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POPULAR ABSTRACT

Decoupling of motor, visual and vocal activity in infancy during dyadic social interactions

The first three years of life are a critical period for children's long-term development, health and wellbeing. Throughout this time key social, cognitive and language skills are formed. Recent research has strongly suggested that the daily experience of play and interaction with the parent is the key factor that supports the development of these skills. As infants and young children actively engage with the external world, these interactions reciprocally gradually shape their brain functions and cognitive skills.

Early on, infants engage their entire body in almost every action they perform. For example, one-month-olds shake their legs and arms and trunk to make it easier to shift their eye gaze from one object to another. Infant motor development involves learning to select only the appropriate body parts to perform specific actions, a process called sensorimotor decoupling. We propose that this process is crucial for the development of social communication during infant-parent interactions and play. For example, when vocalising, infants also kick their legs and move their arms in coordinated way. Meanwhile, the subsequent development of vocal responses to the parent should involve decreasing the leg and arm movement and the enhancement of vocal responses only. We hypothesise that the ability to select the right kind of response is an essential aspect of learning to communicate with the parent, thus it may be significant for the understanding of the precursors to language and communication in later development. We also expect that parental verbal responses may help infants to select appropriate responses and to reduce the irrelevant ones.

In our study, we will follow the development of infants' play with the parent in different situations between the ages of 4 and 12 months, using wearable devices to measure their body movement, vocalisations and looking. We will also measure these behaviours in the parent in real time and conduct advanced analyses to measure how well these responses (activities) are coordinated within the infant and between the infant and the parent. We will also measure language, attention and motor development at 12 and 24 months of age to relate the changes in coordination in infancy to these later developmental achievements.

Our project potentially has important implications for the understanding of common origins of motor, language and cognitive development and may bring new knowledge on the precursors to successful language development. Specifically, it may help to understand, how the quality of early infant-parent interactions affects later development in different areas. In the long run, the project results may also suggest new ways in which we can support the development of infants with early motor difficulties so that they reach their full potential. For this reason, it may suggest new ideas for early intervention for infants born prematurely or those with developmental disorders, where motor problems are common.