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## **Attachment theory, Cortisol and Care for the under 3s in the 21<sup>st</sup> Century: constructing evidence-informed policy**

### **Abstract**

Infant attachment theory is now nearly seventy years old. Despite debates that developed around the original theory relating to the role of the mother and the potential for emotional flexibility in the infant, its core thesis of the role of the 'Internal Working Model' in human mental health endures. Recent neurophysiological research reveals complex relationships between stress biology and infant attachment. In this article, attachment theory is summarised from its origins to its currently emerging relationship with neurophysiology, and implications for policy are discussed. Emergent concepts include the indication that insecure relationships in infancy have the potential to impact upon lifelong mental health, and that contemporary UK policy does not give enough weight to this finding when planning care and social strategies for infants and their families. This article attempts to bring together a cohesive picture of research across neurophysiology, psychology and practice to inform future policy development.

Keywords: Infant Attachment, Internal Working Model, Cortisol, Daycare, Social Policy

7030 words

## **‘Classic’ attachment theory**

Attachment theory was created by the British psychologist John Bowlby over the period directly following the World War II (1939–45). Bowlby drew his theory from his psychoanalytic work with children who had been evacuated from the cities during the war, separating them from home and family at very young ages, with additional theoretical concepts drawn from the ethological study of avian imprinting (Lorenz 1935). Bowlby’s central thesis was that human mothers and babies have a natural, evolved instinct to form a strong emotional bond, which if never made, or if broken in the first three years (which he deemed the ‘sensitive period’), created life-long emotional problems for the child. The evolutionary argument is that attachment in animals is a selected behaviour, due to its propensity to protect the organism from danger. In human beings, such protection does not necessarily always emanate from the mother, hence this concept of a narrow ‘monotropic’ attachment was always open to question.

Consequently, some of Bowlby’s claims have since been robustly challenged, ‘monotropy’ in particular. However, his concept of the ‘Internal Working Model’ (IWM) remains at the heart of modern attachment theory. This relates to the proposal that, based on their earliest relationships, infants construct an IWM of what to expect from other people, and of their own level of ‘lovability’. In this paradigm, stable and loving relationships create an ‘other people are nice and I am lovable’ IWM, whereas troubled and fragmented relationships create an ‘other people are unkind and I am *not* lovable’ IWM. This core emotional ‘setting’, Bowlby proposed, was the basis of all subsequent emotional interactions with others, both in childhood and in later life: “No concept within the attachment framework is more central to developmental psychiatry than that of the secure base’ (Bowlby 1988, 163–164).

The Internal working model forms a type of 'blueprint' for what one can expect from caring adults (Rholes and Simpson 2004). This eventually extends to how one views the value of the self; how one should respond to others one is put in a position to care for; how emotions are managed within these relationships, how one behaves towards others, and expects them to behave towards the self (Howe et al.; Bowlby 1980; Bowlby 1988).

Bowlby’s classic theory of infant attachment (Bowlby 1952) was initially used as the basis for the United Nations Declaration of the Rights of the Child (United Nations 1959). Bowlby drew on ethological theory and Freudian psychoanalysis to form his core theoretical base. As a theorist of the mid-twentieth century, he laid tremendous emphasis on the role of the mother in the life of the infant, proposing that the attachment process between the human mother and baby was innate; an automatic, biological and evolved process, as deeply rooted in primates as the imprinting process in birds (Lorenz 1935).

The fact that the majority of Bowlby’s readers at that time had experienced significant physical and emotional disruption during the period of World War II meant that the theory received enormous public attention. Barbara Tizard, a psychologist who worked closely with Bowlby, remembered:

This was because it appeared at a time, soon after the end of the Second World War, when there was a big movement to get women, in many ways liberated by their wartime work experiences, to stay at home. Professional women like myself – I had my first baby in the year the book was published – became worried that they would damage their children by returning to work even on a part-time basis, and those who worked full-time were widely criticised.

Tizard 2009, 902.

As the world moved on from the immediate aftermath of war however, Bowlby's theory, monotropy in particular, came under increasingly critical scrutiny. Subsequent attachment research, notably by Schaffer and Emerson (1964) who studied large extended working-class families in Glasgow, found that *several* bonds with a small group of adults were formed in the first months. Their participant babies tended to have one primary attachment and several secondary attachments, being content to be cared for by any of these 'bonded' adults. Approximately 50 per cent of these babies had the primary attachment to the mother; the other 50 per cent formed a primary attachment to another member of the family, most commonly the father or grandmother. The primary attachment tended to be the person in the family who showed the most 'sensitive responsiveness' to the baby. Tizard (2009, 902) later re-emphasised these findings with reference to a traditional early industrial custom in northern mill towns, where one woman in an extended family supplied the family's childcare whilst her working relatives each paid her a small sum to do so: 'generations of women in the north of England... worked full-time in the mills, with no apparent north-south difference in the incidence of psychopathy'.

This element of multiple attachments was later explored by Page (2018) in her study of 'professional love' between infants and carers in childcare settings, and empirically tested by Shonkoff et al., (2015) who studied attachment formation between older children and professional practitioners. Tizard and Rees (1974) similarly demonstrated this aspect of human flexibility in an empirical study of the attachments formed by children with adoptive parents whose presence in their lives had occurred some years after the third birthday. They concluded that human beings do have some amount of resilience to withstand a poor emotional start if early attachment difficulties are effectively addressed in later childhood, intimating that the 'sensitive period' is another element of original Bowlbian theory that might have been too 'fixed' in its initial conception.

D W Winnicott (1951) explored another facet of multiple attachment in his study of what he came to call 'transitional objects'- familiar toys and everyday objects (e.g., a teddy bear or a blanket) that small children use to bolster feelings of security. This is unsurprising when we consider the human being as an intensely symbolic primate, with a psychology that is very different to the less symbolic cognition of avian species. Children explore the more complex elements of symbolism when they are old enough to develop spoken language in which words 'stand for' objects, feelings, etc. The phenomenon of the transitional object indicates that pre-verbal human beings can subconsciously create a symbol from a concrete object which can then temporarily 'stand for' an attachment figure. This ability had been previously rather more artistically intuited in the early 20<sup>th</sup> century children's book *The Velveteen*

*Rabbit:*

"Real isn't how you are made," said the Skin Horse. "It's a thing that happens to you. When a child loves you for a long, long time, not just to play with, but REALLY loves you, then you become Real"

Williams 1922, online.

Bowlby showed an ongoing interest in research that tested, questioned and expanded his original theory. Towards the end of his life, in 'A Secure Base' (1988), he re-emphasised his core thesis of the Internal Working Model, explaining that when children's first experiences of their interactions with significant others communicate to them that they are lovable, and that other people are interested in and sensitively responsive to their attempts to communicate, they are provided with a secure base from which to venture out and to which they can subsequently return for help. In the process of doing so, he pointedly cast doubt upon the advisability of the mass daycare culture that was arising over the last quarter of the twentieth century:

Man and woman power devoted to the production of material goods counts a plus in all our economic indices. Man and woman power devoted to the production of happy, healthy and self-reliant children in their own homes does not count at all. We have created a topsy-turvy world'

Bowlby 1988, 2.

Bowlby's misgivings were more recently provided with robust support from a comprehensive study by Jay Belsky, which found that Children who spent a large amount of time in daycare in the early years of life were more likely to develop behaviour problems, aggressiveness and disobedience in particular, and this was indicated by ratings independently supplied by parents, daycare practitioners and, as the children grew older, teachers. (Belsky et al., 2006).

Mary Ainsworth, who joined Bowlby as an associate in 1950 created a research methodology which became known as 'the strange situation' (Ainsworth and Bell 1970) in which she explored the quality of attachment that 18 month old babies had with their mothers. Ainsworth studies began with some small scale observational research with mothers and babies in Uganda (Ainsworth 1967), in which she studied proximity seeking behaviours. This was later followed up by a controversial study which briefly deprived children of their mother's presence (thus, the 'strange' situation) and studied their reaction to this. Ainsworth subsequently proposed that, within her studies, she had gathered empirical support for the proposal that insecure attachments result in fragility within the child's IWM. Specifically, Ainsworth proposed that where children's experience was that bonded carers were readily available to provide emotional support, the infant developed the confidence to independently explore beyond the vicinity of the familiar in an ever-widening arena as they grew older, having built a psychological assurance that they would be able to access emotional support when required. But where children learned that such support was never available, or that it was only available sporadically, they developed an anxiety associated with venturing beyond the immediate orbit of the carer. Ainsworth's

interpretation of her experimental results was that children who consistently lacked sufficient emotional support developed a defence mechanism of responding dismissively to other people's attempts to help and became doggedly unwilling to adventure beyond the familiar. Those who had learned that emotional support was only sporadically and unpredictably available developed a preoccupied/fearful style, developing a defence mechanism of constantly seeking reassurance from others when venturing into unfamiliar territory, due to an underlying concern that help might not be forthcoming when needed. This effect had previously been routinely observed in education and care practice by Bowlby's contemporary, Susan Isaacs (1952, 21): 'without security as a background to his life [a child] cannot dare to explore or experiment, to express his feelings or to try out new relations to people'.

However, later research, notably by Van Ijzendoorn and Kroonberg (1988) indicated that different cultural norms introduced a confounding variable into the 'strange situation' research methodology; cultural expectations were observed to have an influence upon what both mothers and children view as a 'strange' or familiar situation, and have a mediating effect upon typical infant attachment responses within a specific milieu. The key point arising from these studies was that patterns of care may vary across different cultures, and the child's sense of security is dependent upon what s/he has come to expect within his or her relationship with attachment figures. However, the overall indication was that, universally, human infants need to find warm and responsive relationships within the relevant cultural situation, supporting the core pillar of attachment theory. Nevertheless, this was the first point at which the existence of complex conflicting variables entered the arena of attachment research, indicating that the research questions were not as straightforward they may have initially appeared to Bowlby.

Attachment theory therefore entered the 21<sup>st</sup> century very much as a 'live' entity, with many elements still open for discussion. And the exclusive focus on the mother was no longer a feature, secure emotional bonds with adults were still emphasised as a core requirement for healthy development in the earliest years of life. 'Early attachment security is associated with better emotion-regulation capacities and greater social competence' (Cassidy et al., 2013, p.1426). At the beginning of the 21<sup>st</sup> century, the US National Research Council and the Institute of Medicine's Committee on Integrating the Science of Early Childhood Development rooted its policy in the premise that nurturant early environments provide emotional security, and that without access to at least one such relationship, the developmental process required to produce psychologically healthy human beings is disrupted (Shonkoff & Phillips 2000).

### **The Cortisol Studies**

With the growth of medical screening technology in the early 21<sup>st</sup> century, further neurophysiological evidence emerged to support the importance of secure relationships in infancy. A range of studies discovered abnormally raised levels of the stress hormone cortisol in young children in situations in which they did not feel secure in the care that they were receiving. A range of studies discovered that infant cortisol increased across the day from morning to afternoon in young children spending full days in daycare, whilst it decreased across the day in the same

children when they were cared for at home (Dettling et al., 1999; Dettling et al., 2000; Watamura et al., 2003; Watamura, et al., 2009). This finding apparently indicated that Bowlby had been right in his assessment that the home environment was inevitably best at promoting emotional health in young children.

In normal mammalian physiology, cortisol has a regular cycle, rising to a peak as the creature awakens from sleep. It then falls steadily throughout the day, reaching its lowest point prior to the onset of sleep; it then rises steadily in the later stages of sleep, and peaks at the point of waking (Sims et al., 2006). Cortisol levels additionally rise in response to external stressors. This is commonly described by the 'fight or flight' response, which is managed by the body's hypothalamic–pituitary–adrenal 'HPA' system (Thomas et al., 2018). Levels of cortisol return to baseline when the situation is resolved. Research indicates that infants with secure attachments have a lower cortisol peak in response to stress, and a quicker return to baseline, while infants experiencing ongoing stress typically have higher resting levels of cortisol and take longer to return to baseline after individual stressful experiences.

Having a severe history of stressor exposures (traumatic stress in particular, especially if experienced in childhood) or being under current chronic stress greatly impacts the likelihood of ...developing maladaptive acute stress responses.

Epel et al., 2018, 154

There also appears to be a complex relationship between levels of cortisol, behavioural indicators of insecure attachment, and differences in quality of care that infants receive in home and day care environments, which in turn interacts with the socio-economic situation (and the resulting stresses) in which their families are immersed (Sims et al., 2006, Badanes et al., 2012, Watamura et al., 2010). A complex set of variables come into play that mediate individuals' relative stress levels in different situations, for example the quality of the setting (Sims et al., 2006), the temperament of both the mother and the child (Albers et al., 2016) and the quality of the care provided in the home versus the quality of the care provided in the setting (Albers et al., 2016 and Berry et al., 2014). Such findings complicate researchers' attempts to reliably inform policy in this respect. Albers et al., (2016) and Berry et al., (2014) found that infants receiving a higher quality of care in the home displayed a greater cortisol rise in the care setting compared to infants receiving a lower quality of care in the home. Berry (2016) posited that high-quality childcare might therefore act as a mediating factor for children who live with adults who provide low quality care. This had previously been demonstrated in practice by a large sample longitudinal study of British children in early years education, the Effective Provision of Pre-School Education (EPPE) project. 'Whilst not eliminating disadvantage, pre-school can help to ameliorate the effects' (Sylva et al., 2004, online, 4).

Shapancer (2017) commented that key variables in cortisol studies such as daycare quality, individual care giver quality, individual child-parent bonding security and parent access to social support create problematic and potentially confounding variables within research methodologies. Cassidy et al., (2013) agreed, but proposed

that the overall pattern of findings is clear in one respect; that insecure attachments in early childhood have the potential to create poor emotional health even though: 'the precise nature of the connections remains unclear' Cassidy, et al., (2013, 1423). Bernard et al., (2015) raised a further potential variable with their finding that the child's age is also an important and complex factor in the level of the stress response to daycare. They found that rather than children simply becoming increasingly emotionally robust over the period of early years development, pre-schoolers tended to show a larger cortisol increase across the day than babies and school-aged children; in their study 45% of infants, 62% of pre-schoolers, and 35% of school-age children showed a rise in cortisol across the childcare day, and this pattern continued across the first 10 weeks in a new childcare setting. They speculated that the higher levels in the children in the pre-school age group might relate to stresses triggered by peer interaction. Vermeer and Van Ijzendoorn (2006) also found a similar age effect, with three-year-olds experiencing the most significant rise in cortisol levels in daycare settings.

A significant increase in cortisol levels during the day was found amongst Norwegian toddlers in childcare, which was particularly marked for children who spent long hours in the setting. The cortisol rise was not present in the same sample when tested at home. However, the sample for this study was almost uniformly middle class (Drugli et al., 2017), and therefore did not encompass the more subtle element of socio-economic comparison represented in the studies of Albers et al.,(2016) and Berry et al.,(2014) discussed above. Lumien et al., (2016) also found that in three to five year old children, cortisol levels were higher in those who attended daycare full time, as compared to attending part time, regardless of programme or socio-economic status, although quality of setting was not raised as a variable within their specific methodology. The elements of actual amount of cortisol present vs level of rise within the setting is a variable that is difficult to disentangle across the range of studies currently available. To add to this complexity, Singer and Wong (2019) comment that when making international comparisons, researchers should be aware that quality of daycare systematically differs between nations due to differences in funding mechanisms, with the US being at the bottom of the pile.

The overall picture is of a complex impact upon children's stress levels, most particularly through an intricate interaction between the quality of care in the home vs the quality of care in daycare. Additionally, the age of the child and the number of hours spent in the daycare setting must also be taken into account when considering the level of stress caused to the child. The basic fact that children in general tend to show a cortisol rise when attending daycare is therefore only one element of a highly intricate and transacting tangle of variables that need to be carefully considered when planning a national policy for the care of children under three. Watamura et al., (2011, 60) made a particularly important point in their reflection that 'children who experience double jeopardy deriving from low-quality home and child-care environments are particularly at risk for compromised development'. This correlates with the findings of Belsky et al., (2006), in that they found low quality care was particularly detrimental to children whose mothers had been evaluated as lacking sensitivity. Such findings pinpoint a key issue for consideration in societies such as the US and UK in which daycare is largely privately administered, as socio-economically deprived families will be unable to afford the highest quality of daycare, putting children from such families at the risk of experiencing double disadvantage.

## Implications for practice

The core empirical evidence from nearly two decades of cortisol studies indicates that when children experience ongoing stress due to early insecure relationships with adults that destabilise their emotional equilibrium, this sets in train a problem with stress management that may eventually become 'toxic' to that individual.

The main brain structures that are affected by the chronic secretion of stress hormones during childhood (hippocampus, prefrontal cortex and amygdala) are differentially involved in various cognitive functions (memory, emotion regulation, encoding of emotional memories, etc.)

Raymond et al., 2018, 152.

A simplified comparison can be made between a continually stressed brain and a computer constantly running a program that takes up a significant amount of its processing capacity. Research in the areas of 'Adverse Childhood Experiences' (see Smith 2108 for an overview) and cortisol disturbance (e.g. Fairburn 2007, Legua et al., 2019) indicate that implications for such a child are both emotional *and* cognitive as time goes by:

- Fight or flight response always on stand-by
- Quick to anger, to sadness and 'learned helplessness'
- Short attention span
- Problems concentrating at school
- View the world as a dangerous place
- Mistrustful of adults and other children
- Feeling of inadequacy/ lacks confidence
- Lack of self-belief/ lack of self-motivation
- May be over-dependent upon opinion/ support of others (preoccupied)
- May reject support from others (dismissive)

Jarvis 2019, online.

In Bowlbian terms, this pattern of anxiety is the ongoing 'fall out' emergent from the IWM that emotionally insecure young people carry of the world, i.e., that other people may not be friendly and helpful, and that they themselves may not be worthy of affection, compromising their confidence in their own abilities and their willingness to trust other people.

A growing body of research indicates that differences in the quality of early care contribute to variations in the initial calibration and continued regulation [which]... in turn plays an important role in shaping behavioral responses to threat.

Cassidy et al., 2013, 1418

In terms of the mechanisms underlying this cluster of problems, Wagner et al., (2016) empirically linked higher cortisol levels to poorer "executive functioning"

across three cognitive domains: inhibitory self-control, flexibility and emergent metacognition (the ability to reflect on one's own thoughts). Whitebread and Vasilio (2012) explain that executive functioning develops from birth, and involves a growing ability to focus attention, control one's own actions, resist distractions and engage in goal directed activity. They propose that working memory is also involved in executive function, in that children have to be able to securely manipulate both incoming information and previously learned knowledge in order to direct their behaviour towards a goal. Strong executive functioning has been linked to the development of the cognitive skills that promote academic ability (Espy 2004) and mitigate against aggressive behaviour (Ellis et al., 2009).

Executive function is an umbrella term that refers to the following mental processes: working memory or the capacity to hold and manipulate information over short periods of time, inhibitory control or the ability to master and filter thoughts and impulses and to pause and think before acting, and cognitive or mental flexibility such as the ability to shift attention between tasks.

Scorza et al., 2016, 314

Executive functioning and self-regulation also underpin what contemporary employers refer to as 'soft skills', (taking initiative, independent problem solving). Recent complaints have been made that these are increasingly lacking in young people entering the employment market (Davidson 2016), indicating the extremely high stakes involved for nations considering policies for under threes' care provision.

Leugua et al., (2019) proposed that future research should focus upon the overall impact of adverse childhood environments upon the development of abnormal cortisol functioning, attempting to unpick interacting factors. The key issue that future researchers will need to focus upon is to better understand complex and intricate transactions between internal stress coping biology and the effects of the external environment upon these in the early years of life when system is being calibrated. They will also need to more fully integrate contemporary models of infant attachment with an in-depth understanding of HPA functioning, and the interaction of HPA functioning with executive functioning. Early attempts to conceptually integrate the biological and the environmental have already begun. For example, Thomas et al., (2018) examined whether pre-natal social support offered to mothers reduced their biological stress reactions and whether any positive effect was then transmitted to the child. They concluded that positive social processes did indeed create an emotional 'buffer', which reduced biological stress markers in both mother and child.

Blair et al.,(2019) studied the effects of 'Parent-Child Interaction Therapy (PCIT)' which compared families where parents were carrying a range of emotional stressors from their own childhoods to those who were not, indicated by scores on the Adverse Childhood Experiences Questionnaire (Felitti et al., 1998). The study found that parents with a high 'ACEs' score (4 or over) reported significant improvements in the child's behaviour following PCIT, while those with a low score (3 or under) did not. Such findings are not yet conclusive, as research is in its early days, and results, similarly to those reported by Blair et al. are frequently based on small samples, but there are growing indications that two generation focused interventions may be

effective. The researchers conclude:

The current study extends prior research that suggests that PCIT can be implemented successfully with trauma-exposed children... and it makes an original contribution to the literature by demonstrating that PCIT may also be efficacious with trauma-exposed caregivers.

Blair et al., 2019.

### **Daycare or homecare? The intricate balance**

In terms of the complex relationship between quality of care in the home and in the daycare setting, how do we define an 'adverse childhood environment'? Bowlby's (1953) argument that poor homes are inevitably better than good childcare settings appears to have been robustly refuted by the cortisol studies. The indication appears to be that conversely, children under three need affectionate, trusting relationships with a small group of adults who reliably care for them in a calm, attentive, affectionate fashion, regardless of location.

The role that well-trained, well-managed and supported professional adults can play in supporting children at risk from insecure family relationships has been highlighted by Shonkoff et al., (2015) who found that supportive adult-child relationships outside the immediate family circle could blunt the impact of insecure family relationships, and that emotional resilience could be strengthened by supportive relationships with non-familial adults at any point in childhood. They list the important factors in such relationships as follows:

- That the relationship is long-standing, stable, caring and supportive
- The adult provides support for the child to believe that s/he can overcome adversity
- The adult supports the child to develop self-regulation skills, not via the imposition of draconian external discipline, but through gentle support for the child to learn how to regulate his/her own responses in situations that are experienced as stressful
- The adult is careful to support and affirm the social and cultural traditions to which the child and his/her family are affiliated

With respect to home-based care, the chances that secure, bonded relationships will be cemented is greatly optimised by social policies that ensure parents have sufficient financial and social support and are not placed under unmanageable stress during their child's first three years of life. Tharner et al., (2011, 162) explain that 'parenting stress explain(s) the most variance in child emotional and behaviour problems'.

Daycare is not precluded as an option for providing care for under threes, but the emotional support requirements of such young children put very high professional demands upon it. Young children should have secure relationships with all care-providing adults, with all bonded attachments effectively maintained within the daily round of care provision. This conceptually evokes the situation of the early industrial

and 1960s Glasgow families respectively evoked by Tizard (1990) and Schaffer and Emerson (1964), which were located within an organic and close-knit circle. It would be possible to replicate such “attachment circles” in situations in which some of those adults are staff in professional settings, although this would require meticulous attention to the factors that create high quality care (Sims et al., 2006). This might be even more challenging when working with children from families in which bonded relationships are strained. Woodhouse et al. (2018, p.52) describe a ‘Circle of Security’ intervention in which parents are coached to observe their children more closely, and to reflect upon their own responses to their children’s signals, which could be facilitated by high quality settings, and utilised as the basis of team work. Such a technique is implicitly present in earlier initiatives, for example within the Pen Green shared observation system (Whalley 2001) and could be further developed from the basis of more recent findings.

However, none of this is likely to be achieved unless a setting is funded to the extent that it can maintain high adult-child ratios, very low staff turnover and effective training of professional staff so they are fully aware of the cognitive, social and emotional needs of very young children. Such staff would necessarily be well paid, to reflect the education and training required to be employed in the role and be provided with further continuing professional development, and a secure career structure to ensure high levels of retention. The implications are therefore that a nation would need to make a significant publicly funded investment in such a system.

## **Policy Futures**

With respect to constructing a national policy for care for under threes, it appears that there are several choices. A nation might choose to create funding streams that permit parents to principally rely upon home-based care, with additional kin/ friendship support to create a bonded circle of adults, or to set up high quality professional daycare facilities to reproduce such relationships. European nations offer models of both patterns of care, for example, the Netherlands principally relies upon parents, kin and neighbourhood in a culture where adequate social welfare provision is made for families, and part-time working is commonplace, whilst Scandinavian nations dedicate a significant proportion of their Gross Domestic Product to the provision of very high-quality daycare (Naumann et al., 2013).

Since the latter quarter of the twentieth century, the policy of both US and UK governments have been to encourage a society in which two parent employment is the norm. In the UK, the Labour Government of 1997-2010 responded to this situation by the instigation of the Child Care Act 2006, which ‘enshrines in law parents’ legitimate expectation of accessible high-quality childcare and services for children under 5 and their families’ (Jarvis 2016, 110). They additionally set in place a national network of children’s centres to oversee the provision of such childcare, and to provide support and advice to parents experiencing various types of adversity, poverty in particular. Such services were therefore well placed to provide emotional ‘buffering’ for stressed parents, and via the cascade effect described by Thomas et al., (2018), to subsequently reduce day-to-day stress for children.

However, 1000 children’s centres have closed down under austerity measures imposed since 2010, a 62% cut in funding was imposed upon those that are left

(Action for Children 2019), and poorly conceived funding mechanisms for supporting affordable daycare have resulted in a significant number of daycare providers closing down over the year following a funding policy change (Morton 2018), whilst those left are barely managing to meet their staff payroll (Ferguson 2019). To add to this bleak picture, , nearly one in three children currently live in families that are officially designated poor (Child Poverty Action Group 2019) and their parents endure a constant struggle to cope with the new Universal Credit system to which access is only permitted via an impenetrable online tick-box maze (Tiffin 2018). The prediction of a deep world-wide recession following the measures taken to reduce infection during the Covid-19 Pandemic in early 2020 does not bode well for the future.

The combined empirical evidence from attachment and cortisol studies strongly indicate that the birth to three period of a human life matters intensely in terms of nurturing an emotionally secure individual, but contemporary Anglo-American culture currently gives very little thought to this in social policy creation. In both nations, the major costs of non-familial care are borne by the parents rather than the state, and a high proportion of families with children live below the poverty line. Parents are frequently trapped in situations in which they either endure the stresses of potential lost earnings whilst caring for their infant at home, or continue to work and select their childcare provider on the basis of what they can afford, all of which has the potential to raise the stress levels to which infants are exposed throughout their pre-school developmental period

If we continue to operate under policies in which the presence of a child under three means that a family is placed under significant social and financial pressure, we create a society that is 'more concerned with the national economy than... children' (Alderson 2008, p.53). This is the 'topsy turvey' problem that Bowlby (1988, 2) intuited, which has the potential to create a mass societal dysfunction. The fragmented and 'cheapest option' fashion in which we provide infant care, and the large numbers of families that become poverty-fueled emotional pressure cookers is likely to have a significantly negative impact upon long term mental health of the future adult population. 'Humans are extraordinarily adaptive to changes in their living conditions, but not infinitely so' (Gray 2011, 444). Our current childcare situation evokes UNICEF's (2011, 8-9) warning: 'there is a clear danger that...childcare.... may follow a course that is determined by the needs and pressures of the moment, uninfluenced by long term vision'.

Where we go from here is an issue we need to consider extremely carefully. Simplistically advocating a 'back to the future' approach to infant care would lead us into the type of situation in which Czech women recently found themselves. Whilst an entitlement to three years of 'parental leave' from the workplace might seem to be an ideal background to the right for parents to choose home-based care for children under three, it led to some reluctance amongst employers to employ women of child-bearing age, and a subtle pressure on mothers (but not fathers) to become full time carers; only 1% of Czech fathers took parental leave (Sokačová 2011). This evokes the situation that Tizard (2009) describes emerging from the immediate post World War II milieu in the UK, increasing gender discrimination, threatening hard-won rights and stoking up psychological and societal pressures upon mothers of young children, which is in turn likely to lead to stress-afflicted child care environments.

The cortisol studies have built upon attachment theory to give us vital information 'grounded in the best available evidence of what human beings are like' (Singer, 1999, 61), and it would now be prudent to act upon this. An evidence-based policy creation approach would suggest expanding the role of publicly funded children's centres to provide support for struggling families and ensuring through social security mechanisms that no family with a child under three lives below the poverty line. A national system of subsidised childcare for working families should be created under the management of early years specialist graduate leaders. The public expense could be ameliorated through a parental contribution calculated on a designated percentage of income, following the Scandinavian model (Naumann et al., 2013). It cannot be too strongly emphasised that the provision of appropriate infant care is one of the most important issues for contemporary Anglo-American social policy, as it is now increasingly clear that the mental health and productivity of our future population depends upon our current actions.

With the goal of a mentally and physically healthy human race in mind, we can simultaneously be proud of the accomplishments of attachment researchers and look forward to participating in addressing the many... challenges remaining.

Cassidy et al., 2013, 1429

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