



Social competence of preschool children born very preterm

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ABSTRACT

Background: Relatively little is known about the early social development of children born very preterm despite clear suggestions of later interpersonal difficulties.

Aims: To compare the social competence of very preterm (VPT) and full term (FT) born children at age 4 and identify infant, social and family factors associated with later risk.

Study design: Prospective longitudinal study.

Subjects: A regionally representative cohort of 103 VPT (≤ 32 weeks gestation) children and a comparison group of 105 FT children (36–41 weeks gestation) born between 1998 and 2000.

Outcome measures: At corrected age 4 years, a range of parent report, observational and laboratory measures assessed children's emotional and behavioral adjustment, emotional regulation, social interactive behavior and theory of mind understanding. Extensive perinatal, social background and family functioning data were also available from birth to age 4.

Results: Compared to their FT peers, VPT born children had poorer emotional and behavioral adjustment, were less effective in regulating their emotions, had lower levels of positive peer play and had less synchronous interactions with their parents. Within the VPT group, predictors of poor social competence included family socioeconomic disadvantage, extreme prematurity, severity of cerebral white matter abnormalities and early childhood exposure to high levels of maternal anxiety and negative parenting.

Conclusions: VPT pre-schoolers are characterized by a range of subtle social difficulties likely to adversely affect their ability to establish and maintain positive relationships with others. These difficulties need to be monitored alongside other potential neurodevelopmental concerns and parents supported to actively nurture child social competence.

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1. Introduction

An important aspect of child development that has been largely neglected by follow-up studies of children born very preterm (VPT) is social competence or the development of skills and abilities essential for the formation of positive relationships with others. This is somewhat surprising given that school aged children born VPT are often described by their peers as more withdrawn and passive [1], and by their parents as experiencing high rates of sibling conflict and peer victimization [2,3]. Longer term there is suggestion that these difficulties persist, with VPT young adults having greater difficulty establishing and maintaining social relationships than their full term peers. For example, they are less likely to have a romantic partner, more often live alone and without children, and are at increased risk for psychiatric hospitalization [4–9].

Despite a growing awareness of the social impacts of prematurity, few studies have systematically examined the early social development of children born VPT across key domains of social competence shown to be important for children's longer term adaptive functioning [10,11]. These domains span behavioral and emotional adjustment, emotional regulation, a child's interactive behavior with others and social cognitive processing. The adjustment domain, which has been most well studied, includes both externalizing and internalizing behavior. Externalizing behavior problems are characterized by poor behavioral control including conduct problems, hyperactivity/inattention and inhibitory control problems. Internalizing behavior problems are characterized by extreme behavioral control and span emotional symptoms, social withdrawal and anxiety. Emotional regulation refers to a child's capacity to modulate their emotions in response to people and situations using a range of cognitive, physiological and behavioral processes/strategies allowing for empathic and socially appropriate behavior [12,13]. The third domain, social interactive behavior relates to the skills and ability that are involved in forming and maintaining relationships with others, which in turn foster popularity and social acceptance [14]. Finally, emerging social cognitive processes such as being

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able to see the world from another's perspective also play an important role in helping a child to understand and function in their social world. One important cognitive process used to facilitate the perception of both others and self is that of theory of mind, being the ability to impute mental states to self and others [15]. Impairments in social cognitive processing have been linked with aggression, social anxiety and low popularity with peers [11].

To date, follow-up studies of the social development of preschool children born VPT have focused predominantly on children's early emotional and behavioral adjustment, with occasionally a few additional peer items or subscales added. Results from these studies suggest that difficulties emerge early and typically consist of inattention/hyperactivity and emotional problems [16–18]. For example, Spittle et al. (2009) found that by age 2, 9% of VPT children and 3% of FT children were in the clinical range for externalizing problems, 9% and 6% for internalizing problems, and 16% and 6%, respectively for global social competence difficulties (compliance, attention, imitation/play, mastery motivation, empathy, prosocial peer relations) on the parent reported Infant Toddler Social and Emotional Assessment [17]. Similarly, using the Strengths and Difficulties Questionnaire, Delobel-Ayoub et al. (2006) showed that by age 3, VPT children were at increased risk of hyperactivity/inattention, emotional and peer problems [19]. These studies like many others in the field are somewhat limited by their narrow conceptual focus and reliance on single informant measures. To address this research gap, we used a multi-informant/cross-contextual approach to assess the early social competence of a cohort of children born VPT across key domains of social functioning found to be important in mainstream child development research.

A second important and related issue concerns the risk factors and life course processes that place some but not all VPT children at increased risk of poor social competence. Few studies have examined the relative net contributions of a wide range of factors spanning not only early medical risk exposures but also social background and family functioning factors. Spittle et al. (2009) found that female gender, low birth weight, cerebral white matter abnormalities on term MRI and postnatal corticosteroid exposure were significant perinatal predictors of poor social competence in VPT children at age 2 [17]. With respect to family factors, in a second study from this cohort, parental warmth and parent–child synchrony were also linked with better parent reported child social emotional competence. In contrast, parental negative affect was associated with increased child anxiety and withdrawal [20]. Insensitive parenting behavior and parental mental health problems have also been shown to place VPT children at increased risks of emotional and behavioral dysregulation [21,22]. Such studies, although small in number, suggest that modifiable family factors such as parenting behavior, caregiver mental health and the quality of the parent–child relationship have a clear role, alongside perinatal risk factors, in shaping the social outcomes of children born VPT. Developing a better understanding of the individual and family factors that foster these children's adaptive social development during the socially important preschool years is needed to improve the identification of those at risk, as well as to assist in monitoring and intervention efforts to better address the social needs of VPT children alongside other developmental concerns.

The aims of this study were:

1. To describe the early social competence of VPT and FT born children at corrected age 4 years using a multi-method approach. Key aspects of social competence examined included children's behavioral adjustment, emotional regulation, the quality of early peer and parent social interactions, and the development of theory of mind. We hypothesized that compared to their FT peers, children born VPT would be characterized by behavioral adjustment problems especially inattention, more emotional dysregulation, lower quality parent and peer interactions, and less well-developed theory of mind.
2. To identify infant clinical characteristics and socio-familial factors that place preschool children born VPT at increased risk of poorer

social competence. We hypothesized that male gender, extreme prematurity, cerebral white matter abnormalities at term, family social risk, maternal mental health difficulties, and negative/intrusive parenting would be associated with lower levels of child social competence.

2. Methods

2.1. Participants

The sample consisted of two groups. The first group was a regional cohort of 110 children born VPT (≤ 32 weeks gestation; range = 23–33 weeks) who were consecutively admitted to a level III Neonatal Intensive Care Unit (NICU) at Christchurch Women's Hospital (New Zealand) from November 1998 to December 2000. Those with congenital abnormalities or born into non-English speaking families were excluded. In total, 92% of eligible infants were recruited. At age 4, excluding deaths ($n = 3$), 98% ($n = 105$) of these children were followed up. Two further children were excluded due to blindness ($n = 1$) and incomplete data ($n = 1$). This group included infants born extremely preterm (< 28 weeks gestation; $n = 43$) and very preterm (≤ 32 weeks gestation; $n = 60$).

The second study group consisted of a comparison sample of 113 FT born children (> 36 weeks completed gestation; range = 36–41 weeks) recruited at age 2 years. These children were identified from hospital birth records for the same period ($n = 7200$ total births) by alternately selecting the previous or next child of the same gender in the hospital delivery schedule. Of 177 eligible families, 62% agreed to participate. Reasons for non-participation included: untraced (47%); moved overseas (12.5%); refused (12.5%); and agreed to participate but could not be assessed within the four week assessment window due to illness or family circumstances (28%). No significant differences were found between recruited and non-recruited FT children on measures of birth weight, gestational age, gender, family SES (Elly & Irving, 2003), single motherhood or Māori ethnicity. At age 4 years, 96% ($n = 108$) of all FT children were followed up. Reasons for sample loss included unable to be traced ($n = 3$) and refused ($n = 2$). Data was excluded from a further three children due to incomplete data. Table 1 provides a descriptive profile of the neonatal characteristics and family circumstances of both study groups.

2.2. Procedure

All study children completed a neurodevelopmental assessment at corrected age 4 years that included a range of social competence measures, an assessment of child intelligence (IQ) using a short-form of the Wechsler Preschool and Primary Scales of Intelligence – Revised (WPPSI-R [23]), and measures of family social context and functioning. All procedures were approved by the Regional Ethics Committee and informed written consent obtained from all parents/guardians. Key measures included in this analysis are described below.

2.3. Social competence measures (4 years)

2.3.1. Externalizing and internalizing behavior

Parents completed the 25-item Strengths and Difficulties Questionnaire (SDQ [24]) which provides a measure of the extent of child hyperactivity/inattention, conduct and emotional disorder symptoms. The SDQ is internally consistent and has high test–retest reliability [25] and discriminant validity [26]. This short scale was supplemented with items from the Behavioral Rating Inventory of Executive Function – Preschool version (BRIEF-P) inhibitory control subscale [27]. A composite behavior problems score was also computed by converting scores to a common metric (mean of 100 and SD of 15) and summing children's scores across all measures (Cronbach

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