

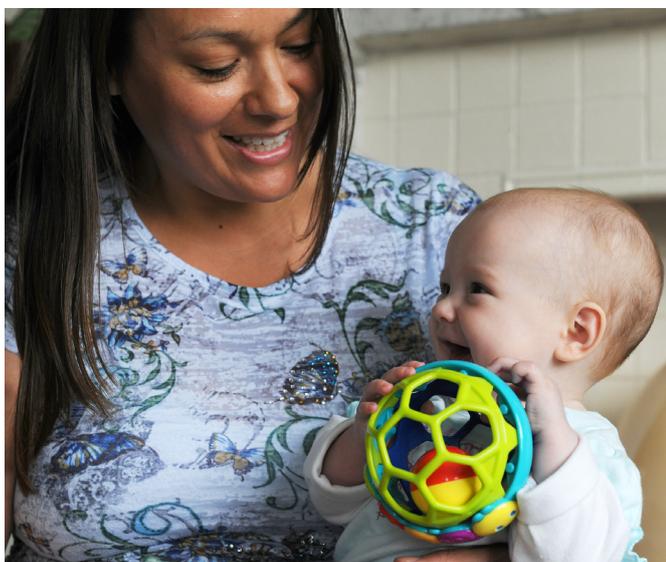


# Human brains are built on connection

The way we relate to our babies matters not just because adults shape their behaviour, but because adults shape babies' brains. The neural pathways in human brains are built on the basis of their early experiences of the world. The most important part of a baby's world is how he or she is treated by the people in it.

The study of neuroscience that has given us a raft of insights into the development of the brain. In this leaflet, I am going to describe one of the insights that I think is particularly fascinating for those interested in babies' development: that brains are incomplete at birth.

Who might 'those interested in babies' development' include? At the core will be parents and early years professionals like nursery staff, foster parents, family support workers, speech and language therapists, health visitors and others. It will also include all those involved in the growing Early Years Movement, including police, social workers, primary teachers, secondary teachers, special needs teachers, economists, domestic violence support workers, business people, and politicians, amongst many others. In effect, that's all of us!



## Brains are incomplete at birth

Babies' brains are not complete at birth. They're designed to keep developing after birth.

Having an organ that is incomplete at birth is a bit odd. When lungs are incomplete at birth, as can be the case with premature babies, we rightly worry, because the baby cannot breathe properly. Similarly, were hearts incomplete, they could not properly process blood. Brains are different than other organs. Not only are they incomplete at birth, they are designed to be incomplete.

Why should brains be incomplete? The answer lies in the size of our brains. As humans got smarter and smarter, during evolutionary history, our brains and thus our heads got bigger. They got so big that it became more difficult for heads to fit through mothers' birth canals. This is especially challenging since we are a mammal species who walks on two legs, thus affecting the tilt of women's hips.

Were heads to get lodged in birth canals frequently, the mothers and babies would die. So one evolutionary solution is to have the size of birth canals, as well as mothers' hips, expand to accommodate the size of babies' heads. But hips can only expand so far before a mother can't walk very well. She would then get eaten by predators and this wouldn't be good for the species!

So evolution did a kind of deal. It said: "I know, we could work a compromise. The baby could be born before the head is so large that it is likely to get lodged in the birth canal." And that's what happened. Human babies are born earlier in the developmental process than are most other mammal species. Relative to other mammals, all humans are premature, or delayed. For those interested in developmental biology, you may like to know that the technical term for such a difference is 'neoteny'.



## What are the advantages of prematurity?

The primary advantage of a brain born 'too early' is that the brain is still very flexible. This means it can develop externally, and knit itself closely to the environment in which the baby finds him or herself. The baby can grow a brain perfectly suited to his or her particular world. It makes humans smarter and more efficient than we would be otherwise.

It also helps us survive. As a baby, it matters less what the specific characteristics of my world are, because I can develop a brain that can cope with a whole range of situations. I can survive in a world where I get cuddled a lot, or one where there are no cuddles. I can survive in a world that is war-torn or one where there is peace. I can survive in a world where I get shouted at a lot, or one where my parents are mute and don't speak at all. I can cope with a world in which there is plenty to eat or where food is in short supply. My brain can cope with all of these settings. The human species becomes a survival success story.

This doesn't mean that there aren't costs of difficult environments. It is more stressful to be in an environment where there is insufficient food, domestic violence, or where my world is chaotic, or where I don't feel safe and loved. But from an evolutionary perspective, happiness doesn't really matter. The point is that I can survive and reproduce. Of course, from an individual or societal perspective, happiness does matter.

## What are the disadvantages of prematurity?

One cost of a very flexible brain is that it is also very fragile in its early stages. The brain is so adaptable that it notices and is affected by everything that happens to it. We now know that

the brain is developing more rapidly during the early years – up to the age of 3 years -- than will ever be the case again. By the age of 3 years, approximately 90% of final brain mass is in place. In fact, 70% is in place by the age of 1 year.

This means that the best time for shaping brains is during the early years, before the age of 3. This doesn't mean that it's all over by 3 years. The brain continues to develop until the early 20s, and even then it still has massive capacities to change and adapt. But the brain will never again adapt as quickly and robustly as it does during the early years.

## The Early Years Movement

So what does all this mean for the Early Years Movement? It means we need to take seriously how important those early years are. We need to take seriously how important our relationships with our babies are. The neuroscience is helping us to realize that it isn't what we 'do' with babies that matters as much as how we 'are' with our babies. It is relationships that lay down the neural tracks along which future experiences of the world will travel.

This growing Movement gives us an opportunity to think more deeply about the kind of neural connections we want to lay down in our babies' brains.

*Suzanne*

If you want to read more about neuroscience and the development of human brains, here are some of my favourite books:

*Parenting for a Peaceful World* by Robin Grille  
Longueville Media 2005

*Why Love Matters* by Sue Gerhardt  
Routledge Publishers 2005

*The Science of Parenting* by Margot Sunderland  
DK Publishing 2006

*How the Nine Months Before Birth Shape the Rest of Our Lives* by Annie Murphy Paul  
Free Press 2010