

THE DEVELOPMENT OF INFANT LANGUAGE IN THE FIRST 12 TO 42 MONTHS OF LIFE: A THEMATIC REVIEW OF PROTECTIVE AND RISK FACTORS

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Abstract

The development of an infant is both invulnerable and vulnerable. Infant development can be either typical or atypical. Growth is accompanied by a variety of challenges throughout pregnancy, childbirth, infancy, childhood, and the adult years. The factors which may contribute to typical development are termed protective factors, while those which may contribute to atypical development are termed risk factors. This may lead to the assumption that different forms of infant development could be parallel due to their influence on protective or risk factors. This study synthesized research on the development of typical and atypical language in infants between 12 and 42 months using a thematic review method. Early diagnosis and intervention are crucial in infants when atypical development is noticed or documented. The study incorporates recent and past evidence and is structured by topics, such as infant development, risk factors, protective factors, and infant language development. The evidence is summarized, accompanied by data collection that describes key characteristics of risk and protective factors related to infant (language) development. The study is directed towards researchers, practitioners, clinicians, speech-language pathologists, psychologists in the field of early childhood education, as well as parents and educators.

Keywords: *Infant language, infant development, protective factors, risk factors, early diagnosis.*

1. Introduction

In many respects, both the 20th and 21st centuries have witnessed remarkable progress in the study of infant development (Bremner & Fogel, 2001; Fitzgerald et al., 2002). The emergence of several theories has established concrete foundations for the scientific investigation of the early life of infants (Bremner & Slater, 2004, p. vi). While the 20th century was marked by the shift from “mechanistic to organismic paradigms” (Fitzgerald et al., 2002), the 21st century is probably marked by the change from general system theory to the interdisciplinary examination of infant development. The validity of theoretical contribution depends on evidence either consolidating or refuting its assumption(s). The early assumptions include, but not limited to, infant development due to ontogenetical changes (Hopkins, 2005), cognitive changes (Mascolo & Fischer, 2005), the interaction between innate and acquired functions (Bolhuis & Hogan, 2005), learning and learning environment (Watson, 2005), and observation and analysis of child behaviour and occurring disorders (Fonagy, 2005). Recent theories propose systematic models for the study of infant development concerning the early theories. These include the infant’s capacity to understand itself and the world around it as in the Theory of Mind (Freeman, 2005; Rakoczy, 2017), the interaction of subsystem to form a system as in the Zürich model of social motivation (Gubler & Bischof, 1991), the prediction of infant development based on its present stage as in the dynamical systems (Schöner, 2005).

A large number of theories has emerged, leading to increased complexity of the study of human infancy. Research in this area has shifted towards a category system approach. This category system includes cognitive development, be it in infancy, such as object knowledge (Bremner, 2005), or beyond infancy, such as the interaction of biological factors and socio-cultural experiences (Callaghan, 2005), perceptual development (Johnson et al., 2005), motor development (Vereijken, 2005), social development (Ross & Spielmacher, 2005), emotional development (Fox & Stifter, 2005), moral development (Turiel, 2005), speech development (Kent, 2005), language development (MacWhinney, 2005), and even more specific aspects like abstract and higher-level thinking—referred to as executive functions (Hughes, 2005).

To sum up, theories and different methods of research that have resulted in the variable outcome indicated the need to shift the study of infant development from diagnosis, description, and analysis, to attempts to reveal the causes that led, or could lead, to atypical infant development (Feldman, 2016; Henderson, 2015; Suci & Robertson, 1992).

2. Methods

A thematic approach was used to conduct this review study. We identified two major themes (variables) in our study: risk and protective factors concerning infant development, and risk and protective factors concerning infant language development. To search for previous literature, we used the University of Verona database (UNIVERSE). We examined the literature using the following keywords: 'infant development' OR 'infant language development' AND 'risk factors' OR 'protective factors'. All databases were activated and limited to English and to articles, review articles, book chapters, and books. A total of 70 documents were reviewed, of which 32 were tabulated for evidence in the two targeted themes.

3. Synthesis

3.1. Infant language development

Language development remains the most mysterious ability being developed by humans starting from prenatal stages (E. K. Johnson, 2016) to early infancy and adolescence (Ornat, 2012). When approaching the language development of infants, a distinction is made between speech development and language development. The former is specific to the development of the sound system, including phonological aspects (Kent, 2005) and even the debatable premimetic and mimetic capacities (Vihman & Depaulis, 2009). The latter refers to all elements of language, including the auditory system, articulation, words, grammar (MacWhinney, 2005), and pragmatics which ensure typical social interaction and communication (Coplan & Weeks, 2009). Recently, researchers have paid more attention to the first three years as the milestone period to understand the nature and the direction of language development, be it typical or atypical (Spencer & Koester, 2016). Infant development and language development operate interactively. *Table 1* summarizes 20 studies approaching other elements of language and mediators that may be conducive to infant language development. Age is shown in months.

Table 1. A Summary of Studies Using Different Predictors to Examine Infant Language Development.

| No. | Predictor/mediator | Method | Age | Implication | Citation |
|-----|---|---------------|-------|--|-------------------------------|
| 1 | Home stimulation and maternal variables | Experimental | 10-12 | Maternal language contributes to overall infant language development | (Psarras, 1973) |
| 2 | Infant categorical discrimination and closure duration. | Experimental | 7.5 | Application of this model to speech perception of infants | (Cohen et al., 1992) |
| 3 | Maternal generation of mothers, fathers' educational level | Experimental | 22 | Environmental context affects receptive and expressive communication | (Montgomery et al., 1999) |
| 4 | Mothers' views on infant language development | Interviews | 13-14 | The need for family integration in the study of overall infant language development | (Hammer & Weiss, 2000) |
| 5 | Babbling as linguistic and non-linguistic | Observational | 6-12 | Typical babbling could be an indicator for typical infant language development | (Oller, 2001) |
| 6 | Shared book reading | Observational | 12-24 | Parents and home visitors conduce to overall infant language development | (Christiansen, 2003) |
| 7 | Parenting intervention for young mothers at risk | Intervention | 4-7 | The intervention of mothers increase expressive language | (McGowan et al., 2008) |
| 8 | Maternal ADHD symptoms of mothers and maternal language | Correlational | 2-12 | Mothers' maternal health either increases or decreases infant language development | (Kryski et al., 2010) |
| 9 | Distributional and phonological regularities affect word learning | Observational | 14 | Phonological and distributional cues marking word categories promote early word learning | (Tafuro, 2011) |
| 10 | Mother-infant early interactions | Experimental | 22 | Parents' behaviour help regulate infant language development, mainly phonology | (Lany & Saffran, 2011) |
| 11 | Maternal depression and bilingual households | Observational | 6-10 | Poor mental health and bilingual households influence early language acquisition | (Women's Health Weekly, 2012) |
| 12 | Fatty acid composition of breast milk and language development | Experimental | 9-12 | A higher level of this acid could increase receptive language development | (Toro-Ramos et al., 2013) |

| No. | Predictor/mediator | Method | Age | Implication | Citation |
|-----|--|----------------------------|--------------|--|-----------------------------------|
| 13 | Walking and language development | Longitudinal | 10-13.5 | Walking involves communicative understanding, cognitive development, parents attribution, and neurological development, which all contribute to language development | (Walle & Campos, 2014) |
| 14 | Mothers' attachment levels and types of verbal control | Correlational | 24-35 | Attachment levels, mothers' status and verbal control affect infant language development | (Nam & Jahng, 2015) |
| 15 | Exposure to cigarette smoking | Cohort follow-up study | 6, 12, 30 | Prenatal nicotine exposure influence cognitive development including language | (Hernández-Martínez et al., 2017) |
| 16 | Educating mothers | Intervention | Newly born | Intervention plays a role in language acquisition for mothers of all socioeconomic status | (Suskind et al., 2018) |
| 17 | Neonatal maturation and receptive language development | Diffusion-weighted imaging | 12 | Neonatal receptive language development could be used to indicate either typical or atypical language development | (Sket et al., 2019) |
| 18 | Beliefs of young educators | Interviews | Under 24 | Qualifications and skills of young educators may support infant language development | (Degotardi & Gill, 2019) |
| 19 | Parent coaching intervention | Intervention | 6, 10, 14 | Parentese style enhances social language skills of infants | (Ramírez et al., 2020) |
| 20 | Conceptions of infant language development | Interviews | Preschoolers | Well-qualified educators can enhance infant language development | (Han & Degotardi, 2020) |

3.2. Risk factors, protective factors, and language development

Several researchers reviewed risk and protective factors that could help predict the nature of infant language development. Having done so, they suggest that this could help researchers, clinicians, parents, and policy-makers make decisions and provide early intervention (if needed) for infants. These reviews resulted in a different list of factors and findings on the degree of impact of each of the elements for language development (i.e., for the protective factors) and language delay (i.e., for the risk factors) (Laasonen et al., 2018; Sania et al., 2019; Short et al., 2019).

As a salient argument, a review concluded that “perinatal, postnatal and environmental factors influence language development,” and breastfeeding enhances language development (Chaimay et al., 2006, p.1080). Another reviewer found that risk factors include “family dynamics ... interaction with parents, immediate social environment, and encouragement” and characteristics like “brain injury, persistent otitis media, and cardiac surgery, besides the type of food and parental counseling, may be related to language disorders” (Gurgel et al., 2014, p. 350). Another review identified eleven biological and eight environmental factors of which gender parents' social status were the most influential predictors for infant language development (Korpilahti et al., 2016).

Another factor causing language delay is associated with different prenatal factors. Reported findings indicated that prenatal exposure to cocaine affects discourse-pragmatic, semantic, and form components of language (Mentis & Lundgren, 1995), prenatal and perinatal factors (e.g., mothers' anaemia) influence all levels of speech and language development (Cabarkapa et al., 2012), and impact of prenatal alcohol exposure on language and speech communication development (Hendricks et al., 2019). Other studies used biological or environmental risk factors to predict typical or atypical language development (See Table 2).

Table 2. A Summary of Studies Using Different Risk Factors to Predict Typical/Atypical Language Development.

| No. | Example risk factor | Language development | Implication | Citation |
|-----|--|--|---|------------------------------|
| 1 | Family factors (e.g., low family income, the inadequacy of family resources) | Expressive language and comprehension measured | The home environment is a mediator between language development and risk factors | (Park, 2002) |
| 2 | Family history | Specific language impairment | Family history mediates language development | (Choudhury & Benasich, 2003) |
| 3 | History of metal lead exposure | Overall language development | Lead exposure increase chances of language delay | (Jorge et al., 2008) |
| 4 | Gender, gestational age, and birth weight | Oral language development | Early detection of hearing loss can decrease chances of language delay | (Fernandes et al., 2011) |
| 5 | Assessment markers | Specific expressive language delay | Assessment markers can help predict language delay | (Everitt et al., 2013) |
| 6 | Language delay | Overall language development | Family contact is essential, and three months is not enough to predict language delay | (Wilson et al., 2013) |

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|----|---|----------------------------------|---|----------------------------|
| 7 | Maternal Non- English Speaking Background, low school readiness, and maternal mental health distress | Receptive vocabulary development | social gradients in children's developmental outcomes increase over time | (Taylor et al., 2013) |
| 8 | Birth weight | Overall language development | Responsive parenting as a protective factor could decrease the impact of birth weight risk | (Madigan et al., 2014) |
| 9 | Gestational 25(OH)D status | Receptive language development | The amount of this vitamin is related to receptive language skills but not cognitive or expressive language | (Tylavsky et al., 2015) |
| 10 | Urban residence, low birth weight, male gender, delivery by Caesarean section, parent consanguinity, and presence of cyanosis after birth | Overall language development | Awareness of risk factors can increase the chance of delayed language occurrence | (Aboufaddan & Ahmed, 2018) |
| 11 | Maternal responsive and intrusive communicative behaviours | Overall language development | Mother-baby interaction and connection affect positively/negatively language development | (Conway et al., 2018) |
| 12 | Family variables (e.g., positive family history) and birth weight | Language development disorder | Early identification of risk factors decreases chances of LDD | (Nasiri et al., 2019) |

4. Conclusion

Risk factors and protective factors stand in a relation of mutual dependence. While risk factors increase the chances of atypical language development, protective factors ensure typical language development. Dissimilarly, while the absence of risk factors indicates typical language development, the absence of protective factors increases the chances of atypical language development. The examination of both is vital for the early identification as well as the consecutive early intervention.

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