



Theory of mind in children with severe speech and physical impairments

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ABSTRACT

The development of a person's ability to understand other's thoughts and feelings, so-called "theory of mind" (ToM), is subject to study. Children with communicative disabilities have exhibited problems in this respect, highlighting the role of language in the development of ToM. In this study, ToM was studied in children with cerebral palsy and severe speech impairments. Two tasks, differently dependent on verbal abilities, were used. The results were compared to those of a mental age matched group. The groups differed significantly on the verbally dependent task while difference in performance did not reach significance on the less verbally dependent one. The results are discussed in terms of a delayed development of ToM in children with severe speech and physical impairments, dependent on verbal abilities.

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1. Introduction

Theory of mind, i.e. an understanding that other people (and oneself) have thoughts, desires and beliefs and that these mental states govern behaviour, is a fundamental ability to fully understand human behaviour and to take part in daily life. It is essential to understand that people engaged in the same situation as one self can have different mental states in spite of the same experience. In general, this ability develops by the age of four (Perner, Leekam, & Wimmer, 1987; Surian & Leslie, 1999) and subsequently at the age of 6–7 an understanding of someone else's thinking about a third person's thinking develops. However the development of theory of mind begins early in the child's life with precursor skills that includes joint attention, use of mental states and pretend play (Miller, 2006).

Many researchers have claimed that language plays a special role in the development of theory of mind. One suggestion is that language influences the development of theory of mind (ToM) through the children's exposure to talk about mental states. This suggestion is based on the findings that mothers' and families' talk about mental states predicts children's later theory of mind performance (Dunn, Brown, Slomkowski, Tesla, & Youngblade, 1991; Ruffman, Slade, & Crowe, 2002), that siblings promote the children's development of theory of mind (e.g. Jenkins & Astington, 1996; Peterson, 2000) and that late-signing deaf children performed worse on theory of mind tasks in comparison to native signers (e.g. Meristo et al., 2007; Woolfe, Want, & Siegal, 2002). The latter finding could be explained by the late signers not having as many opportunities as native signers or hearing children to learn about mental states through conversation.

Another suggestion is that general language abilities promote the development of theory of mind (de Villiers & de Villiers, 2000). Astington and Jenkins (1999), e.g. found that scores of expressive language ability and receptive scores for syntax predicted later performance on theory of mind tasks. Farrar and Maag (2002) also found that vocabulary and MLU predicted performance on theory of mind tasks.

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A combination of linguistic abilities and social competence, i.e. socio-linguistic intelligence, is suggested to be important (Shatz, 1994) for developing an understanding of the mind both of oneself and others. There are two assumptions behind this explanation. First, young children compare themselves to others as they develop a sense of self. Second, as language develops they start to participate in conversations giving verbal expressions to internal states, in line with Siegal, Varley, and Want (2001).

Another account of how children develop a theory of mind assigns a special role to pretend play. There are studies showing that children who engaged more in pretend play performed better on theory of mind tasks than those who did not (Lillard, 1994). Leslie (1987) suggested that the same cognitive structures are used in understanding other minds as in pretend play. Others claim that similar mental representation abilities are engaged in pretend play and false belief, despite the fact that pretend play and false belief develop at different ages (pretend play, in the second year; false belief, in the fourth or fifth year; Forguson & Gopnik, 1988; Perner, 1988; Wimmer, Hogrefe, & Sodian, 1988).

There are also suggestions of a link between the capacity to hold in mind and development of theory of mind. Gordon and Olson (1998) claim that “the concept of false belief itself is acquired when the child has the computational resources to represent, that is hold in mind, a previously created representation even when a new representation is created by a new perceptual situation” (1998, p. 81), a view comparable with the earlier findings of Baddeley (1986). There are studies suggesting that working memory predicts theory of mind competence (Buitelaar, van der Wees, Swaab-Barneveld, & van der Gaag, 1999).

During the last years studies have been published, proposing a close link between executive functions and theory of mind. There are both theoretical and empirical reasons for this proposal. One reason is the hypothetical association between an inability to engage in goal-directed activity and pretend play in children with autism (Hughes, 1998a). Another claim is that ToM tasks pose significant demands on executive functioning (Hughes, 1998a). Carlson and Moses (2001) suggest that their findings of statistically significant correlations between a number of inhibitory control measures and theory of mind tasks imply that executive functioning is centrally involved in ToM development. This suggestion is also in line with other findings (e.g. Hughes, 1998a, 1998b; Hughes, Dunn, & White, 1998; Perner & Lang, 1999).

Due to the proposed importance of the role of language development, pretend play and working memory in the development of theory of mind, children with cerebral palsy and severe speech impairments are of special interest to the field. The diagnosis cerebral palsy is a non-specific diagnosis, based on clinical signs, all depending on a non-progressive damage of the immature brain, before, during or shortly after birth, with motor disabilities. As a consequence (Hagberg & Hagberg, 1993) the children have a severely restricted capacity for independent pretend play. In addition, the children are often limited in their productive speech which limits their contribution to discourse in conversational situations (Hjelmquist & Dahlgren Sandberg, 1996). In her studies of literacy abilities in children with SSPI Dahlgren Sandberg (2001) also found specific problems with working memory. Taken together, these observations indicate possible problems in the development of theory of mind in these children.

During the last decade a few studies have been made on children with SSPI and ToM ability. The common finding is that the children performed worse than children matched for mental age and/or IQ on theory of mind tasks (Dahlgren, Dahlgren Sandberg, & Hjelmquist, 2003; Falkman, Dahlgren Sandberg, & Hjelmquist, 2005). Dahlgren et al. (2003) suggested that the poor performance on the theory of mind task could partly be explained by linguistic and communicative skills. They also questioned the ecological validity of commonly used ToM tasks and argued that performance on false belief tasks might not predict theory of mind performance in real life. In a longitudinal study of six children with SSPI (Falkman et al., 2005) the authors found that the children followed a normal pattern of theory of mind development but with a severe delay compared to children without disability.

However, the role of language abilities in the development of theory of mind abilities in children with SSPI is still unclear. The conclusions from earlier studies have partly been based on the performance on the classical false belief task, Sally and Ann (Baron-Cohen, Leslie, & Frith, 1985) which requires certain verbal skills. The aim of this study was to investigate language abilities and short-term memory in relation to performance on the classical false belief task Sally and Ann and on the “thought picture” measure of theory of mind that minimizes verbal requirements.

2. Method

2.1. Participants

Fourteen children with SSPI participated in this study. The mean chronological age was 9;0, ranging from 5;2 to 12;8: 4 boys (mean age 9;1) and 10 girls (mean age 8;11). Their mean nonverbal mental age was 6;1 years, and their mean linguistic age was 7;7 years. All of the children had cerebral palsy with severe speech and physical impairments. To be included in the study the children had been judged by a speech and language therapist to be unintelligible by people outside the family. Six of them had no speech and the other eight were impossible to understand. Twelve of the children used Bliss as their primary mode of communication and some of them used other graphic media, like pictures or the alphabet. In addition six of the children tried to vocalize. According to medical information, they all had normal or corrected vision and normal hearing. Only one of the children was able to move independently and one boy could walk short distances with support. The children were contacted through local habilitation centres and special schools in the middle and south of Sweden.

A comparison group of 14 typically developing children, nine girls and five boys, with natural speech and without disabilities was used, matched for mental and linguistic age. According to parents and teachers, all of the children had normal vision and hearing and there were no indications of deviant language development. The mean chronological age in the

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