



# Intuition: The BYU Undergraduate Journal of Psychology

---

Volume 15 | Issue 2

Article 8

---

2020

## Infant Language Development: The Consequences of Trauma

Janna Pickett

Follow this and additional works at: <https://scholarsarchive.byu.edu/intuition>



Part of the [Psychology Commons](#)

---

### Recommended Citation

Pickett, Janna (2020) "Infant Language Development: The Consequences of Trauma," *Intuition: The BYU Undergraduate Journal of Psychology*. Vol. 15 : Iss. 2 , Article 8.

Available at: <https://scholarsarchive.byu.edu/intuition/vol15/iss2/8>

This Article is brought to you for free and open access by the Journals at BYU ScholarsArchive. It has been accepted for inclusion in Intuition: The BYU Undergraduate Journal of Psychology by an authorized editor of BYU ScholarsArchive. For more information, please contact [ellen\\_amatangelo@byu.edu](mailto:ellen_amatangelo@byu.edu).

# Infant Language Development: The Consequences of Trauma

**Janna Pickett**

Brigham Young University

## **Infant Language Development: The Consequences of Trauma**

Infants between 0 and 36 months who experience physical and emotional trauma are at risk for severe social, emotional, cognitive, and physiological developmental deficits (Carpenter & Stacks, 2009; Jacobsen et al., 2013). As researchers search for protective factors against these deficits, productive language acquisition (the words an infant can verbally produce) has emerged as a potential predictor of resilience (Bellagamba et al., 2014; McCabe & Meller, 2004). This review proposes that infants who have acquired more advanced language, such as emotion descriptors, are able to define their experiences, learn how to respond to those experiences, and feel in control of their environments. This feeling of control provides resilience against external factors such as those brought on by trauma. However, trauma increases an infant's susceptibility to cognitive deficits such as delayed language (Carpenter & Stacks, 2009; Jacobsen et al., 2013). Furthermore, infancy is a sensitive period for language development (d'Souza et al., 2017). When infants are traumatized, they may miss a critical period to develop language and then suffer long-term language deficits. Language provides resilience, but infants undergoing trauma risk language development deficits, so these infants are forced to confront the challenges of trauma with an underdeveloped language coping system. Infants are also at higher risk, in comparison to other age groups, of being exposed to traumatic events (Lieberman & Van Horn, 2009). Thus, it is vital to understand how—and in what contexts—trauma is related to lower productive language acquisition in order to protect this vulnerable population.

Through a review of the current literature, this paper will explore the patterns found between physical and emotional trauma and productive language. In addition, this paper will present ideas for promoting resilience to guide researchers, pediatricians, teachers, parents, and other professionals working with

infants in their practices. Suggested avenues to protect this vulnerable population include responsiveness to infant cognitive development, careful attention to medical direction, early intervention, and providing stimulating environments.

## **Defining Trauma**

To understand the literature on trauma and language development, clarification is needed on what is being measured. Conceptually, trauma is difficult to define because it is a broad term for a number of experiences, including physical abuse, sexual abuse, medical trauma, natural disasters, neglect, maltreatment, community violence, and grief (National Child Traumatic Stress Network, n.d.). Furthermore, defining trauma is complex because every infant's experience with trauma is distinctly dependent on age, contextual factors, and severity (De Young et al., 2011; Pynoos et al., 2009; Scheeringa et al., 2006). As a result, researchers historically have found it problematic to develop a measure of infant trauma that is both valid and generalizable (Carter et al., 2004; Egger & Angold, 2006; Jones & Cureton, 2014). In an effort to clearly define traumatic experiences, the National Child Traumatic Stress Network (NCTSN) has proposed the following definition of early childhood trauma: trauma is "a frightening, dangerous, or violent event that poses a threat to a child's life or bodily integrity" (NCTSN, n.d.). Because this definition is vague, it provides limited usefulness in terms of developing a valid and generalizable measure, but it does provide a useful starting point for reviewing the literature on trauma. With this framework of trauma, the paper will be further divided into physical and emotional trauma to explain how unique types of trauma are related to productive language acquisition. Though this paper will not comprehensively address all trauma, it will review the two predominantly discussed forms of trauma as they relate to language development.

### **Defining Productive Language**

Trauma is known to interfere with infant development, leading to negative outcomes such as lower productive language (Jacobsen et al., 2013). Productive language represents the words an infant can say, rather than just understand (Swingley, 2009). For example, an infant may reach out their hands for food when a parent asks if they want more, but until the infant can verbally produce the word "more," it is not considered part of their productive vocabulary. Most current research includes measures of productive language (Costantini, 2017;

Eigsti & Cicchetti, 2004). As a result, this paper will also focus on productive language to provide a current assessment of trauma's relationship with language development. Receptive language, the words an infant can understand, is also an important indicator of a child's language skills. However, receptive language requires an assumption about what the infant can understand, so researchers typically measure language with productive language.

## **Physical Trauma**

Physical trauma includes any serious injury to the body (Sheets et al., 2013). Frequently, infants experience physical trauma at birth or directly after birth as a result of the birthing process or sudden adjustment to life outside the womb (Osofsky et al., 2017). Common complications include injuries from breech placement during birth, respiratory distress, and illnesses such as jaundice and colic (Miceli et al., 2000). Preterm infants are at increased risk for this trauma due to lower birth weight, underdeveloped circulatory, respiratory, or nervous systems, and birthing complications (Blencowe et al., 2013). Although not all preterm infants are physically traumatized, early births are regularly characterized by complicated procedures, extended time spent in the hospital, and prolonged issues after returning home from the hospital (Platt, 2014). Thus, because preterm infants are an easy-to-study, at-risk group, the majority of the research on traumatized infants compares samples of preterm infants to full-term infants (Costantini et al., 2017; Cusson, 2003; Foster-Cohen et al., 2007; Suttora & Salerni, 2011). Other types of physical trauma, such as abuse, serious illness, and accidents are less commonly studied. Particularly with cases of abuse, ethical barriers can also be difficult to navigate (Kesler et al., 2008; Reijneveld et al., 2004). For example, in order to fully understand how a child has been abused, the researcher may have to ask about sensitive or triggering information which may disturb the child or current caretakers. Ideally, future trauma research should aim to more accurately represent these groups with larger samples, without violating these ethical concerns.

Studying preterm infants as a traumatized sample provides limited generalizability because each preterm infant case is unique and it requires an assumption that all preterm infants have undergone trauma (Platt, 2014). Some preterm infants may be fully developed at birth and experience little to no developmental delays or complications. Nonetheless, there are common patterns

that have emerged from studying preterm infants that may help researchers understand the risk factors of impaired language (Costantini et al., 2017; Cusson, 2003; Foster-Cohen et al., 2007; Suttora & Salerni, 2011). As a result, the next section will discuss the patterns found while examining preterm infants and then discuss the research that is available for other specific medical trauma in full-term infant samples. The combined research from preterm infants and physically traumatized infants will provide a clearer picture of how to develop productive language in vulnerable populations.

## **Preterm Infants**

A consistent pattern of lower productive vocabulary in preterm infants has emerged from recent research (Cusson, 2003; Foster-Cohen et al., 2007). These infants typically have a delayed onset of talking, and when they do begin talking, their language is less complex. In an article by Cusson (2003), preterm infants were compared to full-term infants when they were 7, 13, and 26 months old. Preterm infants do not have as much time in utero to develop compared to full-term infants, so developmental delays are bound to occur. However, Cusson (2003) found that, in terms of overall development, preterm infants had caught up to full-term infants by 26 months. However, at 26 months, productive language development in preterm infants was still delayed by 3–5 months. This pattern was confirmed by Foster Cohen et al. (2007) who found that preterm infants had lower receptive and productive vocabulary than full-term infants at age two, even after controlling for family variables such as maternal education, maternal age, and socioeconomic status. Because the preterm infants are at a developmentally comparable level to full-term infants, it can be reasoned that trauma is uniquely related to language acquisition. Although traumatized infants are able to catch up to full-term infants on other developmental milestones, they are still at risk for language deficits. In other words, trauma seems to have more long-term effects on language development than other developmental domains. This conclusion, is, again, assuming that all preterm infants have undergone some form of trauma.

Cusson (2003) and Foster-Cohen et al. (2007) also identified additional risk factors for lower language skills. Cusson (2003) suggested that vocabulary development may be negatively related to the length of hospital stay at birth and positively related to birth weight, maternal sensitivity, and Apgar score (a measure

of the infant's overall health at birth: Appearance, Pulse, Grimace, Activity, and Respiration) Foster-Cohen et al. (2007) found that younger gestational age related to lower vocabulary. In summary, infants who are born prematurely are at risk for delayed language development. The risk may be exacerbated if the infant has to stay longer in the hospital at birth, has an environment with low maternal sensitivity, or has a lower birth weight, Apgar score, or gestational age (Cusson, 2003; Foster-Cohen et al., 2007). Because these articles did not control for all of the physical differences between premature infants, the specific factors that puts these infants at risk for delayed language remain open. To determine what types of physical trauma warrant the most concern for language development, future research will need larger samples of infants with diverse physical traumas.

Researchers are also unsure whether language deficits in premature infants are a result of physical disabilities, external social factors, or both. Suttora and Salerni (2011) and Constantini et al. (2017) investigated this question by examining premature infant language deficits from the perspective of mothering. Suttora and Salerni (2011) found that mothers typically adapt their speech based on infant motor cues. When the child begins to walk, it seems to cue the mother that her infant is older. As a response, the mother adapts her infant-directed speech to a more complex speech. However, it is possible that if premature infants have a motor delay which prevents them from walking on a normal developmental trajectory, then mothers will not adapt their speech and the infant will fall behind in language competency (Suttora & Salerni, 2011). This could put the infant at risk for long-term language delays.

Constantini et al. (2017) found that mothers' mind-mindedness, a mother's tendency to view their infant as an individual with a mind, is similarly related to infants' language development. Furthermore, mind-mindedness is more strongly related to preterm infants' language development than full-term infants' language development (Constantini et al., 2017). The perception that a mother has of her infant is related to the infant's cognitive skills. The mother will adjust her speech engagement towards the infant based on her perception of where the infant is at developmentally. If the mother does not feel the infant is ready to speak, then the mother will be less likely to encourage speaking. In some cases, this may be developmentally appropriate, but in other situations, the infant may be ready to speak, despite the mother's perception. This scenario suggests that delayed language may be a result of socialized deficits rather than actual physical deficits (Meins, 2013). In other words, the infant may be cognitively capable of

processing more complex language, but because of physical appearance, the mother does not respond with appropriate scaffolding. When the mother does respond by increasing the complexity of her language despite physical cues, preterm infants may be spared against language deficits (Bernier et al., 2017). Despite physical delays, infants may still develop typical productive language when the response is intentional.

## **Physical Trauma in Preterm or Full-Term Infants**

Preterm infants are at higher risk for physical trauma, but full-term infants can also be impacted (Blencowe et al., 2013; Prasad et al., 2005). Any physical condition which damages hearing structures, speech structures, or the brain structures that support language puts infants at risk for lower productive language capabilities (Mayberry, 2002; Miyahara & Möbs, 1995). However, this portion of the review will primarily address trauma which causes deafness and neurological dysfunction due to the relative severity of the productive language outcomes (Toppelberg & Shapiro, 2000). Exposure to teratogens or infections transmitted in the womb, such as meningitis or measles, tumors, abuse, birth complications, and accidents such as automobile crashes may lead to deafness and neurological disorders (Ciurea et al., 2011; Toppelberg & Shapiro, 2000). Though there are overlaps in the outcomes of deafness and neurological disorders, they will be discussed separately to highlight the differences. Furthermore, it is important to note that it would not be considered a traumatic event if the infant was born with deafness or born with neurological disorders, so these sections address deafness and neurological disorders that strictly resulted from trauma.

## **Deafness**

Deafness prevents infants from processing their environments and practicing speech sounds because they lack sufficient auditory stimuli (Mayberry, 2002). It should be noted that deafness has not been correlated with lower productive vocabulary in infants who have had experience signing since birth (Orlansky & Bonvillian, 1985). In an article by Orlansky and Bonvillian (1985), deaf infants with deaf parents began producing language (signing) at 8.5 months, whereas hearing infants in typical homes did not begin producing language until 11 months. However, in another article, infants were studied after suddenly

becoming deaf or suffering hearing loss after birth through a traumatic experience; these infants were not prepared with communication skills and were at risk for lower productive vocabulary (Griswold & Commings, 1974). For this vulnerable population, the research shows that communication practice can moderate the effect of sudden deafness on language delays (Lederberg et al., 2013). When caregivers were intentional about maintaining communication with their infants and teaching their infants alternative methods to communicate, the infants developed language at the same rate as hearing infants. Thus, deafness puts infants at risk for lower productive language. However, if the infant knows how to communicate, the risk is mitigated.

## **Neurological Disorders**

Neurological disorders impact infants' abilities to process and produce sounds (Miyahara & Möbs, 1995). For example, dysarthria is a neurological condition which weakens the infant's speech muscles, making it difficult for the infant to generate words (Safaz et al., 2008). Another neurological disorder, apraxia, disrupts the communication between the brain and speech structures (Byrd & Cooper, 1989). Infants with apraxia can understand how to generate words and have a willingness to speak, but the execution is difficult or impossible (National Organization for Rare Disorders, 2020). These physical conditions limit the ability of the infant to communicate when they need help and put the infant at a disadvantage in terms of vocabulary exposure (Mayberry, 2002); thus, infants who have been traumatized and suffer neurological disorders are also at risk for lower productive vocabulary. Because productive vocabulary allows the infant to express their needs, it is important to be aware of the potential negative consequences of these conditions.

## **Emotional Trauma**

Infant trauma research also includes emotional trauma, which can be defined as damage to the psychological well-being of the infant (Cascade Behavioral Health, 2020). Unlike medical trauma, emotional trauma does not alter speech structures, but it can be equally detrimental to infant productive vocabulary (Holmes et al., 2018). Emotional trauma can include neglect, emotional manipulation, domestic violence, or mental illness (Shemesh, 2005). It remains



an open question if emotional manipulation, domestic violence, and mental illness are related to lower productive vocabulary in infancy, but neglect has been studied as a predictor of language development deficits (Allen & Oliver, 1982; Fox et al., 1982; Holmes et al., 2018). This line of research stems from the idea that infants require stimulating environments, attentive adults, and sensitive parenting in order for language to develop.

Allen and Oliver (1982) and Fox et al. (1988) found that neglected infants, specifically infants who were consistently neglected, had lower levels of productive vocabulary. The authors concluded that neglect is a strong predictor of vocabulary development because the infant is receiving less language stimuli and does not have the encouragement or opportunity to practice language (Allen & Oliver, 1982; Fox et al., 1988). When digital language exposure (television, phones), replaces responsive parenting, the child is also deprived of this productive language practice (Plowman et al., 2010). This research suggests that infants need consistent in-person interactions for optimal productive vocabulary development.

There is also a significant body of literature with samples of infants from abusive homes (Coster et al., 1989; Eigsti & Cicchetti, 2004; Jacobsen et al., 2013; Robinson et al., 2012). These infants have experienced emotional trauma, but it is not always clear what form of emotional trauma they have experienced. In these samples, infants had lower productive language compared to infants from nurturing, caregiving homes (Coster et al., 1989; Eigsti & Cicchetti, 2004; Jacobsen et al., 2013; Robinson et al., 2012). Coster et al. (1989) and Eigsti and Cicchetti (2004) specifically emphasized that infants from abusive homes are less descriptive and cohesive and speak less in comparison to infants from non-abusive homes. Not only do maltreated infants have less productive vocabulary, but their words are also less effective for communicating. This could be explained by the lack of effective communication modeled in their homes. Thus, the literature points to the pattern that infants with emotional trauma are also likely to have lower language skills. A meta-analysis by Lum et al. (2015) confirms these findings with an analysis of over 26 studies on infant abuse and vocabulary. Lum et al. (2015) concluded that infants from abusive households are a high-risk group for low communication skills and language development deficits in infancy. Robinson et al. (2012) extended these findings through observation of 7-year-old children who were in abusive homes as infants and then adopted into foster care. These

children still had lower productive vocabulary than non-maltreated children, possibly pointing to the long-term consequences of emotional trauma in infancy.

## **Recommendations to Promote Resilience**

Because emotional trauma and physical trauma put infants at risk for delayed language development, researchers have also searched for resilience factors that protect against those deficits. Holmes et al. (2018) identified infant social and cognitive skills and caregiver warmth as protective factors. Coster et al. (1989) identified maternal speech about emotional states as a protective factor, encouraging mothers to talk more about their emotional states to elicit emotion talk from their infants. Furthermore, Cusson (2003) identified maternal sensitivity as a protective factor. A trusting relationship between parent and infant will encourage modeling of the parent's talk, giving infants necessary communication practice. When parents have warm relationships with their infants, are intentional about identifying and responding to their needs, and talk to their infants about their own emotions, the infant may be protected from some of the potential negatives of trauma. In summary, a responsive environment is a strong predictor of infant productive language.

As part of developing a responsive environment, research encourages caregivers to be reactive to discrepancies between infants' physical appearances and cognitive skills (Costantini et al., 2017; Suttora & Salerni, 2011). As previously discussed, infants' physical appearance provides a cue to signal parental speech (Suttora & Salerni, 2011). As a result, those who look or act physically younger than they are cognitively may be at risk of falling behind in language development. Caregivers can avoid this deficit by being aware that their infant's physical appearance may not reflect their cognitive capabilities. Spending time with typically developing infants and their parents may help parents of physically delayed infants to keep their speech patterns paced with the infant's cognitive abilities (Suttora & Salerni, 2011). Similarly, as suggested by Costantini et al. (2017), caregivers should be deliberate about viewing their infants as intelligent beings. Viewing infants as intelligent will encourage more complex speech and interactive conversation, thus promoting productive vocabulary.

Furthermore, though parents have limited control over length of hospital stay after birth, birth weight, and infant Apgar score, Cusson (2003) recommends following medical advice to increase the chances of a healthy pregnancy and

birth, thus preemptively avoiding the risk of infant physical trauma. Common advice to reduce infant trauma includes maintaining a healthy weight before and during pregnancy, avoiding alcohol and drugs, and regularly attending pregnancy checkups. The interdisciplinary expertise of healthcare workers, developmental psychologists, sociologists, and family researchers will provide a more comprehensive understanding of the factors that contribute to healthy pregnancies and healthy infant outcomes. Having multiple perspectives will provide important insight about contributing factors that may have been otherwise overlooked.

Many infants who have had traumatic abuse experiences are placed in the foster system. Smyke et al. (2009) recommends that infants in these situations are placed in homes before they are 15 months old; this allows enough time to implement interventions during a sensitive period of language development, optimizing the infant's chance of avoiding language deficits. Early care education programs may also be helpful in reducing the risk of language deficits for infants who were abused. (Merritt & Klein, 2015). Trained staff can help to create responsive environments that emphasize language exposure and communication practice in a safe environment. When other interventions are not possible or additional help is needed, the National Children's Traumatic Stress Network (n.d.) promotes family cognitive behavioral therapy, child-parent psychotherapy, and meeting with speech pathologists. These professionals can help parents to understand their child's developmental needs and provide them with appropriate reinforcement and practice.

In summary, recommendations to promote resilience against language deficits include being responsive to the infant's cognitive abilities, optimizing infant physical health by following the direction of medical personnel, and placing infants in safe, stimulating environments from young ages. By implementing these practices, we can help infants to have the best possible language outcomes despite adverse experiences.

## **Conclusions, Remaining Questions, and Directions for Future Research**

The research on physical trauma highlights a variety of physical disabilities that increase an infant's risk for lower productive vocabulary (Toppelberg & Shapiro, 2000). Because preterm infants are susceptible to these physical disabilities, they

are often studied to understand the relationship between trauma and language delays (Cusson, 2003; Foster-Cohen et al., 2007). However, because the current literature on physical trauma has not examined all physical differences, the specific physical trauma that puts infants at risk for delayed language remains an open question. Future research may profit from collaborations between human development, speech pathologist, and pediatric researchers to better understand the physical conditions most likely to impede language development.

Infants may also be at risk for delayed language development due to social factors unrelated to physical disability, though it remains an open question if language deficits in premature infants are a result of physical disabilities, external social factors, or both. Some research suggests that both physical differences and social environments interact to predict vocabulary (Constantini et al., 2017; Suttora & Salerni, 2011). Future research should continue to look at the intersection of the physical and the social to provide a holistic understanding of language development. Through this understanding of the physical and social factors at play, more effective interventions for resilience can be developed.

Infants who are emotionally traumatized are also at risk for lower productive vocabulary (Coster et al., 1989; Eigsti & Cicchetti, 2004; Jacobsen et al., 2013; Robinson et al., 2012). Specifically, infants from situations of neglect and abuse are predicted to have lower productive vocabulary because of unstimulating and unresponsive environmental conditions (Allen & Oliver, 1982; Fox et al., 1982; Holmes et al., 2018). However, it researchers are unsure whether emotional manipulation, domestic violence, and mental illness are related to lower productive vocabulary in infancy. Future research should seek out infants who have had experience with these types of emotional trauma to provide insight on other risks to language development. Because it is difficult to study samples of traumatized infants, researchers should also pursue ways to ethically collect more data on trauma.

Future research could also be strengthened by examining productive language over the child's lifespan. Robinson et al. (2012) has demonstrated that emotional trauma in infancy may predict productive vocabulary in childhood, but more longitudinal research is needed to understand the full picture of trauma's impact beyond childhood. By examining the development of productive vocabulary

throughout the course of an infant's life, the specific mechanisms that lead to productive language development may become clearer.

By implicating these suggestions in future research and searching for answers to remaining questions, infants will have a better chance of success both during infancy and throughout their lives. A better understanding of how physical and emotional trauma are related to productive language may help protect infants, despite the negative consequences of trauma. Through productive language, infants gain power over their lives and have the chance to turn a negative situation into a positive opportunity. Thus, it is vital that professionals are united in understanding this relationship in order to protect a vulnerable population.

## References

- Allen, R. E., & Oliver, J. M. (1982). The effects of child maltreatment on language development. *Child Abuse & Neglect*, 6(3), 299–305. [https://doi.org/10.1016/0145-2134\(82\)90033-3](https://doi.org/10.1016/0145-2134(82)90033-3)
- Bellagamba, F., Laghi, F., Lonigro, A., Pace, C. S., & Longobardi, E. (2014). Concurrent relations between inhibitory control, vocabulary and internal state language in 18- and 24-month-old Italian-speaking infants. *European Journal of Developmental Psychology*, 11(4), 420–432. <https://doi.org/10.1080/17405629.2013.848164>
- Bernier, A., McMahon, C. A., & Perrier, R. (2017). Maternal mind-mindedness and children's school readiness: A longitudinal study of developmental processes. *Developmental Psychology*, 53(2), 210. <https://doi.org/10.1037/dev0000225>
- Blencowe, H., Cousens, S., Chou, D., Oestergaard, M., Say, L., Moller, A. B., & Lawn, J. (2013). Born too soon: The global epidemiology of 15 million preterm births. *Reproductive Health*, 10(1), 1–12. <https://doi.org/10.1186/1742-4755-10-S1-S2>
- Byrd, K., & Cooper, E. (1989). Apraxia speech characteristics in stuttering, developmentally apraxic, and normal speaking children. *Journal of Fluency Disorders*, 14(1), 215–229. [https://doi.org/10.1016/0094-730X\(89\)90037-5](https://doi.org/10.1016/0094-730X(89)90037-5)
- Carpenter, G. L., & Stacks, A. M. (2009). Developmental effects of exposure to intimate partner violence in early childhood: A review of the literature. *Children and Youth Services Review*, 31(8), 831–839. <https://doi.org/10.1016/j.childyouth.2009.03.005>
- Carter, A. S., Briggs-Gowan, M. J., & Davis, N. O. (2004). Assessment of young children's social-emotional development and psychopathology: Recent advances and recommendations for practice. *Journal of Child Psychology and Psychiatry*, 45(1), 109–134. <https://doi.org/10.1046/j.0021-9630.2003.00316.x>
- Cascade Behavioral Health (2020). Symptoms, signs, & effects of psychological trauma.
- Ciurea, A. V., Gorgan, M. R., Tascu, A., Sandu, A. M., & Rizea, R. E. (2011). Traumatic brain injury in infants and toddlers, 0–3 years old. *Journal of Medicine and Life*, 4(3), 234.
- Costantini, A., Coppola, G., Fasolo, M., & Cassibba, R. (2017). Preterm birth enhances

- the contribution of mothers' mind-mindedness to infants' expressive language development: A longitudinal investigation. *Infant Behavior and Development*, 49(1), 322–329. <https://doi.org/10.1016/j.infbeh.2017.10.006>
- Coster, W. J., Gersten, M. S., Beeghly, M., & Cicchetti, D. (1989). Communicative functioning in maltreated toddlers. *Developmental Psychology*, 25(6), 1020–1025. <https://doi.org/10.1037/0012-1649.25.6.1020>
- Cusson, R. M. (2003). Factors influencing language development in preterm infants. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*, 32(3), 402–409. <https://doi.org/10.1177/0884217503253530>
- De Young, A. C., Kenardy, J. A., & Cobham, V. E. (2011). Trauma in early childhood: A neglected population. *Clinical Child and Family Psychology Review*, 14(3), 231. <https://doi.org/10.1007/s10567-011-0094-3>
- d'Souza, D., d'Souza, H., & Karmiloff-Smith, A. (2017). Precursors to language development in typically and atypically developing infants and toddlers: The importance of embracing complexity. *Journal of Child Language*, 44(3), 591–627. <https://doi.org/10.1017/S030500091700006X>
- Egger, H. L., & Angold, A. (2006). Common emotional and behavioral disorders in preschool children: Presentation, nosology, and epidemiology. *Journal of Child Psychology and Psychiatry*, 47(3), 313–337. <https://doi.org/10.1111/j.1469-7610.2006.01618.x>
- Eigsti, I. M., & Cicchetti, D. (2004). The impact of child maltreatment on expressive syntax at 60 months. *Developmental Science*, 7(1), 88–102. <https://doi.org/10.1111/j.1467-7687.2004.00325.x>
- Foster-Cohen, S., Edgin, J. O., Champion, P. R., & Woodward, L. J. (2007). Early delayed language development in very preterm infants: Evidence from the MacArthur-Bates CDI. *Journal of Child Language*, 34(3), 655–675. <https://doi.org/10.1017/S0305000907008070>
- Fox, L., Long, S. H., Langlois, A. (1988) Patterns of language comprehension deficits in abused and neglected children. *Journal of Speech and Hearing Disorders*, 1(53), 239–244. <https://doi.org/10.1044/jshd.5303.239>
- Griswold, L. E., & Commings, J. (1974). The expressive vocabulary of preschool deaf children. *American Annals of the Deaf*, 16–28.
- Holmes, M. R., Yoon, S., Berg, K. A., Cage, J. L., & Perzynski, A. T. (2018). Promoting the development of resilient academic functioning in maltreated children. *Child Abuse & Neglect*, 75(1), 92–103. <https://doi.org/10.1016/j.chiabu.2017.07.018>
- Jacobsen, H., Moe, V., Ivarsson, T., Wentzel-Larsen, T., & Smith, L. (2013). Cognitive development and social-emotional functioning in young foster children: A follow-up study from 2 to 3 years of age. *Child Psychiatry & Human Development*, 44(5), 666–677. <https://doi.org/10.1007/s10578-013-0360-3>
- Jones, L. K., & Cureton, J. L. (2014). Trauma redefined in the DSM-5: Rationale and

- implications for counseling practice. *Professional Counselor*, 4(3), 257–271. <http://dx.doi.org/10.15241/lkj.4.3.257>
- Kesler, H., Dias, M. S., Shaffer, M., Rottmund, C., Cappos, K., & Thomas, N. J. (2008). Demographics of abusive head trauma in the Commonwealth of Pennsylvania. *Journal of Neurosurgery: Pediatrics*, 1 (5), 351–356. <https://doi.org/10.3171/ped/2008/1/5/351>
- Lederberg, A. R., Schick, B., & Spencer, P. E. (2013). Language and literacy development of deaf and hard-of-hearing children: Successes and challenges. *Developmental Psychology*, 49(1), 15. <https://doi.org/10.1037/a0029558>
- Lieberman, A. F., & Van Horn, P. (2009). Giving voice to the unsayable: Repairing the effects of trauma in infancy and early childhood. *Child and Adolescent Psychiatric Clinics of North America*, 18(3), 707–720. <https://doi.org/10.1016/j.chc.2009.02.007>
- Lum, J. A., Powell, M., Timms, L., & Snow, P. (2015). A meta-analysis of cross-sectional studies investigating language in maltreated children. *Journal of Speech, Language, and Hearing Research*, 58(3), 961–976. [https://doi.org/10.1044/2015\\_JSLHR-L-14-0056](https://doi.org/10.1044/2015_JSLHR-L-14-0056)
- Mayberry, R. I. (2002). Cognitive development in deaf children: The interface of language and perception in neuropsychology. *Handbook of Neuropsychology*, 8(2), 71–107. <https://doi.org/10.1093/deafed/5.3.266>
- McCabe, P. C., & Meller, P. J. (2004). The relationship between language and social competence: How language impairment affects social growth. *Psychology in the Schools*, 41(3), 313–321. <https://doi.org/10.1002/pits.10161>
- Meins, E. (2013). Sensitive attunement to infants' internal states: Operationalizing the construct of mind-mindedness. *Attachment & Human Development*, 15(5-6), 524–544. <https://doi.org/10.1080/14616734.2013.830388>
- Merritt, D. H., & Klein, S. (2015). Do early care and education services improve language development for maltreated children? *Evidence from a national child welfare sample. Child Abuse & Neglect*, 39(1), 185–196. <https://doi.org/10.1016/j.chiabu.2014.10.011>
- Miceli, P. J., Goeke-Morey, M. C., Whitman, T. L., Kolberg, K. S., Miller-Loncar, C., & White, R. D. (2000). Brief report: Birth status, medical complications, and social environment: individual differences in development of preterm, very low birth weight infants. *Journal of Pediatric Psychology*, 25(5), 353–358. <https://doi.org/10.1093/jpepsy/25.5.353>
- Miyahara, M., & Möbs, I. (1995). Developmental dyspraxia and developmental coordination disorder. *Neuropsychology Review*, 5(4), 245–268. <https://doi.org/10.1007/bf02214648>
- National Children's Traumatic Stress Network (NCTSN). (n.d.). About child trauma.
- National Children's Traumatic Stress Network (NCTSN). (n.d.). Interventions.
- National Organization for Rare Disorder (NORD). (2002). Rare disorders-apraxia.
- Orlansky, M. D., & Bonvillian, J. D. (1985). Sign language acquisition: Language

- development in children of deaf parents and implications for other populations. *Merrill-Palmer Quarterly*, 1(2), 127–143. <http://www.jstor.org/stable/23086272>
- Osofsky, J. D., Stepka, P. T., & King, L. S. (2017). Treating infants and young children impacted by trauma: Interventions that promote healthy development. American Psychological Association.
- Platt, M. J. (2014). Outcomes in preterm infants. *Public Health*, 128(5), 399–403. <https://doi.org/10.1016/j.puhe.2014.03.010>
- Plowman, L., McPake, J., & Stephen, C. (2010). The technologisation of childhood? Young children and technology in the home. *Children & Society*, 24(1), 63–74. <https://doi.org/10.1111/j.1099-0860.2008.00180.x>
- Prasad, M. R., Kramer, L. A., & Ewing-Cobbs, L. (2005). Cognitive and neuroimaging findings in physically abused preschoolers. *Archives of Disease in Childhood*, 90(1), 82–85. <https://dx.doi.org/10.1136%2Fadc.2003.045583>
- Pynoos, R. S., Steinberg, A. M., Layne, C. M., Briggs, E. C., Ostrowski, S. A., & Fairbank, J. A. (2009). DSM-V PTSD diagnostic criteria for children and adolescents: A developmental perspective and recommendations. *Journal of Traumatic Stress*, 22(5), 391–398. <https://doi.org/10.1002/jts.20450>
- Reijneveld, S. A., van der Wal, M. F., Brugman, E., Sing, R. A. H., & Verloove-Vanhorick, S. P. (2004). Infant crying and abuse. *The Lancet*, 364(9442), 1340–1342. [https://doi.org/10.1016/s0140-6736\(04\)17191-2](https://doi.org/10.1016/s0140-6736(04)17191-2)
- Robinson, L. R., Boris, N. W., Heller, S. S., Rice, J., Zeanah, C. H., Clark, C., & Hawkins, S. (2012). The good enough home? Home environment and outcomes of young maltreated children. *Child & Youth Care Forum*, 41(1), 73–88. <https://doi.org/10.1007/s10566-011-9157-3>
- Safaz, I., Alaca, R., Yasar, E., Tok, F., & Yilmaz, B. (2008). Medical complications, physical function and communication skills in patients with traumatic brain injury: A single centre 5-year experience. *Brain Injury*, 22(1), 733–739. <https://doi.org/10.1080/02699050802304714>
- Scheeringa, M. S., Wright, M. J., Hunt, J. P., & Zeanah, C. H. (2006). Factors affecting the diagnosis and prediction of PTSD symptomatology in children and adolescents. *American Journal of Psychiatry*, 163(4), 644–651. <https://doi.org/10.1176/ajp.2006.163.4.644>
- Sheets, L. K., Leach, M. E., Koszewski, I. J., Lessmeier, A. M., Nugent, M., & Simpson, P. (2013). Sentinel injuries in infants evaluated for child physical abuse. *Pediatrics*, 131(4), 701–707. <https://doi.org/10.1542/peds.2012-2780>
- Shemesh, E., Newcorn, J. H., Rockmore, L., Shneider, B. L., Emre, S., Gelb, B. D., Rapaport, R., Noone, S., Annunziato, R., Schmeidler, J., & Yehuda, R. (2005). Comparison of parent and child reports of emotional trauma symptoms in pediatric outpatient settings. *Pediatrics*, 115(5), e582–e589. <https://doi.org/10.1542/peds.2004-2201>
- Smyke, A. T., Zeanah, C. H., Fox, N. A., & Nelson, C. A. (2009). A new model of foster care for young children: The Bucharest early intervention project. *Child and Adolescent Psychiatric Clinics*, 18(3), 721–734. <https://doi.org/10.1016/j.chc.2009.03.003>
- Suttora, C., & Salerni, N. (2011). Maternal speech to preterm infants during the first 2



years of life: Stability and change. *International Journal of Language & Communication Disorders*, 46(4), 464–472. <https://doi.org/10.1111/j.1460-6984.2011.00007.x>

Swingley, D. (2009). Contributions of infant word learning to language development. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 364(1536), 3617–3632.

Toppelberg, C. O., & Shapiro, T. (2000). Language disorders: A 10-year research update review. *Journal of the American Academy of Child & Adolescent Psychiatry*, 39(2), 143–152. <https://doi.org/10.1097/00004583-200002000-00011>