson, 2022; West & Iverson, 2021). The pattern, nature, and individual differences in caregivers' "updating" their models is an important gap in our understanding of the bidirectional relationship between caregiver cognitions and children's evolving capabilities.

Second, in theoretical models, social cognitions have been understood as dynamic, capable of fluctuating with changes in context (Fonagy et al., 1991). Yet, in practice, our study designs and measurements typically capture the relationship at a set point in development, or, if longitudinal, represent either snapshots of time assessed across development or capture more global tendencies. What remains to be considered are specific timescales of the ideal assessments, and further, whether there are some contexts in which mental state reflection may be more or less important (for an example of the importance of caregiver sensitivity varying based on the affective context, see Leerkes et al., 2009). Evidence from research on empathy further suggests effects of psychological symptoms specifically on parental cognitions. Depressive symptoms were linked to lower levels of empathy toward one's own child over and above the association between depression and dispositional, or general, empathy (Salo et al., 2020). Further, given that the ability and tendency to consider a child's mental states may be influenced by the caregiver's own temperamental or developmental attributes (Sharp & Fonagy, 2008), understanding how caregivers' mental and emotional states change as a function of context, including the effects of acute stress as well as functionally impairing depression, for example, is critical for future research.

Third, the measurement of such complex constructs represents a sizeable challenge for research, and current scoring schemes and self-reported assessments have limitations. For parental reflective functioning specifically, existing coding systems produce a single, unidimensional score, which may not fully capture the nuances of caregivers' abilities to reflect upon the thoughts and feelings of both themselves and their children (Garon-Bissonnette et al., 2023; Sleed et al., 2021). This scoring limitation can obscure significant variances in impairments in reflective functioning among caregivers, who might exhibit comparable scores but possess distinct mental content and conceptualizations of their child. For instance, a caregiver who distances themself from thinking in mental states terms would receive a low score of reflective functioning, and at present the same score could also be assigned to a caregiver who attempts reflection but provides confused, diffuse, or inconsistent responses (Garon-Bissonnette et al., 2023). Similarly, as parental reflective functioning considers both reflection regarding the child as well as self as a parent, differences in caregiver- versus child-focused reflective functions specifically may emerge (see Smaling et al., 2016). These qualitative differences may be critical in informing intervention targets for a given caregiver–child pair (Sleed et al., 2021) and relatedly in providing more personalized interventions.

Finally, caregivers' social cognitions and representations may promote responsiveness to caregiving interventions or evolve as a result of interventions. For instance, one recent study indicated improvement in parental reflective functioning after a short-term intervention aimed at bolstering attachment security, improvements that explained significant variance in positive caregiving behaviors (Dexter & Wong, 2023). Relatedly, a separate study indicated that pre- to post-intervention changes in caregivers' beliefs about their importance for child development were linked to more positive dyadic interactions, higher learning, and socioemotional skills in children (List et al., 2021). While this preliminary research is promising, the impact of this work would be further enhanced with pre-registered replications and extensions of this work.

Recommendations for next steps

Current measurement techniques might not adequately differentiate aspects of caregivers' reflective capacities, potentially leading to uniform treatment approaches when more personalized strategies may be advantageous. Recent advances have suggested adaptations to existing coding schemes that have the ability to tap into the representational and perceptual heterogeneity of caregiver cognitions (Garon-Bissonnette et al., 2023; Sleed et al., 2021). These approaches pave the way for tailored methods to support caregiver–child relationships. Specific forms of failures to mentalize were shown to have different determinants in the caregiver's own developmental history; differences otherwise masked using the usual approach to score reflective functioning (Garon-Bissonnette et al., 2023). Similarly, the different representational contents (classified as hostile, helpless, or idealized) of caregivers' discourse when asked to reflect on their children differentially correlated with the attunement and mutuality between caregiver and child. For instance, hostile and idealized representations, characterized by lower reflective functioning, were associated with poorer caregiver–child attunement, and helpless representations were not strongly associated with measures of caregiver–child relationship quality during a brief laboratory assessment (Sleed et al., 2021). Such "splitting" (e.g., rather than lumping) approaches may better yield information necessary to understand how child-related cognitions develop as well as which dimensions matter most for the caregiving relationship, and in turn the child's cognitive, social, and emotional development. Future investigations into these complex dimensions of caregiver social cognitions hold promise for the development of more sophisticated and effective assessment tools (King, Salo, et al., 2021).

Similarly, narrowing the focus from a caregiver's general- versus child-specific ability for social cognitions (e.g., reflective functioning and parental reflective functioning, dispositional empathy and empathy towards child specifically), and perhaps even in specific moments within the relationship, merits attention in future research (see Salo et al., 2020; Smaling et al., 2016). Research from our team demonstrated important variation in caregiving behaviors even within the relationship with a given child (Bailes et al., 2023). This study found that caregivers varied in the degree they felt anger and frustration in response to their child's emotional displays, which were also dependent on whether the emotional expression was considered to be justified or unjustified. Adopting a more granular lens – one that focuses on a given child, a specific relationship, a moment in time, and subtleties of processes, rather than adopting a general, or even caregiver context–specific approach – may be critical in understanding the interrelatedness and complexity of social cognitive and emotional processes.

As previously noted, caregiver–child dynamics are constantly evolving over time, both as the relational partners learn about one another and as the relationship changes in response to growing competencies for both caregiver and child, especially due to the

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dramatic physical and mental changes occurring within the developing child. Exploring caregivers' understanding of their child's mental capacity offers valuable insights into how this awareness may shift with the child's development. The concept of "mind perception" from cognitive science relates to our judgments about others' mental capabilities and has been shown to correlate with a greater liking and valuing of that entity (Gray et al., 2007). Making more accurate judgments about children's capabilities, such as understanding their intentions, is crucial for caregivers. It guides the support they provide in areas like motor skills, language, and cognitive tasks. For example, infant communicative behaviors perceived as intentional by caregivers were shown to be more likely to elicit a contingent behavioral response from caregivers than communicative behaviors perceived as non-intentional (Donnellan et al., 2020). Furthermore, interpreting behaviors more generously – for instance, considering non-blame-oriented reasons for infant night wakings or toddler temper tantrums – can prevent harsh responses or abuse (Bugental et al., 2002). This connection between a caregiver's perceptions of their child's evolving capacities and the caregiver's responsive and constructive behaviors has been posited to influence the quality of the caregiving relationship, enhancing reflective functioning. Our research group has assessed mind perception in adults as they consider the minds of infants and young children throughout development (Weisman et al., 2024) and among caregivers (Salo et al., 2024). We found estimates of children's mental capacities increased non-linearly as a function of chronological age, with greater changes observed in infancy relative to the preschool-age years. Further, higher levels of estimated capacities were associated with higher levels of parental reflective functioning and more positive caregiving behaviors in parents of preschool-age children (Salo et al., 2024).

Caregivers also develop in their new role, and experience in caregiving may further influence their cognitions regarding their child. For instance, pregnant individuals differ in their beliefs about children's needs based on whether or not they have other children (Mascheroni et al., 2022). Specifically, multiparous individuals prioritize attunement, while primiparous individuals place greater value on structure. Within-person, longitudinal research (e.g., studying the same adult across years to follow their journey as a parent with multiple children) is needed to evaluate how to disentangle caregiving experience with child age/developmental stage in their influence on a caregiver's cognitions and behaviors.

In sum, much evidence suggests that social cognitions are central contributors to behaviors and development and are important modifiable targets for caregiver–child interventions. Still, however, many gaps in the literature remain to be addressed. Future research would benefit from exploring caregiver social cognitions regarding their child using assessments and coding schemes that capture different dimensions and distinguish between general, child-specific, and even situation-specific abilities and tendencies. In addition, inclusion of longitudinal designs that permit exploration of how perceptions and behaviors change in concert across the first years of life, including how they relate to contextual factors, is an important area for future research.

Influences of caregiver context on functioning

Definition and value of considering context for caregiving relationships

Developmental psychopathology, as mentioned above, has long considered children's contexts in influencing their outcomes (Cicchetti & Aber, 1998). In keeping with this framework, we consider how the broader context in which a caregiver lives impacts their behavior toward, cognitions about, and ultimately, their relationship with their child (bridging from the macro- to the microsystem; Cicchetti & Aber, 1998). Further, caregiver context specifically impacts the real-life everyday interactions the child has in terms of physical access to their caregivers and the emotional availability of the caregiver during those opportunities for interactions. Notably, we specify caregiver context here, rather than family context, to specify factors that influence the child through their impact on caregiver functioning and availability. While caregiving relationships are influenced by a wide range of environmental, societal, cultural, and personal factors, here we discuss caregiver's (1) relationships with their romantic partners, (2) social support networks, (3) policies regarding post-birth (paid and unpaid) leave, and (4) culture. These factors represent only a few areas to consider within the broader context that impacts caregivers and their relationship with their children. While each is discussed independently, these factors are often related and have bidirectional impacts. For example, cultural norms about caregiver roles may influence expectations regarding dividing childcare between partners (Craig & Mullan, 2010; Fernández & Fogli, 2009); partner relationships provide an important source of social support (Goldberg & Carlson, 2014; McRae et al., 2021); and some configurations of parental leave policies may reinforce expectations that birthing parents are most responsible for a child's caregiving (Schober, 2011).

Partner relationships

Relationships between romantic partners, including the provision of emotional and instrumental support and the quality of the relationship, influence parenting style and interactions with their children (Millings et al., 2013; Overbeek et al., 2007), with implications for attachment and child development (Tan et al., 2018). Here we use "partner relationships" as an umbrella term that includes domestic and marital romantic relationships (i.e., excluding the non-romantic co-parent relationships). Substantial literature has shown that higher partner relationship quality is linked to more positive caregiver–child interactions (Erel & Burman, 1995). Specifically, partner supportiveness is associated with a reduced risk for children's behavioral problems (Goldberg & Carlson, 2014). Along the same continuum, meta-analytic reviews indicate that negative aspects of partners' relationships, in particular conflict, increase children's risk of behavior problems, including externalizing behavior (Buehler et al., 1997; Reid & Crisafulli, 1990). For example, parents' behavior toward one another may spill over to affect interactions with their children, including levels of emotional availability or sensitivity to their child (Buehler & Gerard, 2002; Coln et al., 2013).

Social support networks

Social support refers to the assistance available (perceived and actual) from other people; that is, to one being part of a supportive social network that provides care, including instrumental (e.g., providing childcare, financial assistance) and emotional (e.g., providing care, advice) support (Ceballo & McLoyd, 2002; Kang, 2013). Both instrumental and emotional support have been linked to more involved and nurturing caregiving (Burchinal et al., 1996; Hashima & Amato, 1994). Social support has been found to moderate stress in caregivers and is negatively correlated with postpartum anxiety, depression, and post-traumatic stress symptoms (Cirino & Knapp, 2019; Razurel et al., 2011). Moreover, when caregivers feel supported by social networks, they are more

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likely to feel effective in their caregiving role and are more likely to foster a stimulating home environment (Marshall et al., 2001).

Parental leave

Policies supporting parental leave (or lack thereof) also impact the context in which caregivers raise their children, influencing caregiver availability and caregiver–child relationships. Policies associated with opportunities for parental leave, including whether such leave is provided with pay, influence family dynamics and relationships. Provision of parental leave, whether by the employer, state, or federal government, is related to both the amount of time spent with a young child and more equitable domestic labor division between mothers and fathers (Craig & Mullan, 2010). Gender disparities in paid parental leave may reinforce the idea that women are primarily responsible for caregiving, given that opportunities for leave have typically included only the birthing parent. Providing leaves to non-birthing parents may yield more equitable shares of caregiving tasks. Studies supporting this claim found that fathers who take paid leave are more involved in childcare, not only during that leave, but later in the child's life (Nepomnyaschy & Waldfogel, 2007; O'Brien, 2009). Policies regarding paid parental leave can, therefore, either facilitate or hinder the availability of one or both caregivers for children both early on and later in life.

Culture

Culture—defined as a pattern of beliefs and behaviors that are shared by a group of people that serve to inform their daily living (Bornstein, 2012)—provides a shared system in which individuals live. Culture shapes expectations and hopes caregivers have for their children, how they interact with their children, and inform caregivers' values. Cultural context is influential in the establishment of caregiver cognitions that in turn shape caregiving practices (Harkness et al., 2007). For example, cultural goals related to desired developmental outcomes influence variation in interaction styles between caregivers and infants (Keller et al., 2004). Western cultures tend to encourage autonomy and independence, with caregivers often engaging in frequent verbal and face-to-face interactions with their infants. However, this style differs from caregivers in non-Western cultures, who tend to value social sensitivity and interconnectedness, where caregiver–child interactions are characterized by close physical contact and affective tuning between caregivers and infants (Tronick et al., 1987). Others have documented differences in caregiver social cognitions based on country of origin. For example, studies have found that after accounting for verbosity, caregivers from cultures that value interdependence (e.g., Chinese mothers compared to mothers from the US, the UK, or Australia; Japanese compared to British mothers) display fewer comments about their children's internal mental states when interviewed about their child (Doan & Wang, 2010; Fujita & Hughes, 2021; Hughes et al., 2018) and when interacting with their child (Dai et al., 2020). These results suggest that there are cultural variations in the amount and content of caregiver social cognitions about their children. Caregivers' cultural background influences socialization goals, caregiver social cognitions, and caregiver–child interactions, all of which are likely to shape child outcomes.

Knowledge gaps

Partner relationships

Several studies have established that relationship quality between caregiving partners, including both marital satisfaction and the co-parenting relationship, impacts caregiving behavior. Yet, many studies tend to include observations of mother–child or father–child interactions, assessing caregiving behavior independently for each dyad. Isolated interactions may miss critical dynamics of partner relationships that impact interactions with their children in everyday, naturalistic interactions. Dyadic relationships within a family system likely spill over to affect other relationships and behavior within those systems, influencing individual development. It would be useful to better understand how the quality of the relationship between partners changes over time, how this impacts the co-parenting relationship, and dyadic relationships with children.

Social support networks

Social support provides an important instrumental and emotional resource for caregivers, but the extent to which configurations of caregiver support networks (i.e., type and source) translate to caregiving behavior and child developmental outcomes remains an important gap in the literature. Some research has compared perceived social support (i.e., the subjective appraisal of adequacy of support network) to received social support (i.e., quantity received) and found that perceived social support is more consistently linked to better psychosocial outcomes (Haber et al., 2007). Yet, less is known about how different forms of social support influence behaviors supportive of child development.

Parental leave

Parental leave presents in many different forms; involving one or both parents, as paid or unpaid, and with varying lengths depending on one's employer and state or federal policies. An important gap in our current knowledge is understanding how these different configurations of parental leave may impact parents' relationship with their child, the co-parenting relationship, and ultimately how these may interact to impact child development. Work has begun to differentiate the impact of paid versus unpaid leave on child outcomes. For example, a recent systematic review found that longer duration of paid parental leave was associated with improvements in child health, particularly through reduced infant mortality, and that unpaid leave did not confer the same advantages (Nandi et al., 2018). Further, paid maternity leave is also associated with electroencephalography profiles indicative of more mature brain function by 3 months of age (Brito et al., 2022). Few studies have investigated differences in paid versus unpaid parental leave and its potential impact on child development. One such study found that even after adjusting for differences in level of income and leave duration, children of mothers who took paid leave had higher language scores than children of mothers who took unpaid leave (Kozak et al., 2021).

Culture

Research on the cultural context within which families exist has provided insight into which factors influence caregiver cognitions and behaviors. However, a large majority of the work considering culture as a determinant of caregiver–child relationships and how culture impacts children's development has been conducted in contexts that are not representative of human's evolutionary history *or* the cultural contexts in which the majority of the human population currently resides. Some have termed the focus of research on the populations nearest to the investigators who tend to study caregiving in academic institutions as WEIRD (i.e., Western, educated, industrialized, rich, and democratic) cultural conditions (Lockman & Tamis-LeMonda, 2020; Tomlinson et al., 2014).

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This has meant that the majority of our understanding of caregiver–child relationships is derived from families from similar cultural contexts and has precluded our understanding of how different cultural contexts may impact caregiver–child relationships and child development.

Recommendations for next steps

Although the role of context in influencing child development has long been prominent in the field of developmental psychopathology (e.g., a special issue dedicated to the matter was published twenty-five years ago in this journal; Cicchetti & Aber, 1998), a greater consideration of caregiver context in influencing caregiver functioning and related impacts on child development will move the field forward. Greater consideration of caregiver context lends itself to research which could ultimately inform support and intervention at multiple levels – including garnering support from one's broader cultural context, informing policies on parental leave, and implementation of partner- or family-based interventions. Here, we propose next steps in this line of research that would actualize these aims.

First, social relationships (including both partner relationships and broader social networks) influence one another, are nested and multidimensional (Boyce et al., 1998), and have implications for caregiving. Research seeking a more nuanced understanding of the interrelatedness of these aspects of partner relationships and where to target intervention efforts may provide opportunities to improve caregiving practices and caregiver–child interactions. Studies providing observational measures of physical proximity and partner availability may be a fruitful next step for this line of inquiry, for example. Further, investigating how variation in caregiver social support throughout a child's life impacts developmental trajectories, possible for instance with the use of intensive or accelerated longitudinal designs (Willett et al., 1998), may provide important guidance regarding sensitive periods (and more specific targets) for providing caregivers with additional support.

Second, accumulating evidence suggests that combined maternal and paternal leave, in particular paid leave, supports engaged caregiving from both partners. Exploring how paid versus unpaid leave, and differences in parental duration leave between partners, impacts provision of childcare, as well as the quality and quantity of caregiver–child interactions, will lead to greater understanding of developmental impacts on children. Studies leveraging technologies as described above (e.g., the TotTag, or Looxcie 2 camera) may provide detailed, objective measures in naturalistic settings to better quantify the impact of differences in parental leave and their impact on caregiver–child relationships. It is important for future work to investigate the parameters and impacts of parental leave to inform specific policy decisions, and garner further support to advocate for change in current policies.

Third, while previous work demonstrates that cultural background influences caregivers' expectations for their children, social cognitions regarding their children, and their related caregiving behaviors, future work could investigate how culture brings individuals together to pursue similar and different goals for their children, as well as how culture may impact social networks, partner relationships, and broader views on childrearing and use of instrumental supports. Culture is an important aspect of the contextual dimensions inherent to the field of developmental psychopathology, including the careful consideration of how cultural variation impacts child development.

In summary, caregiver context is a critical and often overlooked factor impacting families, relationships, interactions, and goals for children. Here, we discuss partner relationships, social support, parental leave, and culture, yet these are only a few examples of components of the contexts which influence caregivers. Each of these contexts is interrelated (Boyce et al., 1998) impacting each other to influence caregivers' roles and identities, the family system, and child development. Echoing calls by Cicchetti and Aber (1998), future work should consider how this macrosystem impacts microcontextual features of the caregiver–child relationship and, in turn, child development over time. By understanding more about how partner relationships, social support, parental leave, and culture (provided here as examples) impact everyday caregiving interactions, developmental psychologists can identify (and potentially target) contextual factors to improve caregiver and child outcomes.

Summary and conclusions

Developmental psychopathology is a dynamic discipline with scholarly work key to deepening our knowledge of: (1) how people develop, (2) what drives changes in risk and resilience related to mental health, and (3) how we can use this knowledge to inform prevention and intervention at the individual, family, community, and societal levels. Developmental psychopathology leads the way in exploring the complex individual and interpersonal interactions that impact mental health (Cicchetti, 1993; Masten & Cicchetti, 2010), and here, we posit that the mission of the field will be best actualized by focusing on contexts that are the most fundamental to individuals' development related to mental health. Specifically, we argue that no context may be more fundamental to psychopathology and thriving than one's early life relationships with their caregivers.

Historically, infants and young children have tended to spend the most time with their biological mother, a reality that has led the specific mother–infant pair to be the most commonly studied dyad in research on developmental psychopathology. However, there are many reasons to deepen our understanding of the caregiver–child relationship (in a push toward "relationship-centered" rather than "parent-centered" approaches) *and* extend our work using a "child-centered" lens, in which all adults who care for a child are considered as part of the child's caregiving relationship context. From a relationship-centered perspective, a better understanding of caregivers' tendency *and* ability to reflect on their child's mental states (Fonagy et al., 2002; Meins et al., 2001; Slade, 2005) would help identify personalized targets for intervention to meet the needs of a given caregiver–child dyad. Additionally, within-person, longitudinal studies tracking the evolution of caregiver social cognitions and representations in concert with both caregiver and child development stages would offer valuable insights into the dynamic nature of these relationships, including when intervention may be warranted, how to anticipate struggles, and boost positive practices in the caregiver. From a child-centered lens, a better understanding of the experiences a child has had, including the configuration of quality and quantity of care received from multiple caregivers, would help to identify the various ways that society successfully navigates the high level of care required to raise a child.

Moving the field of developmental psychopathology forward will involve embracing innovative approaches that capture the complexity of caregiver–child interactions beyond the laboratory setting. Although laboratory assessments provide valuable insights, their limits in terms of ecological validity and generalizability underscore the need to complement these assessments with

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research conducted in real-world contexts. To address these limitations, researchers can leverage technological advancements and intensive longitudinal/EMA approaches to study everyday interactions more authentically. Such advancements can offer real-time observations of caregiver–child interactions, allowing researchers to detect meaningful changes during naturalistic interactions and gain valuable insights into the developmental trajectories of these relationships (de Barbaro & Fausey, 2022). Furthermore, wearable technologies can extend researchers' capacity to explore contextual factors impacting caregiver–child dynamics, providing a more representative understanding across diverse environments. These advancements not only enhance the specificity of studying shared social exchanges, but also open avenues for investigating components like touch, language, and emotion socialization. As we move beyond the confines of laboratory assessments, embracing these tools and concepts enables a more comprehensive understanding of the nuanced dynamics shaping the development of caregiver–child relationships "in the wild."

Lastly, caregivers, with multifaceted roles and identities, are influenced by various factors, including their relationships, community resources, and cultural backgrounds (Bornstein, 2012). To advance the field, when possible, research should consider tests of the interdependence of relationships within the family system, policy landscape, cultural variations, and community-level resources that collectively shape the caregiver–child relationship and child development over time. Using approaches that allow us to better understand how caregivers obtain support, what barriers exist, and the tools that may be able to be used to support relationships is needed and will ultimately contribute to our understanding of child development.

Here, we think it is important to wear multiple hats, as scientists who may yield insights useful to individual families, clinicians, and policy-makers to guide what options they need to make available and draw from these varied perspectives (e.g., see Humphreys et al., 2022). Caregiving behaviors are amenable to change and are useful targets given the influence of caregiving (including the continuum of behaviors from maltreatment to those enriching and nurturing) on child development. Research on caregiving relationships allows us to not only advance our knowledge, but also contribute to information useful for action to support individuals and families. By grounding our research in questions that have tangible implications for real-world scenarios, we aim to bridge the gap between academic insights and actionable solutions in various decision-making spheres. Balancing both the scientific goals of knowledge generation and considering how to use such knowledge to address practical challenges within real-world contexts is critical for the future translational impact of our work.

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