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How do maternal interaction style and joint attention relate to language development in infants with Down syndrome and typically developing infants?

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ABSTRACT

Down syndrome (DS) is more detrimental to language acquisition compared to other forms of learning disability. It has been shown that early social communication skills are important for language acquisition in the typical population; however few studies have examined the relationship between early social communication and language in DS. The aim of the current study is to compare the relationship between joint attention and concurrent language skills, and maternal interactive style and concurrent language skills in infants with DS and in typically developing (TD) infants matched for mental age. We also investigated if these relationships differ between children with DS and TD children. Twenty-five infants with DS (17–23 months) and 30 TD infants (9–11 months) were assessed on measures of joint attention, maternal interactive style and language. The results indicated a significant positive relationship between responding to joint attention (RJA) and concurrent language for the DS group, and a significant positive relationship between maternal positive expressed emotion (PEEM) and concurrent language for the TD group. We hypothesise that different social-communication factors are associated with language skills in DS, at least between 17 and 23 months of age compared to TD infants of similar non-verbal and general language abilities.

What this paper adds?

This paper uniquely combines two different social factors (joint attention and maternal interactive style) in the same study and with the same group of infants with Down syndrome. This is the first study to have investigated a link between maternal interactive style and language development for children with Down syndrome. The study found that different social communication skills were associated with concurrent language skills in DS and in TD infants: in DS there was a moderate positive relationship between responding to joint attention and concurrent language skills, whereas in TD infants there was a moderate positive relationship between maternal interactive style and concurrent language skills.

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1. Introduction

Down syndrome (DS) is a genetic disorder caused by an additional copy of chromosome 21. It occurs in approximately 1 in 700 births (Martin et al., 2009). The majority of individuals with DS have some form of learning disability, and the average IQ is 50 (range 30 to 70) (Chapman & Hesketh, 2000). The neuro-cognitive profile of individuals with DS is characterised as having strengths and weaknesses. Although children and adults with DS are reported to be highly sociable and have good ‘people’ skills (Fidler, Most, Booth-LaForce & Kelly, 2008), language is a significant area of weakness. Expressive language skills tend to be more impaired than receptive language abilities (Fidler & Nadel, 2007) and can sometimes be poorer than expected from their general non-verbal functioning (Chapman & Hesketh, 2000). A recent meta-analysis showed that children with DS had significant deficits in expressive vocabulary, compared to typically developing (TD) children matched for nonverbal mental age (NVMA; Næss et al., 2011), while receptive vocabulary skills were in line with NVMA. Receptive vocabulary and gesture production are considered relative strengths (Galeote, Sebastian, Checa, Rey & Soto, 2011). Severe early delays have been reported in language developmental milestones. For example, children with DS produce their first word, on average, at 21 months in comparison to 12 months for TD children (Stoel-Gammon, 2001). Following initial delays, expressive vocabulary continues to develop slowly in DS. Using the Swedish Early Communicative Inventory, the performance of children with DS aged 36 months was reported to be comparable to that of TD children aged 16 months (Berglund et al., 2001).

Given the pivotal role that language plays in development, it is of paramount importance that we attempt to understand the contributing factors, especially in children with DS, as their language abilities can be particularly impaired, although there is wide within syndrome variability. One factor that is likely to be of importance is early social communication skills, and, in spite of the generally positive perceptions (Fidler, et al. 2008), deficits in early social communication in children with DS have in fact been reported (Fidler, Philofski, Hepburn & Rogers, 2005).

One early social communication factor which is related to TD children’s language development is joint attention, defined as a triadic interaction in which the child and caregiver focus on the same object or event (Tomasello, 1995). This behaviour emerges once infants progress to the period of intentional communication, when they develop a repertoire of behaviours serving specific pragmatic functions (obtaining an object, sharing attention with a caregiver) prior to using words. These behaviours, in turn, help build the child’s social communication skills. Although joint attention behaviour is well documented as being concurrently and longitudinally related to language in TD infants, this is less clear in infants with DS, and requires investigation, particularly in relation to their expressive language deficits. Research studies have approached joint attention from two perspectives which complement each other: 1) joint attention skills, where the focus is on investigating the child’s ability to use pointing or eye-gaze to share declarative communication functions related to sharing interest in objects and events as described above; and 2) joint engagement, which focuses on documenting the time the child and caregiver spend in joint attention episodes (Adamson, Deckner, Bakeman & Romski, 2009). Another important social communication factor that is related to language development is the way caregivers behave and respond to their child, or maternal interactive style. For example, the transition from pre-intentional to intentional communication in infants is facilitated by their caregivers, via sensitive responding and support for early proto-conversations (Snow, 1977). Positive maternal input is known to be related to social, language and play development for TD children (Venuti et al., 2012; Venuti et al., 2009). Currently, little is known about the association between maternal interactive style and language abilities in infants with DS. Each of these two factors (joint attention and maternal interactive style) will be discussed in turn.

1.1. Joint attention (JA) and language development

In the first few months of life, infants communicate with their caregivers in dyadic interactions. Between 6–12 months infants are able to follow a shift of gaze/head turn of an adult (Butterworth & Jarrett, 1991). Within this period, infants also start to communicate to adults about objects. This move from dyadic to triadic interaction represents an important developmental milestone (Mundy, Kasari, Freeman & Sigman, 1995). A JA episode can be introduced by the child, i.e. the child chooses an object or topic/event upon which the attention of the dyad is focused. This initiating of joint attention (IJA) is also referred to as ‘commenting’. Alternatively, the caregiver chooses a toy/topic to which the infant’s attention is then directed. This is referred to as ‘responding to joint attention’ (RJA) or ‘attention following’ (Mundy et al., 2003). The emergence of these skills represents the development of underlying social-cognitive processes that may provide a foundation for subsequent language development, such as the capacity for representational thought, and the idea that experiences can be shared (Mundy et al., 1995). Therefore, early words could be considered to replace non-verbal communication acts that have, until that stage, served the same pragmatic, referential, purpose (Wetherby et al., 1998). Furthermore, the use of these communicative skills often elicits verbal responses from caregivers, which increases the contingent linguistic input that the child receives (Yoder & Warren, 1998).

IJA develops between 9–15 months of age; initially infants use gaze shifting to share an object/event with an adult and shortly after this they begin to point (Carpenter, Nagell & Tomasello, 1998). IJA has been shown to account for unique variance in expressive language scores when controlling for initial chronological age, mental age, and expressive language (Mundy & Gomes, 1998) in TD children. Although few studies have investigated IJA abilities in children with DS, the evidence available indicates that children with DS are as likely to initiate joint attention as are developmentally matched TD children (Sigman & Ruskin, 1999). As in TD infants, IJA in infants with DS has been reported to be positively related to receptive and expressive language both concurrently and longitudinally (Mundy et al., 1995; Sigman & Ruskin, 1999).

RJA emerges between 6–12 months in TD infants, and continues to develop until 18 months of age (Butterworth & Jarrett, 1991; Morales et al., 2000). An important progression in RJA occurs between 12–18 months, when infants are able to follow another

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