

Examining the effects of early abuse and the links to sexual offending

Patricia Ann Rawlings

Thesis submitted to the University of Birmingham for the degree of Doctorate in  
Forensic Psychology Practice (ForenPsyD).

The Centre for Forensic and Criminological Psychology  
School of Psychology  
University of Birmingham  
Edgbaston  
Birmingham  
July 2015

UNIVERSITY OF  
BIRMINGHAM

**University of Birmingham Research Archive**

**e-theses repository**

This unpublished thesis/dissertation is copyright of the author and/or third parties. The intellectual property rights of the author or third parties in respect of this work are as defined by The Copyright Designs and Patents Act 1988 or as modified by any successor legislation.

Any use made of information contained in this thesis/dissertation must be in accordance with that legislation and must be properly acknowledged. Further distribution or reproduction in any format is prohibited without the permission of the copyright holder.

## **Abstract**

The complexities of the developmental, cognitive, and neurobiological aspects of sexual offending pose a considerable challenge to those working in the field of the assessment and treatment of convicted sexual offenders. This thesis aims to contribute to the emerging evidence of the links between neurobiology and the practice of mindfulness, within the more firmly established theories of early developmental difficulties and sexual offending.

A systematic review of the literature exploring differences between sexual offenders with child victims and those with adult victims aimed to isolate affective or neurobiological differences between the two groups. The outcome was inconclusive, but suggested that neurobiological evidence should be considered as a factor.

The Affective Neuroscience Personality Scale (Davis, Panksepp & Normansell, 2003; Davis & Panksepp, 2011) and the Cognitive and Affective Mindfulness Scale-Revised (Feldman, Hayes, Kumar, Greeson & Laurenceau, 2007) indicated utility within an offending population to measure core affects and levels of mindfulness. This study did not provide clear evidence of differences between the two main offending groups in terms of affect or mindfulness as an indicator of affect regulation. Levels of mindfulness were found to correlate positively with measures of positive affect in offenders. Both offending groups differed from non-offending norms on three affect scales linked to social interaction and autonomy. A lack of positive affect was more notable than increased negative affect among sexual offenders.

This outcome is consistent with current theories of early attachment and affective development, suggesting a deficit in positive affect may provide an additional link to reduced social interaction, reduced autonomy, and subsequent sexual offending.

## **Acknowledgements**

I would like to thank my supervisor at the University of Birmingham, Professor Anthony Beech, for his guidance, support and patience throughout the process of writing this thesis. Thanks also go to Sue Hanson for her wonderful warmth, enthusiasm and efficiency.

The National Offender Management Service (NOMS) granted permission to undertake research with serving prisoners, as did the Governor and staff of the prison where the research took place. This is very much appreciated.

Gratitude is also expressed towards the men who took the time to participate in the research.

## Contents

	<b>Page</b>
List of Tables	
List of Figures	
Table of Appendices	
Chapter 1    Introduction	1
-   Aims of Thesis	10
-   Structure of Thesis	10
Chapter 2    A Systematic Review	12
-   Abstract	13
-   Introduction	14
-   Objectives of the Review	17
-   Methodology	17
-   Results	38
-   Discussion	47
Chapter 3    Psychometric Critique	56
-   Introduction	57
-   Overview of the Affective Neuroscience Personality Scales	64
-   Psychometric properties	67
-   Conclusions	78

Chapter 4	Empirical Research Study	81
	- Abstract	82
	- Introduction	83
	- Method	91
	- Results	98
	- Discussion	104
Chapter 5	General Discussion	116
	- Aims of Thesis	117
	- Main Findings and Implications	117
	- Limitations	122
	- Future Research	123
	- Conclusions	124
References		126
Appendices		143

## List of Tables

		<b>Page</b>
Table 1	Inclusion / Exclusion Criteria	19
Table 2	Outcome Data of the Systematic Review	30 -37
Table 3	ANPS Dimensions and Subscales	65
Table 4	Sentence-Related Characteristics of Participants	96
Table 5	ANPS Dimensions and Subscales (as used in the current study).	97
Table 6	Results of t-test comparison of the Affective Neuroscience Personality Scale scores by Offender and Non-Offending Populations	99
Table 7	Results of t-test analysis of the Affective Neuroscience Personality Scale score by offence-victim category	101
Table 8	Logistic Regression Analysis to predict offence-victim category from ANPS scale scores	102
Table 9	Results of t-test analysis of CAMS-R scores by offence-victim category	103

## **List of Figures**

Figure 1	Flow Chart of the Search Process in the Systematic Review	<b>Page</b> 26
----------	---	-------------------

## **Table of Appendices**

Appendix 1	Database Searches for Systematic Review	<b>Page</b> 143
Appendix 2	Inclusion / Exclusion Form	146
Appendix 3	Quality Assessment Form	147-150
Appendix 4	Data Extraction Form	151-152
Appendix 5	Articles unable to access in full and therefore excluded	153
Appendix 6	Articles accessed in full and excluded after the inclusion/exclusion criteria were applied	153-154
Appendix 7	Bradford-Hill Criteria (Hill, 1965)	155
Appendix 8	Information Leaflet for Participants	156
Appendix 9	Consent Form	157
Appendix 10	Psychometric ANPS (adapted version)	158-161
Appendix 11	Scoring and scale guide for the ANPS (adapted version)	162
Appendix 12	Psychometric CAMS-R	163
Appendix 13	Scoring and scale guide for the CAMS-R	164
Appendix 12	Debrief Sheet	165

**CHAPTER 1**  
**INTRODUCTION**

## **Introduction**

Understanding the complexities of sexual offending is an issue of high relevance to treatment providers and risk assessors at a practical level, and to the public and governments at a wider level, when considering levels of harm, levels of management and the financial implications of appropriate provision of resources. Ministry of Justice figures report that 72,977 sexual offences were recorded by the police for the year 2013 to 2014 (Ministry of Justice, 2015) and comment that this figure is the highest in a decade, with an increase of 11% since September 2013. Quite apart from the suffering and distress of the victims, the recording, detection and conviction of sexual offences involves a high level of public cost, resulting in a figure of 20,049 convictions for the year (MOJ, 2015). Therefore, the effective treatment and risk assessment of sexual offenders is of great public concern.

The efficacy of sexual offending treatment programmes has been shown to be relatively small, but consistent (Hanson, Morton-Burgon, Helmus & Hodgson, 2009; Lösel & Schumucker, 2005) with cognitive behavioural approaches being found to be most effective. However, the nature of sexual offending is increasingly being seen as having multiple influences (Yates, 2013) thus, requiring treatment approaches that meet their individual risk factors (Kingston, Yates & Firestone, 2012). Increasingly, models of the sexual offending process adopt multidimensional process models, such as the Integrated Theory of Sexual Offending (ITSO; Ward & Beech, 2006), and the Self-Regulation Model (SRM; Ward & Hudson, 1998).

The ITSO model proposes that sexual offending requires analysis of genetic and developmental factors that interact with each other, and with the offender's culture and environment. In the current study, the 'motivational and emotional system', important to both

neurobiological development and neuropsychological functioning (Ward & Beech, 2008), is of particular importance. Meyer, Wood and Stanley (2013), also suggest that biological and interpersonal processes have to be understood from the perspectives of attachment theory and neurobiological development, both integrated within a systems theory approach, if human development is to be understood.

### **Attachment and neurobiological development**

Successful early development and relationships in adulthood have frequently been linked to the early formation of a positive attachment relationship developed between an infant and their primary caregiver (Bowlby, 1975, 1977). Bowlby asserted that a secure attachment formed a template for other relationships throughout life and aided emotional regulation. Failure to form a secure attachment leads to insecure, anxious, avoidant or disorganised attachment styles, leaving an individual more vulnerable to poor relationships, poor emotional regulation and potential psychopathology throughout life (Bowlby, 2000; Briere & Elliott, 2003; Heim, Shugart, Craighead & Nemeroff, 2010; Sroufe, Egeland, Carlson & Collins, 2005). However, attachment styles are not necessarily static (Heim et al. 2010; Singer, Brodzinsky, & Ramsay, 1985) nor do insecure attachments necessarily lead to mental health problems (Collishaw et al., 2007; Singer et al., 1985).

To address these variations, a more integrated process model of early attachment has been proposed by Tronick and Beegley (2011) as the “Mutual Regulation Model”. The Mutual Regulation Model asserts that infants and their main caregiver form several sub-systems which work to regulate the psychobiology of the infant. The responsiveness of the caregiver is the key focus of this model, and this is based upon communication. A notable difference compared to attachment theory as described by Bowlby (1977, 2000) is that the Mutual

Regulation Model allows for the genetic, biological and individual aspects of the infant that form part of the interaction, and the response of the caregiver to these factors, rather than assuming that the infant remains passive.

DiCorcia and Tronick (2011) suggest that regulation of physiology, affect and meaning gradually develops through a series of matching and mismatching responses, with a reparation process to reduce the infant's stress to the mismatched responses, gradually building resilience to stress. Problems within this system include timing, co-ordination difficulties, and the so-called 'messiness'<sup>1</sup> of relationship variables. For example, Ham and Tronick (2008) found a lack of synchronisation in the levels of activity between the sympathetic nervous system and cardiac activity when an expressionless 'still face' episode was displayed by the caregiver to the infant, followed by reunion episodes where usual social interactions resumed. However, they were positively co-ordinated through play episodes. This suggests that interactive play may have a special importance in the early development of relationships, with the competing systems of parasympathetic and sympathetic nervous systems, of the autonomic nervous system, both serving to generate affective activity of the amygdala, a small structure in the limbic system of the brain which plays an important part in the way emotions are experienced. The amygdala collates sensory information via the thalamus, more detailed information from the cortex, with additional contextual information from the hippocampus, forming a central part of fear conditioning (Le Doux, 1998).

The 'messiness' described by Tronick (2009) is suggested as serving a purpose in terms of human relationships, as the competing systems allow for development and change in a way that strict rigid systems could not. This flexibility of social systems provides the potential for

---

<sup>1</sup>Messiness in this context is defined as imperfect coordination between the infant and caregiver responses and affect, with the slight mismatch developing a breadth and flexibility to the interpretation of social meaning.

new co-created meanings to be formed (Fosha, 2009). Tronick (2009) suggests that new meanings developed are part of a developing relationship between individuals, citing the wide variations in the qualities of adult relationships as a rationale for rejecting the use of rigid templates for social interactions throughout life.

The route to the desired state of interaction is achieved through the use of shared meanings. Tronick (2009) asserts that meanings can be made from words or symbols, or with the key affects, behaviour and bodily processes, adding to the way an individual sees the world.

Ekman and Oster (1979) describe how the key affects that are universally recognised across cultural groups, are biological in origin, relating to orienting actions such as sucking, crying and defensive responses. Ball and Tronick (1971) demonstrated how infants of 11 weeks showed defensive responses and apparent psychological distress to a shadow (suggesting an impending collision), with corresponding physiological change when the 'threat' is removed and the infant's caregiver smiles. If such affects are as innate as Ekman and Oster (1979) suggest, then basic affects are present ready to interact with the caregiver. These basic affects have some meanings that change over time when there is an interaction with developing cognitive processes. Increasingly through the lifetime, the feelings of guilt and shame, (Nathanson, 1994), and feelings of guilt and intimate love (Davis & Panksepp, 2011), develop. Such feelings are described as 'secondary' emotions which develop as cultural and social influences integrate with affects over time (Tronick, 2009).

Innate affects are described by Izard (2007) as feeling and motivational components, which are generated automatically and unconsciously in order to activate evolutionary adaptive responses. Izard (2007) suggested core affects of interest, joy, sadness, anger, disgust and fear, which are similar to the affects identified by Panksepp (1998, 2005) linked to

neurobiological systems, and are responsive to interactions from caregivers (Izard, Fine, Mostow, Trentacosta & Campbell, 2002; Montague & Walker Adams, 2001, 2002). Meyer et al. (2013) suggest that within a negative and unresponsive environment, individuals may subsequently have some difficulties in self-awareness of affect processing, while Tronick (2009) suggests that affects become entwined with thoughts over time, increasing the extent to which they can remain unrecognised, yet retaining the capacity to trigger a flight or fight response, or evoke strong feelings, as neurobiological development is responsive to the environment. However, Shouse (2005) offers some clarity with the assertion that affect is an experience of intensity, while emotion is the social projection of a feeling which has been labelled, based upon previous experience. Therefore, while an infant may display affects as an emotional expression, the intensity of feelings originating from non-conscious affects, gradually becomes more controlled and socially constrained through childhood and adulthood.

An infant's expression of affect in such a direct manner is functional, given that an infant has no capacity for language, experience of feelings, or awareness of a need for social modification. It is also consistent with the right hemisphere of the brain developing more quickly than the left side of the brain, prior to the cortex becoming fully formed. (Perry, 2009; Schore, 2001). With development of the right hemisphere being central in developing secure attachment, regulating affective states, and coping with stress, Schore (2001) suggests that effective maturation of the right hemisphere is essential for adaptive mental health. Such development is dependent upon the contact with a primary caregiver providing physical, emotional, and social consistency (Izard & Ackerman, 2000; Schore, 2001).

## **Attachment and adaptive functioning**

The integration of neurobiology, affect and cognition is becoming increasingly recognised as relevant to understanding human psychology (Kernberg, 2006, Tomkins, 1981), with affect being recognised as a motivational system to drive individuals to meet their needs. An affective system that is lacking in development, or regulation, or that is inflexible, is less able to function well, leading to psychopathological symptoms (Daversa, 2010; Marshall & Kenney, 2009), and in some cases a predisposition for sexual offending (Creeden, 2013; Mangilio, 2012; Samenow, 2010; Simons, Wurtele & Durham, 2008).

Particular types of impairment have been linked to the behavioural characteristics of different types of offending, arising from the limbic system which plays an important role in the management of affect and motivation. The anterior cingulate cortex (ACC), amygdala, and orbitofrontal cortex (OFC), are key components of the limbic system from which the behavioural links to offending appear to arise, with activity levels within the amygdala seeming to be of particular note (Wilson, Hansen & Li, 2011; Siever & Weinstein, 2009). For example, individuals with high levels of psychopathic traits show a reduced level of social and emotional responding throughout the limbic system (Daversa, 2010; Fabian, 2010), that is consistent with a lack of concern about others, hypersexuality, and a lack of conditioned fear that increases the risk of anti-social and violent offending.

Diametrically opposed to this group are those who are socially fearful of other adults, with a high level of amygdala function. Fear of contamination and social phobia may also be linked to excessive amygdala activity with Obsessive Compulsive Disorder (OCD) patients demonstrating greater fear of contamination (Rachman, 2004) and reduced sexual functioning and disgust (Fontenelle et al. (2007); Vulink, Denys, Bus & Westenberg, 2006). It has been

suggested (Mitchell, Keylock, Campbell, Beech & Kogan, 2012) that fear of being contaminated by other people may give also be the root of social phobia, with sexual offenders against children. Within this offending group, the fear of contamination from contact with the bodily fluids of others seems to operate more strongly in terms of adults than children.

Such clear differences in amygdala activity with a link to the observed behaviour of social and sexual interactions suggest that neurobiological differences may play a part in sexual offending. While the examples of psychopathic offenders and offenders with OCD may be somewhat extreme examples, other more layered links between attachment and developing neurobiology have also been suggested, with levels of the neuropeptides oxytocin (OT) and arginine vasopressin (AVP) having a significant role in the social behaviours originating from the attachment process (Landgraf & Neumann, 2004; Mitchell & Beech, 2011; Wismer Fries, Ziegler, Kurian, Jacoris, & Pollak, 2005) and affecting amygdala activation as well as impacting upon the Hypothalamic Pituitary Adrenal (HPA) axis system and its' stress regulation role (Heim et al., 2010; Twardosz & Lutzker, 2010).

Luyten and Blatt (2011) suggest the attachment process is linked to the reward system of the brain, serving to reinforce social behaviour at an evolutionary level in order to develop pair bonding, sexual behaviour and maternal care. In addition, they propose the existences of a subsequent secondary level of attachment, developing the cognitive capacities for regulating affect and the use of adaptive coping strategies. Secure attachment may prepare an infant for subsequent adaptive behaviour as an adult through the formation of positive social relationships, along with stress and emotional regulation skills, and serve to develop 'broaden and build cycles' (Fredrickson, 2001). These 'broaden and build' cycles describe the way in

which a subset of positive affects such as love, joy, and play widen the range of an individual's cognitive processes, by encouraging exploratory activities, and seeking positive and safe interactions with others. This positive mindset then adds to an individual's resources through increased problem-solving and social support.

Therefore, should an infant be exposed to stress or threat, the infant will seek to be reassured by their caregiver. If such reassurance is not provided, a secondary strategy is used, with the infant desperately seeking to establish their main caregiver's attention, or alternatively may respond to the absence of their caregiver by withdrawing emotionally if separated from their caregiver. Both of these strategies have been linked to the development of anxiety disorders as adults, arising from attachment patterns of either anxious or disorganised attachment.

Such patterns have been linked to passive-aggressive behaviour, with a reluctance to become emotionally intimate with others, increasing the drive to seek sexual activity with strangers (Mitchell & Beech, 2011). A dismissive style of attachment tends to result from a cold or controlling care-giving style, and has been linked to the development of anti-social attitudes, and a style of interaction where impersonal sexual encounters may be preferred, such as promiscuous casual sexual behaviour, the use of prostitutes, and the potential to rape (Maniglio, 2012; Mitchell & Beech, 2011).

Those who do not develop the capacity to explore and develop a sense of autonomy during the attachment process, tend to be socially isolated and anxious as adults, remaining preoccupied with previous experience of feeling uncertain about others. Such adults may be more likely to sexually offend against children, owing to being somewhat fearful about approaching other adults to develop a sexual relationship, whilst feeling less threatened by the lower social status of children (Cohen & Galynker, 2012; Mitchell & Beech, 2011).

Therefore, when attempting to identify neurobiological differences within different sexual offending groups, it is perhaps the quality of attachment within adult relationships, along with corresponding sexual behaviours that are likely to reveal some divisions with the offending groups. The more specific indicators of abnormal neurobiology are most likely to be evident in the levels of emotional regulation, levels of social fear, anger, anxiety disorders (such as OCD), and resilience to stress, arising from differences in the quality of attachment.

The interactions between neurobiological development, attachment processes, affect and adaptive social behaviour, suggest that a systems theory approach to understanding sexual offending would contribute to current knowledge. Considering affect as a motivator for behaviour, rather than a response may be of benefit and advance the assessment and treatment of sexual offending. However, in order to achieve this, methods of assessing the levels and function of affect need to be established.

### **Aims of the thesis**

This thesis aims to explore the role of early care and the impact this may have upon neurobiological development and social functioning, and how this may fit into established theories of the development of sexual offending. In particular, the impact of early developmental experiences upon the similarities and differences between those who sexually offend against adults and those who sexually offend against children is considered. The specific aims of each chapter will now be discussed in turn.

### **Structure of the thesis**

Chapter 2 provides a systematic literature review which evaluates the existing research into the differences between sexual offenders with adult victims, compared with those with child

victims. Specifically, the review addresses whether or not early abuse or neglect might lead to neurodevelopmental differences that subsequently increased the propensity for sexually offending against adults or children.

Chapter 3 explores the psychometric properties of the Affective Neuroscience Personality Scale (ANPS; Davis & Panksepp, 2011). A scale designed to assess the sub-cortical primary affective systems, offering a potentially innovative approach to assess underlying personality traits developed through very early care experiences.

Chapter 4 describes an empirical study which investigated the utility of the Affective Neuroscience Personality Scale, and the extent to which this psychometric measure could identify differences between offending patterns and primary affective regulation. The study also included an assessment of mindfulness, using the psychometric assessment of Cognitive and Affective Mindfulness Scale-Revised (CAMS-R; Feldman, Hayes, Greeson & Laurenceau, 2007) to assess the extent to which the offending groups have the capacity to manage their primary affects. The overall aim of the research is to explore the extent to which affects arising from the core affective systems impacts upon sexual offending, and the age of the victim.

Chapter 5 discusses the findings in the context of the previous literature and considers how the outcome may be used to advance the assessment and treatment of sexual offenders. Future areas for research are considered in the light of these findings.

**CHAPTER TWO**  
**SYSTEMATIC REVIEW**

**The effects of early neglect and abuse and links to evidence of neurodevelopmental differences within adult male sexual offenders: A systematic review**

**Abstract**

Sexual offending continues to cause a substantial cost to society and while there has been a significant amount of research into the origin and treatment of sexual offending, there are many areas where knowledge is incomplete. Uncertainties and contradictions are frequently attributed to the heterogeneity of sexual offenders. Therefore, the current review sought to exploit the potential difference between the sub-groups of sexual offenders with child victims, against those with adult victims. The area of interest is the experience of the infant during the first 15 months of life, which is a period of neurodevelopment that can have an impact upon mental well-being through life. Given the frequently reported attachment differences between these two offending groups, the current review sought evidence that inferred this very early period of life had an impact that differed or was additional to the more social aspects of parental attachment.

A systematic review was conducted to identify literature where documented differences between adult male sexual offenders could be linked to neurodevelopmental difficulties due to abuse, or neglect very early in life. The review found eight studies with a quality of moderate to strong. The data was assessed qualitatively and odds ratios were calculated for study outcomes to aid evaluation.

There was some evidence for an interaction between neurodevelopmental features and other factors, but no firm conclusions could be drawn about the differences between the two offending groups from the studies reviewed. The strengths and weaknesses of the review are

discussed and suggestions are made in terms of methods and focus for future treatment and clinical practice.

## **Introduction**

Increasing numbers of sexual offences are being reported, with the most recent figures from the Ministry of Justice (MOJ) reporting that in the year ending September 2014, the number of sexual offences recorded by police in England and Wales was 72,977 with 20,049 convictions (MOJ, 2015). This indicates an increase of 22% in the number of sexual offences recorded by police from the year ending September 2013 (MOJ, 2015). Therefore, there is constant pressure upon the Criminal Justice System to provide effective treatment, clear risk assessments, and robust risk management strategies in the community. Reviews of the effectiveness of current sex offender treatment programmes tend to indicate a reliable but modest treatment effect (Hanson & Bussiere, 1998; Hanson et al., 2002; Hanson & Morton-Bourgon, 2005; Hanson et al., 2009). Nevertheless, methods to improve and further develop treatment programmes would be of clear clinical and social benefit.

More recently, studies upon the impact of ‘mindfulness’ skills used in sex offender treatment appear promising (Gillespie, Mitchell, Fisher, & Beech, 2012; Katehakis, 2009). The treatment needs being targeted by teaching these skills is one relating to the impaired neurodevelopmental process linked to early neglect, inconsistent care, and abuse by caregivers during the offender’s infancy.

While the introduction of ‘mindfulness’ techniques within sexual offending treatment programmes is relatively recent and at an early stage, the impact of poor early caregiving is a long-held source linked with offending generally, and in particular with sexual offending

(Harris, Mazerolle & Knight, 2009; Seto & Lulumière, 2010). Faulty early attachment processes (Bowlby, 2000), have been highlighted as a key pre-cursor to sexual offending (Marshall & Marshall, 2000, Ward, Hudson, Marshall & Seigert, 1995) as individuals who have been unable to develop a secure attachment style with their main caregiver, struggle to form close social bonds with others, or to manage their emotions effectively. Such interpersonal difficulties hamper the development of healthy sexual relationships, hence when accompanied by other difficulties, such individuals move closer to the commission of a sexual offence.

Studies which explore the impact of poor attachment have tended to focus upon the differences between those who have sexually offended against children and those who have sexually offended against adults. The rationale being that the individual's deficits are expressed in different ways during the commission of the sexual offence, with those sexually offending against children typically being less angry than those offending against adults, but more frequently expressing elements of social isolation. While some of these studies indicate differences between these two groups in terms of attachment style (Simons et al., 2008; Ward, Hudson & Marshall, 1996; Ward et al., 1995) other studies suggest that such treatment needs are difficult to link to a particular type of offending (Robertiello & Terry, 2007; Wanklyn, Ward, Cormier, Day & Newman, 2012).

Given the evidence that both neurobiological development and social development (through attachment) are indicated as pre-cursors to sexual offending, then both should be considered in understanding the development and treatment of sexual offending, as they will not necessarily have the same impact upon one individual. For example, a neglected infant may develop an increased neural fear response owing to a lack of a comforting carer before they

reach the age of 15 months (Schore, 2001, 2009). If the infant subsequently receives alternative care from a warm and responsive, they may still be able to form a positive attachment bond (Perry, 2009). In this case, less long-term damage may be apparent compared to a child abused emotionally or physically during the whole of their first 15 months of life.

As neurobiological development is sensitive to early attachment processes (Anda et al., 2006; Perry, 2009; Schore, 2001) the impact of attachment processes upon neurobiology has become an important aspect of understanding and treating sexual offending (Beech & Mitchell, 2005; Craissati & Beech, 2006; Mitchell & Beech, 2011; Ward & Beech, 2006). The quality of the attachment relationship impacts on an individual's neurobiological functioning for the rest of their life by shaping the stress response and the capacity to regulate affect (Anda et al., 2006; Schore, 2001; Schore, 2009). Within the first eighteen months of life, the brain relies on the interaction between the carer and infant through facial and bodily contact. This includes touching, holding, facial contact, vocal tones, eye contact and expressions of emotion. Through these methods the brain develops the capacity to regulate affect and stress, obtain optimal brain development and to regulate the autonomic nervous system (Perry, 2009; Schore, 2009).

For an effective and adaptive form of attachment to occur, it is necessary for the caregiver to have a degree of mindfulness and mental health in order to regulate their own affective responses when under stress (Fonagy, Gergely & Target, 2007; Perry, 2009; Schore, 2001). A mindful and affectively well-regulated carer will have the capacity to synchronise responses with the infant, amplify positive affects, and provide a sense of safety. Where the carer suffers from poorly regulated emotions, an infant will still be driven to form a dyadic

response with a carer, who may be either unresponsive or affectively volatile. The carer then becomes a source of fear and confusion, rather than safety and stability, leading to impaired levels of attachment and neurobiological development (Bowlby, 2000; Trevarthan, 2009).

Therefore, rather than seeking to explore only the type of social attachment processes between those who commit different types of offences, the underlying neurodevelopmental processes may offer some insight into the different treatment needs of individual offenders. If further understanding of an underlying neurodevelopmental problem can be considered alongside attachment style and overall functioning, the potential for understanding complex treatment needs would be increased.

It could be argued therefore, that studies of psychological effects are simply identifying a correlate of the risk factors, as opposed to identifying causal risk factors (Kraemer, Lowe & Kupfer, 2005). However, Kraemer et al. (2005) also assert that causal risk factors can be used to identify those of high risk of a particular outcome and provide a base for intervention. Therefore, even if mere correlates are being identified at this stage, if they can be shown to link to risk, treatment need and subsequent response to treatment, then the case for a causal risk factor may be made in the future.

**Objectives of the review:**

To determine if indicators of early neurodevelopmental damage have a relevance to sexual offending that differs from that of attachment style.

To determine if differences in neurodevelopmental damage indicators between those sexual offenders with child victims will differ from those with adult victims.

## **Method**

Preliminary searches of the following databases were undertaken on 9<sup>th</sup> September 2013 to assess the requirement for the current review: Cochrane Database of Systematic Reviews, Cochrane Database of Abstracts of Reviews of Effects, The Health Technology Assessment Database, Centre for Reviews and Dissemination, and The Campbell Library of Systematic Reviews. The preliminary search identified no relevant systematic reviews or meta-analyses on developmental emotional regulation or affective neuroscience and sexual offending. One systematic review of screening for psychological and mental health difficulties of young people who offend was ongoing (Health Technology Assessment Database: Issue 3 of 4, July 2013). However, this was based on young offenders who offend generally, rather than adult sexual offenders.

An initial scoping search of published literature revealed that achieving an appropriate balance between sensitivity and specificity would be difficult to achieve owing to the research question covering a relatively wide range of subject areas, such as Sexual Offending, Attachment, and Neurobiology. In addition, the research question is a relatively narrow one, and from examples of published research accessed it became apparent that the specific information sought was frequently reported as almost a ‘by-product’ of the researcher’s initial aims.

To address this difficulty and to complete the review within the time constraints available, here as well as electronic searching, hand searches of published work were also undertaken.

## Inclusion/exclusion criteria

To identify relevant articles, the abstracts were hand searched to see if they met the inclusion/exclusion criteria (as in Table 1). Appendix 2 is the predefined inclusion and exclusion criteria form used to shortlist articles. In cases where the abstract did not provide sufficient information to make this decision, then the full article was accessed and the criteria applied.

**Table 1**  
*Inclusion/Exclusion Criteria*

<b>PICO</b>	<b>Inclusion Criteria</b>	<b>Exclusion Criteria</b>
<b>Population</b>	Males aged 18 years or above at time of sexual conviction	Males without a sexual conviction when aged 18 years or above
<b>Intervention/Exposure</b>	Evidence that indicates infant neglect and /or abuse more likely than not to have occurred before the age of two years, retrospectively linked to assessments conducted by professionals	Psychological disturbance or distress that occurred in response to events, abuse or neglect beyond the age of age of two years and evidence that indicates a caring nurturing environment prior to the age of two years.
<b>Comparator</b>	Victim type (i.e. sexual offending against a child, or a sexual offence against a adult)	Cases where there is a crossover of victim type, or cases where it is unclear if the victim is a child or adult
<b>Outcome</b>	Standardised Assessments or Data analysis where the outcome is consistent with theory and neurological damage can be reasonably inferred from the data	Assessments not validated with an offender population, or administered by un-trained or unqualified assessors. or Assessments that do not align with the theory of neurodevelopmental damage.
<b>Study Design</b>	Case control and cohort studies	Case studies, reviews of assessment tools, narrative reviews
<b>Other Factors</b>	Year of publication: 1990-2013 Language of publication: English	Year of publication before 1990. Language of publication: Non-English

The inclusion/exclusion criteria were determined as follows:

**Population** - Two key factors were important in selecting the population criteria. The first was that the offender should have been formally convicted of a sexual offence to avoid any ambiguity about the severity of the treatment needed. The second key factor is that the offender should be over 18 years old at the time of conviction. This ensures that a degree of developmental maturity has occurred, thus reducing the wide range of possible confounding variables within the juvenile sex offender typology (Robertiello & Terry, 2007). In addition, the 'over 18 conviction' criteria will also limit (although not entirely eliminate the risk), of including those who have offended in the context of what is ostensibly a consensual relationship with a partner close to the legal age of consent. The alternative age limit of 21 years was considered, but dismissed following the preliminary search. This was due to a greater proportion of papers indicating less clarity in age at conviction, when offender groups were identified as adults. Studies of young offenders were generally much more specific about the age of conviction within their populations.

**Intervention/exposure** – Evidence that indicates infant neglect and /or abuse more likely than not to have occurred before the age of two years, retrospectively linked to assessments conducted by professionals. Such evidence is clearly limited by observation and recall bias (described below in Study Design), in addition to being beyond the reach of direct memory. Therefore, given that such remote evidence is the key focus of the current review, it necessarily must be gathered through inference from associations with subsequent behaviour and clinical symptoms. To render such inferences to be empirically robust, a secondary set of criteria, now commonly referred to as the 'Bradford-Hill criteria' (Hill, 1965; Appendix 7) was applied when reviewing studies. While Phillips and Goodman (2004) urge caution when

using the Bradford-Hill criteria to infer causation from observed associations, this tool provides a useful additional measure to systematically consider the weight of the associations and inferences made in the current review.

**Comparator** – The age of the victim provides the key comparison for this review, and a comparison is made between those who have offended against children and those who have offended against adults. Within the literature these two groups of offenders are more typically termed ‘child molester’ and ‘rapists’, hence these are the terms used within the literature searches in this review. Where offenders have been identified as having offended against both groups, victim crossover adds a confounding factor to the analysis. Therefore, in studies where crossover offenders have not been identified and excluded from the analysis, the study was deemed not to meet the quality standards for the review.

**Outcome** – One outcome criterion are the results of psychological assessments. The range of assessments administered across various countries and jurisdictions within the literature is vast, thus, the inclusion criterion specifies that assessments reported upon should ideally be standardised assessments validated within an offending population. Assessments that are not consistent with assessing the neurodevelopment of an offender with reference to the published literature, or measures of data that could reasonably be linked to the literature (using the Bradford-Hill criteria, Hill, 1965), were excluded. The Bradford-Hill criteria (Hill, 1965) provide a systematic method of assessing inferences of causation through the provision of standards by which to judge the available information (Appendix 7).

**Study design** – While randomised control trials (RCTs) are generally rated as the superior method for high quality investigations (Song & Chung, 2010) such trials would not be

possible for ethical reasons when investigating sexual offending as a control group as there would be implications for the offenders if kept incarcerated, or for the public if risk was not properly managed. There are clear advantages for using case-control studies, such as being able to explore a large number of variables with relatively few participants (Mann, 2003). In addition, Song and Chung (2010) assert that there is recent evidence that well designed observational studies can offer comparable levels of evidence to that of RCTs. Both Mann (2003) and Song and Chung (2010) suggest that case-control studies are particularly well suited and useful for the generation of hypotheses, allowing for the development of clearer definitions of conditions which will lead to clearer research questions for future RCTs. The main areas of possible bias from case-control studies in the current review are from sampling bias and from observation and recall bias. Sampling bias is likely to be minimal as the populations sampled will generally be providing both cases (i.e. both victim groups), although both groups will largely originate from a convenience sample, which might limit validity to some extent.

Two other issues of bias however are potentially present. Firstly, clinical review bias is a possibility as the availability of information may influence assessment of early difficulties, and could influence estimates of co-morbid effects (Deeks et al., 2003). For example, such bias may arise from the potential for the presence of neurodevelopmental difficulties to be assessed as more severe and significant by the assessor than within a wider population when not seeking this factor specifically.

The second possible area of bias is that of recall bias, where individuals vary in their presentation of past events (Petticrew & Roberts, 2006). Participants may tend to recall more difficulties, abuse and trauma in their own early lives when convicted of an offence for which

they may feel remorseful or socially embarrassed. Bias may be limited to some extent in this review as the original assessments and interviews will have been completed without the precise aim of the current review being known to either the assessor or the participant.

**Other factors** - The year 1990 was chosen as an appropriate start date for the search as it was considered early enough to capture the huge increase in the provision of sex offender treatment programmes from the early 1990s (Brown, 2010) from which there was a sharp increase in psychological assessments and research into the treatment of sexual offenders. In addition, key papers focussing upon early neurodevelopment and the impact of neglect or poor care were published from the early 2000s. Therefore, the time span used was chosen by working forwards from the date that key papers emerged early in the relevant fields. On this basis, relevant papers should be captured from this date.

Alerts for new publications meeting the initial search criteria were put in place at the time of the initial search and new publications were reviewed and included if they met the inclusion criteria and quality assessment. A time and financial constraint limited the search to English language publications, and therefore poses a limitation to the current review.

## **Method**

Preliminary searches of the following databases were undertaken on 9<sup>th</sup> September 2013 to assess the utility of the current review: Cochrane Database of Systematic Reviews, Cochrane Database of Abstracts of Reviews of Effects, The Health Technology Assessment Database, Centre for Reviews and Dissemination, and The Campbell Library of Systematic Reviews. In addition, within the Ebsco Host platform, PsycArticles, PsychInfo and Medline databases

were searched specifically to limit the search to systematic reviews, due to platform ‘limiters’ being dependent upon the databases selected.

The preliminary search identified two related systematic reviews or meta-analyses on developmental emotional regulation or affective neuroscience and sexual offending. One systematic review of screening for psychological and mental health difficulties of young people who offend was ongoing (Health Technology Assessment Database: Issue 3 of 4, July 2013). However, this was based on young offenders who offend generally, rather than adult sexual offenders.

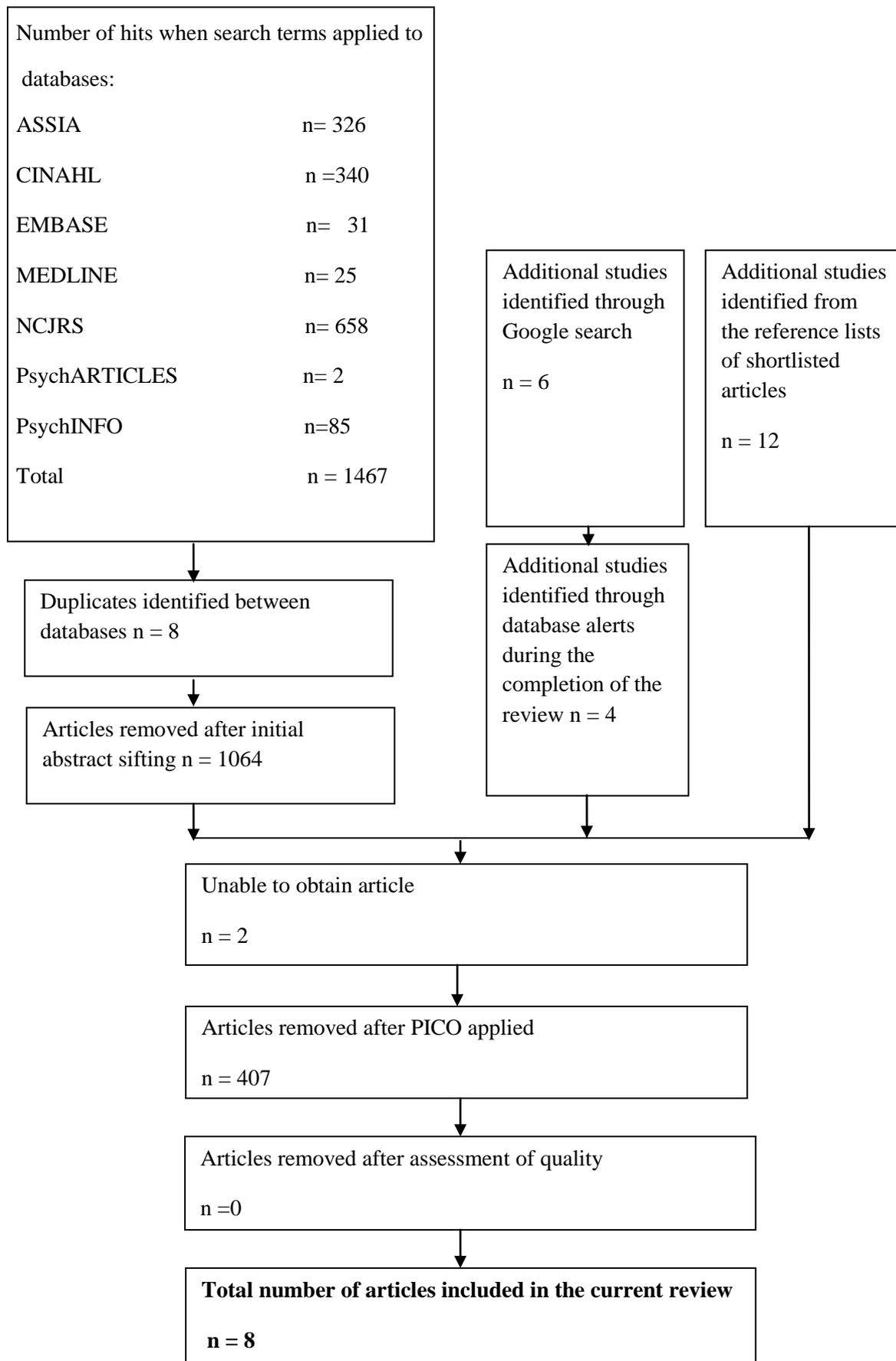
A review of the neuropsychology and neurology of sexual deviance (Joyal, Black & Dassylva, 2007) was identified on the Medline Database. This review found there was conflicting evidence and recommended that future neuropsychological studies should focus upon sub-groups of sexual offenders. Given the current review is to consider adult sexual offenders within the sub-groups of adult and child victim choice, neither of these reviews would address the review aims specifically.

In October 2013, seven databases were searched, having been identified through the scoping exercise and through examining reviews of similar topics. The main search process is detailed in Figure 1, and copies of the resulting process are appended (Appendix 1). An initial screening of abstracts resulted in identifying 1064 studies that were found within the search terms, but were clearly not in the desired area. Commonly found were studies of the impact and attitudes of the therapists and attitudes of sexual offenders. Other types of studies not relevant to the current review were of legal and community aspects of managing sexual offenders. A further major group of studies focussed upon adolescent sexual offenders and

the differences in victim types for those groups. Many of these studies had varying descriptions of adolescence which was dependent upon the legal system of the country from which the sample was drawn.

A conference proceedings search conducted through the two databases, Web of Science CPCI-SSH and Web of Science CPCI-S resulted in a total of 183 hits from the search terms documented in Appendix 1. An internet search (Google) revealed an extra six studies. References from key studies identified 12 additional studies. Key studies were identified by their relevance score on the screening and data extraction form. Two unpublished theses abstracts were identified but it was not possible to obtain the literature from the author. There were no additional examples of grey literature identified.

**Figure 1. Flow chart of search process**



## **Quality assessment of the included studies**

The quality assessment tool used in this systematic review was an adaption based upon a review of quality assessment tools by Deeks et al., (2003). Deeks et al. (2003) reviewed 194 quality assessment tools and concluded that tools developed for the review of non-randomised trials would assess the studies more purposefully and accurately than tools developed for randomised trials. They also identified six tools as particularly suitable for systematic reviews, although noted that all would need modification for each individual review. Two tools in particular influenced the development of the current data collection form and quality review tool for the current systematic review. These two tools, Zaza et al. (2000), and Thomas, Ciliska, Dobbins and Micucci (2004) provided a basis for the development of the specific data extraction form and quality assessment tool used in this review (Appendices 3 & 4).

A particular issue of concern raised by Littell, Corcoran and Pillai (2007) was that quality assessment tools should avoid combining the various aspects of quality ratings into a global rating. The issue may arise when ratings of internal quality, external quality, construct validity, and statistical analysis are combined into an overall rating. As Littell et al. (2007) point out; there is the potential for each quality aspect to vary in quality in opposite directions, or to conflate differing levels of quality. Therefore, if quality ratings are combined into a global quality score, bias in the assessment may occur. This was demonstrated by Herbison, Hay-Smith and Gillespie (2006), who found that having reviewed 43 overall quality scores, none reliably aligned the reviews into high or low quality studies. If quality scores are assessed for each aspect of the review separately, rather than being combined, Littell et al. (2007) assert that such a system avoids significant bias in overall quality assessment.

To avoid such bias in the current review, the quality tool developed (Appendix 3) uses quality scores for each section, with the overall assessment of quality relying upon identification of the overall strength of the study through the number of weak ratings evidenced as present, with a documented method of decision-making on the final quality assessment.

All of the selected studies were quality assessed by the current author, with a sample of 25% ( $n = 2$ ) of the included studies coded individually by second researcher who was a post-graduate practitioner, experienced in the treatment and risk assessment of sexual offenders and who was not involved in any of the studies assessed. There was broad agreement in coding, with the small number of minor coding differences readily resolved through a consensus approach.

### **Publication bias**

Publication bias occurs when missing studies are systematically unpublished owing to a small effect size, leaving a bias in the published literature (Borenstein, Hodges, Higgins & Rothstein, 2009). In this review, it was not possible to locate unpublished studies. It must be assumed that this is a possible weakness.

Publication bias can be further considered within a funnel plot which plots individual study standard error against its effect size. Large studies with a high number of participants will generally have a smaller standard error (SE) and therefore will typically be plotted near the top of the funnel plot and smaller studies with a larger SE will typically be plotted lower down the vertical axis.

However, for large or small studies, the spread of the plots should broadly match the shape of the funnel and be equally spread either side of the vertical axis. Given that smaller studies

need a relatively large effect size if they are to achieve statistical significance, and that larger studies are more likely to achieve statistical significance with a relatively small effect size, it could be argued that these studies are more likely to be published (Cumming, 2012). An indicator of potential publication bias (in favour of statistical significance over effect size), would be more studies plotted to the right of the vertical axis and fewer on the left. Given the low number of studies being assessed is less than ten, such analysis was deemed to be unhelpful. Therefore possible publication bias cannot be ruled out as a weakness in this review.

### **Effect size measure**

The odds ratio (OR) will represent the size of the association between the measured links to risk factors and the type of sexual offence committed. The OR is most often reported for dichotomous outcomes and so is particularly suited to the victim type of the sexual offender (i.e. child or adult victim). In addition, the OR can be calculated from other statistical information available within papers (Borenstein et al., 2009). The OR indicates the odds of a group with a particular risk indicator, being more or less likely to sexually offend against a child or adult, when compared to a group without that risk indicator. An OR of 1.0 indicates no association between risk indicator and victim type. An OR below 1.0 indicates a reduced association between risk indicator and victim type; an OR above 1.0 indicates an increased association between risk indicator and victim type. An OR equal or greater than 2.0 indicates a strongly increased association between risk indicator and victim type. (Littell et al., 2007). Confidence intervals of the odds ratio which include 1.0 indicate that there is no effect.

Table 2 - Outcome Date of the Systematic Review

Authors and year of study <i>(Assessed Quality)</i>	Design	Population	Country	Aim	Theory	Outcome	Quality of link to early neurodevelopmental difficulties
Cohen, Frenda, Mojtabi, Katsavakis, & Galynker (2007)  <i>(Strong)</i>	Case Control	837 convicted sex offenders released into the community	USA	To investigate whether sexual offenders against children have fewer traits related to impulsive aggressive traits compared to offenders against older victims	A multi-dimensional theory linking psychobiological traits with aberrant sexual desire	Offenders against children were less likely to use physical force or weapon (interpreted as less impulsive)  OR= 0.43 [0.22, 0.84] for lack of force.  OR = 0.45 [-.26, 0.78] for lack of weapon	Not a direct link but probable evidence of support in conjunction with other assessment techniques

Hudson & Ward (1997) (Strong)	Case Control	147 men consisting of sexual offenders, offenders and non offenders (across 4 groups)	New Zealand	To investigate differences between offending groups using assessments linked to early experiences	Attachment style variability leads to poor social skills in adulthood.	Staxi trait anger OR = 3.97 [1.69, 9.34]  Staxi anger expression OR = 7.63 [1.34 , 43.51]  Staxi anger control OR = 4.35 [1.85, 10.23]	Moderate as there are some links between attachment style and psychological risk variables
Leue, Brocke & Hoyer (2008) (Strong)	Case Control	98 sexual offenders and a control group of 51	Germany	To investigate bio-personality markers to offence types	Diathesis Stress Model (Meehl 1962), biological personality traits and links to offending	BAS Scale – FS OR = 2.65 [1.30, 5.40]  BIS OR = 2.43 [1.19, 4.94]	Strong – clear link between neurobiology and offending

						Non reward button OR = 2.3 [1.11, 4.60]	
Simons, Wurtele & Durham (2008)  (Strong)	Case Control	269 incarcerated sexual offenders	USA	To identify developmental experiences associated with child sexual abuse and adult rape	Attachment bonds and exposure to abuse impact differentially upon the risk of future sexual offending	Specific types of abuse varied with offence type:  Sexual Abuse Frequency OR = 17.56 [10.67, 28.85]  Physical Abuse Frequency OR =0.09 [ 0.06, 0.15]  Emotional Abuse Frequency	Moderate links between attachment styles, abuse and resulting social mal- adaption

						<p>OR = 1.05 [0.68 , 1.61]</p> <p>Domestic violence Frequency OR =0.13 [ 0.08, 0.21]</p> <p>Attachment Anxious OR = 5.18 [ 2.89, 9.30]</p> <p>Attachment Avoidant OR =0.21 [ 0.12 , 0.35]</p>	
Craissati, McClurg & Browne	Case control	Convicted sexual offenders	UK	To investigate parental bonding	Attachment theory and the theory that	Mother care OR = 0.41 [ 0.16 , 1.07]	Some links between attachment difficulties that may

(2002)  <i>(Moderate)</i>		referred to a community treatment programme		experiences of child molesters and rapists	faulty attachment leads to sexual offending as a maladaptive coping strategy	<p>Mother protection OR = 1.36 [ 0.53, 3.50]</p> <p>Father care OR = 0.54 [ 0.21 , 1.40]</p> <p>Father protection OR =1.07 [0.42 , 2.74]</p> <p><i>All CIs include 1.</i></p>	link to neurodevelopmental aspects
Graham, Kimonis, Wasserman & Kline (2011)  <i>(Moderate)</i>	Case control	Convicted sexual offenders being assessed for SVP civil detention n	USA	To investigate the association between PCL-R scores and childhood abuse	Childhood maltreatment results in desensitization and diminished affective	Offenders against children were twice as likely to have been abused as children OR = 2.05	Possible link between childhood neglect and type of sexual offending from biological temperamental

		=233			responding	(Confidence limits were not provided, but paper gave significance of p = .001, so the assumption that within CI of 95% could be made) Offenders against children were more likely to have experienced abuse	differences.
Levant & Bass (1991) <i>(Moderate)</i>	Case Control	Sample size small (total 64 across 4 groups)	USA	To investigate parental identification among offenders	Links between parental identification (especially violent parent) would determine offence type	A correlation between a lack of parental identity and offending types Mother ID OR 0.69	Poor- social learning could equally adequately explain the findings

						<p>[ 0.20 , 2.34]</p> <p>Father ID OR 0.73 [ 0.22 , 2.50]</p> <p>Parental ID OR 0.72 [ 0.21 , 2.5]</p> <p><i>All CIs include 1.</i></p>	
McCormack, Hudson & Ward (2002)  <i>(Moderate)</i>	Qualitative – Grounded Theory	85 convicted sex offenders across 2 groups. One of sexual offenders against children, one of sexual offenders	New Zealand	To investigate perceptions of early interpersonal relationships	Links between attachment theory, consistency of care giving, and sexual offending	<p>Boundaries- Mother OR =5.84 [ 2.50 , 13.66]</p> <p>Boundaries – Father OR =5.45 [ 2.34 , 12.71]</p>	Moderate – a good link between early negative interpersonal experiences and vulnerability to offending

		against adults				Autonomy OR = 3.18 [ 1.40 , 7.27] Sexual Abuse OR = 2.52 [1.11 , 5.70]  Safety Dimension OR =0.90 [ 0.40 , 2.06]	
--	--	----------------	--	--	--	--	--

## **Results**

Data extracted from the review studies which met the inclusion criteria and which also met the quality assessment criteria of either strong or moderate quality are summarised in Table 2. The number of studies resulting from the search criteria produced a low number of studies that met the inclusion criteria, and resulted in just 8 studies that met the criteria and that were also of adequate quality.

Of the studies included, there were four main themes, but each theme also incorporated other aspects of potential developmental variables. The four main themes were: Attachment, Interpersonal Variables, Personality Traits, and Developmental Experiences.

### **Attachment**

Three of the reviewed studies either focussed entirely upon aspects of attachment, or included an assessment of attachment within the review (Craissati, McClurg & Browne, 2002; Levant & Bass, 1991; McCormack, Hudson & Ward, 2002). While these studies consider that attachment is one of the key areas of exploration within sexual offenders, it is worthy of note that all three of these studies draw attention to the frequency of the inconsistency of caregivers, loss of caregivers, physical abuse, and sexual abuse, all of which are described as being factors associated with reports of poor attachment with significant others, rather than aspects of attachment itself. The McCormack et al. (2002) study went as far as to specify that one of the aims during their examination of offender's perceptions of their early interpersonal relationships was to identify problems such as difficulties with affect regulation. In this respect, the study has strong similarities with the theme of interpersonal variables.

The use of Grounded Theory within the McCormack et al. (2002) study allowed for a progressive and flexible approach to the study, gaining more information than the rather more limited scope of the scale used within the Levant and Bass (1991) study. However, the benefit of the Parental Identification Scale used in the study is that it allows for clear analysis between sub-groups within the sample population. In addition, the paper clearly points to abuse being typically present within the family relationship as an interactive variable, as well as highlighting personality and psycho-social variables within the offence-related sub-groups.

The Craissati et al. study (2002) was part of a much larger study of developmental variables (Craissati & Beech, 2001). Thus while this particular paper retains focus upon the Parental Bonding Instrument (Parker, Tupling, & Brown, 1979) for sexual offenders against children and sexual offenders against adults, the paper also reports the prevalence of adverse experiences in childhood such as emotional and physical abuse. As in the other two studies above (Levant & Bass, 1991; McCormack et al., 2002) the assessment tool used measures the offender's perception of their early relationships. Given that all three of these studies measure perceptions of early relationship quality, but also record significant adverse experiences, it is perhaps unsurprising that there is a general view of poor parental relationships among the three sample groups.

Two of these studies (Craissati et al., 2002; Levant & Bass, 1991) had relatively low numbers of offenders convicted of sexual assault against adults ( $n_2 = 19$  and  $n_2 = 16$  respectively), and this aspect of these studies is likely to have contributed to the confidence ratios of all the assessment measures demonstrating that within these studies the impact of an offender's perception of their parental relationship was not shown to differentiate in terms of the age of

victims. The Craissati et al. (2002) study found the following outcomes from the Parental Bonding Questionnaire: Mother care, OR = 0.41, 95% CI [0.16, 1.07], Mother protection, OR = 1.36, [0.53, 3.50], Father care, OR = 0.54 [0.21, 1.40], and Father protection, OR = 1.07, [- 0.42, 2.74].

Levant and Bass (1991) used the Parental Identification Scale, which was developed by Mark Levant, at some point prior to this study. It has not been possible to verify the validity or reliability of this tool, or to obtain a copy of the scale for examination and review. During the quality assessment process of identified studies, this issue was acknowledged as a potential weakness in the study and it was considered for exclusion from the review. However, given the study took place within a treatment facility and within a period of more general assessment of individuals, a level of additional clinical qualitative assessment was assumed to have taken place during administration of an assessment using bipolar adjectives. As it has not been possible to obtain additional information, the study was retained for review but it was noted that it could possibly be a study with some methodological issues and any conclusions should be viewed cautiously. The outcome measures from the study were as follows: Mother ID, OR = 0.69, 95% CI [0.20, 2.34], Father ID, OR = 0.73, [0.22, 2.50], Parental ID, OR= 0.72, [0.21, 2.5]. Therefore neither the Levant and Bass (1991) study, or the Craissati et al. (2002) study demonstrated practical substantive differences between the two sub-groups of sexual offenders when the odds ratio was calculated to provide the effect size.

Conversely, the McCormack et al. (2002) study did find some notable effects between the two sexual offender sub-groups in their study and the outcome measures were as follows:

Boundaries Mother, OR =5.84, 95% CI [2.50, 13.66], Boundaries Father, OR =5.45, [2.34, 12.71], Autonomy, OR = 3.18, [1.40, 7.27], Sexual Abuse, OR = 2.52, [1.11, 5.70], Safety Dimension, OR =0.90, [0.40 , 2.06]. These outcome measures indicate that sexual offenders with child victims reported both their mothers and fathers as exhibiting firmer discipline as parents towards them, demonstrated less autonomy and experienced more sexual abuse perpetrated upon them as children, compared to sexual offenders with adult victims. There are two main differences in this study compared to the other two studies above (Craissati et al., 2002; Levant & Bass, 1991). The first notable difference is in the increased number of participants and greater proportion of sexual offenders against adults ( $n_1 = 55$  and  $n_2 = 30$ ) in the McCormack et al. (2002) study compared to the other two studies ( $n_1 = 57$ ,  $n_2 = 19$  and  $n_1 = 18$ ,  $n_2 = 16$  respectively).

The second notable difference within the McCormack et al. (2002) study is the technique of eliciting information using Grounded Theory. The aim of this technique is to systematically develop concepts from initial descriptive data which may then inform a hypothesis which is further tested by the gathering of further qualitative data. This technique is therefore a responsive and dynamic one, which is described in some detail within the paper. The literature reflects strong debate about the value of the *Straussian* approach to Grounded Theory (Strauss & Corbin, 1990) compared to Classic Grounded Theory (Glaser, 1999). However, the methodological procedure undertaken by McCormack et al. (2002) is documented in a clear and sequential format (citing Strauss & Corbin, 1990) and that allows for evaluation by reviewers from either of the Grounded Theory perspectives.

A notable similarity between these three studies is the apparent limitation of trying to elicit perceptions of feeling from the three samples in these studies. In the McCormack et al. (2002) study, there were several clear effects between the two subgroups examined, apart from the *Safety Dimension*, a category examining offenders' perceptions of safety and security within the home environment. The other categories are recorded as being based upon relatively factual statements about their early life elicited from the participants, rather than being based upon their feelings about their early life. This is an interesting outcome and is one that bears further examination, perhaps in future studies or when considering the most effective type of interview techniques during assessment and treatment.

### **Interpersonal variables**

The interpersonal variable theme is a focus for two papers in the review (Cohen, Frenda, Mojtabi, Katsavakis, & Galynker, 2007; Hudson & Ward, 1997), although not exclusively so as Cohen et al. (2007) also review aberrant sexual arousal, with Hudson and Ward (1997) also considering attachment within their study. The Hudson and Ward (1997) study demonstrated the following outcomes: Staxi trait anger, OR = 3.97, 95% CI, [1.69, 9.34], Staxi anger expression, OR = 7.63, [1.34, 43.51], Staxi anger control, OR = 4.35, [1.85, 10.23] where clear effects are demonstrated between the sub-groups. However, there was no effect on the loneliness measure, fear of intimacy scale, hostility towards women scale, between the two sub-groups of sexual offenders within this review.

Interestingly, Hudson and Ward (1997) found an association between the attachment styles of the offenders and their fear of intimacy, loneliness, affective regulation, and attitudes towards women, regardless of their offence sub-group. In their analysis of this finding, they draw

attention to the importance of the interactions of these individual vulnerabilities, along with the relevance of considering these risk factors when delivering interventions. In addition, they drew attention to potential sampling variation owing to the outcome of this study being at odds with their previous research where those who had offended against children were found to be more emotionally lonely, and intra-familial offenders against children reported more fear of intimacy compared to those who offend against children who are unrelated to them.

The Cohen et al. (2007) study differed from the other studies within this review owing to the methodology of a large scale data analysis which did not involve direct contact with the offenders. While the large data set (n = 837) provides a great strength to this study, a possible weakness to be considered is the extent to which the individual characteristics are implied from factual records. Indeed this point is made quite clearly within the paper. For example, the measurement of an item such as the *use of force: physical/force violence* scored from data on the New York State Sex Offender Registry is used to infer the presence of the psychobiological trait of impulsivity. This issue is addressed directly in the paper and the point is made that this is an alternative form of assessment, but one which can support more traditional psychological assessments and advocates a multidimensional approach to the assessment of sexual offenders.

The outcome measures of the Cohen et al. (2007) study were that offenders against children were less likely to use physical force or a weapon, with the odds ratios: OR= 0.43, 95% CI [0.22, 0.84] for lack of force and OR = 0.45, [-0.26, 0.78] for lack of a weapon. These variables were deemed to be indicative of impulsive aggression, along with the variable 'threat or coercion'. While Cohen et al. (2007) acknowledge that less force may be necessary

to control a child victim; they draw on previous research linking neurobiological factors with aggression to make the functional link to the variables. Neurobiological factors were also indicated through PET scanning of offenders with a sexual preference for children, when compared to healthy controls. Differences in frontal and temporal lobe function were demonstrated (Cohen et al., 2002), with the evidence further supported by an assessment of the etiological factors behind the development of these risk factors. Therefore, while at first this study might appear to rely too heavily upon inference from behavioural variables, when the evidence within the paper is reviewed as a whole, it provides '*coherence of the evidence*' from the Bradford Hill Criteria (Hill, 1965) which specifies that the known facts should fit together when interpreting cause and effect.

### **Personality traits**

The two studies reviewed with personality variables as a link to sexual offending are Leue, Brocke & Hoyer (2008) and Graham, Kimonis, Wasserman & Kline (2011) which focussed upon Gray's Reinforcement Sensitivity Theory (RST; Gray, 1970). This theory was considered a useful topic for review in terms of sexual offending, as approach-avoidance behaviours in sexual offenders have been linked to affective regulation problems. The basis of RST is that it is a biological aspect of personality where appetitive reinforcers increase impulsive actions, whereas aversive reinforcers have little impact. Owing to anxiety being associated with some subgroups of sexual offenders, and anxiety is also associated with reaction to aversive reinforcers, Leue et al. (2008) used measures of RST (i.e. the behavioural approach system (BAS) and the behavioural inhibition system BIS) with the aim of differentiating between subgroups of sexual offenders. The outcome measures were as

follows: BAS Scale – FS, OR = 2.65, 95% CI [1.30, 5.40], BIS, OR = 2.43, [1.19, 4.94], Non reward button, OR = 2.3 [1.11, 4.60].

The study indicated that sexual offenders against children did demonstrate increased responses on the BIS, compared to impulse control disordered sexual offenders who demonstrated increased responses on the BAS. Impulse control also affected how sexual offenders responded to a change to a reward button, with the impulse control disordered sexual offenders demonstrating more difficulty responding to changes in a reward system. Biological underpinnings are also described within the Graham et al. (2011) study which considers the impact of childhood abuse and neglect upon sexual offenders who are assessed as having higher scores when assessed for psychopathic traits using the Hare PCL-R (Hare, 2003). While the inheritability of impulsive and anti-social tendencies is considered in terms of parents responding abusively in response to poor behaviour, and also considers a gene-environment interaction, the focus of the paper was largely upon the impact that abuse, especially sexual abuse, had upon the offenders during their childhood. In particular, Graham et al. (2011) concluded that the emotional detachment aspect of psychopathy was a reactive response to the trauma they had experienced, although they did not dismiss the possibility of underlying personality traits having an impact on the outcome measures. An important conclusion of the study was that sexual offenders against children were twice as likely to have been abused as children, compared to sexual offenders against adults. The OR was = 2.05 (Confidence limits were not provided, but the paper gave significance of  $p = .001$ , so the assumption that within CI of 95% could be made).

## **Developmental experiences**

Simons et al. (2008) focussed entirely upon developmental experiences to explore differences between sexual offenders against children and sexual offenders against adults. This was a large study ( $n_1 = 132$  and  $n_2 = 137$ ) with a range of assessments, and controlled with methodological rigour. For example, the classification of victim type was determined by official conviction statistics and verified by polygraph. The outcome measures indicated that specific types of abuse varied with offence type, and the odds ratios are as follows: Sexual Abuse Frequency, OR = 17.56, 95% CI [10.67, 28.85], Physical Abuse Frequency, OR = 0.09, [0.06, 0.15], Emotional Abuse Frequency, OR = 1.05, [0.68, 1.61], Domestic Violence Frequency, OR = 0.13, [0.08, 0.21], Attachment Anxious, OR = 5.18, [2.89, 9.30]. The Attachment Avoidant measure did not differentiate between types of offenders, with an OR = 0.21, [0.12, 0.35].

While Simons et al. (2008) make a strong conclusion about the links between attachment and abuse in terms of differentiating sexual offence victim types, in addition, the study also considers a wide range of variables that accumulate and interact with each other, resulting in maladaptive methods to achieve individual goals. This study demonstrates a rigorous and thorough approach to examining a wide range of developmental variables and provides some evidence for the need for “multiple abusive experiences” (p 551) for significant maladjustment to occur. However, family influences are considered as purely social learning issues and there is no reference to biological contributions to the aetiology of sexual offending.

## **Discussion**

Firm conclusions from this review cannot readily be made. However, the review was not expected or designed to clearly identify causal risk factors for specific sexual offences, but rather to identify potential differences in treatment and risk management needs, given the heterogeneous nature of sexual offenders. Nevertheless, it is anticipated that this review of case control studies provides a useful basis for future research studies. Kraemer et al., (2005) term case control studies as “Phase I” studies (p 225). They go on to describe such studies as offering guidance on the size and type of sample populations, how to focus upon the most promising risk factors, and how to assess and measure them.

## **Summary of findings**

While all of the studies within the review had clearly identified factors as goals, isolation of specific factors between the two offending groups proved to be difficult. Thus, within the three studies where the quality of attachment was the research target, other factors such as physical and sexual abuse along with affective regulation and personality difficulties, were all recognised as potentially confounding the outcome. In addition, given that the many of the measures within these three studies relied on adult perceptions of their parental relationships retrospectively, their current personality, level of affectivity, and memories of discrete episodes of trauma may also have influenced responses. Support for this view is offered by the key differences between the two offending groups in these studies being based on factual statements about their early lives, rather than early perceptions recalled through the prism of adulthood.

Nevertheless, historical facts in isolation are unlikely to provide the quality of information necessary in order to understand psychobiological responses. The Cohen et al. (2007) study used the use of weapons to assess levels of impulsivity in offenders. By itself, this measure may appear to be a superficial observation, but when combined with positron emission tomography (PET) scans of the same offenders, the strengths of assessing psychobiological traits through a combination of measures becomes apparent.

Simons et al. (2008) also found the recollection of factual information was valuable, as sexual and emotional abuse differed between the two offending groups, although physical abuse did not. Avoidant attachment again, did not differentiate between the two groups in this study, but there was a clear effect in terms of anxious attachment. Anxious attachment is associated with the expectation that others will not be accessible or responsive, and could reasonably be based upon previous experiences and be likely to hinder the development of positive social and sexual relationships.

Conversely, physical abuse was a differentiating factor in the Graham et al. (2011) study, suggesting that while an emotionally detached response to physical and sexual abuse may be an adaptive response during childhood, it could also be a precursor for later difficulties within adulthood. Offenders reporting either physical abuse or neglect in childhood had higher scores on the behavioural facet of the PCL-R. Graham et al (2011) found that only an interaction of abuse produced significant differences between offence types. While sexual abuse in childhood correlated with higher PCL-R total scores across offence types, the PCL-R affective facet scores were higher for offenders against children with a neglect history. Affective facet scores were also high for sexual offenders with adult victims, but a history of

neglect had no impact on the score. This study suggests that there may be a specific impact of neglect upon development, but this should also be considered in addition to the neurobiological aspects of the development of psychopathy. Therefore, the outcome from participants within this study may not generalise to sexual offenders with lower scores on the PCL-R.

The Leue et al. (2008) study suggested a response that differed from the more anti-social behaviour measured by the PCL-R in the Graham et al. (2011) study. They found that sexual offenders with child victims were more sensitive to negative reinforcement, and were more readily able to change their behaviour in response to a 'non-reward button' in experimental conditions compared to sexual offenders with adult victims. In addition, the study indicated that sexual offenders with child victims were more similar to non-offenders in terms of behavioural inhibition in conflict situations. This study was firmly based upon the psychobiological theory of Gray's (1970) reinforcement sensitivity theory, and the outcome offers an interesting link between early childhood and adult behaviour.

Autonomy measured as a differentiating factor within the McCormack et al. (2002) study, suggests a similar psychobiological link, with a more significant effect than the social boundaries of their mother or father. In a similar manner to the attachment studies, the recollection of feeling safe was not indicative of any differences between the two offending groups, even though sexual abuse was a significant factor.

Of the studies reviewed, the strongest effects are produced by the differences more closely aligned with neuropsychological processes (Cohen et al. 2007; Leue et al. 2008). This finding

suggests that as described by Pennington (2002), that it is functional neuropsychological systems which are impaired by inadequate early care, with resulting social difficulties being the readily observed superficial symptoms. The studies incorporating a multi-dimensional approach appear to have provided the most practical analysis of the interactions between psychobiological differences and the sexual offending pathway.

### **Methodological issues**

The size of sample populations is assessed as having a particularly important effect on the research reviewed with small sample size being one of the greatest weaknesses in the current review. The larger studies (Cohen et al., 2007; Graham et al., 2011) produced more evidence of risk factors. However, very large studies will be more likely to produce an effect whether or not an effect exists (Ellis, 2010). In this review the sample sizes tended to be polarised as providing either a very small sample or a very large sample. Future studies providing moderately large samples would perhaps provide an indication of the relevance of the apparent effects of the larger studies.

The polarisation of sample sizes could be explained by the difficulties of researching this area. As the reviewed studies demonstrate, it is either necessary to conduct individualised psychological assessments which are resource intensive, or alternatively to use large data sets and infer psychobiological correlates with documented behaviour. Therefore, development of identification of a psychological assessment or behavioural measures that can gather relevant information more readily would be beneficial.

An alternative process, suggested by Cohen et al. (2007) was to use a range of methods upon one sample. This could begin with a very large data set of official conviction statistics, move to a smaller sample of broad psychometric assessment with a moderate sample size within the same population, and then move to a still smaller sub-sample for in-depth clinical analysis. In this manner Kraemer et al.'s (2005) stages of investigation could be followed.

The studies in the review were generally case control studies. There are advantages to using this method for studying large numbers of individuals who are known to be within the outcome group of sexual offending. There is a risk of two forms of bias with this method, sampling bias and observation bias (Mann, 2003). Sampling bias might occur in the current studies through accessing convicted sexual offenders. It is possible that given the generally acknowledged low level of sexual convictions those who are convicted may represent some socioeconomic groups more than others, or represent differences in intellectual ability, differences in victim selection, or differences in the level of violence used in the commission of the sexual offence. However, of the studies reviewed, the use of populations of convicted sexual offenders for both cases may serve to limit the impact of such bias. The underlying area of interest is likely to be found (if it is present), even if a level of bias exists within the sample.

Mann (2003) recommends more than one control group from another population to assess the difference between groups. Although it could be argued that an unconvicted control group is so unrelated to the sample population that too many unknown differences are present. Song and Chung (2010) make the case that the validity of a study should be assured by both cases and controls meeting the same inclusion criteria. Such a view would support the comparison

of the two groups of sexual offenders within the same sample population, which occurs in all studies in this review.

While there are some limitations with case control studies, they are nevertheless considered to be useful for generating hypotheses (Mann, 2003), which can then be further explored by other methods. The strength of an influence upon the outcome can then be assessed by the calculation of an odds ratio to compare the likelihood of a predictor leading to the outcome. In terms of measurement of risk factors, this review indicates that measures of offender's perceptions of their early experiences may be a relatively poor measure. This was brought into focus in the McCormack et al. (2002) study where the elicitation of more factual evidence appeared to be at odds with offenders' perceptions. The measurement of perceptions also appeared to be contra-indicated in the Craissati et al. (2002) and Levant and Bass (1991) studies. Therefore, future research would be advised to use measures that do not rely entirely on perceptions of early interactions.

The reason that perceptual measures appear to be less effective when assessing the early lives of sexual offenders is of interest. Given that such assessment is retrospective, it would be important to consider that emotional and behavioural problems, such as attention-seeking or truanting result may have had upon the care-giving relationship. Such behaviours may be early indicators of personality disorder, originating initially arising from poor early neurodevelopment, which may then be either ameliorated or exacerbated by the responsiveness of subsequent care. Therefore, retrospective perceptions of the care-giving relationship will necessarily be prone to the bias of social memory, offering a possible reason for the limited effectiveness of perceptual measures of early childhood. This hypothesis

could not readily be explored through observational methods, so neural indicators of personality disorder precursors could perhaps be assessed alongside future observational studies. Methods of measuring brain waves, such as using an electroencephalographic (EEG) marker during a task to assess impulsivity in decision-making, could be used to indicate affective dyscontrol associated with personality disorder, at the level of the underlying trait (Howard, 2009). This would allow for individual differences between perception and neural responses to be compared, analysed, and understood in terms of their developmental history.

## **Conclusions**

The current review cannot conclude that indicators of poor neurodevelopment has a relevance to the aetiology of sexual offending which differs from that of attachment style, in that there are clear differences in the neurodevelopment of sexual offenders with child victims compared to those with adult victims. However, the review does suggest that an interaction of individual vulnerabilities within the attachment process may best be understood within a developmental systems theory approach.

The specific focus of this review aimed to consider the impact of neural development under the age of 2 years, upon sexual offending. This critical stage of development is frequently subsumed within general childhood histories, or limited by retrospective adult perceptions of memories that occurred later within childhood. While the seemingly intractable problem of obtaining data from this early age has naturally limited research into early neurodevelopment, new approaches are required if the understanding of the aetiology of sexual offending is to develop further.

From the outset of the review, it was clear that a high degree of inference from the available data would be necessary. However, the precision, validity, and breadth of data within many studies, was generally insufficient to provide the cohesive, theoretical and evidentially supported inferences required. Therefore, consistent reliable methods of assessing early neural development have not been achieved at this point. Nevertheless, the review has identified approaches that could achieve this aim more readily in the future.

The results of the systematic review suggest that the function of underlying neurobiological systems reflect the quality of early care, and these functional differences then play a part in the subsequent pathway towards sexual offending. Isolating these functional differences is difficult, with the outcome of the systematic review indicating that a range of assessment methods may be required to provide a sufficient level of coherent data to understand these early precursors of sexual offending.

### **Future recommendations**

Future research would benefit from a systematic phased approach (as described above) with particular attention given to the type of assessments used when conducting offender-facing assessments. In addition, clinical assessments and treatment programmes would also benefit from considering that complex risk and treatment needs resulting from early neglect and abuse are often poorly represented by attachment-style definitions.

Within the studies reviewed, the most consistent outcomes were those linking separate data sources, and also those having a neuropsychological basis, such as a psychometric measure of

the Behavioural Inhibition System, alongside a practical current test of impulsivity. The least consistent measures were those eliciting adult's perceptions of the quality of their early care.

Therefore, from the systematic review, the key components that appear to contribute the most to identifying underlying differences between types of sexual offenders, are assessments that target neurobiological systems, together with an assessment of their current psychobiological functioning. Psychometric measures based upon neurobiological systems, that are sensitive to variations in early care, alongside assessments of current adult behavioural propensities, may offer a practical method of gathering further information to extend the knowledge of the links between early neural development and sexual offending.

A psychometric measure with the capacity to assess sub-cortical affective systems, and assist with the identification of current motivators and inhibitors operating for sexual offenders would clearly be beneficial. The Affective Neuroscience Personality Scale (ANPS; Davis & Panksepp, 2011) was developed specifically to increase understanding of sub-cortical affect and its relation to evolutionary drives. It has not been used within a sexual offender population to date, so normative levels of positive and negative affects have not been established within this population. Therefore, given the ANPS may have the capacity to contribute to the psychobiological data of sexual offenders in an innovative manner, a review of the assessment is discussed within the next chapter.

**CHAPTER THREE**  
**PSYCHOMETRIC REVIEW:**  
**THE AFFECTIVE NEUROSCIENCE PERSONALITY SCALE**

## **Critique of a Psychometric Assessment**

This review examines the Affective Neuroscience Personality Scale (ANPS: Davis, Panksepp & Normansell, 2003) and its potential use within forensic populations for research and treatment purposes. The aim of the tool is to measure affective information processed by neuronal systems within the lower brain regions beneath the cortex. Davis, Panksepp and Normansell, (2003) focussed the tool upon six core affects which are common to all mammals (Panksepp & Biven, 2012) arising from evolutionary responses first described by Darwin (Davis & Panksepp, 2011). The development of affective neuroscience identified that these fundamental affects map onto sub-cortical limbic systems (Panksepp, 1998).

These fundamental sub-cortical affective systems were identified by Panksepp (1998, 2005), and labelled as SEEKING, ANGER, FEAR, maternal CARE, SADNESS, and physical PLAY. Panksepp labelled these words using capitalisation to differentiate these affects experienced at an unconscious (or anoetic) level, from those affects that humans experience and can describe at a conscious (or noetic) level. Learning and higher brain responses are assumed to be secondary to these basic systems (Davis & Panksepp, 2011; Panksepp, 2009; Panksepp & Biven, 2012).

Individual differences within the affects arising from these sub-cortical limbic systems are thought to develop from the very early experiences of an infant's life and are dependent upon the quality of attachment between the infant and caregiver (Bowlby, 1977; Perry, 2009). Feelings of fear or comfort for example, are interpreted at a somatic level (van der Kolk, Roth, Pelcovitz, Sunday & Spinazzola, 2005) and are moderated by the main caregiver. The quality of the emotional moderation attempts will be heavily dependent on the quality of the

attachment relationship. The value of the attachment process is dependent on the quality of the caregiver's own affective regulation (Pryce, 1992; Schore, 2001). Schore (2001) asserts that without an individual being able to regulate their own affective arousal, when becoming a caregiver they will simply be unable to regulate affect within an infant. Positive and regulated responses from the caregiver would not be limited to comforting a distressed infant, but would also amplify positive affects and include play in order to develop behaviour that is confident, and curious (Grossman, Grossman & Zimmerman, 1999; Schore, 2001).

Traumatic stress has been demonstrated to have an impact upon the regulation and development of neural networks, which are later indicated in long-term health, behavioural and social problems. Anda et al. (2006) found that the number of adverse childhood experiences had a strong relationship with the level of brain impairment where the developing brain is exposed to the stress response. Perry (2009) describes how the stress response being activated in a child feeling threatened in a repetitive or prolonged manner will alter the neural networks. An increase in the baseline of reactivity to stress then develops and the brain continues to react as if the child is under constant threat.

Perry (2009) further asserts that a lack of nurturing during the critical neural development period of the first three years of life had an enduring impact on the child's developing brain that continues throughout adulthood. Emotional and social disadvantage caused by a lack of appropriate nurturing have been identified as a fundamental link between development and offending behaviour (Farrington et al., 2006; Murray, Irving, Farrington, Colman & Bloxham, 2010), with many offenders being identified as having attachment difficulties. Sexual offenders in particular have been identified as having ongoing attachment difficulties as adults

(Craissati et al., 2002; Ward et al., 1996). The ANPS aims to identify neurobiological evidence of imbalanced affect due to early attachment difficulties. Identification of these underlying aspects of an offender's affective functioning may prove to be beneficial within their assessment and treatment.

Panksepp and Biven (2011), describe three levels of affect control within the brain, primary secondary and tertiary, within a nested model (Northoff, Wiebking, Feinberg & Panksepp, 2011) that allows for both 'bottom-up' and 'top-down processing' of affect. The primary process consists of raw affects that are sub-cortical and drive basic instinctual behaviours, such as approach and avoidance behaviours, along with homeostatic controls such as hunger and thirst. The secondary process is described as a learning and memory function which is largely an unconscious process. It includes behavioural and affective habitual behaviours, with conditioned responses operating at this level. The tertiary process provides the executive cognitive functions, and is also the level at which reflection and emotional rumination takes place. This nested model shares many features with the systems theory approach to the integration of neurobiological development and attachment theory (Meyer et al., 2013).

The circular nature of the interaction between the three levels of affective control described by Panksepp and Biven (2011), Meyer-Linden-berg, Domes, Kirsch & Heinrichs (2011) and Northoff et.al (2011) presents difficulties when seeking to measure the primary level of affect. The primary processes can initially occur without input from the higher cognitive processes, but over time these affective states contribute to the formation of psychological attitudes in cognitive processes. Farinelli et al. (2013) asserted that personality assessment scales are necessarily accessing responses from the higher levels of cognitive processing, of both the

secondary and tertiary levels; thus prone to distortion, suggesting an additional measure of setting specific tasks and measuring the explicit behavioural response. However, Coenen et al. (2011) argue that such a measure would still remain an amalgamation of primary, secondary and tertiary processes to some extent.

The ANPS scales are based upon the primary process level and are designed to measure the core affects elements, labelled, SEEKING, ANGER, FEAR, maternal CARE, SADNESS, and physical PLAY. (The scales are identified using capital letters to avoid confusion with the more familiar use of the words.) These core affects are linked to specific underlying brain systems. Davis et al. (2003) describe how each affective system targeted by the ANPS can lead to emotional disorders should they become unbalanced.

The early postnatal environment can interfere with developmental changes in the brain, resulting in increases in vulnerability for psychopathology within the neural circuits of endogenous opioids and the neuropeptides, Oxytocin and Vasopressin (Nelson & Panksepp, 1998; Nylander & Roman, 2012). Oxytocin and Vasopressin levels differ in children who have experienced early stress, and this has been linked to long-term neurobiological difficulties (Wismer Fries et al., 2005; McGraw & Young, 2009). Separation anxiety is alleviated in mammalian brains, and social contact is also rewarded by Oxytocin and Vasopressin. These neuropeptides are also involved in the moderation of affects, social control, and the regulation of stress responses (Engleman, Wotjak, Neumann, Ludwig & Landgraf, 1996; Landgraf & Neumann, 2004; Neumann & Landgraf, 2012).

Heim et al., (2009) found a decrease in oxytocin concentrations in response to prolonged abuse, contributing to an increased stress response, increased anxiety and a reduction in the capacity to form an intimate relationship. Oxytocin was also found to sharpen the ‘self’ versus ‘other’ boundary (Colonello, Chen, Panksepp & Heinrichs, 2013), which forms an important aspect of social perspective-taking. A lack of Oxytocin through social isolation could become a risk factor for sexual offending as an individual tries to meet their needs, but lacks the social skills, affective regulation skills and recognition of the boundaries of others.

The ANPS then, assesses the levels of core affects that operate at a sub-cortical level within neural circuits subjected to variations in levels of oxytocin and vasopressin during postnatal development. The levels of these neuropeptides vary depending upon the degree of stress, and the quality of social contact experienced by the infant during the attachment process. The resulting impact on affective and social functioning is of relevance when considering causal links to offending.

Of the six systems, the SEEKING system is considered to respond to stress in the most adaptive manner, as it is rational that an individual under stress should aim to seek for resources to improve conditions for survival. During periods of stress, dopamine levels rapidly deplete so dopamine receptors in some of the ascending systems become hypersensitive in order to maximise the effect of the little remaining dopamine in the system. The neuropeptide dopamine acts as a facilitator in this system, allowing other messages through. Without the presence of dopamine only the very strongest affects manage to develop enough power to trigger behaviour (Panksepp, 1998). The transmission of dopamine links the neural areas within the system to provide a co-ordinated response of both sensory and motor

processes (Farinelli et al., 2013). The purpose of the SEEKING system is to find ways to achieve biological goals such as food, drink and sex in anticipation of the goal. It uses somatic, cognitive and environmental information, linking to the cortical areas of the brain, to drive the behaviour forward. External events can also trigger a learned response (Farinelli et al., 2013), and when the goal is achieved through identifying the target of biological relevance, the brain activity reduces (Panksepp, 2009).

While the SEEKING system is linked to positive affects and sensation-seeking in relatively healthy brains, this system is also likely to be involved in disorders such as Paranoid Schizophrenia and Obsessive Compulsive Disorder, as displacement behaviours tend to occur to reduce their seeking behaviour (Panksepp, 1998). Given that analysis of neurobiological responses has found that specific dopamine neuron terminals within the amygdala and basal ganglia are especially prone to link instinctual tendencies to learned contingencies within this system, it is possible that the instinctual sexual drive could become linked to unhealthy, yet available methods of reducing activity in the seeking system. The capacity for displacement behaviours to become compulsive in rats has been demonstrated (Falk, 1971) but compulsive learned displacement behaviour in humans is yet to be evidenced. Nevertheless, evidence that the role of an adaptive neural motivational system can become disturbed and lead to maladaptive behaviour is well evidenced by the SEEKING system.

The FEAR system in the brain largely consists of the amygdala and the periaqueductal gray of the midbrain. This system is the origin of chronic anxiety when there is mild arousal of the system, to feelings of terror when the system is strongly activated (Panksepp, 1998), suggesting that different neuropeptides instigate different types of anxiety. When

psychological problems occur such as Obsessive Compulsive Disorder (OCD), Post-Traumatic Stress Disorder (PTSD) or more generalised social anxiety, it is thought these arise from the FEAR system through a hyper-sensitised ‘alarm’ component, or through an overly aroused pituitary adrenal stress response (Panksepp, 1998). Separation anxiety has been linked by Panksepp (1998) to a PANIC system that differs in nature from the more generalised FEAR system. The PANIC circuit has been identified by electrical brain stimulation and responds to oxytocin and prolactin during separation distress, reducing distress cries. Research across a range of species has demonstrated this effect and Panksepp (2009) links this to the development of the social bonding of the care giving process in humans. The calls of separation distress will either be responded to appropriately by the caregiver, or may be ignored to a point where the infant ceases to cry. Where there is not a strong social bond between the infant and carer, the cries of separation distress lead to irritation within the caregiver, potentially leading to abusive behaviour. The PANIC system in the brain can be over-sensitised to threat, or an individual can experience an increased pituitary adrenal stress response. (Panksepp, 1998) arising from early exposure to threat. The infant may not be comforted, or the ‘carer’ becomes the threat, producing a similar reaction to that described by Perry (2009) and Schore (2001, 2009), also resulting in problems with neuropsychological development.

Other neural systems identified by Panksepp (1998, 2011) are also likely to be disturbed by developmental variations. For example, the ‘CARE’ scale has emergent emotions of nurturance, love, and attraction, and it is suggested that an imbalance here can lead to dependency and attachment disorders. Equally, inadequate play skills (measured on the PLAY scale) may lead to less response to social rewards, or an increased tendency for attention-

deficit-hyperactivity- disorder to develop. Davis et al. (2003) also considered how social rejection could activate the SADNESS and ANGER systems, increasing anti-social tendencies or social anxiety, thus of relevance when considering offending behaviour.

### **Overview of the Affective Neuroscience Personality Scales**

The Affective Neuroscience Personality Scales (Davis et al., 2003) is a 112-item measure designed to measure the individual affects that link to the sub-cortical structures within the limbic system. There are seven subscales, six of which are described as primary subscales and focus on key affects. The key affects scales are split into two broad dimensions of 'Positive Affect' and 'Negative Affect' as shown in Table 3.

Items for six of the scales were written with the aim of accessing personal feelings and behaviour as opposed to more cognitive social judgements. The addition of the further scale of SPIRITUALITY was included on the basis of its relationship with alcohol addiction therapy and offered a 'Higher Emotion' dimension (see Table 1). A lie or social desirability scale included within the ANPS consists of just five items. The remaining items are described as 'filler items' by Davis et al. (2003), which could be used to explore any particular additional topic determined by the administrator. The disparity in the number of items within the SPIRITUALITY scale and the other six scales is explained by Davis et al. (2003) as part of the developmental process of the ANPS, with the intent of reducing all scales to just 10 items when further developed.

**Table 3**

*ANPS Dimensions and Subscales (from Davis et al., 2003)*

---

**A. Positive Affect**

1. PLAYFULNESS was conceptualised as having fun versus being serious, playing games with physical contact, humour and laughter, and being happy and joyful.

2. SEEKING was defined as feeling curious, feeling like exploring, striving for solutions to problems and puzzles, positively anticipating new experiences, and a sense of being able to accomplish almost anything.

3. CARING was defined as nurturing, being drawn to young children and pets, feeling soft-hearted towards animals and people in need, feeling empathy, liking to care for the sick, feeling affection for and liking to care for others, as well as liking to be needed by others.

**B. Negative Affect**

4. FEAR was defined as having feelings of anxiety, feeling tense, worrying, struggling with decisions, ruminating about past decisions and statements, losing sleep and not typically being courageous.

5. ANGER was defined as feeling hot headed, being easily irritated and frustrated, experiencing frustration leading to anger, expressing anger verbally or physically, and remaining angry for long periods.

6. SADNESS was conceptualised as feeling lonely, crying frequently, thinking about loved ones and past relationships, and feeling distress when not with loved ones.

**C. Higher Human Emotions**

7. SPIRITUALITY was defined as feeling ‘connected’ to humanity and creation as a whole, feeling a sense of ‘oneness’ with creation, striving for inner peace and harmony, relying on spiritual principles and searching for meaning in life.

The ANPS requires respondents to shade a circle within a four point Likert Scale rating which produces a clear response. This may prove frustrating to some responders who would prefer to respond in an ambivalent manner. (Kline, 2000). However, a four point response scale does reduce attempts to respond in a manner which might be perceived as socially desirable and also prevents respondents producing a neutral profile. The response scale is presented graphically which is considered less prone to error (Kline, 1986). Scoring for the items alternates between forward and reverse scoring in seven alternate blocks.

The ANPS does not have a professional manual. A scoring guide is provided within two papers (Davis et al., 2003; Davis & Panksepp, 2011). The initial normative data has been further developed by a range of researchers within clinical and non-clinical groups. Some of the key additional studies are listed within the Davis and Panksepp (2011) review, but this does not provide the type of cohesive and comprehensive summary that would be provided by a manual. Therefore, researchers and clinicians using the ANPS must seek relevant norms from across the published literature. This remains a notable weakness with the assessment to date.

In particular, the assessment has yet to be validated within groups of offenders. While psychometric assessments which lack normative data within offending populations are sometimes compared to clinical subgroups, Kline (1993) asserts that norms should be representative to be useful. Therefore, clinical samples would not necessarily be representative of offending samples. However, Nunnally and Bernstein (1994) argue that many normative samples are chosen by their availability, without being able to foresee all possible applications of a psychometric test during its initial development.

## **Reliability**

### **Internal consistency**

Internal Consistency is the degree to which items measuring the same characteristic vary. The smaller the level of variation, the greater the internal consistency as this indicates that the items are measuring one variable (Kline, 1998). A common method for assessing internal consistency is to use the measure of Cronbach's Alpha (Cronbach, 1951). A minimum level of internal consistency is generally accepted as .70 (Kline, 2000; Nunnally & Bernstein, 1994) to ensure a degree of similarity between the items of a scale. However, Cattell (1973) argued that the construction of psychometric tests with very high levels of internal consistency results in trivial test items.

Additionally, Kline (1993) asserts that broad areas of personality (e.g., extraversion) may not correlate highly with each other, even though the items may measure the psychological meaning of the trait. Therefore, Kline (1993) recommends an aim to achieve an alpha coefficient above .70, while urging caution if this rises above .90, particularly within the field of personality assessment. The rationale for such caution is that variables which do not correlate with each other provide the best predictors in multiple regression (Kline, 1998). Thus, Kline (1993, 1998) advocates a balance between achieving a high level of consistency of items, while avoiding items which are so similar to each other they reveal little of relevance in terms of personality variables.

Cronbach's alpha for the ANPS in the first paper (Davis et al. 2003) was reported to range from .65 to .86 across the scales. The PLAY and SEEK scales were below .70 and the FEAR, ANGER and SPIRITUALITY scales above .80 (Davis et al., 2003). Within the review of the

revised version, Davis & Panksepp (2011) report that unpublished multiple data sets all consistently produced reliability values above .70, thus reaching an acceptable minimum value.

Internal consistency has also been examined by other researchers with other samples. A validation of the French version of the ANPS (Pahlavan, Mouchiroud, Zenasni & Panksepp, 2008) obtained acceptable Cronbach's alpha levels ranging from .71 to .89, with the removal of some of the English items to improve the quality of the French psychometric. Equally, validation of the Spanish version of the ANPS produced acceptable internal consistency, ranging from .71 to .78 (Arbella, Panksepp, Manga, Bárcena & Iglesias, 2011).

However, a validation study by Pingault, Pougá, Grèzes and Berthoz, (2012) found the internal consistency of the SEEK scale to be below .70 which could mean that related variable outcome correlations may be missed on small samples. They assert that researchers using large samples need not be overly concerned, and reiterate that Nunnally and Bernstein (1994) did not advise an absolute threshold of the .70 figure for internal consistency, but rather encouraged consideration of how the measure would be used. It is of interest to note that within a small sample of just 48, Reuter et al., (2005) found that the internal consistency of the SEEK scale was good ( $\alpha = .82$ ). Nevertheless, Pingault et al., (2012) concluded that the SEEK scale could be improved in future versions of the ANPS.

### **Test-retest reliability**

Test-retest reliability is indicated when a psychometric test provides the same score for an individual when they take the test on separate occasions. Recommendations made by Kline

(1993) include allowing a suitable time span so the respondent cannot recall their previous responses, and a minimum correlation coefficient of .70 as an indicator of reliability.

The ANPS items are constructed on the basis that the sub-cortical affective systems characterise an individual's affective disposition, rather than assessing variations over short periods of time. While Davis et al. (2003) link such affective dispositions to the emergence of particular psychiatric conditions or behaviour in therapy, this aspect of the ANPS remains unexamined and could usefully be explored in future studies as there is currently no information pertaining to the test-re-test reliability on the ANPS.

## **Validity**

### **Face validity**

Face validity is the extent to which the items appear to reflect the purpose of the test.

Personality tests are frequently considered to have flawed face validity compared to the greater externally clear face validity of many intelligence tests. As Kline (2000) identified, "introspection as the history of psychology shows, is simply not reliable as a source of information" (p. 158). However, in this case, owing to the intentional attempts to provide a direct link between scale items and the affective systems of the participant, the items appear simple and direct. The test items are clear in that they seek responses about personal feelings and behaviour, thus the appearance of the test would link to its purpose which is to establish how respondents experience affects within their lives. Therefore, the face validity of the ANPS appears sufficient to aid the co-operation of participants.

## **Concurrent validity**

Concurrent validity refers to the level of alignment with other tests, assessing similar attributes. The ANPS has been compared to the Five-Factor model (FFM; Costa & McCrae, 1992) which has five key traits of neuroticism, extroversion, openness, agreeableness and conscientiousness. As the ANPS uses empirical evidence from affective sub-cortical systems it was reasonable to choose a comparison with a biologically based assessment, although based on a different aspect of a biological basis of personality. Nevertheless, one of the FFM dimensions is Extraversion and Neuroticism which had been supported through positron emission tomography (PET), and functional magnetic resonance imaging (fMRI), which identified neural mechanisms which could be associated with these aspects of personality. Therefore, this dimension at least shares a similar basis between the two assessments.

Interestingly, Kline (1993) asserts that it would be rare for a personality assessment to offer sufficiently valid measures with which to correlate new measures. Nevertheless, he identifies the measures of extraversion and anxiety in the Eysenck Personality Questionnaire (EPQ: Eysenck & Eysenck, 1975) as one of the few with sufficient validity to use for this purpose.

When compared to the FFM scales, PLAY was most strongly associated with Extraversion ( $r = .46, p < .001$ ). SEEKING was most strongly associated with Openness to Experience ( $r = .47, p < .001$ ) and CARING was most strongly associated with Agreeableness ( $r = .50, p < .001$ ). The three ANPS scales of FEAR, ANGER and SADNESS were all most strongly correlated with the FFM's low Emotional Stability ( $r = -.75, -.65, \text{ and } -.68$  respectively;  $p < .001$  in all correlations). The strongest correlation between an FFM scale and the Spirituality scale was with Agreeableness ( $r = .26, p < .001$ ) and was not analysed further as it did not demonstrate a high enough correlation with an FFM scale (Davis et al., 2003).

The FFM Conscientiousness scale did not produce a high correlation with any of the ANPS scales, although some low negative correlations with the ANPS scales of FEAR, ANGER and SADNESS were evident. Davis et al. (2003) suggests that conscientiousness may moderate the impact of these negative affects, although such suppression by higher order ‘top down control’ has been more recently questioned (Northoff et al., 2011).

Overall then, the FFM is not ideal in terms of concurrent validity, but is perhaps the closest available assessment. Therefore, there are significant limits upon the weight that could be placed on the concurrent validity of the ANPS.

### **Predictive validity**

Predictive ability is the extent to which a test can predict outcomes. For example, if a test indicates a high level of introversion, then a low level of social interaction would be predicted. The predictive validity of the ANPS with its many potential uses is not yet clearly established, although there are promising indicators for predictive use. For example, Montag, Fiebach, Kirsch and Reuter (2011) found that the FEAR and SADNESS dimensions of the ANPS were lower both individually, and when analysed together (as the composite trait of negative affectivity) in a particular genotype constellation which controls the levels of serotonin and oxytocin. Both serotonin and oxytocin play an important role in affectivity, with oxytocin also having a strong impact on social behaviour. This suggests that there is an inheritable propensity for aspects of personality that arise from the impact of genetic coding on the development of neural systems controlling the neurotransmitter<sup>2</sup> serotonin and the neuropeptide<sup>3</sup> oxytocin. Further, research by Savitz, van der Merwe and Ramesar (2008a)

---

<sup>2</sup> A neurotransmitter is a chemical transporting a message between the synapse of one neuron to another.

<sup>3</sup> A neuropeptide is a neural chemical messenger that has a direct influence upon particular behaviours.

indicated significantly higher scores on the SADNESS scale for individuals with bipolar spectrum illness when compared to relatives without the illness. There is currently a lack of research within specific offending populations where affective dysregulation may be expected, thus the predictive ability of the ANPS within sexual offenders is a current weakness.

### **Content validity**

Content validity refers to the extent to which items are representative of the variables that are being measured, and should be established prior to construction of the test (Nunnally & Bernstein, 1994). However, Kline (2000) asserts that it is only the content of ability tests that can reasonably be validated, suggesting it is not possible to do so with psychometric measures that measure other variables. Nunnally and Bernstein (1994) argue that even within ability tests value judgements about the importance of items is made; evidence to support content validity would be gathered from moderate levels of internal consistency, from circumstantial evidence and from concurrent validity. Therefore, even though the ANPS is not an ability test, indicators of content validity are considered.

Within the ANPS, the internal consistency of the SEEK scale does suggest some weakness in the content validity of this scale. Davis et al. (2003) reported the internal consistency of the SEEK scale was less than .70, but did not report the exact figure. A further validation study Pingault et al. (2012) recorded an internal consistency coefficient of .64. Examination of the items within the scale led Pingault et al. (2012) to be critical of some of the SEEK items and identified them as intellectually challenging owing to the reversed items within the scale. In addition, some of the items include the word 'problem', which showed a slight positive

correlation with the FEAR scale, indicating a possible flaw within the content of these items. This is of some concern when research will be conducted within an offending population containing respondents with 'borderline' and 'low' intelligence. However, to evaluate the ANPS used with a sexual offender population it will be important to compare the research data with the existing norms. Therefore, the SEEK items will be retained in their original form for the current research, although analysis of the results should carefully consider the impact of this potential vulnerability.

The theory underpinning content validity in the ANPS provides links between the clearly defined behavioural responses and the items to be tested. However, the underlying theory is dependent upon the scales being able to assess the relevant psychological attributes that occur in response to the underlying affective systems. Therefore, content validity in terms of circumstantial evidence is not available. Nevertheless, concurrent validity with aspects of the similarly based biological dimension of the FFM does support the content validity of two of the ANPS scales.

Davis et al. (2003) describe developing the items for the scale by attempting to avoid those with social judgements, choosing instead to focus on the behaviour rather than attitudes. The authors reached a consensus on the items following amendments and pilot testing. Therefore the development of the items would appear to meet an acceptable standard.

### **Construct validity**

Construct validity is the extent to which a test is based upon coherent theoretical foundations. The ANPS is based upon the theory that psychological characteristics are linked to an

individual's underlying neurobiology. Further, that these personality characteristics can be measured by self-report of feelings and behaviour. Panksepp has provided evidence that mammalian brains are evolutionarily disposed to experience key affects (Panksepp, 1998, 2005; Panksepp & Biven, 2012). Factor analysis of the ANPS resulted in two factors which split into negative affect and positive affect. These two factors are similar to Gray's (1970) Behavioural Inhibition and Behavioural Approach Systems and Watson, Clark & Tellegen's (1988) Positive Affect (PA), and Negative Affect (NA), factors. These measures offer some support to the constructs of the ANPS.

Kline (1993) asserts that construct validity is the most relevant indicator of validity for psychometric assessments measuring aspects of personality owing to the limitations of the other validity measures within this area. Given the biological evidence of the constructs, this area could be considered to be a particular strength of the ANPS.

Assessment of sexual offenders who have offended against children has been conducted using the FFM by Dennison, Stough & Birgden (2001). They found high values on the Neuroticism scale for intra-familial offenders, but even higher scores on the Neuroticism scale were found for extra-familial offenders. Given the comparison with the FFM during development of the ANPS, it would be expected that the ANPS might also discriminate in this manner.

The facets of anxiety, depression, self-consciousness and vulnerability on the Neuroticism scale were most notable within the whole of the sexual offender participant group. In addition, the Extraversion scale of the FFM scores was higher for non-offenders than for offenders, and such discrimination is also expected with the ANPS. However, additional discrimination

between offence types is predicted when the ANPS is used for assessment as opposed to the FFM, which proved to be ineffective in being able to differentiate between different types of sexual offences. The differences between offence types are expected to be within the ANGER and FEAR scales in particular, with general affect levels being less well regulated when compared to a healthy adult sample. Currently then, the ANPS could be said to be without adequate construct validity applied to sexual offenders, and therefore a suitably large sample should be assessed and evaluated.

### **Appropriate norms**

The initial normative data of the assessment included a high proportion of students and those with higher educational qualifications. Rather more diverse groups have been included in subsequent trials, although normative data for the assessment within psychiatric populations remains somewhat limited and thus poses a potential weakness for the use of the assessment. Specific clinical samples have participated in subsequent validation studies, although to date there has been no normative sample of incarcerated offenders, least still the specific sample of incarcerated sexual offenders.

In terms of the original sample population, it consisted of 214 students, of whom 171 completed all items were used in the analysis, with a mean age of 20 years ( $SD = 3.5$ ). The ANPS was also administered to 598 job seekers with a mean age of 41.9 years ( $SD = 10.3$ ). It was interesting to note that the norm of the jobseeker group differed somewhat from the student group, in that their responses recorded less negative affect. Davis et al. (2003) thus urged caution with groups who may be motivated to respond more positively.

Pahlavan et al., (2008) used a sample of 412 students with a mean age of 20.42 years (SD 1.81) in a validation of a French version of the ANPS. In addition a Spanish validation of the ANPS (Arbella et al., 2011) used a sample 411 of students with a mean age of 22.6 years (SD 3.43). In terms of sample size, this could be considered to be sufficient to establish the precision of Cronbach's alpha coefficient as the 95% confidence level for  $\alpha = .70$  would be reached when  $N = 300$  (Rouquette & Falissard, 2011).

Sample size recommendations in terms of what is appropriate in terms of factor analysis have typically been somewhat variable. One method suggested uses the ratio of the number of participants to the number of items and recommendations vary with a ratio of 10 to one made by Nunnally (1978) or a minimum sample size of 100 (Kline, 1986). The initial sample of a total of 769 participants completing the ANPS would have met Kline's suggested minimum, but would not have reached the Nunnally's suggested number. However, it has been argued that the foundation for determining sample sizes for factor analysis may lack precision (Rouquette & Falissard 2011) and recommend that a sample size of 300 is generally advisable, with an increase in number where the number of factors is large, where the number of items is low, and where Exploratory Factor Analysis is used to extract factors. Given the ANPS has a high number of items, and the factor analysis of the initial sample used Principal Component Analysis and identified two factors, the sample size would meet the average recommendation for the quality threshold of 250 (Rouquette & Falissard, 2011).

In terms of gender, the initial norms provided were comprised of a majority of female students. The second of the original two American samples did include a higher proportion of men (82%) within the job applicants, compared to the first sample of 23% within Psychology

students. However, while the norms for the more homogenous sample of job seekers are provided for the ANPS scores, the FFM tests were not administered to this sample so the analysis of concurrent validity could not include this group.

In a subsequent validation study by Pahlaven et al. (2008) the sample was comprised of Psychology students, again with a high proportion of women as the student norms given across both studies were 70% female. Additionally, in a further validation study of the ANPS, Pingault et al. (2012) draws attention to the potential flaws in this sample base citing Focquaert, Steven, Wolford, Colden & Gazzaniga, (2007) where differences in affective responses were evident between male and female participants, in addition to differences between psychology and science students. Therefore, Pingault et al. (2012) used a sample consisting of a broader range of participants studying a wider range of subjects. The sample consisted of 830 adults working or studying in various fields such as social work, psychology, art, biology, biotechnology and engineering. There was a good balance of male and female participants with 54.8% of the sample being women. The mean age of the sample was 20.6 years ( $SD = 2.1$ ) and the educational level of this sample was on the intermediate to high range which introduced limitations to the norm in terms of both age and education to the wider population, although clearly improving the norm for a student population.

However, Kline (2000) argued that homogeneity of a sample is of most importance, rather than the overall size and should be representative of a specialised population. While the ANPS is becoming increasingly applied and analysed in respect of psychiatric populations (Evans et al., 2005; Reuter, Weber, Fiebach, Elger, & Montag, 2009; Savitz et al., 2008a; Savitz, van der Merwe & Ramesar 2008b) limitations in the establishment of appropriate

norms clearly apply. Kline (2000) suggests that for special groups, sampling procedures should identify which variables are most highly correlated with the test and use those to stratify the sample and in addition proposes that samples could be built up over time when the minimum sample size cannot be met.

This principle of building up the sample size will need to be considered when using the ANPS with the highly specialised population of sexual offenders. The validity of the tool with this sample can be tested with a moderate sample initially, with higher numbers of application over time to build up robust and adequate norms.

## **Conclusions**

The ANPS offers much potential as a psychometric measure for core affects. It was developed from scientific research and fits into a wider theoretical base encompassing neurobiology, development and attachment. The ANPS also meets the criteria of psychometric test construction. Nevertheless, there are some concerns owing to its current stage of development. In particular, the lack of a professional manual is of some concern as most of the normative data for both clinical and non-clinical samples has to be sought within literature that has been published since the initial test development.

A further issue with the normative samples is that there is no offending sample currently available. It would be expected that the normative data for an offending sample would differ significantly from the non-clinical sample as well as across different offence types, albeit on a continuum rather than as distinct categories, owing to sexual offenders being a heterogeneous population. As suggested by Robertiello & Terry (2007), the characteristics and motivations

of sexual offenders may provide a better defined target for effective treatment than the type of victim. While normative data for clinical samples may offer some level of comparison, it would be important for researchers using the ANPS with offenders to consider the type of offending and offer hypotheses for the expected outcome measure. In addition, adequate normative samples for both general and sexual offenders may need to be built up over time.

The SPIRITUALITY scale of the ANPS was included as a topic of interest by its developers, and was not based on the same theoretical basis as the other scales. Pingault et al. (2012) did not include the SPIRITUALITY scale within their validation of the ANPS owing to it being developed from a different model. Therefore, researchers using the ANPS for a neurobiological perspective of affect may consider this scale to be somewhat superfluous and may also choose to remove those items.

The items of the SEEK scale could be improved as it was found to lack internal consistency with some smaller samples (Pingault et al., 2012). This leaves somewhat of a dilemma for researchers wishing to use the ANPS with specific samples as to alter the SEEK scale would mean there were no normative data with which to compare their sample. Therefore, until an improved SEEK scale has been constructed and large sets of normative data are available, it may be prudent to retain the current scale, being mindful of its potential limitations.

Future research with the ANPS should focus upon its utility within offending populations, and in particular within sexual offender populations. While researchers will need to consider some of the limitations in the current state of development of the ANPS, it is potentially an important tool in terms of the assessment and treatment within offending populations.

Psychometric comparisons aiming to assess the neural basis of any differences between differing types of sexual offender, will necessarily be measuring a degree of second-order functioning. Therefore, concurrent administration of an additional psychometric assessment, also having a theoretical basis linked to neural development and attachment theory (such as an assessment of mindfulness), would provide an additional perspective, and would also add to the evidence base for neuropsychological testing.

The ANPS may offer particularly useful insights into the aetiology of sexual offending, targeting positive and negative core affects, and the underlying neural systems responding to neuropeptides such as oxytocin. These targets could potentially provide indicators relating to the quality of the attachment process in a novel and informative manner when assessing sexual offenders. Empirical research using the ANPS within a sexual offender population is described and discussed within the next chapter.

**CHAPTER FOUR**

**EMPIRICAL RESEARCH:**

**COMPARING MEN WHO SEXUALLY OFFEND AGAINST ADULTS AND MEN  
WHO OFFEND AGAINST CHILDREN ON MEASURES OF AFFECT AND  
MINDFULNESS**

## **Empirical Research: Comparing men who sexually offend against adults and men who offend against children on measures of affect and mindfulness**

### **Abstract**

Difficulties in regulating affect and insecure early attachments are factors frequently associated with the risk of sexual offending. The extent to which affects are based in core neurobiological processes and affect imbalance might be managed by mindfulness skills, is of interest for understanding and treating sex offenders. A prison sample of 93 convicted sexual offenders was compared on two self-report psychological measures, one assessing experience of basic affects linked to neural processes, and the other assessing current aspects of mindfulness. Offenders had either sexually offended against children (n=64), against adults (n=18), or both (n=11). Few significant differences were found between the offending groups, on either the Affective Neuroscience Personality Scales (ANPS), or the Cognitive and Affective Mindfulness Scale Revised (CAMS-R). However, differences were found compared to non-offending populations, with lower levels of affect on the PLAY and SEEK scales within sexual offenders. This suggests that a lack of positive affects associated with social interaction and autonomy, may impact upon sexual offending more fully than the prevalence of negative affect. In terms of mindfulness, there was a positive correlation with the SEEK scale of the ANPS, and negative correlations with the FEAR, ANGER and SAD scales. The results provide some support for links between levels of neural affect and levels of mindfulness, suggesting the neural affective systems that the ANPS scales are designed to assess may also reflect the security of early attachment processes. Given the correlation of ANPS scores with CAMS-R mindfulness scores, the results suggest that increasing levels of mindfulness within sexual offenders may prove to be a beneficial additional intervention, in order to improve affect regulation and the ongoing impact of early insecure attachment.

## **Introduction**

Theories of sexual offending incorporate dynamic variables such as deviant sexual interests, socio-affective problems, and difficulties with self-management and self-regulation (Beech & Ward, 2004; Craig, Brown, Stringer & Beech, 2005; Hanson & Harris, 2000; Hanson & Morton-Bourgon, 2005; Mann, Hanson, & Thornton, 2010). Emerging evidence indicates that neurobiological processes are linked to the psychopathology of the dynamic risk factors of sexual offenders. As neurobiological development is sensitive to early attachment processes (Anda et al., 2006; Perry, 2009; Schore, 2001) the impact of attachment processes upon neurobiology has become an important aspect of understanding sexual offending (Beech & Mitchell, 2005; Craissati & Beech, 2006; Mitchell & Beech, 2011; Ward & Beech, 2006). The quality of the attachment relationship impacts on an individual's neurobiological functioning for the rest of their life by shaping the stress response and the capacity to regulate affect (Anda et al., 2006; Schore, 2001; Schore, 2009). Therefore, attachment, neurobiological development, and emotional regulation are all factors relevant to sexual offending, particularly when considered within a dynamic systems approach to development (Fogel et al., 1992; Smith & Thelan, 2003).

## **Treatment effectiveness**

Current treatment programmes are based largely upon cognitive behavioural interventions, and a level of treatment success has been demonstrated by fairly consistent, yet modest gains (Hanson et al., 2009; Lösel & Schmucker, 2005). However, a recent systematic review of treatment for adult perpetrators of sexual offenders against children, found from eight studies there was a lack of evidence of any treatment effect (Långström et al. 2013). Overall, such reviews suggest that current treatment is targeting appropriate areas of need, while at the same

time raising the possibility that either broadening or specialising aspects of treatment need might increase the rate of effectiveness further.

Defining the differences between those who sexually offend against children and those who sexually offend against adults has proved to be problematic, owing to a high degree of heterogeneity within both of these sexual offending populations (Joyal et al. 2014; Robertiello & Terry, 2007; Wanklyn et al. 2012). Robertiello and Terry (2007) described a range of typologies developed to tackle the range of motivations, victim preferences, and risk of reoffending within each category. Efforts to classify these variations included the development of a dual axis classification system of sexual offenders with child victims (Knight & Prentky, 1990), and classification of nine sub-types of rapists, leading to Robertiello and Terry (2007) concluding that typologies of sexual offenders should be considered as a continuum, as opposed to constrained categories.

The systematic review within Chapter 2, highlights the inconsistencies and difficulties when identifying differences between those sexual offenders who choose child or adult victims. Comparison studies providing dual or multiple sources of data appear to offer the most clear evidence, suggesting that a number of data sources within study samples may be an effective method to develop research in this area. Of those studies within the systematic review, those linking neurobiological evidence with current behavioural evidence demonstrated the greater differences between those who sexually offend against children and those who sexually offend against adults (Cohen et al. 2007; Leue et al. 2008). This finding supports the need to consider the function of neurobiological systems, combined with their behavioural expression,

rather than considering behaviour as isolated symptoms (Pennington, 2002; Ward & Beech, 2006).

### **Affect and measurement**

The Affective Neuroscience Personality Scale (ANPS), (Davis et al., 2003; Davis & Panksepp, 2011) was designed to measure the sub-cortical brain systems linked to primal affects. It was developed to measure the activity in these affective systems that link to temperamental variability, and is described as measuring 'core' elements of affective experience, originating from the evolutionary development of the brain shared by all mammals (Panksepp, 2006; Panksepp, 2009). The ANPS is based upon basic neural circuits of the mammalian brain that provide the motivation for biological survival.

Pennington (2002) describes the motivational system as being at the lowest level of innate mammalian behaviour, with behavioural responses that can be demonstrated by stimulation of key circuits in the brain (Panksepp, 1998). Humans can describe their experience following electrical stimulation of specific brain circuits and this can be compared to the behavioural responses of other mammals (Panksepp, 1998; Panksepp, 2005), and neuroimaging studies demonstrating that animals and humans show similar neural responses to care-giving (Davis et al., 2003). Similarities in these key circuits can then be inferred as the key basic circuits are identified. These basic neural systems offer specific benefits to survival in evolutionary terms, by motivating to approach or avoid goals. Conversely when these systems become imbalanced, mental health or personality disorder difficulties may emerge (Coenen, Schlaepfer, Maedler, & Panksepp, 2011; Farinelli et al., 2013; Savitz, van der Merwe & Ramesar, 2008a, 2008b; Panksepp & Biven, 2011).

There are similarities to this theory with some of the other biological theories of personality characteristics, such as the biological theory of personality, (Eysenck, 1967), and the reinforcement sensitivity theory of Gray (1970). These theories are based upon differences in cortical activity, resulting in measurable differences in temperament. Eysenck (1967) linked levels of cortical arousal to the traits of extraversion and introversion, while Gray (1970) focussed more upon motivational systems shaping adaptive behaviour by moving towards goals to aid survival and moving away from threats to survival, indicating a neurobiological sensitivity to reward and punishment. Elliot and Thrash (2010) linked these theories, describing how approach and avoidance temperaments can encompass these theories from a neuropsychological perspective. Similarly, the ANPS is designed to assess the biological basis of the systems that produce psychological symptoms and personality characteristics (Davis & Panksepp, 2011; Panksepp, 2006), driven by core affects that promote survival.

### **Mindfulness and measurement**

Mindfulness is most frequently described as an attentive, non-judgemental focus on the present moment experience, with the aim of avoiding any secondary processing. More recently, Vago & Silbersweig (2012) developed a neurobiological model for the process of mindfulness, drawing links between mindfulness, self-regulation, and motivation. The model is described as having particular relevance to the treatment of psychological disorders, with both internal and external motivators operating as neurocognitive processes.

Motivation is also a key feature of Social Mentality Theory (Gilbert, 2005, Gilbert & Procter; 2006), which is based upon an evolutionary model, with three affective and motivational systems; the drive and resource seeking system, the soothing and affiliation system and the

threat and self-protection system. There are clear similarities to the work of Panksepp (1998, 2006, 2009), although Gilbert places greater weight on the need for social signals to activate either the positive or negative affective systems. The importance of social signals as activators for the survival system is due to Gilbert placing the individual's experience as not simply seeking survival, but as part of the much more complex experience incorporating thoughts and feelings which are socially developed through interactions with others, but still driven by the neural systems providing affect and motivation.

A link to attachment theory is made by Gilbert and Procter (2006), with early neglect and abuse being particularly linked to a lack of activation and maturation within the affiliative system leaving a long-term deficit in the capacity to feel soothed and calm, and primed to react strongly to the negative evaluation or criticism of others with a stress response (Dickerson & Kemeny, 2004). Gilbert and Procter (2006) assert that compassion or mindfulness therapy can positively develop the affiliative system and improve affective regulation.

Mindfulness therapies have more recently demonstrated promise in tackling adult distress, trauma and ongoing affective disturbance, based on the premise that this is addressing the damage caused by early care that was harmful, neglectful or unresponsive. While mindfulness therapies may be a beneficial addition to cognitive behavioural therapy, to treat underlying neurobiological issues presenting as poor interpersonal behaviour and affective dysregulation, the process by which this occurs is not yet fully clear. One line of thought suggests the benefit of an improvement in cognitive flexibility to vary or maintain either positive or negative affects in order to achieve an adaptive response (Chambers, Gullone &

Allen, 2009; Taborsky & Oliveira, 2012), whereas others have suggested increased attachment security leads to an improvement in affective regulation (Kashdan & Rottenberg, 2010; Pepping, Davis & O'Donovan, 2013).

With links between mindfulness and positive affect being identified as part of its beneficial influence, and negative affects such as anger and fear frequently identified within sexual offenders, identification and measurement of levels of mindfulness and measurement of negative affect may help to identify if these two differing factors operate on the same key neural circuits. Therefore, this suggests that mindfulness techniques work at becoming aware of disturbing affects as a process rather than becoming aware of their content. Equally, more awareness of affective processes can also develop and maintain the evolutionary advantages of affective reactions. In this way, with practise, the attentional processes become more automatic, with changes in the function and structure of the brain becoming measurable within experienced meditators (Grant, Courtemanche & Rainville, 2011; Way, Cresswell, Eisenberger & Lieberman, 2010).

An additional aspect of the benefits of mindfulness practise comes not just from its apparent benefits to mental ill health, but also its correlation with the positive aspects of attachment, with Shaver, Lavy, Saron and Mikulincer, (2007), finding a relationship between mindfulness and secure attachment within interpersonal relationships. Shaver et al. (2007) also found that all five facets of mindfulness measured by the Kentucky Inventory of Mindfulness Skills (KIMS; Baer, Smith & Allen, 2004) were predicted by two attachment measures measured by Brennan, Clark and Shaver's (1998) scale of attachment insecurity, using the Experiences in Close Relationships Scale. Low scores on three mindfulness facets: reactivity to inner

experience, acting with awareness and non-judging of experience were related to attachment anxiety. Low scores on all five mindfulness facets (also including observing perceptions, thoughts, and feelings and describing with words) were associated with avoidant attachment. These outcomes suggest that improving awareness of inner experience through the practice of mindfulness skills might improve relationships and psychological health, further supporting Gilbert's (2005) theory that both the affiliative system and affective regulation systems benefit.

Of the various measures that have been developed to measure mindfulness, the revised Cognitive and Affective Mindfulness Scale (CAMS-R; Feldman et al., 2007) was selected as the most suitable measure owing to its sensitivity to psychological disturbance. Analysis of the facet structure of mindfulness through the examination of five mindfulness questionnaires (Baer, Smith, Hopkins, Krietmeyer, & Toney, 2006) found that the CAMS-R questionnaire correlated more closely with the variable of psychological symptoms, than four other mindfulness questionnaires, including the KIMS (Baer et al., 2004). One exception was Alexithymia, a condition where individuals are unable to recognise and describe their feelings.

In a similar manner to the KIMS (Baer et al., 2004) the CAMS-R measures response tendencies assuming that they will be stable across situations, but recognising they can be modified through experiences including mindfulness training. The capacity to measure change in mindfulness following intervention would be beneficial for treatment groups. In addition, the wording of the items has been developed so that specified time periods can be explored

which further enhances its efficacy to measure the effectiveness of interventions, should its value within sexual offending populations be demonstrated.

Additional beneficial aspects of the CAMS-R (Feldman et al., 2007) for this study include its relatively short nature having just 12 items, while the items cover the whole range of mindfulness facets. It also has a four point Likert scale which would avoid confusion when presented together with the ANPS scale.

### **Aims of the study**

Testing the effectiveness of both the ANPS and CAMS-R within the convicted sexual offender population allows for two psychometric assessments to seek differences between two sexual offending groups; those with child victims and those with adult victims. Any differences found between the two groups may indicate differences within underlying psychobiological functions. The concurrent assessment with both scales aims to assess the extent to which levels of mindfulness link to a neurobiological basis of affective regulation within sexual offenders, using two differing, but complementary perspectives, focussing upon innate motivational systems.

Specifically, the following hypotheses were investigated:

#### **Hypothesis 1**

There will be significant differences between sexual offenders who have offended against children, compared to those who have offended against adults on the affect scales of the ANPS.

#### **Hypothesis 2**

The negative affect scales of the ANPS (FEAR, ANGER, & SAD scales) will be significantly

higher within sexual offenders compared to a non-offending population.

### **Hypothesis 3**

The negative affect scales of the ANPS (FEAR, ANGER & SAD scales) will show a significant negative correlation with levels of mindfulness measured by the CAMS-R.

## **Method**

### **Selection of participants**

All prisoners at the chosen prison had been convicted of sexual offences. Not all units in the prison could be approached due to various issues within the prison, but on the identified units all prisoners were offered the opportunity to participate in the research. Response rates varied between 25% and 50% of unit residents, with the lowest level of responding occurring on a unit when distribution of the questionnaires occurred on the same day as the ‘canteen day’ where prisoners order items they wish to purchase such as additional food, toiletries and confectionary. Three respondents began the questionnaire but appeared to lose interest or ran out of time, and handed back the questionnaires only partially completed. Others simply chose not to participate.

### **Development of tool**

The ANPS was developed for non-offending populations; hence there are currently no offending norms available. Panksepp (1998) had described a seventh primal affect of LUST, which encompasses erotic feelings and jealousy. While consideration was given to including a LUST scale, Davis & Panksepp (2011) concluded that it was less relevant to human personality, and the rather more homeostatic nature of the scale was less relevant to affective systems (Panksepp & Biven, 2012). Within the current study the inclusion of a LUST scale

would not add to understanding the impact of affective systems developed early in life. A further consideration was that sensitivity to sexual questions may deter some offenders from participating, or alternatively to focus upon their functioning leading up to offending, rather than more generally. The relevance of this concern was illustrated in a written response on the ANPS questionnaire when a participant wished to make clear that a response to the item 'I love being around baby animals' was not indicative of a sexual interest. Such concerns are frequently noted within the establishment during routine assessment, suggesting that this additional factor should be avoided where possible.

The SPIRITUALITY scale introduced in the revised version was added initially as a measure for those recovering from substance abuse. However, it was not included in a validation study of Pingault et al. (2012) due to the scale being from a theoretical model which differed from the other scales. As the SPIRITUALITY scale was not directly relevant to the current biopsychological approach to the study of affect, it was not included in the current study.

### **Ethical considerations**

Anonymity was a key issue which was addressed as fully as possible by ensuring that returned questionnaires could be returned in a plain envelope which could be placed in a box with other returned questionnaires. Once the questionnaires had been posted in the box they were unidentifiable. Voluntary participation was also a key consideration within the prison environment, not least because of the focus of treatment within this particular environment, but also the known high number of indeterminate sentence prisoners who may feel under more pressure to demonstrate compliance. Therefore, sensitivity to this issue was demonstrated throughout the process of collecting the data.

## **Methodology**

The choice of methodology was somewhat determined by the purpose of the research in order to determine the validity and utility of two psychometric measures which had not previously been used within offending populations. While brain imaging techniques can be used to measure some of the neural circuits, there are many practical difficulties in using such techniques widely, particularly within incarcerated populations. Previous database searches in this area tend to reveal few identifiable differences between sexual offenders with adult victims and those with child victims, which is a finding frequently at odds with clinical experience. While individual interviews and assessment may have revealed individual differences, this would have contributed little to the establishment of wider norms and the evaluation of the ANPS and the CAMS-R across a new population. Therefore, while there may be some limitations to using psychometric measures to gather data, it was an appropriate method to gather data initially, although may benefit from subsequent studies of individuals within the sample groups.

## **Sample**

The participants were all male prisoners serving a current prison sentence within an English Category C prison. All men at the prison had been convicted of one or more sexual offences, either as a current or previous offence. The prison delivered a high number of treatment programs and engagement with the treatment team was a requirement of remaining at the prison, which is designated as providing treatment rather than containment. Therefore, staff and prisoner relationships are generally considered to be of a relatively high quality compared to many other establishments. In addition, owing to the establishment housing sex offenders exclusively, a relatively relaxed environment exists for both staff and prisoners.

The sample of prisoners was gathered on an entirely voluntary basis and anonymity was offered and ensured. Some of the participants did make themselves known to the researcher during general conversation, showing interest in the research prior to participation and post-participation. There were no requests for assistance with completing the questionnaires. It is likely that those who found the questions difficult simply did not participate. Three hundred questionnaires were distributed, with a return of 96 questionnaires (32% return rate). Three were only partially completed, thus were excluded, resulting in a final sample of 93 questionnaires.

Table 4 summarises information on the sentence-related characteristics of the sample. The age ranges of those in the sample were from 21-34 to over 55 years old. The majority of the sample were aged over 45 years (63 %), with 71% having already undertaken some, if not all of the recommended treatment on their sentence plan. Just 9% of the participants had a sentence of less than five years.

Official prison data had suggested that approximately 33% of respondents would have offended against adults and approximately 67% offending against children. However, what occurred was that approximately 12% of respondents indicated that they had offended against both children and adults, with approximately 19% indicating that they had offended against adults only, and approximately 69% offending against children. This was an unexpected response as both official data and clinical opinions had indicated that the numbers of prisoners who had offended against both children and adults was very low. In terms of analysis, the response rate from those who had offended against both children and adults diluted the

expected adult victim offender response, thus limiting comparison analysis to some extent. The data was analysed using SPSS Version 21(IBM Corp, 2012).

### **Procedure**

Prior to the study an information sheet was distributed explaining the purpose of the study, ensuring anonymity, and describing the process of participation. Additionally, the process of asking for help or further information was described. The information sheet was distributed to each of the prison units selected, at least two days prior to distribution of the questionnaire. Subsequently, questionnaires were offered to each resident on the unit with a designated collection time and point, posted on each unit notice board. The questionnaires were supplied in envelopes which could be sealed upon completion to ensure anonymity. At the arranged collection time and point the researcher provided collection boxes for both completed and uncompleted questionnaires. Throughout the process, liaison with unit staff was maintained in order to address any queries or concerns from either staff or prisoners.

**Table 4***Sentence-Related Characteristics of Participants*

Characteristic	Child Victim		Adult Victim		Mixed Victims	
	(n = 64)	(%)	(n = 18)	(%)	(n = 11)	(%)
<b>Age</b>						
21 -34 years	7	(7.5)	1	(1.0)	1	(1.0)
35 - 44 years	11	(11.8)	4	(4.3)	1	(1.0)
45- 54 years	15	(16.1)	6	(6.5)	4	(4.3)
Over 55 years	31	(33.3)	7	(7.5)	5	(5.4)
<b>Sentence</b>						
Under 5 years	10	(10.8)	0		0	
5 – 10 years	26	(30.0)	5	(5.4)	3	(3.2)
Over 10 years	3	(3.2)	2	(2.2)	1	(1.0)
IPP/Lifer	25	(26.9)	11	(11.8)	7	(7.5)
<b>Treatment</b>						
No treatment	11	(11.8)	4	(4.3)	2	(2.2)
Some treatment	31	(33.3)	5	(5.4)	2	(2.2)
Treatment completed	22	(23.6)	9	(9.7)	7	(7.5)

**Measures**

The questionnaire was attached to a consent sheet which also had some basic demographic questions and a request to complete the two attached questionnaires. The first measure was the Affective Neuroscience Personality Scale (ANPS; Davis et al., 2003; Davis & Panksepp, 2011). This measure was developed to measure the activity in sub-cortical affective systems linked to temperamental variability. It is described as measuring ‘core’ elements of affective experience, originating from the evolutionary development of the brain shared by all mammals (Panksepp, 2006; Panksepp, 2009). Panksepp (1998) links these basic attentional, affective and motivational systems of the brain to affective disorders through the action of key neuromodulators acting upon the brain. The ANPS scales to measure these core elements were labelled as SEEKING, ANGER, FEAR, maternal CARE, SADNESS, and physical

PLAY. (The scales are identified using capital letters to avoid confusion with the more familiar use of the words). Definitions of these constructs are shown in Table 5.

**Table 5**

*ANPS Dimensions and Subscales (adapted from Davis et al., 2003 and used for the current study)*

---

**A Positive Affect**

PLAYFULNESS was conceptualised as having fun versus being serious, playing games with physical contact, humour and laughter, and being happy and joyful.

SEEKING was defined as feeling curious, feeling like exploring, striving for solutions to problems and puzzles, positively anticipating new experiences, and a sense of being able to accomplish almost anything.

CARING was defined as nurturing, being drawn to young children and pets, feeling soft-hearted towards animals and people in need, feeling empathy, liking to care for the sick, feeling affection for and liking to care for others, as well as liking to be needed by others.

**B Negative Affect**

FEAR was defined as having feelings of anxiety, feeling tense, worrying struggling with decisions, ruminating about past decisions and statements, losing sleep and not typically being courageous.

ANGER was defined as feeling hot headed, being easily irritated and frustrated, experiencing frustration leading to anger, expressing anger verbally or physically, and remaining angry for long periods.

SADNESS was conceptualised as feeling lonely, crying frequently, thinking about loved ones and past relationships, and feeling distress when not with loved ones.

The second measure is one of mindfulness, the Cognitive and Affective Mindfulness Scale Revised (CAMS-R; Feldman et al., 2007). This was selected as the most suitable measure of mindfulness owing to its sensitivity to current psychological disturbance. Further benefits of this mindfulness measure are its relatively short nature, having just 12 items while covering the range of mindfulness facets: Attention, Present Focus, Awareness and Acceptance. It also

has a 4 point Likert scale which will avoid confusion for participants when presented together with the ANPS scale.

## **Results**

### **ANPS affect scales and offending and non-offending comparisons**

The offending sample scores were compared to a group of non-offending sample scores, on each scale of the ANPS using independent-sample t-tests (Table 6). The non-offending sample population used was selected from a validation study of the ANPS (Pingault et al., 2012). The sample consisted of 830 participants, either working or studying in the areas of social work, psychology, art, biology, biotechnology, computer science or engineering. The mean age was 21 years, with 55% of participants being female.

The offending participants scored significantly higher on the negative affect scale SAD ( $M = 24.02$ ,  $SD = 5.95$ ) than a non-offending group ( $M = 19.91$ ,  $SD = 6.14$ ),  $p < .001$ ,  $d = .45$ , 95% CI [-5.40, -2.82], with Cohen's effect size value suggesting a moderate level of practical significance. The negative affect scales FEAR and ANGER did not indicate statistically significant differences between sexual offenders and the non-offending sample. Further, Cohen's effect size value suggested a low level of practical significance.

Two positive affect scales indicated statistically significant differences between the two groups. Offending participants scored lower on the PLAY scale ( $M = 22.43$ ,  $SD = 5.45$ ) than a non-offending sample ( $M = 30.04$ ,  $SD = 5.46$ ),  $p < .001$ ,  $d = 1.39$ , 95% CI [6.43, 8.79].

Offenders also scored lower on the SEEK scale ( $M = 25.45$ ,  $SD = 4.76$ ) than a non-offending sample ( $M = 27.27$ ,  $SD = 5.29$ ),  $p < .001$ ,  $d = 0.36$ , 95% CI [0.78, 2.86]. While Cohen's effect

size value suggested low practical significance of the SEEK scale difference, the effect size value of the PLAY scale suggested a high level of practical significance.

**Table 6.**

*Results of t-test comparison of the Affective Neuroscience Personality Scale scores by Offender and Non-Offending Populations*

Scale	Offender		Non-Offender		<i>t</i> (921)	95% CI for Mean Difference	Cohen's <i>d</i>
	M	(SD)	M	(SD)			
PLAY	22.43	5.45	30.04	5.46	12.75**	[6.43, 8.79]	1.39
SEEK	25.45	4.76	27.27	5.29	3.18**	[0.78, 2.86]	0.36
CARE	24.31	5.45	24.51	5.80	-0.32	[-0.99, 1.39]	0.00
FEAR	21.56	5.75	20.81	7.29	0.96	[-2.03, 0.53]	0.11
ANGER	17.80	6.11	19.45	7.19	-2.13*	[0.30, 3.00]	0.25
SAD	24.02	5.95	19.91	6.14	6.14**	[-5.40, -2.82]	0.68

*Note.* CI=confidence interval.

\**p* < .05 \*\**p* < .001

### **ANPS scales and offender victim group comparisons**

The scores of offenders with child victims were compared to those offenders with adult victims, on each of the ANPS scales using independent sample t-tests (Table 7). The means, standard deviations and effect size are also shown. Analysis indicated that the two offender groups did not show any statistically significant differences between those who had

offended against children and those who had offended against adults in terms of basic affective circuits and experiences, as measured by the ANPS. Effect size of scales as measured by Cohen's *d* suggested a moderate level of practical significance within the PLAY scale, with a low to moderate level of practical significance within the SEEK, CARE and FEAR scales. Unequal numbers of participants between the offending groups was a factor predicted by official conviction data prior before the study began. However, the eventual ratio of participants within in each group had a greater level of disparity than had been expected when the prospective power analysis was calculated. While the unequal samples suggests that calculation of the effect size using Hedges *g* would be most appropriate (Ellis, 2010), when compared to calculation of Cohen's *d*, the effect size did not differ. Thus, Cohen's *d* was reported as it is arguably a more commonly recognisable measure of practical significance than Hedge's *g*. Overall, therefore, the process of analysis indicated that the unequal sample size was less detrimental to the research outcome than the lack of power resulting from the low numbers within the adult victim group.

**Table 7.**

*Results of t-test analysis of the Affective Neuroscience Personality Scale score by offence-victim category*

Scale	Child Victims		Adult Victims		<i>t</i> (80)	Cohen's <i>d</i>	95% CI of the Mean Difference
	M	(SD)	M	(SD)			
PLAY	22.75	5.69	20.17	5.04	1.74	0.46	[-0.37, 5.54]
SEEK	25.69	4.51	24.56	6.09	0.87	0.23	[-1.47, 3.73]
CARE	24.58	5.26	22.67	4.83	1.39	0.37	[-.84, 4.66]
FEAR	21.14	5.99	22.28	5.18	-0.73	0.20	[-4.23, 1.96]
ANGER	17.44	6.08	17.89	7.06	-0.27	0.07	[-3.80, 2.89]
SAD	24.19	5.94	23.72	7.10	0.28	0.07	[-2.83, 3.76]

*Note.* CI=confidence level

In order to determine the relationship between the scales of the ANPS and the outcome of sexually offending against a child or adult victim, a logistic regression analysis was conducted. Preliminary analysis found no violation of the assumption of linearity. Equally, diagnostic analysis suggested there was no bias in the model due to collinearity between the scales.

The results of the analysis are shown in Table 8. The baseline model predicted that 78% of offenders would be correctly categorised with an initial log likelihood (-2LL) of 86.31.

However, the predictors did not significantly add to the predictive ability of the model (post log likelihood (-2LL = 81.62). Therefore the overall fit of the model does not provide a

significant fit for the data. Roa's efficient score statistic was not significant, but indicated that the PLAY and CARE scales scale added the most predictive power to model, with values of 3 and 2 respectively. The Wald statistic was not significant for any variable, and while the odds ratio of the FEAR scale was above 1, the confidence intervals indicated that this was not a reliable indicator of effect. Four cases were identified as having standardised residuals above 2.58, thus exceeding the expected 1% of cases. The values were all below 3, so were not labelled as outliers. Equally, there appeared to be no notable unusual factors within these cases, so they were not excluded from the full analysis.

**Table 8.**

*Logistic Regression Analysis to predict offence-victim category from ANPS scale scores*

	<i>B</i>	(SE )	Odds Ratio	95% CI for Odds Ratio
Constant	0.85	2.06		
PLAY	-0.07	0.06	0.94	[0.84, 1.04]
SEEK	-0.02	0.06	0.98	[0.87, 1.11]
CARE	-0.04	0.07	0.97	[0.84, 1.12]
FEAR	0.07	0.07	1.07	[0.94, 1.23]
ANGER	-0.05	0.05	0.99	[0.90, 1.08]
SAD	-0.03	0.08	0.98	[0.86, 1.11]

*Note.* CI=confidence level

$R^2 = .06$  (Cox & Snell),  $.09$  (Nagelkerke), Model  $X^2(6) = 4.69$ .

#### **ANPS negative affect scales and levels of mindfulness in offenders**

The CAMS-R total score mean of the offending participants was 33.24 (SD 5.68), which was not statistically significantly different to the score recorded for men within the development sample of the CAM-R (Feldman et al., 2007), where the mean was 32.71 (SD 5.05).

Within the current samples of sex offenders, there was one scale of the CAM-R, ‘Present Focus’, which showed a statistically significant difference between those with child victims (M = 9.03, SD = 1.90) and those who offended against adults (M = 7.28, SD = 2.35),  $p < .01$ ,  $d = 0.74$ , 95% CI [-2.28, - 0.45]. The effect size of Cohen’s  $d$  of 0.74 suggests the level of ‘Present Focus’ in those with child victims, is also of practical significance.

In a similar direction, ‘Acceptance’ had a small effect size (Cohen’s  $d$  of 0.21), accumulating in an overall moderate effect size (Cohen’s  $d$  of 0.49) which may be of practical significance, but not statistically significant in the current study. The differences on the levels of mindfulness between the sexual offending groups are shown within Table 9.

**Table 9.**  
*Results of t-test analysis of CAMS-R scores by offence-victim category*

Scale	Child Victims		Adult Victims		$t(80)$	Cohen’s $d$	95% CI of the Mean Difference
	M	(SD)	M	(SD)			
Attention	7.44	2.07	7.28	2.35	1.34	0.36	[-0.36, 1.81]
Present Focus	9.03	1.90	7.67	1.61	2.77*	0.74	[0.39, 2.34]
Awareness	7.44	2.07	7.28	2.35	0.28	0.07	[-0.97, 1.29]
Acceptance	8.16	2.09	7.72	1.99	0.79	0.21	[-0.66, 1.53]
Total Score	33.66	5.46	31.00	5.74	1.8	0.49	[-0.28, 5.59]

*Note. CI=confidence interval.*

*\* $p < .01$*

### **ANPS and CAMS-R correlations**

There were statistically significant negative correlations between the FEAR, ANGER and SAD scale scores of the ANPS and the CAMS-R score,  $r(91) = .55$ ,  $p < .01$ ,  $r(91) = .34$ ,  $p < .01$  and  $r(91) = .26$ ,  $p < .01$ . A small positive correlation was found between the SEEK scale

scores of the ANPS and the CAMS-R score,  $r(91) = .20, p < .05$ . Within the ANPS scales alone, there were statistically significant positive correlations between the FEAR and SAD scales and the FEAR and ANGER scales,  $r(91) = .60, p < .01$ , and  $r(91) = .46, p < .01$ .

There were also statistically significant positive correlations between the SEEK scale and the CARE and PLAY scales,  $r(91) = .27, p < .01$  and  $r(91) = .25, p < .01$ , in a similar manner to previous studies (Davis et al., 2003; Pingault et al., 2012). However, the significant positive correlation between the PLAY and SAD scale,  $r(91) = .21, p < .05$ , is at odds with previous studies.

### **Social Desirability and Social Anxiety Scales**

No differences in social desirability and social anxiety were found between the two key offending groups. These scales have fewer items than the affect scales, in addition to there being fewer participants within the group of offenders with adult victims, which may have had reduced the effectiveness of these scales.

### **Discussion**

The aim of the study was to seek a measure that could identify underlying affects within sexual offenders, and explore levels of mindfulness and possible neural links between the two. The first hypothesis was that offenders with adult victims would report different levels of affect to those with child victims. While there were no statistically significant differences found in affect between the two main offending groups, a moderate level of practical significance was suggested by the effect size in scale of PLAY, with a low to medium practical effect indicated by the SEEK, CARE and FEAR scales.

The second hypothesis that offender scores would differ from a normal population on both measures was supported to some extent. There was evidence of differences between a non-offending population and the current offending group, with statistically significant and practically significant differences in the PLAY, SEEK and SAD scales. There was also a small practically significant difference in the ANGER scale.

The study provided some support for specific affect differences between offenders with child victims and offenders with adult victims, although this was within the positive affects of PLAY, SEEK, and CARE, with the exception of FEAR, rather than the negative affects as expected. However, the possibility that negative affects experienced were under-reported cannot be completely ruled out, even given the attention given to anonymity. Davis et al. (2003) found that job applicants reported negative affects at a level beneath the norm for college students and suggested that the measure may not be suitable for use with populations where there may be a reluctance to admit negative affect.

There was a significant positive correlation between the PLAY and SAD scale of the ANPS and this differs from previous studies within a normal non-offending population. Given that the SAD scale (in part) considers the potential loss of relatives and loved ones, it might be the case that many of the men in the sample have already lost contact with those closest to them, thus may be resigned to their position of social loss. Equally, some of the men in the sample may not have close family or loved ones to lose, but the link between the SAD and PLAY scales is hard to explain.

A key area of interest is the PLAY scale, which is significantly lower when compared to a normal non-offending population. Panksepp (1998) describes the under arousal of the PLAY circuit being linked to the development of depression, with dopamine blocking agents reducing play activities. In addition, PLAY activities have been found to increase feelings of social strength, and release opioids widely into the nervous system, particularly in the medial preoptic area where circuits for sexual and maternal behaviours are situated (Panksepp, 1998). Therefore, the function of PLAY may be a factor in either neural or social development in ways that are relevant to sexual offending. As interactive play has been strongly linked to the formation of secure attachment between infant and caregiver in the first few months of life (DiCorcia & Tronick, 2011; Izard et al. 2002; Tronick, 2009), the PLAY scale may be reflecting some aspect of this function within the offending group.

In terms of the current sample, the PLAY and CARE scales showed a significant positive correlation, which would be more frequent within women, rather than men in a normal population. However, in the current population, it is possible that the restricted environment and contact with others has produced this outcome. Comparison with a further incarcerated population may illuminate this finding further.

There were no differences between the two key offending groups on the scales of social desirability and social anxiety. This was somewhat surprising as it was expected that offenders with child victims would report more social anxiety than offenders with adult victims. However, the adult victim group was relatively small which may account for this outcome. Alternatively, this could be a further indicator of the apparent homogeneity of the offending group within this study.

The maintenance of anonymity was an important feature of the study, and no direct material or social benefit was linked to the assessment, but the lack of a specific additional objective measure means that some risk of bias from socially desirable responding remained. The items of both psychometric measures used items that would be termed as 'sentiments' rather than factual responses (Nunnally & Bernstein, 1994), thus become more prone to socially desirable responding than factual item, even though the ANPS items were designed to be socially neutral (Davis et al., 2003).

Considering the context of the study, the particularly therapeutic nature of the prison, suggested that participants would engage openly with the assessments, and report negative affect more readily than groups, such as job applicants (Nunnally & Bernstein, 1994). However, improved presentation when assessed is not necessarily conscious, or intentional (Kline, 1993). Socially desirable responding can be thought of as having three components: level of social adjustment, level of self-knowledge, and level of frankness (Nunnally & Bernstein, 1994). They argue that a degree of socially desirable responding is a measure of good social adjustment, and following this argument, is therefore less probable within a prison sample than within the general population. Equally, levels of self-awareness within an offending population would also be expected to be lower than within the general population, affecting an individual's response either positively or negatively to the psychometric items. Thus, this second component of social desirable responding reflects a limitation on self-assessment inventories in general. The third item of frankness, is described as being dependent on the testing context. Nevertheless, individual variations are not typically large, with Nunnally & Bernstein (1994) asserting that correlations between the scores of individuals across testing contexts, will usually be high. Therefore, while socially desirable

responses may have introduced a degree of bias within the results, the addition of a social desirability scale is unlikely to have improved accuracy significantly within this particular study.

In terms of the third hypothesis, it was expected there would be a correlation between the negative affects of the ANPS and the CAMS-R score and the outcome supported this hypothesis. There were statistically significant negative correlations between the CAMS-R score and the negative affects of FEAR, ANGER, and SAD and a positive correlation between the positive affect SEEK and the CAMS-R score.

In the current study there were statistically significantly lower levels of the SEEK scale than in a non-offending population. Panksepp (1998), found links within the neural circuits of the ANGER and SEEK systems, with the expectations raised by the SEEK system leading to frustration experienced within the frontal cortical area when expectations were not met. This frustration could then lead to influence the neural circuit of ANGER. While hunger and pain also trigger this response in a relatively simple manner, the impact of testosterone on these circuits is less clear cut. Panksepp (1998) suggests that the presence of testosterone can lead to feelings of social dominance along with complex feelings of expectation. This is of interest when considering the current population of sexual offenders, as managing complex feelings of sexual expectation while feeling more socially dominant than usual, could increase the risk of sexual offending when present in men with poor social skills, who struggle to make appropriate intimate relationships.

During the development of the CAMS-R, negative correlations between rumination and brooding behaviour (Feldman & Hayes, 2005) and the overall score were found, but it was not developed with a specific anger scale, nor was an assessment of attachment quality made. Therefore, it is of interest that Shaver et al. (2007) found that mindfulness measured using the KIMS (Baer et al., 2004) correlated with levels of avoidant attachment, and attachment anxiety on all five scales. Given the positive correlations between the CAMS-R and positive affect scales of the ANPS, this is of interest and suggests a similar link, suggesting that the development of mindfulness skills may assist in repairing some of the difficulties arising from poor attachment experiences.

The measure of mindfulness and its links with positive affect and negative association with negative affects suggests its utility within treatment and indicates that increased provision of mindfulness skills within treatment may increase positive affect and decrease negative affect. Equally, this study has indicated that mindfulness skills can be measured in an offending population. As the CAMS-R is one of the few measures of mindfulness that can detect change of skills, the outcome within this group of offenders provides a positive indicator that it could be introduced to measure treatment gain for mindfulness skills. While the current study is too small to provide a full norm for the sexual offender population, a modest contribution has been made upon which to add from future studies.

The presence of a significant number of offenders, who had mixed adult and child victims, was both surprising and interesting. Prior to the study, indicators of mixed victim offenders were so limited that it was thought unlikely that the current research would recruit any individuals within this group. However, as the result show mixed victim type offenders

represent a much greater minority than previously thought within this particular prison population. There are no identifiable reasons why this population would differ from sexual offenders in general as the prison holds offenders from right across England and Wales, with a range of determinate and indeterminate sentences, and posing differing levels of actuarial and static risk.

The mix of victims was identified only by the self-reported anonymous questionnaire in response to a question of victim types, rather than of conviction, Therefore, possibly the presentation of the enquiry, along with assured anonymity of the data collection process may have elicited information that is frequently hidden. Should this level of mixed victim offending be representative of sexual offenders more generally, this would be a confounding factor for research when trying to identify differences between sexual offenders against adults and children. Given that clear identification of neuropsychological differences between those with child and adult victims have proven hard to clearly identify (Joyal et al. 2014 ), mixed victim offending may be a factor which has not been always been fully identified and considered. Further research across different populations, would be necessary to establish whether or not this level of mixed victim type is generalised across different populations.

### **Limitations**

The number of offenders having the opportunity to participate was smaller than the study was originally designed to access, due to regime change and specific operational problems on two of the units within the prison. In terms of analysis of the ANPS within a split of those who had offended against adults and those who offended against children, this was a substantial limitation. Prior to the study, prison data had indicated an approximate ratio of 2:1 for sexual offenders with child victims to sexual offenders with adult victims and the *a priori* power

analysis had used this ratio when planning the research. However, a confounding factor emerged when an unexpectedly high number of men returned questionnaires indicating that they had offended against both children and adults. It is possible that this factor emerged from the questionnaire asking about offending rather than conviction (Howard, Barnett & Mann, 2014; Sim & Proeve, 2010) and future studies could add an additional question to clarify this matter. An alternative possibility may be that long-term offending occurred against teenage victims whose legal status changed during ongoing offending. Again, this may be resolved for future studies by an amended question asking for the ages of victims. The sample was self-selecting and entirely voluntary. Therefore, participants may differ from those who were less willing to take part and engage with the research, and this may have produced an outcome which is not fully representative of the prison population.

A further limitation was that the research was completed across the prison population, and this included both those who had completed their designated treatment, those who were part-way through treatment, and those who had yet to undertake treatment. While this was not expected to have an effect on the factors assessed by the ANPS, levels of mindfulness may have varied through treatment. Within the current sample, 71% of offenders had completed at least some level of treatment to address their offending behaviour, and this would usually include Cognitive Behavioural Therapy (CBT) and elements of mindfulness are embedded within this form of therapy. Traditional offending behaviour programmes using cognitive behavioural approaches, encourage a greater awareness of emotions and distorted cognitions, with Jennings, Apsche, Blossom & Bayles (2013), suggesting that improved awareness of dysfunctional thoughts and behaviour leads to increased levels of acceptance, even when this is not a focus of the therapy. Therefore, offenders who have completed some traditional

offending behaviour programmes may be more aware of their internal processes, thus become more mindful than offenders who have not completed any treatment. Within the current sex offender sample, the differing points of treatment may have contributed to an increase in the overall baseline of mindfulness. This confounding factor could be eliminated in future studies through the separate analysis of treated and untreated groups. For both assessments therefore, it would be an improvement for future research to split outcomes between treated and untreated offenders.

### **Implications for practice and future research**

Future research into the amount of mixed victim offending would be beneficial, to establish whether or not the number of offenders in this group found in the current study are typical across other populations of sex offenders as crossover of offending groups could be a significant confounding factor when establishing the cause of sexual offending and treatment pathways. As the anonymity of this study may be a factor in eliciting this information, for future research it may mean that this type of information may need to be sought separately from the main data gathering and analysis process if based on say, interviews or analysis of convictions.

For increased knowledge of the specific brain circuits which link to the experience of affect, the increased specificity of identifying affect through the ANPS, along with the impact of individual aspects of mindfulness, further research could be generalised across various populations demonstrating psychological difficulties. For example, similar research using offenders with non-sexually violent convictions would offer a useful comparison group, and would allow for examination of the PLAY and SAD scale correlation found in the current

sample, as they would also be experiencing the lack of closeness to partners and family whilst within prison.

The positive correlations between the measure of mindfulness produced by the CAMS-R and the positive affects measured by the ANPS, and the negative correlations between mindfulness and negative affects measured by the ANPS indicate that this link may have value for direct practical application. Firstly, the outcome of these measures suggests that they are both useful assessments which can be used to assess progress, and secondly, the link between positive affect and mindfulness offers support for the increased use of mindfulness skills within sex offender treatment programmes.

Cognitive behavioural therapy (CBT) has been shown to be frequently beneficial for the treatment of psychological disorders, including sex offender treatment. However, CBT does not tackle the physiological aspects of psychologically expressed disorders. Farb et al.'s (2007) self-awareness model and the ITSO model (Beech & Ward, 2004) both allow for the disruption of a biologically driven affective response, becoming the default position of the individual in treatment. Therefore, future research could usefully explore the benefits of increasing mindfulness skills for those offenders who have not responded as fully as they might to initial treatment. Equally, researching levels of mindfulness in those who have apparently responded very well to CBT, but have subsequently gone on to engage in behaviour such as absconding from 'open prison' conditions for seemingly irrational reasons, would be of interest to see if their treatment progress in their thinking patterns had been 'hijacked' by underlying negative affect.

## **Conclusions**

The purpose of this study was to investigate the feasibility of measuring core affects originating from key neural circuits in the brain within imprisoned sexual offenders, using the outcome from the ANPS to the CAMS-R, considering victim type, comparisons with non-offending norms, and current levels of mindfulness. The outcome suggests that both measures have utility within a population of sexual offenders, and use for further research and treatment purposes could be considered.

The finding that the affect PLAY was reduced within offenders compared to a non-offending population, suggests that a lack of positive affect may have a greater impact upon offending than previously recognised. If this finding was replicated in further studies, then an increase in positive affect could become a useful treatment target. Equally, the positive affect measured by the SEEK scale might also prove to be a useful treatment target if it is found to correlate with social problem solving ability. The possibility of developing positive aspects of behaviour within offenders, as opposed to simply aiming to reduce negative behaviours is interesting and may offer new routes to effective treatment.

This new application of the ANPS suggests the possibility that the key neural circuits developed very early in life during the attachment process, may be harmed more by a lack of positive affect as opposed to increased negative affect. Given that the study indicates a link between key affects and levels of mindfulness, the development of improved mindfulness skills may be able to ameliorate some of the neural impact of a faulty attachment process.

While, this study has not demonstrated differences in sexual offenders along the dimension of the age of the victim group, it suggests that the ANPS is a suitable tool for this offending group and useful for future studies to plan effective treatment. The current study also provides some support for training sexual offenders in mindfulness practices, with the aim of ameliorating early faulty attachment experiences that contribute to poor emotional regulation and motivational orientation in adulthood.

**CHAPTER 5**  
**GENERAL DISCUSSION**

## **General Discussion**

### **Aim of thesis**

This thesis examined differences between sexual offenders who offend against children, and those who offend against adults, in order to explore links between neuroaffective development and a subsequent sexual-offending pathway. The literature on sexual offenders has consistently identified attachment difficulties, emotional regulation problems and social deficits, although clear links between these factors have not been readily identifiable. Understanding these links more fully may aid treatment development and assist in reducing reoffending further.

### **Main findings and implications**

The systematic review in Chapter 2, found that where significant differences between the two offending groups existed, there was evidence suggesting impaired early neuropsychological development, and current functional indicators of neural deficits, evidenced through their behaviour. This finding is consistent with the view of Pennington (2002), that it is the function of neural circuits that should be examined, rather than more superficial observations, if the source of behaviour is to be understood. If early care has resulted in impairment in neural development to the extent that adult behaviour is functionally different, then this offers tentative support for neural developmental differences between different types of offence motivations. However, the difficulty in obtaining reliable data to explore these early difficulties retrospectively, has resulted in the neuropsychological development of offenders being of great importance theoretically, but remaining difficult to incorporate into applied psychology. Therefore, new approaches may be required.

Chapter 3 reviewed a psychometric tool designed to assess the neural underpinnings of affect expressed through typical behaviour of individuals, the ANPS. This biologically based personality assessment shares similarities with the approach of Gray (1970) and Watson, Clark & Tellegen (1988), which also considered levels of neural activity and the associated expression of behavioural traits. The development of the ANPS assessment arose from direct experimentation upon the neural responses of animals, followed by aligning human responses to similar, but rather less invasive brain stimulation experiments. This method provided more insight into human affective functioning than is possible through observational or introspective methods alone.

The resulting items of the ANPS had been trialled with a range of samples, building a level of normative data for the general population. However, the assessment had not previously been trialled within an offending population, thus the use of this psychometric tool with offenders would need to be considered as exploratory, until the evidence indicates a degree of utility in this area, and a substantial offending normative group is established.

Nevertheless, given the potential benefits of an assessment which may offer insights into early neural damage linked to ongoing affective and attachment difficulties, the value in developing the application of the ANPS with offenders is evident. The review concluded that although further research and development of normative data was required, the ANPS was a sound measure, which may prove a useful tool for innovative research within offending populations.

Chapter 4, described empirical research which assessed two groups of sexual offenders on the neural scales of affect (using the ANPS). While there were no differences between the two

offending groups in this study, there were significant differences between the offending groups and a non-offending norm group. These differences were within the social system of play, and the motivational system to seek. Both measures were significantly lower in the offending groups, and both systems are believed to reflect the quality of early attachment (Panksepp, 1998). Positive early attachment processes include responsive and interactive play between an infant and carer, and develop a degree of safety for the autonomous 'seeking' of new experiences. Therefore, a lack of positive and secure attachment experience would be consistent with this outcome. Given that the ANPS scales of PLAY relates to the development of interactive social skills, and the SEEK scale relates to motivational and active problem solving skills, diminished abilities in these areas may reflect developmental deficits that may prove to be an important factor in the aetiology of sexual offending.

There was also a significant difference between the offending groups and the non-offending norm on the sadness scale, linked to the neural circuit of separation anxiety as a child, and social loneliness as an adult. Again, this outcome would be consistent with insecure attachment processes within the offender groups. However, given that the offending groups were in prison and had also committed sexual offences which create social disapproval, it is perhaps unsurprising that scores linked to feelings of loneliness were high. The application of the ANPS within offenders under community supervision, and offenders convicted of other types of offences may offer additional clarity.

The measure of mindfulness scores (CAMS-R), correlated negatively with the negative affect measures of the 'fearful', 'angry' and 'sadness' neural scales of the ANPS. This finding is consistent with the theory that mindfulness develops and balances the more positive affects

(Chambers, Gullone & Allen, 2009; Feldman et al., 2007; Shroever & Brandsma, 2010). In addition, mindfulness scores correlated positively with the seeking scale linked to the motivational neural circuit. This finding is consistent with the theory that mindfulness is also linked to feelings of security and autonomy (Brown, Ryan & Creswell, 2007; Shaver et al, 2007).

As Schore (2003) asserts, feelings of security, the development of playful interactions, or the development of other positive affects is unable to occur within an environment of threat or danger. Thus, the development of positive affect relies just as heavily upon the caregiver, as does the avoidance of unhealthy levels of negative affect. Tronick and Beegley's (2011) study of infant and caregiver interactions suggest that playful interactions assist in synchronising the parasympathetic and sympathetic nervous systems of the infant, to develop balance in levels of motivation and arousal.

The links and interactions between neurobiological neonatal development, specific types of early social learning, affiliative bonds, and social behaviour that are affected by identifiable neuropeptides suggest that multi-layered, integrated or nested models conceptualise such interactions most effectively. The three tiered emotional processing model of Panksepp and Biven (2012) and the 'Multilevel Meaning' model of Tronick (2009) encompass synchrony between biology and psychology to explain emotional and social functioning. Integrating and linking these features specifically to the development of sexual offending, is conceptualised within the ITSO model (Ward and Beech, 2006, 2008). The benefit of understanding sexual offending in this type of model is that it provides a basis for a similarly integrated method of assessment and treatment.

Where early developmental trauma has occurred, Tronick (2009) and van der Kolk (2005) assert the need to match the level of therapy with the level of the problem, with trauma on the body requiring somatic techniques, and affective difficulties requiring an affect focused therapy. Mindfulness offers a method to integrate developmental treatment needs, upon damaged neurobiological mechanisms (Farb et al., 2007; Gillespie et al., 2012; Vago & Silbersweig, 2012; Way et al.). Relatively small increases in levels of mindfulness have been shown to improve neurocognitive function (Chambers et al., 2009), with dispositional mindfulness being negatively related with cortisol awakening response (Daubenmier, Hayden, Chang & Espel, 2014), suggesting that mindfulness practice evokes change at a neurobiological level.

Beyond the biological level of response, mindfulness techniques have demonstrated benefits in levels of positive affect and cognitive flexibility (Kashdan & Rottenberg, 2010; Schroevers & Brandsma, 2010). Within correctional settings, Shonin, Van Gordon, Slade and Griffiths (2013) reviewed mindful interventions, finding benefits in terms of the reduction of negative affect, and improved self-esteem and optimism. Such outcomes would seem to offer particular benefits within sexual offender treatment settings.

Therefore, the possibility of developing positive aspects of behaviour within offenders, as opposed to simply aiming to reduce negative behaviours, may offer new routes to effective treatment. The application of the ANPS to an offender population, suggests the possibility that the key neural circuits developed very early in life during the attachment process, may be harmed more by a lack of positive affect, than increased negative affect. Given that the study

indicates a link between key affects and levels of mindfulness, the development of improved mindfulness skills may be able to ameliorate some of the neural impact of a faulty attachment process that contributes to poor emotional regulation and motivational orientation in adulthood.

### **Limitations**

The systematic review of the literature in Chapter 2, found that within the studies reviewed, levels of early abuse and neglect did not readily identify differences between the two offending groups, although two of the studies did identify some significant differences. However, the studies within the review were all retrospective, gathering information or assessing difficulties originating in early childhood. Retrospective assessments are known to pose a number of evaluation problems (Kraemer et al., 2005), such as distortion, poor memory, self-presentation, or in this case perhaps simply being too young to have formed any original memories. Furthermore, there is the issue of population change, where individuals may move into situations that reduce their risk of offending or their risk of detection and who remain undetected sexual offenders (Lalumière, Harris, Quinsey & Rice, 2005) and not be within the sample.

Chapter 4 detailed an empirical study using two psychometric assessments to measure levels of affect and mindfulness concurrently. Neither of the assessments (the ANPS and the CAMS-R) had been used with an offending population previously, and while the trial of these measures with sexual offenders drove this aim forward, it also naturally limits the amount that can be drawn from the results at this early stage. However, the outcome is promising, and suggests that both measures have practical value for assessing sexual offenders.

Within the research study, case-control sampling and self-assessment of affects and mindfulness in the present was chosen, in order to compare these different approaches. Nevertheless, this method is still subject to the assumption that the populations of men who sexually offend against adults and sexually offend against children are similar in other ways. Known as Berkson's fallacy, this assumption may result in a limited level of bias (Snoep, Morabia, Hernández-Díaz, Hernán & Vanenbrouke, 2014; Westreich & Daniel, 2014). In addition, the interpersonal features considered in the systematic review studies were subject to the impact of sentencing and the prison environment, thus it cannot be assumed there is no impact from these factors.

It is also possible that there are confounding issues of crossover of victim age groups within particular sub-groups (Kleban, Chesin, Jeglic, Calkins & Mercado, 2013). Such crossover is likely to be present in many studies which are based on convictions, and therefore is also likely to impact upon the studies within the systematic review (Howard et al., 2014; Sim & Proeve, 2010). In the current research study, the higher than expected percentage of cross-over offending resulted in an under-powered sample size. This confounding factor highlighted the need for caution when using official criminal convictions to identify types of victims, as these figures may be undermined by offenders' anonymous self-report.

### **Future research**

Further studies using larger samples of sexual offenders would clearly be beneficial, particularly if the unexpected issue of victim-age-crossover could be managed more effectively within a larger sample. It would also further assist the analysis if the psychometric

evaluation could also be supported by triangulation of the outcome with clinical interviews and fMRI procedures. Establishing greater clarity between the neurobiological basis of the ANPS and the scale output would allow for greater identification of specific difficulties in offenders. For example, given that fearfulness has been shown to be correlated with the volume of the right amygdala (van der Plas, Boes, Wemmie, Tranel & Nopoulos, 2010) and fearfulness has also been linked to the systems of the ANGER and SEEK neural circuits targeted by the ANPS (Reuter, Weber, Fiebach & Montag, 2009), further studies with different offending groups could lead to the identification of very specific treatment needs, and in the process offer further validation for this tool within offending populations.

Assessing the impact upon treatment effectiveness would require assessments of both affect and mindfulness, with the need to develop substantial normative figures for the offending population. Future research could usefully examine any gains, along with investigating the timing, sequencing and duration of such additional treatment intervention in terms of increasing effectiveness in reducing reoffending.

## **Conclusions**

Collectively, this thesis presents support for neural development, and affect being relevant factors within the sexual offending pathway, when considered within a developmental systems theory model. A further observation is that while historically treatment needs for sexual offenders have included the need to manage negative affects, perhaps is the limited development of positive affects that contribute most to the imbalance behind the social and affective difficulties that are present in sexual offenders. It is therefore suggested that

increased relevance should be placed upon developing greater balance with positive affects, rather than simply aiming to minimise the impact of negative affects.

Therefore, treatment programmes for sexual offending could incorporate additional elements of mindfulness techniques with the aim of moderating and improving levels of positive affect, with the aim of rebalancing the social and motivational systems that are not readily reached through cognitive behavioural therapy. However, a great deal more research and evaluation would be required to focus and assess the appropriate sequencing and timing of such intervention.

While these findings can only be considered as tentative at this point, the potential benefits of mindfulness practice are raised as a possibility for reducing the negative impact of early abuse and neglect. Should this prove to be the case, there are clear benefits to using mindfulness techniques to develop and enhance feelings of security, autonomy and positive affect within treatment.

## References

- Anda, R.F., Felitti, V.J., Bremner, J.D., Walker, J.D., Whitfield, C., Perry, B.D., ...Giles, W.H. (2006). The enduring effects of abuse and related adverse experiences in childhood: A convergence of evidence from neurobiology and epidemiology. *European Archives of Psychiatry and Clinical Neurosciences*, 256: 174-186.
- Arbella, V., Panksepp, J., Dioisio, M., Bárcena, C., & Iglesias, J. A. (2011). Spanish validation of the Affective Neuroscience Personality Scales. *The Spanish Journal of Psychology*, 14, 926-93.
- Baer, R.A., Smith, G.T., & Allen, K.B. (2004). Assessment of mindfulness skills by self-report: The Kentucky Inventory of Mindfulness Skills. *Assessment*, 11, 191-206.
- Baer, R. A., Smith, G.T., Hopkins, J., Krietmeyer, J., & Toney, L. (2006). Using self-report methods to explore facets of mindfulness. *Assessment*, 13, 27-45.
- Ball, W., & Tronick, E. (1971). Infant responses to impending collisions: Optical and real. *Science*, 171, 818-820.
- Beech, A. R., & Mitchell, I. J. (2005). The neurobiological perspective on attachment problems in sexual offenders and the role of selective serotonin re-up-take inhibitors in the treatment of such problems. *Clinical Psychology Review*, 25, 153-182.
- Beech, A. R., & Ward, T. (2004). The integration of etiology and risk in sexual offenders: A theoretical framework. *Aggression and Violent Behavior*, 10, 31-63.
- Brennan, K.A., Clark, C.L., & Shaver, P. R. (1998). Self-report measurement of adult romantic attachment: An integrative overview. In J.A.Simpson & W.S. Rholes (Eds.), *Attachment theory and close relationships*. (pp.44-76). New York: Guilford.
- Briere, J., & Elliot, D.M. (2003). Prevalence and psychological sequelae of self-reported childhood physical and sexual abuse in a general population sample of men and women. *Child Abuse and Neglect*, 27, 1205-1222.
- Boccaccini, M.T., Rufino, K.A., Jackson, R., & Murrie, D.C. (2013). Personality Assessment Inventory Scores as predictors of misconduct among sex offenders civilly committed as sexually violent predators. *Psychological Assessment*, 25, 1390-1395.
- Bornstein, M., Hedges, L.V., Higgins, J.P.T. & Rothstein, H.R. (2009). *Introduction to meta-analysis*. Chichester: Wiley.

- Bowlby, J. (1975). *Attachment and loss: Volume 2, separation, anxiety and anger*. Harmondsworth: Penguin.
- Bowlby, J. (1977). The making and breaking of affectional bonds. I. Aetiology and psychopathology in the light of attachment theory. An expanded version of the fiftieth Maudsley Lecture delivered before the Royal College of Psychiatrists, 19 November 1976. *The British Journal of Psychiatry*, *130*, 201-210.
- Bowlby, J. (2000). *A secure base: Clinical applications of attachment theory*. London: Routledge.
- Brown, S. (2010). *Treating sex offenders: An introduction to sex offender treatment programs*. Cullompton: Willan.
- Brown, K.W., Ryan, R.M., Creswell, J.D. (2007). Mindfulness: Theoretical foundations and evidence for its salutary effects. *Psychological Inquiry*, *18*, 211-237.
- Cattell, R. B. (1973). *Personality and mood by questionnaire*. San Francisco, CA: Jossey-Bass.
- Chambers, R., Gullone, E., & Allen, N.B. (2009). Mindful emotion regulation: An integrative review. *Clinical Psychology Review*, *29*, 560-572.
- Coenen, V.A., Schlaepfer, T.E., Maedler, B., & Panksepp, J. (2011). Cross-species affective functions of the medial forebrain bundle – implications for the treatment of affective pain and depression in humans. *Neuroscience and Biobehavioral Reviews*, *35*, 1971-1981.
- Cohen, L.J., Frenda, S., Mojtabai, R., Katsavdakis, K., & Galynker, I. (2007). Comparison of sexual offenders against children with sexual offenders against adolescents and adults: Data from the New York State sex offender registry. *Journal of Psychiatric Practice*, *13*, 373-383.
- Cohen, L.J., & Galynker, I. (2012). Identifying psychological traits potentially subserving aberrant motivation or inhibitory failure in pedophilic behaviour. *Israel Journal of Psychiatry and Related Sciences*, *49*, 280-290.
- Cohen, L.J., Nikiforov, K., Gans, S., Poznansky, O., McGeoch, P., & Weaver, C. (2002). Heterosexual male perpetrators of childhood sexual abuse: A preliminary neuropsychiatric model. *Psychiatric Quarterly*, *73*, 313-336.
- Colenello, V., Chen, F.S., Panksepp, J., & Heinrichs, M. (2013). Oxytocin sharpens self-other perceptual boundary. *Psychoneuroendocrinology*, *38*, 2996-3002.

- Collishaw, S., Pickles, A., Messer, J., Rutter, M., Shearer, C., Maughan, B. (2007). Resilience to adult psychopathology following childhood maltreatment: Evidence from a community sample. *Child Abuse and Neglect, 31*, 211-229.
- Costa, P. T., & McCrae, R. R. (1992). *Revised NEO Personality Inventory and NEO Five Factor Inventory Professional Manual*. Odessa, FL: Psychological Assessment Resources.
- Craig, L., Brown, K., Stringer, I., & Beech, A. (2005). Sexual Recidivism: A review of static, dynamic and actuarial predictors. *Journal of Sexual Aggression, 11*, 65-84.
- Craissati, J., & Beech, A.R. (2001). Attrition in a community treatment program for child sexual abusers. *Journal of Interpersonal Violence, 16*, 205-221.
- Craissati, J., & Beech, A.R. (2006). The role of key developmental variables in identifying sex offenders likely to fail in the community: An enhanced risk prediction model. *Child Abuse and Neglect, 30*, 327-339.
- Craissati, J., McClurg, G. & Browne, K.D. (2002). The parental bonding experiences of sex offenders: a comparison between child molesters and rapists. *Child Abuse and Neglect, 26*, 909-921.
- Creeden, K. (2013). Taking a developmental approach to treating juvenile sexual behaviour problems. *International Journal of Behavioral Consultation and Therapy, 8*, 12-16.
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16*, 297-233.
- Cumming, G. (2012). *Understanding the new statistics: Effect sizes, confidence intervals and meta-analysis*. New York: Routledge.
- Daubenmier, J., Hayden, D., Chang, V., Epel, E. (2014). It's not what you think it's how you relate to it: Dispositional mindfulness moderates the relationship between psychological distress and the cortisol awakening response. *Psychoneuroendocrinology, 48*, 11-18.
- Daversa, M.T. (2010). Early environmental predictors of the affective and interpersonal constructs of psychopathy. *International Journal of Offender Therapy and Comparative Criminology, 54*, 6-21.
- Davis, K.L., Panksepp, J., & Normansell, L. (2003). The Affective Neuroscience Personality Scales: Normative data and implications. *Neuro-Psychoanalysis, 5*, 57-69.

- Davis, K. L. & Panksepp, J. (2011). The brain's emotional foundations of human personality and the Affective Neuroscience Personality Scales. *Neuroscience and Biobehavioral Reviews*, 9, 1946-1958.
- Deeks, J.J., Dinnes, J., D'Amico, R., Sowden, A.J., Sakarovich, C., Song, F.,...Altman, D.G. (2003). Evaluating non-randomised intervention studies. *Health Technology Assessment*, 7, 1-173.
- Dennison, S.M., Stough, C., & Birgden, A. (2001). The big five dimensional approach to understanding sexual offenders. *Psychology Crime and Law*, 7, 243-261.
- Dickerson, S.S., & Kemeny, M.E. (2004). Acute stressors and cortisol responses: A theoretical integration and synthesis of laboratory research. *Psychological Bulletin*, 130, 355-391.
- DiCorcia, J.A., & Tronick, E. (2011). Quotidian resilience: Exploring mechanisms that drive resilience from a perspective of everyday stress and coping. *Neuroscience and Biobehavioral Reviews*, 35, 1593-1602.
- Ekman, P., & Oster, H. (1979). Facial expressions of emotion. *Annual Review of Psychology*, 30, 527-554.
- Elliot, A.J., & Thrash, T.M. (2010). Approach and avoidance temperament as basic dimensions of personality. *Journal of Personality*, 78, 865-906.
- Ellis, P.D. (2010). *The essential guide to effect sizes*. Cambridge: Cambridge University.
- Engleman, M., Wotjak, C.T., Neuman, I., Ludwig, M., & Landgraf, R. (1996). Behavioral consequences of intracerebral vasopressin and oxytocin: Focus on learning. *Neuroscience and Biobehavioral Reviews*, 20, 341-358.
- Evans, L., Akisal, H.S., Keck, P.E., Jr., McElroy, S.L., Sadnovnick, A.D., Remick, R.A., & Kelsoe, J.R. (2005). Familiarity of temperament in bipolar disorder: Support for a genetic spectrum. *Journal of Affective Disorders*, 85, 153-168.
- Eysenck, H.J. (1967). *The biological basis of personality*. Springfield, IL: Thomas.
- Eysenck, H.J., & Eysenck, S.B.G. (1975). *The Eysenck Personality Questionnaire*. Sevenoaks: Hodder & Stoughton.
- Fabian, J.M. (2010). Neuropsychological and neurological correlates in violent and homicidal offenders: A legal and neuroscience perspective. *Aggression and Violent Behavior*, 15, 209-223.

- Falk, J.L. (1971). The nature and determinants of adjunctive behaviour. *Psychology and Behavior*, 6, 577-588.
- Farb, N.A.S., Segal, Z.V., Mayberg, H., Bean, J., McKeon, D., Fatima, Z., & Anderson, A.K. (2007). Attending to the present: Mindfulness meditation reveals distinct neural modes of self-reference. *Social Cognitive and Affective Neuroscience*, 2, 313-322.
- Farinelli, M., Panksepp, J., Gestieri, L., Leo, M.R., Agati, R., Maffei, M.,...Northoff, G. (2013). SEEKING and depression in stroke patients: An exploratory study. *Journal of Clinical and Experimental Neuropsychology*, 35, 348 -358.
- Farrington, D.P., Coid, J.W., Harnett, L., Jolliffe, D., Soteriou, N., Turner, R. & West, D.J. (2006). *Criminal careers up to age 50 and life success up to age 48: New findings from the Cambridge study in delinquent development*. London: Home Office (Research Study No.299).
- Feldman, G., Hayes, A.M. (2005). Preparing for problems: A measure of mental anticipatory processes. *Journal of Research in Personality*, 39, 487-516.
- Feldman, G., Hayes, A., Kumar, S., Greeson, & Laurenceau, J-P. (2007). Mindfulness and emotion regulation: The development and initial validation of the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R). *Journal of Psychopathological Behavioral Assessment*, 29, 177-190.
- Focquaert, F., Steven, M. S., Wolford, G. L., Colden, A., & Gazzaniga, M. S. (2007). Empathizing and systemizing cognitive traits in the sciences and humanities. *Personality and Individual Differences*, 43, 619-625.
- Fogel, A., Nwokah, E., Dedo, J.Y., Messinger, D., Dickson, K. L., Matusov, E., & Holt, S. A. (1992). Social process theory of emotion: A dynamic systems approach. *Social Development*, 1, 122-142.
- Fonagy, A., Gergely, G., & Target, M. (2007). The parent-infant dyad and the construction of the subjective self. *Journal of Child Psychology and Psychiatry*, 48, 288-328.
- Fontenelle, L.F., de Souza, W.F., de Menzes, G.B., Mendlowicz, M.V., Miotto, R.R., Falcão, R.,...Figueira, I.L. (2007). Sexual function in Brazilian patients with obsessive-compulsive disorder and social anxiety disorder. *Journal of Nervous and Mental Disease*, 195, 254-257.
- Fosha, D. (2009). Emotion and recognition at work. In D. Fosha, D. J .Siegal & M.F.Fosha (Eds.), *The healing power of emotion* (pp.172 -203). New York: Norton.

- Fredrickson, B.L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive psychology. *American Psychologist*, *56*, 218-226.
- Gilbert, P. (Ed.). (2005). *Compassion: Conceptualisations, research and use in psychotherapy*. London: Routledge.
- Gilbert, P., & Procter, S. (2006). Compassionate mind training for people with high shame and self-criticism: A pilot study of a group therapy approach. *Clinical Psychology and Psychotherapy*, *13*, 353–379.
- Gillespie, S. M., Mitchell, I. J., Fisher, D., & Beech, A. R. (2012). Treating disturbed emotional regulation in sexual offenders: The potential applications of mindful self-regulation and controlled breathing techniques. *Aggression and Violent Behavior*, *17*, 333-343.
- Glaser, B. (1999). The future of Grounded Theory. *Qualitative Health Research*, *9*, 836-845.
- Graham, N., Kimonis, E.R., Wasserman, A.L. & Kline, S.M. (2012). Associations among childhood abuse and psychopathy facets in male sexual offenders. *Personality Disorders: Theory, Research and Treatment*, *3*, 66-75.
- Grant, J.A., Courtemanche, J., & Rainville, P. (2011). A non-elaborative mental stance and decoupling of executive and pain-related cortices predicts low pain sensitivity in Zen meditators. *Pain*, *152*, 150-156.
- Gray, J.A. (1970). The psychophysiological basis of introversion-extraversion. *Behaviour Research and Therapy*, *8*, 249-266.
- Grossman, K.E., Grossman, K., & Zimmerman, P. (1999). A wider view of attachment and exploration. Stability and change during the years of immaturity. In J.Cassidy & P.R. Shaver (Eds.), *Handbook of attachment: Theory, research and clinical application* (pp. 760-786). New York: Guilford.
- Ham, J., & Tronick, E. (2008). A procedure for the measurement of infant skin conductance and its initial validation using clap induced startle. *Developmental Psychobiology*, *50*, 626-631.
- Hanson, R.K., & Bussière, M.T. (1998). Predicting relapse: A meta-analysis of sexual offender recidivism studies. *Journal of Consulting and Clinical Psychology*, *66*, 348-362.

- Hanson, R.K., Gordon, A., Harris, A.J., Marques, J.K., Murphy, W., Quinsey, V.L., & Seto, M.C. (2002). First report of the collaborative outcome data project on the effectiveness of psychological treatment of sex offenders. *Sexual Abuse: A Journal of Research and Treatment, 14*, 169-194.
- Hanson, R. K. & Harris, A. J. R. (2000). Where should we intervene? Dynamic predictors of sex offense recidivism. *Criminal Justice and Behavior, 27*, 6-35.
- Hanson, R. K. & Morton-Bourgon, K. E. (2005). The characteristics of persistent sexual offenders: A meta-analysis of recidivism studies. *Journal of Consulting and Clinical Psychology, 73*, 1154-1163.
- Hanson, R.K., Morton-Bourgon, G., Helmus, L., & Hodgson, S. (2009). The principles of effective correctional treatment also apply to sexual offenders: A meta-analysis. *Criminal Justice and Behavior, 36*, 865-89.
- Hare, R., (2003) *The Hare Psychopathy Checklist-Revised*. Toronto, ON: Multi-Health Systems.
- Harris, D.A., Mazerolle, P. & Knight, R.A. (2009). Understanding male sexual offending: A comparison of general and specialist theories. *Criminal Justice and Behavior, 36*, 1051-1069.
- Heim, C., Shugart, M., Craighead, W.E., & Nemeroff, C.B. (2010). Neurobiological and psychiatric consequences of child abuse and neglect. *Developmental Psychobiology, 52*, 671-690.
- Heim, C., Young, L.J., Newport, D.J., Mletzko, T., Miller, A.H., Nemeroff, C.B. (2009). Lower CSF oxytocin concentrations in women with a history of childhood abuse. *Molecular Psychiatry, 14*, 954-958.
- Herbison, P., Hay-Smith, J., & Gillespie, W.J. (2006). Adjustment of meta-analyses on the basis of quality scores should be abandoned. *Journal of Clinical Epidemiology, 59*, 1249-1256.
- Hill, A.B. (1965). The environment and disease: Association or causation? *Proceedings of the Royal Society of Medicine, 58*, 295-300.
- Howard, P. D., Barnett, G.D., & Mann, R. E. (2014). Specialization in and within sexual offending in England and Wales. *Sexual Abuse: A Journal of Research and treatment, 26*, 225-251.

- Howard, R. (2009). The neurobiology of affective dyscontrol: Implications for understanding 'dangerous and severe personality disorder'. In M. McMurrin & R. Howard (Eds.), *Personality, personality disorder and violence*. (pp.113-132). Chichester: Wiley.
- Hudson, S.M., & Ward, T. (1997). Intimacy, loneliness, and attachment style in sexual offenders. *Journal of Interpersonal Violence, 12*, 323-339.
- IBM Corp. Released 2012. *IBM SPSS Statistics for Windows, Version 21.0*. Armonk, NY: IBM.
- Izard, C.E. (2007). Basic emotions, natural kinds, emotions schemas, and a new paradigm. *Perspectives on Psychological Science, 2*, 260-280.
- Izard, C.E., & Ackerman, B.P. (2000). Motivational, organizational and regulatory functions of discrete emotions. In M. Lewis & Haviland-Jones (Eds.), *Handbook of emotions* (2nd ed.) (pp. 253-264). New York: Guilford.
- Izard, C.E., Fine, S., Mostow, A., Trentacosta, C., & Campbell, J. (2002). Emotion processes in normal and abnormal development and preventative intervention. *Development and Psychopathology, 14*, 761-787.
- Jennings, J.L., Apsche, J.A., Blossom, P., & Bayles, C. (2013). Using mindfulness in the treatment of adolescent sexual abusers: Contributing common factor or a primary modality? *International Journal of Consultation and Therapy, 8*, 17-22.
- Joyal, C.C., Beaulieu-Plante, J., & de Chanterac, A. (2014). The neuropsychology of sex offenders: A meta-analysis. *Sexual Abuse: A Journal of Research and Treatment, 26*, 149-177.
- Joyal, C.C., Black, D.N., & Dassylva, B. (2007). The neuropsychology and neurology of sexual deviance: A review and pilot study. *Sexual Abuse: A Journal of Research and Treatment, 19*, 1555-73.
- Kashdan, T.B. & Rottenberg, J. (2010). Psychological flexibility as a fundamental aspect of health. *Clinical Psychology Review, 30*, 865-878.
- Katehakis, A. (2009). Affective neuroscience and the treatment of sexual addiction. *Journal of Sexual Addiction and Compulsivity, 16*, 1-31.
- Kingston, D.A., Yates, P.M., & Firestone, P. (2012). The self-regulation model of sexual offending: Relationship to risk and need. *Law and Human Behavior, 36*, 215-224.
- Kline, P. (1986). *A handbook of test construction*. London: Methuen.
- Kline, P. (1993). *Personality: The psychometric view*. London: Routledge.

- Kline, P. (1998). *The new psychometrics: Science, psychology and measurement*. London: Routledge.
- Kline, P. (2000). *Handbook of psychological testing* (2<sup>nd</sup> ed.). London: Routledge.
- Kernberg, O., F. (2006). Psychoanalytic affect theory in the light of contemporary neurobiological findings. *International Congress Series, 1286*, 106-117.
- Knight, R.A. & Prentky, R.A. (1990). Classifying sex offenders: The development and corroboration of taxonomic models. In W.L.Marshall, D.R.Laws & H.E.Barbaree. (Eds.) *Handbook of Sexual Assault: Issues, Theories, and Treatment of the Offender*. (pp. 23-52). New York: Plenum.
- Kraemer, H. C., Lowe, K. K., & Kupfer, D. J. (2005). *To your health: How to understand what research tells us about risk*. New York: Oxford University.
- Lalumière, M. L., Harris, G. T., Quinsey, V. L., & Rice, M. E. (2005). *The causes of rape: Understanding individual differences in male propensity for sexual aggression*. Washington, DC: American Psychological Association.
- Landgraf, R., & Neumann, I.D. (2004). Vasopressin and oxytocin release within the brain: A dynamic concept of multiple and variable modes of neuropeptide communication. *Frontiers in Neuroendocrinology, 25*, 150-176.
- Långström, N., Enebrink, P., Laurén, E-M., Lindblom, J., Werkö, S., Hanson, R.K. (2013). Preventing sexual abusers of children from reoffending: Systematic review of medical and psychological interventions. *British Medical Journal, 347*, 1-11. doi: 10.1136/bmj.f4630
- Le Doux, J. (1998). *The emotional brain: The mysterious underpinnings of emotional life*. New York: Touchstone.
- Littell, J.H., Corcoran, J., & Pillai, V. (2007). *Systematic reviews and meta-analysis*. New York: Oxford.
- Leue, A., Brocke, B., & Hoyer, J. (2008). Reinforcement sensitivity of sex offenders and non-offenders: An experimental and psychometric study of reinforcement sensitivity theory. *British Journal of Psychology, 99*, 361-378.
- Levant, M., & Bass, B. (1991). Parental identification of rapists and pedophiles. *Psychological Reports, 69*, 463-466.
- Lösel, F., & Schmucker, M. (2005). The effectiveness of treatment for sexual offenders: A comprehensive meta-analysis. *Journal of Experimental Criminology, 1*, 117-146.

- Luyten P., Blatt, S.J., (2011). Integrating theory-driven and empirically-driven models of personality development and psychopathology: A proposal for DSM V. *Clinical Psychology Review, 31*, 52-68.
- Manigalio, R. (2012). The role of parent-child bonding, attachment and interpersonal problems in the development of deviant sexual fantasies in sexual offenders. *Trauma, Violence and Abuse, 13*, 83-96.
- Mann, C.J. (2003). Observational research methods. Research design II: Cohort, cross sectional and case-control studies. *Emergency Medicine Journal, 20*, 54-60.
- Mann, R. E., Hanson, R. K., & Thornton, D. (2010). Assessing risk for sexual recidivism: Some proposals on the nature of psychologically meaningful risk factors. *Sexual Abuse: A Journal of Research and Treatment, 22*, 191-217.
- Marshall, P.J., & Kenney, J.W. (2009). Biological perspectives on the effects of early psychosocial experience. *Developmental Review, 29*, 96 -119.
- Marshall, W.L., & Marshall, L.E. (2000). The origins of sexual offending. *Trauma, Violence and Abuse, 1*, 250-263.
- McCormack, J., Hudson, S.M., & Ward, T. (2002). Sexual offenders' perceptions of their early interpersonal relationships: An attachment perspective. *The Journal of Sex Research, 39*, 85-93.
- McGraw, L.A., & Young, L.J. (2009) The prairie vole: an emerging model organism for understanding the social brain. *Trends in Neurosciences, 33*, 103-109.
- Meyer-Lindenberg, A., Domes, G., Kirsch, P., & Heinrichs, M. (2011). Oxytocin and vasopressin in the human brain: Social neuropeptides for translational medicine. *Nature Reviews Neuroscience, 12*, 524-538.
- Meyer, D., Wood, S., & Stanley, B. (2013). Nurture is nature: Integrating brain development, systems theory, and attachment theory. *The Family Journal: Counselling and Therapy for Couples and Families, 21*, 162-169.
- Ministry of Justice (2015). *Criminal Justice Statistics Quarterly Update to March 2014*. Retrieved from <http://www.gov.uk>
- Mitchell, I. J., & Beech, A. R. (2011). Towards a neurobiological model of offending. *Clinical Psychology Review, 31*, 872-882.

- Mitchell, I. J., Keylock, H., Campbell, N., Beech, A.R., & Kogan, D. (2012). Do child molesters show abnormal disgust and fear of contamination reactions? *Psychiatry, Psychology and Law*, *19*, 282-294.
- Montag, C., Fiebach, C. J., Kirsch, P., & Reuter, M. (2011). Interaction of 5-HTTLPR and a variation on the oxytocin receptor gene influences negative emotionality. *Biological Psychiatry*, *69*, 601-603.
- Montague, D.F.P., & Walker-Andrews, A.S. (2001). Peekaboo: A new look at infants' perception of emotion expressions. *Developmental Psychology*, *37*, 826-838.
- Montague, D.F.P., & Walker-Andrews, A.S. (2002). Mothers, fathers and infants: The role of person familiarity and parental involvement in infants' perception of emotion expressions. *Child Development*, *73*, 1339-1352.
- Murray, J., Irving, B., Farrington, D.P., Colman, I., & Bloxham, A.J. (2010). Very early predictors of conduct problems and crime: Results from a national cohort study. *Journal of Child Psychology and Psychiatry*, *51*, 1198-1207.
- Nathanson, D., L. (1994). *Shame and pride: Affect, sex and the birth of self*. New York: Norton.
- National Collaborating Centre for Methods and Tools (2008). *Quality Assessment Tool for Quantitative Studies*. Hamilton, ON: McMaster University. (Updated 13 April, 2010). Retrieved from <http://www.nccmt.ca/registry/view/eng/14.html>.
- Nelson, E.E., & Panksepp, J. 1998. Brain substrates of infant-mother attachment: Contributions of opioids, oxytocin, and norepinephrine. *Neuroscience and Biobehavioral Reviews*, *22*, 437-452.
- Neumann, I.D., & Landgraf, R. (2012). Balance of brain oxytocin and vasopressin: Implications for anxiety, depression and social behaviours. *Trends in Neuroscience*, *35*, 649- 659.
- Northoff, G., Wiebking, C., Feinberg, T., & Panksepp, J. (2011). The resting state hypothesis of major depressive disorder. *Neuroscience and Biobehavioral Reviews*, *35*, 1929-1945.
- Nunnally, J.C. (1978). *Psychometric theory* (2nd ed.). New York: McGraw-Hill.
- Nunnally, J.C., & Bernstein, I.H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw-Hill.

- Nylander, I., & Roman, E. (2012). Neuropeptides as mediators of the early-life impact on the brain; implications for alcohol use disorders. *Frontiers in Molecular Neuroscience*, 5, 1-19.
- Pahlavan, F., Mouchiroud, C., Zenasni, F., & Panksepp, J. (2008). French validation of the Affective Neuroscience Personality Scales (ANPS). *European Review of Applied Psychology*, 58, 155-163.
- Panksepp, J. (1998). *Affective neuroscience: The foundations of human and animal emotions*. Oxford: Oxford University.
- Panksepp, J. (2005). Affective consciousness: Core emotional feelings in animals and humans. *Consciousness and Cognition*, 14, 30-80.
- Panksepp, J. (2006) . Emotional endophenotypes in evolutionary psychiatry. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, 30, 774-784.
- Panksepp, J. (2009). Brain emotional systems and qualities of mental life: From animal models of affect to implications for psychotherapeutics. In D. Fosha, D. J. Siegal & M.F.Fosha (Eds.), *The healing power of emotion* (pp. 1-26). New York: Norton.
- Panksepp, J., & Biven, L. (2012). The evolution of affective consciousness. In *The archaeology of mind: Neuroevolutionary origins of human emotion* (pp. 47-94). New York: Norton.
- Parker, G., Tupling, H., & Brown, L.B. (1979). A parental bonding instrument. *British Journal of Medical Psychology*, 52, 1-10.
- Pennington, B.F. (2002). *The development of psychopathology: Nature and nurture*. New York: Guilford.
- Pepping, C.A., Davis, P.J., & O'Donovan, A. (2013). Individual differences in attachment and dispositional mindfulness: The mediating role of emotional regulation. *Personality and Individual Differences*, 54, 453-456.
- Perry, B. D. (2009). Examining child maltreatment through a neurodevelopmental lens: Clinical applications of the neurosequential model of therapeutics. *Journal of Loss and Trauma*, 14, 240-255.
- Petticrew, M., & Roberts, H. (2006). *Systematic Reviews in the Social Sciences: A Practical Guide*. Oxford: Blackwell.
- Phillips, C.V., & Goodman, K.J. (2004). The missed lessons of Sir Austin Bradford Hill. *Epidemiologic Perspectives and Innovations*, 1, 3. doi: 10.1186/1742-5573-1-3

- Pingault, J-B., Pouga, L., Grèzes, J., & Berthoz, S. (2012). Determination of emotional endophenotypes: A validation of the affective neuroscience personality scales and further perspectives. *Psychological Assessment, 24*, 375-385.
- Pryce, C.R. (1992). A comparative systems model of the regulation of maternal motivation in mammals. *Animal Behavior, 43*, 417-411.
- Rachman, S. (2004). Fear of contamination. *Behaviour Research and Therapy, 42*, 1227-1255.
- Reuter, M., Panksepp J., Schnabel, N., Kellerhoff, N., Kempel, P., & Henning, J. (2005). Personality and biological markers of creativity. *European Journal of Personality, 19*, 83-95.
- Reuter, M., Weber, B., Fiebach, C. J., Elger, C., & Montag, C. (2009). The biological basis of anger: Associations with the gene coding for DARPP-32 (PPP1R1B) and with amygdala volume. *Behavioral Brain Research, 202*, 179-183.
- Robertiello, G., & Terry, K.T. (2007). Can we profile sex offenders? A review of sex offender typologies. *Aggression and Violent Behavior, 12*, 508-518.
- Rouquette, A., & Falissard, B. (2011). Sample size requirements for the internal validation of psychiatric scales. *International Journal of Methods in Psychiatric Research, 20*, 235-249.
- Samenow, C.P. (2010). A biopsychosocial model of hypersexual disorder/sexual addiction. *Sexual Addiction and Compulsivity, 17*, 69-81.
- Savitz, J., van der Merwe, L., & Ramesar, R. (2008a). Personality endophenotypes for bipolar affective disorder: A family-based genetic association analysis. *Genes, Brain and Behavior, 7*, 869-876.
- Savitz, J., van der Merwe, L., & Ramesar, R. (2008b). Dysthymic and anxiety-related personality traits in bipolar spectrum illness. *Journal of Affective Disorders, 109*, 305-311.
- Schore, A.N. (2001). Effects of a secure attachment relationship upon right brain development, affect regulation and infant mental health. *Infant Mental Health Journal, 22*, 7- 66.
- Schore, A.N. (2009). Relational trauma and the developing right brain: An interface of psychoanalytic self psychology and neuroscience. *Self and Systems, 1159*, 189-203.

- Schroevers, M.J., & Brandsma, R. (2010). Is learning mindfulness associated with improved affect after mindfulness-based cognitive therapy? *British Journal of Psychology*, *101*, 95-107.
- Seto, M.C., & Lalumière, M.L. (2010). What is so special about male adolescent sexual offending? A review and test of explanations through meta-analysis. *Psychological Bulletin*, *136*, 526-575.
- Shaver, P.R., Lavy, S., Saron, C.D., & Mikulincer, M. (2007). Social foundations of the capacity for mindfulness: an attachment perspective. *Psychological Inquiry*, *18*, 264-271.
- Shonin, E., Van Gordon, W., Slade, K., Griffiths, M.D. (2013). Mindfulness and other Buddhist-derived interventions in correctional settings: A systematic review. *Aggression and Violent Behavior*, *18*, 365-372.
- Shouse, E. (Dec. 2005) 'Feeling, emotion, affect,' *A Journal of Media and Culture*, *8*(6). Retrieved 13 Jul. 2014 from <<http://journal.media-culture.org.au/0512/03-shouse.php>>.
- Siever, L. J., & Weinstein, L.N. (2009). The neurobiology of personality disorders: Implications for psychoanalysis. *Journal of the American Psychoanalytic Association*, *57*, 361-398.
- Sim, D.J., & Proeve, M. (2010). Crossover and stability of victim type in child molesters. *Legal and Criminological Psychology*, *15*, 401- 413.
- Simons, D.A., Wurtele, S.K., & Durham, R.L. (2008). Development experiences of child sexual abusers and rapists. *Child Abuse and Neglect*, *32*, 549-560.
- Singer, L.M., Brodzinsky, D.M., & Ramsay, D. (1985). Mother-infant attachment in adoptive families. *Child Development*, *56*, 1543-1551.
- Smith, L.B., & Thelan E. (2003). Development as a dynamic system. *Trends in Cognitive Science*, *7*, 343-348.
- Snoep, J.D., Morabia, A., Hernández-Díaz, S., Hernán, M. A., & Vanenbrouke, J. P. (2014). A structural approach to Berkson's fallacy: and a guide to a history of opinions about it. *International Journal of Epidemiology*, *43*, 515-521.
- Song, J.W., & Chung, K.C. (2010). Observational Studies: Cohort and Case Control Studies. *Plastic Reconstructive Surgery*, *126*, 2234-2242.

- Sroufe, L.A., Egeland, B., Carlson, E.A., & Collins, W.A. (2005). *The Development of the person: The Minnesota study of risk and adaptation from birth to adulthood*. New York: Guilford.
- Strauss, A., & Corbin, J. (1990). *Basics of qualitative research: Grounded theory procedures and techniques*. Newbury Park, CA: Sage.
- Taborsky, B., & Oliveira, R.F. (2012). Social competence: An evolutionary approach. *Trends in Ecology and Evolution*, 27, 679-688.
- Thomas, B.H., Ciliska, D., Dobbins, M., & Micucci, S. (2004). A process for systematically reviewing the literature: Providing the research evidence for public health nursing interventions. *Worldviews on Evidence Based Nursing*, 1, 176-184.
- Tomkins, S., S. (1981). The quest for primary motives: Biography and autobiography of an idea. *Journal of Personality and Social Psychology*, 41, 306-329.
- Trevarthan, C. (2009). The functions of emotion in infancy: The regulation and communication of rhythm, sympathy, and meaning in human development. In D.Fosha, D.J.Siegel & M.F.Fosha (Eds.), *The healing power of emotion* (pp.55-85). New York: Norton.
- Tronick, E. (2009). Multilevel meaning making and dyadic expansion of consciousness theory: The emotional and the polymorphic polysemic flow of meaning. In D. Fosha, D. J .Siegal & M.F.Fosha (Eds.), *The healing power of emotion* (pp. 86-111). New York: Norton.
- Tronick, E., & Beeghley, M. (2011). Infants' meaning-making and the development of mental health problems. *American Psychologist*, 66, 107-119.
- Twardosz, S., & Lutzker, J.R. (2010). Child maltreatment and the developing brain: A review of neuroscience perspectives. *Aggression and Violent Behavior*, 15, 59-68.
- Vago, D.R., & Silbersweig, D.A. (2012). Self-awareness, self-regulation, and self-transcendence (S-ART): a framework for understanding the neurobiological mechanisms of mindfulness. *Frontiers in Human Neuroscience*, 6, 1-30.
- Valliant, P. M., & Antonowicz, D. A. (1992). Rapists, incest offenders and child molesters in treatment: Cognitive and social skills training. *International Journal of Offender Therapy and Comparative Criminology*, 36, 221-230.

- van der Kolk, B.A., Roth, S., Pelcovitz, D., Sunday, S., & Spinazzola, J. (2005). Disorders of extreme stress: The empirical foundation of a complex adaptation to trauma. *Journal of Traumatic Stress*, 18, 389-399.
- van der Plas, E.A.A., Boes, A.D., Wemmie, J.A., Tranel, D., & Nopoulos, P. (2010). Amygdala volume correlates positively with fearfulness in normal healthy girls. *Social Cognitive and Affective Neuroscience*, 5, 424-431.
- Vulink, N.C.C., Denys, D., Bus, L., & Westenberg, H.G.H. (2006). Sexual pleasure in women with obsessive-compulsive disorder. *Journal of Affective Disorders*, 91, 19-25.
- Wanklyn, S.G., Ward, A.K., Cormier, N.S., Day, D.M., & Newman, J.E. (2012). Can we distinguish juvenile violent sexual offenders, violent non-sexual offenders and versatile violent sex offenders based on childhood risk factors? *Journal of Interpersonal Violence*, 27, 2128-2143.
- Ward, T., & Beech, A.R. (2006). An integrated theory of sexual offending. *Aggression and Violent Behavior*, 11, 44-63.
- Ward, T., & Beech, A. R. (2008). An integrated theory of sexual offending. In D.R.Laws & W.T.O'Donohue (Eds.), *Sexual deviance* (pp. 21-36). New York: Guilford.
- Ward, T., & Hudson, S. M. (1998). A self-regulation model of the offense process. *Sexual Abuse: A Journal of Research and Treatment*, 10, 141-157.
- Ward, T., Hudson, S.M., & Marshall, W.L. (1996). Attachment style and intimacy deficits in sex offenders: A preliminary study. *Journal of Sex Research*, 33, 17-26.
- Ward, T., & Hudson, S.M., Marshall, W.L., & Seigert, R. (1995). Attachment style and intimacy deficits in sexual offenders: A theoretical framework. *Sexual Abuse: A Journal of Research and Treatment*, 7, 317-335.
- Watson, D., Clark, L.A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, 54, 1063-1070.
- Way, B.M., Cresswell, J.D, Eisenberger, N.I., & Lieberman, M.D. (2010). Dispositional mindfulness and depressive symptomology: Correlations with limbic and self-referential neural activity during rest. *Emotion*, 10, 12-24.
- Westreich, D., & Daniel, R.M. (2014). Commentary: Berkson's fallacy and missing data. *International Journal of Epidemiology*, 43, 524-526.

- Wijk, A.Ph., van Vermeiren, R., Loeber, R., Hart-Kerkhoffs, L., Doreleijers, Th. A.H., & Bullens, R.A.R. (2006). Juvenile sex offenders compared to non sex offenders: A review of the literature 1995-2005. *Trauma, Violence and Abuse, 4*, 27-243.
- Wilson, K.R., Hansen, D.J., & Li, M. (2011). The traumatic stress response in childhood maltreatment and resultant neuropsychological effects. *Aggression and Violent Behavior, 16*, 87-97.
- Wismer Fries, A.B., Ziegler, T., Kurian, J.R., Jacoris, S., & Pollak, S.D. (2005). Early experiences in humans is associated with changes in neuropeptides critical for regulating social behaviour. *Proceedings of the National Academy of Sciences of the United States of America, 102*, 17237-17240.
- Yates, P.M. (2013). Treatment of sexual offenders: Research, best practices, and emerging models. *International Journal of Behavioral Consultation and Therapy, 8*, 89-95.
- Young, M.H., Justice, J.V., & Edberg, P. (2010). Sexual offenders in prison psychiatric treatment: A biopsychosocial description. *International Journal of Offender Therapy and Comparative Criminology, 54*, 92-112.
- Zaza S., Wright-de Agüero, L.K., Briss, P. A., Truman, B. I., Hopkins, D. P., Hennessy, & M. H. (2000). Data collection instruments and procedure for systematic reviews in the 'Guide to Community Preventive Services'. *American Journal of Preventative Medicine, 18*, 44-74.

## APPENDICES

### Appendix 1 – Database Searches

Web of Science CPCI – SSH Time span 1990 - 2013

Search terms: TITLE: (sex offender) OR TITLE: (rapist) OR TITLE (child molester) AND TITLE: (neglect) OR TITLE: (abuse)

Results: 118

Refined by: CONFERENCE TITLES=( IIND WORLD CONGRESS ON VIOLENCE AND HUMAN COEXISTENCE OR CONFERENCE OF CONSENSUS ON PSYCHOPATHOLOGY AND CURRENT THERAPY FOR SEXUAL OFFENDERS OR 3RD EUROPEAN CONFERENCE OF LAW AND PSYCHOLOGY OR CONFERENCE ON SEXUAL OFFENDERS OR INVITATIONAL CONFERENCE ON ESTABLISHING A MEDICAL RESEARCH AGENDA FOR CHILD SEXUAL ABUSE OR ANNUAL MEETING OF THE AMERICAN SOCIETY OF CRIMINOLOGY OR CONFERENCE ON UNDERSTANDING AND MANAGING SEXUALLY COERCIVE BEHAVIOR OR CONFERENCE ON WITHOUT CONSENT CONFRONTING ADULT SEXUAL VIOLENCE OR 105TH ANNUAL CONVENTION OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION OR 111TH ANNUAL CONVENTION OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION OR 2ND EUROPEAN CONF ON LAW AND PSYCHOLOGY OR 2ND INTERNATIONAL CONGRESS ON NEUROBIOLOGY PSYCHOPHARMACOLOGY AND TREATMENT GUIDANCE ICNP OR 103RD ANNUAL CONVENTION OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION OR 5TH CONFERENCE OF THE EUROPEAN ASSOCIATION OF PSYCHOLOGY AND LAW OR 46TH ANNUAL MEETING OF THE AMERICAN SOCIETY OF CRIMINOLOGY OR BIENNIAL MEETING OF THE SOCIETY FOR RESEARCH IN CHILD DEVELOPMENT OR 4TH INTERNATIONAL CONFERENCE ON PSYCHO SOCIAL PERSPECTIVES IN THE QUASI COERCIVE TREATMENT OF OFFENDERS SPECTO SOCIAL CONTROL AND VULNERABLE GROUPS OR CONFERENCE ON PSYCHOBIOLOGY OF POSTTRAUMATIC STRESS DISORDER OR CONFERENCE ON VICTIMS OF ABUSE THE EMOTIONAL IMPACT OF CHILD AND ADULT TRAUMA OR ANNUAL MEETING OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION )

Web of Science-CPCI-S Time span 1990-2013

Search terms:

Search terms: TITLE: (sex offender) OR TITLE: (rapist) OR TITLE (child molester) AND TITLE: (neglect) OR TITLE: (abuse)

Results: 65

Refined by: CONFERENCE TITLES= (3RD EUROPEAN ACADEMY OF FORENSIC SCIENCE MEETING OR CONFERENCE ON CONSEQUENCES OF SEXUAL ABUSES OR CONFERENCE OF CONSENSUS ON PSYCHOPATHOLOGY AND CURRENT THERAPY FOR SEXUAL OFFENDERS OR CONFERENCE ON PSYCHOBIOLOGY OF POSTTRAUMATIC STRESS DISORDER)

PsycARTICLES

-----

001	(sex offen* or rapist* or child-molest* or peadophil* or child molest*).ti.	62
002	((neurodevelopment* or personality or endophenotype or neuroscience or affective neuroscence).ti. or biological.af.) and neurobiological.af.	10605
003	(affect* or emotion* or anger or avers* or compuls*).ti. or amygdala.af.	23524
004	2 or 3	2259
005	1 and 4	2

PsycINFO 1990 to October Week 1 2013

-----

001	(sexual offender* or rapist* or child molester* or peadophil*).ti.	1527
002	(abuse* or maltreatment or neuro* or attach* or neglect*).ab	385339
003	(affect* or emotion* or anger or avers* or compuls*).ab.	407057
004	2 and 3	77857
005	1 and 4	85

Ovid MEDLINE(R) 1990 to October Week 1 2013

-----

001	exp Child Abuse/ or exp Child Abuse, Sexual/ or exp Sex Offenses/	600
002	(neurodevelopment* or personality or endophenotype* or neuroscience or affective neuroscence or biological or neurobiological).ab.	1317760

003 (affect\* or emotion\* or anger or avers\* or compuls\* or amyda 1210732  
la).ab.  
004 1 and 2 and 3 25

Embase 1990 to 2013 Week 40

-----  
001 (sex offender\* or rapist\* or child molester\* or peadophil\*). 601  
ti.  
002 (maltreatment or neglect or child abuse or sexual abuse or t 1239143  
rauma\*).ab.  
003 (neuro\* or psycho\* or personality disorder or emotional dysr 1141494  
egulation or detachment).ab.  
004 2 and 3 174042  
005 1 and 4 31

ProQuest

assia

October 1 2013 through October 6 2013

(ti(male sexual offenders) AND ab((attachment OR child abuse or  
maltreatment)) OR ab((trauma OR child neglect)) AND ab((affect\* OR  
emotion)) OR ab((anger OR anxious responses to predictable and  
unpredictable aversive events)) AND ab(compulsive)) NOT  
subt.exact("posttraumatic stress disorder" OR "psychological trauma" OR  
"symptoms" OR "women" OR "traumatic life events" OR "survivors" OR  
"parents" OR "victims")

326

**Appendix: 2**

**Inclusion/Exclusion Form**

<b>Article Title:</b>				
<b>Author(s):</b>				
<b>Date:</b>				
<b>Population</b>	Adults who have been convicted of the sexual offences, being 18 years old or above at the time of the offence.	Yes	No	?
	Offenders can be identified either as the rapists of adults or as child molesters	Yes	No	?
<b>Exposure</b>	Evidence of early exposure to factors linked to neurodevelopment difficulties leading to measurable psychological outcomes, or evidence that allows for such an inference of a correlation to be made	Yes	No	?
<b>Comparator</b>	Differences in the psychological indicators of neurodevelopment damage between rapists of adults and child molesters	Yes	No	?
<b>Outcome</b>	A measurable psychological/behavioural difference between the two offender groups	Yes	No	?
<b>Other Factors</b>	Year of publication 1992 – 2013	Yes	No	?
	Language of publication : English  (The above parameters were generally defined within the search terms of electronic databases)	Yes	No	?

**Instructions**

For any queries identified, seek to resolve through obtaining additional information

Where both ‘Yes’ a’ No’ are indicated, inclusion decisions should specify whether some data can be usefully be extracted. The basis of the decision made, along with any specific limitations of the data should be documented.

Where a clear ‘No’ is indicated for one or more criteria, the study should be excluded from the review.

### Appendix 3

#### Quality Assessment Form

<b>A) Selection Bias</b>		Very Likely	Somewhat Likely	Not Likely	Unclear
1. Are the individuals likely to be representative of the target population?					
		80 - 100%	60-79%	Less than 60%	Unclear
2. What percentage of selected individuals agreed to participate?					
<b>RATE THIS SECTION</b>	<b>STRONG</b>	<b>MODERATE</b>		<b>WEAK</b>	
	1	2		3	
Comments:					

<b>B) Study Design</b>					
1. Design:					
				Yes	No
2. Was the design appropriate?					
<b>RATE THIS SECTION</b>	<b>STRONG</b>	<b>MODERATE</b>		<b>WEAK</b>	
	1	2		3	
Comments:					
<b>C) Confounders</b>		80 -100% (most)	60-79% (some)	Less than 60% (few or none)	Unclear
1. Were there important differences between groups prior to assessment?					
2. If yes, indicate the percentage of relevant confounders that were controlled (either in the design or analysis).					
<b>RATE THIS SECTION</b>	<b>STRONG</b>	<b>MODERATE</b>		<b>WEAK</b>	
	1	2		3	
Comments:					

<b>D) Blinding</b>	Yes	No	Unclear	
1. Were the assessors aware of the status of participants				
2. Were the study participants aware of the research question?				
<b>RATE THIS SECTION</b>	<b>STRONG</b>	<b>MODERATE</b>	<b>WEAK</b>	
	1	2	3	
Comments:				
<b>E) Data Collection Methods</b>	Yes	No	Unclear	
Were data collection tools shown to be valid?				
<b>RATE THIS SECTION</b>	<b>STRONG</b>	<b>MODERATE</b>	<b>WEAK</b>	
	1	2	3	
Comments:				
<b>F) Withdrawals and Drop-outs</b>	Yes	No	Unclear	Not applicable eg. one survey or interview
Were withdrawals and drop outs reported? Numbers and reasons?				
	80 – 100%	60 – 79%	Less than 60%	Not applicable eg. retrospective case control
Percentage of participants completing the study				
<b>RATE THIS SECTION</b>	<b>STRONG</b>	<b>MODERATE</b>	<b>WEAK</b>	<b>NA</b>
	1	2	3	
Comments:				
<b>G)</b>	80-100%	60-79%	Less than 60%	Unclear

<b>Intervention Integrity</b>				
What percentage of participants received the exposure of interest?				
	Yes	No	Unclear	
Was the level and type of exposure measured or indicated?				
Is it likely that the participants received an unintended exposure?				
<b>RATE THIS SECTION</b>	<b>STRONG</b>	<b>MODERATE</b>	<b>WEAK</b>	
	1	2		
Comments:				
<b>H) Analyses</b>	<b>Community</b>	<b>Institution</b>	<b>Individual</b>	
Indicate the unit of allocation				
Indicate the unit of analysis				
	Yes	No	Unclear	
Are the statistical methods appropriate for the study design?				
<b>RATE THIS SECTION</b>	<b>STRONG</b>	<b>MODERATE</b>	<b>WEAK</b>	
	1	2	3	
Comments:				

**GLOBAL RATING:** Transcribe the component ratings from the grey boxes on the previous pages.

A. SELECTION BIAS	STRONG	MODERATE	WEAK	NOT APPLICABLE
	1	2	3	
B. STUDY DESIGN	STRONG	MODERATE	WEAK	NOT APPLICABLE
	1	2	3	
C. CONFOUNDERS	STRONG	MODERATE	WEAK	NOT APPLICABLE
	1	2	3	
D. BLINDING	STRONG	MODERATE	WEAK	NOT APPLICABLE
	1	2	3	
E. DATA COLLECTION METHOD	STRONG	MODERATE	WEAK	NOT APPLICABLE
	1	2	3	
F. WITHDRAWALS AND DROP-OUTS	STRONG	MODERATE	WEAK	NOT APPLICABLE
	1	2	3	
G. INTERVENTION INTEGRITY	STRONG	MODERATE	WEAK	NOT APPLICABLE
	1	2	3	
H. ANALYSIS	STRONG	MODERATE	WEAK	NOT APPLICABLE
	1	2	3	

**GLOBAL RATING FOR THIS PAPER:**

1. STRONG (no WEAK ratings)
2. MODERATE (one WEAK rating)
3. WEAK (two or more WEAK ratings)

Is there a discrepancy between the two reviewers with respect to the component A – H ratings?    No    Yes

If yes, indicate the reason for the discrepancy:

- 1      Oversight
- 2      Differences in the interpretation of criteria
- 3      Differences in interpretation of the study

**Final Decision of both reviewers (circle one):**

**1      STRONG          2      MODERATE          3      WEAK**

## Appendix 4

### Data Extraction Form

Article Title:					
Author(s):					
Published Article <input type="checkbox"/>	Technical Report <input type="checkbox"/>	Unpublished Thesis <input type="checkbox"/>	Abstract Presentation <input type="checkbox"/>	Book or Book Chapter <input type="checkbox"/>	Other: ..... <input type="checkbox"/>
Date:			Reviewer:		
		Description		Location in text (pg & paragraph/figure/table)	
Population Description:		Size of group 1: Size of group 2: Age: Ethnicity: Type of offender:			
Specific measure used and target of assessment:					
Theory on which the study was developed:					
Comments:					
Link to neurobiological correlate <sup>4</sup> :					
Comments:					

Study Design:			
	Suitability:		
Setting (location and environment)			
Informed consent obtained	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Unclear <input type="checkbox"/>
Aim of Study			
Notes:			

Assessment Outcome Scores: (From Page Numbers).....	Child Victim Offenders	Adult Victim Offenders	Confidence Intervals
Mean			
SD			
n			

Odds Ratio	
Confidence Interval	

d	
SE	

Other numerical information to calculate effect size:		

**Appendix 5:** Articles unable to access in full and therefore excluded from study

<b>Author and Date of Publication</b>	<b>Title of Publication</b>	<b>How Study was Identified</b>	<b>Type of Article</b>
Bumby, K.M. (1996)	Intimacy deficits, the fear of intimacy and loneliness among child molesters, rapists, non-sexually offending inmates	Database search	Dissertation Abstract
Kanter, T. (2000)	A phenomenological study of adult attachment in male sexual offenders	Database search	Dissertation Abstract

**Appendix 6:** Articles accessed in full and excluded after inclusion criteria were applied

<b>Author and Date of Publication</b>	<b>Title of Publication</b>	<b>Reason for Exclusion</b>	<b>Method of Identification</b>
Boccaccini, Marcus T ; Rufino, Katrina A ; Jackson, Rebecca L ; Murrie, Daniel C Psychological assessment, 2013, Vol.25, pp.1390-5	Personality Assessment Inventory scores as predictors among sex offenders civilly committed as sexually violent predators	All sexual offenders were assessed as one group and were not analysed separately	Auto alert from database search
Craissati and Beech , 2006	The role of key developmental variables in identifying sex offenders likely to fail in the community: An enhanced risk prediction model	The key focus of this paper was to link developmental variables with community failure and therefore noted variables in a factual manner, without additional exploration of psychological or personality variables that may still have an impact upon offending. The paper describes how such	Database search

		exploration may be beneficial in future studies.	
Robertiello and Terry, 2007	Can we profile sex offenders? A review of sex offender typologies	The profiles were simply descriptive and could not add to the review	Database search
Valliant and Antonwicz, 1992	Rapists, Incest offenders and Child Molesters in Treatment: Cognitive and Social Skills Training	The paper concentrated on variations in response to treatment between the groups and these differences are not readily linked to the developmental model	Database search
Wijk, van Vermeiren, Loeben, Hart Kerkhoffs, Doreleijers and Bullens (2006)	Juvenile Sex Offenders Compared to Non-Sex offenders: A review of the literature 1995 – 2005	Although there were some offenders between 18 and 21 within the studies in this review, it was not possible to identify outcomes with this group. Individual studies covered by this review were accessed and considered for inclusion	Database search
Young, Justice & Edberg , 2010	Sexual Offenders in Prison Psychiatric Treatment: A Biopsychosocial Description	The paper included a range of sexual offenders, but there is no differentiation between those who offend against adults and children	Database search

## Appendix 7

### Bradford-Hill Criteria (Hill, 1965)

The strength of the association	The greater the magnitude of the association the greater the likelihood that it is causal
Consistency	If the association is observed at different times, places and by different researchers it is more credible
Specificity	The more specific the disease and the groups of people affected the greater the likelihood of causality
Temporal relation	Does the suspected cause precede the disease
Biological gradient	Is there a dose-response type relation
Biological plausibility	Do the findings fit with plausible biological and disease mechanisms
Coherence of the evidence	The cause and effect interpretation should fit with other known facts regarding the natural history and biology of the disease
Prevention	Does avoidance or removal of the cause decrease the incidence of the disease
Reasoning by analogy	Does the evidence mirror or match another cause and effect relation

Information Sheet

My name is Ann Rawlings and I am a qualified psychologist working here at [REDACTED]. I am also currently undertaking research at the University of Birmingham. My research area is looking at emotions that developed early in life, how emotions affect your life, and to see if there are links between emotions and types of offending. Information from this study may help to improve treatment programmes.

I am seeking people willing to complete two questionnaires which will take about 20 minutes to complete. The questionnaires will be made available on the unit within the next few days. Questions will ask you about how you feel emotions and some questions are personal in nature. If you wish to take part in this study, please collect a set from me when they are available on the unit. Then complete the questions and post the completed forms in the collection box which I will bring to the wing at unlock.

You will not be asked to put your name on the sheet and your answers will remain anonymous. Once you have posted the questionnaires in the collection box it will not be possible to identify your sheet if you change your mind about being part of this study.

It is a completely free choice if you wish to participate in this study and there will be no negative consequences if you do not wish to take part. As the questionnaires are anonymous, once you have handed in your questionnaires it would not be possible to change your mind about participating as it could not be traced back to you.

When the study is complete, I will provide a summary of the outcome and will be happy to speak to meeting groups (such as OPAL, IPPs/Lifers, Expressions, etc.) if invited. The collected data will be stored in a locked secure cabinet and will be used during the preparation of my doctoral thesis. The data will also be used in a paper to be published in a professional journal.

If you have any questions or concerns, or need help completing the questionnaires, please contact me. I will stay in close contact with your residential staff to make this as easy as possible.

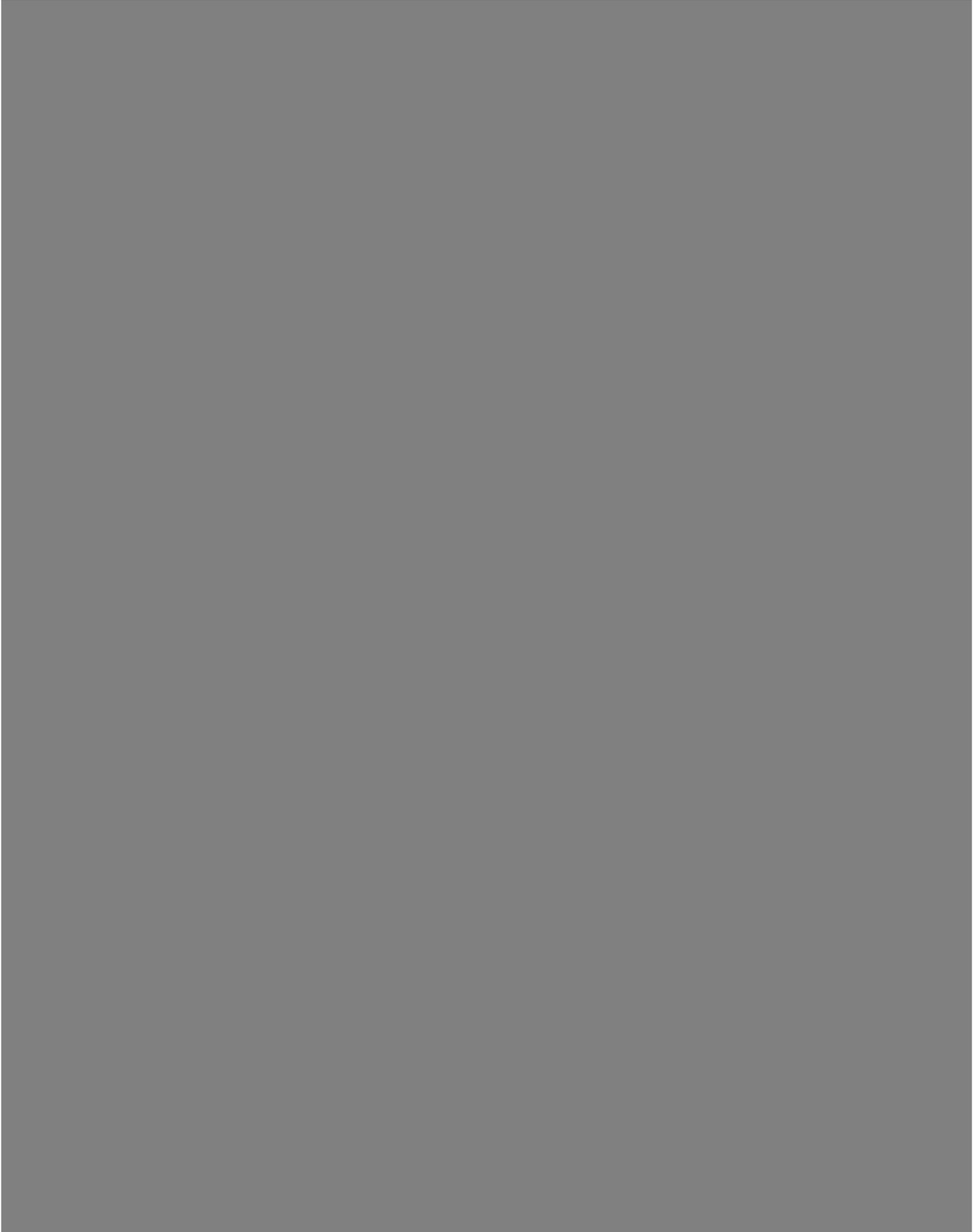
Ann Rawlings

Registered and Chartered Forensic Psychologist  
Psychology / Programmes Department



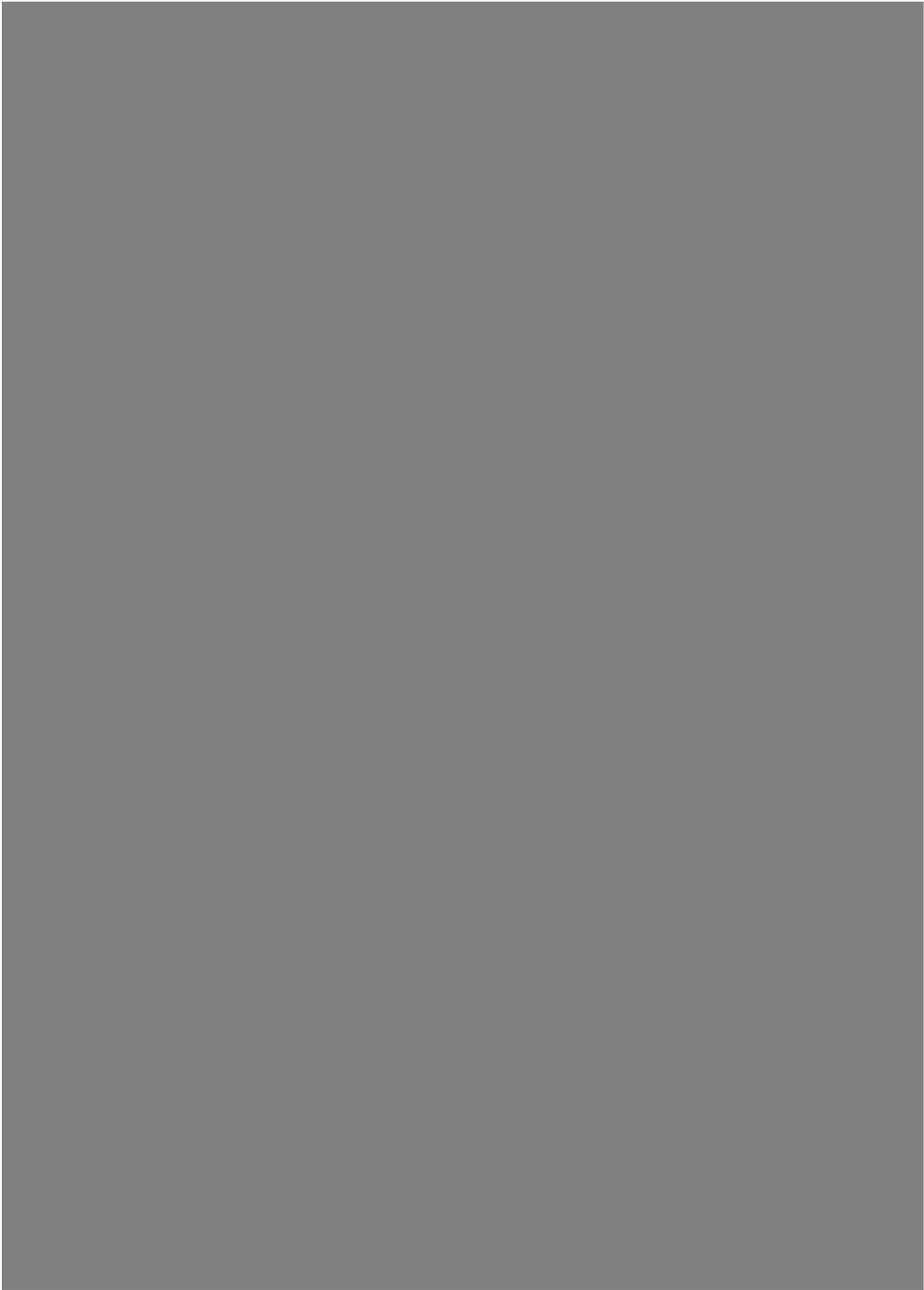
Appendix 10

**ANPS - Please mark by filling the bubble , like this**









Appendix 11

Scoring and Scale Guide for ANPS – (Adapted Research Version)



Appendix 12

**CAMS-R Questionnaire**

**Please mark bubbles  $\emptyset$ , like this**



Appendix 13

Scoring and Scale Guide for CAMS-R

## Debrief Sheet

Thank you for taking part in the study.

This study aims to learn more about the biology of emotions and the ability to manage emotions. The questionnaires asked about how you experience key emotions and how you manage these feelings.

It is hoped that the results of this study will contribute to knowledge that will improve treatment pathways.

If you have any queries, questions or concerns regarding this study, please contact the researcher via an application:

Ann Rawlings  
Registered and Chartered Forensic Psychologist  
Psychology / Programmes Department  
HMP [REDACTED]