MOTHERS, DAYCARE AND CHILD WELLBEING IN NEW ZEALAND.

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He currently gives health education lectures to British schools on the effects of alcohol. His health book *Getting Physical* won The Times Educational Supplement's Information Book Award. Dr Sigman's most recent book published in 2011 is *Alcohol Nation: How to protect our children from today's drinking culture*. His book on child development *The Spoilt Generation* was published in 2009, and *Remotely Controlled* (2007) concerned the physiological effects of screen media on children and young people. He has visited NZ in 2004, 2007 and most recently 2010. Dr Sigman wrote the report '*Young People and Alcohol - What does the medical evidence tell us about the drinking age in New Zealand?'* for Family First NZ in 2011.

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Executive Summary

The provision of daycare has been one of the most successful sales stories in recent history. In New Zealand, childcare continues to be commodified by the state, private sector and even the church, to levels unthinkable only a generation ago. The number of young children and infants attending daycare centres has risen dramatically and the age at which they first enter daycare centres is younger than ever before.

But as consumption of, and thirst for, daycare continues apace, there are many questions about the long term effects on an entire generation of children that are simply not being asked in public, with answers that many may prefer not to hear.

Daycare continues to be evaluated by later child *outcomes* in terms of 'skills' such as language or 'school readiness' at age five or six that can be imparted through New Zealand's ECE (Early Childhood Education) policies. But what has proved elusive is an understanding of how the young child is affected emotionally and physiologically, and how they *experience* daycare while they are actually *there*. Babies can't speak and toddlers have limited verbal abilities.

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However, a new generation of research from the biosciences is starting to provide an insight into the real-time effects of daycare. These findings are at odds with the information most policy makers and members of the public have been exposed to. Moreover, there is no mention of this evidence by either the Ministry of Education or the Education Review Office (ERO), which regularly monitors New Zealand's childcare centres.

IN PARTICULAR:

● Attending a daycare centre, and the consequent separation from parents, is a significant source of stress for many young children. In many cases, 70 to 80 percent of children in centre-based daycare show increasing levels of the stress hormone *cortisol* throughout the day.

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● Cortisol is produced by the hypothalamic-pituitary-adrenal axis (HPAA), the system involved in a child's response to fear or uncertainty. The HPAA may be programmed by early childcare experiences. Elevated levels of stress and cortisol in young children are particularly of concern because a range of developing neurobiological systems is put at risk, including HPAA programming, causing lasting changes in the settings and function of the child's HPAA.

● Children's immune systems are now also implicated. A recent study reported *"elevated cortisol in children during childcare may be related to both lowered antibody levels and greater illness frequency."* (Watamura et al, 2010, p 1156).

● Attending daycare for an extended time, whether small-scale and home-based, or large-scale and centre-based, that routinely triggers stress in young children could have potential long-term consequences for their mental and physical health as adults. So-called 'high quality' daycare does not override these effects.

● The effects of daycare also appear long-lasting: children who, during their first three years *"spent more time in center-based childcare – whether of high or low quality – were more likely to have the atypical pattern of lower levels of cortisol just after awakening when they were 15 years of age, which could indicate higher levels of early stress"* (Roisman et al, 2009).

There is growing evidence of profound beneficial neurobiological effects a mother's physical presence has on her young child that cannot be achieved by anyone else including paid childcare workers.

● There is now an emerging association between deficiencies in the child's early years environment, and negative consequences on adult HPAA function and stress-related disease.

● At the same time there is growing evidence of profound beneficial neurobiological effects a mother's physical presence has on her young child that cannot be achieved by anyone else including paid childcare workers.

● It appears that a mother's presence, or lack of it, during the early years has biological implications for the child ranging from the epigenetic to the neuroendocrine to the neuroanatomical. Daycare is now a part of this equation.

● In the case of early childcare, it should be incumbent on those with an open mind on this matter to provide overwhelming evidence that paid daycare workers can elicit the same intimate and often unique interactions that occur between mothers and babies.

Based on the above issues, there should be an urgent reconsideration of New Zealand's future direction in early years childcare, including:

● Discussing the effects of daycare on the child continues to be a controversial undertaking. Nevertheless, discussions of childcare must, in future, be uncompromising and honest with an exclusive focus on the wellbeing of the child. Such discussions should reflect a pronounced reduction in concern for the feelings of adults and the reaction of the media or pressure groups. As a rule of thumb, discussion of daycare should cease communicating what is assumed adults are interested in, and instead make judgments about what is likely to be in *children's* best interests.

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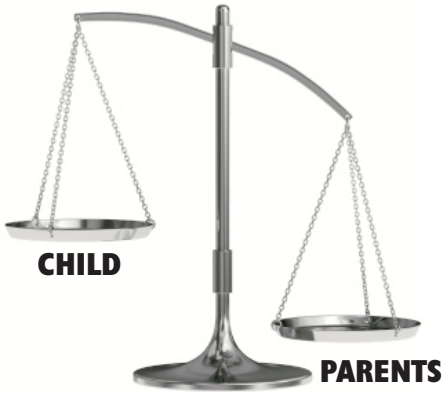
● Sexual politics must be excluded in future considerations of child wellbeing. It should be incumbent upon policymakers to ensure that any discussion about child wellbeing is a discussion about *child* wellbeing - not about parental guilt, be it maternal or paternal.

● Terms, such as 'family-friendly policies', 'flexi-hours' and 'maternity leave' often amount to meeting the needs of the parent and the economy, not the child.



Terms such as 'family-friendly policies', 'flexi-hours' and 'maternity leave' often amount to meeting the needs of the parent and the economy, not the child.

● New Zealand must understand the distinction between 'skills' and human and spiritual qualities, and decide which are more important to cultivate at the very early stages of child development.

● The current bias, whereby the government invests in professionals to care for New Zealand's children while offering no tax breaks or economic incentives for parents who sacrifice careers and income to be full-time carers for their young children, should be revised to reflect a default position of parents generally being superior carers for their own children in comparison to paid carers, particularly at an institution.

● Full-time parenting should be seen as a 'child's right'. Government policy and spending should enable parents to be physically present for their children so that the children are raised in the best environment possible. Such an approach should involve in-home support programmes to afford parents a break. New Zealand's current 14 weeks paid parental leave must be extended considerably.

Full-time parenting should be seen as a 'child's right'.

● The status of full-time motherhood has been relatively low. Mothers have been undervalued. Therefore, New Zealand should undergo a timely and long overdue re-evaluation of motherhood. Measures should be adopted to enhance the feelings of full-time mothers with the same vigour and social marketing acumen that has been applied to other forms of public persuasion such as 'embracing multiculturalism and diversity'. Redressing 'full-time motherism' should be at least as important as campaigns to redress 'racism'.

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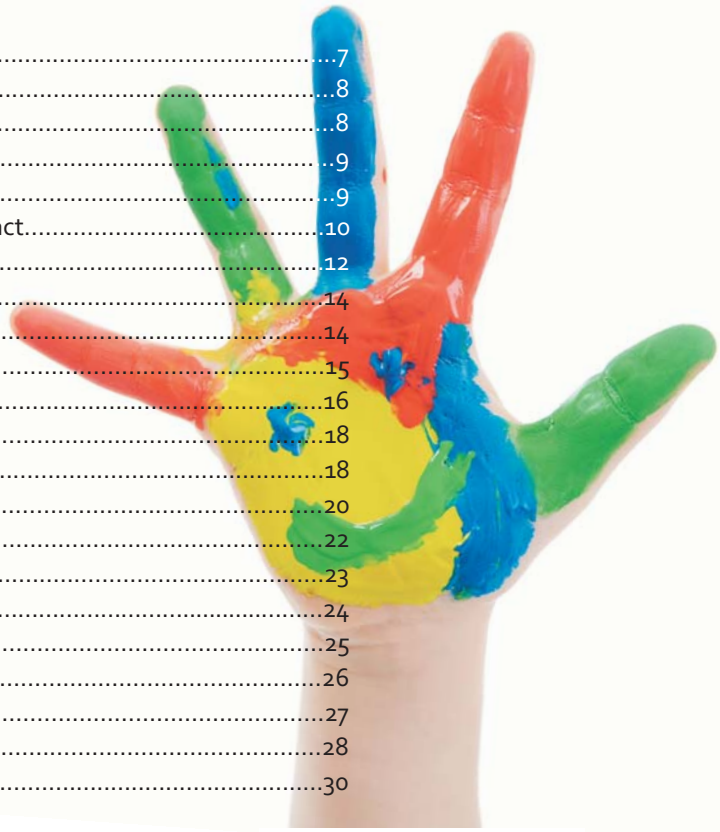
● Policy discussions of the *quality* of care should not be used to override or distract attention from the unavoidable fundamental issue of the *quantity* of care: how many hours per day/week/month/year and at what ages children attend daycare. The age at which a child starts (for example, three months versus three years old) and the number of hours a week in question (six versus 30-plus) should be unpackaged and considered important components of any public discussion of daycare.

Policy discussions of the quality of care should not be used to override or distract attention from the unavoidable fundamental issue of the quantity of care.

While the long-term effects of daycare and cortisol release are not fully understood, New Zealand must pause for thought, adhere to the tradition of a principle of precaution, and assume that generally, maternal care during early child development is better than daycare for child wellbeing and later development. This is justified and prudent.

Contents



Introduction

Children have been cared for by people other than their mothers since the dawn of humanity. This practice continues in industrialised societies today in the form of daycare, considered by many as merely the updated version of a long-established time-tested tradition. Advocates of daycare centres routinely position paid childcare workers as forming 'a circle of attachment' around the infant akin to that found in traditional or village-based societies. These childcare workers are described as *"alternative attachment figures"* who *"are able to provide the necessary support"* for infants and toddlers separated from their mothers for extended periods (Sims, 2010).

However this portrayal is a fallacy of village life. The modern childcare centre is an evolutionary novelty bearing no resemblance to childcare throughout history or in traditional societies today (Konner, 2005).

Segregating children by age is new. Throughout most of human history, people have lived in small foraging groups and children rarely had playmates of the same age. Socialization involved interacting with people of all ages, from infants to grandparents (Konner, 2005). In village-based societies and foraging groups today, children play in multi-age playgroups (Hewitt & Lamb, 2005) and may be watched over by various carers, including older sisters and grandmothers (Hrdy, 2005).

In traditional societies cited as examples of care by 'a circle of attachment' or the 'extended family', the situation on closer inspection bears no resemblance whatsoever to daycare centres in New Zealand today. In traditional societies, children are cared for by a hierarchy of long-standing attachment figures, most of whom are biologically related to that child.

Furthermore, the child often remains in or near their own home/hut/tent, which is closely connected to a village. And the disposition and behaviour of the babies and toddlers is often noteworthy.

One of many examples is a study of the Dogon in West Africa which found a complete absence of anxious-avoidant attachment in young children, attributed to the community's infant care practices which involve responsiveness, constant closeness to mothers, and immediate breastfeeding in response to signs of stress (True, Pisani and Oumar, 2001).

The author of this report (Dr Aric Sigman) has visited many of these traditional societies including the Dogon, Republic of Congo, Bhutan, North Korea, Mali, Borneo, Tonga, Burma, West Papua, Turkmenistan, Laos, Iran, Vietnam, Bolivia, Burkina Faso, Far Eastern Siberia, Sumatra and Cambodia, and has observed precisely this. Furthermore, the highly experienced mothers within these societies instinctively feel non-familial care, especially daycare, does not offer the best circumstances for the wellbeing of their young children.

Yet there is an inherent assumption that researchers and policy makers from industrialised societies - who have comparatively few children and spend relatively few hours in close proximity to them - have a better sense of young children's emotional needs than mothers from traditional 'developing' cultures who have more children and spend more time with them. It is therefore appropriate to ask - is this justified or do traditional societies actually know something that we don't?

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Desert daycare: Damla, Turkmenistan, where all childcare is done by biologically-related family members.

Older sister and cousins caring for younger brother.

Daycare's Family History

Many adults in New Zealand attended Kindergarten or playgroup, and many have had, or currently have, their own children in some form of daycare at certain points. But the age at which children used to start such care was older and the number of hours per week and per year they spent there were very limited. This report is concerned with the earlier age of initiation and the extended time young children spend in daycare.

Do traditional societies actually know something that we don't?

The daycare centre continues to be described in ever-evolving ways. In the 1970s it was referred to as 'child-minding', the 1980s 'child-care', the 1990s 'early learning centres', and the 21st century has spawned the current incarnation 'early childhood education'. Yet, irrespective of the name, today, across the industrialized world, the number of young children and infants attending daycare centres has risen dramatically and the age at which they first enter daycare centres is younger than ever before.

And New Zealand is a central figure in this trend.

The number of children under two in childcare in New Zealand has increased by approximately 50 per cent in the past decade and now includes 25 per cent of all infants under two. With almost 60 per cent of two-year-olds also in care, New Zealand's total of 36 per cent of all those under three in childcare is now among the highest in the world - in 2005, when the figure was 32 per cent, New Zealand ranked seventh-highest out of 28 OECD nations. And the trend looks set to continue. A new OECD report '*Doing Better for Families'*, representing the policy strategy of 34 industrialised countries, has concluded: *"It is crucial to mobilise maternal labour supply more effectively"*, adding that *"from a career perspective alone, women are probably best advised to go back to work at an early stage after childbirth"* (OECD, 2011).

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Eye-To-Eye Contact

Beyond international comparative statistics lie the actual implications for the individual child: a drastic reduction in eye-to-eye contact with their own parents. One of the most pronounced changes across the industrialized world is a reduction in the number of minutes per day that parents interact with their own children. Recent history has seen parent and child in marked retreat from one another as New Zealand has moved from a culture of greater common experience to a society of more individual experience. She is in good company, as parent and child in Britain, too, step back from one another in unprecedented strides. Parents who work full-time spend only 19 minutes every day *"caring for [their] own children"* according to the British Government's Office for National Statistics, while a further 16 minutes is spent looking after their children as a *"secondary activity"*, indicating that the parent is doing something else - such as the supermarket shopping - at the same time. The study looked specifically at working women in Britain and what they do during a typical 24-hour period (ONS, 2006).

NZ's total of 36 per cent of all those under three in childcare is now among the highest in the world.

While part of this drop in eye-to-eye contact is the direct result of more mothers leaving the home to go to work when their children are younger than before and for longer hours than before, there are additional reasons.

Eye-To-Screen Contact

Over the last twenty years, social interaction (eye-to-eye contact) has gone down while eye-to-screen contact has gone up. Just before the year 2000, life became literally virtual: people would spend more time in front of a screen than spending time interacting with other human beings (Figure 1).

Social disengagement is now rapidly increasing as eye-to-eye parent-child interactions are being displaced by the eye-to-screen relationship.

Studies at Stanford University have led to a 'displacement' theory of Internet use: *"In short, no matter how time online is measured and no matter which type of social activity is considered, time spent on the Internet reduces time spent in face-to-face relationships ... an hour on the Internet reduces face-to-face time with family by close to twenty-four minutes."* (Nie et al, 2005).

It isn't just parents who are diverting their gaze from their child to the screen. Children too have never before started viewing so young and with such increasing frequency and length of time. By three months of age, 40 per cent of infants are regular viewers of television, DVDs or videos, and by the age of 2, this number increases dramatically to 90 per cent (Zimmerman et al, 2007).

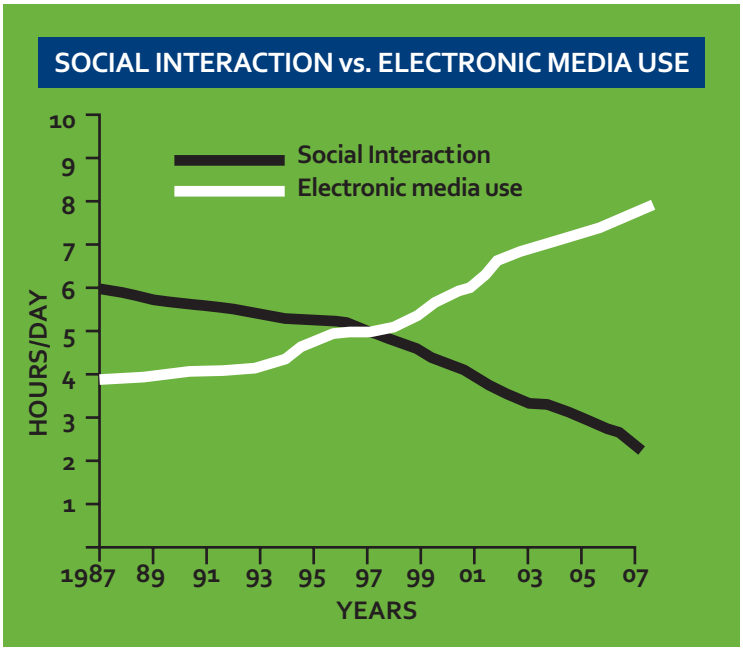

Figure 1. Hours per day of face-to-face social interaction declines as use of electronic media increases. These trends are predicted to increase (data abstracted from a series of time-use and demographic studies) (Sigman, 2009).

Children under 8 are spending more time than ever in front of screens. A new study, '*Zero to Eight: Children's Media Use in America'*, found almost half of infants watch daily "*TV or DVDs, and those who do watch spend an average of nearly two hours doing so.*" Nearly one in three infants has a TV in their bedroom (*Zero to Eight*, 2011).

An ongoing study of family interaction today by the University of California-Los Angeles has measured things such as *"physical proximity in home spaces"* and reported that *"family members seldom came together as a group."* Children were found alone in almost 35 per cent of observed cases. They concluded that social disengagement is now rapidly increasing, as eye-to-eye parent-child interactions are being displaced by the eye-to-screen relationship (Campos et al, 2009). The impact of multi-tasking gadgets is one of the most dramatic areas of change, described by the scientists as *"pretty consequential for the structure of the family relationship"* (Ochs, 2006).

Does Eye-To-Eye Contact Matter?

Eye-to-eye contact along with skin-to-skin contact is vital for child development at all ages but particularly during the very early years.

Eye-to-eye contact along with skin-to-skin contact is vital for child development at all ages but particularly during the very early years. 80 per cent of a child's brain growth occurs during the first three years of life. Much of the talk about infancy and early childhood is consumed with 'stimulating the child to learn'. Yet this ignores the first and most important aspect of 'Early Childhood Education':

emotional learning. Everyday, ongoing touching, cuddling, singing, and smiling are vital aspects of attuned, responsive care necessary to develop key parts of child brain circuitry. Close, physical touch from someone who loves the child is crucially important. These things enable the child to develop the neurocircuitry required to feel empathy and care for others, which is a basic necessity for healthy functioning as an adult. This 'learning' requires high levels of eye-to-eye contact.

Many have found it convenient to imply or openly suggest that sufficient eye-to-eye contact and attendant learning can be provided by paid childcare workers. Yet, simple arithmetic demonstrates that a care worker's eye contact must by necessity be constantly divided between a number of babies or toddlers and is unavoidably interrupted.

This unrivalled bond starting long before birth puts the biological mother at an enormous advantage in the 'early childhood education' of her child, through intimate physical contact.

Eye-To-Mother Versus Eye-To-Careworker Contact

Most pertinent is the question: if high levels of eye-to-eye contact are vital, is it better with the biological mother? We are increasingly told that when it comes to childcare, water is as thick as blood. This belief certainly suits our circumstances today. As Aldous Huxley wrote in his *Ninth Philosopher's Song: "Blood, as all men know, than water's thicker / But water's wider, thank the Lord, than blood."*

Any attempt to proclaim parity between daycare and mother care must ensure that daycare can provide the intricate and unique interactions known to take place between mothers and young children.

Yet, bonds of family and common ancestry are stronger than those bonds between unrelated people. This is most pronounced in the bond between mother and infant including mother and fetus. And this unrivalled bond starting long before birth puts the biological mother at an enormous advantage in the 'early childhood education' of her child, through intimate physical contact.

There is a uniqueness of the mother-child bond at the very ages when many children are in daycare. And so, any attempt to proclaim parity between daycare and mother care must ensure that daycare can provide the intricate and unique interactions known to take place between mothers and young children.

Nuclear magnetic resonance imaging (NMR) studies of the brains of mothers have shown that areas of the brain that are associated with reward and with positive emotions are stimulated when the mothers are shown pictures of their own smiling infants. This effect is much weaker when the infants are not their own. Mothers also show stronger brain activity in response to children crying than adult men or women who are not mothers. This strong emotional response may help a mother understand her own child's emotions when he or she is still too young to articulate them. Paid care workers therefore cannot respond to a client's child in this way (Esel, 2010).

Oxytocin is considered the 'trust' hormone underlying the strengthening of the bond between mother and child. Oxytocin plays an important role in the onset of maternal behaviour. Oxytocin centres of the mother's brain are stimulated by visual cues of her baby with her brain responding rapidly (within 2 seconds) to visual cues of her own baby. The dopaminergic reward processing regions in a mother's brain are also activated when a mother securely attached to her child sees her own child (Strathearn et al, 2009a).

Babies learn an extraordinary amount about the world and relationships merely by breastfeeding.

Babies learn an extraordinary amount about the world and relationships merely by breastfeeding. Moreover, when a baby suckles at a mother's breast, it starts

a chain of events that leads to a surge of the hormone oxytocin in the mother's brain, which in turn strengthens the bond between mother and child. Scientists have recently identified an unprecedented specialised maternal brain system, which coordinates a *"swarm"* of oxytocin factories, which generate extremely intense and recurring bursts of oxytocin. This does not happen between baby and care worker (Rossoni et al, 2008).

Touch, smell, sound, visual, and perhaps other types of sensory stimuli contribute to the adaptive changes in both mother and infant. For example, pheromones are chemicals secreted by an animal that influences the behavior or development of other members of the same species such as triggering instinctive behavioural responses. The dark area around a mother's nipple warms suddenly at the sound of her own crying baby and pheromones are released from the surrounding skin glands. These pheromones speed the time it takes the newborn infant to locate the breast and begin suckling (Schaal et al, 2006). Babies turn toward the odor of their *own* mother's breast as opposed to another woman's lactating breast (Wyatt, 2003). Careworkers cannot elicit this response from a client's infant.

The issue of breastfeeding is more than just about milk. There is now evidence that breastfeeding may provide a protective effect against maternal neglect and maltreatment by helping to strengthen the relationship between mother and child. It is thought that there may be a physiological mechanism through which breastfeeding alters the pattern of mother-child bonding and potentially reduces the risk of child neglect. This mechanism is highly unlikely to exist between paid care worker and client infant (Strathearn et al, 2009).

Yet, some academics and advocates of early years daycare subscribe to what is referred to as *"the good-enough caregiving hypothesis"* as opposed to what is considered a somewhat old fashioned mother-child *"bonding hypothesis"* (Else-Quest et al, 2003). One aspect of this is evident in their view of bottle feeding and breastfeeding. To provide continuity in breast feeding, working mothers have been encouraged to use breast pumps to express milk that can be used any time by daycare workers to feed the baby through a plastic container and rubber teat. In addition to all of the evidence above, what may be inconvenient for the working parent, care worker and baby is the finding that all breast milk is not equal: the composition of breast milk changes throughout the day. Research suggests that breast milk produced in the evening or night-time contains substances such as tryptophan that make babies sleepy (Aparicio et al, 2007; Cubero et al, 2005, 2007, 2009).

Tryptophan isn't the only substance that may help babies develop better sleep patterns. There are several human milk nucleotides such as 5'UMP, 5'AMP, and 5'GMP, that either induce sleepiness or help regulate a baby's body clock, which according to researchers *"could be involved in inducing the 'hypnotic' action of breast-milk at night in the infant."* (Sanchez et al, 2009).

And there may be still other substances in breast milk that influence a baby's sleep. For example, in the morning most mothers produce peak levels of the stress hormone cortisol in order to wake up and increase alertness. Breast milk expressed and stored at this time could be less conducive to sleep. There is the additional issue of a lack of mouth-to-flesh contact during the hours a baby is under the care of a centre worker. And so divorcing or 'liberating' a mother from her own biology and her child's physiological and behavioural reactions is not as straightforward as some may prefer to believe.

Across cultures, foetuses can remember and recognise their biological mother's voice before they are even born and then prefer it after birth to that of other

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women, including care workers. Newborns will even change their behaviour to elicit their own mother's voice. Researchers have found that experiences in the womb have an impact on infant behaviour and development and that recognising the mother's voice in the womb may play a role in mother-infant attachment. It is believed that in-utero neural networks sensitive to the mother's voice and native-language speech are being formed (Kisilevsky et al, 2003, 2009).

And neurophysiological research finds only the biological mother's voice preferentially activates the parts of the baby's brain responsible for learning language, even when that baby listened regularly pre-birth to a nurse who was also a mother and whose voice was matched to be similar to the mother (Beauchemin et al, 2010). These researchers see the findings as showing, *"scientifically speaking, that the mother's voice is special to babies…This research confirms that the mother is the primary initiator of language…"*

And there is a reciprocal effect. New mothers seem to be biologically primed with a linguistic advantage for their own children. When hearing a recording of infant-directed speech ('baby talk' or 'Motherese'), only mothers with young infants exhibit increased brain activity in areas known to govern language. This enhanced activation is not observed in any other group, including mothers whose children had advanced beyond the preverbal stage (Matsuda et al, 2010).

Years later, a mother's voice continues to have physiological effects on her child. When children and young adolescents who are experiencing anxiety along with raised levels of the stress hormone cortisol hear their mother's voice on the telephone, there is a dramatic change: a rapid rise in oxytocin and dramatic reduction in those cortisol levels (Seltzer et al, 2010). It should not be surprising to learn that the mother-child interaction is now being elevated to a medical status. Editorial papers in critical care medical journals are now calling for recognition and use of "*The Therapeutic Effects of a Mother's Voice*" on seriously ill patients in hospital (Alspach, 2010, p. 13).

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'Quality Time' And Attachment

The degree of warmth and affection, particularly between mother and child, can curb a child's stress reactions and generally make a child more resilient to stressful and difficult situations later on. Research has shown that while the hormone oxytocin serves an important function in creating a strong bond between mother and child, disruptions in the bond can lead to dysregulation of a baby's brain chemistry, specifically the way that baby is affected by stress later. Lower stress reactions have been linked with better health outcomes in both humans and animals.

The degree of warmth and affection, particularly between mother and child, can curb a child's stress reactions and generally make a child more resilient to stressful and difficult situations later on.

Researchers have suggested that maternal nurturing behaviour may stimulate developmental processes which are critical for the future capacity of the child to regulate stress biologically and psychologically. A recent study entitled *'Mother's affection at 8 months predicts emotional distress in adulthood'* found high levels of affection between mothers and infants were associated with fewer symptoms of distress 30 years later compared to offspring of mothers who showed low or normal levels of affection. The findings of this study strongly support the view that early life experience influences adult health and emphasise the importance of a strong nurturing relationship with the biological mother (Maselko et al, 2010).

There has been an aversion to discussing whether, and exactly how much, children need their parents, particularly their mothers. While evolution has enabled the

infant, in order to survive, to 'adapt' to circumstances, including being separated from its mother and cared for by paid care workers at a centre, this does not mean that it is preferable for the child's wellbeing. Furthermore, there is the issue of whether the depth or nature of the bond or attachment between mother and child is influenced by the sheer number of hours the mother and child are together or separated during the early years.

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Society believes that it is important for a married couple to spend sufficient time together or it may affect the closeness of their relationship and problems may subsequently develop. Yet, society is more reluctant to apply the same principle of togetherness to the mother-infant relationship.

The suggestion that the sheer number of hours per week/month/year spent between mother and child matters, is considered provocative and contentious. Specifically, to suggest that an infant or toddler regularly placed in daycare for eight hours per day/40 hours per week may influence the depth or nature of the bond or attachment between mother and child, may elicit the response that the relationship may as a result be neither better nor worse but simply different.

One of the solutions to reduced quantity of time between mother and young child has been to describe the fewer number of hours spent together as 'quality time'. In many ways, the term 'quality time' encapsulates the shift of emphasis in the parent-child relationship. One may have overheard working parents say, *"Ah, yes, but I spend quality time with my children"*, but have we ever openly questioned what this different time zone actually means? The implication is that there is something better about the smaller amount of time that parent spends with their children. But look more closely and it becomes clear that quality time has been defined here entirely by the parent, not by the needs of the child, often being almost scheduled into a busy working week.

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In reality, 'quality time' is something that can only be defined by the child and often occurs spontaneously: when a child bumps their knee and is comforted by their own mother at that moment; simply enjoying some togetherness by cuddling up on a sofa together; the knowledge that 'Mummy' has made their lunch.

In fact, 'quality time' often takes place without the mother even being present in the room; just knowing that she's in the house, even if she's not seen, is a powerfully reassuring feeling for a child. It has been said, *"A child needs to know that their mother's presence is a spirit in the house."* Real quality time is usually unplanned, undefined and can occur at all times of the working day, as well as the highly inconvenient middle of the night. It's a feeling, not an appointment. Quality time is not a substitute for the sheer *amount* of time children need every day from their parents.

The unique intricate interactions taking place between the biological mother and baby facilitate the development of that child's brain connections necessary to feel empathy to consider and care for others.

Both the *quantity* and *quality* of time spent between parents and their young child sets the foundation for that child's future relationships with the parent and with others. The unique intricate interactions taking place between the biological mother and baby facilitate the development of that child's brain connections necessary to feel empathy to consider and care for others. This is not one of the early childhood education 'skills' mentioned by the New Zealand daycare research establishment, which prefers to emphasise qualities such as 'school readiness'.

Genderless Parenting

Related to the belief that early years parenting can be delegated to paid carers at a daycare centre is a belief in the interchangeability of mothers and fathers as parents of young children. If fathers can fulfill the role of a 'good enough parent' to infants and toddlers this would further uncouple women from their own evolutionary history thereby providing far greater economic and familial flexibility. There are however two shortcomings to this presumption.

Firstly, women and men are created, develop and function differently. Yet, despite this fact, there remains an ongoing industry continuing to investigate this open question, along with a contrived 'debate' suggesting that men and women are essentially very similar.

The National Academy of Sciences in the United States became so concerned at this continuing misperception that their Board on Health Sciences Policy formed the Committee on Understanding the Biology of Sex and Gender Differences, whose report states bluntly: *"Sex matters. Being male or female is an important variable in all areas and at all levels of biomedical and health related research...sex affects behaviour and perception"*. They've even gone so far as to go on the offensive: *"Barriers to the advancement of knowledge about sex differences in health exist and must be eliminated."* (National Academy of Sciences, 2001).

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Researchers at Yale University School of Medicine, have published a major twenty-six-year review of *'Sex Differences in Brain Structure, Function, and Chemistry'* concluding, very matter-of-factly, *"there are important differences that distinguish the male from the female brain"*. (Cosgrove et al, 2007). It is interesting that in both cases the research teams were entirely female.

There are important differences that distinguish the male from the female brain.

If men and women are different, it stands to reason that they will do many things in different ways. Parenting just happens to be one item in a very long list, and the most important one.

The second obstacle standing in the way of any presumed interchangeability of mothers and fathers as parents comes from the children themselves. For example, the study *'Boys Will Be Boys; Cows Will Be Cows: Children's Essentialist Reasoning About Gender Categories and Animal Species'* found that children are born with an inherent presumption that males and females, mothers and fathers, are inherently different and that such differences come from the inside, not from society - we are born with them. 5- and 6- year-olds saw men and women as being the equivalent of two completely different species of animal (Taylor et al, 2009).

Church And State Daycare

Irrespective of the issues above, New Zealand has welcomed daycare with an ever-widening embrace. This continues to be reflected in the way the Ministry of Education depicts daycare:

"Research shows that children who are involved in quality early childhood education (ECE) benefit in many ways, and that these benefits also extend to their family/whanau and the wider community."

"Taking part in ECE builds a strong foundation for your child's ongoing education,

learning and development. Children learn lots of new skills by participating in ECE, building on the skills they learn at home and from their families/whanau." (Ministry of Education, 2011a).

The Ministry explains: *"At an ECE service children learn how to:*
- *interact with new people and form relationships*
- *trust adults and other children*
- *play and learn with people outside their immediate family*
- *take turns and negotiate*
- *take part in learning experiences in a group*
- *ask questions and find out more."*

It is clear the Ministry values so-called 'skills' in babies and toddlers. And there is a strong implication that their list of what are merely natural aspects of child development which have emerged in the child for hundreds of thousands of years could not have done so without state intervention. Neanderthal children were thought to have a language, and despite their lack of institutional daycare, they lived in complex social groups. In fact, Neanderthal teenagers wore cosmetics they neatly stored in their makeup containers (Zilhão et al, 2010).

Over the past decade, church adverts for daycare inform parents that houses of worship are "now enrolling under-2's".

The Ministry goes on to explain New Zealand's "*curriculum framework for the ECE sector. It covers the education and care of children from birth to school age ... to guide children's learning opportunities ...a learning programme for your child. ... This early learning story forms the beginning of your child's learning journey to share with your family, other ECE services and eventually school. Services record and communicate your child's learning story with you in different ways.*" (Ministry of Education, 2011b).

The church in New Zealand too now guides babies and toddlers along the modern path of their 'learning journey'. Over the past decade, church adverts for daycare inform parents that houses of worship are *"now enrolling under-2's"*.

And so to question the inherent goodness of daycare is to question the judgment and the endorsement of the established foundations of our society, the State and the church.

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The Lesser-Known Effects Of Daycare

Discussing the effects of daycare on the child continues to be a controversial undertaking hindered by bitter politicised arguments involving women's rights, governmental desire for economic growth, a disproportionate sensitivity to guilt of *working* as opposed to full-time mothers, and the media's portrayal of daycare study findings. Researchers who have voiced concerns over the effects of daycare have been attacked, others have suddenly had their research data re-analysed prior to publication (Belsky, 2001; Henry, 2006; James, 2010). However, the uncomfortable question remains: generally, which is better for a young child during weekdays: the biological mother or a paid carer at an institution?

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In attempting to answer this it should be clear that many fundamental aspects of a child's developmental wellbeing are simply not accessible to current methods of assessment: they are plainly too nuanced or unsuitable. And so it is reasonable to call into question in the first place the so-called 'evidence-based' approach to policy decisions on childcare. Should we rely so heavily on our current ability to 'measure' the effects of daycare in order to make fundamental decisions?

Until now, much of the daycare research has been conducted within the professions of child education and social work. Research has focused on later outcomes for the child such as the emergence of noticeable behavioural problems, language skills or 'school readiness' at the age of five or six. New Zealand's educational establishment and national media report intellectual and skill advantages and greater 'school readiness' in those children who attend daycare (Ministry of Education, 2011a).

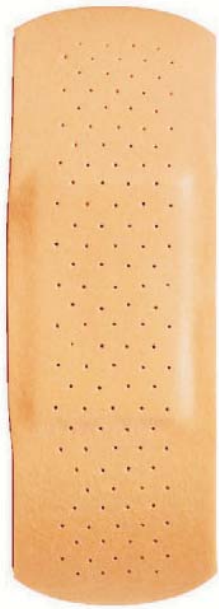
However, what is rarely discussed openly is the distinction between the effects of daycare on children of low socio-economic status whose mothers have low levels of education, and children of middle-class socio-economic status with professional mothers of higher educational background. What is often conspicuous by its absence is a facility allowing middle-class parents to make clear like-for-like comparisons between parental and centre-based care. A typical example is a recent 'meta-analysis' of maternal employment and *"child functioning: achievement and behaviour problems"* (Lucas-Thompson et al, 2010).

The press headlines reported: *'Daycare Does Not Cause Academic or Behaviour Problems'* and the lead researcher is quoted as reassuring society, "*Overall, I think this shows women who go back to work soon after they have their children should not be too concerned about the effects their employment has on their children's long-term well-being."* (Newswise, 2010).

While in point of fact, the small print of the study actually concludes that there is one rule for the rich and one for the poor, which may make uncomfortable reading. *"Early employment [was] most beneficial when families were challenged by single parenthood or welfare status…negative effects of employment for middle-class and two-parent families and for very early employment (child's first year)."* (Lucas-Thompson et al, 2010).

And so on closer inspection, the benefits widely extolled are in many cases often a description of the *remedial* use of daycare as an 'intervention' for deprived children. However, for middle class children, it's often a case of: take a privileged mother out of the home, and some of the privileges leave with her.

The benefits widely extolled are in many cases often a description of the remedial use of daycare as an 'intervention' for deprived children.



Skills Versus Feelings

While daycare continues to be evaluated by later *outcomes* in terms of the 'skills' imparted through New Zealand's ECE policies, what has proved elusive is an understanding of how the young child is affected emotionally and physiologically, and how they experience daycare while they are actually *there*. Babies can't speak and toddlers have limited verbal abilities when it comes to describing their inner world.

However, a new form of research from the biosciences is starting to provide an illuminating glimpse of this unspoken landscape, with the child's physiological reactions at the daycare setting helping to shed light on their experience. And some of those responses paint a different picture from that painted by the daycare research establishment and those promoting ECE in New Zealand: there is something about attending daycare for an extended time, whether small-scale and home-based or large-scale and centre-based, that often triggers stress and physiological changes in young children which could have potential long-term consequences for their mental and physical health as adults. While New Zealanders are regularly informed of the perceived benefits of daycare, it is the intention of this report to offer some of the neuroendocrine (brain/hormone) evidence, which is conspicuous by its absence in discussions of daycare (Sigman, 2011). This research will

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provide a broader understanding of daycare - irrespective of its political acceptability.

The University of Minnesota College of Education and Human Development reports that in many cases, 70 to 80 percent of children in centre-based daycare show increasing levels of the stress hormone *cortisol* throughout the day, with the biggest increases occurring in toddlers. Yet by age five, children don't exhibit these stress reactions.

Cortisol is produced by the hypothalamic-pituitary-adrenal axis (HPAA), the system involved in a child's response to fear or uncertainty. The HPAA may be programmed by early childcare experiences. Neuroendocrine research of stress in infants and small children has used salivary samples to measure cortisol, to gauge HPAA reactions to stress. Therefore, by examining cortisol levels in children in daycare environments, especially those who cannot yet talk, unique insight into how stressful they find these environments is provided.

HPAA dysregulation is now considered a biological explanation for why children living in a low socioeconomic environment (SES) may be more vulnerable to developing psychiatric and physical illnesses later in life.

In general, cortisol levels undergo a daily cycle; the level peaks in the early morning, often declining across the day to reach the lowest level at about midnight to 4am, or three to five hours after falling asleep. Infants are born without a daily rhythm in cortisol and they acquire it during their first year of life.

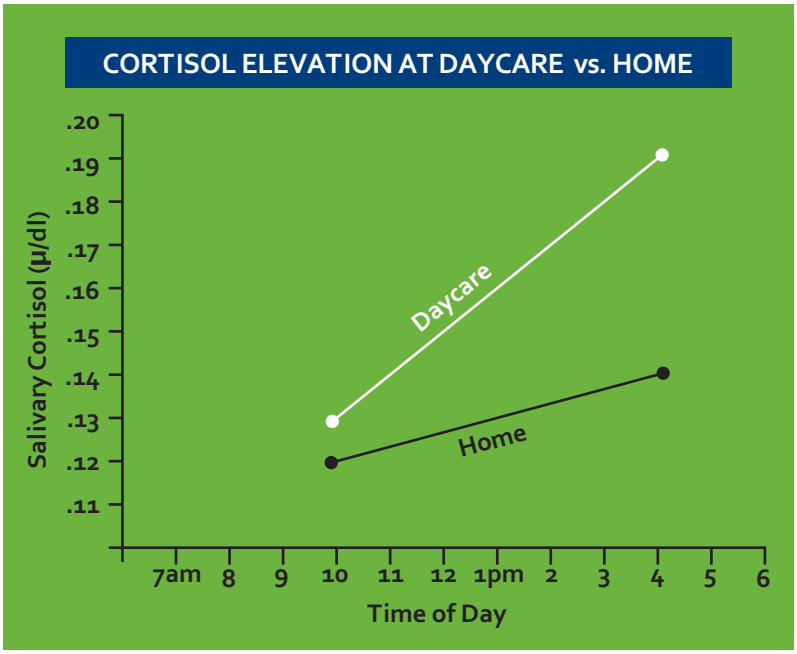

Figure 2. Compared to cortisol levels at home, increases were noted in the majority of children (63%) at home-based day care, with 40% classified as a stress response, even in daycare homes where there were only one or two children (see Gunnar et al, 2010).

Under certain circumstances, a rise in cortisol as an appropriate stress response is a healthy and necessary part of life. After a perceived danger has passed, the body then tries to return to normal. However, when stress is chronic, high levels of cortisol remain active in the system. These high levels of cortisol can have significant health consequences in adulthood. For example, increased cortisol exposure is independently linked to higher numbers of plaques in, and artherosclerosis of, the carotid arteries (Dekker et al, 2008). And high cortisol levels strongly predict cardiovascular death, even in people who have no pre-existing cardiovascular disease (Vogelzangs et al, 2010).

Impaired function or 'dysregulation' of the HPAA is now implicated in the stress-related disorders such as depression and anxiety. One international study recently reported that cortisol levels at age 17 can be used to predict the development of psychiatric disorders during the subsequent 2.5 years of these adolescents' lives (Ellenbogen et al, 2011).

HPAA dysregulation is now considered a biological explanation for why children living in a low socioeconomic environment (SES) may be more vulnerable to developing psychiatric and physical illnesses later in life. In a recent study at the University of British Columbia, it was found that over a two-year period, cortisol rose almost twice as much in low-SES compared with high-SES children (Chen et al, 2010).

It's interesting that a study comparing different child-rearing environments, found low cortisol levels in infants of families with an 'anthroposophic lifestyle' considered an alternative, more natural holistic approach thought to provide environmental conditions for the infant aimed at reducing stress, compared to infants in families with more conventional lifestyles (Stenius et al, 2010).

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Attachment, Copresence And Cortisol

It has been suggested that children who experience less nurturance early in life may be less securely attached as adolescents and adults with greater vulnerability to stress compared to children who experience consistent, nurturing caregiving (Gallo & Mathews, 2006). Based on growing evidence, it would be a reasonable guess that being in close physical proximity to a young child, referred to as 'copresence', appears to reduce cortisol and boost attachment.

It has been suggested that children who experience less nurturance early in life may be less securely attached as adolescents and adults with greater vulnerability to stress compared to children who experience consistent, nurturing caregiving.

There is a close relationship between maternal care, copresence, and infant cortisol levels. A Swedish study examined daily cortisol levels among infants and mothers who remained at home with their children, 93 percent of whom were breast feeding. Strong correlations were identified between mother and child cortisol levels on all sampling occasions, while weaker correlations were found between father and child levels and only in the afternoon and the evening samples (Stenius et al, 2008).

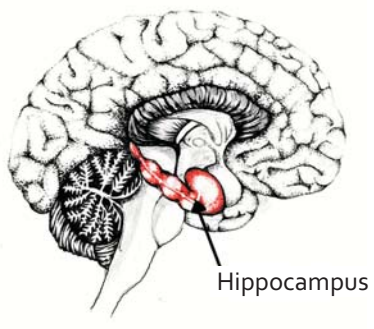
Demonstrating further the role of copresence, a study published in the journal *Developmental Psychobiology* reported lower cortisol levels among three to eight year old children who had slept in their parent/s' rooms, and also those children who attended less daycare in the first four years of life (Waynforth, 2007).

As well as being in close proximity, attachment has been linked with waking cortisol levels in healthy female children and adolescents aged 9 to 18 years. Those with a more anxious attachment style had higher levels of cortisol on awakening and a subdued cortisol awakening response, compared to those who were securely attached. It has been pointed out that this is the same cortisol dysregulation pattern linked with disorders in adulthood (Oskis et al, 2011). Crucially, adolescents' attachment orientation also influences their blood pressure responses to everyday social interactions (Gallo & Mathews, 2006).

HPAA Programming During The ECE Years

Over the past decade, a body of animal and human research has revealed the profound influence of early-life parenting on HPAA function in adulthood. For example, early-life parental care has been shown to influence the development of the brain's hippocampus, an area particularly important in forming new memories and connecting emotions and senses, such as smell and sound, to memories. Early life care may also modify the cortisol awakening response (Engert et al, 2010).

The quality of a mother's care in early childhood is a factor thought to influence the size of the hippocampus.



In rats, the quality and sheer amount of the mother's care causes changes in the brain's structure and function and alters brain cell functioning and the response to anti-inflammatory hormones (including cortisol) and stress.

In controlled experiments involving rats, highly significant reductions in the length and density of the branches of brain cells are found in the hippocampus of adult offspring with mothers who were less attentive to them (Champagne et al, 2008). In the human brain, the quality of a mother's care in early childhood is a factor

thought to influence the size of the hippocampus (Buss et al, 2007). Attachment insecurity has now been significantly related to reduced brain size and brain cell density within the hippocampus of young adults (Quirin et al, 2010) (See Figure 3).

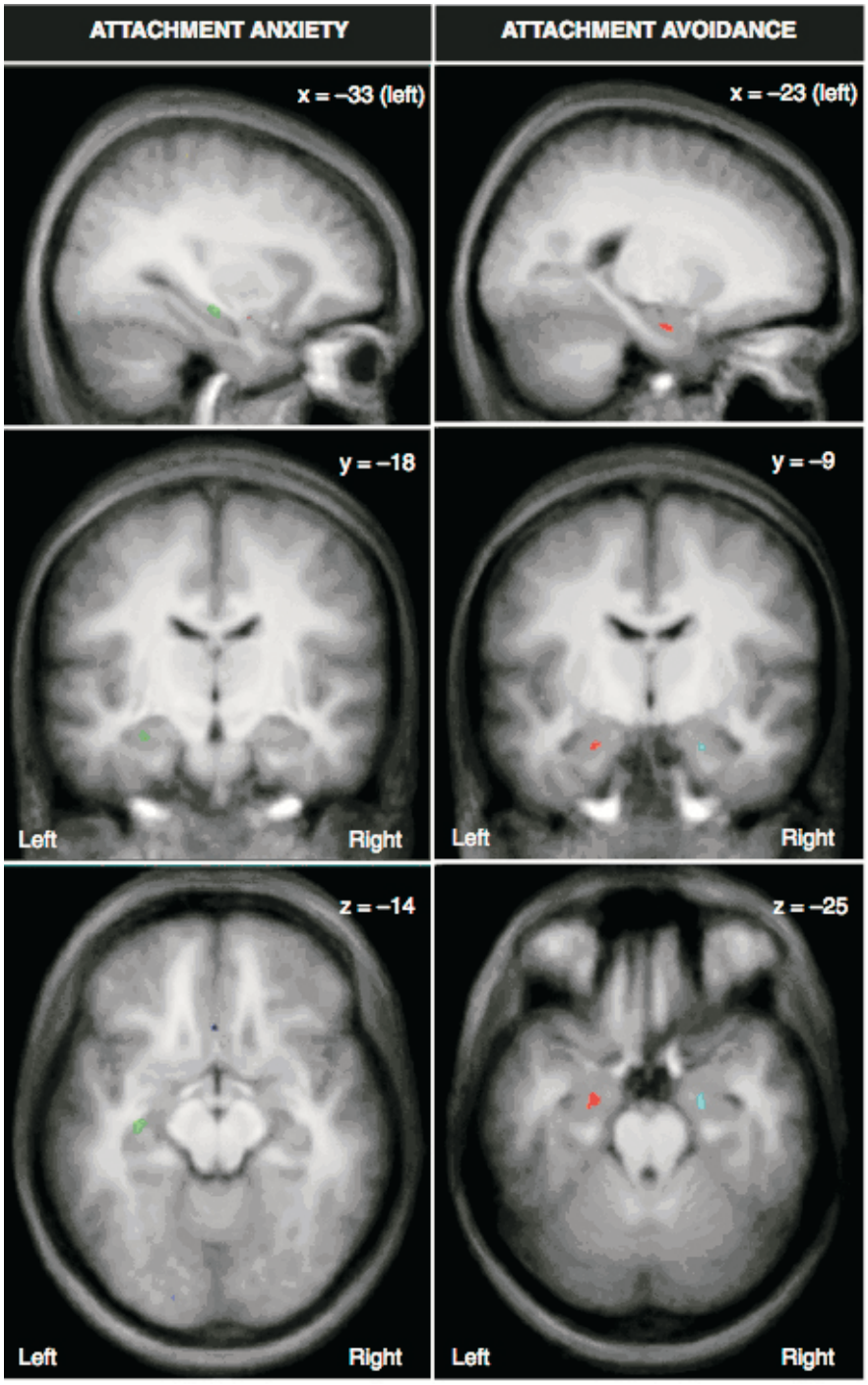


Fig. 3 Insecure Attachment and hippocampal cell density
*Clusters of gray matter concentration in the hippocampus correlated with human attachment styles. Coloured areas denote lower gray matter concentrations in the left hippocampus found in people with high attachment anxiety scores **(left)**. Lower gray matter concentration in the left as well as in the right hippocampus were found in people with higher attachment avoidance scores **(right)** (Quirin et al, 2010).*

The mechanisms by which the child's early care experiences are translated into neurobiological, temperament and behavioural changes are thought to involve changes in the way genes are regulated (gene expression). Maternal care or a deficiency of it plays a key role: maternal care can produce semi-permanent changes in gene activation in brain regions vital in responding to stress, thereby

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providing a potential mechanism for the early childhood programming of stress-induced disease in adults (Tara, Craft & DeVries, 2009).

In rats, the degree of maternal care alters the offspring *epigenome* - software type instructions within genes - in cells of the hippocampus, as well as altering the HPAA response to stress (Weaver et al, 2004; Weaver, 2009).

Stress occurring during sensitive periods of child development might therefore cause lasting changes in the settings and function of the child's HPAA (Murgatroyd et al, 2009; Mesquita et al, 2009).

In fact a recent study entitled *'Parents' psychological stress over time may affect children's cortisol at age 8'* reported that *"parenting stress could be a relevant factor for children's adjustment of the HPA axis with long-term effects and leave children more vulnerable to experiences of stress...The longitudinal relation found between parenting stress at age 1 and cortisol levels at age 8 supports the idea that children's HPA axis activation is adjusted early in life with regard to early experiences of stress. Early experiences of stress may have a lasting effect on the HPA axis, resulting in an increased activity with constantly elevated levels of cortisol...Hence, our results support a sensitive period for HPA axis adjustments in infancy"* (Koch et al, 2010).

Society and academia seem more willing to accept that 'parenting stress' can cause long-term changes in children's vulnerability to later stress, yet curiously reluctant to consider that daycare could do the same thing.

There is now an emerging association between deficiencies in the early years' environment and negative consequences on adult HPAA function and stress-related disease.

Elevated levels of stress in young children are particularly of concern because a range of developing neurobiological systems is put at risk, including HPAA programming. Concern is not restricted just to high cortisol levels; it includes any dysregulation of the child's daily cortisol cycle or their HPAA in general.

Therefore, a key aspect in the early care environment for young children is the ability of adults to be available to respond appropriately to stress reactions triggered (inevitably) by normal day-to-day events. Given the findings mentioned earlier that, in many cases, 70 to 80 percent of children in centre-based daycare show increasing levels of the stress hormone *cortisol* throughout the day, it is fair to question whether daycare environments best offset the effects of stressors for young children.

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Daycare And Stress Hormones

Attending a daycare centre, and the consequent separation from parents, is a significant source of stress for many young children. A review and meta-analysis of nine studies - *'Children's Elevated Cortisol Levels at Daycare'* - concluded: *"Our main finding was that at daycare children display higher cortisol levels compared to the home setting. Diurnal patterns revealed significant increases from morning to afternoon, but at daycare only...We examined all papers on possible associations between cortisol levels and quality of care, and the influences of age, gender, and children's temperament. Age appeared to be the most significant moderator of this relation. The effect of daycare attendance on cortisol excretion was especially notable in children younger than thirty-six months. We speculate that children in center daycare show elevated cortisol levels because of their stressful interactions in a*

group setting." (Vermeer & van IJzendoorn, 2006, p.390).

A study published in the American Medical Association's journal *Archives of Pediatrics and Adolescent Medicine* compared the cortisol levels of children aged 16 months to two years on two childcare days versus two non-childcare days and found highly significant differences in the children's patterns of cortisol secretion on childcare days characterised by an afternoon increase in cortisol levels. This was not the case on non-childcare days (Sumner, Bernard and Dozier, 2010).

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Other studies have compared professional home-based (a woman looks after other people's children in her home) and center-based childcare. In one, children from childcare homes and children from childcare centers in the 20-40 months age range were monitored. The authors concluded *"children displayed higher cortisol levels at childcare than at home, irrespective of type of care"* (Groenveld et al, 2010, p 502).

Again suggesting the importance of the mother, similar patterns of results on HPAA function have been found for full-time home-based daycare. Researchers examined children (3.0-4.5 years) in full-time home-based daycare and found that *"Compared to cortisol levels at home, increases were noted in the majority of children (63%) at daycare, with 40% classified as a stress response"* (p. 851), even in daycare homes where there were only one or two children (Gunnar et al, 2010).

Elevated cortisol in children during childcare may be related to both lowered antibody levels and greater illness frequency.

The child's HPAA and their immune system are linked. So, a recent study at Cornell University examined both cortisol levels and antibody secretion among three to five-year-old children *"attending very high quality, full time childcare centers".* Salivary antibody provides a critical line of defense against germs entering children's bodies via the mouth. Saliva samples were taken across the day at home and in childcare, to examine the relationship between cortisol concentration and antibody secretion - secretory IgA (SIgA) - and their relationships with the child developing an illness. Researchers identified rising cortisol levels at daycare which predicted lower antibody levels on the weekend. Of particular note was a declining daily pattern in antibody secretion on weekend and daycare days for older preschool children. They concluded that *"elevated cortisol in children during childcare may be related to both lowered antibody levels and greater illness frequency"* (Watamura et al, 2010, p 1156).

In addition to lowering antibody levels, day-care related stress may activate immune cells in a child's skin, resulting in inflammatory skin diseases such as eczema (Joachim et al, 2008). Researchers at the Environmental Health Research Institute in Dusseldorf used the German birth cohort study to determine the incidence and prevalence of eczema up to the age of six. Of 11 possible risk factors, only daycare attendance during the first two years of life was significantly associated with later eczema. *"Daycare centre attendance is associated with an increased prevalence and incidence of eczema. Regional differences in eczema prevalence could be explained by regional differences in utilization of early daycare"* (Cramer et al, 2011, p 68).

It is important to realize that the one year elapsing between ages two and three constitutes one third of a child's life, incidentally during the greatest period of brain volume growth and at a time when experiences affect the way genes are expressed in the child's developing brain.

A study published just before Christmas 2011 found that elevated stress hormones in infancy appear to be linked to allergies up to the age of two. The study, carried out by researchers at the Karolinska Institutet in Sweden and colleagues, appears in the *Journal of Allergy and Clinical Immunology*.

The researchers concluded that the association they found between cortisol levels and allergies suggests that an altered HPAA plays a role in causing allergies.

Other research has found that between ages two and three, the differences in cortisol levels between home and daycare are transient, diminishing over a period

of a year. At 3 years of age, children displayed higher cortisol levels at daycare only if they had a 'later entry', defined as starting after 16 months, while children with more daycare experience, entering before 8 months, showed higher cortisol levels at home (Ouellet-Morin et al, 2010).

Although this suggests some form of adaptation, it is important to realise that the one year elapsing between ages two and three constitutes one third of a child's life, incidentally during the greatest period of brain volume growth and at a time when experiences affect the way genes are expressed in the child's developing brain. And so even if cortisol rises diminish within a year, there has been some systematic HPAA dysregulation, such that subtle lasting effects may have already been set in motion.

Additionally, the effects of daycare also appear long-lasting. A large-scale study in 2009 involving nine institutions followed approximately 1,000 children from one month through mid-adolescence to examine the effects of childcare in children's first few years of life on later development. The researchers observed children in and out of their homes. When the children were 15, they measured their levels of awakening cortisol.

Children who, during their first three years, *"spent more time in center-based childcare – whether of high or low quality – were more likely to have the atypical pattern of lower levels of cortisol just after awakening when they were 15 years of age, which could indicate higher levels of early stress".* Abnormal cortisol patterns were observed regardless of the child's gender or ethnicity, the family's income level, the mother's level of education, or the sensitivity the parents exhibited towards the children as teenagers. It is thought that these children may be more prone to stress in their teen years (Roisman et al, 2009).

Interestingly, a recent study by the US Department of Health found that the effects of daycare from birth to 4.5 years extend to age 15 years. Both quality and quantity of daycare were linked to adolescent functioning: *"More hours of nonrelative care predicted greater risk taking and impulsivity at age 15"* (Vandell et al, 2010, p 737). Although the clinical significance of these effects is still being debated, the very fact that such long-term reliable differences have been found is important.

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Quality Of Care And Cortisol

Like many countries, New Zealand continues to focus on acquiring a greater supply of 'high-quality early childhood education' – the assumption being that if the carers are more competent and there is a lower child-to-carer ratio then this overrides any effects brought about by the young age at which a child is separated from its mother and the long hours that child may spend each day away from mother and home environment (ECE Taskforce, 2011).

The quality of care has been found to mitigate some - but not all - of the relationship between daycare attendance and cortisol dysregulation. In the study above (Groenveld et al, 2010) in home-based childcare, lower caregiver sensitivity was associated with higher levels of cortisol during the day. In center-based childcare, lower global quality of care was associated with an increase in cortisol between 11am and 3pm. The authors concluded that the quality of care is an important factor in young children's wellbeing and HPAA stress reactions.

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Interestingly, in daycare centres higher cortisol levels in the paid carers themselves can actually be used to predict that they will provide *"lower-quality caregiver behaviour"* toward their clients' children, even when other obvious causes - higher physical workload, more children under two years to care for, and younger caregiver age - were taken into account (Schipper et al, 2009, p 55).

Higher cortisol levels in the paid carers themselves can actually be used to predict that they will provide "lower-quality caregiver behaviour" toward their clients' children.

Gunnar et al's 2010 study above on home-based daycare also found that cortisol increases over the day were larger in settings where children moved frequently between activities, were given relatively little time for free play, and spent long periods of time in structured activities (learning letters, numbers, and colours) led by the carers. The researchers reported that the behavior of the care provider is linked with both how well children function at daycare, and how much their cortisol rises.

It is not surprising that when carer-to-children ratio is higher, carer sensitivity is greater, and children are not pushed, cortisol rises may be less pronounced. However, cortisol increases still occur, and for long periods of time during highly formative years.

Some argue that repeated separation stress between infant and mother can produce better child outcomes with the child being more resilient to later stress, and less fearful. These beliefs are based on a misinterpretation of studies of monkeys whereby increased cortisol that was caused by episodes of separation of an infant monkey from its mother was associated with better outcomes in terms of greater resilience, brain structure and function.

What advocates of such studies are unaware of, or reluctant to consider, is that these studies actually involve free-living foraging monkeys that are biologically independent from their mothers and only then separated from their mothers for only an hour a week for only 10 weeks (Parker et al 2004; Katz et al, 2009). This highly convenient yet misappropriated example intended to prove the benefit of separating mother and baby is not at all comparable to breast-feeding babies and small toddlers in daycare for 35 hours a week.

Curiously the Ministry of Health, the Paediatric Society of New Zealand and the New Zealand Society of Endocrinology are not recommending placement of infants in daycare to *enhance* HPAA function in developing children.

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Potential Implications

It is clear that early childcare experiences are associated with changes in the way the child's HPAA system functions, both at the time but decades later too. It is not an over-reaction to now be aware that sustained or increased exposure to stress hormones such as cortisol can have adverse effects on brain areas such as the hippocampus, and decreased production of new brain cells. Elevations of cortisol can lead to structural changes in the amygdala which is involved in the processing of emotions such as fear and anger (Sharpley & Bitsika, 2010). Overexposure to cortisol also negatively affects the prefrontal cortex. Such damage might progressively reduce the control of the HPAA and lead to increased stress responses (Arborelius et al, 1999; Fuchs et al, 2000).

HPAA dysregulation and its effects may be subtle and nuanced but still may be highly significant, particularly so since the structure and function of the brain is developing in children. Given that cortisol exposure can be neurotoxic (poisonous to brain cells), with adverse effects on both specific brain cells and entire neural systems, and that some children are experiencing elevated cortisol levels at

daycare during the first three years of life when the brain will reach approximately 80 percent of its adult size, any consideration of daycare in New Zealand must now take these factors into account.

The early rearing environment and a less secure infant-mother attachment are now associated with earlier puberty in girls (Belsky, Houts, & Fearon, 2010), as is absence of the biological father. Deardoff et al (2010) found this to be the case only among higher income families and posited that *"higher income families without fathers are more likely to have a single mother who works long hours and is not as available for caregiving"*. The study pointed to *"neuroendocrine pathways that influence development"*, especially cortisol release.

The Ministry of Education sets licensing standards and criteria for daycare including minimum ratios of staff-to-children and restrictions on class sizes while the Education Review Office (ERO) regularly monitors the centres. Yet curiously, any mention of cortisol or HPAA programming is conspicuous by its absence.

It appears that a mother's presence, or lack of it, during the early years has biological implications ranging from the epigenetic to the neuroendocrine to the neuroanatomical. Daycare is now a part of this equation. Of course, understanding the effects of daycare obviously involves more than mere neuroendocrine studies. However, New Zealand must pause for thought.

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CONCLUSIONS

Principle Of Precaution

The under-reported research above is not conclusive and may not be comfortable but we have a duty to our children not to ignore it. And it may also help explain the nature of children today and adults tomorrow, along with their problems and their needs.

Few stop to consider that daycare is an evolutionary novelty which has grown suddenly and rapidly in New Zealand. When considering the potential effects of profound new developments in other areas of child health and wellbeing, our society instinctively adopts the principle of precaution. Yet the absolute opposite has been the case with daycare. The accepted position at the moment considers daycare attendance as an accepted healthy practice which we must treat as equivalent in terms of child wellbeing and later development.

While of course the long-term effects of daycare and cortisol release are not fully understood, emphasising the possible negative implications in keeping with our tradition of a principle of precaution is justified and prudent. In the case of early childcare we should remind ourselves that when it comes to an issue of such fundamental importance, we must subscribe to the ancient medical principle of *'first do no harm'*, and assume that generally, maternal care during early child development is better than daycare for child wellbeing and later development. Moreover, it should be incumbent on those with an open mind on this matter to provide overwhelming evidence that paid daycare workers can elicit the same intimate and often unique interactions that occur between mothers and babies.

Beyond the academic sphere of *'publish or perish'* exclusively evidence-based judgments of daycare, lies the responsibility to advise on what is probably better for child health and development as it stands at present. Such guidance should

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err on the side of caution. And while open-mindedness has its place in academia, it is a luxury children can't afford when it involves blanket policy making. Daycare decision-making is a rather perverse situation where an open mind can be a dangerous thing.

We must therefore ask ourselves which, as a rule of thumb, should take priority: women's rights or child wellbeing.

The Submaternal Imperative

Understanding the effects of daycare on the child continues to be discussed through the prism of sexual politics and women's rights, while in uncomfortable truth women's rights and adult self-fulfillment are not exactly the same issue as child wellbeing. Worse yet, they may often compete for precedence. We must therefore ask ourselves which, as a rule of thumb, should take priority: women's rights or child wellbeing, and to what extent should research and the public discussion of child wellbeing be influenced by the concerns of sexual politics?

There is a distinct lack of high-profile research and media publicity intended to enable stay-at-home mothers to feel valued.

Specifically, our understanding of non-parental care has been bedeviled by an over-consideration for maternal guilt and media reaction to the findings of daycare studies. However, curiously, there appears to be little effort invested in concern over the feelings of *stay-at-home* mothers. There is a distinct lack of high-profile research and media publicity intended to enable stay-at-home mothers to feel valued.

As it stands, for two-parent and professional households, the impression given is that mothers who do stay at home for the first few years of their child's life confer no benefits or advantages on their child when compared to equivalent time spent in non-parental care. Parental and non-parental care are presented as equal alternatives entailing nothing more than a discretionary lifestyle choice involving mere stylistic differences. In short, this means that the many mothers who have spent years at home with their children in the belief that this conferred significant benefits to them have wasted their time. Yet the uncomfortable but nagging question remains: which is generally better for a young child during weekdays - the biological mother or a paid carer at an institution?

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Allied to this is an ambivalence and, at times, a seeming aversion to the idea that attachment between child and biological mother is unique. To suggest that motherhood is special is seen by some as in some way demeaning, even insulting, to women. Research and public discussion often reflect a concern that unique interactions between child and mother can be interpreted as a female obligation and responsibility entailing hindrances, a reduction in choices and a loss of freedom. There are also women for whom daycare may be of understandable appeal because they simply do not feel very sensitive and nurturing toward or strongly attached to their infant or toddler. While this may be uncomfortable, research and the political climate cannot be based on the submaternal feelings of the minority.

It may be the case that many of the mothers working in the media, in full-time policy making, and other related jobs are more likely to fall into this category. The consequent influence of this submaternal minority is to project a distorted impression of childcare issues with an overriding emphasis on accessing 'high quality care' accompanied by the belief that early mother-child detachment is inconsequential or advantageous for the child.

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Suggesting that this may not be the case is met with accusations of being *'anti-women'*, or wanting to *'roll the clock back to the 1950s and tie women to the kitchen sink'*. Like many countries today, New Zealand does not enjoy a healthy climate of open discussion about the effects of daycare on children.

Children Cannot 'Move On'

In other areas of child development, society welcomes a framework of optimal parenting practices. For example, we accept that five servings of fruits and vegetables a day is optimal and preferable to four servings, which in turn is preferable to three servings and so on. In fact the Ministry of Health even offers recipes and an infant/toddler menu as specific guidance on the matter: *"puréed fruit without skins, pips or seeds, cook to soften if needed (apple, pear, mango) cooked and puréed kumara, kamokamo ... pumpkin ... and puréed legumes"* (Ministry of Health, 2008).

Society has moved on but children's needs have not - and will not - 'move on'.

And yet when it comes to parenting practices such as parental/non-parental care, which infringe upon our adult professional freedoms, society seems to actively retreat from constructing any framework that may be construed as a hierarchy of optimum to less optimum practices. No matter how uncomfortable, New Zealand needs a framework to make *fully* informed decisions about its children's wellbeing.

While there is consensus that more children are in institutional childcare than ever before, there is little open discussion, nevertheless agreement, as to how this may affect the children. Daycare may be fulfilling an economic need and an adult need but this is not all the same as fulfilling the child's needs. Society has moved on ... but children's needs have not - and will not - 'move on'. Consideration of daycare continues to be dominated by the feelings of the parent, not the wellbeing of the child.

There is a growing demand and sense of entitlement to so-called 'affordable daycare'. Yet this is clearly an oxymoron.

More and more children are having their behaviour and emotions molded (or not) at younger ages by people who are paid to care for them, but who do not love them. At the same time, there is a growing problem observed in the behaviour and emotional make-up of children of all ages, and we have to consider how these early child-rearing experiences may contribute to this.

These thoughts may be uncomfortable and may arouse guilt, but they must stop being elevated and therefore almost dismissed as political debates or, on the other hand, merely lifestyle choices.

There is clearly a presumption of a right to a so-called work/daycare balance for parents of young children, while the starting point should clearly be child wellbeing, not a 'balance'. There is a growing demand and sense of entitlement to so-called 'affordable daycare'. Yet this is clearly an oxymoron. Meeting the needs of a young child is expensive, labour-intensive and talent-dependent: ongoing eye-to-eye contact with a child in care costs time and money. Mary Poppins is more expensive than a place at the Anytown Daycare Centre.

Stay-at-home parenting and common sense don't have an economic lobby group.

Research continues to purportedly answer the question: is there any real difference between a biological mother and a paid carer at an institution? And in attempting to answer this, it often seems there's an entire industry unrestrained by common sense. As someone once said: *"the truth belongs to those who commission it."* And stay-at-home parenting and common sense don't have an economic lobby group.

Mothers may have 'moved on', but children haven't. And that needs to be our reference point from now on. If we don't see parenting as important, it implies that we don't see children as important, and what will our children make of these values? Will they respect us as parents if we don't value the roles we occupy? How will this affect their self-esteem?

If we don't see parenting as important, it implies that we don't see children as important.

We must also pause and reflect upon the growing evidence for the intergenerational transmission of parenting, which *"is robust across diverse study samples, different types of measurement, different lengths of time, and after the introduction of a variety of control variables."* (Conger et al, 2009).

Female mammals raised with nurturing mothers have been shown to exhibit more nurturing and less anxious maternal behaviour in their turn. Transfer of maternal behaviour from one generation to another is thought to be an example of an epigenetic change, in which environmental influences [e.g. quality of a grandmother's mothering] cause chemical changes to DNA that lead to changes in the expression patterns of genes which influence the way the next generation mother cares for her child (Esel, 2010).

And so what might be the effects of intergenerational transmission of *non*-parental care by paid daycare workers to child?

Healthy child development involves far more than a couple of skill advantages, heightened assertiveness and a mere absence of problems.

Open Discussion

Beyond any steps that governments can take, parents everywhere can and should be made aware of the difference between sending their child to a daycare centre at the age of three months as opposed to the age of three years, and between their three-year-old going to daycare for nine hours a week as opposed to 35. Furthermore, common sense should dictate that babies and young children need a very low child-to-carer ratio (about one to three). And as with the government's more recent position lauding the superiority of breastfeeding over formula milk, they should take an equally clear stand commending the general superiority of child-rearing from birth to age four and a half by the child's own mother until it is proven beyond any doubt otherwise.

The first of many uncomfortable explanations may be that many professional working parents and an industrialised economy value 'skills' more than human and spiritual qualities.

Researchers and society must now ask why outcome measures of daycare have taken precedence over others. For example, 'school readiness', academic achievement and overt behavioural problems are highly prominent outcome measures in both academic publications as well as the popular media. There has been an accompanying desire for children to be more assertive and acquisitive. Yet healthy child development involves far more than a couple of skill advantages, heightened assertiveness and a mere absence of problems. It demands the *presence* of more abstract qualities such as empathy, compassion, consideration, patience, emotional self-control and social etiquette, which remain elusive and under-researched. The first of many uncomfortable explanations may be that many professional working parents and an industrialised economy value 'skills' more than human and spiritual qualities. And what of their children when they become parents?

The majority of mothers in New Zealand want to spend more time caring for their young children at home.

The majority of mothers in New Zealand want to spend more time caring for their young children at home. Perhaps 'measuring' the instinctive reactions of mothers to being routinely separated from their infants and toddlers is even more informative than purported 'evidence-based' methods of understanding such a deep long-standing complex phenomenon.

RECOMMENDATIONS

● Discussions of childcare must in future be uncompromising and honest with an exclusive focus on the wellbeing of the child. Such discussions should reflect a pronounced reduction in concern for the feelings of adults and the reaction of the media or pressure groups. As a rule of thumb discussion of daycare should cease communicating what is assumed adults are interested in and instead make judgments about what is likely to be in *children's* best interests.

● Sexual politics must be excluded in future considerations of child wellbeing. It should be incumbent upon policymakers to ensure that any discussion about child wellbeing is a discussion about *child* wellbeing, not about parental guilt, be it maternal or paternal.

● Terms, such as 'family-friendly policies', 'flexi-hours' and 'maternity leave' often amount to meeting the needs of the parent and the economy, not the child, and viewed as the 'progressive' reforms of a more civilised society. It must now be asked: civilised for whom, exactly? The child? New Zealand must engage in a clear consideration of values and set priorities involving economic imperatives, adult individualism, family and marital integrity to ensure child wellbeing is the main priority. Over-worked parents, extended childcare and increasing wealth do not confer strong marriages, good parent/child interaction, happy children and well-functioning families.

● New Zealand must understand the distinction between 'skills' and human and spiritual qualities, and decide which are more important to cultivate at the very early stages of child development.

● In planning *'An Agenda for Amazing Children'* the Ministry of Education's ECE Taskforce has announced: *"Total Government funding for early childhood education will be something over $1.5bn in financial year 2010/11. Government spending on early childhood education has almost tripled in the past ten years…continues to increase, and has recently done so at unexpectedly high rates…This does not necessarily mean that this expenditure is not a good investment."* (ECE Taskforce, 2011). The current bias, whereby the government invests in professionals to care for New Zealand's children while offering no tax breaks or economic incentives for parents who sacrifice careers and income to be full-time carers for their young children, should be revised to reflect a default position of parents generally being superior carers for their own children in comparison to paid carers, particularly at an institution.

● New Zealand allows 14 weeks paid parental leave in order for mothers to recover from pregnancy and childbirth and for babies to bond with mothers. And while the Ministry of Health clearly states, *"Exclusive breastfeeding is recommended until babies are around six months"*, this is at odds with a 14-week period in which to establish a breastfeeding and daily routine, and then return to employment while the infant is placed in a childcare centre. Paid parental leave must be extended considerably.

● Full-time parenting should be seen as a *'child's right'*. Parents should not be compelled to compromise good parenting because they have to work full-time to survive financially. This is even more important for single parents. Government policy and spending should enable parents to be physically present for their children so that the children are raised in the best environment possible. Such an approach should involve in-home support programmes to afford parents a break.

Over-worked parents, extended childcare and increasing wealth do not confer strong marriages, good parent/child interaction, happy children and well-functioning families.

New Zealand must engage in a clear consideration of values and set priorities involving economic imperatives, adult individualism, family and marital integrity to ensure child wellbeing is the main priority.

● The status of full-time motherhood has been relatively low. Mothers have been undervalued. Therefore, New Zealand should undergo a timely and long overdue re-evaluation of motherhood. Questions should be asked as to why society has been celebrating the liberation of woman from her own evolutionary history instead of acknowledging and appreciating her unique, inherent, unrivalled power in advancing her child's wellbeing? Why has motherhood not been viewed as an incomparable responsibility carried out by a gender with awe-inspiring qualities? If we are so concerned about sexism and being sensitive to women's feelings about their choices, why must the negative feelings - the guilt - of some working mothers take precedence over supporting the feelings of stay-at-home mothers? Measures should be adopted to enhance the feelings of full-time mothers with the same vigour and social marketing acumen that has been applied to other forms of public persuasion such as 'embracing multiculturalism and diversity'. Redressing 'full-time motherism' should be at least as important as campaigns to redress 'racism'.

Why has motherhood not been viewed as an incomparable responsibility carried out by a gender with awe-inspiring qualities?

● Policy discussion of the *quality* of care should not be used to override or distract attention from the unavoidable fundamental issue of the *quantity* of care: how many hours per day/week/month/year and at what ages children attend daycare.

● The age at which a child starts (for example, three months versus three years old) and the number of hours a week in question (six versus 30-plus) should be unpackaged and considered important components of any public discussion of daycare. As a general stance, unless there are special circumstances, it should be assumed that the earlier a child starts in daycare, the more changes they experience in daycare arrangements and the more hours per day/week and years they attend, the more pronounced any unfavourable effects are likely to be.

Why must the negative feelings - the guilt - of some working mothers take precedence over supporting the feelings of stay-at-home mothers?

● Unfortunately, there is not as yet a 'recommended daily allowance' or dose of daycare, but common sense should enable society and parents to decide what is and isn't good for young children.

And so, the burden of proof for the proposition that paid careworkers can provide all the necessary qualities for young children must in future fall entirely upon the proponents of daycare. When it comes to an issue of such fundamental importance, until there is clear overwhelming evidence to the contrary, we must assume that 'Mother knows best'.

Until there is clear overwhelming evidence to the contrary, we must assume that 'Mother knows best'.

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Family First NZ is a charitable organisation registered as a Charity with the Charities Commission and was formed in 2006. Its purposes and aims are:

- to promote and advance research and policy regarding family and marriage
- to participate in social analysis and debate surrounding issues relating to and affecting the family
- to produce and publish relevant and stimulating material in newspapers, magazines, and other media relating to issues affecting families
- to be a voice for the family in the media speaking up about issues relating to families that are in the public domain.

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