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Chapter 3

NIGHT-TIME INFANT CARE: CULTURAL PRACTICE, EVOLUTION, AND INFANT DEVELOPMENT

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INTRODUCTION

Human infants are the most neurologically immature of all primates at birth, Compared with other mammals, we exhibit an unusual mixture of altricial and precocial traits (Martin 1992). Among nest-building mammals (known as 'cache species'), the reproductive pattern is to give birth to large litters of premature infants whose eyes and ears are undeveloped, and who--lacking in hair or fur--huddle together for warmth, spending a period of days or weeks sequestered in hiding while the mother forages. Such infants experience a period of external gestation in the nest. To avoid attracting the attention of predators, these infants are silent when the mother is absent, and only defecate when the mother returns to the nest and stimulates them to do so. Caching species feed their infants once per day with milk that is dense in fat which satiates the infant for many hours. In these species, infants are known as altricial. In contrast, precocial mammals' infants are born singly, or in small multiples, in a neurologically advanced state. Not only are their eyes and ears functional at the point of birth, but they can muster co-ordinated neuromuscular control within a short period following delivery. Precocial infants can take to their feet and follow their mothers, or cling to her body and be carried—alerting her with cries if they are separated. They suckle frequently and of their own volition when hungry. In these species, milk is thin and watery, high in calories (lactose) providing energy, but low in fat. Humans are clearly descended from species with precocial infants (Small, 1998). Our infants are born with their senses well developed, and like other precocial infants, they cry to if separated from their mother. The composition of human milk is that of a precocial species – low in fat and protein but high in carbohydrates--it is milk designed for infants who can maintain a close proximity with the mother via their own activity (clinging or following)--yet human infants lack the neuromuscular control to either cling to their mother or run after her. In this sense, they are 'secondarily altricial', that is at birth they are less developed than would be expected in comparison with the typical primate

pattern of brain development (Small, 1998). The explanation for this phenomenon is easily found by considering the sequence of events during the course of human evolution.

The mosaic nature of our evolutionary history reveals that those traits characterising us as 'human' and thereby separate from other primates – our bipedal walk and our expanded brains – arose at different points in our evolutionary history. Bipedalism was first, appearing in the fossil record up to 5 million years ago; our ancestors remained small-brained bipeds for several million years. Around 2 million years ago the fossil record reveals the beginning of encephalisation – increase in brain size – which appears to have occurred gradually over time. This gave rise to what is known to biological anthropologists as the 'obstetrical dilemma' involving a conflict between two selective forces driving evolutionary change (Rosenberg, 1992; Rosenberg and Trevathan, 1995). Hominins (our bipedal ancestors) had developed narrow pelves for efficient bipedal locomotion, but as the genus *Homo* diverged from other hominins via increasing encephalisation, childbirth became problematic. The solution to the dilemma regarding the delivery of the head of a large-brained hominin through the pelvis of a bipedal hominin resulted in a compromise: infants were born before brain development was complete. By comparing gestation length, birth weight, adult body size, and adult brain size across a wide range of mammals, Martin (1992) has calculated that the human gestation period should be around 21 months in length – but no human mother could physically give birth to an infant with a head the size of a 12 month old infant. The solution to the obstetric dilemma was the truncation of the gestation of human infants who are born at the last possible moment while the head will fit through the pelvis. The consequence of this compromise is that human infants must complete a foetal brain growth trajectory during their 1st year of life, after which brain growth slows and tapers off as adult brain volume is approached. Human infants, therefore, are born with only 25% of their adult brain volume, compared with greater than 50% in other primate species. This explains the human infant's curious mix of precocial and altricial traits. Sight and hearing are well developed as these are in place early in development; however the neurological control of muscular function and co-ordination does not develop until several months following birth—causing human babies to be secondarily altricial. By 12 months of age, when human infants are gaining control of their balance and begin to take their first tentative steps under their own control, they achieve the developmental stage at which truly precocial mammals are born.

Consideration of the human neonate from this evolutionary perspective reveals several important features of its development which have far reaching consequences for human infant care. The first concerns the nature of human milk, which is low in fat and less dense than that of species who cache their infants in nests. As human milk provides few calories per feeding, this indicates that humans conform to the evolutionary pattern of 'on-demand' feeders, where infants nurse frequently throughout the day and night. In order for such on-demand feeding to be effective, mothers and infants must be in close proximity to one another both night and day – an important facet of human infant care-giving which is often overlooked in post-industrial Western societies where infants are routinely separated from their mothers for sleep (Lozoff and Brittenham, 1979). This fact led McKenna (2000) to state that so entwined is the biology of mother-infant co-sleeping with nocturnal breastfeeding that any study that purports to understand biologically normal infant sleep without understanding how these two activities interrelate socially and biologically must be considered incomplete. But it is not simply food that drives the infants' need for physical contact with its mother.

The importance of physical contact on the development of infant monkeys was firmly demonstrated by the experiments of Harlow and colleagues in the 1950s and 1960s (Harlow, 1959; Blum, 2002). More recently, experimental work has revealed that among human and other mammalian infants the most fundamental systems such as breathing, arousal patterns, heart rate, sleep architecture, and thermoregulation are affected by the presence or absence of parental contact (Fardig, 1980; Korner and Thoman, 1972; McKenna, 1990; Stewart and Stewart, 1991; Christensson et al., 1992; Fransson et al., 2005). The human infant's unique evolutionary history makes this even more critical – requiring an external gestation period involving in-arms care and close physical contact with their caregiver day and night for the first few months of life (Hrdy, 1999; Small, 1998). The fact that close caregiver contact is crucial at night as well as during the day means that the species-wide, normal context of human infant sleep is social – that human babies are designed to expect close maternal sleep contact.

CROSS-CULTURAL PERSPECTIVES ON NIGHT-TIME INFANT CARE

> …We must accept that the modern Western custom of an independent childhood sleeping pattern is unique and exceedingly rare among contemporary and past world cultures. (Crawford, 1994: 46).

In those societies with a strong Euro-American influence, the moment of birth is commonly viewed as the beginning of autonomy for a baby who is no longer connected to the mother. Early independence is a developmental goal to be achieved rapidly by infants, particularly at night. However, the majority of the world's cultural groups practice some form of parent-infant sleep contact as traditional or normative practice. Most of the world's mothers cannot conceive of any other way to sleep their baby than by their side– and in fact some argue that to separate an infant from its mother for sleep is abusive or neglectful treatment (e.g. Morelli, 1992). Cross-cultural and inter-country surveys, ethnographic descriptions, and epidemiological case control studies have all contributed to the knowledge of infant sleeping arrangements worldwide. Because of their different research paradigms and goals, the outcomes of these various investigations sometimes present a confusing picture of normative behaviour in any given location and at any given time. It is clear, however, that private bedrooms for children are the exception rather than the rule around the world (Jenni, 2005). Barry and Paxson's (1971) cross-cultural survey has often been cited as defining the normative pattern of infant sleeping arrangements worldwide. This review of 127 cultural groups for whom ethnographic reports were available attempted to code and quantify sleeping arrangements for infants based on ethnographers' descriptions and found that in 79% of the societies examined infants normally slept in the same room as their parents, with 44% sharing the same bed or sleeping surface. A more recent study conducted using the HRAF probability sample (Nelson et al., 2000) uncovered references to sleep contact in 25 of 53 societies for which infant care information was available, and reported that placing infants in separate rooms at night was unusual.

In reviewing the effects of environment and climate on child care practices, Whiting (1981) argued that infant care practices (including sleeping arrangements) are not distributed randomly across the world. He described several traditions in infant sleeping arrangements.

!Kung infants were carried in a sling on their mother's body during the day, and slept on a cloth on the ground beside the mother (Konner, 1976, cited in Whiting, 1981) which Whiting considered typical for 'African infants'. In Eurasian societies with a 'cradle culture', the cradle was a device in which the infant was transported during the day, and in which it slept at night (e.g. Lewis and Ban, 1977, cited in Whiting, 1981). Hammocks often replaced cradles as receptacles for infant sleep in the Middle East, while in China, Japan, India and Southeast Asia infants were carried and slept during the day in a shawl or sling on their mother's bodies, and at night they slept in the family bed or sleeping platform. This pattern was also typical of societies in islands of the Indian and Pacific Islands. Hogbin (1943, cited in Whiting, 1981) described New Guinea infants as sleeping at night enfolded in their mothers' arms on the floor. Infant care in North America was reportedly similar to that in Eurasia with the use of a cradleboard which was strapped to the mother's back when carried, and leant against an object to keep it upright when not being carried – contrasting with the Eurasian cradle in which the infant was positioned horizontally. Throughout South America, infants were carried in slings during the day and again slept in their mother's bed at night, although in some places hammocks were used for infant night-time sleep. In the very south of the Americas (Patagonia), the cradleboard again appeared and was used both for infant carrying and sleeping. The geographic distribution of these infant carrying and sleeping practices led Whiting to conclude that infant care practices were closely related to climatic isotherms: mothers sleeping with their infants on shared beds or mats in 85/91 cases where winter climate was hot or mild (>=10^{o}C); fewer sleeping together (29/45) in situations where winter temperatures fell, on average, below 10^{o}C. In the remainder of these cultures, infants slept separately in a crib or cradle.

It must be borne in mind that cross cultural surveys, such as those cited above, are limited in scope and unsystematic. In many cultures, private sleeping arrangements have been unavailable to – or simply overlooked by – ethnographers, with only 44-46% of cases in the standard ethnographic sample being rated reliably, and with variation found between different authors' rating schemes. They do, however, provide a general picture that mother-infant sleep contact is more common around the world than sleep separation, even among those societies where a harsh climate means infants may be separately wrapped and transported during the daytime.

Infant and child sleep behaviours in small scale traditional societies were recently reviewed by Worthman and Melby (2002) while Jenni and O'Connor (2005) have summarised the literature on culture and children's sleep in industrialised and complex modern societies. Although one might assume that parental attitudes to infant sleep may be similar in those societies with a strong Euro-American influence, it is interesting to note the inter-cultural differences between parenting practices even here. Italian parents, for instance, who prefer to have infants sleep in their rooms, are reported by Wolf and colleagues (1996) to consider the American norm of putting children to bed in separate rooms to be "unkind".

The practice of prolonged physical contact with the care-giver is a common theme in reports of infant care cross-culturally, particularly during the transition from wake to sleep, and during sleep. Morelli (1992) found that in Mayan families infants commonly fell asleep in someone's arms and were taken to bed with their parents, sleeping with their mothers from birth to 2 or 3 years of age, or until the birth of their next sibling. For Mayan families, sleeping alone was considered undesirable and mothers responded with shock and disapproval at the American custom of sleeping infants in rooms on their own which they felt

was neglectful. In Balinese society, Margaret Mead (cited by Jenni and O'Connor, 2005) reported that infants were held continuously day and night, and that being alone for even brief periods of sleep was undesirable at any age, but that infants and children were particularly vulnerable to spirit risks during sleep. Recent ethnographic reports reinforce similar themes. Liamputtong Rice and Naksook's (1998) examination of child rearing practices among Thai mothers in Australia revealed that infants were routinely in the presence of adult company, particularly at night-time, with 80% sharing their mother's bed. Likewise for Native Brazilian Terena children sleeping in the same bed with family members was customary practice and reflected the high values attributed to family links in the Terena culture (Reimao et al., 1998). Even within societies where Euro-American parental aspirations for infant independence may dominate, cultural sub-groups still persist with traditional infant sleep practices that run counter to the dominant child-rearing ideology. Abbot's (1992) study of rural Appalachian families in Eastern Kentucky in the US, for instance, emphasises how family solidarity is reinforced by physical sleep contact during infancy and childhood.

In contrast to the tendency in the post-industrial West to cast the role of the caregiver as promoting and fostering infant independence, in Japan the converse perspective prevails. Here, the infant "is seen as a separate biological organism who from the beginning, in order to develop, needs to be drawn into increasingly interdependent relations with others. In America, the infant is seen more as a dependent biological organism who, in order to develop, needs to be made increasingly independent of others" (Caudill and Weinstein, 1969: 72). In re-examining the sleep practices in US and Japanese families, Latz and colleagues (1999) discovered that many more Japanse than US children (aged 6 to 48 months) regularly slept with their parents (59% vs 15%, $p<0.001$). Likewise, in Korean (Lee 1992) and Chinese (Nelson and Chan 1996) families parent-infant sleep contact is normal and common.

CHANGING NOTIONS OF INFANT SLEEP IN WESTERN POST-INDUSTRIAL SOCIETIES

> Co-sleeping, parents and children sharing a bed at night, does work well, but chiefly, it seems, in other societies. In a society like ours which stresses the development of independence and the importance of privacy, co-sleeping is associated with a wide range of problems. (Eisenberg et al., 1989)

Many parents in Western (and Western-influenced) societies believe that babies should be separated from them at night to encourage independence and preserve their safety – to sleep with them is argued to be irresponsible and dangerous. The adoption of this view, however, appears to be only a relatively recent cultural development. Less than two centuries ago, mother-infant sleep contact was the norm in Euro-American households (Hardyment, 1983). In the wake of the industrial revolution, increasing wealth for firstly the middle and then the working classes led to changes in living conditions; initially houses with a room for sleeping separate from the main living area, and eventually separate bedrooms for most inhabitants of the house. When space for separate sleep locations was coupled in the 1920s and 1930s with the popularisation of behaviourist childrearing strategies, which emphasised the self reliance of children and the withholding of affection by parents, solitary infant sleep

became a desirable goal in post-industrial societies (Hardyment, 1983). This was the era when the primary discourse of childrearing revolved around independence, self-control and self-reliance. The goal of parenting was to encourage the child to stand on its own feet, with no help from anyone. Advocating uncompromising programmes of infant physical and psychological development, early twentieth century infant care 'experts' such as John B. Watson and Frederick Truby King (Hardyment 1983) hugely influenced post-industrial attitudes to infant care – even though their approaches were largely discredited in their own lifetimes. Hardyment (1983:165) comments that, "their influence, discredited or not, still lives on underground….remain[ing] in the basic assumptions of grandmothers, it probably lingers uneasily in the earliest impressions of many of today's mothers".

Synonymous with 'progress' and 'upward mobility', the provision of a separate nursery for a new infant became obligatory in middle-class US and UK households, and in the space of a generation, became the norm for night-time infant care. Nowadays, many parents in Anglo-American households view the preparation of a separate room in which the infant will sleep as a necessary and 'traditional' ritual during pregnancy. However, it is a custom which has a relatively short history and is of little or no immediate advantage to the infant for whom it is lovingly prepared. Likewise, middle-class German infant sleep practices reflect parenting values and beliefs associated with their specific culture (Valentin, 2005), with infants largely sleeping in a separate bed in their own room, often with transitional objects for company, and bed-time rituals featuring lullabies. Valentin traces the origin of these ideas and practices in Germany through the influences of Freud (prevention of trauma associated with observation of sexual activity), Nazi ideology (which discouraged emotional attachment of children to parents) and Benjamin Spock (who advocated that children cry themselves to sleep for as long as necessary) – identifying a 'cult of independence' in German childrearing practices and de sires. Sharing sleep contact with ones' child is considered to be 'spoiling' him, and the fear of making parenting errors and thereby 'destroying the life of their child' (p.271) was a common theme for German parents.

Within societies where western post-industrial infant care ideologies dominate, stark contrasts can arise between the infant sleep practices of indigenous cultural groups and those of the majority culture. Infant care practices relating to sleep came under close scrutiny in New Zealand following the various publications of the New Zealand Cot Death Study (Mitchell and Scragg, 1993; Scragg et al., 1993; Mitchell et al., 1994; Scragg et al., 1995; Scragg and Mitchell, 1998) which identified bed-sharing with parents who were smokers as increasing the SIDS-risk for infants. Within the New Zealand cultural landscape, bed-sharing is a complex issue. Inter-ethnic similarities and differences and intra-ethnic tensions around the issue of infant sleep were explored for Maori, Tongan, Samoan, Cook Island, Niuean and Pakeha (European) cultural groups in Aukland, NZ by Abel and colleagues (2001). They found that Pacific cultural groups favoured sleep contact with infants while European-derived New Zealanders favoured infants sleeping alone, however there were differences and tensions between island-raised and NZ-raised Pacific care-givers in their practices. The underlying cultural ideals regarding healthy personal development in early life were particularly crucial to understanding the desirability of shared or separate sleep environments for infants: Pakeha parents favoured Western notions of increasing the independence and autonomy of their infants, while Pacific parents generally favoured interconnectedness as the best means for fostering an infant's physical, moral and spiritual development (Abel et al., 2001). Along with differing ideologies, practices also differ with bed-sharing Pacific Island infants being placed

to sleep on top of their parents' bed-covers, rather than in the parents' bed as is the practice for infants of other groups (Tuohy et al., 1998).

Similar contrasts can be observed in comparing the infant care practices of immigrant groups to Northern Europe with those of native Europeans. Even within a relatively small nation such as the UK, much cultural variation in infant sleep exists due to both the diversity in cultural practices of immigrants to the UK, and variations in parenting style within the native UK population. Gantley and others (1993) documented the diversity of infant care practices in Cardiff between Bangladeshi and Welsh mothers. Bangladeshi infants were consistently cared for in a sensory rich environment, including sleeping close to other people both day and night. In contrast, Welsh infants experienced alternating periods of intense sensory input and deprivation with long periods of lone quiet sleep emerging as a culturally desirable goal for infants – as was encouragement of sleep independence at an early age. Although Gantley and colleagues included no statistics on the frequency of bed-sharing families in their sample, such data were published following a survey on infant care practices in Birmingham (Farooqi, 1994). This study determined that, based on the responses of 374 mothers who completed a questionnaire issued at a large District General Hospital, 36% of Asian infants slept in their parents' bed compared with 11% of white infants. Furthermore, 33% of white infants were reported to sleep in a separate bedroom, compared with only 4% of Asians.

A cross-cultural comparison of Sami and Norwegian children (Javo et al., 2004) challenges the belief that solitary sleep is positively correlated with independence. Significantly, more Sami than Norwegian children slept with their parents, yet Sami children were observed to be significantly less demanding of their parents' attention during play than their Norwegian counterparts. Interestingly, a report of the Norwegian SIDS study (Arnestad et al., 2001) documented that since 1993 co-sleeping had emerged as a more common mode of sleep for Norwegian infants and attributed this to a campaign at the beginning of the 1990s to increase breastfeeding in Norway which encouraged co-sleeping, as this would bring the mother and infant closer, so making night breastfeeding easier. In Sweden, 23% of 3 month old infants were found to regularly bed-share with their parents (Lindgren et al., 1998); 25.9% of exclusively breastfed infants were regularly sleeping in the same bed as the parents compared with 11.3% of formula-fed infants ($p=0.001$) while 20.3% of partially breastfed infants regularly slept in the same bed as the parents. This relationship between breastfeeding and close sleep contact has repeatedly emerged in many studies, as mothers in Western post-industrial societies that had lost the traditions of breastfeeding and sleep contact with their infants rediscover their importance, and their interconnectedness.

INFANT SLEEP LOCATION IN THE UK: THE INCREASING IMPORTANCE OF BREASTFEEDING

Prior to the infant sleep research conducted in the North-East of England by Ball and colleagues (1999, 2000), parent-infant sleep contact was not considered to be part of mainstream British parenting ideology (Davies, 1994) although little research had explored the extent to which actual parenting practices supported this assumption. Our initial work demonstrated that previous surveys had generally under-reported bed-sharing prevalence by

failing to determine all of the places that babies slept during the night– and that parents were likely to report in such studies only the places where their baby was 'supposed' to sleep, or where s/he began the night, but not their actual sleeping strategies – particularly if parents suspected their practices were not the norm (Ball et al., 1999, 2000; Hooker et al., 2000).

In a subsequent study of 253 families in the same geographical area, comprising an ethnically homogeneous sample of native white Britons, we found a strong association between breastfeeding and mother-infant sleep contact (Ball, 2002, 2003). This relationship is a predictable one – breastfeeding mothers who sleep with their infants are able to nurse with a minimal amount of disruption, and without either of them fully waking, a finding compatible with the reports of Mayan mothers (Morelli et al., 1992) who claimed that they generally did not notice feeding their babies in the night, and Elias and others (1986) who found that very high proportions of American La Leche League mothers regularly slept with their infants. This strategy for night-time feeding was utilised by 72% of mothers in our study who breastfed their infants beyond the first month, compared to 38% of mothers who either formula fed, or breastfed for less than a month. Mothers who initiated breastfeeding but gave up during the early weeks had expectations for their infant's sleep development that were inconsistent with the biological reality of sleep for a breastfed infant, and which conformed to the developmental pattern of sleep among formula-fed infants (Ball, 2003). When their breastfed infants did not 'sleep through the night' these mothers were unwilling or felt unable to continue with nocturnal breastfeeding and began supplementing their infants with formula-milk in order to promote longer bouts of night-time sleep, citing their own tiredness, their desire to have their partner help with night-feeds, and the needs of other children as rationales. In contrast, new mothers who had discovered the ease with which they could nurse at night when bed-sharing indicated that they persisted with breastfeeding for much longer periods than they might have done otherwise (Ball, 2003).

We discovered that UK mothers who slept with their infants for the ease and convenience of breastfeeding did not generally sleep with their babies all-night every night. Babies slept in a variety of places, often beginning the night in a cot or crib in their parents' room, and being moved into the bed when the parents went to sleep, or in the early morning hours. Only by asking parents to enumerate (via sleep logs) all the different places where their babies slept over a period of several nights were we able to build up a picture of parent-infant sleep contact in the neonatal period – and only by repeating the process in the babies' 3rd month of life were we able to identify how bed-sharing behaviour changes over time. The picture revealed of bed-sharing being most prevalent among neonates was confirmed by a comparative analysis of data from the control sample of the nationwide CESDI study (Blair and Ball, 2004).

Breastfeeding was the most prevalent, but not the only reason for bed-sharing discovered in our research. Some UK parents sleep with their babies for other reasons such as the enjoyment of close contact (particularly if apart from the baby during the day); to monitor the baby when ill; to help settle a fractious baby; or because they have no alternative sleep space available (Ball, 2002). These diverse motivations for bed-sharing indicate that all parents are potential bed-sharers; that bed-sharing may sometimes be unplanned; and may not always be practiced out of choice—with obvious implications for the dissemination of information regarding safe bed-sharing practices.

We concluded from our research that the reality of parenting a newborn infant causes first-time parents to implement night-time care-giving strategies that they had not previously

contemplated. Bringing the baby into their bed to sleep was described as an 'intuitive' strategy by many new parents. In fact, many parents explained their change of opinion regarding sleeping with their newborn because "it just felt like the right thing to do" (Ball et al., 1999). Experienced parents, who had much more realistic expectations regarding infants and sleep, generally followed the strategies that had worked with their previous child(ren). The majority had previously slept with other infants and sometimes harboured severe anger or resentment towards third parties (health professionals, relatives, strangers) who voiced the opinion that parents and infants should not bed-share, feeling passionately that sleeping with their infant was 'natural'. Trevathan and McKenna (1994) summarized the results of 59 studies which illustrate why parent-infant sleep contact "feels like the right thing to do", ranging from the benefits of bonding and attachment, through frequent suckling, sensory cues which regulate breathing, physiological effects of touch (esp. skin to skin contact), to the soothing effects on infants of vestibular stimulation and maternal heartbeat. Although new parents were generally unaware of the range of developmental, psychological and physiological benefits accruing from parent-infant sleep contact, they were able to articulate that sleeping with their newborn reduced their anxiety regarding its safety at night, soothed their infant, minimized the effect of night-feeds on parental sleep, and enhanced their feelings of 'closeness' with their baby. The results of this research indicate that, despite receiving advice to the contrary (and holding opinions to the contrary in the prenatal period), new parents in our studies experimented with a variety of infant sleeping arrangements in the first few postnatal weeks. Once they had experienced bed-sharing the benefits to both themselves and their infants became obvious, and sleep contact emerged as a regular pattern of behaviour. Contrary to the opinion of Davies (1994) that bed-sharing is unfamiliar to the white ethnic majority of the UK, the results of our studies in the northeast of England indicate that parent-infant bed-sharing is a more prevalent practice in Britain than has been generally recognized.

INFANT SLEEP IN THE US: CONTESTED GROUND

In the US in the early nineties, it was widely believed that parent-infant bed-sharing was a minority (and in some senses a deviant) form of infant care-giving that received, and in some quarters continues to receive, a bad press. It was reported that parent-infant bed-sharing occurred more or less frequently within various ethnic groups (Lozoff et al., 1984; Askew et al., 1988), and that it was commonly associated with sleep problems in young children (Hanks and Rebelsky, 1977; Lozoff et al., 1985; Lozoff et al., 1996). The subtext of many of these articles implied that parent-child bed-sharing signified over-permissiveness (with intimations of neglect) on the part of the parents, lack of parental control, or else was a characteristic of social deprivation, and, therefore, an 'underclass' phenomenon to be discouraged and eliminated. In a study of Hispanic-American children, Schachter and colleagues (1989) reported a significantly greater prevalence of all night bed-sharing (21%) for urban Hispanic infants aged 6 to 48 months of age compared to white middle-American urban infants (6%). Although discouraged in recent US history, sleep contact appears to be increasing in prevalence. A telephone survey of random samples of night-time caregivers of infants under 7 months of age revealed that 45% of infants had spent some time in an adult

bed during the two week period prior to the interview, while the proportion of infants usually sharing a bed with an adult increased from 5.5% to 12.8% between 1993 and 2000 (Willinger et al., 2003).

At present, some US authorities argue that parent-infant bed-sharing is a questionable practice that should be abandoned by modern health professionals and parents because of health and safety concerns (Drago and Dannenberg, 1999; Nakamura et al., 1999; Scheers et al., 2003). However, those taking a broader view of human behaviour and infant development have shown that parent-infant sleep contact can be advantageous for the survival and well-being of human infants. McKenna (1990a, b) suggests that what evolutionary biologists call an "adaptive fit" exists between parent-infant sleep contact and the physiological vulnerabilities of newborns. With substantial physiological evidence, underpinned by evolutionary theory, McKenna demonstrates that parental proximity may help infants resist some types of SIDS (cot death) and promotes breastfeeding (see McKenna and Mosko, 1990, 1993; McKenna et al., 1990, 1997). He challenges infant care practices that ignore the infant's evolutionary history in favour of rapidly changing cultural practices, which promote the social best interests of the parents but not the biological best interests of the infant (McKenna, 2000). SIDS research continues to produce ambiguous results concerning the nature of the relationship between infant sleep location and risk of SIDS. There is now clear evidence from several studies that solitary sleep for infants in a room apart from their parents is a SIDS risk-factor (Mitchell and Thompson, 1995; Blair et al., 1999; Carpenter et al., 2004) and parents are advised to sleep their infants in the same room as an adult caregiver for at least the first 6 months of life. However, regarding sleep contact on the same physical surface there is disagreement. All epidemiological studies confirm that sofa sharing, and bed-sharing with parents who smoke, both greatly increase an infant's risk of SIDS. However, the issue of whether epidemiological studies have demonstrated an increased risk for the infants of non-smoking parents is contested (while no adequate data have yet been obtained to properly examine the question of SIDS-risk in the context of bed-sharing by non-smoking breastfeeding mothers).

DISCUSSION AND IMPLICATIONS FOR INFANT CARE

For the majority of mothers who sleep with their infants in 21st century post-industrial societies, the motivating factor is the link between bed-sharing and breastfeeding which has now been independently observed in many different studies (Rigda et al., 2000; Ball, 2003; Blair and Ball, 2004; McCoy et al., 2004; Quillin and Glenn, 2004). Video observations of bed-sharing breastfeeding infants indicate that they nurse more frequently, and for longer periods than breastfeeding infants who do not sleep in their mothers' bed (McKenna et al., 1997), but nonetheless routinely bed-sharing mothers sleep as much as solitary sleeping mothers, and rate their sleep more positively (Mosko et al., 1996; Mosko et al., 1997). Breastfeeding mothers have also been observed to sleep in a characteristic (seemingly instinctive) manner that appears to confer several safety benefits for the infant (Ball, 2006), and in our most recent research on the effects of sleep proximity on breastfeeding initiation, conducted on the post-natal ward of a large regional hospital with mothers and infants on their first two nights following delivery, we have demonstrated that unhindered night-time

contact between mothers and babies significantly increases the frequency of nursing bouts during the night (Ball et al, 2006). Regardless of the SIDS debate there is a growing body of evidence that breastfeeding and bed-sharing form an interconnected suite of behaviours that became uncoupled in the recent history of certain European and European-derived nations, with dramatic consequences for breastfeeding prevalence, and consequently both infant and population health. As these societies now strive to encourage mothers to breastfeed their infants the issues regarding infant sleep location are brought dramatically into focus.

The ways in which parents sleep their infants is influenced by both culture and biology. In societies where the physical and physiological relationship between mother and infant has been fostered and retained, infants generally sleep in contact with or in close proximity to their mothers. In societies where mother-infant partition has been encouraged, and reinforced by means of artificial formula milk and the invention of consumer products that mimic the mothers' presence (rockers, pacifiers and so on), infants are more generally separated from their parents for sleep. In the latter societies, as the importance of breastfeeding is reaffirmed and breastfeeding prevalence increases, mothers are rediscovering and adopting infant sleeping practices that are compatible with frequent night-time breastfeeding. Currently, however, bed-sharing in the post-industrial West is a hugely variable practice, the safety of which is dependent on beds and parents, motivations and environments. Without prior consideration and appropriate guidance regarding the potential hazards to infants of various aspects of the 21st century adult sleep environment parents may not be aware of the gradient of safe and unsafe ways to share sleep with their infant. Ignorance of safety precautions is not a legitimate reason for denying parents and infants the experience and benefits of sleep contact, however. Parents are routinely provided with guidance on how to preserve their infants' safety in environments with far greater lethal potential than their mothers' bodies (cars for example), so surely safe bed-sharing guidelines are not impossible to devise. The evolutionary trajectory of human infancy leads directly to the mother's body as the primary environment in which her infant's development should occur, and infants worldwide sleep safely in their mothers arms. After an absence of several decades, Western infants, it seems, are coming home.

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