**Child abuse and its effect on brain development**

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In the first of two articles, Jenni Whitehead explores present understanding and research on how abuse experienced in childhood affects the child’s developing brain function and how this in turn affects learning

I have worked with many children and adults who have experienced abuse in childhood and have come to be fascinated by the way that survivors manage to carry on leading often very successful lives despite traumatic experiences.

This is not to say that all survivors are successful in life and obviously some people suffer terrible ongoing issues related to their experience of abuse. However, when starting to talk about the effects of abuse I always want to start by challenging the myth that says that if you are abused the damage is permanent.

In this article I want to explore research on the effect that childhood abuse has on brain functioning. Some of the research suggests that abuse can bring about permanent physical changes in how an individual’s brain works. Nonetheless, by understanding some of the possible changes we may be able to develop ways of working that are more successful with, and for, survivors of abuse.

As an officer in charge of a girls’ hostel back in the 80s, I came to understand that most of the girls in our care had been subjected to abuse and at any one time it seemed that about 80% of them had been subjected to sexual abuse. There appeared to be a number of commonalties across the girls in terms of how:

* they accommodated their experience of abuse
* they managed their everyday lives
* their learning was affected.

Later, as an older, more experienced, worker I worked with adult survivors and began to realise that for many of them things hadn’t changed that much. They were dealing with the issue of abuse in pretty much the same way as the girls I had worked with – they were just more skilled at it!

The following descriptions of commonalties are drawn from my own experience and as such are anecdotal descriptions of the way some survivors manage. I am not suggesting in any way that I have carried out research that would support the following descriptions but will give references to works that explore some of these issues in detail at the end of this article.

**Accommodation**

The term accommodation is used to describe how children come to manage their experience of abuse. One of the most common forms of accommodation is dissociation. In order to psychologically survive each actual event of abuse the child must develop a coping mechanism, and for many children the coping mechanism is ‘this is not happening’. In order for ‘this’ not to be happening the child focuses on something other than what is physically happening to their bodies. The child might focus on the curtains or their teddy or may invent a place inside their heads that they can go to, or may feign sleep. Repeating the coping mechanism reinforces it and once established as a coping mechanism the child is likely to use it whenever either abuse occurs or when something happens that reminds them of abusive events.

Example 1: Sex education may result in the sexual abuse survivor dropping straight into their coping mechanism. The teacher may actually see a change in the child’s demeanour; sometimes people describe this as the ‘shutters coming down’ The lesson goes on, but the child, while physically present, is mentally in the curtains, their teddy or in that place they have invented inside their heads.

Example 2: Children whom we know have been sexually abused sometimes present with poor bladder control. Now, it may be that they have a urinary tract infection, but it may also be that when their body sends them a message that they need to pee their coping mechanism kicks in, ‘want to pee – that’s genitals I don’t go down there.’

Many of the survivors I have worked with describe how in order to cut out any memory of abuse they cut out any memory of childhood – it’s simply too painful to look back.

**Managing everyday lives**

If you successfully cut out the past and establish a pattern of not looking back you in effect live only in the present and the immediate. Understanding this has helped me to understand why some children behave in ways that suggest that they do not recognise likely consequences of their actions. They appear to change their behaviour to suit the immediate situation.

Example: The child who has messed up in some way with a member of staff may sit down with them and draw up a new contract for future behaviour. While the contract is being drawn up the child is totally compliant, agreeing with all that is said and the member of staff is lured into that wonderful feeling of success. Five minutes later the child is off with someone up to some new unacceptable behaviour and the staff member is left feeling foolish to have believed that the child was willing to change!

If we understand that the child is functioning in the present perhaps we can come to understand that while they were with us, working on a new contract, they probably did mean everything they agreed to. They probably were being honest, but that was then, and when another person comes along and says ‘Lets do this now’, this is now, a new present, and they are just as likely to agree with the other person for that moment.

There is a major problem in managing your life by living in the present: if you can only go forward and never look back you stop yourself from using all the useful information and experiences that enable us to learn from the past.

In successfully cutting out the past the child cuts out useful learning as well.

**Effect on learning**

I have noticed in my work with survivors that here are certain aspects of learning that appear very difficult for them, particularly learning that builds on past learning. Many of the children and adults that I have worked with have had great difficulty with subjects that demand an understanding of sequence, maths for instance. In order to carry on moving forwards in understanding maths and  more complex maths you have to sometimes go back to previous learning of the process of working things out.

Going back in order to go forward is a difficult process for some survivors. I hasten to add, however, that some children may use numbers as a way of escaping more difficult thoughts about their past and so develop a fascination with maths. I am using maths only as an example of the need to understand sequence as integral to some areas of learning.

**So what has this to do with how the brain functions?**

Recent research from a number of sources and from different professional groupings has shown evidence that early childhood affects physical changes in the way the brain functions. This has helped me to put yet another perspective on my understanding of how some survivors come to behave and think in the way that they do. I am hoping it will help you too.

**How the brain develops**

To start with we need a basic understanding of how different parts of the brain develop, their purpose and function. (Any biology teachers reading this? Please forgive my extremely basic explanation!)

It is generally now accepted that genetics predispose us to develop in certain ways, (nature), but that our interactions with our environment have a significant impact on how our predispositions will be expressed (nurture); these interactions organise our brain’s development and, therefore, shape the person we become (Shore, 1997).

Babies are born with almost all the neurons they will ever have. Neurons are brain cells, the raw material of the brain. The neurons present at birth are primarily what the new-born have to work with as they develop into children, adolescents and adults. During feotal development the neurons migrate to form the various parts of the brain. The main structure of the brain is in place at birth, but, much of the brain’s growth occurs in the first few years after birth.

The brain develops sequentially from the bottom up so the first areas of the brain to fully develop are the brainstem and the mid brain. These brain areas govern the bodily functions necessary for life and are referred to as ‘autonomic functions’. The limbic system and the cortex develop last. The limbic system regulates emotions and the cortex is involved in abstract thought.

Each region of the brain manages its functions through complex processes, often using chemical messengers to help transmit information to other parts of the brain and body (Perry, Pollard, Blakely, Baker & Viglante, 1995).

By the age of three the brain has reached almost 90% of its adult size (Perry 2000c). Growth in each area of the brain is dependent on receiving stimulation that causes activity in that region. This stimulation gives the foundation for learning.

The connections formed between neurons are called synapses and it is the synapses that organise the brain by creating pathways that govern everything we do from breathing and sleeping to thinking and feeling. At birth the synapses that are present are primarily those that govern bodily functions; almost all other functions are developed as babies grow through childhood into adulthood (Shore 1997).

Brain development and learning involves the strengthening of some synapses and discarding others and this process is highly dependent on stimulation and environment.

Synapses develop at an incredible rate during children’s early life. However, by adolescence about half of a person’s synapses have been discarded and those remaining will exist for the rest of the person’s life (Shore 1997).

The early overproduction of synapses is believed to be the result of evolution that has led the human brain to expect certain experiences. For instance, babies appear to be pre-wired to respond to the sound of the human voice. Early synapses need reinforcement if they are to be strengthened; if they are not strengthened through repetitive use  the brain may discard them.

For example, all babies have the genetic predisposition to form strong attachments to their primary caregiver but if the caregiver is unresponsive, threatening or rejecting, and the attachment process is disrupted, the child’s ability to form healthy relationships during later life may be seriously impaired (Perry, 2001).

The research in this area does not suggest it is impossible to learn or relearn in later life but does suggest it is much harder.

**Memories**

Memory helps us to organise our learning. Repeated experiences strengthen the neuronal pathway, the pathway becomes sensitised and at some point it becomes a memory. In early life the child learns and, through repetition, remembers how to do certain things and the appropriate response to others in specific situations. This process is so efficient that eventually we do not have to keep thinking our way through the process – it happens automatically. The brain learns through reinforcement, repetition and the development of memories.

**Early development**

If a baby smiles and the caregiver smiles back the baby learns that smiling is a good way to interact. Alternatively, if a baby’s primary caregiver is always unresponsive to their crying the baby will learn that crying does not bring a response. A  primary development task in the first year of life is described as ‘the development of trust’ and so the baby who is repeatedly ignored by the caregiver is likely to develop an impaired sense of trust in their world. This has a knock-on effect on later psychological development tasks.

**Stress**

The experience of moderate and predictable stress in childhood has not been found to be particularly harmful – in fact this low level of stress can help children to develop ways of coping with life in general. However, chronic stress sensitises neural pathways and overdevelops the regions of the brain that deal with anxiety and fear responses.

Children who are constantly under threat of abuse will need to focus their brain’s resources on survival and responding to threats in their environment. The chronic stimulation of fear responses hinders the stimulation of parts of the brain involved in more complex thought and this effects learning.

Cortisol is a hormone that helps the body prepare to cope with stress, and studies have shown that children who have been subjected to abuse have abnormal secretions of cortisol (Hart, Gunner, Cicchetti, 1995).

It is important to understand that the abused child’s reaction to stress is not abnormal: their brain development is often an adaptive response to their negative environment. However, it is maladaptive to other environments. If the brain’s main focus is survival it will be more difficult to develop healthy cognitive and social skills. Abused children often have great difficulty when presented with kindness, nurturing and stimulation: their brains may have underdeveloped pathways to adapt to this new world.

Repeated abuse and resulting stress may cause an affect on the neurochemical systems which can cause changes in: attention, impulse control, sleep patterns, and fine motor control (Perry 2000).

Studies have shown that child abuse affects the development of a number of regions of the brain:

* the hippocampus – involved in cognition and memory
* the subcortical and limbic systems – involved in emotions and abstract thought.

The results of these effects include:

* extreme anxiety
* depression
* difficulty forming attachments and relationships.

Chronic activation of the neural pathways involved with fear responses can also  create permanent ‘memories’ which shape the child’s perception of and response to their environment (Shore 1997).

If early childhood is experienced in a persistent state of hyper-arousal and hyper-vigilance, constantly anticipating threats or disassociation the child is likely to have difficulties with the very ordinary tasks of learning at school. In order to learn, to incorporate new information the child’s brain must be in a state of ‘attentive calm’, a state that the traumatised child may find difficult to achieve.

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**Child abuse and its affect on brain development (part two)**

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Child abuse can affect a child’s ability to learn. In the second of two articles, Jenni Whitehead looks at ways of helping such children in the classroom.

The first part of this article addressed a growing body of research about how childhood abuse can bring about physical changes in the way that the brain functions. Research shows that repeated experiences of abuse will cause a child to develop coping mechanisms as an act of survival. It suggests that the regions of the brain that deal with anxiety and fear responses may be overdeveloped in people who have been subjected to abuse. Chronic stimulation of fear hinders the development of parts of the brain involved in more complex thought and this affects learning.

Repeated abuse and resulting stress may affect neuro-chemical systems and cause changes in attention, impulse control, sleep patterns, and fine motor control. (Perry 2000)

Studies have shown that child abuse affects the development of a number of regions of the brain:

* the hippocampus – involved in cognition and memory
* the subcortical and limbic systems – involved in emotions and abstract thought.

The resulting effects include extreme anxiety, depression and difficulty forming attachments and relationships.

Dissociation is the term used to describe the process by which a person detaches themselves from events that they are directly involved in. Children who repeatedly use dissociation as a coping mechanism may develop a way of being that affects their ability to look back at the past for fear of coming face-to-face with abusive memories. If the past becomes a scary place then children may develop a way of being that means they are always in the present and deny themselves access to the past. As many curriculum subjects build on past knowledge to move forward, to take learning further, some abused children will struggle with learning and taking in new learning.

**How might this present in the classroom?**

Abused children may have great difficulty with understanding subjects that involve sequential learning. Problem-solving may prove particularly difficult; maths is one example. Such children may attempt to avoid such subjects or distract themselves in the lesson either by ‘drifting off’ or by involving themselves in disruptive behaviour. Their attention span may appear limited and where their flight response is over-developed they may show signs of extreme anxiety.

Some children may, however, try to establish and/or maintain strong routines, within which they are able to operate. This can become an obsession, always wanting to know what happens next, needing to know that everything is in its rightful place and always will be, becoming frustrated, confused and sometimes angry if routines are changed without warning. The child is trying here to establish a new set of ‘definites’, rules to operate within. The routines become the child’s safety net and woe betide anyone who alters the routine or pattern of the day!

**Keeping routines, rules and boundaries**

As most teachers know, routines provide both structure and control to the school day. However, the importance of routines for children who have suffered abuse may not be recognised and there is a risk that some routines may be broken by staff who are trying, in a way, to compensate for a child’s difficult background. For instance, when a child who has been abused is naughty or disruptive, some staff may tend to be more lenient than they would if they were dealing with a pupil who has a better home life. I am not suggesting here that staff should ignore the child’s background or that they shouldn’t try to understand causes behind behaviour – after all we should be doing this for all our pupils. I am suggesting, however, that rules are rules and all children need to learn that behaviours have consequences.

Routines, rules and regularly repeated messages provide the safety net for learning and this is particularly important for abused children. If the rules and boundaries are very different at home from at school the child may have to step over the boundary or break the rules a few times in order to establish exactly what and where they are! In other words we can’t expect a child to understand new rules and boundaries overnight.

Try to establish clear routines and if you have to change a timing of an event or order of the day make sure this is explained to the child with a reassurance that the usual routine will be returned to as soon as possible. If you make an appointment with a child make sure you keep it and keep to the time set. These sound like little things but they are extremely important to the child. If you are a member of staff who spends individual time with a young person make sure that you stick to both the time set for starting and the time set for finishing.

By keeping a routine and doing what we say we will, the child will learn to put trust in us, and this in turn helps children to understand that relationships are worth developing and that not all people are untrustworthy.

If we have agreed that our meeting with a young person will last half an hour, keep to it. The child who drops a bombshell on us five minutes before the end of a set session poses a difficult question: should we extend the time? If we do not end the session when we say we will we will be breaking the rules we have set, the boundaries we have given to that time. If we don’t extend the session we may lose the opportunity. We need to ask ourselves, ‘why have they said this now?’ If we have given a clear set of rules to work within, it may be that the child is testing them, or that the child is actively using the time, telling us something big at a time when they know you cannot continue for very long. Maybe they can only cope with five minutes of talking about it. My advice is to stick to the time, mark the ending of the session and arrange another session to talk about the new issue. Your professional judgement may tell you that the next session needs to come very quickly, and in some cases immediately, after the first, but always mark the end of one session before starting the next: ‘Our session was set for half an hour and that time has finished now, so you may go off to do other things. However, you said something just now that tells me you may need some more time. Shall we carry on now for a further half an hour or shall we set another time?’

Being clear, especially about time, helps the child to know how to use the time given, to keep focused and again helps the learning process.

**Memory**

I have described how some children try to always look forward and try hard not to look back; while this protects them from difficult memories, it does little to develop memories that are useful. We can help children to start to use their memories properly in a number of ways, see below.

**Helping children use their memories**

* Recap – most teachers will recap what the class did in the last lesson as a matter of course. For the survivor of abuse recapping has two purposes: it helps the child to think back to previous learning and it helps them to see it is safe to look back.
* Written instructions – for some children it is necessary to write down instructions, even for quite simple tasks. You may send a child to the office to ask for something but by the time they are there they may well have forgotten the task. Memory is affected by abuse.
* Diaries – For the same reason diaries are very useful but only if staff help the child to fill them in regularly and learn how to use them.
* Photographic records – taking photos of children’s work offers a permanent record that can be used to help the child remember past achievements or to recap on past learning. Remember, though, that some children may have good reason to be frightened of the camera, always explain why the photograph is to be taken and seek the child’s permission.
* Recognise that for some children learning such as maths may prove particularly difficult and they may need extra time spent with them going back over previous learning before taking on new problems.
* Repetition – perhaps the most useful aid to memory is repetition. We don’t have to constantly think through how to do simple tasks because we have repeatedly done them. Children may need tasks repeatedly explained and the learning reinforced through repetition.

**Grounding**

In the first part of this article I explained how some children may appear to switch off in lessons, glaze over, drift away. This may occur in lessons that in some way present as a reminder of abuse; sex and relationship teaching is one such instance. The young person may drop straight into their coping mechanism as a way of getting through the lesson. If this happens, gently remind the child where they are, what they should be doing and let them know they are safe, use their name to call them back.

Try not to draw too much attention from the other children. Approach the child from the front so they can see you, and say their name, ‘Susan you are here in school where you are safe, we are doing maths, I will help you.’ You may need to repeat this message a number of times. This will help the child to reground. Do not touch a child who has drifted off, you might startle them, and in worst cases your touch may be misunderstood or misinterpreted.

**Panic attacks**

Survivors may experience anxiety to the extent that they have panic attacks. A child experiencing a panic attack will be very scared and may react to others out of fear. Panic attacks can affect the child’s breathing.

Try to reground the child in the way described above. Do not get too close and try to help them control their breathing by gently reminding them to breath slowly and calmly. In through the nose and out through their mouth. As the child calms down remind them again that they are in school and that they are safe and use their name to call them back.

**Managing our feelings**

Being cross with a child who cannot remember the task or who appears to drift off during a lesson is never the answer. If we feel frustrated at having to repeat things over and over again discuss this with a trusted colleague. Child survivors need our care, understanding and our patience.

**Finally**

Some children who have been abused will find even sitting in a classroom difficult and in extreme cases such children may need an escape route. Design a system by which the child can indicate that they are feeling unsafe and are getting the urge to run. The system would allow the child to leave the classroom and to go to an agreed space for a short period of time to come round.

Many of the strategies I have described here will already be being used in school for all children. If this is the case, brilliant. If not I hope this article will spark off discussion across the staff team and help people improve their own practice.

I strongly believe that schools can provide the structures and routines that will help the child to feel secure enough to engage in learning.

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