

Social and communicative functioning

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It is widely acknowledged that the establishment of positive attachment relationships and communication with primary caregivers is an important outcome of social-emotional development in early childhood. Attachment security and communication abilities are also associated with key developmental achievements later in childhood, and indeed across the life-span. Research conducted with children with Down syndrome suggests that although differences in attention regulation and emotional responsivity may modify the developmental processes in some respects, the general patterns are similar to those in typically-developing children. It is known from research in this latter population that sensitivity and 'mind-mindedness' in caregiving are of key importance, as is the development of shared attentional focus. We argue that targeted research to identify the ways in which parents can most effectively support these core functions in the early development of children with Down syndrome should be a priority, as should involving parents as research partners in this endeavour.

Undoubtedly there are numerous research questions that remain unanswered regarding the social and communicative abilities of infants, children and adults with Down syndrome. For the purpose of this paper, which is to stimulate discussion regarding urgent research priorities in these topic areas, we have chosen to consider the idea of key questions from a developmental perspective. In part this is because we believe that better understanding the development of these core abilities is most likely to point to effective ways of supporting them. But also it is now much clearer that the early stages of development, when brain functions are most plastic, offer the best opportunities to overcome difficulties that may become much less tractable if addressed later in development, when early difficulties in specific areas may have subsequent wider-ranging effects on linked processes as the brain becomes increasingly 'modularised' and specialised in function.

We have chosen to focus on a relatively high-level outcome of early development, because this outcome, attachment to caregivers, is at the confluence of the many components of social and communicative abilities. There is now solid evidence that attachment security is a key achievement of the first year of life, and that it represents the mutual effects of a range of environmental, genetic and constitutional factors^[1]. It is of great significance for subsequent development into later childhood and beyond, as evidenced by links into

emotional and cognitive development, and into the formation of later close relationships. Thus it can be taken as a proxy for the many lines of early development that are seen at more fractionated levels of analysis, encompassing attention, communication, memory, executive functions, emotional sensitivity and expressiveness, along with social skills and understandings such as mentalising capacities. It is also appropriate to look at attachment in children with Down syndrome because of relative strengths in social functioning^[2]. Indeed, strengths in social domains differentiate Down syndrome from many other developmental disorders^[3].

While there is general agreement that standard measures of attachment security, notably Ainsworth's Strange Situation, can be carried out and meaningfully analysed with children with Down syndrome, there have been concerns raised that the qualities of attachment security and the form of organisation of attachment-related behaviours that are seen in such measures may be different in children with Down syndrome^[4]. Thus the pathways to attachment may not necessarily be equivalent to those for typically-developing children and, of equal importance, the sequelae of attachment status may also be different for this population.

Research is currently uncovering more complex models of the development of attachment in typically-developing populations than the simple environmentally-determined models that have been current

until recently, or the simple separate contributions models for genes and environments^[5]. It is beginning to be apparent that the pathways to attachment may involve more complex gene-environment interactions, such that certain genotypes may work in one way in certain environments, but in different ways in other environments^[6,7]. At the same time, although the 'transmission gap' in attachment development (referring to unexplained links in the intergenerational transmission of attachment) remains to be filled, the caregiving conditions that favour secure attachment are becoming more clearly defined. Also, the infant characteristics that interact with these are also being delineated, for example aspects of temperament^[8].

Again, though, it must be said that these new understandings are based almost entirely on typically-developing populations, and it would be a mistake to extrapolate from this body of research to development in Down syndrome without confirmatory evidence from this target population.

Taking attachment security as a focus can also highlight those aspects of early social communication that are especially important for psychological development, hence offering the opportunity to investigate those components of caregiver behaviour that are most likely to be worth supporting and enhancing.

These considerations suggest that longitudinal studies will offer particular promise in clarifying the pathways in the

development of children with Down syndrome that are most amenable to positive intervention, and most likely to enhance developmental outcomes.

It is important to recognise the significance of the individual developmental trajectories followed by children with Down syndrome. It is a truism worth repeating that there is at least as much variance within this population as there is within the typically-developing population. Given the difficulties in recruiting large sample sizes in special populations, we need to realise that treating our samples as homogeneous, and averaging data in consequence, may not be the only and best way of analysing the research data that we gather. Doing so may seriously compromise the identification of the unique characteristics of each child's progress^[9]. More value may be gained from a thoughtful mix of qualitative, idiographic approaches with quantitative, nomothetic methods. We would like to highlight the importance, within such a range of methods, of involving parents as research partners. Not only do parents have ongoing regular experience with their children and hence they offer opportunities for tapping into fine-grained and context-related aspects of their children's development, but also parents may feel a benefit from involvement in research and the positive nature of the enterprise.

Turning to psychological processes, attention and its regulation are increasingly being seen as core components in early development, with implications across both the cognitive and the social domains. Given the neuro-anatomical differences in children with Down syndrome, specifically in the frontal cortical regions associated with attention regulation and executive function that have been argued to affect attention processes, clarifying the role of attention processes in early development is a further potential research priority^[10]. The use of brain-imaging techniques, along with other sensitive experimental methods, is likely to prove fruitful here.

Moving up a level of analysis, the achievement of joint attention is a key outcome of early development, with significance for social, communicative and cognitive development. This process, which has been termed 'secondary intersubjectivity', marks a progression from

the dyadic relations established within the framework of primary intersubjectivity, and makes possible the shared reference to external objects and events that supports the social development of cognition. Studies of attention in children with Down syndrome suggest that their ability to attend is in line with their developmental level^[11]. However, children with Down syndrome are less likely than typically developing (TD) children to protest at maternal directiveness^[2] and they tend to respond to direction by showing sustained attention^[12]. This suggests that, as is the case for children who are born with severe/profound hearing loss^[13], the development of joint attention in infants with Down syndrome may involve rather different dynamics from those observed among typically developing children.

Because of the central role of joint attention, understanding the social processes that support its emergence can be seen as an important research priority. This will require fine-grained observational analysis of dyadic relations with children with Down syndrome, again probably most fruitfully pursued within a longitudinal cohort design paradigm.

So far, this set of suggestions for further research has been concerned with early development, with the key social processes of the first 1-2 yrs of life. However, with the establishment of attachment, of joint attention (shared reference) and the maturation of cortical functions associated with attention and executive functions, in the succeeding stages of development, from 2-5 years of life, the development of communication, social relations and cognitive growth play an important role, especially in respect of preparation for participation in schooling.

Because the focus of this session in the conference is on social and communication abilities, we must be mindful of the complementary role that the caregiver plays in the development of these areas. The impact of the birth of a child with Down syndrome into a family has effects on the parent(s) and any other siblings, and more widely within any extended family^[14]. The ways in which the primary caregiver(s), and other family members, respond to the challenges faced depends in part on their own psychological characteristics and in part on the specific profile of the individual child with Down syndrome. In the

early weeks and months after birth, dealing with medical issues is often to the fore, along with adjustment to the birth. The complex interaction of these factors and their effects on the emergent patterns of communication and caregiving is deserving of further study, so that parents can be offered the most appropriate support during this challenging period. Patterns of communication and care established early on are important for the building of supportive relationships and the more that can be known about how best to encourage these, the better.

Central in the endeavour to better understanding the development of these important early relationships should be a recognition that attachment is not just a cognitive process, but is essentially about emotional connectedness, about the sharing of warmth, joy and affection, as well as supporting an infant's propensity to explore the environment in positive ways. Attachment also serves to regulate distress, and the sensitivity of caregivers to infant distress (which may be muted in some young children with Down syndrome) should not be overlooked.

Finally, we would like to note that the importance for social learning of relations beyond those with primary caregivers, such as relations with siblings and peers, is increasingly being realised. The roles of emotional expression and sensitivity to others' emotions in the development of empathy, and abilities to learn collaboratively are worthy of more attention in the special context of children with Down syndrome. With increasing concern around the risks of autism-like behaviours emerging in the development of some children with Down syndrome, issues of relatedness with others must surely be put high on the agenda for future research.

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