



Development is profoundly influenced by the quality of early experience

# Beginning the journey

**Maria Robinson** explains how daily interactions between a baby and its main carer have a direct impact on the way the brain develops.

In the last two decades, research into the workings of the human brain has expanded enormously, aided particularly by new scanning technologies such as Magnetic Resonance Imaging (MRI) which allow medical professionals and researchers to see a living brain 'at work'. Such images, together with more traditional methods of examining brain function and development have provided great insights into brain function and development. They have also provided the neurological/physiological underpinning for what many theorists working to understand human behaviour have suspected and suggested for many years, which is that human development is profoundly influenced by the quality of early experience.

But, how does this happen and what are the implications? To answer this, we need to not only broadly know how the brain works but also to acknowledge that it grows and develops within an interactive, social environment. Cozolino (2006), for example, notes that the brain "depends on social interactions with others for its survival and acts as an interface between experience and genetics".

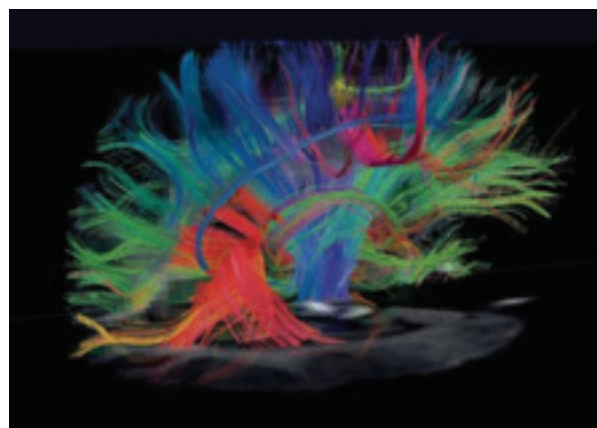
In the newborn baby, the brain has its basic structure with much of the older, more primitive parts of the brain formed and fully functioning with early connections between the 100 billion neurons already in existence. Then, during these early years, millions of connections are made between

neurons, 'pruned' and then reformed dependent on sensory and emotional experience. Patterns of activity are laid down becoming more established via the consistency, predictability and quality of those experiences. This last sentence presents a clue to the importance of interactions between parent and infant because these will form the pathways between the more instinctive and emotional areas of the brain and the frontal lobes (Sunderland, 2006).

Parents are the child's first contact with the world and the very helplessness of the infant together with their brain being 'on alert' for

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experience means that the way in which parents interact with their child sets the scene for the emergence of the child's own unique personality. Particularly important are face to face interactions. At only a few hours old, babies will respond differently to happy, sad or surprised faces and are able to display facial, vocal and bodily signs of general contentment and distress which over the first year become more differentiated into joy, sadness, anger, fear and disgust



A healthy human brain. Each fibre in the image represents hundreds to thousands of individual neural fibres in the brain.

(Soussignan & Schaal, 2005; Cozolino, 2006).

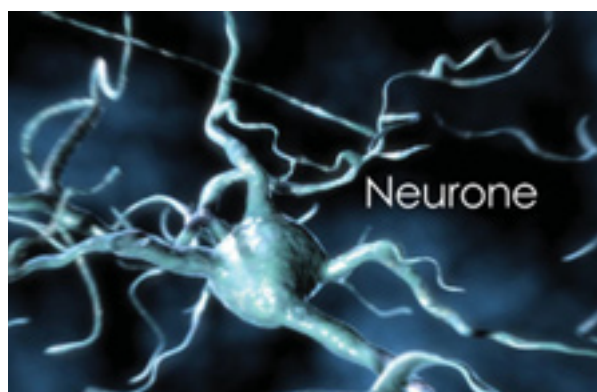
Babies, of course, are not passive recipients but their responses also influence the parents' responses. For example, Messinger (2002) demonstrated how the width of a baby's smile influenced parental reactions and such reactions/interpretations of an infant's expressions have very real implications in the life of the baby. This is because the quality of interactions is based on this understanding and interpretation of the child's facial and bodily signals by the adult. Such interpretation becomes the mechanism by which relationships are formed and crucially the 'correctness' or otherwise of the interpretation will also influence the further response from the child and this synchrony or disharmony will contribute over time to the child's ongoing emotional state and burgeoning sense of self.

'Nature' or evolution plays its part too as parents talk to babies in a very special 'sing song' way with extended vowels, exaggerated facial expressions and mouth movements. Not only is



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being spoken to and responding so pleasurable in most situations, but the mobile face attracts a baby's attention. This supports all aspects of development by helping babies to localise sound on the midline, match sounds to mouth movements, helping the eyes to focus and the exaggerated facial expressions help the immature brain to link the movements of the face with feelings. This is supported even further by the almost instinctive way in which parents and carers will copy the baby's expression and also help to modulate it. A potential neurological support to this process has been the discovery, originally in primates 'of the existence of individual neurons in the cortex', which responded to the observation of an action using the hands acting on an object as if the primate was carrying out the same procedure (Rizzolatti et al, 1996, 2002). This was a breakthrough in considering the neural basis for imitation and these neurons were therefore termed 'mirror neurons'. Similar neurons have been found in the human cortex, which respond to both visual and motor sensory input. While it is not currently known whether these are active at birth, the findings by some researchers, particularly Meltzoff (2002), of newborns imitating some facial gestures is suggestive of, at the very least, a rudimentary innate capacity for 'mirroring' observed actions. If this is the case, when the baby is imitated, these immature mirror neurons may also activate so the child will experience its feelings reflected back. Also, if the parent is 'tuned in', there will also be a sense of these feelings being 'managed' as the parent aims to raise or lower levels of mood. All the basic emotions of happiness, sadness, anger, fear, disgust and surprise (Ekman, 2004) can be discovered and perhaps reflected by those around the baby and so, dependent on the quality



of these responses, the baby will learn about the overarching emotional quality of their inner world. These interactions, impacting on this rapidly growing brain, therefore set the course for a child who learns to trust or for a child who treads his path with wariness and a watchful eye for danger.

Sunderland (2006) provides a graphic picture of the brain scan of a child from a Romanian orphanage where a lack of affection as well as physical care has resulted in inactivity of those parts of the brain which deal with processing

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and regulating emotions. While this is an extreme example, it should not be dismissed as irrelevant to 'ordinary' situations because children feel real pain when their distress is not comforted, resulting in a highly stressful state with raised levels of the stress hormone, cortisol. This normally has peaks and troughs throughout the day but consistently unmet distress needs means that the child's brain becomes organised around fear and rigidity which also affects the child's

Images supplied by Siren Films. Taken from 'The Wonder Year - First Year Development & Shaping the Brain'. The film is available to buy from [www.sirenfilm.co.uk](http://www.sirenfilm.co.uk)

ability to learn. On the other hand, being nurtured creates a chemical buffer against stressful challenges and so as Cozolino says, "good parenting tells the child he or she is loved accepted and valued; fortifies the body for growth and strengthens immunological functioning" (P.221). Children blossom when nurtured! ■

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