University of Southampton

Doctoral Programme in Educational Psychology

Title: Can neurological research increase our understanding of Attachment Theory and improve school interventions for adolescents?

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Abstract

Originally introduced by John Bowlby, Attachment Theory proposes that an infant forms an attachment with their primary caregiver during a sensitive period of development and uses this individual as a secure base from which to explore the world (Bowlby, 1979; Bowlby 2008). The attachment relationship that develops forms a template that the infant uses as a reference for future relationships with other individuals. If a child does not form the appropriate bond with their caregiver they are likely to develop an insecure attachment style. According to a recent publication, forty percent of children in the United Kingdom show signs of insecure attachment (Moullin, Waldfogel & Washbrook, 2014). Insecure attachment has been shown to affect cognitive functioning (e.g. Bernier, Carlson, Deschênes & Matte-Gagné, 2012) and behaviour (Fearon, Bakermans-Kranenburg, IJzendoorn, Lapsley & Roisman, 2010). Despite the growth of preventative intervention programmes (Moullin, Waldfogel & Washbrook, 2014) research on supporting children who have already developed an insecure attachment is limited. Bowlby's work does not consider whether attachment style can be altered once an infant has left their sensitive period of development (Mercer, 2011). This assignment proposes that neurological research within this field of psychology increases our understanding of Attachment Theory when incorporated into a biopsychosocial model of attachment. The assignment aims to explore the contribution that neurological research has to the development of intervention programmes for adolescents with insecure attachment. The findings from this developing area of research will be explored cautiously and the implications for Educational Psychologists will be discussed.

Introduction

A recent report by The Sutton Trust (Moullin, Waldfogel & Washbrook, 2014) was the latest publication to emphasise the importance of parent-child bonding in the early years of a child's development. The study reported that approximately forty percent of children display signs of insecure attachment. This statistic caught the attention of national newspapers, generating headlines such as 'poor parent child bonding hampers learning' (Richardson, 2014) and 'four-in-10 children missing out on good parenting' (Paton, 2014). The meta-analysis found that an infant's attachment to their caregiver had an impact on a number of 'key outcomes in childhood' (p32) including language skills (Belsky & Fearon, 2002), language development (IJzendoorn, Dijkstra & Bus, 1995), executive control (Bernier, Carlson, Deschênes & Matte-Gagné, 2012) and even adolescent obesity (Anderson & Whitaker, 2011).

Along with an impact on cognitive functions, an insecure attachment relationship has been found to have an effect on the development of social factors and behaviour. In a meta-analytic study Fearon, Bakermans-Kranenburg, IJzendoorn, Lapsley & Roisman (2010) found that an insecure attachment increased the risk of externalising problems, as well as the development of aggression and anti-social behaviour. Furthermore, Fraley, Roisman, Booth-LaForce, Owen & Holland (2013) found that adult attachment styles resulting from insecure attachment in infancy have consequences for interpersonal functioning, emotion regulation and wellbeing thus suggesting it disrupts development throughout the lifespan.

Attachment theory has remained prevalent in psychological research since Bowlby's (1979) original work and the publication of the Sutton Trust report indicates that it is likely to remain a core feature in government initiatives, policy and the public eye. This assignment will first outline Attachment Theory before exploring the developing field of neurological research to decipher any additive value it has to traditional literature. In doing so a

biopsychosocial model of attachment will be recommended and the implications of this research on working with adolescents will be proposed.

A history of Attachment Theory

Attachment Theory was developed between 1958 and 1963 as a result of Bowlby's work with institutionalised children who had been separated from their parents and his scepticism of Freud's psychoanalytic theory of infant-mother bonds (Holmes, 2012). It appears to suggest attachment is an evolutionary mechanism that has developed to protect helpless infants from threat. There are a number of core tenets of attachment theory: First, it posits that a child forms a bond with a primary caregiver during infancy. Secondly it suggests that the child uses this caregiver as a secure base from which to explore the world independently. Finally this attachment develops into a template for future relationships. Each concept will now be examined in further detail:

The first feature of Bowlby's theory involves the primary caregiver. Bowlby (2008) argued that attachment was a 'monotropic' process whereby an infant forms a strong attachment and preference for one primary caregiver during a sensitive period of development. The sensitive period has been critiqued by some scholars who argue that attachments can be formed later in childhood (Rutter, 2002) even if a child is originally deprived of a primary caregiver (Zeanah & Smyke, 2008). These opposing viewpoints will be addressed later on in this assignment.

The second main facet of attachment theory was developed by Mary Ainsworth. Having accepted a position in Bowlby's research team in 1950 (Bretherton, 1992) Ainsworth proposed that children use their primary caregiver as a secure base from which to explore the world (Ainsworth, & Bell, 1970). When a child feels safe they move away from their secure base, exploring independently and experiencing social interactions with peers. When the

child feels there is a potential threat their desire to explore is overridden and the child returns to the safety of their attachment figure. Ainsworth was responsible for the development of the 'Strange Situation' as a measure of attachment. This is still commonly used in modern attachment research (e.g. Aikins, Howes & Hamilton, 2009).

The final aspect of Attachment Theory to be described is the Internal Working Model of relationships (Coan, 2008). Bowlby suggested that a child's first attachment relationship forms a mental representation that is used to predict and regulate the behaviour of their attachment figure and their future relationships (Shaffer, 2008). If a child is securely attached to their primary caregiver they are more likely to form positive relationships in the future. Advances in cognitive and developmental psychology that have occurred since Bowlby's original publication have led some researchers to propose a more detailed version of the Internal Working Model: Bretherton (1992) suggested that attachment scripts form the basis of Attachment Theory. Like Bretherton, Waters & Waters (2006) suggested that Internal Working Models are script-like representations that have been established according to the secure base experiences described by Ainsworth and built up as an internal schema. Research by Waters & Rodrigues (2001) identified the key element of a Secure Base Script as the resolution of a problem and a return to normality. They found that single Secure Base Script episodes conceptualise an individual's previous attachment experiences.

These descriptions of Attachment Theory highlight the process that occurs for a child who develops a secure attachment with their primary caregiver. However, if an infant does not experience the appropriate bonding experiences with their primary caregiver or does not have a primary caregiver, they are likely to develop a form of insecure attachment causing a negative model of themselves and others (Shaffer, 2008). Two classifications of insecure attachment have been recognised in the literature as 'avoidant' and 'resistant' (Ainsworth, Blehar, Waters & Wall, 1978). Prior & Glaser, (2006) suggest that children with an insecure

avoidant attachment style have experienced very little soothing behaviour from their caregiver and show a limited response to separation from this caregiver. Children with an insecure resistant attachment style are immediately distressed when separated from their caregiver and combine angry ambivalent behaviour with contact-seeking behaviour on the caregiver's return. A further category of 'disorganised insecure attachment' was added to Ainsworth's classifications by Main & Solomon (1987). These children display contradictory behaviour, undirected expressions of distress and an apprehension towards their caregiver.

By the age of eighteen months a child has left the sensitive period of development and formed specific attachment behaviours (Prior & Glaser, 2006). Children with insecure or disorganised attachment styles are likely to develop incomplete or inappropriate Internal Working Models, leading to the negative consequences described in the previous section of this assignment.

Since Bowlby's original work this theory has not been significantly altered or replaced (Mercer, 2011). However, emerging developments in neuroscience could support the possibility that attachment styles can be altered even after a child has left their sensitive period of development. In order to develop this line of argument a biopsychosocial model of attachment will now be proposed:

Biopsychosocial model of attachment

In the 1970's Engle (1977) proposed a medical model that would account for all the factors that influence mental and physical health. This model suggested that biological, psychological, social and structural processes and connected subsystems all interact with one another. It is referred to as the 'biopsychosocial model' (Suls, Krantz & Williams, 2013). Engle's model has been well received in psychology as it allows practitioners to work at all levels of analysis. Indeed it has been applied to tools such as the Interactive Factors

Framework (Frederickson & Cline, 2009) that can be used in work carried out by Psychologists. Suls, Krantz & Williams (2013) argued that often studies do not manipulate or control all areas of the biopsychosocial model and recommended strategies that could be used to ensure they are accounted for. The authors highlighted a need for cross-disciplinary research in order to increase the depth of connections between the aspects of this model. One criticism that could be made of Bowlby's theory of attachment is that it does not account for all areas of a biopsychosocial model although as Bowlby's work preceded Engle's model this is not surprising. Traditional Attachment Theory seems most applicable to the 'psycho' and 'social' elements of Engle's model: Internal Working Models or scripts are cognitive functions that are constructed via the social interactions that occur between a child and their primary caregiver. These scripts are developed according to initial social behaviours experienced by an infant thus accounting for the psychological and social aspects of the biopsychosocial model. Attachment theory therefore lacks the biological element of the model. Schore & Schore (2008) proposed that neurological research could account for this.

The following section of this assignment will examine the role of neurobiological research on attachment in order to argue its place in a biopsychosocial model that can be used to suggest that attachment style can still be altered after an infant leaves their sensitive period of development:

Neurobiological research

Schore & Schore (2008) refer to the recent increase of work in the field of neurobiology as 'the decade of the brain' (p10). Advances in scientific tools such as Magnetic Resonance Scanning have provided a clearer picture as to how the brain functions and changes throughout the lifespan (Yurgelen-Todd, 2007). In order to argue for a neurological perspective to be included in a biopsychosocial model two main aspects of neurobiological

attachment research will be discussed: First the method by which insecure attachment impacts on brain development (Schore & Schore, 2008) followed by how environmental factors can be manipulated to influence brain development (Kolb, 2013):

Researchers in neuroscience increasingly argue that insecure attachment impacts upon the development of certain areas of the brain (Schore & Schore, 2008; Coan, 2008; Allen, 2012). Schore & Schore (2008) proposed that attachment plays a role in emotion, stress modulation and self-regulation. Coan (2008) added that attachment relationships serve regulatory functions. Allen (2012) suggested that early attachment trauma can have long term adverse effects on emotion regulation. Allen argued that insecure or disorganised attachment impairs stress regulation.

One explanation for this impairment is provided by Strathearn (2011) whom examined the effect of attachment on the neurotransmitter Oxytocin. Oxytocin attenuates stress and anxiety by inhibiting the amygdala i.e. the area of the brain responsible for flight or fight responses (Allen, 2012). This system is responsible for regulating emotions. Strathearn (2011) reported that rodents who experienced a reduced level of maternal care and were therefore unable to form a secure attachment had an inhibited Oxytocin system. Furthermore, Polan & Hofer (2008) found that maternal behaviour shaped stress reactivity. Offspring who experienced low levels of stimulation and interaction showed higher fear and avoidance in adulthood. Although this research was carried out on non-human subjects the effect of insecure attachment on Oxytocin levels has also been found in human subjects: Women who reported childhood emotional neglect showed significantly lower levels of Oxytocin (Heim et al, 2009). However, the cross-sectional nature of the study (self-reports were used to confirm childhood neglect) does mean the results must be interpreted with caution.

Dedreu (2012) used an experimental design and gave an intranasal dose of Oxytocin to young males classified with attachment avoidance or attachment anxiety and then faced

them with a social dilemma. The study found that increasing Oxytocin modulated the behaviour of participants with attachment avoidance as they showed increasing displays of trust and cooperation. However, Oxytocin did not have an effect on individuals with attachment anxiety. Therefore it is possible that Oxytocin levels are affected by certain types of insecure attachment and not others. These findings emphasise the fact that neurobiological research is in the preliminary stages and further research is still required before causal statements can be made.

A further aspect of neurological research that adds to our understanding of attachment is neuroplasticity. It has been found that brain organisation and development can be altered by experience (Kolb, 2013). It has been suggested that this plasticity i.e. the brains ability to be altered, remains throughout the lifespan (Lenroot & Giedd, 2006). Kolb suggested that although it is less obvious, an adults' brain can still be altered by experience. These findings might suggest that it is possible to alter insecure attachment by changing an individual's environment.

Furthermore, research has suggested that there is an additional sensitive period of brain development at the start of adolescence during which structures such as the pre-frontal cortex and the limbic system (including the amygdala) undergo rapid reorganisation (Crews & Hodge, 2007). Changes in emotional capacity are also argued to occur during adolescence as young people try a variety of affective responses whilst developing their sense of self (Yurgelun-Todd, 2007).

The research reviewed here highlights several factors: Attachment experiences seem to modify neurological developments such as affect regulation by altering neurotransmitters such as Oxytocin. Additionally, neuroplasticity research suggests that the organisation of the brain can be altered across the lifespan. Based on these findings it seems possible to infer that

attachment style can be altered during a critical period of development in adolescence and potentially throughout the lifespan. The value of this research will now be deliberated:

Schore and Schore are advocates of neurological research within the field of attachment. In a recent paper they proposed a new 'Modern Regulation Theory' (Schore & Schore, 2008, p17) that amalgamated Bowlby's work with other psychological theories using neurological findings. Modern Regulation Theory is based on a premise that biological predispositions are influenced by early caregiving relationships. The authors claim that this theory explains the process by which early social experiences influence regulatory processes in the brain. Modern Regulation Theory appears to incorporate both aspects of neurological research that have been reviewed in this section. According to Schore and Schore (2011) it provides an explanation as to why early environmental experiences influence regulation later on in life. It fills a gap in Bowlby's work as he did not describe the events that occur after the child has left the sensitive period of development (Mercer, 2011). If this is the case then neurobiological research is invaluable and should dominate future academic research.

Furthermore, Mercer (2011) criticised Bowlby's work by arguing that it did not provide enough empirical evidence that early attachment was an essential determinant for later behaviour as you could not measure attachment consistently from infancy to adulthood: Infant attachment is commonly measured using the 'Strange Situation' whereas adult attachment is usually measured using the Adult Attachment Interview (henceforth AAI, Main, 1999). Even Main herself acknowledged that the AAI does not measure attachment in the same way as the Strange Situation (Allen & Manning, 2007). The development of neurobiological techniques allow for a consistent longitudinal measure of attachment.

However, there have been a number of criticisms about the literature produced in this field and it is important to address these before hastily replacing traditional attachment theory with Modern Regulation Theory:

First the advances made in neurobiological research are relatively recent. Allen (2012) argued that researchers and practitioners should be wary of focusing too strongly on the neuroscience of attachment. Zeenah & Smyke (2008) also stated that there is not yet enough known about the neuroscience that underlies attachment. A collection of scientists stated in a recent declaration that neurological research is preliminary and should not be offering guidelines in policy or practice at this stage nor should it be making causal claims (Santiago Declaration, 2007). According to these warnings Schore & Schore's (2008) theory should be interpreted with caution.

A further criticism of this work is that it is mainly carried out using non-human participants (Mercer, 2011). Research on the effect of insecure attachment on regulatory systems and brain development has commonly used rat pups as subjects in order to manipulate environmental conditions such as maternal deprivation (Strathearn, 2011; Polan & Hofer, 2008). Although this is effective in controlling extraneous variables and providing experimental control there are clear implications on the generalisability of the research. Mercer (2011) stated that the 'existence of serious species differences' (p28) makes it questionable whether you can use observations about attachment in rats and apply it to human behaviour. Researchers in the field of neuroscience must be using human subjects to explain the effect of attachment on human brain development. Research methods are beginning to enable researchers to examine human subjects in a non-obtrusive process however this is an area for development within the field as it will reduce the need for animal research in the acquisition of empirical evidence for Attachment Theory.

A final criticism of Modern Regulation Theory is that Schore & Schore have developed the theory by mainly citing their own research (Mercer, 2011). In their paper (Schore & Schore, 2008) the researchers offer ten references to their own publications. The

ethical nature of this is questionable and must be taken into consideration by those advocating a shift to Modern Regulation Theory.

Although criticisms of neurological attachment research and Modern Regulation Theory have been presented, the research still seems valuable when used within a biopsychosocial model alongside traditional theory. The final section of this essay will explore the additive value of this biological aspect in the proposed model of attachment.

EP implications

Attachment Theory is still applied in current policy: Moullin, Waldfogel & Washbrook (2014) used Bowlby's work to argue that parenting matters and recommend strategies to prevent the development of insecure attachment. Programmes such as Family Nurse Partnership, The Incredible Years Programme, and Circle of Security are preventative parenting interventions that focus on the development of a secure attachment between a young child and their caregiver (Moullin, Waldfogel & Washbrook, 2014). These strategies have been recommended by the Sutton Trust as they have shown significant positive effects on attachment styles.

In comparison to Early Years prevention strategies, intervention programmes for adolescents with insecure attachment are limited. In the context of traditional Attachment Theory this is unsurprising because Bowlby stated that attachments were formed during a sensitive period of development in infancy. However, Bowlby never proposed that attachment style was unchangeable after this period. Therefore applying a biopsychosocial model of attachment might encourage a more optimistic approach to supporting adolescents with insecure attachment:

As aforementioned, research on the neuroplasticity of the brain suggests that it remains malleable across the lifespan (Lenroot & Giedd, 2006) and goes through a

reorganisation process during adolescence (Crews & Hodge, 2007). Yurgelen-Todd (2007) proposed that an adolescent's emotional responses and affective expression have not yet finished developing as young people are continuing to try out different responses and develop their sense of self.

Beijersbergen et al (2012) investigated whether attachment style was continuous from infancy to adolescence and found that high levels of sensitive maternal support in early childhood did predict secure attachment when the child reached adolescence. However the researchers also found that increasing maternal sensitivity altered a young person's attachment style from insecure in childhood to secure in adolescence. It seems therefore that there is a second sensitive period during which an adolescent's attachment style could be altered through intervention. These findings are unsurprising if neurological research is incorporated into a biopsychosocial model of attachment.

There are a variety of implications of adding neurological research to attachment theory for Educational Psychologists. It may simply be the details of an intervention that must be altered: A recommendation that could be made by Educational Psychologists to teachers working with insecurely attached adolescents is the use of attunement strategies and nurture rooms in order to provide adolescents with a primary caregiver and a secure base (Stevens, Van Werkhoven, & Castelijns, 2001; Cooke, Yeomans & Parkes, 2008). Using staff as an attachment figure in this way has yielded mixed results: Harder, Knorth & Kalverboer (2012) found that children did not use staff as attachment figures whereas Zegers, Schuengel, IJzendoorn & Janssens (2006) found children sometimes used mentors in school for an attachment relationship. The research on Oxytocin could be used to interpret these results as the neurotransmitter is released by physical touch and soothing behaviours. Considering that work on non-humans often identifies licking and grooming as attachment eliciting behaviours (Strathearn, 2011; Polan & Hofer, 2006) the relationship offered to

children by members of staff may not be sufficient in building a secure attachment as, despite scholars arguing for more acceptance of physical contact between staff and students, school culture does not deem these behaviours as appropriate (Owen & Gillentine, 2011). Bearing this in mind Educational Psychologists may wish to alter their advice in this area: A different method that has been proposed involves using peers as attachment figures during adolescence (Nickerson & Nagle, 2005; Seibert & Kerns, 2009). It may be more appropriate to advocate a modification of attunement strategies using peer relationships to encourage healthy use of physical touch in order to boost the development of emotion regulation in the brain.

Alternatively, if psychologists are to advise staff to provide an adolescent with an attachment figure they may consider intersubjectivity research: Schore & Schore (2008) described intersubjective communication i.e. non-verbal communication in human interactions as regulating the right side of the brain. As aforementioned this is the area that controls Oxytocin release. Schore & Schore (2008) claimed that it is important for a therapist working with an insecurely attached patient to be aware of their own non-verbal communication. If applied to a school setting this may mean that teachers who do not consider their own behaviour and communication will not be able to support an adolescent with insecure attachment. According to Dorpat (2001) adults working with these individuals need to be working at a primary communication level using 'body movements (kinesics), posture, gesture, facial expression, voice inflection, and the sequence, rhythm, and pitch of the spoken words' (p451) to build an attachment relationship. It may be the responsibility of the Educational Psychologist to deliver whole school training on these primary communication behaviours in order to ensure staff, especially those designated as primary attachment figures, are consistently using the appropriate intersubjective communication techniques.

Finally, when working individually with insecurely attached adolescents Educational Psychologists should consider the fact that, unlike infants in their sensitive period, adolescents are more likely to be able to verbalise their emotional regulation. In fact they are specifically required to do so when completing the AAI to establish their attachment style (Dubois-Comtois, Cyr, Pascuzzo, Lessard & Poulin, 2013). Educational Psychologists must be responsible for accessing pupil voice in their work as it may provide a valuable insight into the best intervention to use with the student. If a young person feels most secure with peers this should be incorporated into the recommendations given to the school in order to provide the adolescent with the best chance to form a secure attachment.

Conclusion

The negative effects of insecure attachment are clearly established in academic literature and policy advice (Fearon et al, 2010; Moullin, Waldfogel & Washbrook, 2014). Bowlby's original research on Attachment Theory has stood the test of time and remains the main theoretical perspective in this field (Mercer, 2011). However, recent developments in neurological research have provided further insight into the study of attachment (Schore & Schore, 2008) thus enabling it to be considered using a biopsychosocial model (Engle, 1977) and provide optimism that adolescents have a second sensitive period of development during which interventions could alter an insecure attachment style.

Researchers have advised treating neurological findings with caution (Santiago Declaration, 2007) as the area is still in development therefore psychologists should not interpret the findings too literally. For example, DeDreu's (2012) findings that providing intranasal Oxytocin to men with insecure attachment avoidance increased their trust and cooperation should not encourage Psychologists to recommend injecting adolescents with Oxytocin. Rather they should combine the findings with traditional Attachment Theory into

the biopsychosocial model in order to support interventions. Thus the implications for Educational Psychologists should be to encourage the correct use of non-verbal communication when building an attachment bond. They should develop an understanding of the adolescent's own perspective of their emotional regulation in order to identify the most appropriate attachment figure to use with the adolescent. Educational psychologists must also be aware of any changes that develop within this increasingly expanding field of research. Their practice must evolve with these changes to our understanding of Attachment Theory in order to support young people facing the adverse effects of insecure attachment.

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