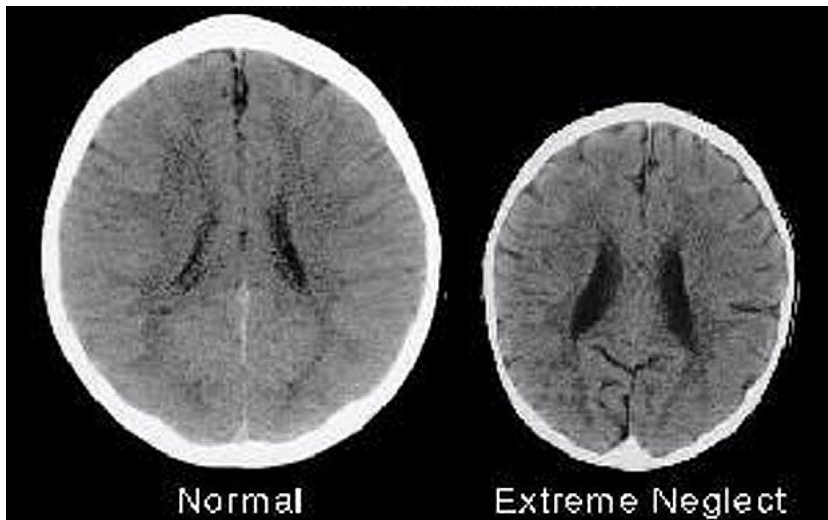


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## What's the difference between these two brains?

They both belong to three-year-olds, so why is one so much bigger? Because one was loved by its parents and the other neglected – a fact that has dramatic implications



Images of the brains of two three-year-old children clearly showing the effects of neglect

By Alasdair Palmer

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Take a careful look at the image of two brains on this page. The picture is of the brains of two three-year-old children. It's obvious that the brain on the left is much bigger than the one on the right. The image on the left also has fewer spots, and far fewer dark "fuzzy" areas.

To neurologists who study the brain, and who have worked out how to interpret the images, the difference between these two brains is both remarkable and shocking. The brain on the right lacks some of the most fundamental areas present in the image on the left. Those deficits make it impossible for that child to develop capacities that the child on the left will have: the child on the right will grow into an adult who is less intelligent, less able to empathise with others, more likely to become addicted to drugs and involved in violent crime than the child on the left. The child on the right is much more likely to be unemployed and to be dependent on welfare, and to develop mental and other serious health problems.

What could possibly cause so radical a divergence in brain development? The obvious answer is that it must have been some illness or terrible accident.

The obvious answer is wrong.

The primary cause of the extraordinary difference between the brains of these two three-year-old children is the way they were treated by their mothers. The child with the much more fully developed brain was cherished by its mother, who was constantly and fully responsive to her baby. The child with the shrivelled brain was neglected and abused. That difference in treatment explains why one child's brain develops fully, and the other's does not.

Neurologists are beginning to understand exactly how a baby's interaction with their mother determines how, and indeed whether, the brain grows in the way that it should. Professor Allan Schore, of UCLA, who has surveyed the scientific literature and has made significant contributions to it, stresses that the growth of brain cells is a "consequence of an infant's interaction with the main caregiver [usually the mother]". The growth of the baby's brain "literally requires positive interaction between mother and infant. The development of cerebral circuits depends on it."

Prof Schore points out that if a baby is not treated properly in the first two years of life, the genes for various aspects of brain function, including intelligence, cannot operate, and may not even come into existence. Nature and nurture cannot be disentangled: the genes a baby has will be profoundly affected by the way it is treated.

The details of how the chemical reactions that are essential to the formation of new brain cells and the connections between them are affected by the way a mother interacts with her baby are extremely technical. Suffice it to say that there is now a very substantial body of evidence that shows that the way a baby is treated in the first

two years determines whether or not the resulting adult has a fully functioning brain. The damage caused by neglect and other forms of abuse comes by degrees: the more severe the neglect, the greater the damage. Eighty per cent of brain cells that a person will ever have are manufactured during the first two years after birth. If the process of building brain cells and connections between them goes wrong, the deficits are permanent.

This discovery has enormous implications for social policy. It explains two very persistent features of our society. One is the way that chronic disadvantage reproduces itself across generations of the same families. There is a cycle of deprivation – lack of educational attainment, persistent unemployment, poverty, addiction, crime – which, once a family is in it, has proved almost impossible to break.

The way that the development of a child's brain is dependent on the way that the child is treated by its mother explains why this depressing cycle happens. Parents who, because their parents neglected them, do not have fully developed brains, neglect their own children in a similar way: their own children's brains suffer from the same lack of development that blighted their own lives. They, too, are likely to fail at school, to be liable to get addicted to drugs, to be unable to hold down a job, and to have a propensity to violence.

The second persistent feature is the dismal failure of rehabilitation programmes that aim to diminish the rate at which persistent young offenders commit crimes. Many different approaches have been tried, from intensive supervision to taking young offenders on safaris, but none has worked reliably or effectively. Recent research indicates that a large majority – perhaps more than three quarters – of persistent young offenders have brains that have not developed properly. They have, that is, suffered from neglect in the first two years of life, which prevented their brains from growing. As a consequence, they may be incapable of responding to the same incentives and punishments that will steer those with more fully developed brains away from crime.

That result may lead you to conclude that nothing can be done about the social problems that result from childhood neglect. But that would be wrong. There is a way to break the cycle, and it is not terribly difficult to achieve. It consists in intervening early and showing mothers who neglect their children how to treat them in a way which will lead their babies' brains to develop fully.

“Early intervention”, as the policy is called, has been tried in parts of the US for more than 15 years. It consists in ensuring that mothers identified as “at risk” of neglecting their babies are given regular visits (at least once every week) by a nurse who instructs them on how to care for the newborn child. Data from the city of Elmira in New York State, where such programmes have been in place longest, show that children whose mothers had received those visits did much better than children from a comparable background whose mothers were not part of the programme: they had, for instance, 50 per cent fewer arrests, 80 per cent fewer convictions, and a significantly lower rate of drug abuse.

Graham Allen, the Labour MP for Nottingham North, has been a fervent advocate of introducing early intervention programmes into the UK since at least 2008. That year, he collaborated with Iain Duncan Smith, now Secretary of State for Work and Pensions, on *Early Intervention: Good Parents, Great Kids, Better Citizens*, a report for the Centre for Social Justice which set out evidence that the neglect of children in the first two years of life damages the development of their brains. The report also looked at the social problems that resulted, and examined the effects that early intervention could have in helping to solve those problems. Mr Allen's own constituency is one of the most deprived in England: it has the highest rates of teenage pregnancy in Europe, and one of the lowest rates of participation in higher education.

“There is no doubt that early intervention can make a tremendous contribution to improving our society,” Mr Allen says. “Not the least benefit is the financial one. The amount it saves taxpayers, by reducing benefits, by cutting care home places for kids who would otherwise have to be taken from their parents, by reducing prison places, and so on, is staggering.”

Andrea Leadsom, the Conservative MP for South Northamptonshire, agrees. She is a passionate advocate of early intervention programmes. “I know they work because I have seen them in operation”, she says. “I helped to run an early intervention centre in Oxford, one of the first early intervention programmes in England. I have helped to institute such programmes in Northamptonshire. I can bear witness to the astonishing benefits. The biggest problem at the moment is that the programmes are far too small. In Oxford, the centre sees perhaps 300 babies a year. But there are 17,000 babies born in Oxford every year, which means there are 34,000 babies in Oxford in the first two years of life who might benefit from the programme. We need central Government to get behind early intervention so that it happens on a big enough scale everywhere.”

Frank Field, the Labour MP for Birkenhead, is another passionate advocate of early intervention. He has also introduced small-scale schemes in his own constituency, and is working hard to find ways to get such schemes adopted more widely.

There is a remarkable cross-party consensus that early intervention is a vitally important policy which needs to be supported nationally. Both David Cameron and Ed Miliband have endorsed early intervention, and insisted that it should be implemented. But nothing is happening to make sure that it is. “Quite the opposite,” notes Mr Allen. “The funding I thought was earmarked for it is being taken away. The plans that I have put forward are being hollowed out.”

“It's crazy,” adds Mrs Leadsom. “This is a policy that has the potential to transform our society, to mean that the next generation of babies will grow into more responsible, less crime-prone, and better educated adults. We know what needs to be done to get those results: we need to ensure that mothers who are at risk of neglecting or abusing their babies in the first two years of life are instructed how to care for them and interact with them properly. But no one in central government is

pushing it. In fact, they're taking away the early intervention grant in order to pay for the pupil premium for two-year-olds."

Frank Field is just as depressed about the prospects of getting early intervention adopted by the Government. "The Prime Minister asked me to write a report on early intervention," he says. "My hopes were up when I delivered it several weeks ago. But as far as I can tell, he hasn't even read it."

What explains the failure to adopt early intervention programmes nationally? The greatest obstacle may simply be that the biggest benefits will not be obvious for 15 years. The babies who benefit from early intervention today will take more than a decade to grow into teenagers who do not commit the crimes they would have perpetrated had their mothers not been helped by an early intervention programme. Elections, however, are every five years. That means the benefits will not accrue to the politicians in power now, but to their successors – which could be why those in power now are reluctant to expend effort and money on early intervention programmes.

"I hope that isn't true," says Graham Allen. "Because if it is, it would mean we are politically incapable of implementing the one policy that will certainly make our society immeasurably better. And what more profound condemnation of our political system could there be than that?"



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