



# National Offender Management Service

## Neuroscience and sexual offending

Dr Adam Carter

New Directions in Sex Offender Practice  
3<sup>rd</sup> & 4<sup>th</sup> April, Birmingham University, UK.

- What is neuroscience starting to tell us about why people can become vulnerable to sexual offending?
- Implications of the emerging knowledge - how we can change the way we design programmes to reduce sexual offending?
- Implications for the way we should engage and work with people who have committed sexual offences

# What is neuroscience

- Neuroscience - the study of the brain; behavioural neuroscience - the study of the link between brain and behaviour.
- Neuropsychology (e.g., the study of lesions), and neuroimaging methods are used to establish links between the brain's structures and activity. Neuropsychology establishes causal connections and neuroimaging establishes correlational links.

Rotshtein & Mitchell, in press

# Three structure model of the brain

Cortex – thinking brain (Prefrontal cortex – advanced functioning)

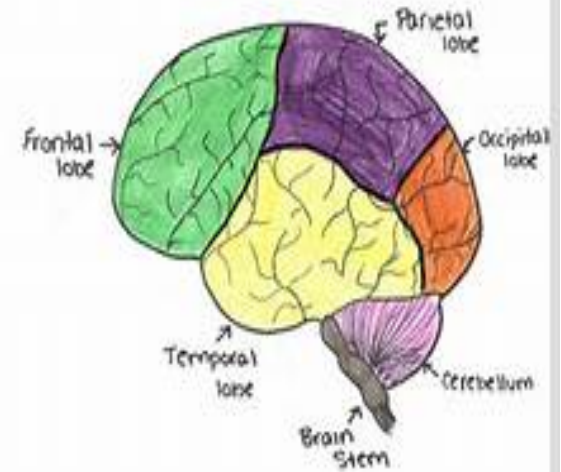
Limbic system (Social/emotion)  
Amygdala (threat response)

Brain stem (Sustaining life)

# Simple model of the brain

## Simple model of the brain – three main functions


- Brain stem – responsible for number of essential cardiovascular functions to sustain life, e.g. heart beat and respiration
- Limbic system – integral part in emotional and motivated behaviors. Hippocampus involved in translating new experiences into neural memories to be referred to later. The amygdala are within this area - critical for screening for threats.
- Cerebral cortex – top of the brain – most advanced and developed part of the brain. Contains the frontal lobes where human “higher functions” take place.



## Trauma and the brain

Genetic predisposition and experience both combine and interact together to develop the brain. Early experiences shape the design of the brain and its functions

- Neurons – building blocks of the brain capable of making some 10,000 connections with other neurons across synapses
- Neurons that “wire together, fire together” (Arden & Linford, 2009)
- Trauma is one of the experiences that can effect both the way connections are made and how the brain develops



*"Our brains are sculpted by our early experiences. Maltreatment is a chisel that shapes a brain to contend with strife, but at the cost of deep, enduring wounds."*

Teicher, 2000, p. 67

Trauma - over attending to survival and responding to perceived threats:

- Perpetual fear state
- Hyper arousal through memories of fear
- Removing themselves from abuse mentally through dissociation
- Disruption to bonding and making attachments



# Trauma and the brain

- Overactive amygdala and rise in stress hormone cortisol can impact on Hippocampus
- Hippocampus - verbal learning and learning in context (Creeden, 2009)
- Abuse and maltreatment may also alter ability for the brain to use Serotonin – promotes feelings of emotional stability (Healy, 2004)
- Evidence trauma impacts negatively on the brains ability to integrates its hemispheres – possibly means, “...neurological obstacles to creating and sustaining secure attachment relationships”. (Creeden, 2009).

- Physical damage to brain that abuse brings – Shaken Baby Syndrome
- Effect of malnutrition and lack of stimulation
- Damage from substance misuse, traumatic brain injury, acquired brain injury and toxicity that can cause neurological difficulties (Jenkin & Borkett-Swann, 2010).

## Other influences on brain development

- Alcohol abuse, drug addiction, poor health and nutrition are prevalent in offender populations (Stone & Thompson, 2001).
- Psychosocial adversity has direct impact on brain development, particularly the prefrontal cortex. Impulsive and aggressive offenders have been exposed to a disproportionate amount of adversity including head trauma, social deprivation, child abuse, and family dysfunction.
- Aggression, psychopathy and substance abuse associated with neurological deficits  
(Fishbein, 2003).
- Lowings and Wicks (2012) reported that 46 - 86% of the prisoner population in the UK is likely to have a neurological disorder which would interfere with their ability to learn new information and apply existing learning.

# We have a good understanding of what factors best predict reconviction...

## Sexual interests

- Sexual preoccupation, deviant sexual interests

## Attitudes and beliefs

- Offence supportive attitudes; hostile schemas

## Relationships

- Lack of intimacy with adults, emotional congruence with children

## Self regulation

- Impulsivity, poor problem solving, non-compliance with rules

## Attitudes and beliefs/sexual interests

- No biological basis for attitudes that can raise the risk of further sexual reoffending has been established. However, a common theme behind attitudes related to sexual offending may be rigid cognitive style.
- Strength of sexual arousal, and the ability to control sexual interests, have been associated with specific regions of the brain, with biological dysfunction linked to problems with sexual preoccupation and difficulties with sexual regulation.

# Self-management

Impulsivity, poor emotional control, and poor problem-solving constitute the risk-related difficulties in the self-management domain.

- Deficient executive functioning has been associated with difficulties with self-management.
- Neurological dysfunction to certain regions of the brain can stop higher order responses of a non violent nature being initiated in response to conflict (Davidson, Putman & Larson, 2010).
- Neglect can result in difficulties with attention, language and increased impulsivity (e.g. Norman et al., 2012).

View of self and others, can then affect social behaviour and quality of intimate relationships.

- An overactive amygdala as a result of unfavourable childhood experiences which can lead to grievance and hostility response to others because it causes repeated activation of a threat response even when this reaction is not warranted (Thornton, 2008).
- Making appropriate and non-threat interpretation responses in social situations could be hampered by damage to high-level cognitive functioning processes (Fishbein, 2003).

Most treatment approaches are “primarily presented in a language based modality (which) largely ignores the type of neuro-processing obstacles that might make it difficult for many of our clients to learn, remember, and retrieve useful information and skills necessary to avoid or prevent further abusive behaviour” (p.234, Creedon, 2004).

- Assessment and treatment commonly take place at the cognitive level – extensive abstract verbal discussion and written forms of communication
- Sessions often delivered in a static way
- Group members seated and generally required to listen
- Follow fixed group format



## Mr A

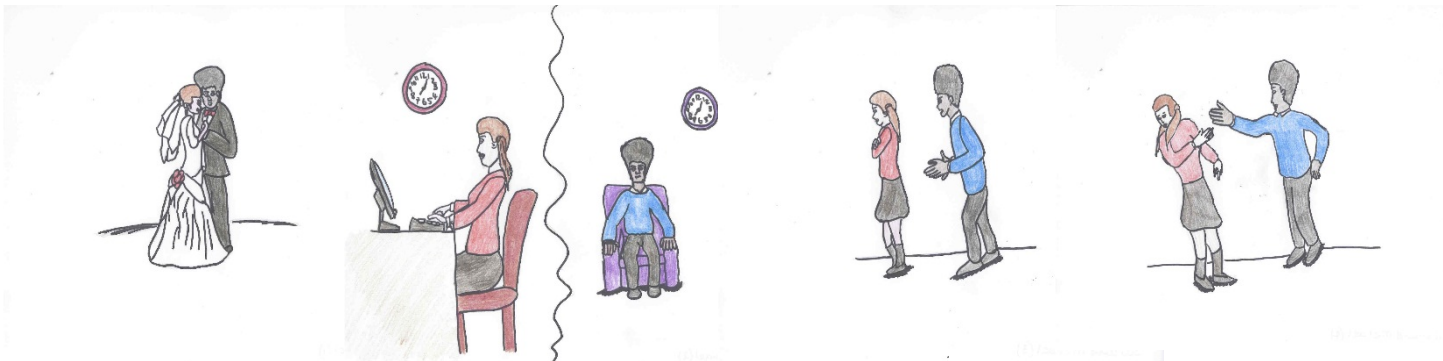
- Experienced persistent neglect as a child
- Is impulsive, often emotionally driven and struggled at school
- Finds it hard to articulate his inner world
- Suspicious of others

## Mr B

- Well educated
- Had a caring and loving childhood
- Likes to discuss, analyse, read and write.
- Easily trusts others

# Visual methods

- Drawing
- Visual representations
- Story boards (e.g. Ok and Not Ok scenarios)
- Pictures that can prompt discussion
- Role play sketches on DVD
- Attention to wider environment







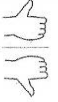
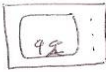






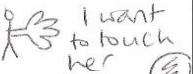




# Auditory methods

- Questioning skills; clarity and unambiguous
- Use of language e.g. tone
- Avoid abstract/hypothetical
- Scenario to prompt discussion
- Avoid dry humour
- Re-capping
- Check and double check understanding

# Kinesthetic methods

- Appropriate gestures
- Physical demonstration e.g. in action Learning Logs
- Stepping stones
- Encourage them to direct you
- What would I see if there was a film of this situation?

Learning Log - Example

					
Day	What's going on ?	Thoughts	Feelings	What did I do?	OK/ not OK? Next time??
Sat	 watching kids on TV	 she's fit.		 went to my room and masturbated	 Next time - New me tactics, their shoes → better life 😊 -  play playstation
Monday	 Teacher looks sexy	 I want to touch her Goon brush against her she won't mind get her alone	 10/10	 sorry excuse me!	 Next time - stop and think she won't like that she is a nice person I respect her I will get in trouble  long time

- Medication (anti-androgen, SSRI)  
(Grubin, 2009)
- Order in which needs are addressed
  - Eyebrows-down approach (Visual, audio, kinaesthetic)
  - Repetitive skills practice
  - Real life integration
- Programmes that are sympathetic to neuro-psychology of offenders (Creeden, 2009)

# Executive functioning

- Executive functioning thought to span several brain regions - prefrontal cortex (Paschall & Fishbein, 2002) several sub-cortical pathways (Koechlin, Corrado, Peitrinin, and Grafman, 2000; Monchi, Petrides, Strafells, Wrosley, and Doyon, 2006).
- Individuals with lesions to the prefrontal cortex often have difficulties planning and decision making, difficulties with impulsivity and emotional dysregulation (Masterman & Cummings, 1997; Tatenoi, Jorge, and Robinson, 2003).
- Executive functioning deficits - reported in populations of male and female incarcerated young offenders (Enns, Reddon, Das, and Boukas 2007; Olvera et al., 2005).

# The Great Eight



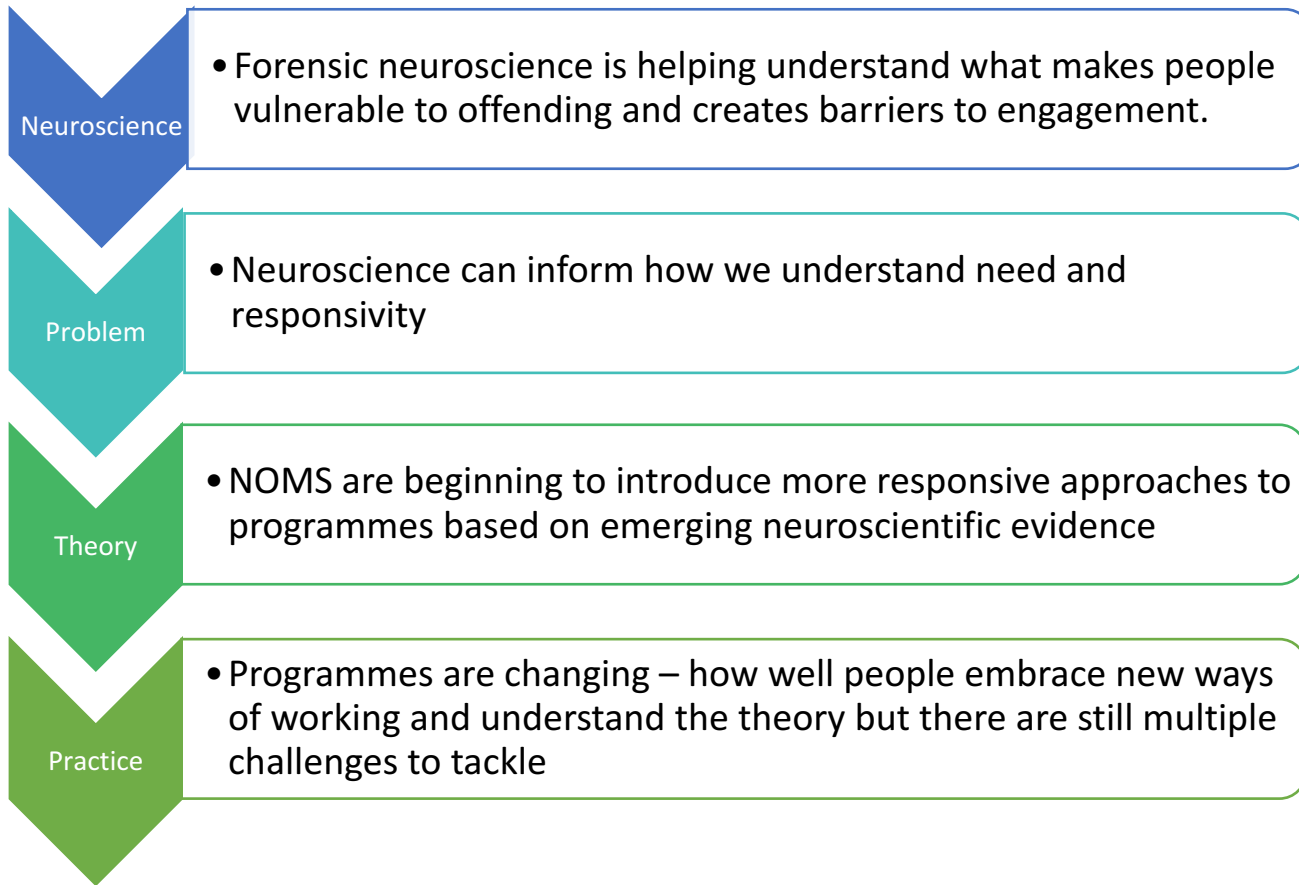
- Develop a basic familiarity with the structures and functions of the social brain and their impact on social behaviour.
- Be aware of the ways in which childhood adversity, such as trauma, violence, abuse or neglect, can impede the development of the brain and how this affects behavior in adolescence and adulthood.
- Always consider your clients' childhood experiences and any possibility of head trauma; reflect on how the impact of these experiences may be playing out in current behavior and talk to your clients about how their early experiences might have affected their brain development.

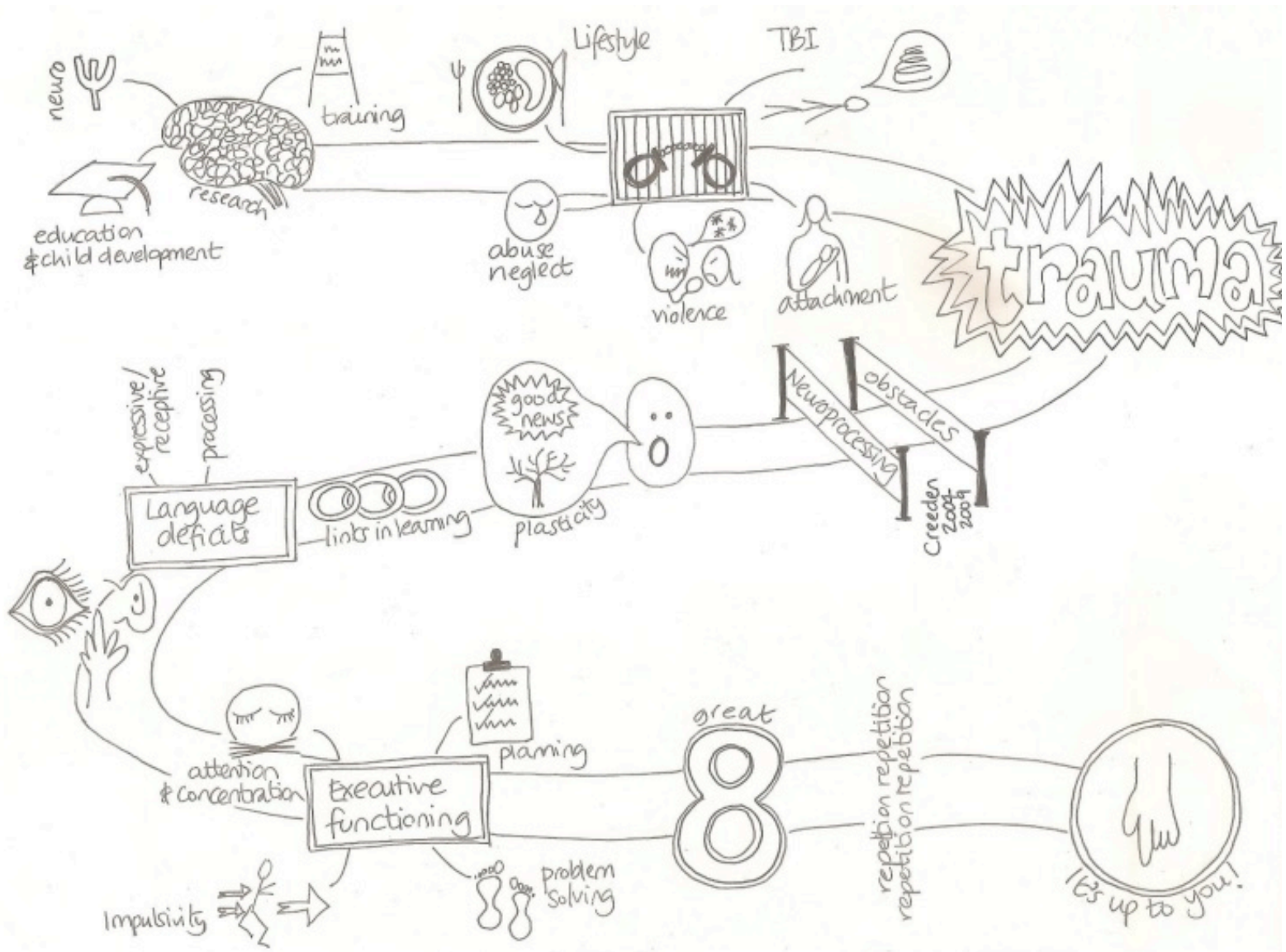


- Define your approach with your clients as building strengths and skills that improve pro-social brain functioning, rather than removing risk factors.
  - Become familiar with 'brain friendly' methods of working with people
  - Create rehabilitative environments and interactions that recognize the plasticity of the brain but also the limitations of those who may be deficient in certain capabilities. In particular, develop environments which use coaching and reinforcement to encourage people to utilize new skills. Do not expect punishments to change behaviour.
- Carter & Mann, in press

- Augment cognitive-behavioural psychological interventions by considering other activities or therapies that might benefit your clients, such as mindfulness, nutrition, physical exercise, EMDR, or medication.
- Be patient when people struggle. The pro-social ways of behaving that you probably learned effortlessly, they are learning the hard way. Carter & Mann, in press

# Summary





Thank you

[adam.carter@noms.gsi.gov.uk](mailto:adam.carter@noms.gsi.gov.uk)

Dr Adam Carter

Interventions Services

Her Majesty's Prison Service and Probation