Further information on the approaches used to promote positive relationships and behaviour in Scottish schools can be found at:

Education Scotland website

Education Scotland Rights, Support and Wellbeing Team Professional Learning Community (Glow login required)

Education Scotland Rights, Support and Wellbeing Team Twitter feed
@rswhome

Recognising and Realising Children’s Rights. Education Scotland 2013. This resource aims to develop participants’ knowledge and understanding of the United Nations Convention on the Rights of the Child (UNCRC) with the purpose of promoting rights-based values, attitudes, skills and practices among those adults who have a duty of care for children and young people.

Better relationships, better learning, better behaviour. Scottish Government guidance March 2013

Behaviour in Scottish schools 2012

Journey to Excellence. Professional development pack. Learning together: promoting positive relationships

Other useful information is available at:

http://www.scotland.gov.uk/Topics/People/Young-People/gettingitright
GIRFEC. Getting it right for every child

www.respectme.org.uk
Scotland’s anti-bullying service.

www.pinscotland.org
The Pupil Inclusion Network (PINS) is for practitioners and managers in the voluntary sector who work with young people who are excluded, disaffected or disengaged from school.
http://www.wecanandmustdobetter.org/
CELCIS – Centre for excellence for looked after children in Scotland. We Can and Must do Better training materials.

http://www.growingconfidence.org/what-is-confident-staff-confident-children
Confident staff, confident children. A training course with a focus on mental health and emotional well-being.

http://www.themotivatedschool.com
The overarching aim of this programme is to promote a better understanding of the nature and effect of motivation on learners.

http://www.yor-ok.org.uk/YorOK-Workforce/Common%20core%20of%20skills%20and%20knowledge%20for%20the%20children%20workforce.pdf
A useful document which describes the skills and knowledge for everyone working with children and young people – “The Common Core of Skills and Knowledge – at the heart of what you do” published by the Children’s Workforce Development Council supported by the Department for Children, Schools and Families.
The following notes provide a brief overview of current thinking on brain development and may be useful for trainers who have limited prior knowledge of the area and who wish to deepen their understanding before delivering the training. However, please note that this is not a pre-requisite of this training programme which has been developed on the basis that Trainers are not expected to be experts in this field.

### Brain Structure and function

#### Meet your 3 brains!

**Reptilian brain**

- Also known as the brain stem
- At birth, the brain stem is “hard wired” to manage basic functions of survival (no conscious effort required)

**Limbic system**

- Generally understood as the emotional brain
- At birth, the limbic system is partially wired

**Neocortex**

- Largely unconnected at birth (full of free neurons)
- Executive centre of the brain; higher brain function

The brain is made up of millions of cells called neurons, comprising long, tail-like structures called axons and dendrites. Neurons connect with each other and it is these connections that form the basis of learning.
Nature or Nurture?

Both nature and nurture impact on brain development. Having a good genetic background helps but the environment shapes and develops what is naturally there. During the first few years of life, millions of connections are made in the neocortex and limbic systems and these continue to be made into adolescence. It is important to note that these are not fixed and can be changed. This has implications for the ways in which we interact with children and young people as we will see later.

Brain scan studies of children subject to socio-emotional deprivation in Romanian orphanages showed that some areas of the brain were less developed when compared with those of children who had experienced nurturing relationships from birth. (Abnormal Brain Connectivity in Children After Early Severe Socioemotional Deprivation: A Diffusion Tensor Imaging Study. Thomas J. Eluvathingal, MDa, Harry T. Chugani, MDa,b,c, Michael E.Behen, PhDa,d, Csaba Juhász, MD, PhDa,b, Otto Muzik, PhDa,c, Mohsin Maqbool, MDa, Diane C. Chugani, PhDa,c, Malek Makki, PhDa).

It was concluded that structural changes may underlie the cognitive, socio-emotional and behavioural difficulties that are commonly observed in these children. In other words, they had not made the neuronal connections associated with positive, calm, loving relationships. The importance of attachment in infancy has been well documented.

The purpose of attachment is to gain comfort and protection. Human babies need to establish an effective strategy for making sure that the adults around them provide the basic necessities of life. Attachment behaviour is usually activated at times of distress or anxiety eg hunger – baby cries – stress – release of the stress hormone cortisol – mother feeds – stress relieved – cortisol back to normal. Baby learns that stress can be managed and that care givers help to do this. Trust is developed and the world is safe and predictable. The baby develops neuronal pathways that are associated with trust and soothing. In situations where needs are not met, for example, baby is hungry / wet / uncomfortable but is left to cry because the mother / care giver cannot cope as a result of, for example, alcohol, substance misuse or the baby is subject for physical abuse, the neuronal pathways that are most used are those associated with alarm, stress and fear. Those associated with trust and soothing remain undeveloped. Synaptic pathways that are regularly used are reinforced and as mentioned previously, this is the basis of learning.

The work of Bruce Perry (Child Trauma Academy Houston) has indicated that chronic stress or repeated traumas can result in a number of biological reactions. Chronic activation of certain parts of the brain can “wear out” other parts such as the hippocampus which is involved in cognition and memory. (As in the Romanian study above) An excess of the hormone cortisol (fight or flight) may damage or destroy neurons. Chronic activation of neuronal pathways involved in the fear response can create permanent memories that shape the child’s perception of a response to the environment. This may result in hyperarousal – memories automatically trigger a response to fear without conscious thought. Their baseline has been altered and they therefore tend to over-react to triggers that other children find non threatening. Brains are less able to interpret and respond to verbal cues. Some children react by dissociating – removing themselves from the situation – zoning out.

The prefrontal cortex is the location of smart decision making. It is where you integrate new information and turn it into action. It is also the bit of the brain that suppresses inappropriate behaviour. What Bruce
found was that the cells didn’t connect nearly so effectively in the prefrontal cortex, it actually shrunk in baby animals exposed to stress.

The hippocampus similarly shrunk. The significance of the hippocampus is that this is the bit that integrates new knowledge with old knowledge. Having a small hippocampus means you are less able to learn and, critically, the hippocampus is the bit of the brain that develops receptors for cortisol. These receptors don’t appear to develop where babies experience stressful and inconsistent early lives. The baby is left unable to measure the level of cortisol and send signals to the adrenal glands to suppress its production.

The amygdala is the other area of the brain that gets more cellular activity in response to stress and the amygdala is the area that regulates the emotional response. Aggression and anxiety is activated. When they become fearful, babies and children are less able to learn.

Adolescence

Most teens who have not been the victims of abuse or neglect find their teenage years exciting and challenging. Normal puberty and adolescence lead to the maturation of the physical body, but the brain lags behind, especially in the areas which control reasoning and logical thinking. Most adolescents act impulsively at times, using their “lower” brains because the frontal lobe is not yet mature.

For adolescents who have been abused, this impulsive behaviour may be even more apparent. Often they have developed brains that focus on survival at the expense of the more advanced thinking that happens in the brain’s cortex (Chamberlain 2009). An underdeveloped cortex can lead to increased impulsive behaviour as well as difficulty with tasks that require higher level thinking and feeling. They may show delays at school and in social skills. They may be more drawn to risky behaviours (drink/drugs etc) Teenagers who lack stable relationships with caring adults who can provide guidance and model appropriate behaviour may never have the opportunity to develop the relationship skills necessary for healthy adult relationships and parenthood.
Implications for us as professionals

Knowing how brains develop can help us understand why some children and young people present with challenging behaviour.

Good, strong, positive, trusting relationships and modelling behaviour will help to support the optimal conditions for learning. For example, adults should be calm for children to be calm.

However, we should also be aware that neural pathways can be re-arranged and young people can change. Through practice and attention, adults can change their own behaviours and new ways of responding to situations can become a habit.
One of the reasons that relationships are so important is because brains are developing as a consequence of that relationship. So neuro-science has been revealing over the last twenty years – particularly over the last ten years – we have learned an awful lot about babies’ brain development. And it is certainly the case that babies’ brains develop partly on the basis of the genetic codes that they have, but they also develop on the basis of the kinds of relationships that they have with other people, the kinds of responses that they get.

Now that makes sense when we come to understand that compared to other mammals babies are born earlier in the developmental trajectory than, say, sheep and cows, and horse, and dogs and cats. And that is because human heads are so big that they didn't fit through vaginal canals if they kept getting bigger and bigger. So in a sense evolution had to do a kind of deal, we will have babies be born earlier in the developmental process so that their heads won't be so big that they are going to get stuck, because that would be bad for mothers and babies because we would die and the species would die. That means that brains are actually more fragile than they are for other mammals, because they are younger, they are less mature. But it also means that they are able to be much more flexible, and that’s why humans can survive in such different environments, in such different circumstances; that’s why they can learn to speak different languages; that’s why they can learn to cope with families that are very expressive, and families that aren’t so expressive; that’s why they can learn to cope with families where there is domestic violence, and families where it is very quiet and peaceful. Brains and babies can cope with a whole raft of possible environments because their brains are really flexible.

But it also means that if your brain is developing in relation to that world, that once the key pathways in your brain are established those are the pathways that you carry with you into your adulthood. That is why there is so much excitement and interest and worry and attention now being given to these really early years, because we know how much brain development is going on in those early years.

Because there has been so much excitement about these early years people can think right, that’s it, so it’s a done deal by the time they are three; it is not a done deal, the brain continues to develop, and in fact there is another period of real reorganisation in adolescence, and the brain will continue to develop roughly through up until about twenty. And then of course much later on we all joke about how you begin to lose lots of those connections.
The really important thing here is that we are asking children to develop particular kinds of brains with the environment that we present them with. Brains can cope with a variety of situations, but they are meant to cope with those situations, and that may have consequences that we hadn’t reckoned on. So if I just take an example of a child that lives with domestic violence, so there is a lot of shouting and perhaps some hitting, and their needs often aren’t noticed. That child needs a brain that helps them to cope with a threatening environment. That is the world they are born into, and that’s what their brain needs to help them to learn to do. Now how does a brain do that? Well it does that by monitoring for threat. So we have to spend a lot of energy and a lot of attention watching for where the next shouting will come from. Well, if I am monitoring for where the next threat comes from I cannot be so interested in what that blue block on the ground there tastes like. In other words I can’t learn about other things in the world – or as many other things in the world – if I have to spend a lot of energy monitoring for threat.

Another of the ways in which that brain will be being influenced is, in order to cope with that threat I will be needing to produce a lot of a hormone called cortisol, which we all need at times of stress. So when you arrive at a meeting late, because you left the house late, because the traffic lights didn’t turn in the order you wanted them, your body has actually got more cortisol in it, and it actually needs cortisol to help you cope with the stress of being late. But if you have cortisol in your system all the time, what it begins to do is to swap the brain with a stress hormone, so at the extreme ends it is as though the brain is drowning in a stress hormone, because the body is producing so much of this stress hormone, and it has learned to produce it very quickly, so it turns on the production of cortisol quickly.

Cortisol got developed to help us cope with immediate stress, like escaping from a sabre toothed tiger, and so if you have a child who has spent the morning coping with a stressful environment, and they arrive at school, or they arrive at playgroup, or they arrive at their childminders, and we want them to sit down and be quiet, they can't do that, they have just been running away from a sabre toothed tiger, and their brain is developing to cope with sabre toothed tigers, a world of sabre toothed tigers. Their brain will always now look for sabre toothed tigers, so we will have created a person who thinks the world is a bit of a threatening place, and will always spend part of their energy looking for threat. If they are looking for threat it will be harder for them to tap empathy, it will be harder for them to connect to other people because actually they will be a bit anxious about other people.
One of the things that we did was create a narrative about what we mean by early years and the connection to the point of impact and violence, and we looked at a young man at fifteen and a half who had committed a murder, and we looked at his life from the day he was born. And we chose him only because we had some CCTV footage of the murder happening, not because we thought he was really bad. But when we looked at him we found that before he was fifteen he had moved house, I think, eleven times. His mum had had to move house four of those times because of domestic abuse; his mum was an alcoholic. The areas he lived in were some of the most deprived areas in Scotland, and indeed the UK. He had no supportive family around him at all; he had an extended family that was wholly workless, where he had uncles who had previous convictions for violence and a whole range of things. And when he was a baby that was obvious, when he was a toddler it was obvious, but the radar wasn't smart enough to pick him up; when he was needing our help and couldn't ask for it, he didn't get it. And then when he started as an adolescent to annoy us, then we paid attention, and we stopped trying to protect the child and started wanting to punish an adult.

And that is where we are in Scotland sometimes, with a punitive notion that criminal justice will fix this. And you just have to look all around you in newspapers every day of the week, and they are talking about, we need to punish these young people more and they will stop doing it. No they won't, because they don't know any better, their sin is ignorance, and it’s our responsibility to banish the ignorance; the technical solution for ignorance is education, the social solution is relationships, so that these young people understand. When they are babies, we can pick up on that, that we can say we might only have you in our day centre, our nursery, our primary school for seven hours a day, five days a week, but while you are with us you will get consistent good relationships demonstrated to you. We will link in with other people around in this community to support you even when you are not here, we will do the best that we can for you, because it's not about taking kids out of that environment and putting them into another environment that we think is going to be better, and might not be, it’s about saying we will support you and your mum and dad, or your mum, or your dad, or your gran – whoever is looking after you – to be as good as they can be, and that’s what services need to be in Scotland for the twenty-first century, that’s getting it right for every child, not just those ones that will be fine, but those ones that actually need our help.