

# The Pros and Cons of Day Care

## Introduction

Since this is such a controversial matter, I will devote much greater space to it and provide much greater detail than the other reviews.

In what follows, I provide evidence that high-quality day care can increase the cognitive skills and academic performance of children of low-income parents, especially parents who are not very sensitive in the way they relate to their infant and toddler. There is also some evidence that emotional problems, such as depression, may be reduced in the long term for children from high-risk families, if they are in day care combined with interventions that improve parenting skills.

However, there is no evidence that day care is advantageous to children from middle-class families, and there is considerable evidence that it increases the risk of dysregulated cortisol levels, aggression, disobedience and emotional insecurity, especially if the care is of low quality. Unfortunately, this latter is the norm in the United States and the UK.

High quality is defined as follows (Daycare Trust, 2009):

- For under-tuos the ratio of children to staff should be 3:1
- For under-threes the size of core groups in which children are cared for should be eight

- For children aged two years and over, half of staff should be graduates and the remainder should be up to Level 3 qualification
- For children under two, one third of staff should be graduates, the rest up to Level 3
- Pay scales should be based on equivalent roles in schools
- Other non-staff costs (e.g. premises costs) should be one-third of staff costs

Whether applying these or looser criteria, the quality of the vast majority of care provided by British (and American) day care centres falls far short of high (Leach, 1994, page 88; Daycare Trust, 2009; UNICEF, 2008). In the case of the United States, an authoritative researcher stated that ‘the vast majority of American child care is of unacceptably low quality’ (Ramey, 2005, page 432), estimating that only 9% of day care for American under-threes is high-quality. The author pointed out that there is a strong tendency to ignore, perhaps even to suppress, this very vital fact for anyone who wishes to be an advocate of day care: ‘many of the studies ... gloss over the basic finding that so many children spend so much time in low- to medium-quality care, and such a small percentage are in consistently high-quality care’ (Ramey, 2005, page 432).

These facts are worrying. Nearly all experts agree that low-quality day care is harmful and medium-quality often is as well. Only a small proportion is high-quality. Follow through the logic, and the vast majority of American and British children in day care today are put at risk of emotional problems from being there.

### **1. The Pros of Day Care**

Overall, there is a large body of evidence spanning more than 20 years and from many different countries suggesting that children whose mothers work in the early years achieve less, educationally, than those whose mothers do not work (Hill et al., 2005). For example, a study of 516 pairs of siblings born in the 1970s found a causal relationship

between full- or part-time maternal employment before the age of five and lower educational achievement in young adulthood, such as a reduced likelihood of obtaining A levels (Ermisch et al., 2000, 2001). This was especially likely if the mother was of a high income, possibly because the child sees less of its usually highly educated and intelligent mother, so it has less opportunity for these attributes to be passed on to them. If a mother returns to work full-time very early, before the child is three months, there is a substantially increased risk of a number of problems in later childhood (Berger et al., 2005).

However, these adverse effects of maternal employment are not necessarily connected to day care. In fact, the strongest case in favour of it is the evidence that high-quality care leads to good cognitive outcomes in children from disadvantaged homes.

Like many previous studies, the American National Institute of Child Health and Human Development (NICHD) longitudinal study of 1,000 children found that at 15 and 24 months, the more attentive, responsive and stimulating the day care, the higher the cognitive and linguistic functioning (Belsky, 2008, page 9). Similar findings occurred at age four and a half, and high-quality early day care predicted higher maths, reading and memory scores up to age nine. When quantity was measured, there were similar gains – the more hours spent in day care, the more that the same cognitive and linguistic benefits were found, until age nine (Belsky, 2008, page 14). However, the boost to achievement had almost completely disappeared by age 11, except for vocabulary.

If this proves that high-quality care can be beneficial for cognitive development, at least until middle childhood, it is also the case that low-quality care is as bad for it (Peisner-Feinberg et al., 1997). This is unfortunate, since the quality of the vast majority of American and British care is either low or medium; it follows that the vast majority either do not benefit cognitively, or are actually impaired. But be that as it may, there is no question that when day care is done well it can benefit mental development, at least in the early years.

By far the greatest benefit goes to children of low-income mothers, many of whom are single, and this may be at its most providential when considerable care is also taken to improve parenting sensitivity skills. Where government has forked out for full-scale early intervention of this kind, its impact on the outcomes of the children of low-income or single parents is considerable (and not just on mental ability, possibly on emotional development as well).

The evidence for the American Head Start programme is unequivocally positive for disadvantaged children (Love et al., 2001, 2005; Administration on Children, Youth and Families, 2002). This is likely to be because these programmes do a lot more than just provide (often second-rate) day care. A great deal of help is provided to mothers to increase their sensitivity to their children, as well as more practical and social support from child centres. The sensitivity therapy may include weekly home visits for the first year, and fortnightly ones for the second and third (Love et al., 2001, 2005).

Thus far, results from Britain's Sure Start programme have been desperately disappointing, apparently actually leading to worse outcomes for children from the most disadvantaged homes (such as low-income single mothers) and only marginally improving functioning in some better-off families (Belsky et al., 2006). A possible explanation is that, although it was originally intended to be much more than just day care, Sure Start rapidly turned into a method for cheaply enabling low-income mothers to discard their under-threes and return to work (even its apologists admit this – see Sinclair, 2009, page 44: with the expansion of the Sure Start programme 'came a reduction in spend per child and an increased emphasis on day care to help women, particularly single mothers, get back to work').

However, overall, there is no question that in America, as part of a comprehensive package, high-quality day care can significantly improve the short- and long-term ability and educational performance of children from low-income families. As Heckman (2006) has shown,

the earlier you intervene with disadvantaged groups, the more effect your money buys. Spending money on unemployment benefit or imprisonment is far less effective as a way of helping someone to become a solvent, law-abiding member of society than spending on early intervention.

Heckman (2006) is notable for his criticism of the overemphasis placed by American and British interventions on intelligence and cognitive skills as targets in the early years. Most European nations make no attempt at formal teaching and curricula until age seven. Prior to that they regard the promotion of social skills, play and fun as primary (Heckman, 2006; UNICEF, 2008). It is also important to always look closely at claims made for the benefits of intervention programmes in terms of the age at which the child starts and whether it entails therapy for sensitivity of the mother. There is very little doubt that out-of-home educational programmes increase academic performance when they begin after age three, much more debate regarding the benefits for under-threes.

The long-term advantages of high-quality day-care-based intervention programmes may extend beyond cognitive advantage. A study of 104 infants from high-risk, disadvantaged homes (nearly all African-American) randomly assigned half of them for full-time day care and parental assistance to the age of five years, the other half having no intervention (McLaughlin et al., 2007). Measured at age 21, the children who had been helped were significantly less likely to suffer from depressive symptoms. The more the children had a low-quality home environment, the greater risk of depression at 21 where there had been no intervention. A striking finding was that negative effects of a low-quality home environment were almost completely neutralised by being in the intervention group. While there is little other evidence that day care is beneficial for emotional outcomes in adulthood, this study does prove that it can be so for children at severe risk: where a child's home environment is very liable to create both low cognitive

performance and emotional problems, there is a case for providing an extensive intervention programme which includes day care.

However, there is no evidence at all that this model is better in the long term for the children of educated middle-class mothers. In practical terms, if you are a disadvantaged mother there may be a case for putting your child in day care if it really is high quality (very rare in the United States or Britain), if improved cognitive performance is what you want. There is no scientific basis whatever for doing this if you are middle-class: all the evidence shows that the more your child is exposed to you the better, unless, that is, you are depressed. Hence, by the age of three and a half, large gaps are opening up between high- and low-income children, due to very different levels of education and social skills in the parents of the different social classes (Feinstein, 2003). What makes the middle classes perform so much better at school is contact with their parents. This may help to explain the overall finding mentioned at the start regarding working mothers – where they are middle-class, in most cases they leave their child in the company of substitutes who are young women, usually with much less education and lower IQs than them. All the evidence on what enables a child to perform well would predict that doing so would reduce its performance – as it does.

That high-quality day care, alone or in combination with an intervention programme, can improve cognitive performance in children of low-income families is not a case for middle-class parents to opt for it. The fact is, anyway, that most day care is not high-quality. When you put this together with the evidence you are about to read about the proven emotional problems caused by day care, there seems no case whatever for opting for day care if you are a middle-class parent and seeking substitute care.

## **2. Cortisol Levels and Day Care**

Cortisol is the stress hormone secreted when a person feels under threat, leading to fight or flight in animals, and to aggression or hyperactivity,

or withdrawal, in humans. As we shall see, there is now overwhelming evidence that day care causes children to have abnormal cortisol levels, probably increasing the risk of behavioural problems like aggression, fearfulness and hyperactivity.

It has been established for some time that maltreatment in early life, like neglect or abuse, causes children to be hyper-responsive to threats. They have either high levels of cortisol, so that when feeling threatened they get quickly jammed into an aggressive, defensive state, or else exceptionally low levels (Dawson et al., 2000). In these latter cases, the child has become so used to feeling insecure or under attack that its system has closed down, is blunted, so that even quite extreme threats no longer affect the child: it has given up reacting to threat by secreting cortisol (Tarullo et al., 2006; Gerhardt, 2004, pages 78–83). This damage to the cortisol system may endure into adulthood if the maltreatment is not reversed (Graham et al., 1999; Tarullo et al., 2006). Where maltreatment is extreme, such as in cases of sexual abuse, it is possible that the very high concentrations of cortisol which the child secretes in response to the dangers causes key parts of the brain not to grow properly (Dawson et al., 2000; Weniger et al., 2008). For example, on average, a woman who was sexually abused as a child has 5% less of the hippocampal region of the brain than one who was not; similar impacts have been shown on the amygdala (Teicher, 2002). Students of such cases hypothesise that it is the high cortisol resulting from abuse which causes the brain deficit. Looked at from the positive side, good-quality early experience has been shown to create stable, healthy cortisol secretion and growth of the relevant parts of the brain (Schoore, 2001).

Overall, maltreated children who have been taken into institutional care and subsequently adopted are liable to have abnormal levels (Gunnar et al., 2006). Interestingly, the levels become most abnormal when in the company of adoptive parents, perhaps distressed by having to engage in personal relationships which may remind them of the risk

of earlier abandonment or abuse (Wisner Fries et al., 2008). Studies of children who were placed in institutions following maltreatment and who were subsequently adopted into responsive, stable homes show that the abnormal cortisol levels often persist seven years after adoption (Gunnar et al., 2001).

Given all this, if day care is as distressing to under-threes as many researchers believe, it would not be surprising if it affected their cortisol levels: when distressed we usually secrete the hormone.

The initial key piece of evidence is that cortisol levels in toddlers are immediately affected after they are left by their mother in day care on the first and subsequent days. Ahnert et al. (2004) studied 70 15-month-old toddlers on three occasions: at home before starting child care, during the time the mother left the day care facility and after the mother had gone. Ahnert found that during the first hour after the mother had departed, cortisol levels almost doubled compared with the level when the toddler was measured at home before ever having experienced day care. This increase after the first hour was also found on the fifth and ninth days of going to day care. It is compelling evidence that in the short term, leaving a toddler in day care dramatically increases their cortisol levels in the hour after the mother departs.

But being left in a new situation and the disappearance of the mother might naturally make the toddler initially anxious. Perhaps the cortisol levels settle down once the toddler got used to the new place? Alas, no. When they were measured again after having attended day care for five months, although the amount of the increase in cortisol compared with the original level at home had decreased, it was still significantly higher (Ahnert et al., 2004).

The next piece of evidence is that meta-analysis of nine studies shows that day care causes increased cortisol during the course of the day compared with at home (Geoffroy et al., 2006; Vermeer et al., 2006). Cortisol in infants and toddlers decreases during the day at home, comparing mid-morning with teatime. When at day care, the

level rises during the day. The most likely explanation is the stress of coping without mother and of being with so many other small children with more or less unfamiliar adults. The extent to which the levels are responses to the caring environment is suggested by the fact that they do not rise as much if the quality of the day care provision is good (Sims et al., 2005). However, even in the best-quality care provision, there is still a significant increase during the day in the day care setting compared with home (Wakamura et al., 2009). That day care and cortisol dysregulation have been so consistently shown to correlate strongly implies that there is something about day care which is stressful.

That cortisol levels are a direct response to quality of care is supported by two further studies showing that raised levels can be normalised if the care provided by parents becomes more sensitive. Mothers of high-risk children were taught how to care more sensitively and effectively, resulting in more normal cortisol (Brotman et al., 2007; Fisher et al., 2007).

In and of itself, these studies should be a cause for alarm about the impact of day care because there is abundant reason to suspect that dysregulation of cortisol is harmful to behaviour. Cortisol is known to dampen the immune system (Riechlin, 1993; Sapolsky, 2004) and this may partly explain the well-established fact that toddlers in day care suffer much more physical illness than those raised at home (Haskins, et al., 1986; of course, exposure to so many other children's infections is also a reason). But the worry becomes considerably greater when you learn that the impact of day care on cortisol levels continues long after early childhood. Measured at the age of 15, the longer a child was in day care when small, the more its cortisol levels were affected, statistically significantly so (Roisman et al., 2009). The other enduring factor was how sensitive the mother had been in the early years. These effects of early day care and sensitivity endured after controlling for other potentially key factors, like social class and the contemporary relationship of the 15-year-old with its mother.

It is important before we go any further to emphasise that it is not just day care which affects cortisol; other kinds of potentially distressing care does so too. If the child is cared for at home by an unresponsive parent it is just as big a problem. As mentioned at the outset, severely maltreated children who were subsequently taken into institutional care have cortisol dysregulation. But so do children of depressed mothers. This is a very important point: if a mother stays at home and cares for her child and becomes depressed, there is every bit as much risk that her child will be adversely affected as if she puts the child in day care. For example, a study measured how depressed mothers were and the cortisol levels of their children during the first 10 years (Gump et al., 2009). It showed that degree of depression and levels were related, as well as that there are enduring effects of the mother being depressed during the early years. There are many other studies indicating the same (Ashman et al., 2002; Ronsaville et al., 2006). Hence, while day care may be harmful to cortisol levels, a mother who is depressed and caring for her infant is equally likely to be so.

In terms of the implications for behaviour of the impact of day care on cortisol, the most well-established are aggression and disobedience. Several studies suggest that increased cortisol leads to greater aggression or fearfulness among children in day care. This has been shown among three- and four-year-olds (Tout et al., 1998; Dettling et al., 1999), as well as smaller children (Watamura et al., 2003). While the relationship between cortisol levels and aggression or other disturbances in older children may be complex, meta-analyses strongly suggest it exists (Alink et al., 2008). This brings us to the negative impact of day care about which all authorities are agreed: increased levels of aggression and oppositional, defiant conduct.

### **3. Day Care and Aggression**

To recapitulate, there seems little doubt that day care raises cortisol levels. While disrupted cortisol levels may be associated with many

problems, including depression and fearfulness, there is considerable evidence they also affect aggression and good conduct. If so, when children raised in day care are compared with ones raised at home, they should be more aggressive.

In a 2001 review, Belsky (2001) presented extensive evidence that this is so. Subsequent studies support his conclusion. For example, similar findings have been obtained in two large samples of English (Melhuish et al., 2001; Sammons et al., 2003) and Northern Irish (Melhuish et al., 2002) children. But most influential of all have been the results from the NICHD study which has followed 1,000 children from early childhood into teenage.

The study found that the more time a child spent in non-maternal care (most of it day care), the more disharmonious was its relationship with its mother when with her. This was equally true at six to 36 months (NICHD ECCRN, 1999) as at five years old (NICHD ECCRN, 2003a). The findings were similar for problem behaviours involving aggression and disobedience. The more time the child was in non-maternal care of any kind during its first five years, the greater their difficultness in three key respects (NICHD ECCRN, 2003):

- Assertiveness: they talked too much, bragged or boasted and argued a lot
- Disobedience: they talked out of turn, were disobedient at school, defiantly talked back at school staff and disrupted school discipline
- Aggression: they got into many fights, were prone to cruelty, bullying or meanness, they physically attacked others and they destroyed their own possessions

These results were found whether the report about the child was being made by the teacher or the mother. In all, aged four and a half, 25% of children who had spent a lot of time in non-maternal care displayed

these traits, compared with only 6% of those raised at home (NICHD ECCR, 2003, page 997). This is a huge difference and it was still the case when the children moved to kindergarten.

Of particular significance was the greater likelihood of these problems, as the quantity of time spent in non-maternal care increased. The percentages rise in direct relation to the hours spent in non-maternal care (0–9 hours a week, 6% (mother and substitute ratings combined); 10–29 hours, 15%; 30–34 hours, 16%; over 45 hours, 25%). Great care was taken to establish that the children really were worse behaved, rather than merely more independent and self-assertive as a result of having learnt to look after themselves young.

In all likelihood, they were angry and afraid. If so, that could explain why the aggression and misconduct ceased to show up in the sample after the age of eight (Belsky et al., 2007). At that age, they had bad work habits and poor social competence, although this ceased to be true at 11.

A very possible interpretation is that the anger and fear felt in early life started to express itself in a variety of ways, including being turned against the self – depression, shyness, social insecurity. This would have skewed the statistics, so that those who continued to express their rage through misconduct or aggression were fewer.

As we get older, we express ourselves through different means. If non-maternal care does disrupt cortisol levels and create an angry person, that can be expressed in many ways, including drug and alcohol abuse. It could explain why a different study of 585 American children found that non-maternal care was a highly significant predictor of substance abuse at age 18 (Dodge et al., 2009): substance abuse is strongly associated with aggression and depression.

Whatever the truth of this, a particularly telling study suggests a further possibility (Dmitreva et al., 2007). The United States has high rates of early day care, with over half of under-ones in non-maternal care full-time. By primary school, a majority of the pupils in most school

classes have been exposed to day care. Given that such care increases aggression and misconduct, this could be contagious: children who were home-reared may be forced by the misbehaviour of the non-maternal cared children to begin misbehaving themselves. Dmitreva et al., (2007) confirmed this in a large sample (3,440) of children in 282 primary-school classes across America. She found that children who had been home-reared were significantly worse behaved, the greater the proportion of the peers in their class who had been in day care.

If replicated, this study could prove highly significant in influencing social policy. While it would take a brave politician to say so, the fact is that violence in the United States grew massively following the period in which increasing numbers of children were spending their early years in day care. There are many reasons for this, but it is at least plausible that one of them is that day care increased the proportion of the population that were angry, a key precursor to violence (James, 1995). Indeed, other studies suggest a connection between adult violence and non-maternal care: more children in non-maternal care eat sweets, early sweet-eaters are more likely to be violent in adulthood.

In a sample of 12,500 British children born after 2000, the ones whose mothers worked full-time were more likely to be consuming sweetened drinks, and snacking on sweets and crisps between meals (Hawkins et al., 2009). They were less likely to be eating three portions of fruit a day. The mothers' sheer lack of time was thought to be likely to be a major reason for this.

The connection between sweet-eating and violence was shown in a large nationally representative British sample followed from their births in 1970 (Moore et al., 2009). It found that men who had eaten confectionary daily when aged 10 were significantly more likely to be violent at age 34. The researchers showed that this was more than just a correlation.

It remained true after other key variables had been taken into account, like how the boys were cared for by their parents at age five

(harsh physical punishment being the major cause of violence). In all, at age 34, 69% of the violent had been sweet-munchers when aged 10 compared with 42% of the non-violent. One hypothesised explanation was that sweets were being used by parents or carers in childhood as a short-term reward. This decreased the boy's ability to delay gratification, making him more impulsive and easily frustrated when thwarted. These characteristics are more common in people who use violence rather than words to express anger.

But there may also be a direct biological effect of the sweets. Additives in them have been shown to increase the risk of acting out – of putting thoughts into action rather than reflecting on the consequences or causes of the impulse. As children, this may have made them more violent, but this lasted into later life. Having acquired a taste for sweets, the violent men may have gone on eating them in adulthood, exposing them to the biological impact of additives on behaviour then.

Whatever the explanation, there is a link to having a working mother.

While debate exists about the extent of the effect of day care on aggression – how many children are affected, how much – nobody now disputes that this is a main effect of day care. Even if it only makes a small proportion, such as 10% of children, more aggressive, and even if the increase is simply at the level of defiance and disruptiveness rather than full-scale violence, this become enormously significant when the numbers of children involved are in the millions, over several generations. Unsurprisingly, very few researchers and no politicians at all are prepared to say it, but the huge rise in day care could be greatly increasing the levels of aggression, incivility and even violence in our society.

An immediate apparent contradiction to this claim is that the Scandinavian nations have used day care for the majority of their population for 50 years. If day care increases aggression, how come these are not the most aggressive, uncivil, violent societies? The answer may be

that the adverse impact of day care on behaviour is not restricted to its effect on aggression. It could be that being stressed by day care does not necessarily express itself in that way if the care and the wider society channel the anxiety in different directions. As we saw earlier, day care raises cortisol levels and although fight is one of the ways this is expressed, it can also be expressed through flight, or a state of perpetual anxiety about which way to go: insecurity.

#### **4. Insecure Attachment and Day Care**

Thousands of scientific studies prove that we are made insecure if the care we receive between six months and three years of age is not responsive and reliable (Cassidy et al., 1999). The insecurity takes three main forms: clinging, avoidance or a confusing mixture of the two (known as ‘disorganised’).

Before anything is said about the possibility that day care increases insecurity, the fundamental causes need to be understood: rates of insecurity are easily highest among children cared for by unresponsive mothers. Some 60 studies suggest that 62% of children with such mothers are insecure (De Wolf et al., 1997). In many cases, the unresponsiveness is caused by depression. As we shall see, it is beyond doubt that the risk of insecurity is at least as great for a child cared for at home by an unresponsive mother than if the child has substitute care, including day care.

Overall, if insecure in early life, there is a much greater risk of being an insecure adult. One study measured responsiveness of maternal care at one, eight and 24 months (Beckwith et al., 1999). The degree of responsiveness at those ages independently predicted how insecure the person was 18 years later, over and above the many other events which might have influenced this in the intervening years. In about two-thirds of cases, people have the same pattern in adulthood as in early childhood (Weinfield et al., 2000; Waters et al., 2003). About 40% of adults are insecure (Bakersman-Kranenburg et al., 2009). While

being insecure is not in itself a mental illness, studies of 10,500 adults show that the insecure are much more likely to suffer the commonest problems, such as depression (Bakersman-Kranenburg et al., 2009). In short, early care creates insecurity that often lasts into adult life, and such people are at greater risk of mental illness.

The insecure are more likely than the secure to have elevated or blunted cortisol levels (Gerhardt, 2004; Tarullo et al., 2006). If mothers are helped to provide security-inducing sensitive care, it improves cortisol levels (Bakermans-Kranenburg et al., 2008). Since children who have been in day care also have cortisol dysregulation, it would not be surprising if they were also more likely to be insecure.

A basic point is that when the security of children to their substitute carer is tested, it is considerably less than security to parents. A review of the security of 2,867 children investigated in 40 studies, mostly of the effects of day care, showed that only 42% of them were securely attached to the substitute, compared with 60% to their mother and 66% to their father (Ahnert et al., 2006). The larger the size of the group within which the children were cared for, and the higher the ratio of children to carers, the less the likelihood of secure attachment to the substitute. What was more, children were far more likely to be securely attached to a substitute if they were being cared for at home than at a day care centre – 59% versus 40%. Since so many children are insecurely attached to the substitutes who look after them in day care, it is plausible that this would decrease their security to their mothers.

When, in 1986, the distinguished American child psychologist Jay Belsky published a review of the evidence, overall 43% of children in non-maternal care for more than 20 hours a week were insecure (Belsky, 1986, 1988). By contrast, the proportion was 26% for children raised at home by mothers. Controversy subsequently raged in America for 10 years until the publication of the results of what was intended to be a definitive test of the matter, based on following 1,000 American infants from birth (NICHD ECCRN, 1997). It found that, in and of

itself, non-maternal or day care did not cause insecurity. This single finding has led many commentators to cease regarding day care as a potential cause of insecurity.

However, that is to ignore the full findings of the study. If the mother was measured to be insensitive, then the combination of this with only 10 or more hours of non-maternal care a week during the first year did increase the risk of insecurity; the more hours, the greater the risk. This was true when insecurity was measured at six, 15 and 36 months. Insecurity was also increased if the childcare arrangements were changed several times or if the day care was low-quality (which is very common in the United States and Britain). In short, while insensitive mothering increased the risk of insecurity on its own, it did so more when combined with day care.

To dismiss altogether the studies suggesting that day care directly causes insecurity which Belsky reported in 1986 and 1988 on the basis of one study – however well designed – would be unusual. More common is to await replication of the finding. A British study of 1,000 children was indeed intended to supply a test of the NICHD finding ([www.familieschildrechildcare.org](http://www.familieschildrechildcare.org)). For reasons that have never been explained, however, although some data were gathered on attachment security, they were never completed. The original authors having failed to analyse their data, they are now being studied by new researchers who may provide evidence which contradicts the NICHD finding. Since the NICHD study there have anyway been new studies which continue to strongly suggest that day care is a major cause of insecurity.

One study showed that 15-month-olds who had been secure before were at increased risk of becoming insecure three months after entering day care (Ahnert et al., 2004). This was significantly so, the longer the hours the mother worked and the more unreliable her work pattern. Conversely, the longer the mother stayed at the day care centre before leaving the child at the beginning of its time there, the less the risk of insecurity.

Another body of studies concerned day care in Israel (Oppenheim, 1998). For many years there it had been common practice not only for young children to spend the day in care but for them also to stay the night. Evidence accumulated that children who stayed overnight were much more at risk of insecurity than ones who only spent the day in care. This strongly suggests that extensive periods apart from parents increase the risk of insecurity and that this extreme form of day care independently causes it (indeed, overnight sleeping was subsequently discontinued in Israel).

Two further studies of Israeli children provided a direct challenge to the NICHD findings. The first, with a large sample of 758 infants, contradicted the NICHD finding in that insecurity was independently caused by day care, after allowing for other factors (Sagi et al., 2002). The most likely to be secure were infants raised at home by a relative other than mother, the most insecure were the ones in day care. The day care provided was mostly of very poor quality, with large numbers of infants per carer – the day care centre with the best ratio was 6 infants for 1 carer and the average was 8:1, whereas a 3:1 ratio is recommended by UNICEF for under-twos (UNICEF, 2008). It was also the case that the most likely to be insecure were infants whose mothers were insensitive. Nonetheless, the fact that day care alone did cause insecurity – irrespective of the mother's sensitivity or other factors – is grounds for questioning the NICHD claim that this is not the case.

The second study looked more closely at a subsample of 151 infants from the first. Its conclusion repays quotation (Koren-Karie et al., 2005, page 122) : 'Can exposure to early and extensive center care be viewed as risk factors that might contribute to insecure infant-mother attachment relationships? According to the NICHD Early Child Care Research Network study (1997) conducted in the United States, the answer is no at the main effect level ... According to the Haifa Study of Early Child Care (Sagi et al., 2002) the answer is yes. In this study, center care infants were insecurely attached to their mothers at a higher

rate than infants who were either in maternal care, individual nonmaternal care, or family day care. Therefore, contrary to the NICHD Early Child Care Research Network (1997) conclusion, the Israeli study suggests that center care in and of itself does increase the likelihood of insecurity attachment relationships between infants and their mothers.'

It has been objected that these findings do not necessarily have wider implications since they refer to low-quality day care. However, as noted above, there is good evidence that only 9% of American day care facilities are high-quality. Given that 91% of American (and British) day care is more or less of low quality, the Israeli findings are surely of considerable importance. As also noted, there is a strong tendency for interested parties to gloss over the uncomfortable evidence that most care is not of high quality.

There is another highly significant fact that recent studies have uncovered which is also rarely given much attention: the kind of mother who leaves her child in day care is more likely to be insecure herself and those who see returning to work as beneficial to their child are more likely to be insensitive in relating to their baby. These facts must be handled with care, of course, because they can run the risk of stigmatising working mothers. But they surely must be faced up to and considered when attempting serious analysis of what is in the best interests of under-threes, for they are highly significant in explaining both the decision to use day care and its effects.

The NICHD study found that when mothers said they believed it was beneficial for their child if they worked, their infants were more likely to be insecure (NICHD ECCRN, 1997, page 875). For example, such mothers strongly agreed with the statement 'children whose mothers work are more independent and able to do things for themselves'. Mothers with these views were less sensitive or responsive. They were more likely to have their children in poorer-quality care, at earlier ages, for more hours per week and they were more likely to move their child rather than sticking with one arrangement. There is likely to be a

large overlap between such mothers and Raphael-Leff's (2005) Regulator (my Organiser).

A number of linked findings need to be added to these, also demonstrating that the sort of mother who prefers day care is different from one who does not. Generally, mothers who return to work while their child is under one are more likely than average to be better educated, have higher incomes and a higher professional status (Melhuish et al., 1991; Dench, 2010). They also have less belief in the idea that exclusive maternal care is important for young infants (Melhuish et al., 1991; NICHD ECCRN, 1997). Those mothers who say they prefer day care as an option shortly after birth report a stronger career identity (Hock et al., 1988). Working mothers who choose day care express more negative attitudes to the role of motherhood than stay-at-home mothers (Melhuish et al., 1991). In these respects, they overlap with Raphael-Leff's (2005) Regulator (my Organiser).

A key additional finding is that mothers who prefer day care also are more likely to be insecure themselves (Koren-Karie, 2001). Seventy-one middle-class mothers of under-ones had their security measured. Half of them subsequently sent their infants to day care, the other half cared for them at home. Whereas only 17% of the at-home mothers were insecure, 39% of the working ones were. This finding is important because it is well established that insecure parents are less sensitive than secure ones (George et al., 1999). Insensitive and negative-intrusive parenting is also commoner in mothers who have very high and very low cortisol levels (Mills-Koonce et al., 2001). Mothers who are anxious or depressed before birth or after it are more prone to insensitive mothering and to have children with elevated cortisol (Grant et al., 2009). This chain of findings link together maternal working, maternal insecurity, insensitivity and dysregulated cortisol in both mother and child.

Taken together, it seems clear that there is a particular sort of woman who favours day care over other kinds. She is more likely to be insecure and insensitive. She is more likely to believe that her work is

beneficial to her child, and to leave the child for longer, in lower-quality day care, changing the arrangements more frequently, all of which increase the risk of insecurity and cortisol dysregulation (and aggression) in the child. Given all this, it would hardly be surprising if studies found that the combination of such mothers with the potential stress of day care would mean a higher percentage of their children were insecure than ones cared for by their mothers at home.

### **5. Day Care and Other Potential Problems**

It should be clear by now that it seems very likely that day care, in and of itself, increases the risk of three problems for children: cortisol dysregulation, aggression and insecurity. There are also a number of other problems which it might cause that have not been directly assessed.

For example, there is considerable evidence that extremely neglectful care causes children to develop ‘indiscriminate friendliness’, in which the child acts with equal niceness to strangers and people it knows, possibly in an attempt to attract love and attention, and because it has not learnt the most basic elements of intimacy. For example, Romanian orphan toddlers who had spent more than eight months in an orphanage displayed significantly more indiscriminate friendliness than ones who had been adopted or who had always been with their birth parents (Chisholm, 1998). There were similar findings in fostered children who had suffered severe prior maltreatment (Albus et al., 1999; see also Wolf et al., 1999). Adopted children are at considerable risk of dysregulated cortisol (Gunnar et al., 2001, 2006; Wismer Fries et al., 2008). If the study were done, it would not be surprising if children in low- or medium-quality day care (91% of American children in day care) for long hours exhibited some elements of indiscriminate friendliness.

Likewise, it would be unsurprising if a greater vulnerability to depression in adult life were found among children who had been in low- or medium-quality day care for long hours. Prolonged separation

from parents has been shown to have caused long-term depression and insecurity in large samples of adults who were evacuated during the Second World War when measured decades later. In one sample, there was a higher likelihood of adult depression if the evacuation occurred aged four to six years old rather than at age 13 (Rusby et al., 2009). In another, depression was nearly twice as common in evacuees compared with children not separated, or ones with their mothers but not with fathers, absent due to military work (Pesonen et al., 2007). In a final study, those evacuated between the ages of four and six years showed much higher likelihood of insecure attachment (54%), compared to those not evacuated (32%), the younger the age of evacuation, the greater the insecurity (Rusby et al., 2008). Other findings indicate that extended or repeated separation from the mother in itself causes long-term emotional problems in adulthood, in particular, borderline personality disorder. This was so even after other factors were controlled, and the longer and earlier the separation, the greater the risk of developing this problem (Crawford et al., 2009). Again, as with indiscriminate friendliness and adoption, these are extremes. But day care entails repeated and more or less prolonged separation from mother. It would not be surprising if it has similar, albeit less severe, long-term effects.

Taken with the established adverse effects of day care, these observations provide a basis for speculating about the impact of differing national caregiving practices. In the case of Scandinavia, for example, despite decades of nationalised day care, there has not been one single study evaluating its emotional consequences. As a leading Dane told me, such research would not be commissioned in case it demonstrated problems that were felt to be ideologically incompatible with the high number of working mothers of under-threes (James, 2007, page 239). Yet such research seems urgently required because, despite having much higher-quality care than in the United States or Britain, there might still be significant adverse effects (James, 2007, pages 230–45). As discussed earlier, overt aggression is unlikely to be one of these –

Scandinavian nations do not have high rates of assault or other violence perhaps because, as also pointed out, there is a strong cultural pressure to be friendly and cooperative, particularly emphasised in the nursery system. However, it could be that anger and fear generated by day care do exist and are simply channelled in other ways, including internalising disorders and indiscriminate friendliness. It is also possible that they show up in the extremely elevated rates of teenage alcohol abuse, although this also has other causes as well (James, 2007). Of particular interest would be studies measuring security of attachment, comparing home-reared versus day care. If the NICHD study is right, there should be no difference, but as noted, other studies have different findings. Equally interesting would be measurement of basic levels of attachment security among the adult Scandinavian population – are they elevated compared with nations in which most of the population are reared at home when under-three, such as Austria?

Cross-national comparison of rates of attachment security correlated with prevalence of day care, including measures of quality of care, should be revealing. It would seem highly probable that the adult population of Israel have high rates of insecurity, given the high proportions who have experienced extensive day care from early childhood and the well-established high rates which result from it (Sagi et al., 2002; Koren-Karie et al., 2005). Another intriguing comparison is between adults reared in early childhood before 1989 in East rather than West Germany. When the Berlin Wall came down in 1989, 56% of East German under-threes were in day care (23% of under-ones and 89% of two- to three-year-olds), often for very long days, with after-school care added on to enable mothers to work longer hours (Ahnert et al., 2001). This is a far higher proportion than was the case in West Germany then, or today (UNICEF, 2008). Trained to do so by the state, the carers in East Germany strongly emphasised social competence and conformity, rather than individuality, in the children. This training was radically altered after reunification, with much greater emphasis on emotional

needs and individual requirements of the child, and a reframing of the carer role from teacher to companion (Ahnert et al., 2001). When attachment security of infants was measured in East Germany before and after reunification, the proportion of insecure children was twice as large beforehand, a whopping 80% (Ahnert et al., 2001, page 1850). That it was still 61% after reunification is remarkable. The samples were small (40 and 64) but if these figures were duplicated nationally, it would predict huge differences in security between middle-aged East and West German populations as a whole.

Such large-scale comparisons may produce worrying evidence regarding the consequences of British government policies during the last 13 years, in which the Sure Start programme has greatly increased the number of children from low-income families in day care and in which considerable financial inducements have been offered to all families to use it (Inter-Departmental Review, 2002).

The key comparisons would concern cortisol dysregulation, aggression and disobedience, and insecurity of children who had been in day care while under three, compared with those cared for by mother at home. Based on the evidence of this review, I would predict an overall effect of day care: increasing the risk of cortisol dysregulation, aggression, disobedience and insecurity. The effects should be largest for the combination of low-quality day care and maternal insensitivity.

## **6. Conclusions**

This review of the evidence regarding the effects of day care leads to two uncomfortable conclusions which, taken together, make for a particularly worrying story:

- The younger and longer an under-three spends in day care, and the lower the quality of the care, the greater the risk that the child will have dysregulated cortisol (elevated or blunted) levels, be aggressive and disobedient, and suffer insecurity

- Mothers who regard their work as beneficial to their under-three, or who favour day care over other substitute care, are more insensitive in relating to their children and are more likely to leave their child in lower-quality day care for longer, from younger ages, chopping and changing the care

This suggests that, on its own, day care considerably increases the risk of important problems for children. But it also shows that day care is at its most harmful when it is low-quality and when mothers are insensitive. The tragedy would appear to be that the very infants who are most at risk of being adversely affected by day care – ones with insensitive mothers – are the very ones who are most liable to be placed in it. Since low-income mothers are more liable to be insensitive (NICHD ECCRN, 1997), it might suggest that British government policy has been peculiarly ill-conceived in the last 13 years, or at least, since little day care is high-quality, ill-executed.

This is a highly contentious matter. Less so is a simple fact: a middle-class parent who chooses even high-quality day care as substitute care for their child should not expect it to gain, cognitively, and it will run unnecessary increased risk of cortisol dysregulation, aggression and disobedience, and insecurity. That is always assuming the parent can find a high-quality day care setting.

While it must also be said that the majority of children in day care do not suffer any adverse consequences, judged by the measures currently used, these measures are limited. If factors like indiscriminate friendliness and depression were measured, and if the long-term effects in adulthood were measured, the proportion suffering adverse effects may actually be much higher.

## Bibliography

- Administration on Children, Youth and Families, 2002, *Making a difference in the lives of Infants, Toddlers and Their Families*, Washington D.C.: Dept Health and Human Services.
- Ahnert, L. et al., 2001, 'The East German child care system: associations with caretaking and caretaking beliefs, and early attachment and adjustment', *American Behavioural Scientist*, 44, 1843–63.
- Ahnert L. et al., 2004, 'Transition to child care: Association with infant-mother attachment, infant negative emotion and cortisol elevations', *Child Development*, 75, 639–50.
- Ahnert, L. et al., 2006, 'Security of children's relationships with nonparental care providers: a meta-analysis', *Child Development*, 77, 664–79.
- Albus, K.E. et al., 1999, 'Indiscriminate friendliness and terror of strangers in infancy', *Infant Mental Health Journal*, 20, 30–41.
- Alink, L.R.A. et al., 2008, 'Cortisol and externalizing behavior in children and adolescents: mixed meta-analytic evidence for the inverse relation of basal cortisol and cortisol reactivity with externalizing behavior', *Developmental Psychobiology*, 50, 427–50.
- Ashman, S.B. et al., 2002, 'Stress hormone levels of children of depressed mothers', *Development and Psychopathology*, 14, 333–439.
- Bakermans–Kranenburg, M.J. et al., 2008, 'Effects of an attachment–based intervention on daily cortisol moderated by dopamine receptor D4', *Development and Psychopathology*, 20, 805–820.
- Bakermans–Kranenburg, M.J. et al., 2009, 'The first 10,000 Adult Attachment Interviews: distribution of adult attachment representations in clinical and non-clinical groups', *Attachment & Human Development*, 11, 223–63.
- Beckwith, L. et al., 1999, 'Maternal sensitivity during infancy and subsequent life events relate to attachment representations at early adulthood', *Developmental Psychology*, 33, 693–700.
- Belsky, J. et al., 2006, 'Effects of Sure Start Local Programmes on children and families', *British Medical Journal*, 332 (7556): 1476.
- Belsky, J., 1986, 'Infant day care: a cause for concern', *Zero To Three*, September, 1–7.
- Belsky, J., 1988, 'The 'effects' of day care reconsidered', *Early Childhood Quarterly*, 2, 333–73.
- Berger, L.M. et al., 2005, 'Maternity leave, early maternal employment and child health and development in the US', *The Economic Journal*, 115,

F29–F45.

- Brotman, L.M. et al., 2007, 'Effects of a psychosocial family-based preventive intervention on cortisol responses to a social challenge in preschoolers at high risk for antisocial behavior', *Archives of General Psychiatry*, 64, 1172–79.
- Cassidy, J. et al., 1999, *Handbook of Attachment*, New York: Guilford.
- Chisholm, K., 1998, 'A three year follow-up of attachment and indiscriminate friendliness in children adopted from Romanian orphanages', *Child Development*, 69, 1092–1106.
- Crawford, T.N et al., 2009, 'Early maternal separation and the trajectory of borderline personality disorder symptoms', *Development and Psychopathology*, 21, 1013–30.
- Dawson, G. et al., 2000, 'The role of early experience in shaping behavioural and brain development and its implications for social policy', *Development and Psychopathology*, 12, 695–712.
- Daycare Trust, 2009, *Quality Costs*, London: Daycare Trust.
- De Wolf, M.S. et al., 1997, 'Sensitivity and attachment', *Child Development*, 68, 571–91.
- Dench, G., 2010, *What Women Want: Evidence from British Social Attitudes*, London: Hera Trust.
- Dettling, A.C. et al., 1999, 'Cortisol levels of young children in full-day childcare centers: relations with age and temperament', *Psychoneuroendocrinology*, 24, 519–36.
- Dmitrieva, J. et al., 2007, 'Child care history, classroom composition and children's functioning in kindergarden', *Psychological Science*, 18, 1032–9.
- Ermisch, J. et al., 2000, *The Effect of Parents' Employment and Children On Children's Educational Attainment*, IZA: Discussion Paper No 215.
- Ermisch, J. et al., 2001, *The effect of parents' employment on children's lives*, York: Joseph Rowntree Trust.
- Feinstein, L., 2003, 'Inequality in the early cognitive development of British children in the 1970 cohort', *Economica*, 70, 73–97.
- Fisher, P.A. et al., 2007, 'Effects of a therapeutic intervention for foster preschoolers on diurnal cortisol activity', *Psychoneuroendocrinology*, 32, 892–905.
- Geoffroy, M.C. et al., 2006, 'Daycare attendance, stress and mental health', *Canadian Journal of Psychiatry*, 51, 607–15.
- George, C. et al., 1999, 'Attachment and caregiving', in *Handbook of*

- Attachment, Cassidy, J. et al., London: Guilford Press.
- Gerhardt, S., 2004, *Why Love Matters*, Hove: Brunner–Routledge.
- Graham, Y. et al., 1999, 'The effects of neonatal stress on brain development', *Development and Psychopathology*, 11, 545–65.
- Grant, K.–A. et al., 2009, 'Maternal prenatal anxiety, postnatal caregiving and infants' cortisol response to the still-face procedure', *Developmental Psychobiology*, 51, 625–37.
- Gump, B.B. et al., 2009, 'Trajectories of maternal depressive symptoms over her child's life span: relation to adrenocortical, cardiovascular and emotional function in children', *Development and Psychopathology*, 21, 207–225.
- Gunnar, M.R. et al., 2001, 'Salivary cortisol levels in children adopted from Romanian orphanages', *Development and Psychopathology*, 13, 611–28.
- Gunnar, M.R. et al., 2006, 'Bringing basic research on early experience and stress neurobiology to bear on preventive interventions for neglected and maltreated children', *Development and Psychopathology*, 18, 651–77.
- Hawkins, S.S. et al., 2009, 'Examining the relationship between maternal employment and health behaviour in 5-year-old British children', *J of Epidemiological Community Health*, 63, 1–6.
- Heckman, J.J., 2006, *Investing in Disadvantaged Young Children is an Economically Efficient Policy*, presented at the Committee for Economic Development/ The Pew Charitable Trusts/PNC Financial Services Group Forum on 'Building the Economic Case for Investments in Preschool', New York, January 10, 2006.
- Hill, J.L. et al., 2005, 'Maternal employment and child development', *Developmental Psychology*, 41, 833–50.
- Hock, E. et al., 1988, 'Maternal separation anxiety' in *Maternal Employment and Children's Development*, Gottfried, A. et al., Plenum: New York.
- Inter-Departmental Childcare Review, 2002, *Delivering for Children and Families*, London: ONS.
- James, O.W., 1995, *Juvenile Violence in a Winner-Loser Culture*, London: Free Association Books.
- James, O.W., 2007, *Affluenza*, London: Vermilion.
- Koren–Karie, N. et al., 2005, 'The emotional quality of childcare centers in Israel', *Infant Mental Health Journal*, 26, 110–26.
- Leach, P., 1994, *Children First*, London: Michael Joseph.
- Love, J.M et al., 2001, *Building Their Futures*, Washington D.C.: Dept. Health and Human Services.
- Love, J.M. et al., 2005, 'The effectiveness of early head start for 3-year-

old children and their parents: lessons for policy and programs', *Developmental Psychology*, 41, 885–901.

McLaughlin, A.E. et al., 2007, 'Depressive symptoms in young adults: the influences of the early home environment and early educational child care', *Child Development*, 78, 746–56.

Melhuish, E. et al., 2001, 'Cognitive and social/behavioural development at 3-4 years in relation to family background', Technical Paper 7, The Effective Provision of Pre-school Education Project, London: Institute of Education/DFES.

Melhuish, E. et al., 2002, Pre-school experience and social/behavioural development at the start of Primary school, Belfast, N.I.: Stranmills Univ Press.

Mills-Koonce, R. et al., 2009, 'Psychophysiological correlates of parenting behaviour in mothers of young children', *Developmental Psychobiology*, 51, 650–61.

Moore, S.C. et al., 2009, 'Confectionery consumption in children and adult violence', *British Journal of Psychiatry*, 195, 366–7.

NICHD-ECCRN, 1997, 'The effects of infant child care on infant-mother security', *Child Development*, 68, 860–79.

NICHD-ECCRN, 2003, 'Does amount of time in child care predict socioemotional adjustment during the transition to kindergarden', *Child Development*, 74, 976–1005.

NICHD-ECCRN, 2003a, 'Early child care and mother-child interaction from 35 months through First Grade,' *Infant Behavior and Development*, 26, 345–70.

Oppenheim, D., 1998, 'Perspectives on infant mental health from Israel: the case of changes in collective sleeping on the Kibbutz', *Infant Mental Health Journal*, 19, 76–86.

Peisner-Feinberg, E. et al., 1997, 'Relations between preschool children's care experiences and concurrent development', *Merrill-Palmer Quarterly*, 43, 451–77.

Pesonen, A-K. et al., 2007, 'Depressive symptoms in adults separated from their parents as children', *American J of Epidemiology*, 166, 1126–33.

Ramey, S.L., 2005, 'Commentary', in NICHD-ECCRN, *Child Care and Child Development*, New York: Guilford Press.

Riechlin, S., 1993, 'Neuroendocrine-immune interactions', *New England Journal of Medicine*, 329, 1246–53.

Roisman, G.I. et al., 2009, 'Early family and child care antecedents of awakening cortisol levels in adolescence', *Child Development*, 80,

- Ronsaville, D.S. et al., 2006, 'Maternal and environmental factors influence the hypothalamic-pituitary-adrenal axis response to corticotropin-releasing hormone infusion in offspring of mothers with or without mood disorders', *Development and Psychopathology*, 18, 173–194.
- Rusby, J.S.M. et al., 2008, 'Childhood temporary separation', *Attachment & Human Development*, 10, 207–21.
- Rusby, J.S.M. et al., 2009, 'Long-term effects of the British evacuation of children during World War 2 on their adult mental health', *Aging and Mental Health*, 13, 391–404.
- Sagi, A. et al., 2002, 'Shedding further light on the effects of various types and quality of early child care on infant-mother attachment relationship', *Child Development*, 73, 1166–86.
- Sammons, P. et al., 2003, 'Measuring the impact on children's social behavioural development over the pre-school years', *The Effective Provision of Pre-school Education Project*, London: Institute of Education/DfES.
- Sapolsky, R. M., 2004, *Why zebras don't get ulcers* (3rd ed.), New York: Henry Holt.
- Schore, A.N., 2001, 'Effects of a secure attachment relationship on right brain development, affect regulation, and infant mental health', *Infant Mental Health Journal*, 22, 7–66.
- Sims, M. et al., 2005 'Children's cortisol levels and quality of child care provision', *Child: Care, Health and Development*, 32, 453–66.
- Sinclair, A., 2009, *0–5: How Small Children Make a Big Difference*, Provocation Series, 3, No. 1, London: The Work Foundation.
- Tarullo, A.R. et al., 2006, 'Child maltreatment and the developing HPA axis', *Hormones and Behavior*, 50, 632–9.
- Teicher, M.H., 2002, 'The neurobiology of child abuse', *Scientific American*, March, 54–61.
- Tout, K. et al., 1998, 'Social behaviour correlates of cortisol activity in child care', *Child Development*, 69, 1247–62.
- UNICEF, 2008, *The Child Care Transition*, Innocenti Report Card 8, UNICEF, Innocenti Research Centre, Florence.
- Vermeer, H.J. et al., 2006, 'Children's elevated cortisol levels at daycare: a review and meta-analysis', *Early Childhood Research Quarterly*, 21, 390–401.
- Watamura, S.E. et al., 2009, 'Cortisol patterns at home and childcare', *J of Applied Developmental Psychology*, 30, 475–85.

- Waters, E. et al., 2003, 'Attachment security and early adulthood: a twenty year longitudinal study', *Child Development*, 71, 684–9.
- Weinfield, N.S. et al., 2000, 'Attachment from infancy to early adulthood in a high-risk sample', *Child Development*, 71, 695–702.
- Weniger, G. et al., 2008, 'Amygdala and hippocampal volumes and cognition in adult survivors of childhood abuse with dissociative disorders', *Acta Psychiatrica Scandinavica*, 118, 181–90.
- Wisner Fries, A.B., et al., 2008, 'Neuroendocrine dysregulation following early social deprivation in children', *Developmental Psychobiology*, 50, 588–99.
- Wolf, P.H. et al., 1999, 'The orphans of Eritrea', *J of Child Psychology and Psychiatry*, 40, 1231–7.