



Currently the world is dangerous place for more than half the world's children many of whom live in poverty and are subjected to neglect and abuse on a daily basis.

We need to understand how a child's brain develops and how it is affected by experience in either a positive or negative fashion, in order to find ways of changing the outcome and the world that children and adolescents live in. Although this development starts from at or even before birth it continues through the teenage years when adolescence adds further complexity to the young person's development.

This paper will focus on some of the neurobiology of infant brain development and some of the more recent advances in our understanding of this topic.

Setting the scene

The key to understanding the link between early childhood experience and subsequent behaviour is in the ageold nature versus nurture relationship. There is a complex interplay here that is at the core of human emotional development and behaviour.

Our genes are not a static blueprint, they can actually alter with experience in the sense that they can be 'switched on' or off. Nature and nurture operate together to fashion our brains. This process occurs throughout our lifetime but it occurs at a much faster and more intense rate in childhood.

Brain development in utero

From the first few days of conception our brains begin to form from rudimentary cell tissue. As the foetus develops, in the brain, layer upon layer of nerve cells or neurones migrate to their ultimate anatomical positions. Although they send out their axons to meet each other and become connected (and therefore able to communicate with each other), at birth we are not fully connected. The organisation of our brain in this way is primarily genetically determined.

In later foetal life and particularly from the moment of birth, experiences inter act with our genes to 'switch on' our connections. Thousands of new connections occur as we develop synapses in response to the environment we find ourselves in. Each sensory experience modifies and 'sculpts' the thousands of surrounding neurones and in this way our brain becomes 'wired'. This process occurs regardless of the postnatal environment but the subsequent pruning and refining of the pathways is environmentally determined.

All drugs, including alcohol that the mother ingests will be received by the foetus. Many of these such as alcohol can have direct teratogenic effects. In addition there may be less obvious but equally important effects on synaptogenesis that will cause the neurobehavioural issues such as attention deficit and hyperactivity.

The brain wiring process

Touch is the first sensory modality to come 'on line' and has been labelled the 'mother of all senses'. Smell, taste, balance, hearing and vision follow in that sequence, and it appears that each sense needs to follow the sequential pattern

for complete development. The type, the frequency, the intensity and quality, the order, and the number of experiences will all have an impact. The neurones 'talk' to each other via these connections and our brain becomes wired as axons and dendrites or spiderlike projections reach out in all directions within the brain. They send their messages electrically with the help of brain chemicals, and larger distances are covered by the formation of long projections called axons, which can form nerves.

Most nerves are eventually coated with myelin or white matter, which enables very rapid transmission of information. Myelin is particularly vulnerable to certain toxic insults in development especially excess cortisol. In most areas of the brain this process of 'connectivity' or synapse formation and subsequent myelination occurs over the first 2 to 3 years. After this time there is a process of pruning where only the pathways that are being used frequently are retained and the brain becomes a more efficient and less complicated structure in terms of its neural pathways.

Those connections that are not frequently being used are lost. The more mature brain is less sensitive to experience and less likely to change. It becomes harder for new patterns to develop. We are 'hard wired' according to the quality and amount of experience we have.

How experiences impact the wiring

There are critical and sensitive periods in brain development during which rapid changes take place, and after which it becomes difficult if not impossible to recapture those developments: learning a musical instrument is a good example of this. Attachment to a consistent caregiver is another. The connections that occur with an attachment relationship need to be made within the first 18 months before the window of opportunity is lost.

With failure of this to occur there are likely to be problems in many areas in later life as the child grows up unable to establish firm trusting relationships with other humans. Lack of early attachment has been shown to correlate with poor social competency, lower teacher ratings of educational competence and other outcomes in teenage years.

The experiences essential for activating neurones and promoting synapse formation need to be the right ones if they are negative, then the hard wiring that takes place retains all the negative connotations including the emotional memory of the experience. This includes a triggering of the physiological and somatic sensations that accompany a negative experience such as a smack or witnessing family violence. Therefore if a child is repeatedly smacked, put down, ignored or abused they may become 'hard wired' for these emotions and after 2 or 3 years it becomes more difficult to change.

Just as negative experience can affect an infant in this way, lack of stimulation or neglect/lack of positive input can be equally devastating. The connections will be weak or may never develop. On the other hand, when a child is nurtured, played with, sung to, cuddled and stimulated positively, he or she will be programmed in a positive fashion. This type of experience sets a child up for life, hopefully receptive to all forms of communication and experience.

When negative interactions occur in infancy, the physiological associations that accompany the experience include the release of hormones including adrenaline

and cortisol. This has been described as a 'fight or flight' reaction. Unfortunately cortisol, although a crucial hormone in normal amounts, when secreted at inappropriate times and at much higher levels can interfere with the developing brain and there may even be structural changes occurring that are irreversible and loss of myelin. The brains of chronically deprived and abused children have been shown to be smaller than normal.

How do we know?

The evidence for the link between early childhood experience and subsequent brain development comes from a number of sources and is still accumulating. Neuroimaging techniques, animal studies, autopsy findings, and blood analysis of hormones can all support the hypothesis.

The most compelling evidence comes from the case stories that we read in the media – countless stories of violence being perpetrated in our communities by offenders who themselves have been subject to abusive and/or neglected childhood. There are now good data from longitudinal studies¹ that we can predict who is at risk of becoming an offender on the basis of a number of demographic factors present even before a child is born e.g. mother is young, unsupported, drug using, has psychiatric history, multiple partners.

We can continue to add to those factors throughout childhood. There are also some intervention studies that have been shown that we may be able to interrupt the cycle of violence if we target interventions towards those at greatest risk. It is important that continuing research and support for such programmes is encouraged.

Equally important is giving all prospective and new parents in addiction, and all childcare workers and policymakers this information so that there is awareness in the community of the importance of early childhood experience on late infant development. In the context of what is legally acceptable we need to remember that if we abuse or neglect our children, we don't just cause acute pain and suffering at a humane level, we also may potentially damage their brain forever.

Adolescent brain wiring

Up until now I have focussed on the brain changes occurring in the first few years. Brain development continues at different rates in different areas throughout life. Functional and structural MRI scans are showing us just what the extent of this brain development is, particularly in late childhood and adolescence.

It seems that there is a burst of neuronal activity, with increased numbers of brain cells and increased connectivity with subsequent pruning of lesser used

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connections similar to that which occurs in the 3 years, in the prefrontal cortex, corpus callosum and in other parts of the brain. The prefrontal cortex is the area of the brain that controls 'executive functioning' or reasoning and judgment.

Prior to 15 or 16 years of age we tend to make decisions based on our emotional ('gut reaction') rather than our rational thinking. This is based in the amygdala where emotional values are processed. Functional MRI scans show that teenagers use this part of the brain when making decisions. From the early teen years there is a transfer of decision making to the prefrontal cortex where decisions are more rational and objective, and consequences are thought through. The prefrontal

cortex denotes social behaviour and knowledge and allows us to control impulsive behaviour. At the same time the corpus callosum (the bundle of fibres connecting the two sides of the brain) changes and grows. This allows problem solving and creativity to develop and assist us in planning.

Therefore, throughout our adolescence we slowly become more reasoned, and our decision making reflects the fact that we are using this important part of our brain in everyday life. Impulse control, planning and an understanding of the rules of conduct become incorporated into our thinking. There is a sex differential operating with boys lagging 2 or 3 years behind girls in this developmental process.

The teen brain and the adult brain are therefore both anatomically and physiologically different. The forces that shape this adolescent brain development are unclear. Obviously this is biologically driven as part of puberty, but just how important environmental factors such as nutrition, parenting, education, physical activity, peers, drugs, infections and many other factors are is not known. It is clear however that whilst the teen brain is undergoing these changes it is particularly vulnerable to the effects of drugs and alcohol.

The implications of this are huge. Teenagers are not the same as adults in their ability to think rationally or make sound judgments. It is probably not sensible to put boys behind the wheel of a car at 16 years of age, and it certainly doesn't seem right to submit youngsters in their early teens to the same expectations with regard to criminal activities (within reason the cultural context is also critical). A 14 year old cannot be expected to have the same ability to think through the consequences of a criminal action as a 40 year old.

The legal process should acknowledge and reflect this. Similarly our thoughts around teenage pregnancy and the supports needed should reflect the fact that teenage parents may not always be able to control angry impulses or make rational decisions about a child's health needs. It is therefore likely that at least until our mid 20's these neurobiological changes which are occurring create potential for change and in some cases repair. More research will hopefully show just how we might both enhance cortical development and promote such repair.

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Seven Observations of a Family Court Lawyer

1. Conflict and chaos is toxic to the developing brain.

The beauty of the science is that it evidences what we instinctively know to be true. Consistent nurturing and positive, rich experiences programme an infant's brain in a positive way. Conflict, chaos and neglect are toxic to the developing infant brain.

The fact that exposure to conflict is harmful to children is not news for Family Court practitioners. The definition of psychological abuse in the Domestic Violence Act includes allowing a child to see the physical, sexual or psychological abuse of a person with whom the child is in a domestic relationship. Time and time again we are presented with evidence of the serious psychological consequences for children (of all ages) caught in the crossfire between their parents.

There is something compelling though in the information about exactly what happens to the developing infant brain when exposed to the prolonged stress of family violence for example. Learning that excessive levels of the 'stress hormone' cortisol can interfere with the developing brain and may even cause irreversible structural changes, or that the brains of chronically deprived or abused children have been shown to be smaller is the sort of information that can trigger protective action by a parent, or by extended family members. Many who have felt uneasy about a loved one's chaotic circumstances but have hesitated to interfere with the family unit on the basis of a baby being "too young to know what's going on" are armed with the information evidencing the need to act.

2. Neglect is just as dangerous – but harder to identify and action

In a 2002 paper Dr Bruce Perry, MD, PHD, an internationally recognised authority on children in crisis said:

"Neglect is the absence of critical organizing experiences at key times during development. Despite its obvious importance in understanding child maltreatment, neglect has been understudied. Indeed, deprivation of critical experiences during development may be the most destructive yet the least understood area of child maltreatment. There are several reasons for this. The most obvious is that neglect is difficult to "see." Unlike a broken bone, maldevelopment of neural systems mediating empathy, for example, resulting from emotional neglect during infancy is not readily observable."

Again it is the early years that are critical:

"The earlier and more pervasive the neglect is, the more devastating the developmental problems for the child. Indeed, chaotic, inattentive and ignorant caregiving can produce pervasive developmental delay (PDD; DSM IVR) in a young child (Rutter et al., 1999). Yet the very same inattention for the same duration if the child is ten will have very different and less severe impact than inattention during the first years of life."

[Dr Bruce Perry, 2002, The Child Trauma Academy, Childhood Experience and the Expression of Genetic Potential: What Childhood Neglect Tells Us About Nature and Nurture – available on the Brainwave website: www.brainwave.org.nz]

In December 2010 the Officer of the Children's Commissioner released a report Preventing child neglect in New Zealand by Dr Janine Mardani: www.occ.org.nz/publications. In the covering press release the Commissioner said:

"Most people are aware of neglect in its most obvious form – when children are left 'home alone' while their parents are out drinking or found living in homes turned into P labs. There have been a number of cases like this in recent months. But most neglect is less obvious and more prevalent than this. Most neglect is about continually failing to provide the basics needed for a child to develop and thrive, physically, psychologically and socially. That may not sound as damaging as physical or sexual abuse, yet the consequences from year after year of neglect can be disastrous."

Dr Mardani expands at p12 of the substantive report:

"Despite the clear evidence of harm from neglect, current knowledge is unable to establish an unequivocal cause and effect relationship between neglect and its multiple adverse outcomes, while controlling for the multiple other risk factors that a child has been exposed to (Truman, 2004).

A growing body of evidence does, however, describe a cascade of negative impacts from early exposure to the toxic stresses of recurrent child abuse or neglect, severe depression, substance abuse or violence within a family (Center on the Developing Child at Harvard University, 2007). Such exposures can result in persistently elevated stress hormones that disrupt brain development...immune responses and metabolic regulatory functions. This in turn may result in increased susceptibility to multiple physical and mental health illnesses."

Some Child Youth & Family data culled from Dr Mardani's executive summary is of interest:

- Neglect is the second most frequent Child, Youth and Family child maltreatment investigation finding.
- Neglect is the sole maltreatment investigation finding for two in three
- (63.1 percent) children with identified neglect.
- Four in ten (41.7 percent) children with identified neglect were aged 04 years in the year to June 2009.
- Maori children are 4.5 times more likely and Pacific children 1.6 times more likely to have a finding of neglect, compared to European/Other children.
- Almost half of all children with identified neglect (45 percent) live in New Zealand's most deprived neighbourhoods (NZDep2006 quintile5).
- The most common Child, Youth and Family responses to neglect are: Family Group Conference (38.1 percent), No Further Action (24.3

percent), or a Family/Whānau Agreement (19.6 percent). Family Group Conferences are slightly more common in the 1517 year old age group and Family/Whānau Agreements are slightly more common in the 04 year old age group.

- Family Court Orders are sought for one in thirteen (7.9 percent) children with findings of neglect.

The first of Dr Mardani's 6 recommendations is that the Ministry of Social Development work with Child, Youth and Family, the Ministry of Health, Ministry of Education and Police develop a shared understanding of child neglect that is reflected in all child neglect and abuse policies, including family violence policies. Should it eventuate this piece of work would be very useful in the Family Court too. In the meantime, Dr Mardani's thorough analysis of the topic is helpful.

Family Court practitioners are as guilty as the rest of the population in being slow to recognise neglect, and in being less proactive in seeking to intervene than when confronted with a child who has been physically or sexually injured. However the scientific evidence seems to indicate that we do so at our peril.

The Family Court must balance competing factors: the need to intervene so as to protect children from a neglectful environment; and the need to provide parents an opportunity to improve their parenting skills to a "good enough" standard so that the issues of neglect are addressed and the child can remain with his or her parent(s). Some of the hardest cases are where a loving but incapable parent is not able to make and sustain the required changes within their child's timeframe. The removal of children from these parents is a stressful but necessary intervention, which for very young children in the critical stages of brain development must happen sooner rather than later. This can be difficult to achieve within the Family Court's timeframes: an argument that a parent is unable to effect change usually requires an evidenced history of programmes and supports being ineffective; or a s133 psychologist's report; or both. This process can take months (and all too commonly years), which is disastrous for very young children's critical and sensitive time periods of brain development.

3. The cocreation of a secure attachment bond is the essential task of the first year of human life

Scientist, clinical psychologist and clinical neuropsychologist Allan Schore discussed the neuroscience of attachment in the Family Court Review:

"We now know that the evolutionary mechanism of attachment does more than just provide the baby with a sense of safety and security. Rather, attachment drives brain development, fivesixths of which happens postnatally. In fact the brain grows more extensively and more rapidly in infancy than at any other stage of life. It more than doubles by 12 months, and 40,000 new synapses are formed every second in the infant's brain. But, importantly, this brain growth is influenced by "social forces," and therefore is "experience dependent." It requires not only nutrients, but the emotional experiences embedded in the relationship it co-creates with the primary caregiver.

There is now agreement in my field that the essential task of the 1st year of human life is the cocreation of a secure attachment

bond of emotional communication between the infant and his/her primary caregiver. The baby communicates its burgeoning positive emotional states (e.g., joy, excitement) and negative emotional states (e.g., fear, anger) to the caregiver so that she can then regulate them. The attachment relationship shapes the ability of the baby to communicate with not just the mother, but ultimately with other human beings. This survival function—the capacity to communicate one's own subjective internal states to other human beings—is the basis of all later social relations. Thus, the major developmental accomplishments of infancy are the capacity to communicate emotional states, and subsequently the capacity for self-regulation, which is the ability to regulate emotional states.”

[Schore, A and McIntosh, J (2011) Family Law and the Neuroscience of attachment, Part I. Family Court Review, 49:501512.doi10.1111/j.17441617.2011.01387.x]

The complexities of attachment theory cannot be fully explored in this paper. I highly recommend the interdisciplinary journal Family Court Review's July 2011 special edition: "Attachment Theory, Separation and Divorce: Forging Coherent Understandings for Family Law".
<http://onlinelibrary.wiley.com/doi/10.1111/fcre.2011.49.issue3/issuetoc>

The Family Court review confronts challenging issues, such as whether formation of an attachment bond is gender specific (yes and no: Schore & McIntosh 2011); primary and secondary attachments (unfortunately named but a reality of the sequential timeframes of infant brain development: Schore & McIntosh 2011); whether frequent or equal time periods with both parents are required for attachment to flourish (no: "attachment requires an attunement where the child feels felt by the caregiver, even if it is once a week. That is more important than just disorienting a very young child by frequent shifts in their location": Siegel 2011).

How then to utilize this information in the Family Court where practitioners are faced daily with stressed, grieving, angry or fearful parents? How can this knowledge be used in Court room door negotiations so as to focus on an outcome that is truly in the best interests of an infant rather than the best deal that can be cobbled together at the time by competing adults? In an ideal world every family in breakdown would have the benefit of a psychologist assessing, explaining and supporting an infant's opportunity to form secure attachments with his or her parents.

In the absence of that Family Court practitioners can assist by understanding the neuroscience of attachment sufficiently well so as to be able to advise clients properly about what arrangements might be in the best interests of their young child. Early attachment influences multiple facets of cognitive and emotional development. Attachment drives brain development, particularly the young child's growing capacity to know, express and self regulate their emotional world (McIntosh 2011).

It is useful to pick out Jenny McIntosh's opening reflections on the significant fields of agreement amongst the specialists who contributed to the Family Court Review special issue on attachment:

“Primary Caregivers and Attachment Hierarchies

All contributors agreed on the essential role of a primary attachment figure in the first year to two of life. Richard Bowlby’s sentiment summarizes the views of most: that any debate in the divorce law arena about infants’ need for a primary caregiver reflects the difficulty that “what is sociologically popular and what is developmentally necessary are at loggerheads”.

Agreement was clear on these points:

- Care arrangements in infancy should support the growth and consolidation of the primary relationship, and where possible, at the same time allow for familiarity and growing attachment with the second parent.
- The term “primary” parent does not denote being a “better” parent, but being primary for fundamental aspects of the attachment development.”

[McIntosh, J. E. (2011), Guest Editor’s Introduction to Special Issue on Attachment Theory, Separation, and Divorce: Forging Coherent Understandings for Family Law. *Family Court Review*, 49: 418–425. doi: 10.1111/j.17441617.2011.01382.x]

It is difficult to advance the proposition that children do not have equivalent attachment relationships to a parent who is fearful of losing their parental role in a child’s life. From a fearful adult’s perspective the way to protect his or her relationship with their child is to equalise the time between parents. This may not be what the child needs at all, and may in fact be harmful to their development (particularly in highly conflicted situations). Until we understand and learn how to adequately advocate an infant’s developmental needs we risk continually promoting care giving arrangements that meet adult needs for equality but endanger a child’s window of opportunity to form a secure primary attachment.

However children’s developmental needs change rapidly. Once a child has secured an attachment to a primary parent, over time he or she needs to develop relationships and secure attachments with other people, especially his or her other parent. In intact families parents will observe that they each have a different relationship with their children during different periods of their childhoods: it is the same in separated families. However it is difficult for the parent of an infant to trust that their time will come, particularly given the high level of mistrust often evident in relationships that end early in a child’s infancy.

4. Time is of the essence

Section 4(5) of the Care of Children Act 2004 requires the Court to take into account the principle that decisions affecting the child should be made and implemented within a time frame that is appropriate to the child’s sense of time when determining what best serves the child’s welfare and best interests. Similarly s5 of the Children Young Persons & Their Families Act 1989 requires any Court which or person who exercises a power under the Act shall be guided by the principle that decisions affecting a child or young person should, wherever practicable, be made and implemented within a timeframe appropriate to the child’s or young person’s sense of time.

A child’s sense of time changes over different periods of their life. As Dr Rowley has explained there are critical and sensitive periods in brain development during

which rapid changes take place, and after which it becomes difficult if not impossible to recapture those developments.

The very nature of the Family Court process is risky for infants in those critical and sensitive periods of brain development. There is much debate currently about the financial cost of the current Family Court process: the bigger story is the harm that the process inadvertently causes through delay. I would argue that any proceeding in the Family Court about a child under the age of three must have urgent priority so that decisions can be made within their critical timeframes. This is particularly so when a child's ability to securely attach to a primary adult is at risk due to conflict, chaos or neglect. There is a role for lawyer for child in trying to expedite proceedings through the Court as soon as possible however all lawyers need to contribute by acting with the true urgency required for an infant's sense of time.

5. Early Childcare Centre vs Available Competent Parent

An argument can arise in the Family Court about the availability of a parent at home with a preschooler versus a parent who wishes to place the child in a daycare or early childcare centre while he or she is working. As with many debates in the Family Court, there is no straight forward answer: so much depends on the variable circumstances of the particular parents and their relationship with their particular child.

In February 2011 a report was released by the Office of the Children's Commissioner: "Through their lens: An Inquiry into nonparental education and care of infants and toddlers". This report is a comprehensive review of non parental care of under twos and found that "greater emphasis needs to be given to the particular needs of infants and toddlers. There should be more support for parental care of those under 12 months...". The fastest growing sector in early childhood education is for infants under two. The study found that approximately 25,000 babies under the age of one year were enrolled in non parental care services in New Zealand, which equates to about 40% of babies under the age of one. The report provides important information in a time where economic policies are developed to facilitate an early return to paid work rather than enabling the critical work of parenting babies and infants.

www.occ.org.nz/publications

An often repeated word in the early childcare centre debate is "quality". All are agreed that a high quality centre provides better outcomes for infants than does a poor quality centre. However what is meant by high quality is seldom discussed. The Brainwave Trust Aotearoa website has a list of the sorts of questions to ask when identifying a suitable early childcare centre. www.brainwave.org.nz. Clearly the most important question is: Does the centre (or other non parental childcare arrangements) provide the opportunity for the child to form the kind of comfortable, secure relationship with an adult that will nurture their healthy emotional development?

6. Adolescents and Teenagers

The risk taking and impulsive, emotional behaviours typical of teenagers has perplexed adults for generations. It is only relatively recently that scientific evidence has been available about the burst of neuronal activity that occurs

during adolescence, which goes some way towards answering the question What was that teenager thinking?

We now know that during adolescence our brain is 'rewiring' in a number of ways, including the transfer of the decision making process from the amygdala (where emotional values are processed) to the prefrontal cortex (which controls reasoning and impulses). This process is complete towards the end of adolescence, which is usually in about the midtwenties.

"It's as if, while the other parts of the teen brain are shouting, the Prefrontal Cortex is not quite ready to play referee. This can have noticeable effects on adolescent behavior. You may have noticed some of these effects in your teen:

- difficulty holding back or controlling emotions,
- a preference for physical activity,
- a preference for high excitement and low effort activities (video games, sex, drugs, rock 'n' roll),
- poor planning and judgement (rarely thinking of negative consequences),
- more risky, impulsive behaviors, including experimenting with drugs and alcohol."

[The Partnership for a Drug Free America: A Parent's Guide to the Teenage Brain
<http://teenbrain.drugfree.org/science/behavior.html>]

In a 2008 Harvard Magazine article on the teenage brain David K. Urion, an associate professor of neurology comments that programs aimed at preventing risky adolescent behaviors would be more effective if they offered practical strategies for making inthement decisions, rather than merely lecturing teens about the behaviours themselves. ("I have yet to meet a pregnant teenager who didn't know biologically how this transpired," he says.)

<http://harvardmagazine.com/2008/09/theteenbrain.html>

Worryingly the propensity for risk taking behaviour such as experimenting with drugs and alcohol occurs at the very time that the teenage brain is more susceptible to harm than the adult brain from drug and alcohol use.

Research has identified subtle but important brain changes occurring among adolescents with Alcohol Use Disorder (AUD), resulting in a decreased ability in problem solving, verbal and nonverbal retrieval, visuospatial skills, and working memory.

[Peter Monti, Director of the Center for Alcohol and Addiction Studies at Brown University
http://www.eurekalert.org/pub_releases/200502/aceade020705.php]

This is problematic for adolescents on many levels, not least of which in a youth offending context.

In a speech to the 2009 International Drug Symposium Judge Becroft cited research done in New Zealand by Kaye McLaren about risk factors for youth offending, and whether they can usefully be addressed by interventions:

“In her 2000 paper she groups problems which lead young people into crime into 5 broad categories. Drugs and alcohol appear as risk factors in 4 of the 5 categories. This suggests that drug and alcohol risks are widespread to the extent that they appear in every facet of a young person’s life. They are difficult for the young person to avoid. And they are difficult for the authorities and the community to deal with “criminogenically”, for the obvious reason that anything other than a comprehensive approach is unlikely to remove the connection between the young person’s offending, and their use of alcohol and drugs.”

He noted a further study by Schroder et al, Profile of young people attending alcohol and other drug treatment services in Aotearoa New Zealand, Australian and New Zealand Journal of Psychiatry 2008; 42:963968, which “showed that young people attending these services presented with a range of needs including mental health issues, criminality, family conflict, and disengagement from school. The study reported that over half of the sample had criminal convictions, and over a quarter had spent time in a youth justice residence.”

For the majority of teenagers it is a matter of keeping them safe during this period of impaired judgment, while simultaneously loosening the reins so they can achieve independence. Contemplate then the ages that adolescents are legally permitted to do some things in New Zealand (this is not a comprehensive list):

Age 14 can be left alone without an adult looking after them; are able to babysit younger children but only if capable of reasonable supervision and care; can be prosecuted for any criminal offence

Age 16 can leave home without parents’ consent (but until 17 Child Youth and Family can send the child home if they believe they are at risk); can sit a driving test and obtain a learner’s driver’s licence; can get married or enter into a civil union with parents’ consent; can (usually) decide which parent to live with if parents are separated, and decide whether to visit the other; cannot be made to undergo treatment for mental disorders without their consent, unless under a compulsory treatment order; may be eligible for certain kinds of benefit assistance; can leave school or be expelled from school (excluded if younger than 16); can start fulltime work and earn minimum wage (after a period of probation for 16 and 17 year olds); can legally consent to sexual intercourse; get a tattoo without parental consent

Age 17 are heard in the District Court rather than the Youth Court if charged with a criminal offence; can join the armed forces without parental consent

Age 18 can be legally independent of their parents’ guardianship; can be employed in a position that pays minimum wage; can open a cheque account, borrow money or apply for a credit card; are no longer protected by the United Nations Convention on the Rights of the Child; can vote in local body and general elections, and can stand as a candidate for election; are able to purchase and consume alcohol and cigarettes; can enter into contracts; join the Police force; buy fireworks, make a will

Age 20 are legally classed as an adult, with full capacity to make their own decisions

Most of the laws that determine the above legal ages were set before the evidence about adolescent brain development was available. Are the legal ages still appropriate now that this evidence is known? Is it right to expect a 17 year old to have adult reasoning and judgment when the part of the brain responsible for reason and judgment is still under development? And should they do “adult time for an adult crime?” Is it sensible to put a 16 year old behind the wheel of a car? Or enable an 18 year old to purchase cigarettes and alcohol? Should 18 year olds be in the Police force?

7. Brainwave Trust Aotearoa

Overwhelmingly the scientific evidence shows that an infant’s experiences in the early years are critically important to infant brain development and have lifelong impact.

We know that both genes and experience are important. Neglect, chaotic environments, violence and abuse can result in aggressive, remorseless and intellectually starved members of society. Many New Zealander’s staggering crime, mental illness and drug and alcohol abuse statistics are related to early childhood trauma and neglect. However consistent nurturing and positive rich experiences result in flexible, responsible, empathetic and intelligent members of society. Investment in the early years is required to shape society that we wish to live in.

The Brainwave Trust Aotearoa seeks to inform all New Zealanders about the neuroscience in the hope that one day all children in New Zealand have the best possible start to life.
www.brainwave.org.nz

Lope Ginnen, Barrister & Chair of Brainwave Trust Aotearoa