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An investigation into practices and effects of parent-infant cosleeping

Elaine Hooker

A thesis submitted to the University of Durham in accordance with the requirements of the degree of Doctor of Philosophy in the Department of Anthropology, University of Durham.

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Abstract

The data presented in this dissertation provides an insight into what happens to infants at night, particularly with regard to the controversial practice of taking a new-born baby into the parental bed to sleep. Generated via two interrelated projects designed to explore whether and if so how, parent-infant cosleeping was practised in Northeast England. The interview study presented in the first half of this thesis, obtained background information and qualitative data about what prospective parents expected, followed up by their ensuing experiences. Subsequently, direct observational techniques in the home environment, as detailed in the second part of this thesis, explored in more detail one practice that has become a topic of debate among academics, health professionals and parents, cosleeping or bed sharing. This research, involving in-home video recording of triadic and dyadic cosleeping, was the first of its kind.

Results from the interview study confirm that parents pursue a heterogeneous array of night-time parenting strategies but that 65% of the sample had coslept and that breast-feeding was a prime motivator for cosleeping. The most important result from this study was that infants were being brought into bed with both parents. This study has shown that cosleeping is a relatively common parenting practice in the UK. The video study confirmed that cosleeping environments are diverse but that its effect on sleep was moderate. Differences were observed between dyadic and triadic nights concerning orientation and proximity of infants to both parents and infants who were breast-fed favoured the side sleeping position whereas those who were bottle-fed tended to sleep supine. The presence of the father in the bed had few effects on the mother-infant dyad. This study is an initial step towards providing information to ensure safe cosleeping environments for all infants and joins a growing body of multidisciplinary enquiry into a natural parent-infant sleep environment.

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Author's Declaration

I declare that the work in this thesis was carried out in accordance with the Regulations of the University of Durham. No part of this thesis has previously been submitted for a degree in this or any other University. This thesis has not been presented to any other University for examination in the United Kingdom or overseas

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Signed: K Hooker ***Date:*** June 2001

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Dedication

This thesis is dedicated to the memory of my parents:

Walter Pugh ***b June 1923 – d May 1973***

Joyce Pugh ***b May 1926 – d Dec. 1973***

The pattern for life that you gave to me has been sustained throughout an adult life without you. Even in death you have shaped my life. My memories, although often poignant, reflect the love we shared and you are with me still…….

Your children are not your children.

They are the sons and daughters of Life's longing for itself.

They came through you but not from you

And though they are with you they belong not to you.

Kahlil Gibran 1883-1931: *The Prophet* 1923 'On Children'.

Chapter 1

Introduction

In Euro-American society the moment of birth is frequently viewed as the beginning of autonomy for a baby who is no longer connected to the mother (McKenna 1995). Early independence is a developmental goal to be achieved rapidly by infants, and is also reflected in our perception of parenting skills (Spock 1976, Kagan 1984). Successful parenting is often gauged by proficient 'night-time parenting', particularly sleep management, where a 'good' baby is seen as one who sleeps right through the night. Less than a generation ago inexperienced mothers were told 'don't pick him up all the time', you'll spoil him' or 'leave her cry and she'll eventually go to sleep' (Newson and Newson 1966). But babies in other cultures are not indiscriminately left to cry themselves to sleep (Gantley et al. 1993) highlighting major differences in cross-cultural attitudes on infant autonomy.

In non-western cultures new-born infants generally sleep with their mothers (Barry and Paxson 1971). Infants are treated as an extension of the mother, generally being carried in a sling, which gives them continuous human contact as well as access to the breast (Liedloff 1975). However, in the West new-born infants are isolated for sleep in their own cot, often in a different room from their caregiver. A study of 126 families in the US determined that 74% of the children (aged between 6 months and 4 years old) slept in a crib in a separate room from their parents and that 55% had no adult company at bedtime (Lozoff, Wolf and

Davies 1984). Medical anthropologists are now questioning these paradoxical differences in infant care practices.

Some would argue that cosleeping (infants and their parents sleeping in the same bed) is a questionable practice that has been abandoned by modern health professionals and parents, because of health and safety concerns (Mitchell and Scragg 1993; Drago and Dannenberg 1999; Nakamura et al. 1999). However, those in favour, have argued that cosleeping may be advantageous for the survival and well being of human infants. McKenna suggests that what evolutionary biologists call an 'adaptive fit' exists between parent-infant sleep contact and the physiological vulnerabilities of new-borns (McKenna 1990). With substantial physiological evidence, underpinned by evolutionary theory, McKenna demonstrates that parent-infant cosleeping may help infants resist some types of SIDS (cot death) (McKenna 1990a, 1990b; McKenna and Mosko 1990c, 1993, 1994; McKenna et al. 1994, Mosko et al. 1996, 1997a, 1997b). 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. Risk implications of prolonged close contact between parents and their infants during sleep have generated much debate and led to confusion and concern among parents-to-be and health professionals. While parents who cosleep are adamant yet often covert in their strategies, health professionals and childcare experts have raised concerns regarding infant safety while cosleeping.

The cosleeping debate has intensified over the last decade with media interest and popular 'advice books' (e.g. Jackson 1990 and 1999) fuelling the controversy and increasing interest, all of which have added to the queries of doctors, midwives, health visitors and parents regarding the benefits or risks of cosleeping with new-borns. Cosleeping is not considered to be part of mainstream British or American parenting ideology (Davies 1994) but little research has demonstrated this. A variety of studies have examined parent-child cosleeping in toddlers and children (3-5 year olds) with sleep problems (Hayes and Roberts 1996), while others have examined cosleeping in older children with serious psychiatric problems (Rath and Okum 1995). A few researchers have used telephone surveys in an effort to gather quantitative data on cosleeping but these methods commonly fail to determine all of the places that baby sleeps through the night (Ball, Hooker and Kelly 1999.)

This thesis will describe and explore parent-infant cosleeping interactions via two interconnected projects, a prospective interview study (undertaken in 1995/6) and an observational video study (undertaken in 1997/8). The interview study was designed to discover whether, how and under what circumstances parent-infant cosleeping was practised in the local North Tees community. The information was collected by interviews examining attitudes and experiences regarding parent-infant night-time sleeping strategies from parents who were naïve to the cosleeping focus of the research. Following this, in an observational video study, I made infra red video recordings of cosleeping parents and their infants, in the home environment, to discover the characteristics and extent of behavioural

interactions between mothers and their infants and compare these with conditions and behaviours during triadic cosleeping, (i.e. when the father was also present in the bed). This research, which uses video recordings of triadic and dyadic cosleeping, is the first study to examine cosleeping in the home environment and report on the effect of the father's presence and behavioural interactions with his infant, and compare these with the interactions between the mother-infant dyad.

The thesis is arranged into 4 parts:

Chapter two reviews the literature concerning cosleeping, and other associated childcare practices, from anthropological, evolutionary, cross cultural and epidemiological perspectives. Chapter three describes and presents the results from the interview study. Chapter four describes and presents the results from the observational video study. Chapters five discusses the results from both studies in terms of parents' perspectives regarding cosleeping and the risks and benefits of cosleeping for the infant.

Chapter 2

General Literature Review

The evolutionary context for infant sleep

Viewed from the perspective of anthropology, cosleeping is clearly the characteristic form of mother and infant sleep for humans. The evolutionary paradigm predicts that our ancestors were adapted to sleep with their infants for protection, for close contact and for feeding. The only certain generalisation we can make about child care practices among our hominid ancestors is that they would have breast-fed their infants (otherwise they would have died) with babies presumably sleeping in very close contact to their primary care giver and food source (Eaton et al. 1988). The helplessness of human infants, which exacerbated the primate infants' need to remain close to a caregiver, came about because of an evolutionary conflict that occurred over 2 million years ago and doubtless claimed the lives of many mothers and infants. The increase in brain size, which followed the decrease in aperture and change in shape of the pelvis to permit bipedalism, meant that the fit between infant head circumference and space available in the birth canal became tighter (Rosenberg 1992). Selection favoured a delay of brain growth, making human neonates more helpless than other primates, being born with only 25% of their adult brain size compared with 45% for infant chimps. After birth human infant brain size more than doubles during the first year and by the age of 3 years the child's brain has grown to more than three times its birth size and is 75% of adult size (Trevathan 1987). The neurological immaturity of a human neonate impacts directly upon care giving practices required for human

infants who are extremely vulnerable during the postnatal period. It is an evolutionary derived necessity therefore that human infants have close and prolonged contact with their caregivers. Trevathan (1987) concludes that birth at such an early stage in development, no matter how advantageous, could never have been selected for had not the care taking behaviours of mothers been available to counterbalance the whole process.

Biological anthropologists Trevathan and McKenna have argued that, from an evolutionary angle, modern women have inherited from their ancestors "difficult parturition, helpless infants, naturally selective behaviours for responding to neonatal needs" (Trevathan 1987, p 238), one of which McKenna suggests is maternal-infant cosleeping (McKenna 1990).

Cross-cultural context

Mother-infant cosleeping is the normal sleeping practice for most 'traditional' societies (Barry and Paxson 1971) and some 'developed' or industrialised ones such as Korea (Lee 1992) and Japan (Caudill and Plath 1966). However, very little research has been conducted on the prevalence of cosleeping in the UK or US.

A review of the literature prior to 1987, a benchmark date due to the publication of a paper by McKenna which proposed that mother-infant cosleeping could prove to be protective from some instances of SIDS, indicates that there was little published research about the prevalence and practice of parent-child cosleeping, let alone parent-infant cosleeping. However, in a cross-cultural survey of child care practices

in 186 societies world-wide Barry and Paxson (1971) reported that 65% of the 127 societies surveyed practised parent-infant cosleeping on the same bed or sleep surface, while in the remaining 35%, infants slept in the same room as the parents but not the same bed. It was unknown for the 61 other societies whether infants slept in the same bed, although it was known that they shared the same room as their parents.

Caudill and Plath (1966) were the first to carry out extensive research on cosleeping with their now classic study 'Who Sleeps by Whom' in Japan in the early sixties. They expected cosleeping customs to be consistent with the interpersonal and emotional patterns of family life and hoped to dispel the western notion of Japanese cosleeping being linked to overcrowding. They interviewed 323 urban families in 3 different regions of Japan with the aim of clarifying parent-child cosleeping. The authors contacted families with 3-4 month old babies through well-baby clinics and in two neighbourhoods. What they discovered through extensive questioning, plus sketches of sleeping quarters, was that an individual in urban Japan could expect to sleep in close proximity to one or both parent, from birth to puberty, and with their own offspring after the birth of the first child. Sleeping alone appeared to be more commonly found between puberty and marriage and often accepted as necessary for a widowed parent. The authors argue that this style of parenting emphasises the very nurturing style of Japanese family life and derives from strong family bonds related to cultural values of interdependence (Caudill and Plath 1966).

One of the above authors went on to conduct a cross cultural observational study matching 30 Japanese mothers with 30 American mothers of 3-4 month old infants (Caudill and Weinstien 1969). Interested in how cultural differences are manifested in behaviour, they carried out their observations in the home environment of the infants. Unfortunately they chose to observe simple events that would frequently occur in both cultures i.e. infants vocalisation and the caretakers talking to the baby, rather than fewer, more dramatic events such as infant bathing or how it was put to sleep at night. Among the footnotes (no 25) of this paper, however, there is a description of cosleeping. All of the Japanese infants coslept with both parents and would do so for several years. Of the American sample 17 infants slept alone in a separate room, whilst the other 13 slept in a crib in the parents room but each of these parents planned to move the baby before the end of the infant's first year. Caudill and Weinstien concluded from the study that culture was the most important source of difference in the behaviour of both infant and caretakers.

As explained by Hanks and Rebelsky (1977), most of the early American studies into cosleeping involved psychiatric populations (e.g. Kaplan and Poznanski, 1974; Oleinick et al; 1966; Sperling, 1971) on the pretext that children should not sleep with parents as it aroused sexual anxiety. The interest generated by anthropologists, and the cross cultural comparisons involved with the Japanese studies led Hanks and Rebelsky (1977) to collect detailed descriptive data about the practices and attitudes of American parents towards cosleeping. Their aim was to determine whether there was a self-motivated objection by parents to sleeping with their children or a cultural taboo. Recruiting through nursery schools, day-care centres and food co-

operatives, they obtained a sample of 27 mothers that was relatively homogeneous in terms of education and life style (all middle to upper middle class). The age range of the 53 children belonging to these mothers was from two months to 13 years. Even with such a diverse age range the authors found (through questionnaires and interviews) that cosleeping did exist in the American middle class, although this mainly seemed to be occasional cosleeping. Two thirds of the children in the sample had begun to cosleep by the age of one or two years and many of the parents who had initially brought their infants into parental bed mentioned that breast-feeding was more convenient. The research of Hanks and Rebelsky (1977) began to establish that cosleeping happened in ordinary families raising questions about how and when it stopped and what the long-term consequences would be.

The academic interest in cosleeping continued with another American study conducted by Lozoff, Wolf and Davies in 1984. Sparked by her own observations of infant sleep management in other cultures (Latin America and Asia), Betsy Lozoff noted that infants were not expected to go to bed by themselves and did not sleep alone. After reviewing the anthropological literature Lozoff concluded that 'the American middle class was unique in putting the baby to sleep in a room on his own' (p 171). She felt this was a particular problem for paediatricians who were recommending infant care practices that differed from those in other cultures. With colleagues she embarked on a research project that would investigate cosleeping practices in urban families in the US. Enrolling 150 children with well care appointments (in private practices, well baby clinics and hospital services) in the

Cleveland area, they used hour-long interviews about sleep to obtain data. The final results were based on 126 children and although infants less than 6 months were enrolled, the team decided that their sleep patterns and practices were "disturbed and irregular" and therefore not included (p 175). They restricted their analysis to children over 6 months and under 4 years old.

Lozoff et al. (1984) used a fairly rigid definition for cosleeping practices, describing "never" as an isolated or extraordinary occurrence; "occasional" as more than once a month but less than three times a week; "frequent part night" as three or more times a week for part of the night and "frequent all night" as three or more times per week for all of the night. The main elements for distinguishing cosleeping were that it was recent, not exceptional for the family, and entailed sleep for both parent and child (p 174).

From what they described as a representative sample (similar demographic characteristics to the census data for that area), they identified several important issues regarding cosleeping in late infancy and early childhood. Firstly they identified that cosleeping was a recent and routine practice in 35% of white and 70% of black families (n = 96 whites and n =30 blacks). They noted that cosleeping had a number of problematic correlates in white families that were not apparent in black families; problems relating to low levels of education and occupational skills, family stress, maternal ambivalence to the child, and disruptive bedtime sleep problems. Many of the cosleeping families managed sleep time contrary to Spock's (1955) recommendations on sleep practices and contrary to some of his

recommendations on childcare in general. The authors identified a trend that suggested an increase in cosleeping in father-absent households but could not differentiate between black and white cosleepers or their non-cosleeping counterparts in the occurrence or duration of breast-feeding episodes. From the analysis they suggested that black parents slept with their infants regularly, as an accepted subcultural pattern, whereas among the white families it generally involved older children who could independently find their way into the parental bed (Lozoff, Wolf and Davies 1984).

Once Lozoff et al. (1984) had estimated the prevalence of cosleeping in the United States, and demonstrated that, contrary to paediatric recommendations, it was regularly practised, other paediatricians became concerned that western infant sleep practices were being imposed upon urban ethnic minorities. To assess the association between cosleeping and sleep problems Schachter et al (1989) replicated aspects of Lozoff's research among a sample of Hispanic Americans in New York. The primary caregiver from two hundred and ten Hispanic-American families with infants aged between 6 and 48 months was briefly interviewed (10 to 15 minutes) at well child clinic appointments. The Hispanic sample was matched with Lozoff's Cleveland sample of 83 white children for age, sex, and mother as primary care giver. Using similar definitions for cosleeping to Lozoff et al. (1984) they found that all night cosleeping was significantly more common among the sample of Hispanic-American families than among white American families. However, for occasional cosleeping they discovered no significant ethnic differences, with frequent part-night cosleeping being significantly less common in Hispanic families

than in the white American sample. Frequent all-night cosleeping in this sample was found to be associated with sleep problems, with cosleeping occurring mainly among toddlers and not infants. All night cosleeping was especially common among single parents living in multiple family households in the Hispanic-American sample. Concluding that cosleeping was often associated with sleep problems, Schachter et al. (1989) recommended that cultural diversity was only one factor to consider when giving advice concerning cosleeping.

More recently, comparative studies into infant sleep practices have been undertaken which have continued to focus on cultural variation (Morelli et al. 1992, Lozoff et al. 1996, Latz et al. 1999) while another has linked infant care practices, cultural variation and SIDS (Gantley et al. 1993). Morelli's (1992) study examined the cultural variation of infant sleep practices, whilst also determining the rationale behind the strategy employed, for a group of middle-class Americans and group of Mayan parents from Guatemala. Morelli and colleagues were particularly interested in parental attitudes regarding the consequences for children cosleeping or sleeping apart. The two groups involved came from very different environments with 18 middle class American mothers living in the city in contrast to 14 Mayan mothers who lived in a small rural town in highland Guatemala. The families were similar in number of children, number of first born in each family, mother's age, father inclusion and primary daytime caregiver being the mother but differed in educational standards (i.e. the American mothers had completed more years of schooling). To gather data on sleeping arrangements they used a similar method to the earlier Japanese cosleeping study, by asking parents to draw a map of their home

indicating position of rooms, beds and identifying where each person slept. More qualitative information was then gathered on the rationale behind their practices. The age of the infants involved ranged from birth to two years. Results show that all 14 Mayan mothers coslept with their infant (in the same bed) from birth up to 12-24 months whereas none of the 18 US slept with their new-borns. Fifteen American families opted to place the baby in a crib near the parents' bed (for up to 6 months then moving the baby to its own room) with 3 sets of parents choosing to place their new-born infants in their own room straight from hospital. There was also a marked difference in bedtime routines in that no bedtime routines existed for the Mayan families, babies were not coaxed to sleep but allowed to fall asleep when sleepy, usually in the presence of a family member. For the US families bedtime routines played an important part in the activities surrounding infant sleep time. After putting on night clothes etc. (Mayan families did not have specialised clothing for sleep) 10 of the 18 US families went on to read stories to their infant or invest time in preparing their infant for sleep, but then 11 of the 18, once in bed, were expected to fall asleep on their own. Important differences in night-time feeding arrangements were also discovered: for Mayan families feeding was on demand through the night and not an issue, as the infants were sleeping in the same bed and mothers did not fully wake to feed. The majority of American mothers did not feed in bed reporting that they had stayed awake during night-time feedings. The issue of night-time feeding will be discussed in more detail in the feeding and cosleeping section of this chapter.

In explaining their infant sleep practices most of the Mayan families considered their arrangements to be the only way for parents and their infants to sleep. This reflects cultural norms as Mayan families in general consider sleeping alone to be a hardship and would endeavour to find a sleeping companion if their regular one was away (Morelli et al. 1992; p 612). When told of the American way of placing an infant to sleep alone, responses of the Mayan mothers were of disbelief and disapproval, the practice was considered to be similar to child neglect. For the US families, although they had initially wanted to keep the baby close for mainly practical care giving reasons, they soon moved their infants to separate sleeping quarters (usually around 3-6 months after birth). The authors comment that these findings suggest that American parents encourage independence during infancy and consider it to be an important goal that they train infants to be independent. Another reported difference was the need for the American infants who slept alone to use security objects and bedtime routines to help them to sleep. The Mayan babies did not require any security objects and the authors note that from a cross cultural perspective these differing practices mean that some parents would rather their children become dependent on an object rather than a person. They conclude that the sleeping arrangements found reflect child-rearing objectives that in turn reflect cultural values for interpersonal relations.

The cross-cultural studies reviewed so far have demonstrated cosleeping exists as a cultural preference where values reflect interdependence rather than individual autonomy. Other contemporary studies have aimed to examine cosleeping in Western cultures in another context; its association with sleep problems.

Continuing interest in cosleeping led Lozoff et al. (1996) to examine whether cosleeping was associated with sleep problems in the US, paying particular attention on ethnic and socio-economic status (SES). With an urban sample of 186 families they looked at differences in the relationship between cosleeping and sleep problems in white higher SES, white lower SES, black higher SES, and black lower SES. The sample groups were fairly evenly divided (in order n=54, n=40, n=47, n=43) and each family had a healthy child aged between 6-48 months. Information on sleep patterns and practices, the child's behaviour and development and family structure was gathered a month before an interview was arranged. These were collected by parental report, with the comment that "although time lapse video recording and or prospectively collected diaries would have provided an additional perspective, these techniques were beyond the resources of the project" (p 10). The actual interview lasted approximately 30-45 minutes and was conducted by an experienced health professional at the child's well-child care appointment. Following the pattern of previous research (Lozoff et al., 1984) cosleeping was defined as parent and child sleeping in body contact with each other for all or part of the night (exact definitions of cosleeping can be found on p 14, paragraph 2). Stressful sleep problems were defined as regular bedtime protests, night wakings and parental-child conflict, distress and frustration.

As with other cosleeping studies Lozoff et al. (1996) found that attitudes and practices of cosleeping differed between ethnic groups, but they also found that it differed among the white population by SES. A much higher percentage of black

families than white reported some all night cosleeping (57% vs. 17%) but reports of part night cosleeping were very similar between ethnic groups (23-26%). Among the white sample the proportion of regular cosleepers was highest among lower SES families. The absence of the father did not seem to affect the results for either group. Regarding sleep problems, the results showed that regular cosleeping was associated with increased reports of night waking and/or bedtime protests among the group of lower SES white children. This trend was not found in the lower SES black children but was apparent in the higher SES black children. As for stressful sleep problems, these were reported more frequently by the white than the black cosleeping families. The black families involved did not associate sleep problems, bed time behaviour or night wakings with cosleeping. Lozoff and colleagues use their own and other cosleeping studies to argue convincingly that cosleeping and night wakings should be considered as 'normal' sleep practices and sleep problems, once they have occurred, are unlikely to be solved, with regular cosleeping. However, the authors insist that cosleeping has been universal throughout human evolution that the practice of cosleeping is common in many contemporary cultures and finally, that cosleeping is common among various ethnic and SES groups in the US. For these reasons Lozoff et al. (1996) suggest that health care professionals should respect family choices by examining the cultural context when cosleeping occurs to assess parental response to their children's sleep behaviour. The authors believe that this will allow paediatric health professionals to adjust any advice they give about cosleeping and sleep problems, which will lend support to parents in the sleep management of their young children.

Latz et al. (1999) used interviews of parents of healthy 6-48 month old children in Japan and United States to examine whether cosleeping was associated with sleep problems. Fifty-six Japanese parents and 61 white US parents were interviewed. All the children involved had been breast-fed and lived in two parent, middle class families. The American interviews were conducted by an experienced social worker at routine paediatric appointments for well children and took around 45 minutes. Latz herself, accompanied by a translator, with interviews lasting on average 1.25 hours interviewed the Japanese sample at home. The protocol for both sets of interviews was the same in that it focussed on occurrences in the month preceding the interview. In this study cosleeping was defined as parents and children sleeping in body contact with one another, categorising cosleeping as being "absent", "rare" (occurring only in extraordinary circumstances), "occasional" (occurring more than once a month but fewer than 3 times per week), "regular part night" (3 or more times a week for part of the night), and "regular all night" (3 or more times a week for all of the night). They defined sleep problems as the number of unwanted behaviours at bedtime and during the night. Two behaviours, bedtime protests and night waking, were coded for frequency and severity. Results from this study confirmed, as found in other studies, that more Japanese children coslept regularly (3 or more times per week) than did American children (59% vs. 15%, $p<.0001$). However, there was no significant difference found between the two groups for part-night cosleeping ($p=37$). Regarding sleep associated problems the American children had more regular bedtime struggles and night wakings than the Japanese sample. In the Japanese sample cosleeping was only associated with night waking whereas in the US sample cosleeping was associated with bedtime struggles, night

waking and stressful sleep problems. The results of this study showed that cultural differences can influence the connection between sleep practices and sleep problems with the practice of cosleeping in Japanese families not being associated with any increased sleep problems (Latz et al. 1999).

These studies were beginning to identify that cosleeping was a night-time care giving strategy that parents employed for many reasons including ethnicity, differing socio-economic status and bedtime struggles. However, to date, no systematic examination has been made of cosleeping with new-borns (0-5 month) and it is this gap that the present study was designed to fill. All the studies reviewed so far have concentrated on older infants and toddlers and not new-borns.

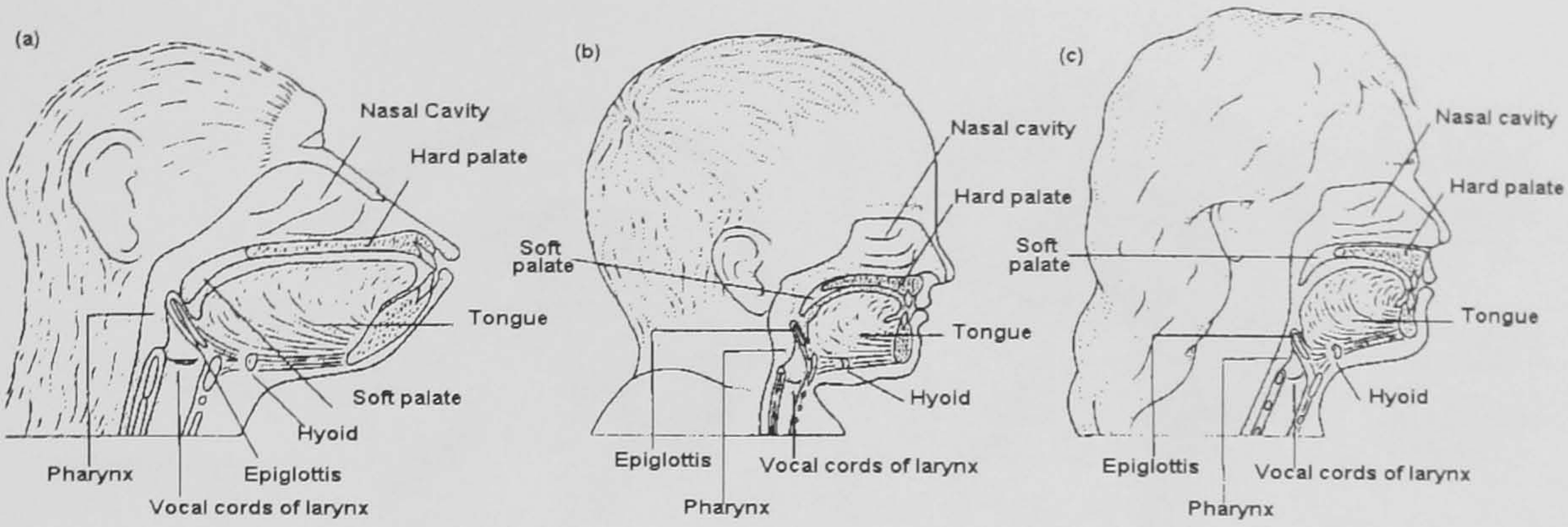
Is SIDS a consequence of solitary infant sleep?

McKenna (1986) introduced an evolutionary perspective to consider how an infant sleeping in close contact with his mother or primary care giver could be resistant to certain types of SIDS. Up until this time, as shown above, the cosleeping debate had been confined to cross-cultural comparisons, paediatric concerns or psychiatric populations. McKenna entered the arena with a stimulating hypothesis that ignited the cosleeping debate. His hypothesis concerns the behavioural and physiological relationship between cosleeping mothers and infants and how this may be protective for some infants against certain types of SIDS or cot death. The studies subsequently conducted by McKenna and colleagues emphasise that our knowledge of infant sleep is based on clinical studies of solitary sleeping infants rather than on infants sleeping in a

social context. With substantial physiological data from polysomnography, and video recordings combined with evolutionary and cross cultural theory, he has suggested that an adaptive fit exists between parent - infant sleep contact and that this 'fit', argued in terms of 4-5 million years of human evolution where parent-infant contact was continuous during the early years of life, has implications for SIDS. He speculates that between 2-5 months (the most common time for cot death) human infants' breathing patterns shift to prepare for speech. "Speech breathing is learned before speech itself in the context of the infant asserting increasingly efficient voluntary control of its crying" (McKenna 1990b p191).

A biological account given by Lieberman (1992 p135) shows how human respiration is linked to the evolution of speech. The human supralayngeal airway differs from that of any other adult mammal in that liquids and food all use a common pathway through the pharynx. Humans are more likely to choke when they eat as food can fall into the larynx blocking the airway into the lungs. In non-human mammals the anatomy of the throat is arranged to ensure that the non-human mammals can drink and breathe at the same time. Until the age of 3 months, when the throat anatomy begins to change, human infants have this same shaped airway which allows them to breathe and drink simultaneously.

Figure 2.1 (from Lieberman 1992)

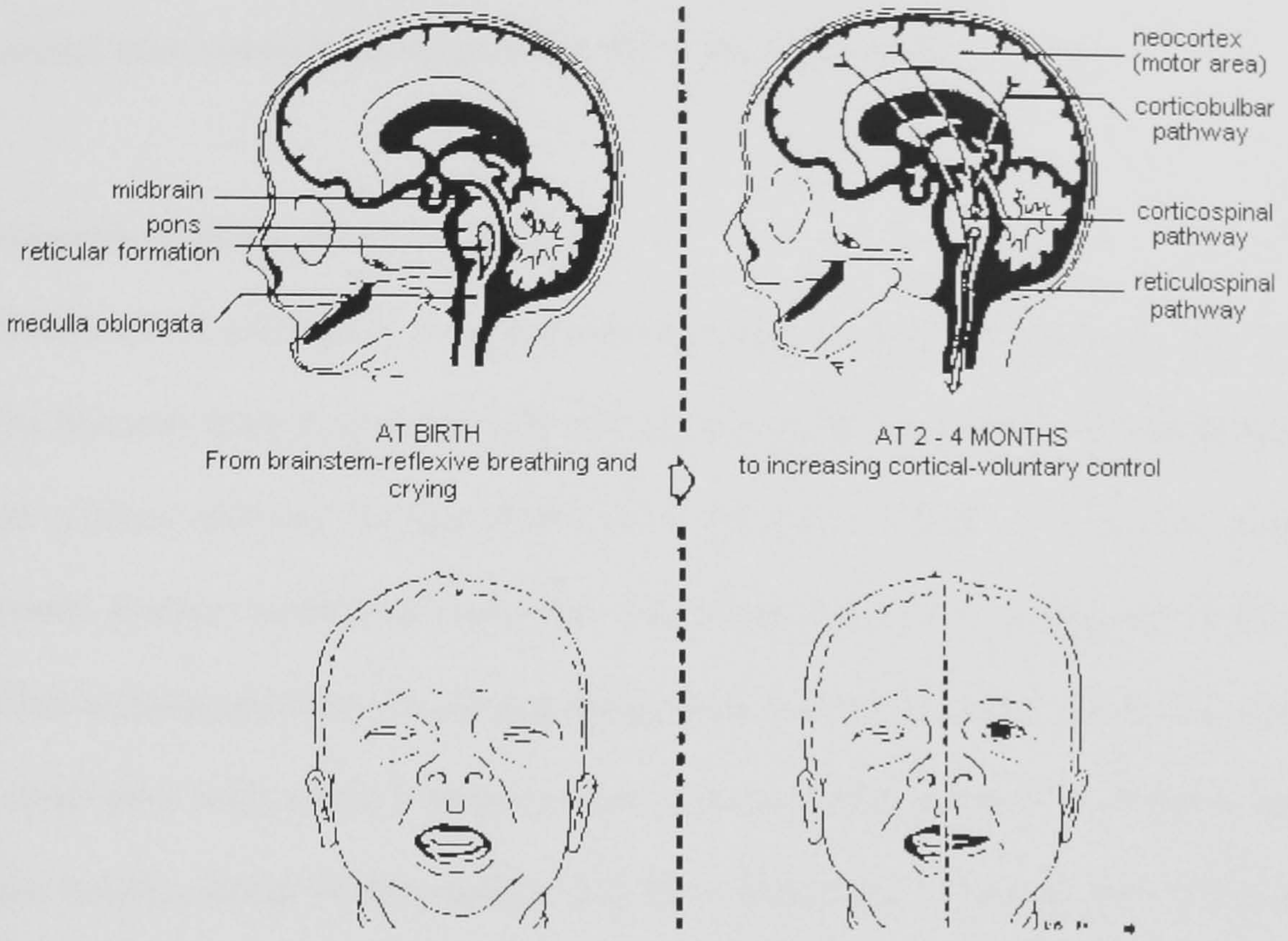


Diagrams of the heads of (a) adult chimpanzee, (b) infant and (c) adult human.

In contrast to the chimpanzee's supralaryngeal airway, the soft palate, or velum, can seal off the nasal cavity from the rest of the supralaryngeal airway during speech production. The vocal tract of the infant resembles a chimpanzee's and begins to develop the adult form between 3 and 6 months of life - the critical time period for cot death.

McKenna (1990b) cites Wilder (1972) to provide other biological theories to explain why an infant's attempt to control airflow during crying and non crying vocalisations is so important. He has argued that there is an experientially based or learned component in infant respiratory behaviour as it relates to vocalisation and that during the period of time in which infants are at increased risk of SIDS, there is a shift toward greater functional interdependence between higher brain cortical structures that permit voluntary control of breathing and lower brain stem structures that control automatic breathing. (see Figure 2.2)

Figure 2.2 (from McKenna 1990b p 193)



Shifting respiratory control at 2-4 months postnatal age showing the emergence of shared brain stem-cortical breathing control necessary for speech breathing vis-a-vis crying (from McKenna 1986)

At what is considered to be a very vulnerable time (2-4 months), with anatomical and neurological changes affecting respiration, McKenna (1990b) concluded that babies require stimulation through contact, stroking, sound and breath exchange.

McKenna also argued that a baby's temperature is better maintained through body contact and that it maybe while in a deep sleep that a baby's best stimulant to breathe in is the carbon dioxide breathed out by his/her parents. He has stressed that his model does not suggest that separate parent - infant sleeping causes SIDS but that his ideas could indicate that social sleep patterns are more likely to help an infant resist or combat SIDS. He concludes that consideration of the infant's

evolutionary past can help us to begin to separate the social best interest of the parent from the biological and social best interest of the infant, and by doing so propose new research questions about SIDS (McKenna 1990b p149).

Research of McKenna and colleagues

McKenna and colleagues, using polysomnography and video recordings, were the first research team to quantify both the physiology and behaviour of bed sharing and solitary sleeping mother-infant pairs (McKenna 1996). With data from several studies, conducted under lab conditions, they have contrasted mother-infant cosleeping pairs with solitary sleeping mothers and infants. Beginning with a small pilot study using 5 mother-infant pairs to a large study of 50 mothers and their healthy, breast-feeding infants they have reported several important findings that will be summarised here.

Using polysomnography alone in their initial study McKenna et al. (1990) documented the sleep patterns of 5 mother-infant cosleeping pairs. The healthy mother-infant pairs (infants aged between 2-5 months old) spent one night in a sleep laboratory, sleeping in the same single sized bed, while undergoing all night polygraph recordings of sleep. Physiological data were collected from EEG (electroencephalogram) electrodes placed on the skull, EOG (electro-oculogram) electrodes monitoring eye movements, skeletal-muscle tone was measured using EMG (electromyogram) placed on the chin, and respiration measured by a chest strain gauge. These physiological measurements allowed them to identify the sleep states of both mother and infant. Their findings were that the cosleeping

mothers and infants exhibited more frequent, synchronous, partner induced arousals than the solitary sleeping mother-infant pairs. Synchrony was also found between the sleep/wake stages of the cosleeping pair and infant sleep stages were altered in that the cosleeping infants spent less time in deep sleep (McKenna et al. 1990)

McKenna's subsequent study involved 3 further mother-infant pairs spending 3 consecutive nights in the lab. Monitored as in the previous study using polysomnography, the mothers and infants slept apart for the first 2 nights (in adjacent rooms) and together in the same bed on the third night. The first night was to allow for an adjustment to strange surroundings and by having the mother-infant pairs sleeping together and apart they could contrast measurements of sleep. Findings revealed that (on average) cosleeping mothers and infants experienced more arousals than they did when sleeping alone and that these arousals overlapped. They also found that the cosleeping pairs exhibited more frequent sleep stage shifts, whilst simultaneously spending more time (at the same time) in the same sleep or awake stage. Cosleeping infants spent less time in NREM (nonrapid eye movement) stage 3 and 4 than when they slept alone, a finding replicated from the initial study. When examining caregiving interactions, the cosleeping mothers contributed to the duration of their infants' arousals by patting and touching their infants. They reported that their sleep was not disturbed, recounting that they had the same amount of sleep, if not more, than they did at home. The sleep position and orientation of cosleeping mother-infant pairs was such that infants slept mostly on their back or side, within a few inches of the

mother's face and that both faced one another during sleep (McKenna et al. 1993). However, the proximity of the colseeping mother-infant pair could be confounded by the effect of using a single bed, which would limit space.

As the first lab investigations of infant sleep in a cosleeping context, McKenna acknowledges that these preliminary studies involved a small number of subjects, that the results could only be discussed as trends and that no firm conclusions could be drawn about the specific effects of cosleeping. However he argued that they illustrated important issues and gave him the incentive to continue his investigations using a much larger study sample (McKenna et al. 1993).

A three-year study, begun in 1994, was designed to examine 50 Hispanic mothers and their 3 month old, breast-feeding, healthy babies. Sleep logs were used for a two-week period before entry to the study to assess whether the mother-infant pairs were routine cosleepers or routine solitary sleepers. Routine cosleepers were strictly defined as cosleeping for at least four hours a night, for five days per week, whereas routine solitary sleepers were defined as cosleeping no more than twice per week for any part of the night. The mother-infant pairs underwent 3 consecutive nights of study. The first night was employed as an adaptation night to reflect the routine home sleeping arrangement followed by a cosleeping night and a solitary sleeping night, in random order. Polygraph recordings determined standard physiological measurements simultaneously in the mothers and infants. As with the previous studies, data was collected from electrodes placed on the skull, eye and chin. Thoracic and abdominal respiratory effort was measured via

respiratory belts and airflow was measured via an oro-nasal thermistor for the mothers and a thermocouple for the infants. Also, for the first time, McKenna's team used continuous infra-red, audio-visual recordings to monitor the mother-infant pairs who slept together in a twin size bed for the cosleeping night and in adjacent rooms (with the door between them open) on the solitary sleeping night. The video recordings for all subjects were analysed in real time with observable behaviours recorded and their duration measured (McKenna 1995 p49).

Results from this larger study continue to be analysed but several important findings have already been reported. Using data from a cohort of 20 routinely bed sharing and 15 routinely solitary sleeping, breast-feeding, Latino mother and infant pairs, Mosko et al. (1997) undertook the first research to measure the effects on adult sleep of cosleeping with infants. The infants were 11-15 weeks old and were involved in studies on the effects of cosleeping. Results showed that, irrespective of routine sleeping arrangement, mothers' total sleep time was not decreased on the bed sharing night, compared to the solitary sleep night. There was however, variation in sleep stages. Between the two groups there was a reduced amount of Stage 3-4 sleep on the bed sharing night (3.9%), while Stage 1-2 sleep was increased by 3.7%. The authors suggest that this may be protective against SIDS as by limiting the amount of Stage 3-4 sleep and lengthening the bouts of Stages 1-2, cosleeping could promote infant arousability: it being easier for infants to arouse from lighter sleep than from deeper sleep. The research team also proposed that the increased breast-feeding activity that occurred in the cosleeping environment could encourage more light sleep (stage 1-2) (McKenna

et al. 1997). Mosko et al. (1997) concluded that the impact on maternal sleep, whilst cosleeping with an infant, was modest and different from the reported impact of sleeping with another adult. They suggested that the benefits for the infant are enhanced, as effects on maternal sleep are adaptive providing increased opportunities to monitor infant status.

Another important finding was that cosleeping mothers and infants exhibited mutual (partner induced) arousals. One possible reason cited by McKenna, for these overlapping arousals is that the cosleeping mother-infant pairs regularly slept facing each other at short distances (between 28% - 99% of the night in physical contact). This not only increased the amount of sensory stimuli to the infant but also suggests given the high degree of mutual orientation between the pairs, that they retain some awareness of the others presence during sleep (Mosko et al. 1997). McKenna considers this finding particularly relevant for SIDS prevention as arousal deficit has been proposed as being responsible for some cases of SIDS. The results may be exaggerated however, because the mother and infant pairs slept in a single bed in this study.

Videotape recording technology presents a unique opportunity to investigate aspects of a cosleeping environment in detail, McKenna's team have utilised a smaller sample from the study outlined above to examine sleeping position, orientation and proximity of 12 Latino mother-infant breast-feeding pairs. Using the same protocol as before, six pairs of routine cosleepers and 6 pairs of routine solitary sleepers were examined sleeping in the sleep lab. for 3 consecutive nights.

Although polysomnography recordings were made only the infra-red videotape recordings were analysed here to offer a unique picture of sleeping position, proximity and orientation of mother-infant cosleeping pairs (Richard et al. 1996). The results show that infants were never placed to sleep in the prone position (during the cosleeping night) regardless of their routine sleeping condition, but on the solitary nights 3 regular cosleepers and 1 solitary sleeper were placed prone to sleep. Since prone sleeping is a known factor for SIDS, McKenna argues that by promoting non-prone positioning, cosleeping may protect some infants from SIDS (McKenna 1996). They also found that the mothers and infants slept facing one another on the cosleeping night, with 7 of the 12 infants being orientated to their mother for the entire night and identifying no difference between routine cosleepers and routine solitary sleepers. Observational analysis of face to face proximity revealed that most pairs slept most of the time less than 30 cm apart, being less than 20cm apart for considerable periods of time, again with no significant difference ($F = 0.89$) between routine cosleepers and solitary sleepers. The authors argue that this orientation of mothers towards their infants permits a higher degree of maternal vigilance during cosleeping (Richard et al. 1996). As face to face orientation is consistent among cosleepers, interest has been exhibited towards the amount of CO_2 exposure experienced by a cosleeping infant. The CO_2 content of the air close to the mother's face was measured by McKenna's team and their early findings suggest that the content is sufficiently raised to stimulate infant respiration but not abnormally raised such that O_2 saturation is affected (Mosko et al. 1997).

While some researchers embrace McKenna's proposals based on an evolutionary perspective (e.g. Dettwyler 1992, Trevathan 1987) opposition to the ideas of McKenna have come particularly from SIDS epidemiologists in New Zealand (Mitchell and Scragg 1993, 1996). These researchers argue that their epidemiological studies found parent-infant bed sharing[1] to increase the risk of SIDS compared with infants who slept alone. The New Zealand Cot Death Study, a case-control study, was conducted during a 3 year period (November 1987-October 1991) examining 485 SIDS cases compared with 1,800 control infants. During interviews parents were asked whether the infant shared a bed with another person during the 2 weeks prior to, or on the day/night for, the sleep when death occurred. They found that the indigenous New Zealand population were more likely to bed share compared with New Zealanders of European descent, that bed sharing was uncommon during the day, and that the amount of time spent bed sharing was reported as being less than (<) 2 hours per 24 hour period. Twenty four percent of the SIDS cases examined died in bed compared with 10.5% of control infants sharing the bed on the index night. The risk was still significant when controlling for confounders such as ethnicity, educational level, occupation, birth weight, breast-feeding, sleep position and maternal smoking.

Further analysis of the same data (Scragg et al. 1993) revealed that bed sharing during the last sleep was a risk factor among Maori infants but not for non-Maori infants (who were predominantly of Pacific Island or European descent). As bed sharing was found to be a more significant risk factor among infants whose

[1] They used the term bed sharing rather than cosleeping, explaining that cosleeping can refer to sharing a bed, or sleeping in someone's arms or sleeping in close proximity but not in bodily contact.

mother smoked and not significant for infants whose mothers did not smoke, the researchers identified smoking as the most likely interaction between bed sharing and something else among the Maori sample. To determine if the risk of SIDS associated with bed sharing was related to maternal smoking and additionally, alcohol consumption and to discover why bed sharing was not a consistent risk factor for SIDS among the other ethnic sub groups in New Zealand, further analysis and interviews were carried out (Scragg et al. 1993). Again using the nation-wide case-control study, home interviews were conducted with the parents of 393 SIDS infants and 1592 controls. Parents were again asked if the baby shared a bed with someone during the 2 week period before death or at the time of death (or a nominated date for the controls). The parents were not given a definition of bed sharing and mothers were also asked about the number of alcoholic drinks consumed in the month before their infant's death. Both parents were asked about the amount of smoking that had occurred in the final 2 weeks. Scragg et al. (1993) found that maternal smoking interacted with bed sharing to increase the risk of SIDS but that alcohol was not a factor by itself. The authors suggest that the link between smoking and bed sharing explain why their earlier report found a higher risk among Maoris, as Maoris have higher smoking prevalence than non-Maoris.

SIDS and infant care practices

Cot death is not a new phenomenon. Knight (1983) suggests that we need not refer to medical journals to find original literature on cot death, but to go further back in time and look at the Old Testament of the Bible. Chapter III of the first

book of Kings tells of a difficult judgement by Solomon about the death of a baby that "had been overlain in the night" and which Knight speculates sounds like Sudden Infant Death Syndrome. In a description of SIDS, Knight refers to the definition of SIDS that is widely accepted and was proposed at one of the earliest international conferences on SIDS in Seattle, U.S.A in 1969, devised by Dr. Bruce Beckwith of Seattle:

> The sudden death of any infant or young child which is unexpected by history and in which a thorough post-mortem examination fails to demonstrate an adequate cause for death.

However, as Dayton (1992) reports even now, years later "attempts to find the cause of SIDS have been seriously hampered by the failure of scientists to agree on a precise definition of the phenomenon" (p 15). Beckwith himself argued that his definition was still "too permissive" and that without stricter boundaries, scientists could find their research results confused by conditions other than SIDS. This highlights only one problem that SIDS researchers face in their quest to find answers.

Over the years a number of hypothesis have been proposed to explain SIDS. They range from congenital abnormalities (e.g. enlargement of the thymus), failure of neurological control mechanisms (e.g. sudden arrest of breathing), effects of external insults (e.g. infection, respiratory disease and pneumonia) to accidents of chance (e.g. suffocation or inhalation of vomit) (Naeye, 1980; Knight, 1983; Golding et al, 1985; Culbertson, Krous and Bendell, 1989). In 1968 "sudden deaths, cause unknown" was included as a category in the WHO

International Classification of Disease (Factfile 1: FSID 1994), while prior to this date physicians, unsure of the cause of an infant's death, entered pneumonia on death certificates (Culbertson et al. 1989). This has tended to promote misinformation, has affected SIDS statistics and highlights how research has been hampered by imprecise terminology. In the 1970s different sources gave contradictory claims that cot death had increased or had remained unchanged but this reflects the increased use of the term by pathologists rather than an actual increase in the frequency of deaths (FSID 1994). Progressing to the eighties and nineties we find that things have changed considerably but with still no definite answers to the enigma of cot death. Very strong epidemiological patterns, consistent in different countries, have indicated a number of specific factors associated with large numbers of unexpected infant deaths (Golding et al. 1985).

So far, there is no advice given to parents that can guarantee prevention of cot death, but there are ways in which the risk can be reduced (FSID 1994). Dramatic evidence of this can be seen in Britain after the government started its "back to sleep" campaign (which encouraged parents to sleep babies on their backs) in 1991. A programme to change one care practice, infant sleeping position, resulted in a reduction of cot deaths by more than half from 935 cot deaths in 1991 to 545 in 1992 and dropping further to 442 in 1993 (OPC&S 1994). As of 1998 the annual SIDS rate in the UK (including Northern Ireland) was 344 (FSID information 1999).

However, as Fleming (1995) reminds us, there is still no proven explanation as to why sleeping prone increases an infant's risk of SIDS. Furthermore not all cot deaths are attributable to sleeping position. There is, however, speculation concerning both the re-breathing of carbon dioxide and overheating in the prone position. Fleming et al. (1990) concluded that overheating and the prone position are independently associated with an increased risk of sudden infant death, claiming that in the prone position the exposed surface area of the baby that can contribute to radiant heat loss is less than that in the supine position. A later study carried out in New Zealand (Ponsonby et al. 1993) came to the same conclusions, suggesting that guidelines for appropriate infant thermal care were needed. Southall and Samuels (1992) proposed that a randomised controlled trial would be useful in helping to determine the importance of sleeping position as it would allow identification of any hazards of the prone position. They postulate that such a trial would be considered unethical, however, and that the contribution of sleeping position to SIDS may remain unsolved.

Balarajan et al. (1989) identified considerable ethnic differences in postneonatal mortality and the incidence of SIDS in England and Wales during 1982-5. Using data from the Office of Population Censuses and Surveys and classifying ethnicity by place of mother's birth they discovered that infants of mothers born in Bangladesh, India and Africa had lower postneonatal mortality than infants of mothers born in the UK or the Republic of Ireland. Infants with mothers born in Pakistan and the Caribbean experienced higher postneonatal mortality rates than those born in the UK.

Ethnic differences in sleeping position and in the risk of cot death have also been highlighted by Farooqi et al. (1991). This study illustrated that Asian infants in Britain, were about seven times more likely to be placed on their backs to sleep than white infants suggesting that in view of the lower incidence of SIDS in the Asian community in Britain, the supine sleeping position may be protective. They conclude "that it would be tragic if adoption of 'western ways' promoted by health care professionals were to place babies born in the Asian community in Britain at higher risk of SIDS" (p 1455).

Cross cultural perspectives on SIDS

Infant care practices vary world-wide, from the use of the cradleboard in Navajo infancy (Chisholm 1983), to infants being placed in a sling hung from the roof in the centre of the only 'living' room in India (personal communication, Kapadia 1995). However, it is only in certain Western industrialised countries that babies are expected to sleep all-night and alone. Evidence suggests that cot death is rare in many cultures where babies routinely sleep with the rest of the family.

The most often cited example of this paradox is a study by Davies (1985) who offered an explanation as to why cot death in Hong Kong was a rare problem. Davies undertook a survey hoping to discover why SIDS was absent in the Hong Kong population. A sample of medical professionals, including forensic pathologists, casualty specialists and consultant paediatricians, were contacted (by writing) to request their understanding of the problem in Hong Kong and to estimate cot death rates. Respondents were consistent in their opinion that cot

death in Hong Kong was very rare. From the two Government mortuaries, for a 5 year period beginning in 1980, 15 infants were described as SIDS deaths after necropsy. Ten babies from the Kowloon mortuary were all ethnic Chinese with an average age range of 4 months. More interesting was that of the 5 cot deaths from the Hong Kong Island mortuary, 3 babies were of western origin (1 Chinese, 1 Japanese and 3 British babies). Davies calculated that with 418,196 registered births in Hong Kong during the 5-year period, the approximate incidence of SIDS works out at a very low 0.036 per 1000 live births. Breast-feeding rates in Hong Kong, at that time, were extremely low (only 24% at birth) with extremely crowded living conditions, leading to high rates of respiratory infection, which Davies suggested meant that much higher rates of SIDS in Hong Kong would be expected. He proposed that social and environmental factors somehow neutralise high risk factors, describing how, in Hong Kong, babies are left alone infrequently, and that sleeping arrangements are different from western care practices. Davies also speculates that stronger, extended family support could mean less chance of filicide. There were also seldom very young marriages, with fewer unwanted babies and maternal smoking was unusual. More importantly, Davies was the first to question whether the custom of placing an infant supine was contributing to the very low rates of SIDS in Hong Kong.

In a follow up to Davies' (1985) work, Lee et al. (1989) carried out a prospective study in order to further examine Hong Kong's low SIDS rates. Parents with infants aged 1 to 12 months, that were found dead at home during December 1986 – November 1987 and subsequently diagnosed as SIDS deaths after post-mortem,

were visited at home by 2 doctors who gathered information surrounding the death, details of the family, the pregnancy and child care practices. In total 21 babies were diagnosed as SIDS with parents of 16 of these being interviewed (the others could not be contacted or declined). The SIDS rates appear to have dramatically risen as 21 in a one year period does not correspond with the 15 SIDS deaths in 5 years mentioned in the previous study in Hong Kong, possibly related to the more rigorous methods of the Lee et al. study. All infants were ethnic Chinese. Two control groups of infants were chosen to match each index baby for sex and age, one group being recruited from the hospital and one from the community. Results showed that the only significant differences between cases and controls pertained to sleeping position. Two of the 32 control babies usually slept in the prone position compared with 7 of the 16 babies who died ($p=0.004$). Ten of the 16 cases were found prone at time of death. The usual place of sleeping was described as the parent's sleeping area for 12 of the cases and 14 and 13 of the control groups, respectively. Two of the cases compared with 4 and 5 of the controls slept in the same bed as the parents, and 4 cases compared with a total of 4 controls sleeping in another room with someone else. One infant from the community sample slept alone in a separate room. This study confirmed the low incidence of SIDS in Hong Kong and concluded that social stimulation due to crowded living conditions, and the traditional use of the supine sleep position, indicated that the relationship of SIDS to child care practices required more investigation.

Further research by Nelson et al. (1996) has more recently investigated Hong Kong's remarkably low SIDS rate. Using a random selection process on the post natal ward of the Prince of Wales hospital in Hong Kong, Nelson et al. recruited mothers willing to participate when their infants were 4 weeks old. Postal questionnaires were sent to the families, asking detailed questions on child care practices. One hundred families (predominately Cantonese Chinese) completed the study. Results from this study reflect child care patterns found in the other Hong Kong studies but commented particularly on where the infants slept. Eighty one percent of babies slept in the parent's room with 32 % sharing the parental bed (a third of these were described as being 'in direct contact') and the rest sleeping in another or own room. Seventy eight percent of infants slept supine with 18% lateral and 3% prone but soft bedding was not used to sleep on with 58-59% describing bedding as firm (rattan mat). The low breast-feeding rates were confirmed with only 9% of infants still breast-feeding by 4 weeks of age. Maternal smoking was still reported as being low with only 3% of mothers smoking. As with the other Hong Kong studies, certain proposed risk factors for SIDS such as cosleeping and lack of breast-feeding were more common whilst others such as prone sleep position, soft under bedding and maternal smoking were not, but SIDS rates in Hong Kong remain very low, at 0.3/1000 live births (Nelson et al. 1996).

In the light of the above knowledge regarding ethnicity and SIDS, in combination with the hypothesis of McKenna (1990), Gantley et al. (1993), examined the possibility that SIDS could be linked to care practices in different ethnic groups.

Although not entirely related to cosleeping the theoretical background was concerned with McKenna's theory of close contact with a caregiver during infant sleep. Using a non-random sample of 60 mothers of Bangladeshi or Welsh ethnic origin, with infants under one year of age, they used an ethnographic interview technique, with interviews lasting approximately one hour, to establish " a day in the life" of each infant. The sample included 20 Bangladeshi mothers, 20 Welsh working class and 20 middle class mothers which included 13 Welsh and 7 Bangladeshi mothers.

Several themes emerged from the results that allowed the researchers to identify possible risk, or protective, factors involved in infant care practices. Cultural contrasts between the infant care practices of the Welsh and Bangladeshi mothers were linked to living patterns, family networks, sleeping patterns and notions of interdependence or independence. The Bangladeshi families lived in relatively large groups in small Victorian terraced houses, typically with 2-3 brothers and their wives and several children living all together as an extended family. In contrast, Welsh families lived in similar accommodation, converted into flats for nuclear units consisting of mother, father and child or mother-infant units. This meant that the Bangladeshi infants were exposed to a busy social environment whereas the Welsh infants were involved with fewer people who encouraged independence and were therefore left alone for longer periods of time. Family networks were very important to the Bangladeshi family units and child rearing was the responsibility of everyone in the household whereas the involvement of other family members in the Welsh community was less frequent and not as involved. The numbers of children

per family was greater in the Bangladeshi families than the Welsh, and greater importance was placed upon a new arrival in the Bangladeshi households. Welsh mothers seemed to attribute loss of income, low status and relative isolation as being associated with motherhood. Bangladeshi mothers breast-fed their infants and rarely smoked, employing oil to massage their babies after bathing, increasing tactile stimulation. Welsh mothers more commonly smoked and used talcum powder to soothe their baby after a bath. For sleep, Bangladeshi infants were considered to be vulnerable by their parents and slept close to other family members, sleeping at night either in the mother's bed or close to it, and by day in the constant bustle of family life. They were never alone. Older children also slept in their parents' room. In complete contrast, the Welsh parents placed infants in a cot in their bedroom for a period of 2-3 months and then the infants were expected to sleep alone, in their own room. During the day, Welsh babies were placed in an isolated quiet place away from family life and were encouraged to sleep through the night. Bangladeshi practices encouraged group membership and close proximity whereas the Welsh parents were more concerned with practices that encouraged individuality, independence and self-reliance.

McKenna (1996) has described how the last decade has seen child care practices proven to be the most important elements for reducing the chances of an infant dying from SIDS. He describes the importance of childcare practices as the 'surprise of the decade' for many renowned SIDS researchers (pg 206). However, when we consider these practices from anthropological, cross cultural and

evolutionary perspectives it seems obvious that infant care practices would be important components of SIDS prevention.

SIDS and cosleeping

In taking a historical perspective on SIDS most authors (e.g. Knight 1983, Golding, Limerick and Macfarlane 1985, Mandell in Culbertson et al. 1989) emphasise the fact that parent-child cosleeping was given as the reason for many of the unexplained infant deaths prior to the twentieth century. Overlaying, which occurs when an adult in bed with a baby inadvertently rolls on the baby and suffocates it, was attributed as the cause of many cases of infant death. However, as Golding et al. (1985) point out, infanticide was also extremely common, even in recent history, and little attempt was made to investigate these deaths. Some babies therefore may have been intentionally overlain.

In recent years studies investigating the epidemiology of SIDS have reported that infant deaths from SIDS have occurred when cosleeping (Carpenter 1972; Luke 1978-cited in Young 1999; Bass et al. 1986; Mitchell et al. 1993; Fleming et al. 1996). However, under closer scrutiny many of the reported cases of infant deaths that occurred when cosleeping have also implicated other factors, which include parental intoxication by alcohol or drugs, obesity and fatigue. During the 1970's two different case control studies (one in the UK-Carpenter, 1972 and one in the US- Luke 1978) identified that cosleeping was more common in SIDS cases than in the control group. During the American study, (Luke 1978 cited in Young 1999) which included 92 deaths identified as SIDS in a 4-year period, the authors

reported a disproportionate number of deaths that occurred at the weekends (16 of the 44 cases) that were bed sharing. Both studies reported a speculative association between cosleeping and SIDS due to the infant being taken into bed for either comfort because of a minor illness (Carpenter, 1972) or due to some kind of asphyxiation by overlaying, possibly exacerbated by parental drug or alcohol consumption (Luke 1998). Luke (1998) offered a suggestion that the parental desire to sleep later, combined with an increased consumption of alcohol, could account for the increased SIDS deaths at weekends.

Bass et al. (1986) have also looked at death scene evidence of SIDS. Investigation found overlaying was the cause of death in one definite case out of twenty-six. A further five cases of overlaying, where the evidence was less convincing but never the less required consideration were cited. However, if we look at the results of the study more closely we find that maternal factors, which may have contributed to overlaying in these cases, include drug abuse, seizure disorder, obesity and extreme fatigue.

The interaction between sleep position, bedding and SIDS became the focus for research in the eighties which led to the "back to sleep" campaign in the UK (Fleming 1990). As previously mentioned the "back to sleep" campaign in the UK reduced SIDS rates dramatically but infant sleep position is not the only thing to consider when reviewing safe sleeping environments. In the first significant epidemiological study of SIDS since the national campaign to reduce the risk, Fleming et al. (1996) presented detailed analysis on certain aspects of infants' sleeping environment which have been linked to SIDS, including cosleeping.

With a two year, population based, case-control study, data were collected from three regions in the UK, via interviews with the families of 195 babies who had died from SIDS (aged between 7-364 days) and 780 matched controls. Research interviewers who visited the bereaved family twice, usually within two weeks of the infant's death, took narrative accounts of the events leading up to and including the infant's final sleep. A full questionnaire with over 600 items, including social and demographic data, the medical history of the infant and other family members, use of cigarettes, alcohol and drugs and the precise sleeping arrangements for the infant was completed during the two week period.

Several issues regarding infants' sleep environments were reported for the first two years of this 3-year study. The researchers found that prone and lateral sleeping positions were both associated with increased risks of death as compared with a supine position when adjusted for relevant risk factors. Investigation of the infants' thermal environment illustrated that twice as many cases as controls slept in rooms that were heated during all of the last (or reference) sleep. The data also showed that the infants who died were more heavily wrapped than the controls and that a small but significant group of babies who died wore a hat to sleep. Analysis of the position of covers or arrangement of bedding showed that significantly more of the babies who died were found at the bottom of the cot, with the covers over their heads and, of these, more were under duvet covers. Few babies were placed for the last sleep at the bottom of the cot, suggesting that the infants may have moved down under the duvets themselves. They found that cosleeping (described as routine bed sharing with one or both parents, 2 or more

nights per week), was more common among babies who died than controls and for infants who were regular cosleepers rather than occasional cosleepers (due to a rare event, such as the baby being unwell). There would appear to be an increased risk of bed sharing in combination with alcohol consumption and smoking. The CESDI study identified that more of the SIDS mothers had consumed 3 or more units of alcohol in the 24 hours before their baby's death; bed sharing was still significant among those who had not consumed any alcohol. However, most of mothers who coslept with their infants also smoked, and subsequent analysis showed that the risk associated with bed sharing and smoking mothers was highly significant. Key messages from the CESDI study proclaimed that SIDS remains a major cause of death in infancy, and the risk of SIDS is increased with prone or side sleeping position, loose bedding (particularly duvets) and bed sharing with mothers who smoke. This report said nothing about fathers who smoked. They suggest that risks may be reduced by supine sleeping position, placing the baby with feet at the foot of the cot ("feet to foot"), making sure that bedding is tucked in and avoiding the use of duvets (Fleming et al. 1996).

A study in California found no evidence of any significant relationship between bed sharing and SIDS. Klonoff-Cohen and Edelstein (1995) matched 200 infants who died from SIDS with 200 living controls comparable for gender, age, ethnicity and hospital of birth. The sample contained a mixture of white, African-American, Latin American and Asian infants. Results showed that of those infants who had died of SIDS, 45 (22.4%) were sharing a bed. Having identified that daytime bed sharing was more common in African-American and Latin

American families than white families, overall odds ratios were adjusted for routine sleep position, passive smoking, maternal age and education, breast-feeding, infant birth weight and medical conditions at birth. The authors could find no interaction with cosleeping and passive smoking or alcohol use by either parent (Klonoff-Cohen and Edelstein, 1995).

Young (1999) identifies the potential hazard of adults sleeping on a sofa or couch with their baby, a practice which was involved in more than one in twenty deaths recently reported by the CESDI study (Blair et al., in press, Fleming et al., in press). It is important therefore, that the range of circumstances that may make 'bed sharing, and sofa sharing' more dangerous be examined in suspected 'overlaying' infants' deaths. An explanation by McKenna proposes that as SIDS and suffocation are difficult to distinguish, a sofa death could be proxy for bed sharing-when it is more likely to be suffocation. He further suggests that this definition of bed sharing (which includes sofa deaths) illustrates why simple generalisations about the supposed risks of bed sharing must be limited to particular circumstances (McKenna 1998, p664).

Breast-feeding and SIDS

The relationship between breast-feeding and SIDS is unclear. There is evidence that increased breast-feeding reduces infant morbidity and mortality world wide (Howie 1999) but clinical and ethnographic studies have only recently begun to examine the role that sleeping arrangements play in promoting or discouraging feeding practices (McKenna and Bernshaw 1995). Epidemiological studies have

examined risk factors associated with SIDS, finding that although artificial feeding increased risk (McKenna et al. 1997), when controlling for other factors, such as socio-economic status and maternal smoking, breast-feeding did not lower the risk of SIDS (Fleming et al. 1996; Mitchell et al. 1997). However, these epidemiological studies suffer from a lack of standardisation on the type, frequency, and duration of breast-feeding episodes are not compared, contrasted, or classified in the same way.

McKenna and colleagues (1997), being the first study to directly measure nocturnal breast-feeding behaviour in any group, analysed the videotape portion of nightly recordings to determine that, when tested in their usual sleeping conditions, infants who routinely coslept, breast-fed three times more than infants who routinely slept separately. As part of their study (procedure described on pg 38) using 35 Latino mother and infant pairs they found that the infants who routinely coslept also fed for longer (39%). McKenna suggests that by increasing breast-feeding, cosleeping might be protective against SIDS (McKenna et al. 1997). If, as McKenna has suggested, close sleeping proximity is an important factor for eliciting arousals then another is breast-feeding. The mothers and infants involved in the study exhibited significantly more breast-feeding activity when sleeping together than they did when sleeping apart in adjacent rooms. However, not everyone agrees with McKenna's conclusions regarding the possible protective effect of breast-feeding and bed sharing against SIDS. Hauck and Kemp (1998) have argued that there is insufficient evidence to support that breast-feeding per se reduces SIDS risks. The debate continued with McKenna

(1998) counter arguing that their research data does prove that breast-feeding infants who cosleep assume or are placed in the safer supine infant sleeping position when compared with routinely solitary sleeping infants.

Summary

The review of the literature raises several issues to consider when examining cosleeping and parent-infant night-time care giving practices. It also provides clear evidence to support the need for the present research to be undertaken. Cross cultural studies have demonstrated that cosleeping is the predominant mother-infant sleeping practice in many of the world's populations and that it is only certain Western industrialised societies that regard the regular acceptable pattern of infant sleep to be solitary and for longer periods of time than are biologically acceptable for the infant. The pre-requisite that breast-feeding infants must remain close to their mothers is the context in which human infant sleep evolved and the two are inextricably linked. The literature provides evidence to suggest that practices of cosleeping and breast-feeding encourage one another. Previous clinical investigations of infant sleep have been based on infants sleeping in solitary environments and cosleeping has been considered by many as being associated with infant or child sleep problems. This has led to diversity among study populations and a variation in age range for children involved, which has proven to be problematic. The assessment of cosleeping practices varies immensely due to dissimilar definitions provided with each study. Research on new-born cosleeping has been infrequent with research regarding fathers'

interactions or effects upon the cosleeping dyad, practically non-existent, which again highlights the importance of the present study.

Chapter 3

Interview Study

Introduction

In the last few decades the practice of cosleeping in the UK has been relatively unknown and sharing the parental bed has not been considered a mainstream parenting practice. This is mainly due to advice given by child health professionals being generally based upon research that considers frequent cosleeping in the context of child sleep problems (Heron, 1994, Jackson, 1999 cited in Young, 1999). Cosleeping research has begun to demonstrate the existence of a physiological and behavioral relationship between mother-infant cosleeping pairs but most of this research has been undertaken in the US and it is vital to determine what happens in the UK. The frequency of cosleeping practices in the UK has only just been assessed via the CESDI SUDI (Confidential Enquiry into Stillbirths and Deaths in Infancy and Sudden Unexplained Deaths in Infants) study. However, this large population-based only provided a snap shot of where the infants slept on a particular night (Young 1999) and does not fully explain who employs cosleeping as a night-time parenting strategy and furthermore, why. As one of the first epidemiological investigations into cot death since the 'reduce the risk' campaign which led to the dramatic reduction in SIDS rates, the full study involved 1300 control infants whose median age was 14 weeks. The CESDI SUDI study established routine sleeping practice plus a specific 'day time' or 'night-time' sleep chosen to match the final sleep of the SIDS infants to discover that a large proportion of parents (31.5%) bed shared for at least part of the night (Blair, P, cited in Young 1999). From this study, results show that the

most common practice amongst parents in the UK is to share a room with their infant and approximately one quarter of infants slept in a separate room from their parents (Young 1999).

Figure 3.1 Reprinted table from Young 1999 (pg 65)

Table 3.1 Infant Sleeping Place on a particular night: Results from the CESDI SUDI study.

Infant Sleeping Place	N	Percentage
Shared parental bed, put back in cot before end of sleep	166	15.2%
Shared parental bed for whole night or placed in bed during night and found there at end of sleep	179	16.3%
Room-shared in parental bedroom but didn't bed share	456	41.6%
Slept in separate room from parents, alone with siblings	290	26.5%
Shared a sofa with parent	4	0.4%
N = 1095 controls		
Results printed with permission by Dr Peter Blair, Medical Biostatistician , CESDI SUDI Study 1993-96.		

These results correspond with results from a pilot interview study that I undertook in 1994-95, in the North Tees Health Area. The aim of the research was to investigate parent-infant sleep practices using anthropological techniques (questionnaires and ethnographic interviewing) among a convenience sample of 59 parents taken from a local baby clinic and mother and toddler groups. The proportion of children (aged 0-4 years) involved in this study that had been taken into their parents bed to sleep was 88%, however the frequency of cosleeping was mainly described as occasionally-38.5% and an isolated occurrence-28.8%, with cosleeping all night, every night occurring among only 7.7% of the respondents. This identification that cosleeping did occur in a small UK population was accompanied by the knowledge that issues relating to the benefits or risks of cosleeping were almost never addressed by health professionals or modern childcare literature. Furthermore, parents had voiced their concerns for infant

safety whilst cosleeping during the interviews. Although much of the study focussed on mother-infant cosleeping due to most of the subjects being enlisted through mother and toddler groups, it became apparent that much of the cosleeping concerned "three-in-a-bed".

Interview study literature review

Cosleeping/bed sharing studies in contemporary western cultural contexts

Several studies have examined cosleeping in Western cultural contexts but these are difficult to assess as they include definitions of cosleeping that have not been standardised, consist of very different age ranges, and often involve psychiatric populations or specialist populations. Mandansky and Edelbrock (1990), for instance, undertook research on cosleeping using a randomly selected sample of 303 parents with children who were 2 and 3 years old. Their aim was to determine the prevalence of cosleeping including demographic correlates. Using a non-clinical setting, they also measured the association between cosleeping and childhood emotional problems. Information was gathered in the home environment of selected households with children aged 2-3 years. These were located in various geographic areas that were stringently chosen to reflect the socio-economic status of that area (Massachusetts). They also used a follow up technique to re-contact the subjects a year later, and of 199 original families 157 were reassessed. There were significantly more lower socio-economic status families who were unable to be re-contacted ($p=<0.01$). The prevalence of cosleeping was described as never; once per month; once per week; several times per week and always. Reasons given for cosleeping included child awakes; child illness; nightmares; storms and parents' absence. They reported that most parents (55%) of the sample had coslept with their child sometimes and at least for part of the night, with 11% cosleeping regularly. As with other cross-cultural studies mentioned previously e.g. Morelli et al. 1992, Lozoff et al. 1996, cosleeping was more common among non-white families, and they found a similar trend for more frequent cosleeping occurring in

lower SES families. Cosleeping was also more common in father absent households. Behaviourally they did not find a significant relationship between cosleeping and child behaviour problems, but families that coslept were more likely to report sleep problems regarding getting the child to sleep or it waking through the night. The authors suggested that, whilst waiting for further research, guidance may be given to ensure that parents realised that frequent cosleeping was likely to prevent rather than guarantee sleep throughout the night (presumably for parent and child).

Within western cultures there are forms of cosleeping that compare with those seen in other cultures. In Kentucky USA, Abbott (1992) examined parental-child sleeping locations as part of a larger ongoing study on social class differences in family life and child rearing. Having determined that cosleeping was normal local practice, Abbott devised a short interview for mothers to obtain information on a particular child's sleep location history. The total number reported upon was 107 mothers, as 20 mothers were added to a clinical sample of 87, who were interviewed at home about wider issues concerning childcare practices. The sample was predominantly working class but also contained some middle and upper class families. The children concerned had an age range of 2-264 months with a mean age of 67.4 months (5 years old). The level of education was described as mainly high school standard but with some college and professional qualifications. The sample was arranged in nuclear families, a trend typical for that region. Results show that parent-child cosleeping was widespread and demonstrated a regional, cultural pattern that does not compare with the usual practice of white American

populations. Whilst stressing that it was not a quaint practice from a distant past, Abbot emphasised that the mothers interviewed were very aware of the alternate practices given by contemporary child rearing experts but that maybe economic uncertainty was promoting strong family bonds, and cosleeping was not part of this.

Here in the UK, interest into cosleeping research has begun to permeate from the US, with several UK research teams examining various aspects of infant sleep (including cosleeping) and associated environmental factors (Wailoo et al. 1989, 1990; Fleming et al. 1990; Tuffnell et al. 1994; Sawczenco et al. 1997; Young 1999). Later in this thesis a review of the literature relating to my observational video study details many of the studies mentioned above but one that requires discussion here is that of Young (1999). Using polysomnographic and infra red video and audio recordings, Young examined the sleeping (and caregiving) interactions of five mother and infant pairs who routinely bed shared and five mother and infant pairs who routinely room shared. The mothers were all Caucasian, non-smoking and breast-feeding their infants which categorised them as being at low risk for SIDS. Over a period of five months the mother and infant pairs visited the sleep lab. at St. Michael's hospital in Bristol, beginning when the infant was approximately four weeks of age, and returning at monthly intervals for two consecutive nights and were randomised to one night bed sharing and one night room sharing, or vice versa. Clear differences were observed between the routine bed sharers and the routine room sharers regarding the frequency and duration of breast-feeding, the nature of night-time interactions and the type of bedding chosen.

Young also reported how bed sharing affected maternal and infant sleep states, the proximity, and the orientation of mother-infant pairs.

Not much is known about how parents cope with infant care during the night, especially in the UK, and studies concerning infant care practices will hopefully encourage preferred, and safer advice for health professionals and parents concerning night-time infant care practices.

Cosleeping/bed sharing and feeding

Choices on infant feeding are a relatively new phenomenon. Method of feeding was not an issue for our hominid ancestors, in that mothers either breast-fed or their infants died (Stuart-Macadam 1995). Early civilisations practised choice regarding who fed the baby but the method of feeding was the same. The ancient Egyptians, for instance, used wet nurses with legal contracts being drawn up to protect both parties involved. Artificial feeding methods however were not introduced until the 15th and 16th century (Fildes 1988). Thus infant physiology has evolved via a singular, intricate, relationship between the mother and infant (Stuart-Macadam 1995), which modern cultural practices of childcare jeopardise.

The fundamental differences in breast milk quality between the cache species and the carrying species provide another strand of evidence supporting the evolutionary picture of human infants as requiring constant maternal contact (Lozoff and Brittenham 1979). In general the cache species, those who leave their offspring hidden for long periods of time e.g. lions and wolves have very high fat, high protein, low carbohydrate milk which satisfies for long periods of time and is slow

to digest. The carrying species (most primates, including humans) have low fat, low protein, high carbohydrate milk that provides short term energy, is quick and easy to digest but does not satisfy for long periods of time. The composition of human milk clearly indicates that human infants are designed to nurse frequently through out the day and night (Jellife and Jellife 1970; Dettwlyer 1995), which implies that human infants would have slept in close contact with their mothers throughout evolutionary past.

The prevalence and methods of breast-feeding world-wide have been documented by anthropologists, health professionals, nutritional experts, breast-feeding advocacy groups, women's studies, etc. (e.g. Dettwyler 1992). However, there are inconsistencies with terminology that confuse and make it difficult to derive conclusions from studies concerned with infant feeding choices and morbidity, mortality and growth. We also need to understand that breast-feeding is not purely biological or nutritional, but that it is bound in cultural patterns that have affected the structure of women's roles in society (Maher 1992).

Breast-feeding has been cited as a reason for cosleeping (Hayes and Roberts 1996; Ball and Hooker, 1998) in western, industrialised cultures but in non-industrialised, third world societies where cosleeping is the norm, most women initiate breast-feeding and continue for over a year or more (Dettwyler 1992). Breast-feeding frequency varies between cultures. Among the nomadic !Kung San, mothers breast-feed their infants up to 4 times per hour, whilst in Northern Europe 5-6 feeds in 24 hours is reported as the norm. Cultural practices for

feeding regimes reflect child-rearing goals, and where the western notion of solitary sleeping and early autonomy is favoured, then regimented controlled feeding is employed. However, the inconvenience of breast-feeding through the night is greatly reduced if the baby is near to the milk source (Jelliffe and Jelliffe 1976; Ball 1999).

Research by Elias et al. (1986) challenged the published norms for infant sleep patterns, which had been established in the US during the 1950s and 60s when breast-feeding was deemed 'unfashionable' and breast-feeding rates were very low. Normal sleep/wake patterns were registered as increasing from 4-5 hour sleeping bouts to 8-10 hours by four months of age which, the authors suggest, was suprising when examining infant sleep from an evolutionary viewpoint. Following 32 mother-infant pairs during a prospective 2-year study, they collected data on 24-hour patterns of feeding and sleep. Comparisons were made between 16 families who were classed as typical American middle class and 16 who were atypical in that they were enrolled through the La Leche League. The authors explained that the nature of child care of those involved with the La Leche League meant that they employed maternal care practices more commonly found in non-western cultures in that they nursed frequently, weaned late, and keep their infants in close proximity. The two groups were similar in socio-economic status, mother's age, and family size. The infants involved were second or later born babies and there were an equal number of girls and boys in each group. All were breast-fed, and no restrictions were placed upon the mothers concerning the management of nursing or care of their infants.

Families were interviewed at home eight times, when infants were between 2 and 24 months old. During the interviews data were collected concerning infants' weaning age. Mothers also completed time lines in a diary for one 24-hour period at each of the eight age points. Nursing bouts were clearly defined as lasting at least 5 minutes, separated from another nursing bout by at least 10 minutes. Sleep bouts were defined in 15 minute units where sleep had occurred, measured against 15 minute units without sleep. Frequency of nursing episodes and amount of infant sleep was the number of bouts in 24 hours with duration of both being measured as the sum of duration of all bouts in 24 hours. They defined bed sharing/cosleeping as mother and infant sharing a bed for an hour or more between 8pm and 6am.

Elias et al. (1986) found that published norms for breast-feeding and sleep/wake patterns were completely outdated, and argued that they had been developed 30 years ago when early weaning was commonly practised. The infants in the standard care group were more similar to published norms (increase in length of maximum sleep bout from 4-5 hours to 8-10 by 4 months old) than the La Leche group due to being nursed initially and then weaned. The sleep/wake patterns between the two groups provided the most startling evidence that sleep/wake patterns were related to feeding. The infants in the La Leche group were weaned later and nursed more frequently, whereas the standard care group infants were weaned by 7 months. The maximum sleep bout length of the standard care group increased, on average, from 6 hours at 2 months of age to 8 hours at 4 months, and more than 8 hours for infants who were 2 years or over. In complete contrast the

longest sleep bout for the La Leche group infants was, on average, 5 hours at 2 months, and showed no increase until 20 months, as infants continued to sleep in short bouts and wake often. Sharing a bed was an important strategy for facilitating breast-feeding for the La Leche League mothers. Sixty percent shared a bed with their infant (at all ages over 2 months). This compared with only 25% of the standard care group who shared a bed with their infant. Cosleeping was strongly associated with sleep bout length - those infants who slept with their mothers slept for shorter bouts than did those infants who slept alone. Mothers who nursed and shared a bed with their baby slept in shorter bouts and had less sleep than those who nursed but did not bed-share, (sharing a bed but not nursing rarely occurred). The mother-infant pairs who did not nurse nor share a bed slept the longest. The authors argued that as breast-feeding was becoming a more 'fashionable' form of feeding which mothers wanted to continue for longer time periods, then normal infant sleep/wake patterns required further investigation and revision.

Almost a decade later Pinilla and Birch (1993) identified that although breast-feeding rates had continued to rise in the US, the length of time for which mothers breast-fed their infants was still below the UNICEF/WHO recommended goal of 6 months. Reasons cited by the authors for this early termination of breast-feeding include the western practice of mothers returning to work outside the home where they are not given facilities or support to continue breast-feeding; and the comparison of behaviours between breast-feeding infants and formula-feeders who sleep through the night from an early age. This comparison between sleep

and feeding behaviour between the breast-feeders and the formula-feeders may also, they suggested, have caused mothers to question their own beliefs concerning mothering. The reasoning behind the research, given by the authors, was if mothers returning to work required a full, uninterrupted nights sleep, could mothers employ a strategy that would encourage their breast-fed infants to sleep longer through the night. The aim of the study was to examine whether exclusively breast-fed infants could be trained to sleep through the night (defined in this study as between 12 midnight until 5am) during the early days of life, the first 8 weeks. Twenty-six first-time parents-to-be (mothers in the last trimester) were recruited from announcements in the local newspaper or through obstetricians' offices in a suburb of Illinois, United States. To be selected for the study the mothers had to present no complications during pregnancy, and intend to breast-feed for at least 8 weeks. Once the baby was born it had to be a single birth, with birth weights of 300g or more and 5-minute Apgar scores of 8 or more. When the couples agreed to participate they were then randomly assigned to one of two groups: treatment or control. The treatment condition focussed on behavioural techniques that would train the infants to sleep through the night from an early age. The other half was the control group. The parents also completed a 72-hour dietary activity diary of their infants' feeding and sleeping patterns each week. Those who completed the study received $50.00 for their participation. The study cohort was described as having similar socio-economic and demographic characteristics from information gathered in a prenatal questionnaire. During the final 3 months of the pregnancy parents in the treatment group were given verbal and written instructions on how to teach their

infants to sleep through the night. They were instructed to offer a 'focal feed' to their infants every night between 10pm and 12 midnight and then gradually lengthen the intervals between middle of the night feeds by undertaking alternative care giving behaviour e.g. blanketing, changing baby's nappy or walking with the baby. Parents in the treatment group were also advised to avoid holding, rocking or nursing their infants to sleep and to ensure that environmental cues between day and night were accentuated with high levels of stimulation during the day but much lower levels at night. Parents in the control group were offered the same advice on teaching their infants to sleep through the night but only after the end of the 8-week period.

Results from this study showed that by 3 weeks, infants in the treatment group were sleeping longer at night and by 8 weeks were all sleeping through the night (12-5am), compared with 23% of the control infants. Although the milk intake for 24-hour periods did not differ between the groups, Pinilla and Birch (1993) found that the treatment group infants were feeding less frequently through the night but compensated for this by feeding for longer during the early morning feed. The authors argue that their study provides evidence that night waking is not an essential component of breast-feeding, that stretching the time of infants feeding schedule trains the infant to sleep longer, and that this type of training can be easily provided for parents. The impact of this training for parents may well be acceptable to them but must surely be a dubious strategy for hungry infants. Surely the notion of any interaction between mother and infant being performed in

such extreme conditions (without physical contact or noise) must be completely alien to mother and infant.

Cultural variation regarding feeding strategies have been stressed in the breast-feeding literature (Dettwyler 1992) but studies of cultural variation, in infants sleeping arrangements and breast-feeding are rare (McKenna et al. 1997). One previously mentioned study, which goes some way to address the issue, is by Morelli et al. (1992). Their study (described in detail on pg 26) compared cultural variation regarding infant's sleeping arrangements between middle class US and highland Mayan mothers. During the first two years of infant's lives they discovered definite differences in sleeping arrangements and infant feeding. The norm among the Mayan families was for the baby (or toddler) to sleep with its mother until another child was born or until 2-3 years of age and to nurse on demand. Mothers involved in the study reported that feeding their infant was not difficult and that they did not waken fully to feed but just enough to make the breast accessible for the infant. They also regarded their sleeping arrangement as the only way for a baby and parents to sleep, explaining that the only difficult transition period for Mayan families occurs when a new infant replaces the toddler or older infant. In contrast, all but one of the American mothers (n = 18) reported staying awake to feed their infants. Ten mothers fed their babies in a different room, whilst 2 mothers fed in the parents room but not the parental bed. Six mothers chose to feed in bed but 5 then placed the baby back into their cots. The one mother who fed in bed and allowed the infant to remain in bed commented that nightly feedings did not affect or bother her. The authors suggest that the

findings from this study indicate encouraging independence is a developmental goal for the US families where parents believe that sleeping apart helps train children to be independent. The practices of the Mayan infants and toddlers, reflected in this study, demonstrate that the youngsters were not yet held accountable for their behaviour, not being complete individuals who could be easily separated from their mothers. Morelli et al. (1992) claim that these differences reflect very different child rearing goals and differing values for interpersonal relations.

How British parents manage night-time caregiving of small infants has not been investigated in any great detail thus far, hence the rationale for the first study presented in this thesis. This prospective interview study was carried out in an industrial/post industrial region of the north east of England within an economically and educationally heterogeneous population. It was designed to gather information on parent's attitudes and practices regarding infant sleep strategies, the circumstances under which prospective parents think they might cosleep and the circumstances under which they actually do cosleep. Based on the available literature and a small-scale pilot study on this topic, conducted via interviews with mothers at parent-toddler groups in 1994-95, the following hypothesis and predictions were developed. These will be examined using a combination of qualitative and quantitative data from the interview study.

- **Hypothesis 1**

Cosleeping is a more prevalent practice in Britain than acknowledged by health professionals or the academic literature.

- **Hypothesis 2**

Expectant parents will have made few preparations for coping with night-time parenting and plans made will change as baby arrives.

Predictions

a) Parents with previous children will be more realistic in their expectations than first time parents.

b) First time parents will underestimate the nocturnal disruption their new baby will cause.

c) Parents will be concerned for infant safety and want to keep the baby close.

d) First time parents will underestimate the length of time baby will share their room.

e) Parents will be wary of cosleeping

- **Hypothesis 3**

Mothers who breast-feed will employ different sleeping strategies to those who formula-feed.

Prediction

a) Mothers who breast-feed will be more likely to cosleep.

- **Hypothesis 4**

Fathers will be involved in more night-time caregiving than they anticipate.

Predictions

a) Babies will be taken into bed with both parents, mother and father.

b) Few fathers will anticipate that their role in night-time care giving will be important.

- **Hypothesis 5**

Parents will have various reasons for taking the baby into their bed.

Prediction

a) Parents will take ill or unsettled babies into their bed.

b) Single mothers will be more likely to take their baby into bed when they sleep alone.

Methods involved with the interview study

In a year long study (Oct. 95-Oct. 96) I examined parental attitudes and experiences regarding parent-infant night-time sleeping strategies in the North Tees Health Area, north-east England. The North Tees Ethics board granted ethics approval. Prospective parents were contacted through antenatal hospital wards, clinics and parent-craft classes at North Tees Hospital, and interviewed using semi-structured face to face interviews (with one or both parents). The parents, who were naive of the cosleeping focus of the research, were approached by myself and the general purpose of the study was explained fully. Confidentiality was guaranteed and all participants were required to sign a consent form before the initial interview – see Appendix A for consent form.

A semi-structured interview design allowed for the simultaneous collection of quantitative and qualitative data. At the initial interview information was gathered regarding the parents' age, employment, educational status, health status (if relevant), and if applicable, smoking habits. After discussing care-giving strategies used for previous children (where relevant), information was obtained on the intentions, expectations and arrangements being made for the product of the current pregnancy. Information regarding infant sleeping arrangements, feeding arrangements, the intended caretaking strategies during infant illness were all obtained. Parents were also asked how these caregiving strategies had been decided upon – see Appendix B for questionnaire. The initial interviews generally lasted around 30-60 min., and field notes were written up both during and immediately after the interview. A contact phone number was obtained with

permission to re-contact the parents for interview again around 3-5 months after the birth.

Re-contact interviews, again with one or both parents, were conducted in their home by prior arrangement. During this interview I gathered birth details and discussed actual caregiving strategies that the parents now employed, especially focussing on sleeping arrangements. Feeding, information about the reality of infant caregiving versus expectations, advice received from professionals, relationships, a sense of how disruptive a new baby can be to ordered lifestyles, and coping strategies were all discussed – see Appendix C for re-contact questionnaire. Again the interviews were written up as field notes, and entered into a computer database, Paradox for Windows. The data was then coded with all possible responses being assigned a specific value and analysed using queries, a facility of Paradox.

Chi Square and Fisher's exact tests were used to test significance between variables and significance was attributed when $p < 0.05$.

Results

Sixty couples/mothers were interviewed prior to the birth of their babies. There was very little opposition to the initial interviews as most of the parents were very keen to discuss their baby (still in utero). Forty of the original 60 families were then interviewed again after the birth. Of the 20 missing families, 14 parents were uncontactable (telephone number changes subsequent to a cable company entering the area), 5 were unwilling/too busy to carry out a recontact interview and one couple experienced a still birth. Table I illustrates the characteristics of the forty families who were interviewed twice and provides details on the 20 families who dropped out or were lost to contact, for comparative purposes. It can be seen that the study sample represented a varying cross-section of age, parity, occupations etc. The number of caesarean deliveries is high in this sample, presumably due to the recruitment of some families from the antenatal ward where one might expect to find mothers with potential complications. The parents completing both interviews were, on average, two years older than the parents who were lost to the study following the initial interview, however t-tests confirmed no statistically significant differences between the ages of the final study population and the drop outs. A slightly greater proportion of the dropouts were single mothers, families containing smokers, and families where the current pregnancy was unplanned. There were 3 school-age mothers in the study sample and all 3 completed both interviews. Using Chi Square and Fisher's exact tests I found no statistically significant associations for the variables presented in Table I between the dropouts and participants who completed both interviews. Because antenatal and

post-natal comparisons are being made the quantitative results presented here refer only to the 40 families who completed both sets of interviews.

Table I Description of study sample

		40 families completing 2 interviews	20 families completing 1 interview
Mean age of fathers		30.4 (19-42)	28.3 (19-40)
Mean age of mothers		27.8 (15-42)	25.8 (19-37)
Mothers aged under 18		7.5%	0%
Single mothers		5%	15%
Primiparous mothers		57.5%	50%
Average number of other children		0.8 (0-10)	0.7 (0-2)
One or both parents smoke		10%	25%
Planned pregnancy		72.5%	65%
Father's occupation:	Professional	35%	20%
	Skilled/semi-skilled	40%	35%
	Unskilled	20%	25%
	Unknown	5%	20%
Babies' mean age at re-contact interview		10 weeks	-
Sex ratio (m:f)		23:19	-
Singleton:twin births		38:2	-
Normal:caesarean delivery		26:13	-

Antenatal expectations

What to expect regarding sleep was for some parents, especially new parents, an unknown at the time of the antenatal interview. Many were aware that their sleep would be disrupted and the lack of sleep was an obvious concern, but it seemed to be viewed by prospective parents as one of those 'unpredictable' factors of

childbirth that necessitated a 'wait and see' attitude. Some parents-to-be had instigated steps to ensure the least disruption. One new set of parents had banished their dog from their bed in order for it to be accustomed to being downstairs after the baby was born. Another experienced mother was trying to get her two young children into a routine at bedtime, in order to facilitate life with a new baby and a husband who permanantly worked a night shift.

When asked at the initial interview 'where will your baby sleep during the night?' 33 parents (82.5%) said they intended to have the baby close, in a crib by the bed, 2 parents (5%) were going to isolate their baby in a separate room, and 3 families (7.5%) intended to cosleep, (the remaining 2 families had not thought about where the baby would sleep) as shown in Table II. Many parents felt that they wanted to keep the baby close for practical reasons and also to 'keep the baby safe'. One father spoke of his anxiety for his unborn infant, which he attributed to the experience of a family member suffering a cot death. He felt that this experience meant that he would not keep his baby anywhere else but very close during the night. He also felt that the need to keep his baby close was instinctive, a comment that was reiterated by other parents. One single schoolgirl mother had decided (or had been persuaded) that her baby would sleep by its grandmother's bed so that the mother could continue with her schooling and not be interrupted through the night. The desire to keep infants close is also reflected in previous strategies of the 19 experienced parents, as shown in Table II.

Table II Infant sleep locations employed by families in this sample

	Separate room	By parental bed	In parental bed
Where will this baby sleep? (asked prenatally)	5%	82.5%	7.5%
Where had previous babies slept (where relevant)?	11.8%	70.6%	17.7%
Where did this baby sleep? (asked postnatally)	12.5%	45%	42.5%

The few parents that did not want the baby with them at all through the night were experienced parents who had used the "baby alone" strategy for previous children. One mother commented 'it seemed to work fine for the last one, so we'll do it again'. Other parents, who anticipated moving the baby into its own room early on, still wanted to have the baby close for the first few weeks. These parents felt that the baby would become 'used' to being in the parental bedroom and wanted to get the baby established in its own room as soon as possible, one mother commenting 'the baby mustn't become accustomed to being in our bedroom'. The time period envisaged by parents as acceptable for room sharing varied from 6 weeks to a year. Circumstances such as lack of bedroom space, in a few cases, determined where the baby would sleep after the initial period. The size of the baby in relation to the sleeping place was also identified as a possible marker for independence during sleep (e.g. parents anticipated moving their baby into another room when s/he outgrew their new-born crib or Moses basket). However, developmental 'milestones' such as sleeping through the night, not feeding through the night and "establishing a routine" were all anticipated to be indicators for when a baby would be moved from the parents' bedroom into a nursery.

Questions asked at the antenatal interview that specifically focussed upon cosleeping produced interesting responses concerning parents' perceptions of cosleeping. When discussing sleep strategies during the early stage of the interview, parents were asked whether they intended to cosleep with the infant they were expecting: 30 (75%) parents answered definitely not; 7 (17.5%) replied maybe ('I can imagine it will happen'); 3 (7.5%) expected that they would employ cosleeping as a strategy (see Table III). Towards the end of the initial interview parents were asked whether they imagined ever taking the baby into bed with them, a question that produced answers in complete contrast to the earlier question, as shown in Table III:

Table III Anticipated and actual cosleeping practices

	No	Maybe	Yes
Antenatal intention to cosleep	75%	17.5%	7.5%
Imagined having baby in bed (antenatally)	20%	42.5%	37.5%
	Never	**Occasional**	**Regular**
Actual practice postnatally	38%	19%	43%

The reasons why parents did not anticipate cosleeping outweighed (in their minds) any perceived benefits. The main reason stated for not wanting the baby in the bed was a parental fear of overlaying. Parents commented: 'I'd be scared I'd roll and squash the baby', and 'Oh no, I'd be afraid of falling asleep with the baby in bed'. Entwined with this fear was the idea that the baby could suffocate. 'No I

wouldn't put the baby in bed with me, I'd be scared I fell asleep, and then it could suffocate or be squashed when we both roll over'. Other parents had similar fears, 'we'll possibly cosleep when the baby is older but the thought of cosleeping with a new-born makes us very nervous'. One experienced mother commented about the practicality of the cosleeping arrangement and felt 'there won't be enough room in the bed for all of us'. Another major concern was that the baby would develop 'bad habits' wanting to remain in the bed for an indeterminate amount of time. 'We don't want the baby to become too accustomed to being in our bed' or 'we don't want to spoil it' were common comments. Some parents had anecdotal evidence from other peoples' experience of cosleeping which had put them off, such as 'my friend coslept with her baby and her child is five years old now and she's still in the bed'. One mother (who was a nurse) had a 'horror' story to relate regarding her experience of nursing a patient who had a baby with brittle bones. Contrary to medical advice the mother slept with the baby and the baby suffered severe multiple fractures and died. Even those who felt their baby would be in bed for a cuddle said 'I'll stay awake until the baby goes back to sleep and put it back in the crib'. The circumstances under which parents thought bringing the baby into bed was acceptable were to feed and because of illness, 'I'd have the baby in the bed for feeding and during any illness but not for sleeping as we'd worry about causing any injury'. One mother had very mixed feelings on bringing the baby into bed, stating that 'if the baby was ill then I'd bring it into bed but would have to 'kick' the father out of the bed because he's a heavy sleeper and I'd fear for the baby's safety'.

The parents who imagined some cosleeping anticipated 'it could happen a lot'. Although one mother said that the baby would probably come into the bed for the morning feed, she was dubious about the baby sleeping between both parents. She then related a story about her son who at 5 weeks old was in the bed when the mother fell asleep, nudged him out of the bed and he fell on the floor. After this experience she always put something soft down on the floor to catch the baby if he fell. For some cosleeping inspired very positive comments. Another pair of first-time parents said that 'yes, we wouldn't mind the baby sleeping in the bed with us. We quite like the idea, especially when the baby is new and the novelty value is still quite high'. This mother also thought that 'cosleeping will be more convenient for breast-feeding but I can imagine that there will be times when my partner sleeps elsewhere when I've got the baby in bed'.

Few fathers believed they would have much involvement in night-time care giving. Many appeared willing to help but felt that it would more practical for the mothers to be the primary caregiver, 'well I'll be at work' or 'I'll help on a weekend or days off but I can't feed the baby (breast-feeding)'. Most of the parents acknowledged that they had discussed the strategy they anticipated employing and had reached a decision together. However there were a few mothers-to-be who felt that the father would just have to go along with the decisions she made about the baby, e.g. 'my partner would put the baby in his own room if he had his own way'. There was also one father who was adamant that he would not be involved with cosleeping, 'no chance, I'll get out of the bed if the baby comes in'.

Most parents were aware of the current advice on what position new babies should sleep in, supine as recommended by the 'back to sleep' campaign. When asked 'what position will you place your baby to sleep'?

- 28 parents intended to place their babies on its back to sleep
- 5 stated they would place it on its side
- 6 parents had not decided or thought about the position of sleep.

If we examine the results from the recontact interviews we find that parents' expectations, especially those of new parents are very different from their later experience of night-time parenting. 'Nothing can prepare you for this, I was like a zombie for the first couple of weeks, barely functioning at all' was one mother's answer to the experience of new parenthood. Overall the 40 families interviewed postnatally had pursued a heterogeneous array of night-time parenting strategies: baby alone, baby in parent's room, baby in parent's bed -- but the predominant night-time strategy was to keep the baby close for the first few months of life. The regular sleeping arrangements of 40 families (42 babies) are shown in Table II.

Sleeping arrangements after birth

In those families where babies did not sleep near the parents at all during the night (5 in total), 2 were infants of experienced parents who had employed this strategy before (placing the babies in their own room straight from hospital) and 3 were infants of first-time parents who had intended (and tried) to keep their babies

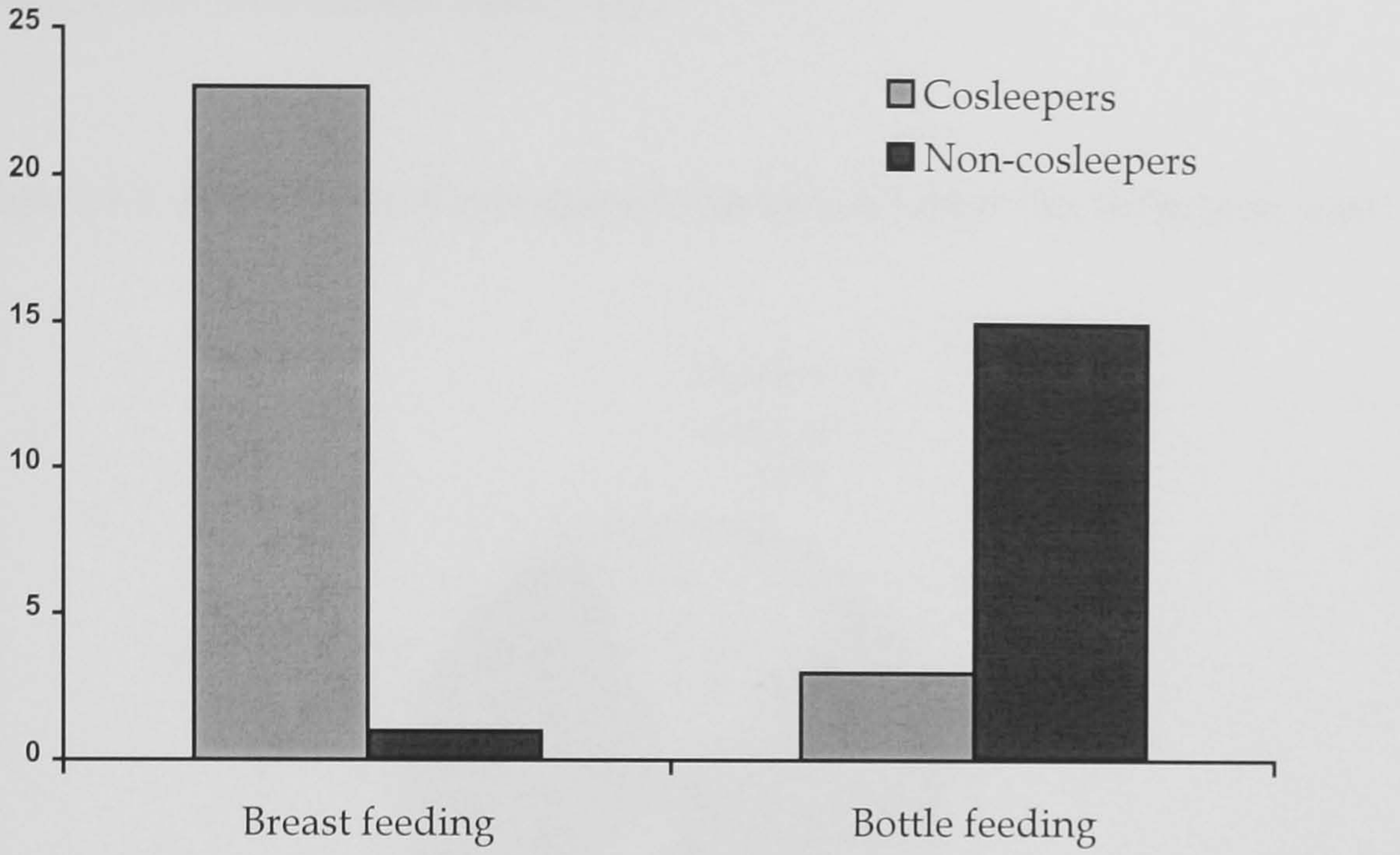
close but found that the baby 'made too much noise and were kept them awake'. In an particular case one mother, whose baby was a special care baby born with an undeveloped lung, planned to have the baby close but after spending two nights with the baby by the bed at home, moved the baby out of the parent's room because she was too anxious. 'I was just not sleeping, I could hear the baby breathing and I was just laid listening, almost imagining breathing problems'. The baby's grandparents had commented that this seemed a little harsh on the baby but the parents explained that it was the only way they felt they could cope.

Table III shows that antenatal expectations regarding the intention to cosleep were very different from the actual experiences of cosleeping for these 40 families. For all the concerns at the antenatal interviews, at the post-natal interviews 64% were found to be at least occasional cosleepers. Parents who had not intended to cosleep had actually found it to be a very convenient and practical way to care for their baby. One of the most important results of this study is that most cosleeping babies were being brought into bed with both parents: 95% of the cosleeping babies slept with both their mother and father simultaneously, with only 2 babies cosleeping with their mother's only. 'More cosleeping has occurred that I ever would have expected' commented one first-time mother. 'I felt that I was barely functioning for the first 6 weeks, I was so tired and in desperation I kept the baby in bed with me after a feed. Yes, I was very nervous about it but after the first time I began to relax and could actually get some sleep. My husband was much more relaxed about the baby being in the bed'. The cosleeping father of twins did not find the initial experience of cosleeping so relaxing, he spent the first few

nights with one foot out of bed, "firmly anchored to the floor" because he felt this would keep him from moving about in the bed. Another father found that cosleeping with his infant when the mother was taken back into hospital was, for him, a useful strategy for coping with the baby at night, although both of the baby's grandmothers had taken the father to task for cosleeping. In all, 16 sets of parents spontaneously commented that they were surprised at the ease/convenience of cosleeping.

As Figure 3.2 illustrates I found a statistically significant relationship between breast-feeding and cosleeping ($X = 17.28$, $df=1$, $p< 0.001$). Comparing the feeding strategies for the 26 cosleeping babies, 23 (88.5%) were breast-fed while the remaining 3 (11.3%) were exclusively bottle-fed. Twelve of the breast-fed cosleeping infants slept in their parents' bed following their early morning feed. I refer to these infants (who begin the night sleeping in a cot or crib, and who are regularly moved into their parents' bed during the course of the night) as 'combination cosleepers'. Those babies who slept all night, every night, in their parents' bed are referred to as 'habitual cosleepers', while babies who shared their parents' bed on 2 or fewer occasions a week are referred to in this study as 'occasional cosleepers'. Non-cosleepers are defined here as those babies whose parents reported that they had never let their baby sleep with them. Out of the 16 non-cosleepers identified in this sample, 15 (93.8%) were bottle-fed, while there was only one breast-fed baby who had not coslept by the time of the post-natal interview.

Figure 3.2 Frequency of cosleeping with breast-feeding and formula-feeding

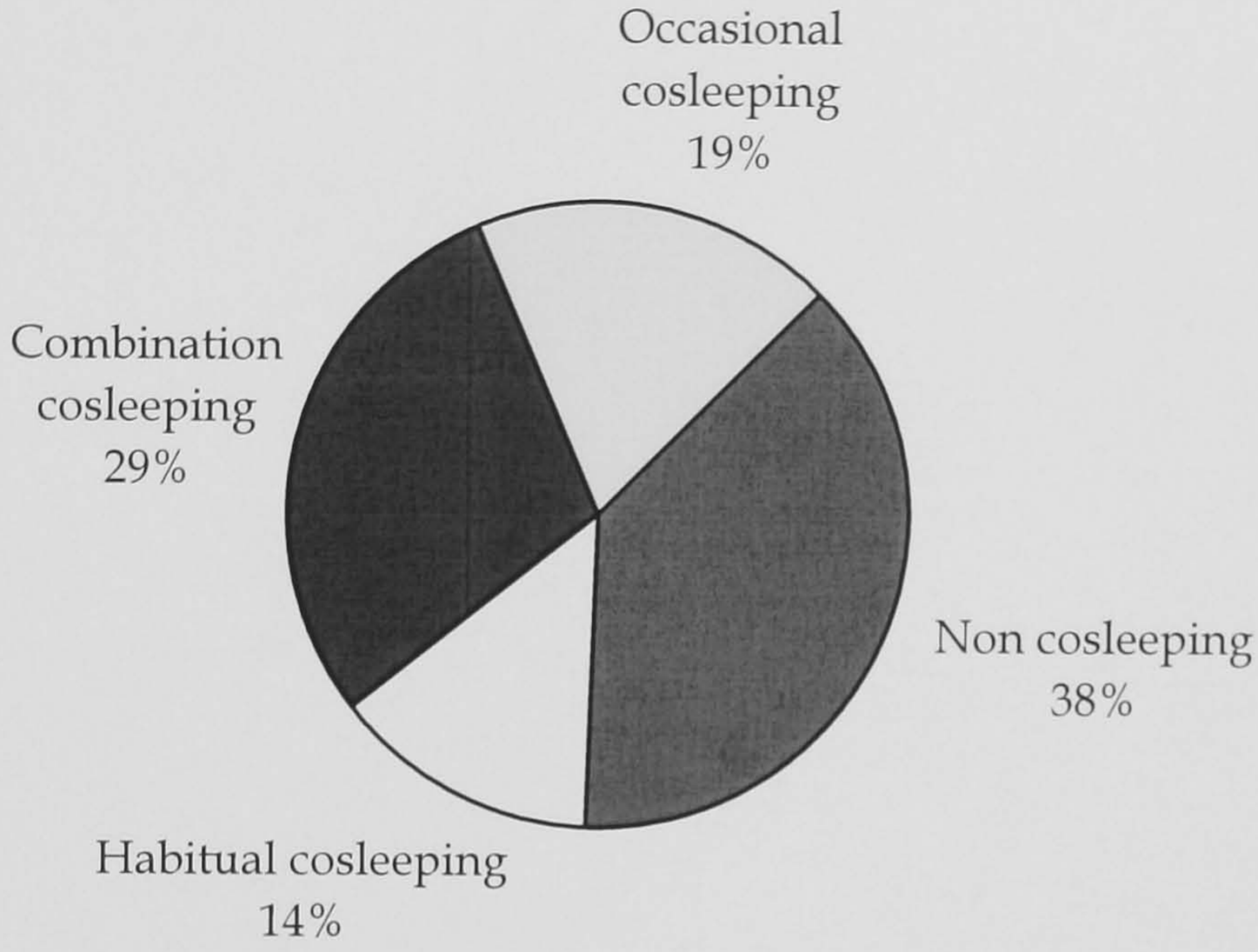


($\chi^2 = 17.28$, df=1, $p < 0.001$)

In twenty-four families babies were regularly breast-fed and 23 of these also acknowledged being cosleepers. Many of the mothers involved found that they could feed lying down and therefore found cosleeping an easy option. Indeed 10 mothers began cosleeping in hospital because of the associated ease with feeding and having the baby in the bed. One first time mother explained how she continued cosleeping at home after leaving hospital. She stated that as she became more proficient at breast-feeding, when feeding through the night she felt that she was not actually fully awake but described herself as being in a 'restful, half awake/half asleep state'. This ease of caring for breast-fed babies in bed is also emphasised in an interesting trend towards cosleeping after the early morning feed (usually around 2-4 am). As can be seen in Figure 3.3 (a descriptive breakdown of cosleeping arrangements) almost half (46.2%) of the cosleeping

parents were taking the baby into bed with them, on a regular basis, for the early morning feed (combination cosleeping).

Figure 3.3 Breakdown of cosleeping frequency by 'type' (definitions in text).



There were other circumstances that led to cosleeping. Parents tended to take ill or unsettled babies into their bed. Fifteen babies were snuggled into bed with the parents when they were experiencing a period of illness or when the babies were unsettled. Not all parents used this strategy; seven parents had walked the floor at some point with their unsettled, crying infants, while two babies, during an unsettled spell, were left to cry themselves to sleep. One set of first-time parents described how they had not had any sleep with their baby for 2 nights, due to a bad attack of colic and the only way they could stop him crying was to place him in the car seat and take him for a drive in the car. That was until, in desperation

and against their 'better knowledge', they finally took the baby into their bed and managed to all get some much needed sleep.

Discussion

If we consider a continuum of cosleeping, where along that line could we place the parents and their infants from this study? McKenna describes a cosleeping continuum as ranging from same bed contact at one point to completely eliminating any parent/infant sensory exchanges e.g. infant alone in a different room with the door shut, at the other (McKenna 1993). The parents in this study would certainly be positioned more towards the cosleeping pole than the solitary one. This in itself is a radical post-modern move from the isolated infant sleeping arrangement of the 'Spock' years or the advice of Erna Wright (1972). In this study only 5 sets of parents managed night-time care giving by expecting their baby to sleep alone in a separate room. The majority of parents, therefore, acted on their prebirth desire (expressed during the antenatal interviews) to keep the baby close and employed one or more variants of this option as their primary night-time care giving strategy.

Many of the parents found themselves sleeping with their infants at 'the same bed point', employing cosleeping as a coping strategy despite ever imagining that they would. Contrary to the opinion of Davies (1994) that cosleeping is unfamiliar to the white ethnic majority of the UK, our results support our initial hypothesis (page 56) that parent -infant cosleeping is a more prevalent practice than has been generally recognised. If we look at the antenatal intention to cosleep 70% were adamant that they <u>would not</u> cosleep. In the final analysis however over 62% coslept at least occasionally by 12 weeks, supporting the prediction 2f. This adoption of cosleeping as a parenting strategy contrast with other cosleeping

studies (Lozoff, Wolf, and Davies 1984) which found that only a small percentage of white western families coslept. These studies however have been carried out in the context of comparing ethnic/cultural variation that did not apply to this study. The ethnic compilation of this study was fairly homogenous with only one non-white family in the opportunistically collected study sample.

From the comments of parents who participated in this study, we find reasons why they coslept ranged from practical caregiving to instinctive bonding (supporting predictions 2c, 3a and 6a). Many mothers spoke of the ease with which they could care for their babies during the night, 'it's so much easier to feed her in bed, I don't even have to wake up properly', 'I have fallen to sleep whilst feeding and have woken the next morning, shocked that I've gone back off to sleep' were mothers' experiences. But nature has prepared mothers and infants for this with the soporific effect of breast-feeding. Parents who coslept felt that sharing a bed with their infant gave them the ability to bond and many commented that 'after the birth, it just felt right to keep the baby close'. One mother had returned to work soon after her baby was born and she found that cosleeping gave her the contact with the baby that she missed through the day, 'if I sleep with the baby, I can feel close-cuddled up and it somehow helps me not to feel so guilty about leaving her through the day'. Similar comments came from two cosleeping fathers from the study but for them there was no involvement of guilt. They were happy being close to their infants during the night as they were away from them during the daytime (as predicted in 4a).

The expected relationship between cosleeping and breast-feeding (predicted in 3a) that this study found is consistent with other studies (e.g. Morelli et.al.1992). Breast-feeding, and the discovery that feeding the baby in the bed provided the ability to conduct night-time feeds with as little disruption for the parents as possible, were both precursors to cosleeping. One family's experience of cosleeping meant undisturbed sleep for the father 'I can attend to the baby without disturbing my partner, I always seem to wake just before the baby does, it's as if I instinctively know she wants feeding'. In hospital several mothers had been shown how to breast-feed lying down (particularly following c-sections) and found that they could successfully feed their baby through the night without fully waking up. Many of the mothers in this study who had not envisaged cosleeping had employed it as a strategy purely on the ease of breast-feeding. Formula-feeding parents were not so inclined to stay in bed, as they had to get up to prepare or collect a bottle (supporting hypothesis 3).

Several studies have highlighted this trend of breast-fed infants being cosleepers with solitary sleepers being more likely to be bottle-fed in a separate room and returned to their crib for sleep (Elias et al., 1986; Pinilla and Birch, 1993; Hayes, et al. 1996). Breast-fed infants do not develop sleep/wake patterns to equal bottle-fed or even adult sleep/wake patterns. It is well documented that breast-fed babies sleep in short bouts with frequent waking instead of having the long unbroken night sleep of their bottle-fed counterparts. If breast-feeding is to be encouraged, as it is with current educational programmes for new parents attending antenatal classes, then advice on cosleeping should accompany it. Many women cease

breast-feeding because of a lack of sleep (Pinilla and Birch 1993). Rather than employ one of the complicated training programmes which have been proposed to make the continuation of breast-feeding easier for new mothers by teaching their new-born infants to lengthen their night-time sleep bouts (Gillham 1998), the parents in this study found it easier to take their breast-feeding infant into bed, feed and then sleep. This is reiterated by the trend for many of the North Tees cosleeping infants to be placed initially in a cot and then taken into the parental bed for the early morning feed, (combination cosleepers) and left in the bed to resume sleep. This finding has important implications for breast-feeding promotion, both in terms of the likelihood that cosleeping prevalence will increase as breast-feeding rates increase and also in terms of he growing need for all families of new-borns to receive adequate advice on cosleeping safety (Ball 1999).

Another important result from this study is that cosleeping in English culture is triadic (supporting prediction 4a). This is an important finding as research into the physiological effects of cosleeping have concentrated on infants sleeping with their mothers only (McKenna et al. 1990, 1994, Young 1999, although at Durham we are currently undertaking new research in this area). Ninety five percent of the babies from this study were being taken into bed with both parents with only 2 cosleeping mothers sleeping with baby alone. One of these was a Bangladeshi mother who slept downstairs with the new-born infant whilst her husband slept upstairs with the other children. The other cosleeping mother was adamant that

the father should not be in the bed at the same time as the baby and as soon as she brought the baby into bed she 'threw her husband out'.

Cosleeping is not considered to be part of mainstream parenting ideology in the UK and many of the parents we interviewed had received criticism from health visitors, midwives and relatives. We conclude, from this research, that despite this criticism and especially for breast-feeders, bringing their new-born baby into bed with mother and father is a night-time strategy that many parents find effective. This being so, I would like to see more discussion on cosleeping practices and cosleeping safety between parents and health professionals and increased education for health visitors, midwives etc, regarding cosleeping frequency and the reasons for its frequency.

Chapter 4

Observational video study

Introduction - study objectives

The interview study presented in chapter 3 identified that parent-infant cosleeping was relatively common practice in the North Tees area. Although much of this was transitory, a proportion of infants slept all night, every night in their parents' bed for reasons including cultural tradition, convenience and increasing interest in the suggestion that mother-infant cosleeping is protective against SIDS (McKenna 1990). Previous research conducted in sleep labs. in the US and UK indicate that a close behavioural and physiological relationship exists between mother-infant cosleeping pairs (McKenna et al. 1996; Sawczenco et al. 1997; Pollard et al. 1997; Young 1999). However, a major finding from the interview study was that cosleeping in our culture is triadic, and, to date, no researchers have investigated the effects of bringing the baby into bed with both parents. The video study aimed to compare night-time interactions when infants sleep with their mothers alone vs. mother-father-infant cosleeping.

Video study literature review

As reported in the interview study, cosleeping arrangements are not easily defined and require clarification. We have already seen that cosleeping is not practised the same way in all cultures or within different settings and circumstances. For instance in some of the New Zealand studies, the health professionals, researchers and Maori mothers involved have described a wide range of ways to cosleep ranging from same bed to same room (Gantley 1994). It is not a unitary phenomenon and the variables require some classification (McKenna 1996). Whilst some researchers have proposed that sleeping arrangements can reflect child-rearing goals (Sadeh 1993) others acknowledge the more practical effect of keeping the baby close for easier night-time management (Medoff and Schaefer, 1993; McKenna, 1995).

If we consider our evolutionary past, our mammalian heritage dictates that cosleeping and breast-feeding have been closely associated for millions of years. However, recently it has become clear that body position, proximity, facial orientation and increased sensory stimuli are all elements of cosleeping that are relevant to nocturnal breast-feeding (Richard et al. 1996). In the behavioural analysis of McKenna's (1996) video study of cosleeping mother-infant pairs, he reported that infants faced their mothers for between 70-100% of the sleep time, that the number of breast-feeding episodes doubled but that the time spent feeding was reduced by half. This trend for breast-fed infants to wake more often at night is consistent with other studies (Wolke et al. 1995). Although the study of infant feeding, particularly breast-feeding is described as an active interdisciplinary

field, with an array of literature (Dettwyler 1992) examinations of infant feeding practices in a cosleeping context are few. The convenience of nursing and easier night-time management have been cited as reasons for cosleeping and are listed as benefits of the practice (Medoff and Schaefer 1993). Breast-feeding has been shown to be a precursor to cosleeping, and night feeding in the parent's bed is one of the self reported reasons for cosleeping (Hayes and Robert 1996; Hooker et al. in press 1999).

If the practice of mother-infant cosleeping has been inadequately studied or reported, then introducing the father into the cosleeping equation further complicates the scenario, as data on the prevalence of triadic cosleeping, or fathers' experience of this in the industrial west, are virtually non-existent (Ball et al. 1999). The only data on cosleeping and fathers suggests a significant increase of cosleeping in father absent households (Madansky and Edelbrock 1990 cited in Medoff and Schaefer 1993) and where fathers' absence is a frequent and expected event, then the frequency of cosleeping has been shown to double (Forbes et al. 1992).

From a cross-cultural viewpoint, the practice of both parents sleeping with their infant is widespread but not as pervasive as mother-infant cosleeping. In cross-cultural analysis of father-infant sleeping proximity Whiting and Whiting (1975) determined that a close father-infant relationship existed in the majority (26/49) of societies where infants slept in close proximity to both parents. This contrasts with only a quarter (5/20) of societies where fathers slept away from their infants

and wives (Ball et al. 1998). In a cross cultural survey of the 186 societies in Murdock and Whites' (1969) "Standard Cross-Cultural Sample", Barry and Paxson (1971) coded mother-infant cosleeping from ethnographies of 80 societies and determined that it was common practice. The sleeping proximity of the father was unknown in 7 cases (9%); fathers slept in a separate room or building in 25 cases (31%); in the same room as the mother-infant cosleeping pair in a further 25 cases (31%); and coslept (in the same bed or sleeping surface) with the mother and infant pair in 23 cases (29%).

Triadic colseeping is not, therefore, an uncommon form of night-time parenting in other cultures, but within industrialised societies father-infant interactions and triadic cosleeping are neglected areas of study. The task of finding examples of observational, (video) studies similar to the present study is literally impossible. The closest examples that can be used for comparative analysis are those involving video observations of mother-infant cosleeping dyads such as Richard et al. (1996), Mosko et al. (1997b & c), and the longitudinal analysis of Young (1999).

Video Observation

Although video cameras now record our every movement for a multitude of reasons, the use of video recorders for anthropological observational research is a relatively new field that has developed over the last ten years (Lehner 1996). This fact, combined with the knowledge that very few studies have been conducted of cosleeping adults (Pankhurst and Horne 1994) and that parents had previously

never been filmed in the home environment sleeping with their infants, meant I found myself in a pioneering, exciting area of anthropological research. What Jackson described in one of the broadsheets in 1995 as being 'a field of research too young to have video cameras in real bedrooms' became a reality with this study in northeast England in 1997.

Time-lapse photography has been employed to great effect to explain movement synchrony between bed partners (Aaroson et al. 1980) and previously, their pets (Spagna and Hobson 1976), whilst wrist actimetry and morning sleep logs have been used successfully to assess body movements of adult bed partners (Pankhurst and Horne 1994). Actimeters have been described by those who have used them as being an attractive method for measuring the association of body movements between partners during sleep.

Although video tape recordings have been used to record sleep-wake behaviour in human infants, these have either been conducted primarily with the subjects sleeping in isolation (Anders and Sostek 1976; Anders 1979; Thoman 1987; 1990; Halpern et al, 1994) and more recently, with their mothers (Richard et al. 1996; Mosko et al. 1997; McKenna et al. 1997; Sawczenco et al. 1998; Young 1999). Twenty years ago Anders used 'in the home' time lapse video recordings of infants under 1 year old, to observe and assess sleep/wake states, night-time waking patterns and maternal interventions. Two groups of normal infants (n=68) aged 2 and 9 months were monitored, in their own homes, for one night using time lapse video recordings. Twelve hours of recording, with the camera focussed

only on the infant's crib, were filmed onto a one-hour reel of tape, in time lapse mode. The video camera used was sensitive to low light and a light source with an infra-red filter provided invisible illumination. Parents kept nightly sleep logs regarding their infants, during the week before the recording night to determine if the recording procedures had been intrusive. They recorded and gauged sleep states as QS = quiet sleep, AS = active sleep, AW = awake and OOC = baby out of the crib. Information on the development, with increasing age, of sleep states has been published (Anders 1979; Anders et al.1992), along with observations on the ability to fall asleep, bedtime and rising time, care-giver interventions and waking/sleeping during the night.

Research projects related to several causes for SIDS has led other investigators to examine the sleeping environment of infants. Wailoo and his team entered the 'home recording' arena when examining the thermal environment and body temperatures of 3-4 month old infants (1989 and 1990). Overheating and infants' inability to thermoregulate due to excess bedding has been associated with an increased risk of cot death (Fleming et al. 1990). Wailoo maintained (and still does, personal communication 1999) that infants should be monitored in their normal environment, at home. Their 1990 study used thermographic imaging to study babies sleeping at home to record gross body movements and the timing of parental interventions, and this data had to be correlated with environmental temperature recordings and continuous recordings of the infants' heart rate and rectal temperature (Anderson et al. 1990). After recording infants sleeping in isolation this team also recorded the rectal temperatures of cosleeping infants, to

investigate the effect of cosleeping with parents on core body temperatures of infants. Continuous, overnight recordings of the rectal temperatures of 34 infants cosleeping infants were made and compared with recordings taken from 34 infants sleeping alone. The infants were matched for age, gender, feeding practice, thermal environment and sleeping position. The researchers found that their cosleeping cohort had significantly higher rectal temperatures (0.1°C) than the controls. They proposed that the difference in rectal temperatures suggested that cosleeping infants were in a different physiological state to other infants (Tuffnell et al. 1994).

The work of McKenna and his research team has been reviewed in detail previously but mention of their work is required here, as a reminder that they utilised the video tape recordings of a smaller sample from their study, to examine sleep position, orientation and proximity of 12 Latino mother-infant cosleeping , breast-feeding pairs, as described on page 40.

Similar research to McKenna's, investigating the physiological effects of cosleeping, has been carried out in the UK. Fleming's team at Bristol created a sleep laboratory resembling a comfortable, domestic, British bedroom (which could also be thermally controlled). Using video camera, polysomnography and nocturnal body temperature recordings they made physiological comparisons of infants cosleeping with their mothers and sleeping separately in a cot at monthly intervals, between the infants' first and 5th months (and this study also forms the basis for the thesis of Young (1999). They enlisted 5 mother-infant pairs defined

as low risk for SIDS (non-smoking, breast-feeding). The normal routine practices for these infants is described as sleeping in a cot in the parental bedroom at home and rarely brought into the parental bed (cosleeping for no more than 3 nights per week for any part of the night). They were defined as room sharers. This definition was confirmed by the completion of a sleep practice questionnaire before recording took place. Contrasted with this group was another group of 5 breast-feeding, non-smoking, mother /infant pairs who were defined as cosleepers, (at home, mother and infant slept together in the same bed for at least 6 hours per night, 7 nights per week). Mothers visited the sleep laboratory for the initial acclimatisation night when their babies were 4 weeks old, which was then followed by a night sleeping in their usual 'at home' arrangement. Monthly visits were made to the sleep laboratory until the infants were 5 months old, with mother-infant pairs sleeping for 2 consecutive nights, randomly assigned to either cosleep in a double bed or to room share with the baby sleeping in a cot by the bed or vice versa. Recordings comparable to McKenna's were taken from thermistor sites on the baby only, with rectal temperature measured via a 5cm flexible probe. EEG, EOG, ECG, chest and abdominal movements and O_2 were digitally recorded onto a computer (IMS2000 polygraph using CARDAS software -Oxcams Ltd. Oxford). Video recordings using infra-red illumination were made with a time signal superimposed onto the video. Results show that infants were in a warmer environment when cosleeping, and although peripheral temperatures were raised, rectal temperatures, (reflecting core body temperature) were not elevated (Sawczenco et al.1998). They found no significant differences in the number or length of active or quiet sleep periods, or the length of nocturnal

awakenings and total length of infant sleep when cosleeping compared to solitary sleeping. More importantly when assessing re-breathing CO_2, as a possible risk mechanism for SIDS, they concluded that the maximum inspired CO_2 when cosleeping was 2.4% and was not associated with reduced oxygen saturation (Sawczenco et al. 1998).

A review of the literature reveals how technology has been applied to collect data involving maternal-infant sleep and how the technology used has progressed from time lapse to continuous video recording. We have now entered an era where we are no longer dependant upon anecdotal evidence of parent –infant sleep, as in the case of the unnamed film-maker who filmed himself sleeping with his infant and found that he instinctively rolled away from his baby during sleep (Davies 1995). Ironically this example is indicative of another very important issue that the present video study was designed to clarify the influence or effect of having the father in the bed. The interview study identified that cosleeping in western culture is triadic (three-in-a-bed), therefore it becomes paramount to examine cosleeping in the home environment and to include fathers. Although other studies have not concentrated their efforts on fathers we can take some of the methods used from previous studies and apply these to include all those who cosleep with their infants. Therefore, the present study has endeavoured to conform to a standard protocol set by those researching in similar fields.

The pilot video study was designed to investigate the feasibility of using video equipment to observe night-time interactions between parents and their infants,

which would allow for comparative analysis between the 3 in the bed night (triadic) and the 2 in the bed night (dyadic). The methodology for coding videotaped interactions between mother-father-infant cosleeping was also evaluated. Specific aims were to identify how the presence of the father in the bed affected any relationship between the mother-infant pair, questioning the benefits or risks involved for an infant sleeping with both parents as opposed to sharing a bed with the mother only. The main hypotheses to be tested are described below. The specific variables associated with the hypothesis and predictions and the methods for testing each hypothesis were as follows:

Feasibility

To assess the feasibility of in-home video recording of parent-infant cosleeping which involved assessing the competency of the infra red video technology in observing interactions between parents and infants and evaluating the methodology for coding video taped interactions in triadic and dyadic sleeping arrangements.

- **Hypothesis 1 - diversity of cosleeping arrangements**

Parents will arrange their cosleeping environment in different ways that will be tailored to attend to specific risks that concern that family.

- **Hypothesis 2**

The fathers' presence in the bed will influence and affect the cosleeping environment.

Cosleeping environments on dyadic and triadic nights will include:

a) sleep place and position

i) the effect of triadic and dyadic cosleeping on the place of infant sleep

ii) the effect of triadic and dyadic cosleeping on the position of infant sleep

iii) the effect of triadic and dyadic cosleeping on the position of maternal sleep

b) proximity

i) the effect of triadic and dyadic cosleeping on parent-infant proximity during the night

c) orientation

i) the effect of triadic and dyadic cosleeping on parent-infant orientation

d) cover arrangements

i) the effect of dyadic and triadic cosleeping on cover position on the infant during sleep

e) caregiving activities

i) the effect of dyadic and cosleeping on the frequency of infant caregiving activities

f) three in a bed

i) the effect of triadic and dyadic cosleeping on nocturnal safety/potential risk events

- **Hypothesis 3**

The fathers' presence in the bed will be disruptive and cause the mother and infant to have less sleep

Parental and infant sleep-wake states:

i) the effects of triadic and dyadic cosleeping on infant sleep-wake states

ii) the effects of triadic and dyadic cosleeping on mother sleep-wake states

iii) the effect of the father on synchronous sleep states between the cosleeping mother-infant pairs

iv) comparison between mothers' and fathers' sleep-awake states on triadic cosleeping nights

- **Hypothesis 4**

Parents who cosleep with their infant and employ either breast-feeding or formula-feeding will experience differences in night-time feeding interactions.

i) the frequency of night-time feeding episodes will vary between triadic and dyadic nights and between breast-feeders and formula-feeders.

ii) fathers will affect feeding interactions.

iii) fathers of infants who are bottle-fed will carry out night-time feeding episodes.

Methods involved with the video study

We obtained further approval from the ethics committee of North Tees Health Authority concerning the recruitment of participants to the video study, and this project began in early 1997.

As the first study of its kind to be undertaken, this pilot study initially aimed to assess several aspects concerning the feasibility of in-home video recording of parent-infant cosleeping. Feasibility involved several issues: a) would parents allow a camera into their bedrooms, b) was the infra red video technology competent to observe interactions between parents and infants, and c) could I develop the methods for coding video interactions in triadic sleeping arrangements.

Equipment

A video camera, tripod and infra red lamp used to pilot recordings of parent-infant cosleeping interactions was originally purchased from the Queen Elizabeth Hospital for Children, Hackney Road, London. A research team from the hospital, headed by Dr Sheila McKenzie, was involved in a study using time lapse video recordings of children with breathing problems, due to abnormal tonsils. They had used the equipment to pilot the study, which had proved to be successful and had purchased similar, technically superior but much lighter, equipment for the final study. I contacted the research team to enquire about the equipment they were using and ascertain the feasibility of using similar equipment for the cosleeping study. During this discussion they suggested that they would sell the

pilot equipment, which the Department of Anthropology, University of Durham, agreed to purchase. The video camera purchased produces such clear pictures that it is still used today! Other equipment for the pilot was borrowed from the University. Once the feasibility of using the equipment, in the home environment, was tested, the Department of Anthropology purchased a custom built, portable, set of equipment from Stowood Scientific Instruments, Oxford, that was used for half the recordings made for this pilot study

The equipment, specially modified for recording in the home environment (shown in Illustration 4.1 and contained in a portable, aluminium box) consisted of:

- Bandridge VA 474 Tripod
- JVC video recorder HRJ 220-with remote control and connected to the mains supply via an isolation transformer
- Bandridge Audio Amplifier
- Nortek Time Date Generator
- Super Uni-Directional Electret Condenser Microphone
- Dennard 880 Infra-Red Lamp
- JVC TK-S240 Video Camera

Illustration 4.1 Video recording equipment.

Process of Recruitment

Inclusion criteria for this pilot project was: any family, in the North Tees region, who were normally cosleeping with their infant and who would consider having a video camera in their bedroom. For the infant, inclusion criteria were that they were in good health, with normal growth and coslept with their parents, and were less than 6 months of age.

Having built up a good research relationship with the health professionals from North Tees Health Authority during the interview study it seemed pertinent to continue to recruit families for the pilot video study from North Tees Health maternity services, via midwives and health visitors - see Appendix D for

example of poster that was displayed in health centres and baby clinics. Local media services, TV, press and radio were also used in an effort to raise the profile of the research and to generate sufficient interest that parents would contact us to volunteer for the study. This was used to good effect with TV producers and reporters showing a great deal of interest - see Appendix E for examples of several newspaper articles. The focus of the research benefited from what turned out to be a 'media frenzy' but many of the volunteers for the study generated this way came from outside the local area or had infants older than the cut off. It was therefore not logistically practical to recruit all those who volunteered.

It was originally planned to recruit 10 families who coslept with their baby regularly, were non-smokers, with breast-fed infants under 6 months old. However, two of the recruits, although breast-feeding when they volunteered, had switched to formula feeding shortly before being videotaped. Two infants included in the study were exclusively bottle-fed and a further family who were formula-feeders were included because their circumstances made them particularly interesting. The mother of this infant had written to us, after reading about the study in a local newspaper, to explain that the primary caregiver of her infant was not herself but her husband. She was a full-time career woman with a demanding job (working long hours and one weekend out of two) and the father, who worked from home, was able to look after his daughter. The opportunity to include a father as the primary caregiver and the willingness of the family to take part in the study provided sufficient reasons for accepting them. In all, fifteen of the families who volunteered were videotaped as part of this project. On

reviewing the tapes, however, one family failed to share their bed with their infant on the nights in question (although they did cosleep with their toddler, with the infant in a crib by the bed). The videos from this family were not included in the analysis, which is based on the other 14 families.

Procedure

The process of recruiting families, after the initial contact through the various channels previously mentioned, was achieved by time consuming and meticulous methods to ensure that the parents were fully aware of what the study entailed and their part in it. This was a gradual process of communication with the family (usually the mother) ensuring that information concerning the study and their participation in it was fully understood. A great deal of time was concentrated into achieving an arrangement of trust whereby those involved were made to feel that they could contact the researcher at any time, with any question. Information about previous studies and knowledge of them was shared and much time was spent just listening to their own anecdotal experiences of sharing a bed with their infant. For any family who required further reassurances concerning the study, the telephone number of previous participants was offered (and often used) to allow the family the opportunity to discuss the 'research experience' with a family who had already taken part. Careful reassurances about control of the video recording and the tapes were reiterated during conversations with the parents. They were made fully aware that they could turn the video recorder off at any time and make any adjustment to the recordings that they deemed to be unacceptable.

During this process of recruitment, a full written explanation of what the study entailed was also provided entitled 'Information for Parents' – see Appendix F. After agreeing to proceed with the study a consent form –see Appendix G - was signed and on a mutually agreed date the specialised video equipment was installed in their bedrooms for a total of three nights. The first night served as an adjustment night, whilst the other two nights, in an order decided by the families themselves, were either observed as a dyadic (mother-baby) cosleeping night or a triadic (mother-father-baby) cosleeping night.

The specialist video equipment was contained in a portable (if heavy) aluminium box and consisted of a camera and tripod, a video recorder which could be set to long play to enable us to get a full eight hours of recordings from one four hour video tape. The video tape recorder was connected to a genloc device that overlaid the time and date onto the recording, enabling us to ascertain the exact time when coding videos. A small microphone allowed us to monitor sound and an infra red light allowed the family to sleep in normal conditions but enabled video observations even during the hours of darkness. Initially, (for the first two families videoed) we used a different infra red lamp, which unfortunately failed during one of the recordings of family E, and proved difficult to replace. We purchased another, which proved to be more reliable.

The video camera was placed as close to the bed as possible so that the whole bed and its immediate surroundings could be filmed, illuminated by the infra red lamp mounted on the tripod adjacent to the camera. Parents controlled the starting time

of the recordings (usually when they went to bed) and changed the tape daily-written instructions were given to this effect-see Appendix H. It was reiterated to the parents that they could, at any time, stop the video recording and they were asked not to alter their normal night-time parenting practices. To ensure that a true representation of their night-time behaviour was observed subjects were asked to fill in sleep logs for one week prior to videotaping. The sleep logs – see Appendix I - collected information concerning where the baby fell asleep, the subsequent sleeping places of the infant throughout the night, position of sleep, number of feeds, parent-infant care taking interactions, infant clothing and bedding and alcoholic drink and smoking practices of the parents.

Parents were also interviewed extensively using a set of semi-structured interview questions – see Appendix J for questionnaire regarding aspects of cosleeping - following taping, enabling qualitative data on practices and effects of cosleeping to be discussed and collected. Parents normally viewed the videotapes after recording and were given the opportunity to erase anything, which they deemed inappropriate. Strict guidelines were adhered to in order to maintain parents' confidentiality.

Behavioural code

The videos were analysed using a behavioural code that employed an ethological approach to analyse the observations of parent-infant night-time interactions. Methods for measuring behavioural interactions between mothers and infants have already been established by McKenna and his colleagues. However,

research to date has not included fathers and here I adapted McKenna's taxonomy to include observations of father, mother and infant night-time behaviour. The use and development of an 'ethogram' (a behavioural taxonomy) is central to the study of animal behaviour and human ethology uses the concepts and procedures developed in animal ethology and adapts them to examine the physiological mechanisms underlying behaviour and behavioural patterns in humans (Eibl-Eibesfeldt 1989). Describing ethology as a 'nearly limitless discipline' Lehner (1996) offers several definitions, demonstrating that a precise and widely accepted definition eludes ethologists (pg 2). Eisner and Wilson (1975:1) define ethology as the:

> ....study of whole patterns of animal behaviour under natural conditions, in ways that emphasise the functions and the evolutionary history of the patterns.

Human ethology is simply defined by Eibl-Eibesfeldt (1989 pg 6) as 'the biology of human behaviour'. Both definitions can be applied to the present study of observations of night-time interactions under natural conditions, of parent-infant cosleeping.

Video recordings of both dyadic and triadic nights were coded for the duration of the tape (usually around 7 hours) then inputted into a computer spreadsheet (Excel 5). The data were reviewed in epochs of 3 minutes with any intermediate movement, feeding bout or interaction also being coded. A copy of the taxonomy

can be found in Appendix K, and an example of the data coding spreadsheet (one complete and one empty) is given in Appendix L.

Videos were coded in real time with all feeding, movement and care giving interactions being recorded for type, time and duration. The observed sleep states of those in the bed were recorded in one of 4 categories, with orientation, proximity and position of individuals involved being observed and recorded as defined in the taxonomy. The limb position of the parents in relation to the infant was also coded, as was the approximate height of the infant in relation to the parents in the bed. The place and direction of the infant was recorded using clock position as a guide and finally the cover position on parent and infant was observed, coded and entered.

Due the small numbers of volunteers involved in the study non-parametric tests were applied, ideal for analysing pilot study data (Siegel and Castellan 1988). Chi-square tests were used to determine simple association between variables. To establish whether there were significant differences for variables under the two conditions (triadic and dyadic) a Wilcoxon signed ranks test for two related samples was used. The Wilcoxon-Mann-Whitney test was applied for between group comparisons e.g. mothers vs. fathers on the triadic night. The data was manipulated and analysis run using an Excel 5 computer application. Significance was attributed when $p < 0.05$.

Results

I report here on 14 families who were all regular cosleepers and were observed sleeping in their home environment for 3 consecutive nights, using a video camera and infrared lighting. Ten of the infants were breast-fed, two had recently switched from breast-feeding to formula-feeding, and two infants had been bottle-fed from birth. In thirteen cases the mother was the primary caregiver and in one case the father was the primary caregiver.

1 Feasibility

The first aim of this pilot study was to assess the feasibility of in home video recording of parent-infant cosleeping and to discover whether parents would volunteer to have a video camera and recorder in their bedrooms.

1.1 Recruits

Families volunteered to take part in the study for various reasons ranging from an academic interest in the subject to a realisation that their cosleeping practices were much maligned by society and a desire to demonstrate that their sleeping strategy worked for them. Mothers either contacted us following media appeals, or were approached to take part in the video study by myself, after learning that they were regular cosleepers, during the interview study. Mothers were also far more interested in having the video equipment placed in their bedrooms than were fathers. Due to this, I was dependent on the mothers to persuade their partners to allow their nocturnal interactions with their infants to be recorded. Those who took part achieved this but there were several other mothers whose powers of

persuasion failed and they were lost to the sample. Paternal reasons for not wanting to be involved generally concerned genuine fears that the videos would find their way into non-academic arenas. Video clips of comical, embarrassing situations have become popular entertainment in the nineties, for example the ITV programme "You've Been Framed". Reassurances regarding ethical issues of confidentiality did not appear to allay paternal concerns and these fathers declined to take part in the study, much to the disappointment of mothers.

There were delicate issues concerning the placement of a video recorder and camera in 'real' bedrooms and parents were assured that they could turn the camera off at any time, but many commented that they were too tired to do anything else during the night but get some sleep! One mother involved in the video study did choose to borrow a 'nightie' (sleeping garment) from her mother, as she usually slept naked. Another family edited their tape and removed a brief portion of tape that they did not wished to be viewed without further explanation.

1.2 Equipment

A further aim of the pilot study was to assess the competency of the infra red video technology in observing interactions between cosleeping parents and infants and to evaluate the methodology for coding video taped interactions in triadic and dyadic sleeping arrangements.

On the whole, the equipment worked to good effect and we are continuing to use the methods (and some equipment) established in the pilot video study to further

observe interactions between parents and infants who cosleep in the home environment. The original infra red lamp proved to be problematic during the recording of family E, but the purchase of a different type of infra red lamp soon rectified the problem. The purchase of a trolley to transport the equipment to various households also eased operator load (lack of muscles) but household stairways still prove to be hazardous when carrying the equipment to the bedroom.

2. Diversity of families and sleeping arrangements

2.1 Family A

These parents (mother aged 32, father aged 37 years old) had a 6 month old daughter, who was their first child. The mother was a sales executive who had no formal post secondary education. The father described himself as a househusband who worked when he could (around 20% of his time) as an export consultant. He had obtained a degree and a further masters degree in civil engineering. The mother and father were British with the father being of Jordanian descent and they had been married 3 years. The infant was born by elective caesarean (to fit in with the mother's busy schedule) in hospital, after a normal pregnancy, at 38 weeks and weighed 6lb 4ozs.

The bedroom of **family A** can only be described as very large and very different from the other family bedrooms of those involved in the study. The bedroom was a complete self-contained unit with a study area, a living room area and the bedroom area, which contained the bedroom furniture. The bed was composed of

twin, single beds fastened together to make a king sized double bed, with pillows and a duvet cover. The camera was placed to the left-hand side of the bed.

2.2 Family B

These parents (mother aged 33 and father aged 33) had a two-month-old female infant in addition to one other daughter, aged 4½ years old. Both parents had obtained degrees and were currently employed as academics in different universities. The father was American and the mother British and they had been married 7 years. The infant was delivered naturally at 37 weeks gestation, and had been exclusively breast-fed since birth. The parents were habitual, all night cosleepers and had slept with their previous infant for 9 months. This family's baby was born in hospital but the mother elected for a DOMINO delivery (Domicilary IN-OUT) and left hospital 4 hours after delivery. The baby slept in the parent's bed from the first night.

The bedroom of **family B** was an average sized bedroom in a three bed roomed semi-detached house. The bed was a king size bed and cellular covers and sheets were used, rather than a duvet. Pillows were placed on the bed positioned in such a way, so that there was a definite gap between one set of two pillows for the mother and one set of two pillows for the father. This allowed the baby to be placed fairly high up in the bed (level with the parents) without coming into contact with the parents' pillows. The video camera was placed, at the bottom of the bed, in the middle of the bed, but away from the bed by approximately 3 feet. A point to note was that the bedroom of Family B did not contain a cot.

2.3 Family C

The parents from this family (mother aged 26 and father aged 28) had a 6-month-old daughter in addition to two other children, a boy aged 5 years old and a girl aged 3 years old. Both parents had left school at sixteen with no post-secondary education. The mother was not employed outside the home, whilst the father was an electrician at a local steelworks, and his pattern of work occasionally included shift work. Both parents were English, and they had been married 5 years. The baby had been delivered naturally, in hospital, at 40 weeks gestational age, weighing 7lb 5oz after a trouble free pregnancy and was exclusively breast-fed since birth. The parents had coslept with the other two children but not as often as the new baby, with the mother attributing this to 'better breast-feeding with this baby' when describing the reasons for cosleeping.

Family C had the smallest bedroom of the study subjects. In a three bedroom semi-detached house (two average size bed rooms and one tiny bedroom), the parents had recently moved into the smaller of the two average sized bedrooms to allow the other two children to share the larger bedroom (with all their toys). The only bedroom furniture apart from the ¾ sized double bed was a small wardrobe placed on the same wall as the head of the bed. There was no other furniture in the room and hardly enough room to place the camera. This meant that the camera was very close to the bed, angled at the bottom left hand side and not directly in the middle of the bed. This further restricted the access into the bed, which did not appear to be a problem for the family involved. This parental bed

had a duvet and pillows and there was no separate sleeping place for the infant in the bedroom but there was a cot in the small bedroom.

2.4 Family D

These parents (mother aged 33, father aged 40) had a 6-month-old son who was their first child. The father was employed as an editor and had some post secondary education (A levels, HND and had dropped out of University). The mother left school at 16 years and trained on a YTS (youth training scheme). She was not currently employed, outside the home, but her occupation prior to the birth of her baby was as a cardiographer. Both parents were British and they had been married just over 3 years. The mother had a 'perfect pregnancy', which she 'sailed through', however, the birth (which occurred in hospital) was difficult. The baby was 4 days overdue and labour was induced, instigated by health professionals involved with the birth and the ventouse suction procedure had to be employed. The baby's birth weight was 7lb 12oz; he was exclusively breast-fed from birth and was taken into the bed to breast-feed at night during his 2-day stay in hospital.

The bedroom of **family D** was contained in a two bedroom-terraced house and thus was slightly smaller than the average British bedroom (average British bedroom is 15' x 13' or approx. 5 x 4 metres). The bed was a standard double sized bed furnished with a duvet and pillows. A cot was placed on the right hand sidewall of the room, but was filled with toys and evidently not used at all. The camera could not be placed directly at the end of the bed, and was angled slightly

to the left side of the bed, about a metre away from the bed. A bed rail was placed on the mother's side of the bed to prevent the baby from falling out of the bed.

2.5 Family E

These parents (mother and father aged 34 years) had two daughters aged 4 months and 2 years old. The mother had just returned to work after the birth of her second baby, and was employed as a recruitment consultant. The father was employed in business development. Neither parent had any post-secondary education, both were British, and had been married for three years. The second pregnancy was not straight forward as the mother was diagnosed as having gallstones towards the latter part of the pregnancy (8 months). These had given the mother a considerable amount of pain and discomfort and she was prescribed drugs to alleviate the pain. The baby was 9 days over her estimated birth date and labour was induced, (in hospital) due to the mother being 'at the end of her tether'. The ventouse suction procedure was used in the final stage of labour. The baby weighed 10lb 3oz at birth and was breast-fed during her 24-hour stay in hospital. The parents, now habitual cosleepers, had not slept with their previous infant preferring to place her in a cot to sleep

The bedroom of **family E** was contained in an average, British, three bedroom semi detached house. The focal point of the room was the large king-size bed, complete with large pillows and a duvet. Again the furniture dictated the position of the camera, placement being at the bottom, left hand side of the bed,

approximately 2 feet away. The infant did have a cot in another room that she had only slept in during the day.

2.6 Family F

The parents from this family (mother aged 36 and father aged 35 years) had a 6-month-old daughter, who was their first child. Both parents were academics with PhD's and employed at the same university, as lecturers. The mother was English, the father white-Chinese and they had been married 2½ years. The baby was born by normal delivery at 39 weeks and 5 days gestational age, after a trouble free pregnancy and weighed 7lb 12 oz. The infant did not take to breast-feeding straight away, with mother and baby taking 3 weeks to establish a breast-feeding routine. The infant's delivery occurred in the local hospital, where mother and infant stayed for 5 days and nights.

A large, old, 4 bedroom town house provided the living quarters for **family F,** who had modified their sleeping arrangements to create, what they perceived, to be a safe cosleeping environment for their daughter. The bedroom was large, with a standard double bed, which was not on a base but placed directly onto the floor, surrounded by very large cushions, complete with sheets and blankets. A cot was placed close against the right hand side of the bed. Following the same position as the bed, the body of the cot was placed directly onto the floor, without legs and the left side of the cot was missing, which meant that the open side was a continuation of the bed. The camera was placed, in space, at the bottom left hand side of the bed to allow a clear view of the bed and the cot.

2.7 Family G

The parents from this family (mother aged 35 father aged 35) had a 4-month-old daughter in addition to two other children, a boy aged 5 years old and a girl aged 3 years old. The father was employed as an engineer whilst the mother remained in the home. Both parents were British, they had been married eight years and both had degrees in engineering. The baby was born in hospital, during a normal delivery, at 39 weeks gestational age and weighed 6lb 8oz. She had been exclusively breast and had slept with her mother/parents since birth. These parents had coslept with all of their children as infants.

The main feature of **family G's** sleeping arrangement was the size of the bed. Referred to as the 'family bed' it occupied most of the space in the bedroom of a large 4-bedroom town house. It was an 'extra large' bed purchased specifically to allow anyone who cared to share - to sleep there. Furnished with a duvet and pillows it was the only piece of furniture in the room, apart from a chest of drawers. This allowed plenty of room for the camera, which was placed, at the bottom of the bed, towards the left-hand corner. Another feature from this family that was not found in any other family taking part in the study, was the presence of the family cats (2) throughout three nights of video taping. They shared the bed with the other family members.

2.8 Family H

The parents from this family (mother aged 36 and father aged 51 years) had a 6-month-old daughter, who was their first child. The father was an engineer (with out any formal post secondary education), spending his week working away from home to return at the weekend. The mother, (who had a degree) was looking for employment but was quite content to be 'kept busy' at home. She was also a cigarette smoker. Both British, the parents had been co-habiting for two years. Their infant had been delivered normally, in hospital, seven days over her due date and weighed 7lb 4oz. She had been breast fed for eleven weeks but had changed from breast to bottle before being video taped.

The bedroom of **family H** was in a three bedroom terraced cottage and was of average size. A standard sized double bed, furnished with blankets and pillows, was placed up against the sidewall of the room, which meant that access to the bed could only be gained from the open side. A cot was placed in the room, along with two other items of bedroom furniture. The camera was centrally placed, at the bottom of the bed.

2.9 Family I

The parents from **family I** (both aged 29 years old) had been married for 5 years and had two little boys aged 3 years and 4 weeks old. The father had a HND certificate in arbouraculture and was employed as a tree specialist. The mother was on maternity leave from her post as a residential social worker but was studying for a social worker diploma. The baby was delivered normally, in

hospital, at 38 weeks, weighing 6lb 8 oz. Bed sharing with their infant was a new experience for this family as their first baby had slept in a cot. The necessity of breast-feeding often was cited as the reason for cosleeping.

An average sized bedroom and double bed were the sleeping quarters for **family I**, with blankets and pillows used as the preferred bedding. There were several other pieces of furniture in the room but no cot and the camera was placed centrally at the foot of the bed.

2.10 Family J

Family J had the youngest parents involved in the study, mother aged 19 and father aged 21 years old. Their baby boy was 2 months old and their first child. The father was employed as a hydraulic fitter and attending college as part of his training. He was a cigarette smoker, smoking on average, 3 cigarettes per day. The mother's college studies had been interrupted by the birth of her baby but she was planning to return to her studies at a later date. Both parents were British and had been cohabiting since the birth of their infant. The infant was delivered normally, in hospital, 2 weeks early and weighed 6lb 9oz. He had been exclusively breast fed since birth and had begun to bed share whilst feeding in bed.

Previously, **family J** had been living with her parents but had moved into a two-bedroom council owned property just before being filmed. The bedroom was an average size, containing a double bed (with sheets, blankets and pillows), a chest

of drawers and a Moses basket (placed to the left of the bed). The camera was again positioned centrally at the foot of the bed.

2.11 Family K

Another young couple that volunteered to take part in the study was **family K**, mother aged 23 and father 25 years of age. Their infant, a boy, was 4 months old but no other information pertaining to this family is available, as they did not return the relevant forms (they had several reminders!). Information gathered comes from general conversation and observations. Both parents were local to the area with the father employed and the mother remaining at home. The baby was exclusively breast fed from birth and had begun to cosleep in hospital.

The bedroom of **family K** was contained in a 3 bedroom terraced house of average size. A standard sized double bed, furnished with blankets and pillows, was in the middle of the bedroom, with plenty of access for the camera, which was centrally placed at the bottom of the bed. There was no separate baby-sleeping place i.e. a cot, in the bedroom.

2.12 Family L

The parents from **family L** (mother aged 25, father aged 27 years old) had been married for 4 years and had two little girls, aged 3 years and 4 months old. The father was employed as a mechanic and the mother was not employed outside the home. Both parents were British and neither had any post secondary education. Their infant was delivered normally, in hospital at 38 weeks, weighing 6lb 9oz.

Although bottle fed from birth, the infant had been taken into bed on a regular basis since leaving hospital. The family had experience of sharing a bed with their first infant but not as regular or as often as the new baby.

Family L's large bedroom was contained in a terraced town house. The bed was standard size, with duvet and pillows but the baby had her own cover, independent of the parental duvet, which was used when she was sharing the bed. The other bedroom furniture did not affect the camera position, which was placed to the left, at the foot of the bed. There was a cot beside the bed, which the infant was placed in before being taken into the parental bed.

2.13 Family M

The parents from **family M** (mother aged 27 and father aged 32 years old) had a son aged two months old. He was the first child for the mother but the father had another son from a previous relationship. The father was a builder without post secondary education whilst the mother trained as an educational psychologist and had a degree. Both parents were British, and had been cohabiting for four years. The baby was delivered, normally, in hospital at full term and weighed 6lb 5oz. He had been exclusively breastfed since birth.

The sleeping environment for **family M** was an average sized bedroom, in a three bedroom, semi-detached house. The bed was a standard size with duvet and pillows but the pillows were always placed away from the baby. The camera was

placed at the bottom of the bed, slightly to the left, with lack of space dictating the position.

2.12 Family N

Family N parents (mother 28, father 31 years of age) had a baby girl, aged 7 months old, who was their first child. Both had degrees, with the father working for the local council and the mother employed as a university lecturer. Married and both British, their infant was delivered normally, in hospital at 38 weeks gestational age, weighing 7lb 5oz. The infant had been breast fed exclusively and had slept close to her parents, either on the parental futon or on a futon next to her parents, since birth.

Family N's bedroom was contained in a large four bedroom semi-detached house with two futons placed on the floor and plenty of room to place the camera. The parents had purchased a 'baby' futon which was placed along side their own futon, and duvet and pillows were used. The camera was placed at the bottom of the parental futon, to the left side.

Table IV Summary of subject's background data

	Family	Parents age	Post-secondary education	Employment	Housing	Total children
A	**Father**	37	Degree and higher degree	Worked from home as export consultant part time	Very large bungalow within its own spacious grounds	1
	Mother	32	None	Sales executive		
B	**Father**	33	Degree	Both employed as academics in different universities	3 bedroom semi-detached house	2
	Mother	33	Degree and higher degree			
C	**Father**	28	None	Electrician at local steel works	3 bedroom semi-detached house	3
	Mother	26	None	Housewife		
D	**Father**	40	A levels and HND	Editor	2 bedroom terraced house	1
	Mother	33	None	Housewife		
E	**Father**	34	None	Business development	3 bedroom semi-detached house	2
	Mother	34	None	Recruitment consultant		
F	**Father**	35	Degree and higher education	Both lecturers at the same university	Large 4 bedroom town house	1
	Mother	36	Degree and higher education			
G	**Father**	35	Degree	Engineer	Large 4 bedroom town house	3
	Mother	34	Degree	Housewife		
H	**Father**	51	None	Civil Engineer	3 bedroom terrace cottage	1
	Mother	36	Degree	Housewife/unemployed		
I	**Father**	29	HND	Aborts	3 bedroom semi-detached house	2
	Mother	29	Studying for DIPSWA (social worker)	Residential social worker		
J	**Father**	21	Ongoing	Hydraulic Fitter	2 bedroom council owned terraced house	1
	Mother	19	Ongoing	Housewife/student		
K	**Father**	25	None	Process worker	3 bedroom terraced house	1
	Mother	23	None	Housewife/unemployed		
L	**Father**	27	None	Mechanic	3 bedroom terraced house	2
	Mother	25	None	Housewife/unemployed		
M	**Father**	32	None	Builder	3 bedroom semi-detached house	2 (mothers first, fathers second)
	Mother	27	Degree	Educational psychologist		
N	**Father**	31	Degree	Council employee	Large 4 bedroom semi-detached house	1
	Mother	28	Degree	Lecturer		

Table IV shows that the families who took part in the video study were heterogeneous in terms of education, employment, living standards, age and number of children. All the parents were non-smokers apart from the mother from family H and the father from family J. The descriptions of the cosleeping environments provide the first evidence, in the home, concerning the diversity involved with the sleeping arrangements of cosleeping families (as shown in table V). Furthermore, it is evident that the parents involved in the video study had modified their sleeping arrangements to account for their infant's safety. This supports the prediction from the first hypothesis: that parents will arrange their cosleeping environment in different ways that will be tailored to attend to the specific cosleeping safety risks that concern particular families.

Table V Summary of sleeping environment.

Family	Bedroom size	Bed size	Covers used	Safety concerns
Family A	Very large, separate living quarters	Two single beds pushed together to create a king-size bed, - over 5'/152cm wide	Duvet and pillows	Had previously created a platform within the bed to place the infant upon.
Family B	Average sized bedroom	King sized bed-5'/152cm wide	Cellular blankets and pillows	Pillows pushed apart to create a sleeping place for the infant.
Family C	Small bedroom	¾ double bed3'6"/107 cm wide	Duvet and pillows	No obvious safety concerns
Family D	Smaller than average sized bedroom	Standard double bed 4'6"/137cm wide	Duvet and pillows	Bed rail was used to stop the infant falling out of the bed
Family E	Average sized bedroom	King sized bed – 5'/152cm wide	Duvet and pillows	Purchase of a king sized bed to allow for cosleeping
Family F	Large bedroom	Standard double bed4'6"/137cm wide	Cotton sheets, blankets and pillows	Bed was directly placed onto the floor with cushions surrounding it and cot was adjacent and also placed directly alongside the bed, on the floor
Family G	Large bedroom	Extra large bed over 5'/152cm wide	Duvet and pillows	Large family bed to accommodate everyone
Family H	Average sized bedroom	Standard double bed 4'6"/137cm wide	Cotton sheets, blankets and pillows	No pillow for baby but pillow placed beside infant was sleeping to prevent her from falling out of bed
Family I	Average sized bedroom	Standard double bed 4'6"/137cm wide	Cotton sheets, blankets and pillows	No obvious safety concerns
Family J	Average sized bedroom	Standard double bed 4'6"/137cm wide	Cotton sheets, blankets and pillows	Pillow placed beside the infant to preventing him falling out of bed
Family K	Average sized bedroom	Standard double bed 4'6"/137cm wide	Duvet and pillows	No obvious safety concerns
Family L	Large bedroom	Standard double bed 4'6"/137cm wide	Duvet and pillows	This infant has a single cover of her own used independently from the parental duvet
Family M	Average sized bedroom	Standard double bed 4'6"/137cm wide	Duvet and pillows	Mother made sure that covers were 'tucked in' under the mattress to secure infant
Family N	Large bedroom	Standard sized futon 4'6"/137cm wide	Duvet and pillows	Futon level with the floor with baby futon placed beside at the same level

3 Triadic and dyadic cosleeping

Table VI Number of 3-minute scans and observation time for each family:

Family	Dyadic night	Triadic night
A	137 scans 6 hours 51 minutes	158 7 hours 54 minutes
B	151 7 hours 33 minutes	156 7 hours 48 minutes
C	138 6 hours 54 minutes	73 3 hours 39 minutes
D	153 7 hours 39 minutes	165 8 hours 15 minutes
E	24 1 hour 12 minutes	78 3 hours 54 minutes
F	163 8 hours 9 minutes	137 6 hours 51 minutes
H	163 8 hours 9 minutes	165 8 hours 15 minutes
G	166 8 hours 18 minutes	160 8 hours
I	161 8 hours 3 minutes	165 8hours 15 minutes
J	159 7 hours 57 minutes	154 7 hours 42 minutes
K	163 8 hours 9 minutes	162 8 hours 6 minutes
L	161 8 hours 3 minutes	151 7 hours 33 minutes
M	163 8 hours 9 minutes	149 7 hours 27 minutes
N	164 8 hours 12 minutes	164 8 hours 12 minutes

The discrepancies in observed sleep time that occurred were due to:

- the infant from family C started the triadic night sleeping in her cot and began cosleeping (brought into the parental bed) at 3:20am.
- infra red lamp failure during recordings on both nights for family E, which meant that cosleeping interactions could only be observed during daylight hours. The results from family E cannot therefore, be treated as representative as they do not provide a representative picture of this family's cosleeping behaviour.

3.1 Infant sleep place and position

The data presented in this and subsequent sections were devised by taking the number of scans made (1 every 3 minutes) in which the infant was asleep or appeared asleep as the denominator, calculating the number of scans where the infant was in a particular place or position as the numerator, dividing the latter by the former and multiplying by 100, to express as a proportion of total infant sleep time.

Figure 4.1 shows the most common infant sleeping places (in the bed) for each family on the dyadic and triadic nights. On the dyadic night infants were placed or preferred the be on the outside of their mothers whilst on the triadic night infants sleeping in between the parents was more commonly observed. It would appear that mothers appreciated the extra space when fathers were not in the bed on the dyadic night and slept in the centre of the bed with the baby at their side.

Figure 4.1

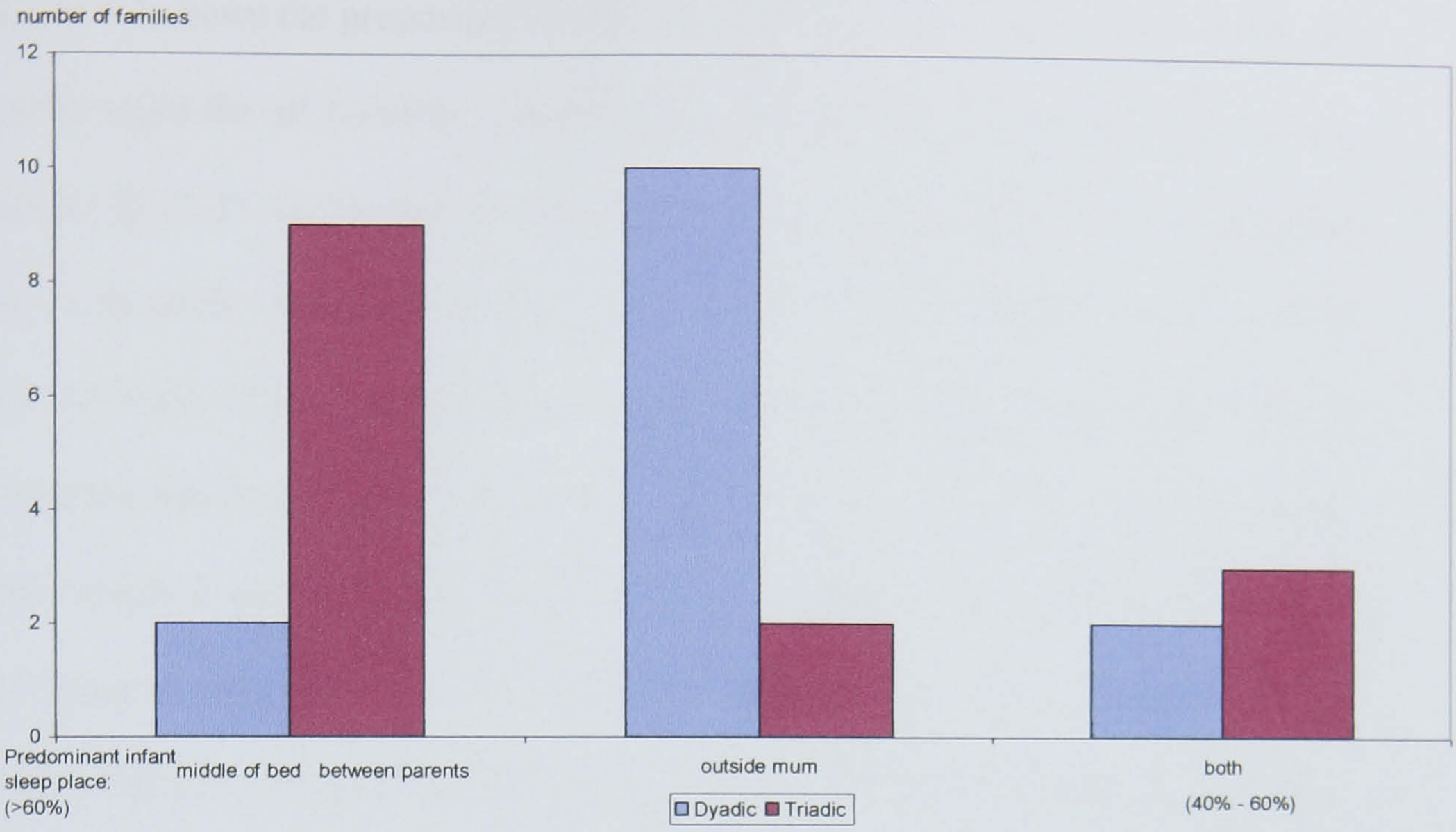

Predominant infant sleeping place
number of families
12
10
8
6
4
2
0
Predominant infant sleep place: (>60%)
middle of bed
between parents
outside mum
both
(40% - 60%)
Dyadic
Triadic

Figure 4.2 shows the proportion of sleep time for each infant sleep position on the dyadic night for all families. On the dyadic night 6 of the 10 breast-fed infants (babies B, C, D, G, M, and N) spent the majority of time in a lateral rather than supine position. The other breast-fed infants (babies F, I, J and K) were on their side for some of the sleep time but a larger percentage was spent supine. The 4 bottle-fed infants (baby A, E, H and L) were supine for most of the dyadic night, with infants E and H supine for 100% of the sleep time, although the sleep time for infant E only comprises 42 minutes of observation. Three of the 6 infants slept in the prone position for a short period during the dyadic night (baby B, baby C and baby D). Examining the data further to ascertain how the incidences of prone sleeping occurred reveals that baby B was sleeping prone on her mother's chest, baby C had turned into the prone position herself but was repositioned into a lateral position by her mother after 10 minutes and baby D rolled onto his front but then rolled back onto his side to face his mother.

The proportion of the night that infants slept in a lateral position was smaller on the triadic sleep night, and mainly involved the breast-feeding infants (as shown in figure 4.3), apart from the infant from family M who slept laterally for 100% of both nights. Two of the 3 infants who slept in a prone position for a short time on the dyadic night also did so on the triadic night (baby B and baby D). Further investigation of the infants' prone sleep position on the triadic night reveals that baby B was turned prone by her mother during an unsettled period and then repositioned laterally (with mother B facing her infant the entire time that the

infant was prone). Infant D turned into the prone position himself and then turned into a lateral position during a sleep period.

Figure 4.2

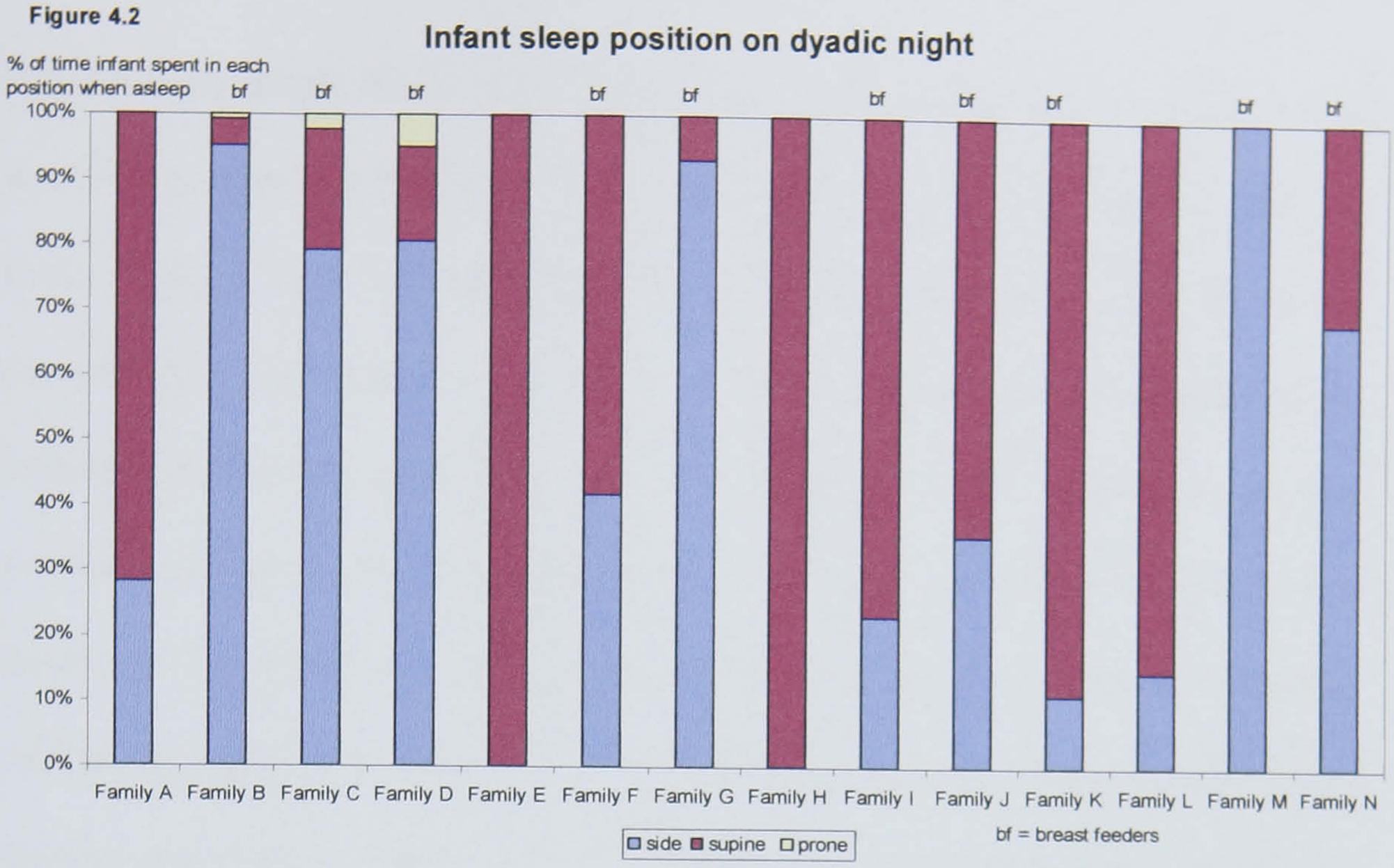
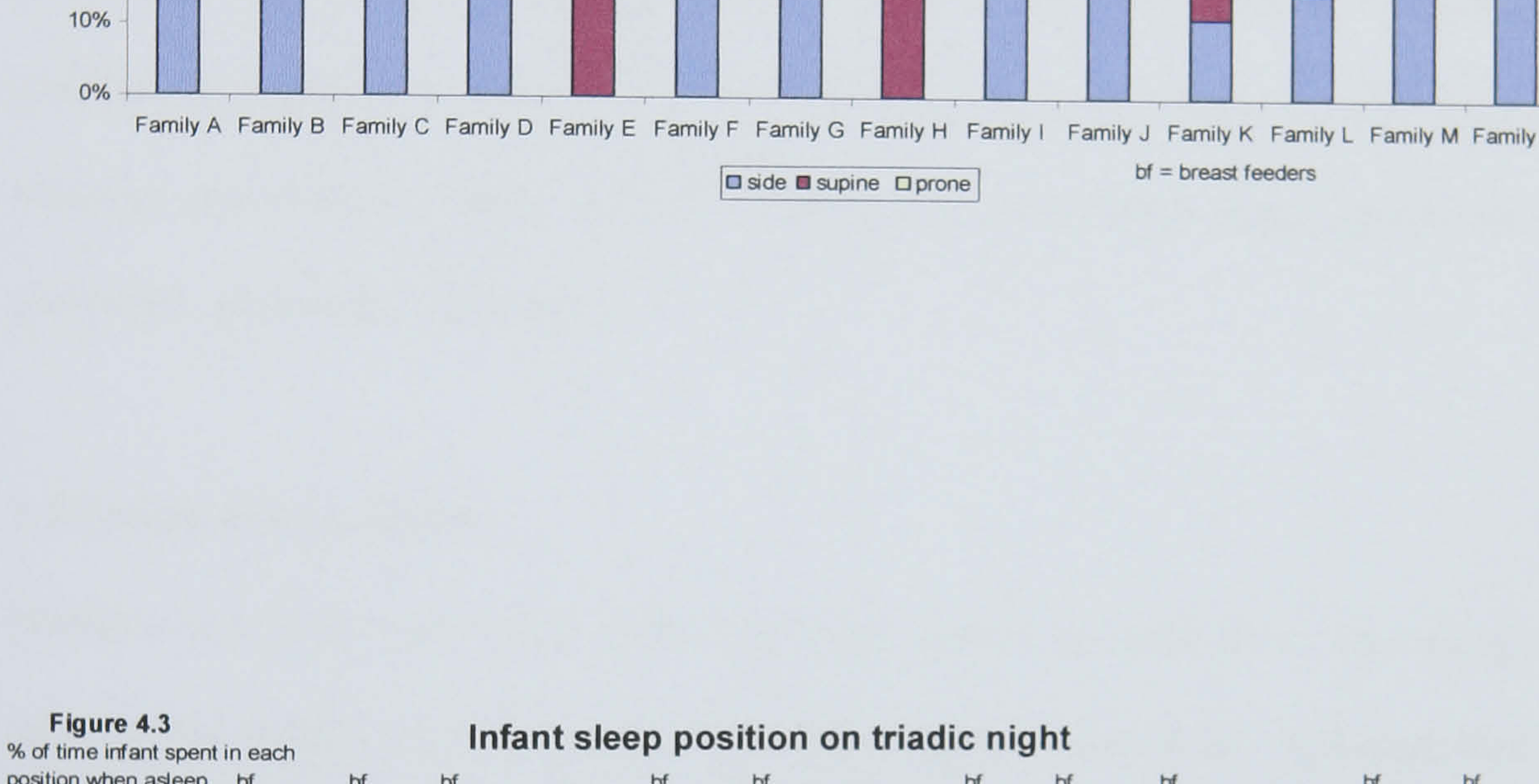


Figure 4.3



The summary graph (figure 4.4) shows that, overall, although the proportion of time infants spent sleeping in a lateral position was less on the triadic than the dyadic night, it was still the favoured position for infant sleep, especially for breast-feeders. To examine if the presence of the fathers in the bed affected the position infants slept in, a Wilcoxon signed ranks test (for matched pairs) was conducted on the dyadic and triadic night data but no significant difference was found (n =12, T+ =40 p = 0.4849). Two infants were observed sleeping in a prone position for a greater proportion of the triadic than the dyadic night but time spent sleeping prone was of short duration and during consecutive scans rather than numerous, individual instances.

3.2 Parent sleep position

Mothers predominantly slept curled up (legs curled up and arms encircling) around their infants on both triadic and dyadic nights (figure 4.5). Although this position appeared to be more prevalent when the father was in the bed with the mother-infant pair, a Wilcoxon signed rank test determined that the difference in proportion of scans where the mother curled up around her infant (when both asleep) on the dyadic vs. the triadic night was not significant (N = 14, T + = 69, p = 0.1629). To see if this 'curled up' position was characteristic of the breast-feeding mothers another Wilcoxon signed rank test was used, excluding data from the formula-feeding mothers, but again this was not significant (N = 10, T + = 32, p = 0.3477).

Figure 4.4

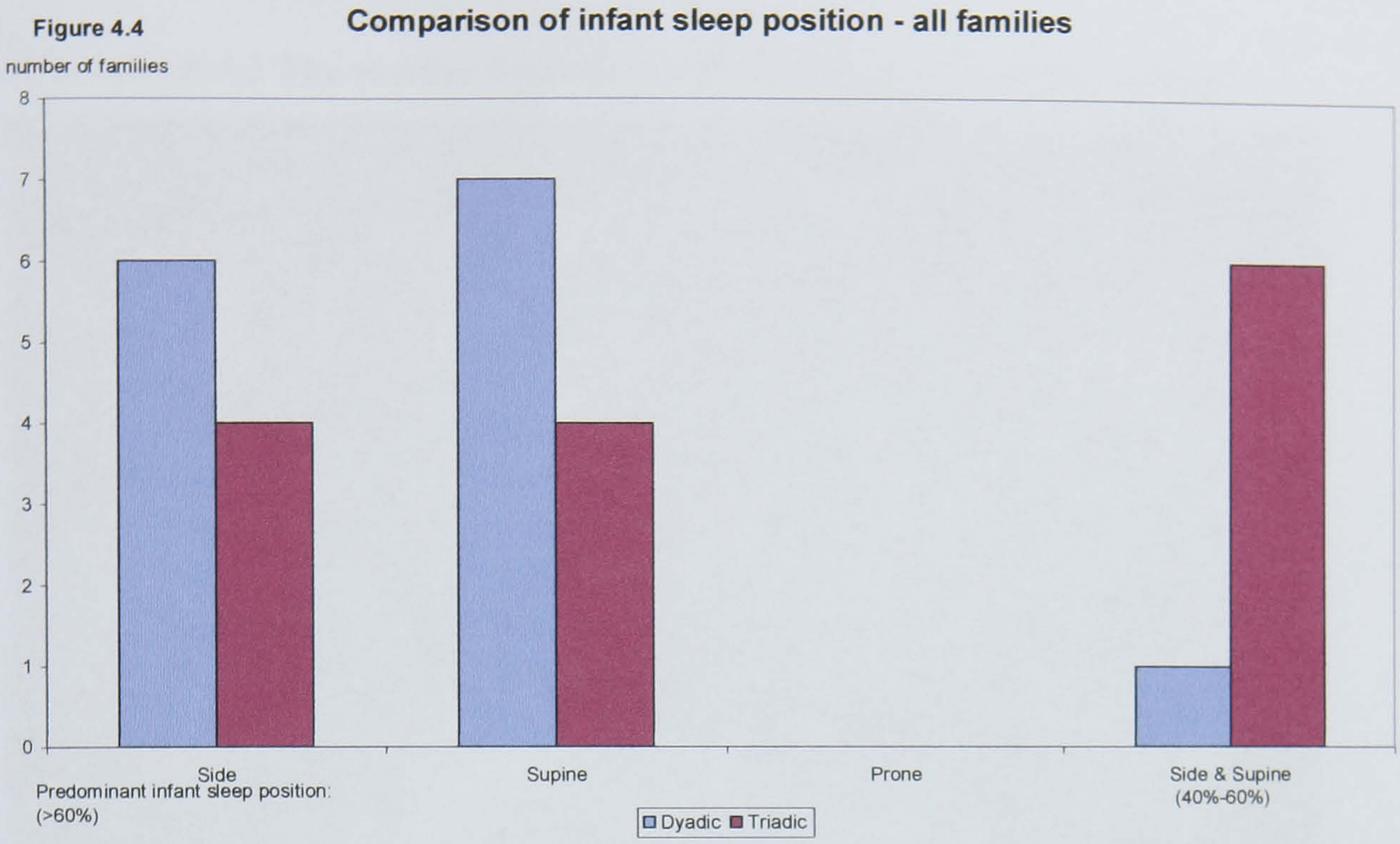


Figure 4.5

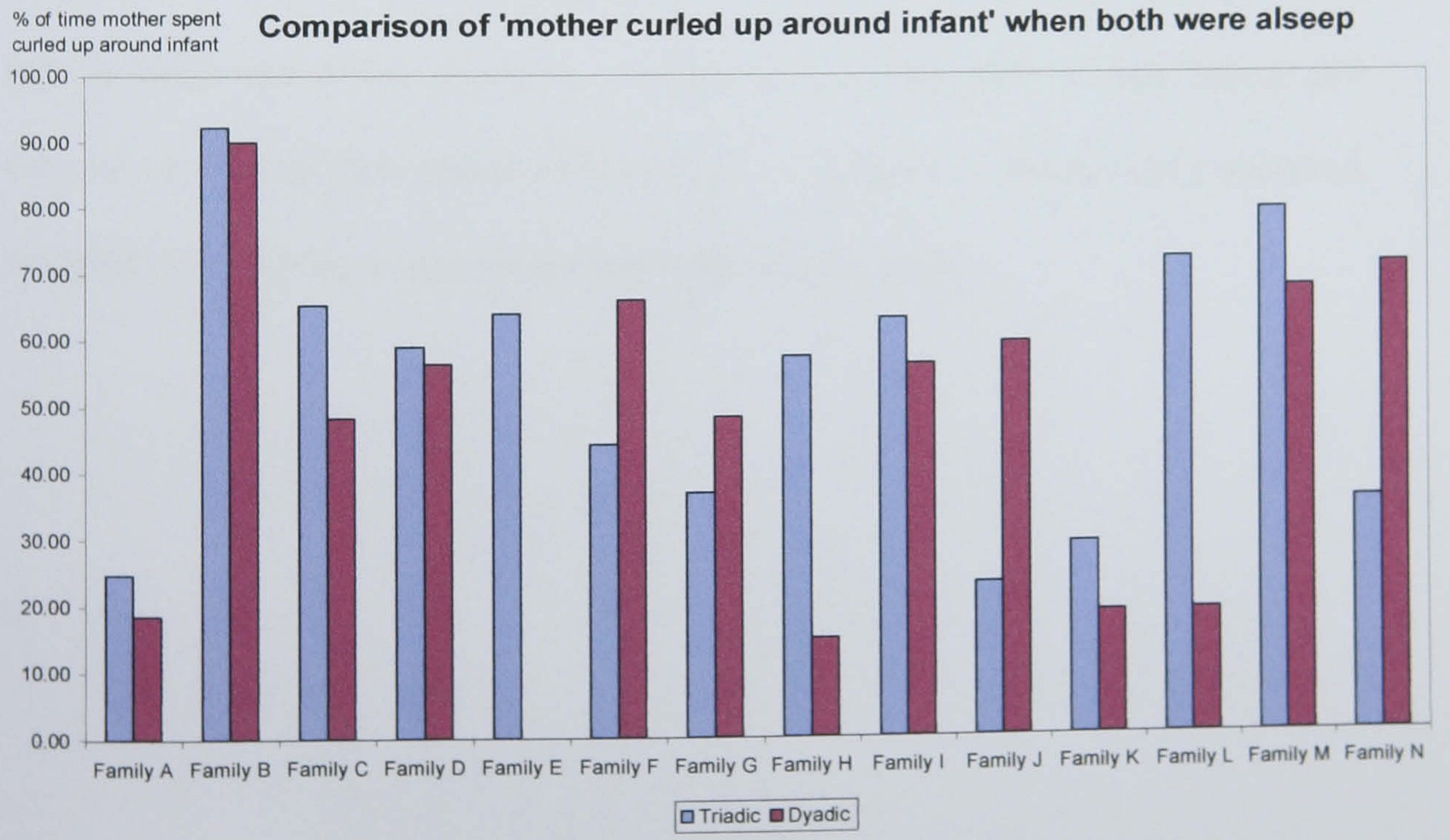


Illustration 4.2 The mother from family D curled up around her infant

Fathers generally did not curl up in this fashion and were observed to have their legs in either one of two positions, straight or in a knee tuck. A few fathers did did curl up around their infant (fathers A, G, J, K and L) but were only observed sleeping this way for short periods during the triadic night.

Illustration 4.3 The father from family A curled up around his infant

There was more variation in fathers' whole body position, when their infants were asleep, compared to mothers' body position. Figure 4.6 shows that father A, B, E, J, and M slept in all three positions (lateral, supine and prone) during the triadic night, whilst fathers C, D, F, G, H, I, K and M were either lateral or supine, with the father from family L sleeping lateral and prone. Mothers exhibited some variation in body position on the dyadic night when the father was not in the bed (figure 4.7) but appeared to spend more time positioned on their side whilst their infants were asleep during the triadic night (figures 4.8). To test if the proportion of scans concerning side sleeping varied between mothers and fathers (on the triadic night) a Wilcoxon-Mann-Whitney test was applied and found to be

significant ($p = 0.0129$). To examine if mothers predominantly slept in a lateral position significantly more on the dyadic night than when the fathers were in the bed on the triadic night, a Wilcoxon signed rank test was applied. However, there was no significant difference in the number of observed scans of mothers sleeping in the lateral position, when the infant was asleep, between the dyadic night and the triadic night ($N = 14$, $T- = 57$, $p = 0.4039$).

3.3 Orientation

The mothers' orientation towards their infants when infants were asleep appeared to be very similar on the dyadic and triadic nights. On the dyadic night (figure 4.9) only mothers A and K spent the majority of the night facing away from their infants (71% and 61%), whilst the other mothers faced their babies for most of the time (100-51%). During the triadic night, (as shown in figure 4.10), mothers A and K faced the baby more frequently than they had on the dyadic night, but this could be the influence of the father in the bed as they may have been facing the fathers. A Wilcoxon signed rank test was applied to examine if mothers tended to face their infants more on the dyadic night than the triadic night, which showed no significant difference between the two nights ($N = 14$, $T + = 58$ $p = 0.3804$). For the majority of the time, <u>most</u> mothers orientated towards their infant when asleep. For fathers, the majority spent the triadic night facing away from their infants, when asleep (figure 4.11). Fathers A, H, J, and M divided the sleep time between facing away, facing neutral and sleeping facing their infants, with the father from family L both sleeping away and facing his baby.

Figure 4.6

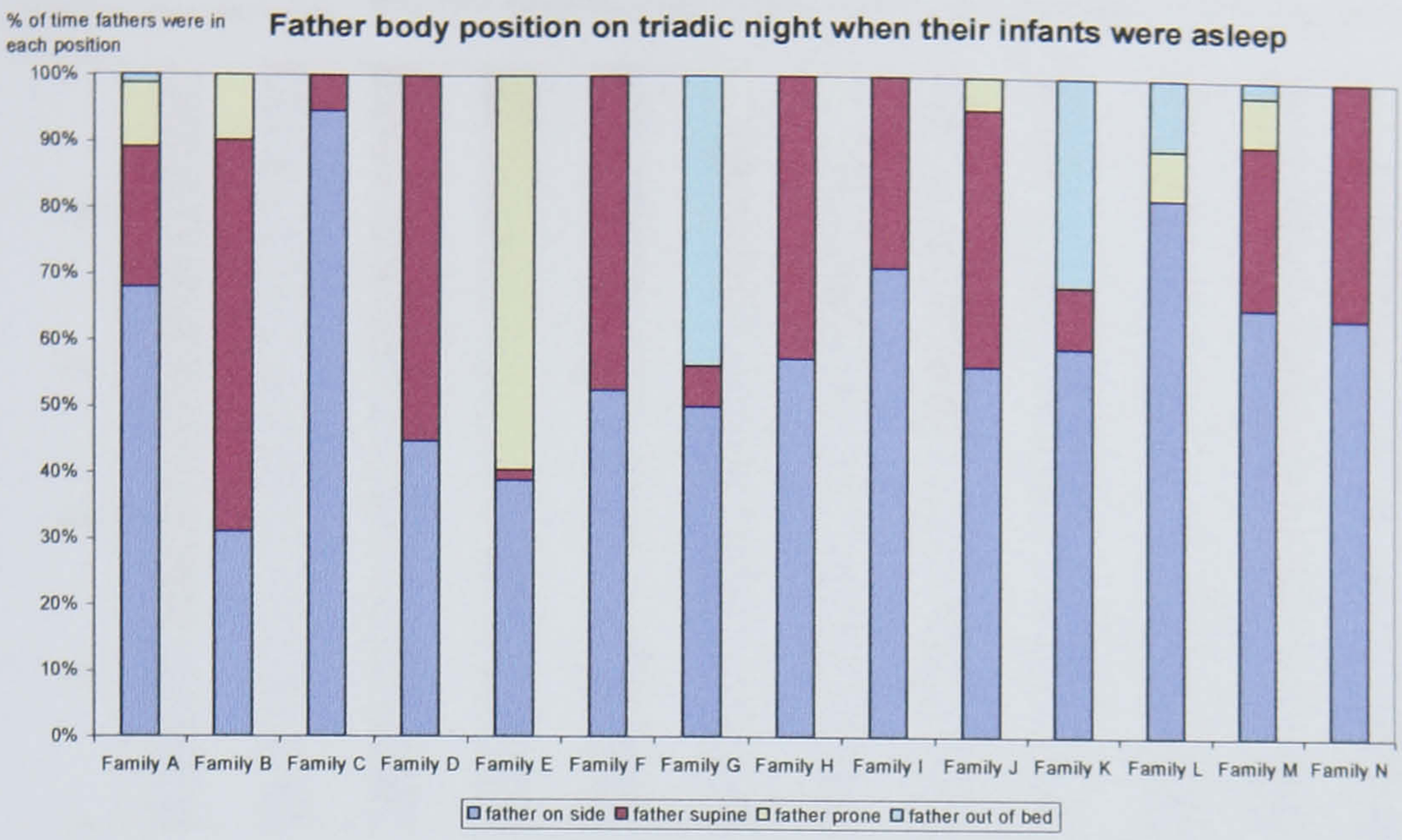


Figure 4.7

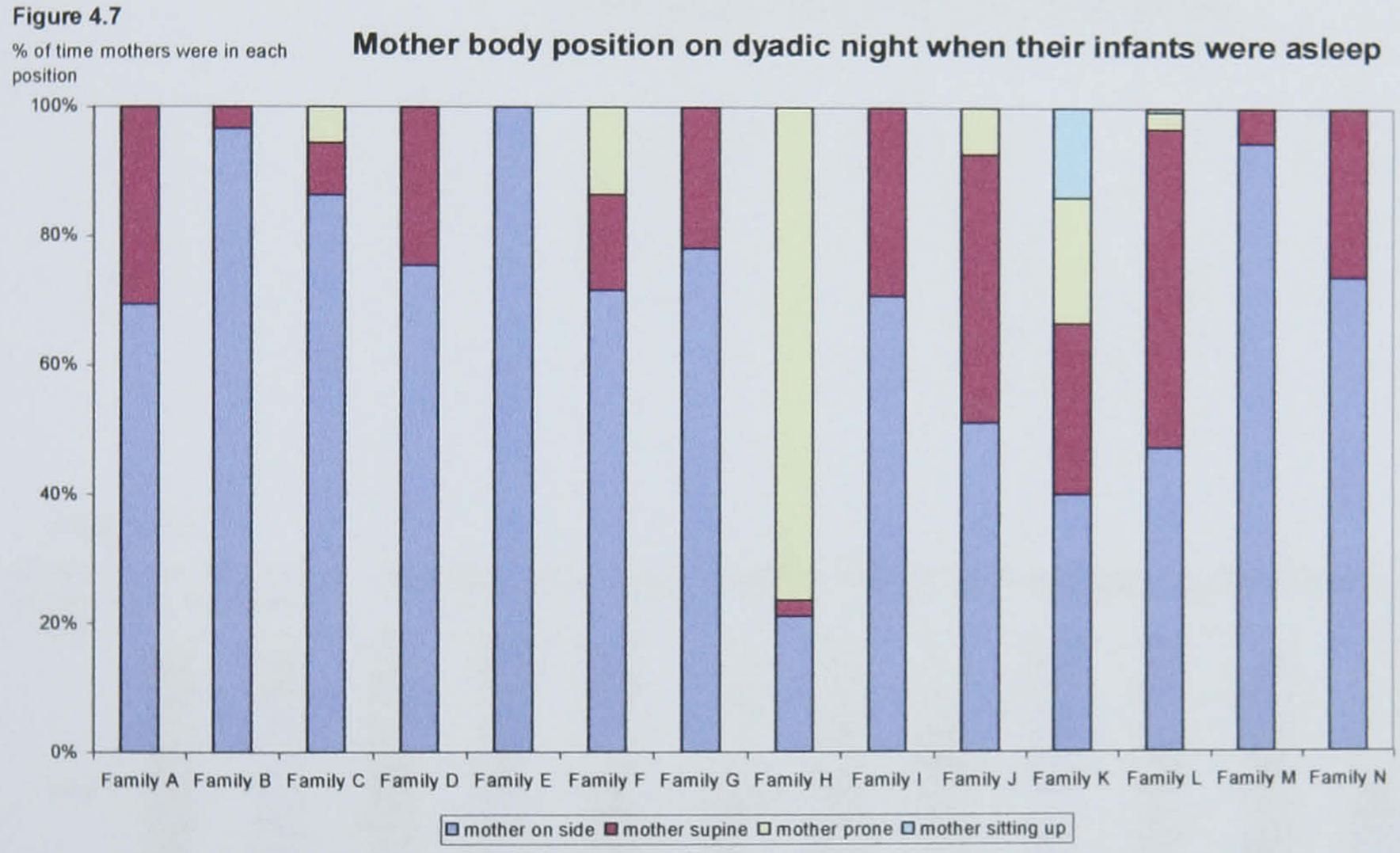


Figure 4.8

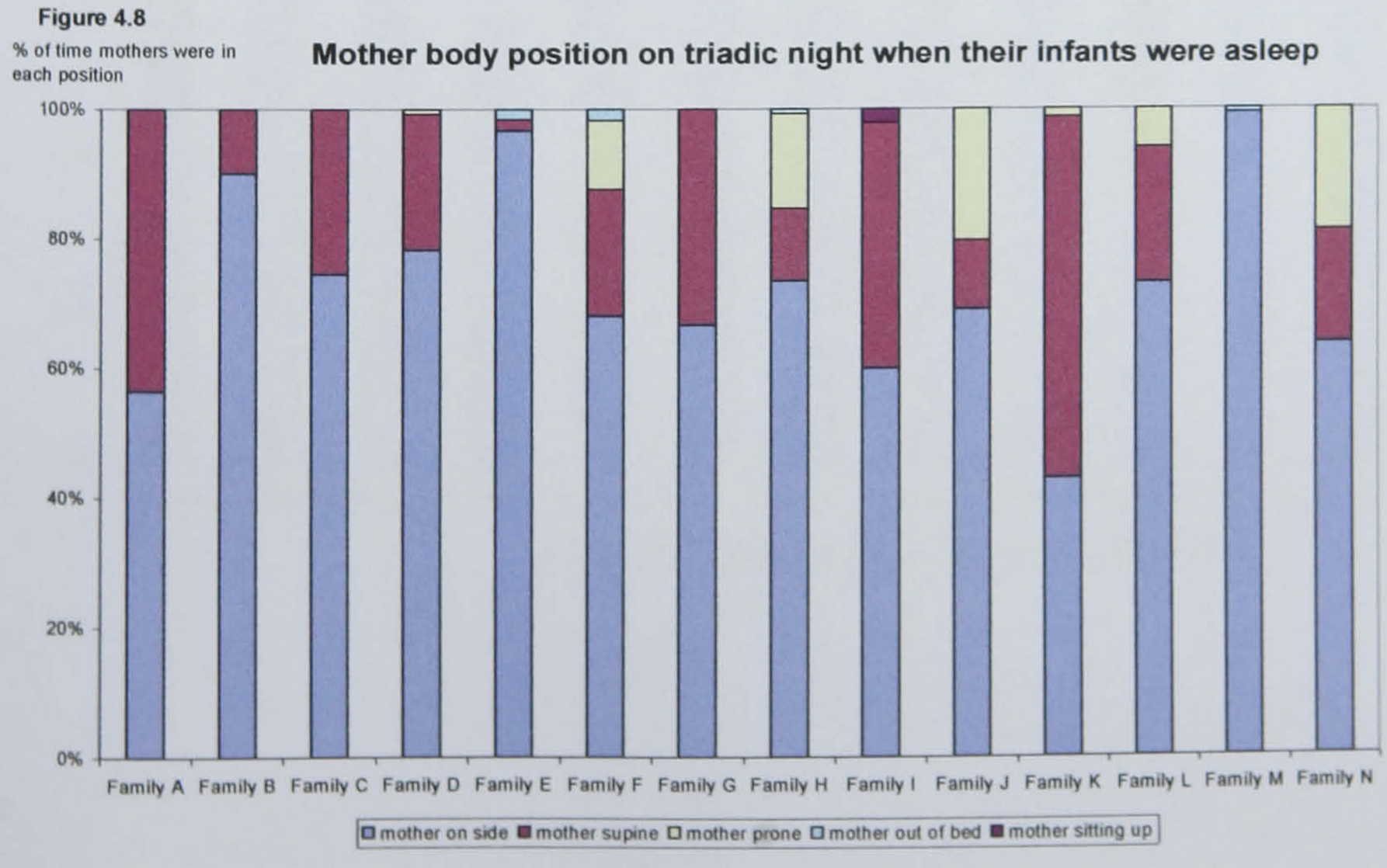


Figure 4.9

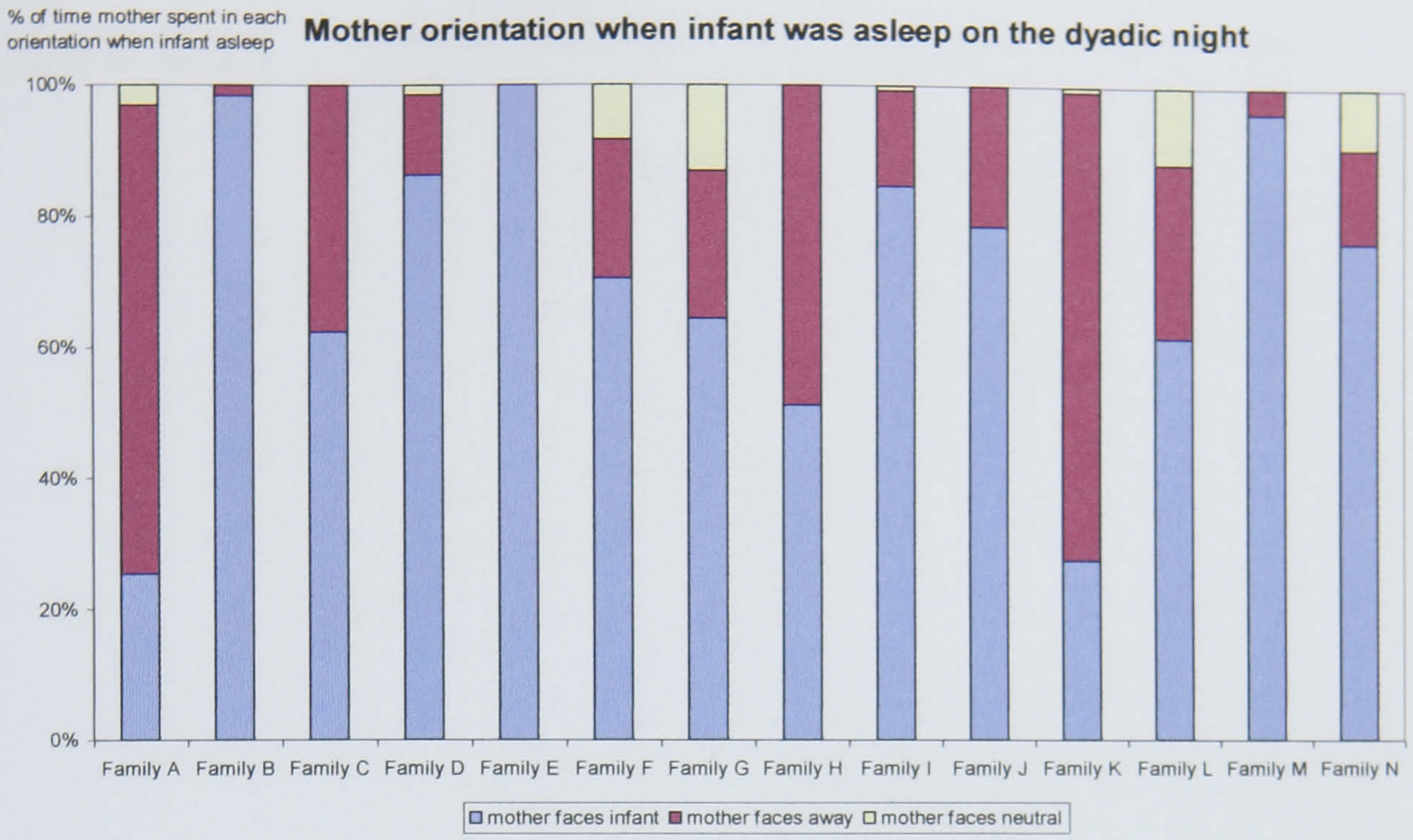


Figure 4.10

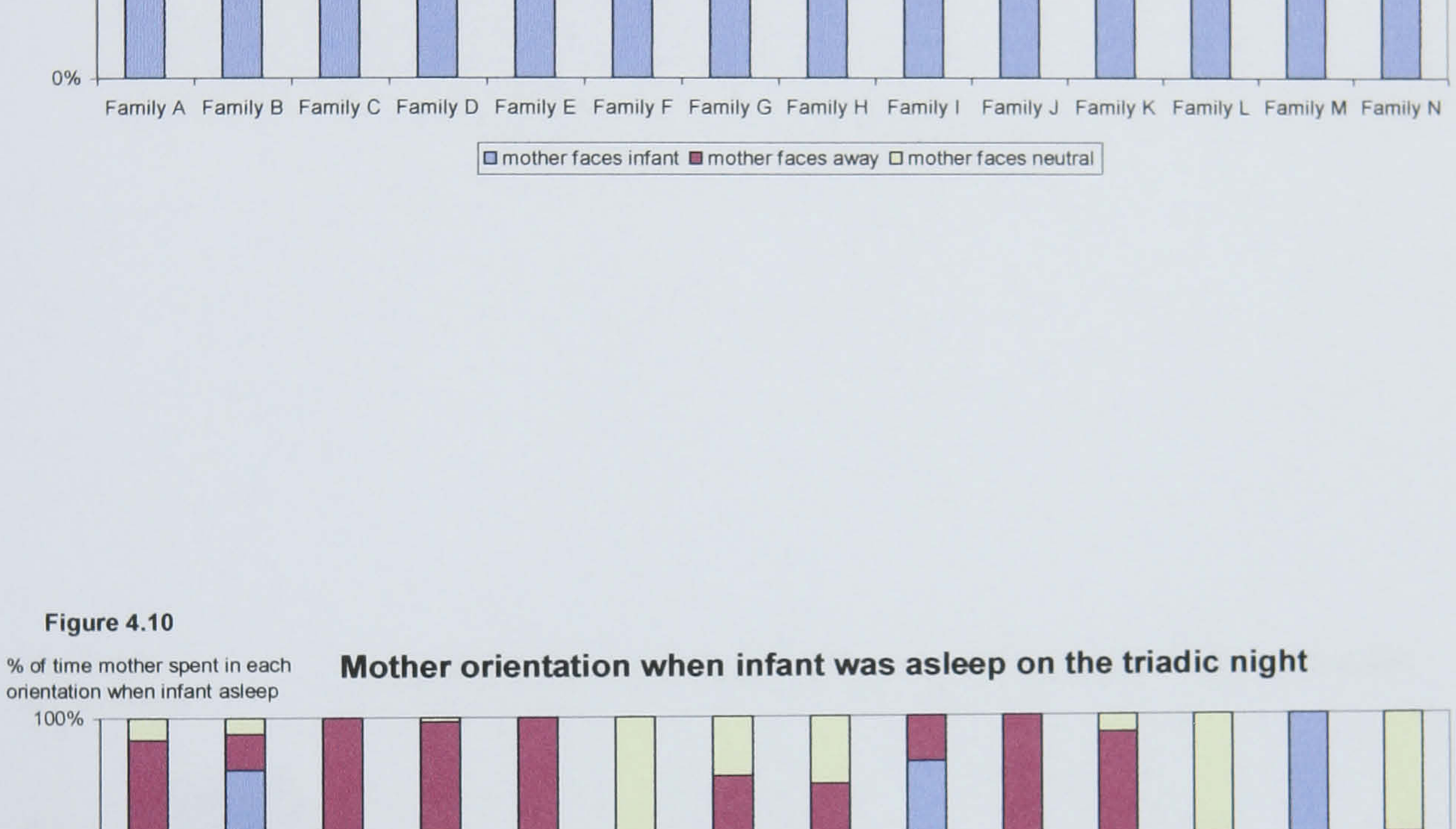


Figure 4.11

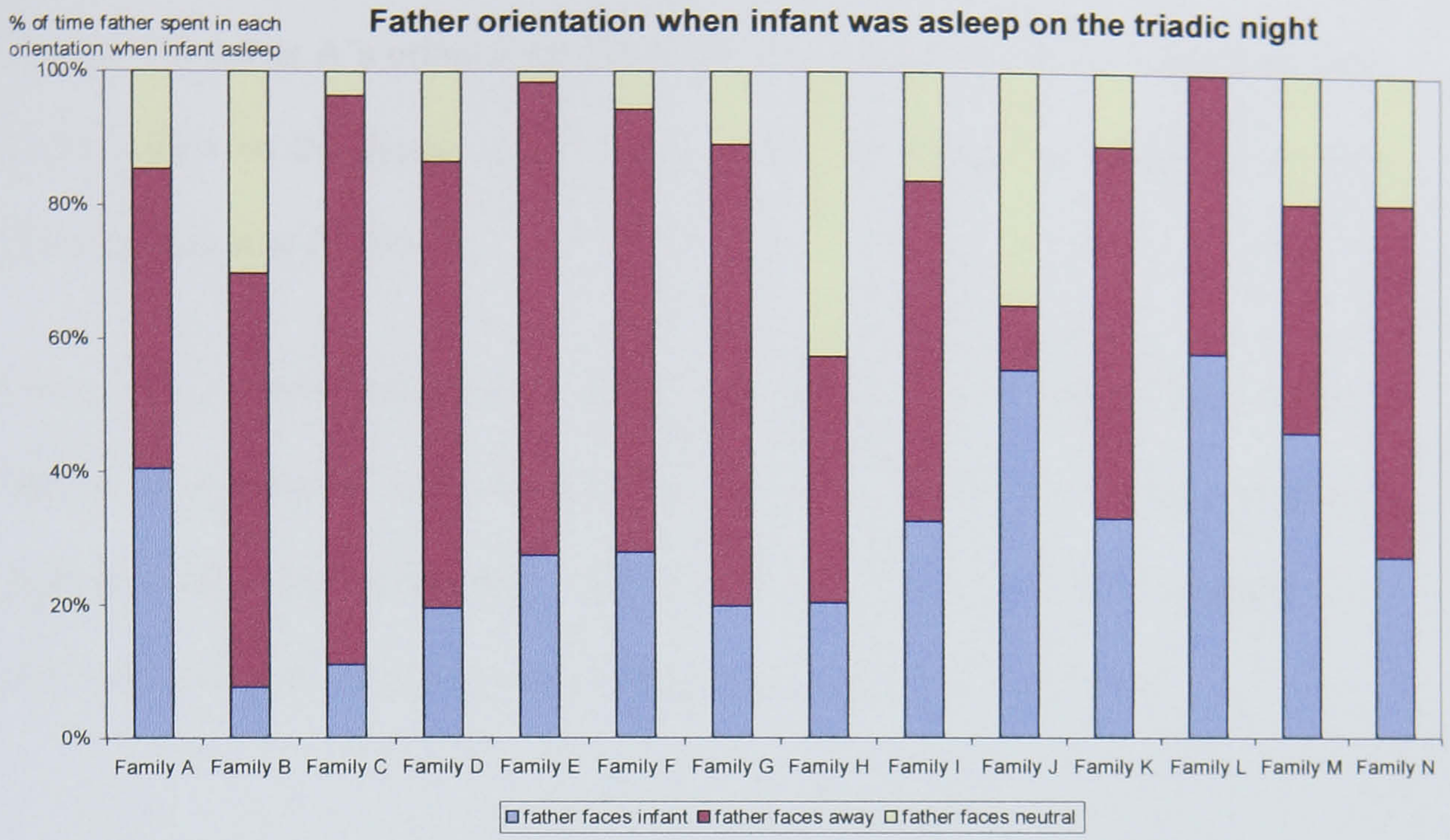
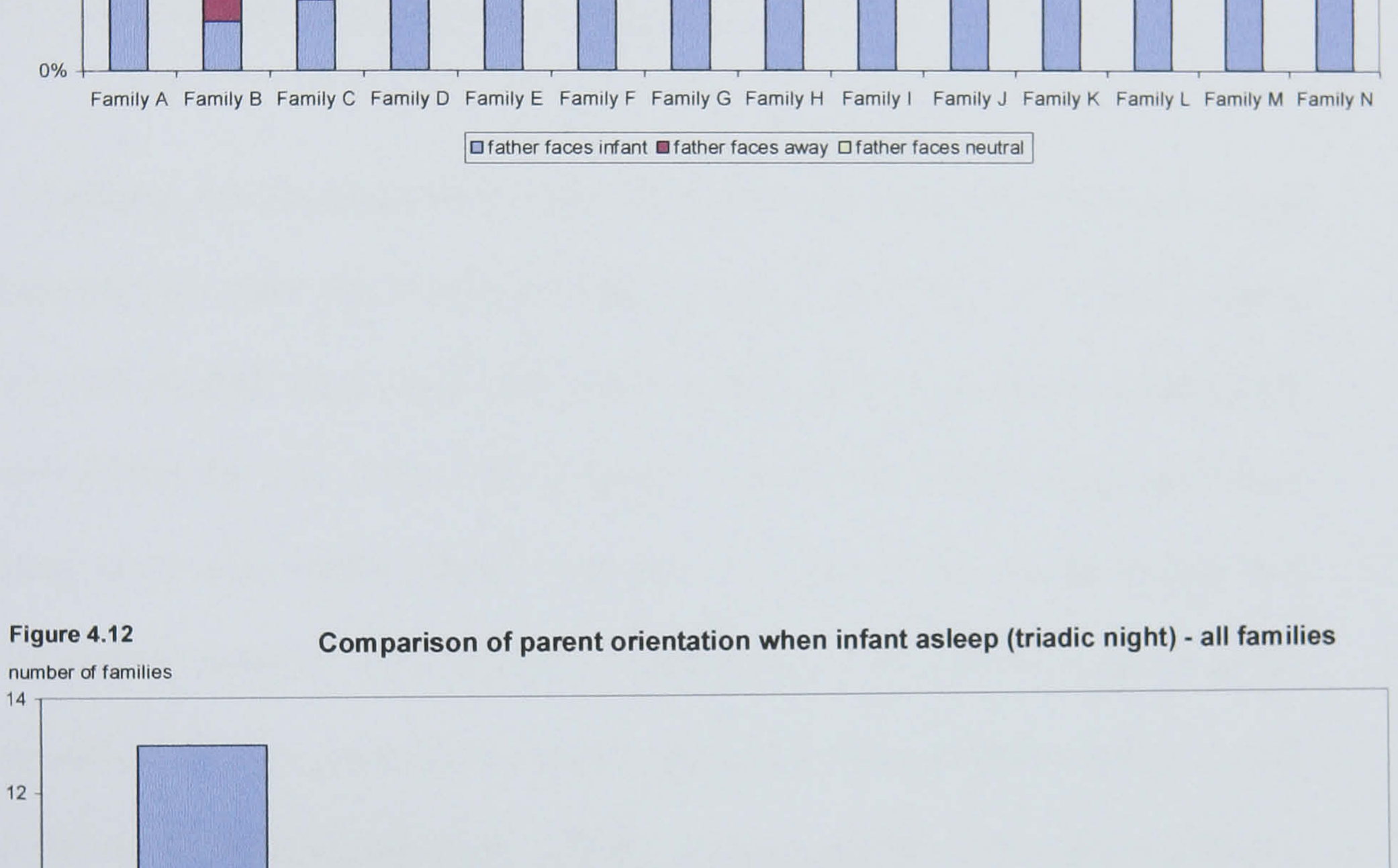


Figure 4.12



Comparing father A's orientation towards the infant on the triadic night with that of his wife's on the dyadic night, his frequency for facing the infant was 40.3% whereas hers was 25.4%.

Comparing parents' orientation, when the infants were asleep (figure 4.12), fathers predominantly slept facing away from their infant, whereas the mothers predominantly slept facing their infants. Using a Wilcoxon-Mann-Whitney test there was a significant difference in parental orientation ($p = 0.0005$).

Considering the observed sleep time for infant orientation on the dyadic night (figure 4.13) we see that 10 infants (infants A, B, C, D, G H, I, J, M, and N) spent over 60% of their sleep time facing their mothers, with 6 of these infants facing their mother for over 90% of sleep time. The other 4 infants spent more time facing away from their mothers, (infants E, F, K and L, two breast-feeders, and two formula-feeders). On the triadic night (figure 4.14) infants A and E spend over 40% of the sleep time facing their fathers with the infant from family J facing his father for 90% of the night. Infant A spent slightly more time orientated towards her father than the mother. All but one breast-feeding infant (the infant from family J) faced their mothers more than their fathers.

Figure 4.13

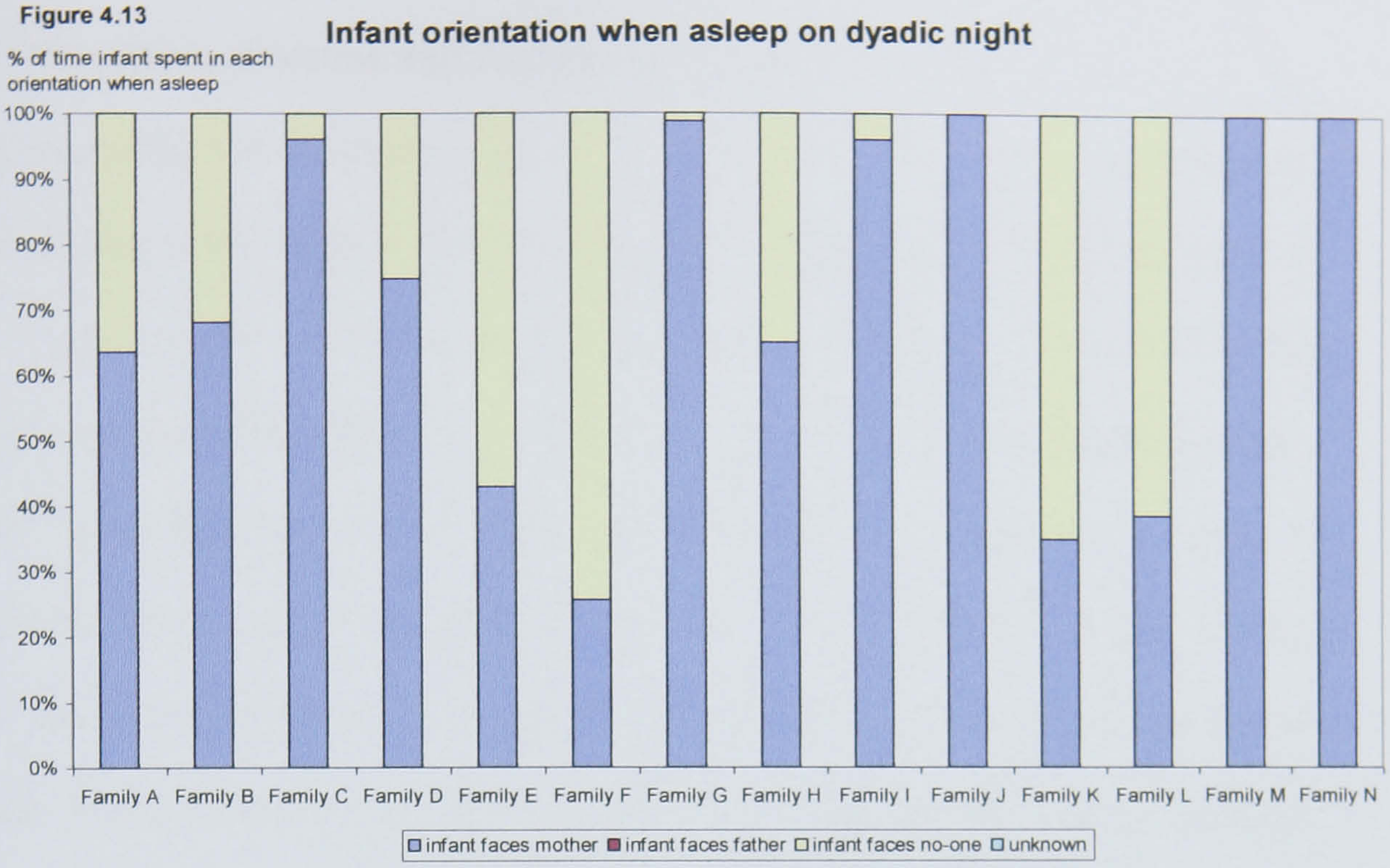
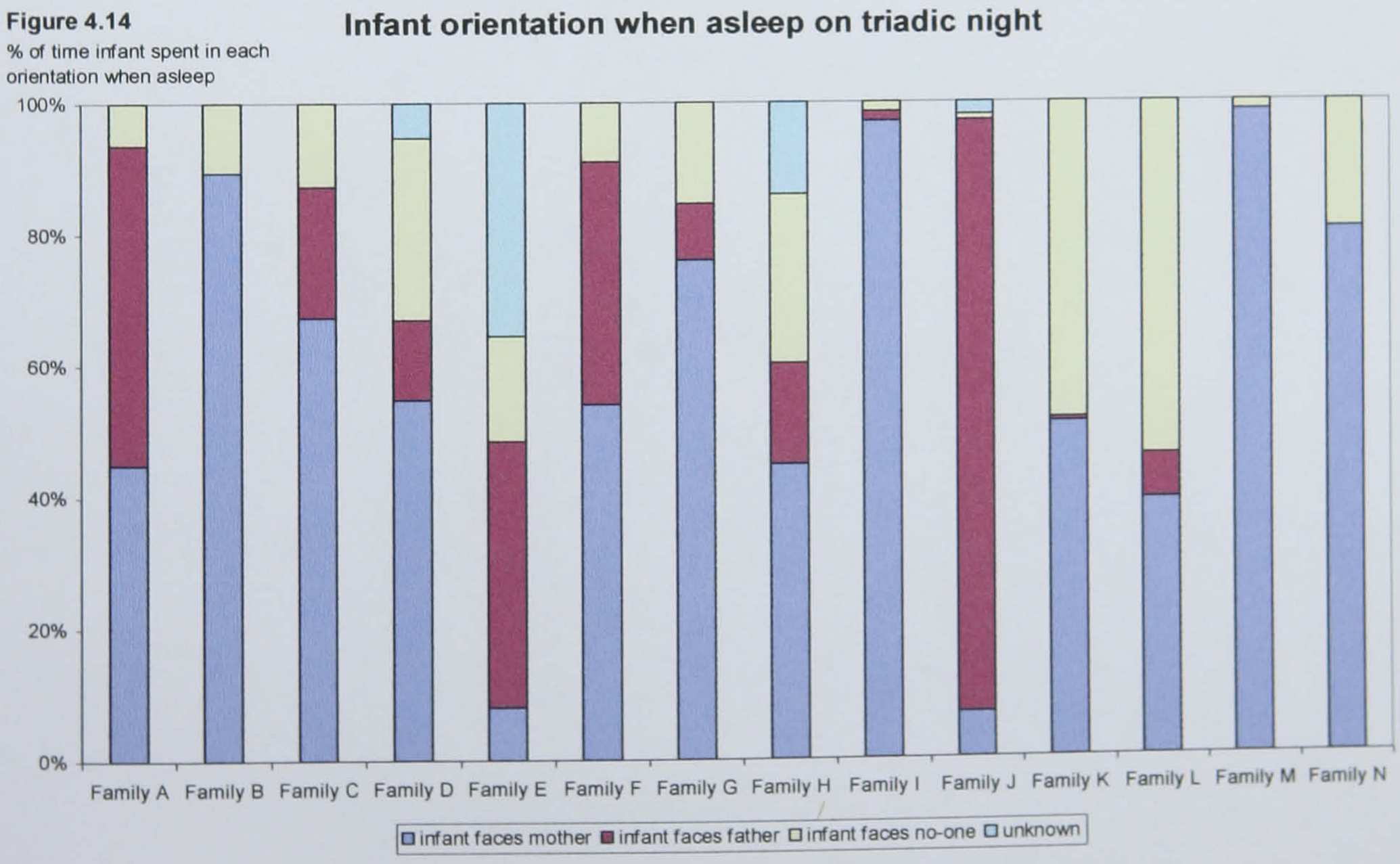


Figure 4.14



3.4 Proximity, direction and position in the bed

In comparing the proximity of mothers and infants, when asleep, on the dyadic and triadic nights, figure 4.15 shows that on the dyadic night 12 of the mothers (B, C, D, E, F, G, H, I, J, K, M and N) were touching the baby for over 40% of the observed sleep time with 5 mothers (B, D, J, M and N) being in physical contact with their infant for over 70% of the night. The marked exception was mother A who was more than 20 cm away from her baby for the 84% of the night. During the triadic night (figure 4.16) 12 out of 14 mothers slept touching or within 4cm of their infants for the majority of the night (70% or over), with the exceptions being mothers A and J. In summary, results show that mothers generally spent most of the time in close physical contact with their infant. To test for differences between maternal close contact during the dyadic and triadic nights, a Wilcoxon signed rank test was applied and the difference was not found to be statistically significant ($N = 14$, $T+ = 72$, $p = 0.1206$).

Illustration 4.4 Family C – triadic cosleeping

The frequency of father proximity when the baby was asleep, as shown in figure 4.17, is not as consistent as mother-baby proximity. Fathers exhibited greater variation in the distances between themselves and their babies. Father J was in physical contact with his infant for a greater proportion of scans than were the other fathers (83%). The results show that the majority of fathers (10) slept 10 or more cm away from their infants for most of the night.

Figure 4.15

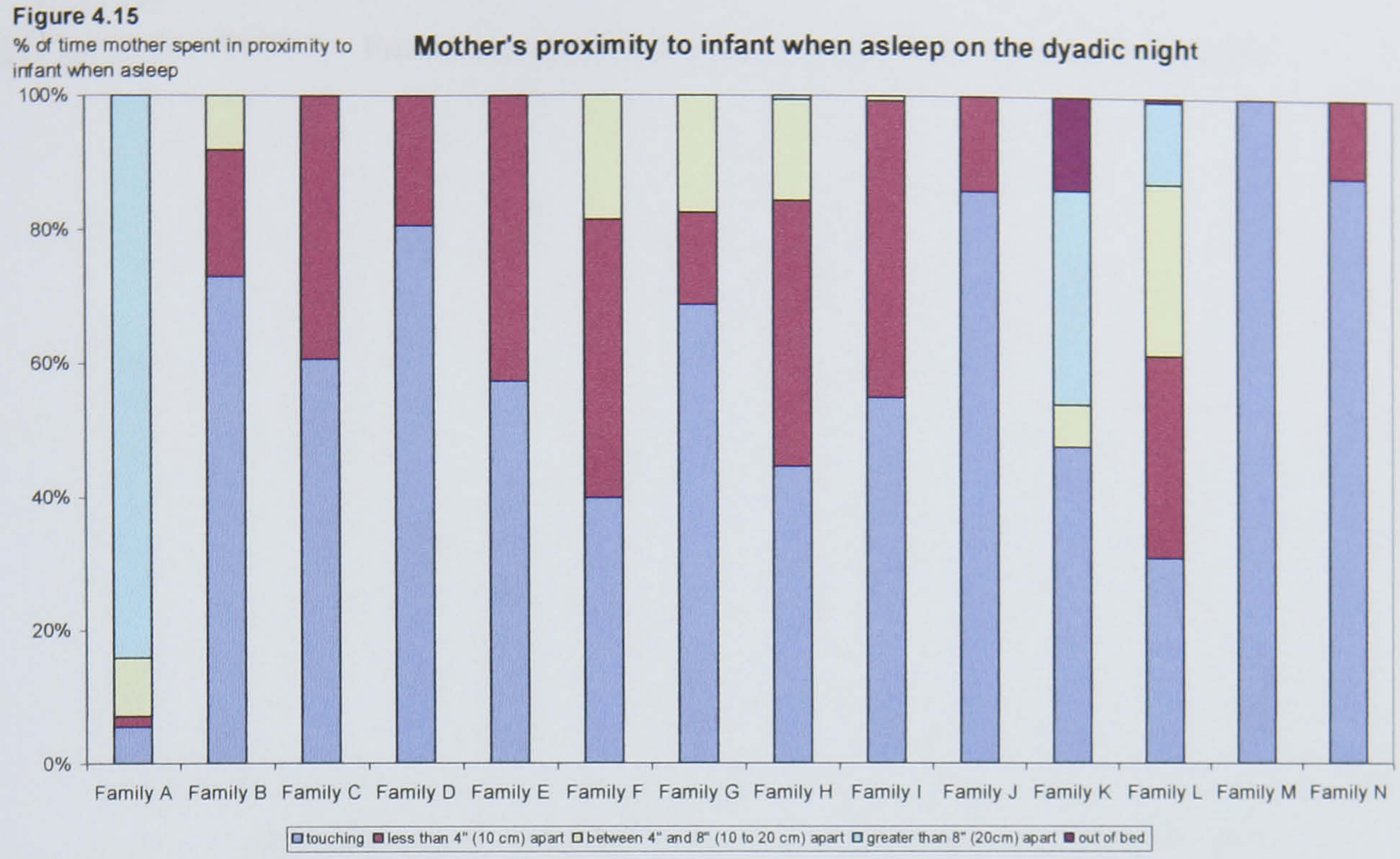


Figure 4.16

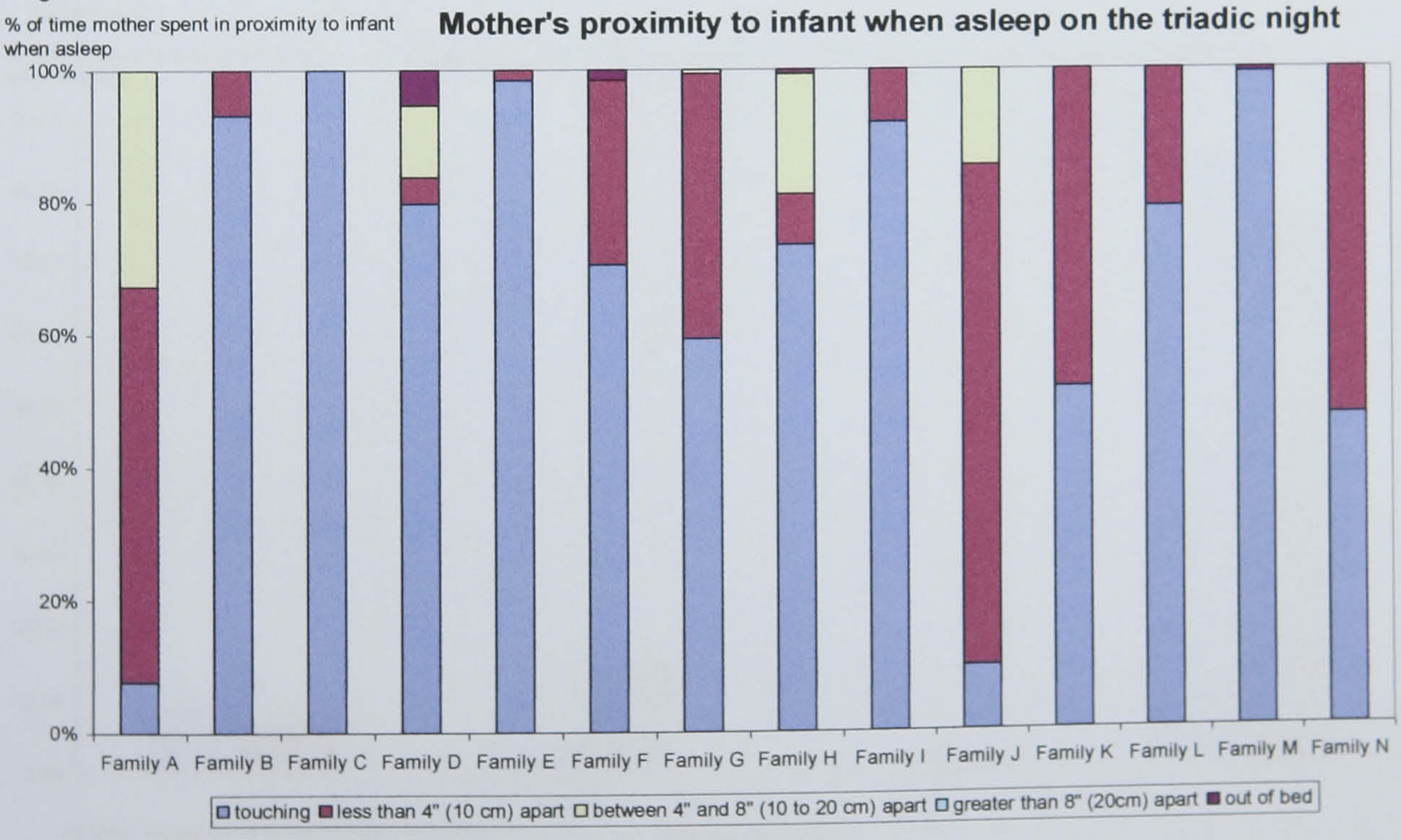


Figure 4.17

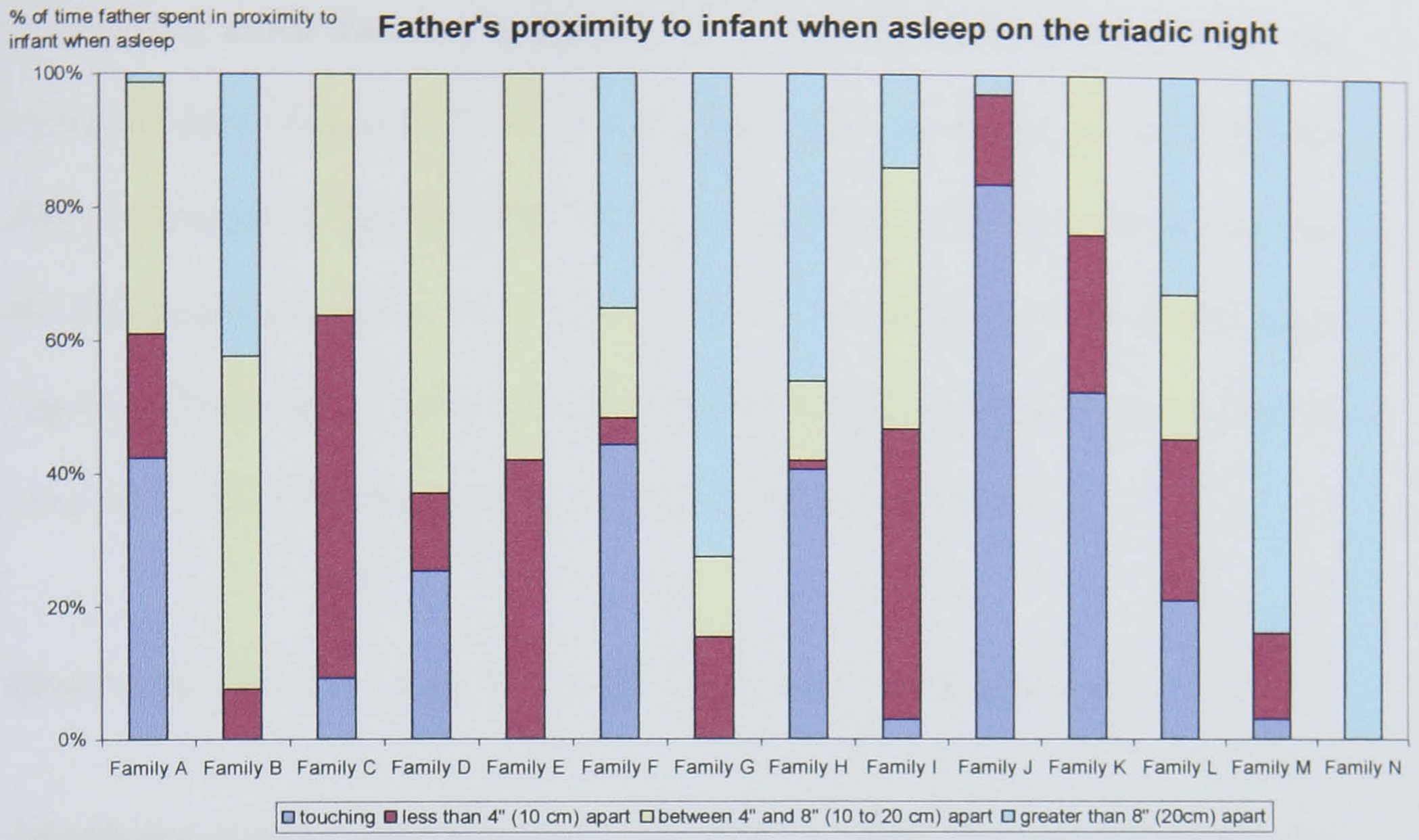
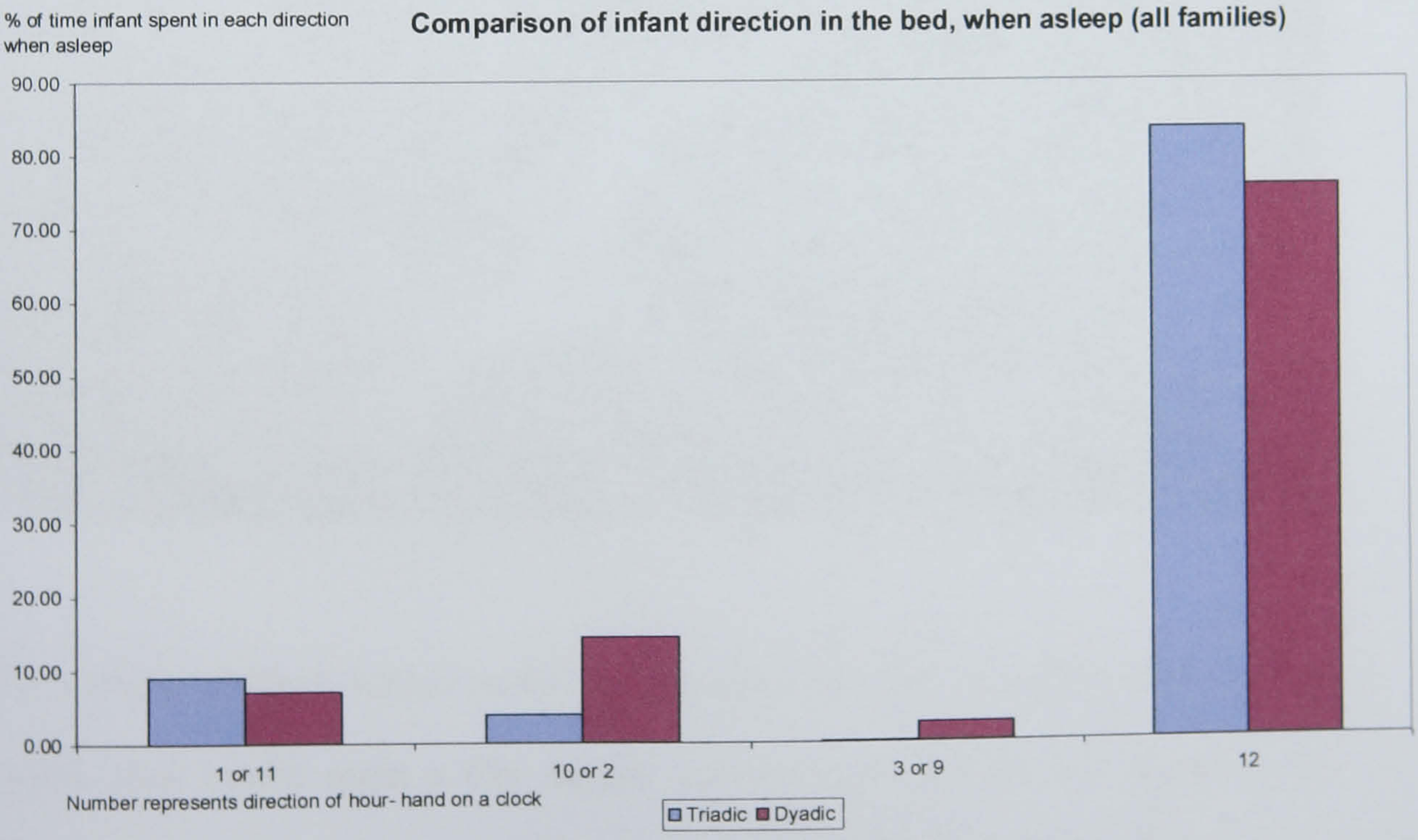
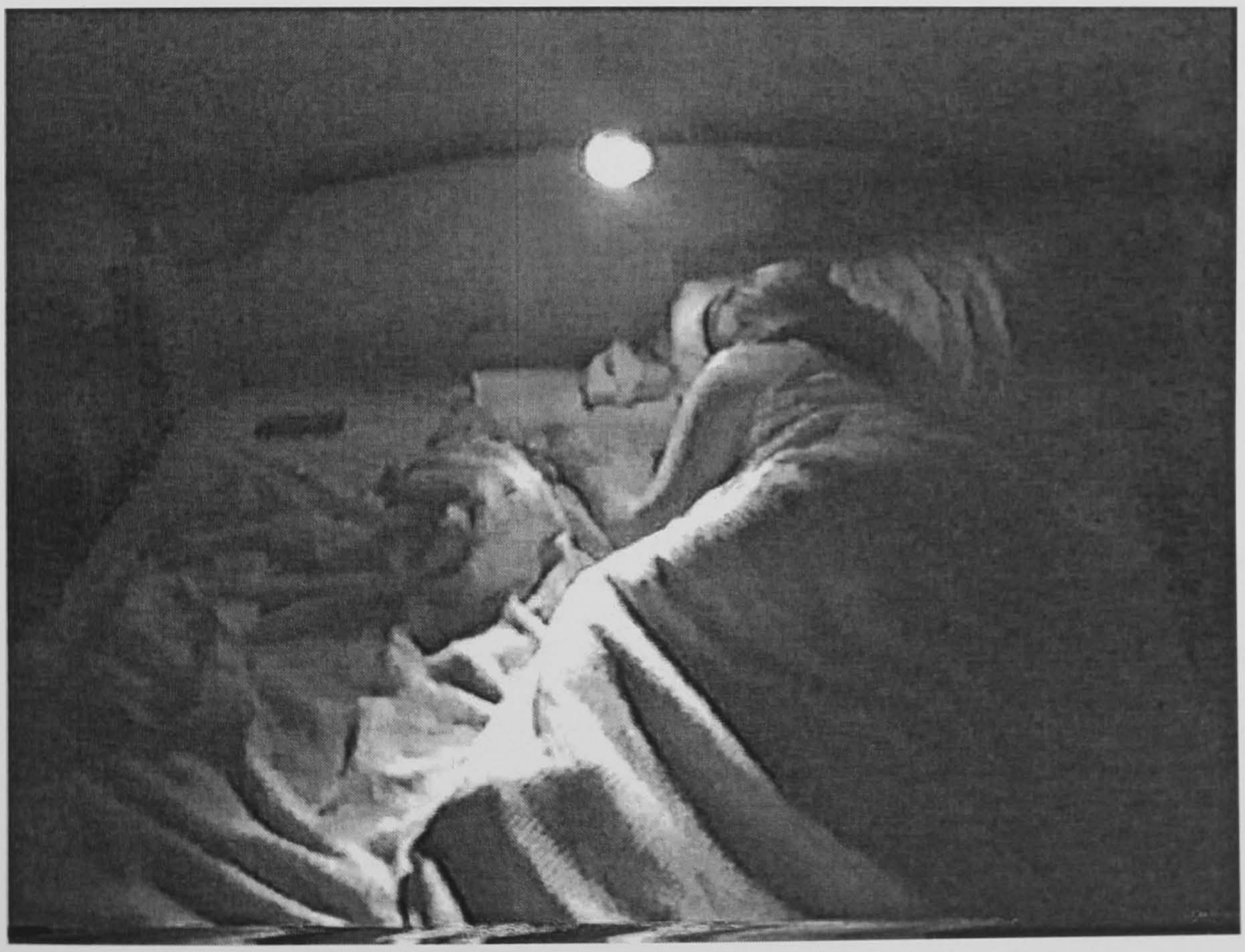


Figure 4.18



In analysing infant direction in the bed, (when the infants were asleep) from the summary chart (figure 4.18) we can see that infants spent the majority of time sleeping straight in the bed (with their heads pointing towards the top of the bed and feet pointing towards the bottom). This varies slightly on the dyadic night (figure 4.19) compared to the triadic night (figure 4.20), when the proportion of scans where the infant was observed sleeping straight was lower.

Illustration 4.5 Infant B on the dyadic night with plenty of room.



To examine whether infants tended to 'go sideways' (when asleep) more on the dyadic than triadic night a Chi Square test was applied and was found to be significant $p = 0.00016$). The infants from 6 families never 'tipped' or moved

sideways when the father was in the bed compared with 3 infants who never tipped during the dyadic night. This result does suggest that the father's presence in the bed may encourage the infant to remain in an upright position in the bed, when asleep.

On examining vertical height of infant in the bed in relation to their parents, when asleep, we discover that on the dyadic night (figure 4.21) there was more variation of 'height' to mother than on the triadic night (figure 4.22). During the dyadic night the preferred height for infants was at mothers chest level, shown by 8 infants who were positioned at their mothers chest for over 70% of the sleep time. The bottle-fed infants from families A and L spent nearly 100% of the sleep time level with their mother's face. However, slight differences in levels did occur during the triadic night, with the exception of infants A and L, where 7 babies were at their mothers' chest level for nearly 100% of the night. The infants from family A and L did not deviate from the dyadic night, sleeping level with their mothers face for nearly 70% of the triadic night. These infants remained at face height to their father on the triadic night (figure 4.23) whereas 4 of the infants (infants B, C E and F) were at their father's chest height for 100% of the sleep time. Three infants who remained at mothers' chest height throughout the dyadic night were level with their fathers chin for some portion of the triadic night, illustrating the relationship between mother and infant.

Figure 4.19

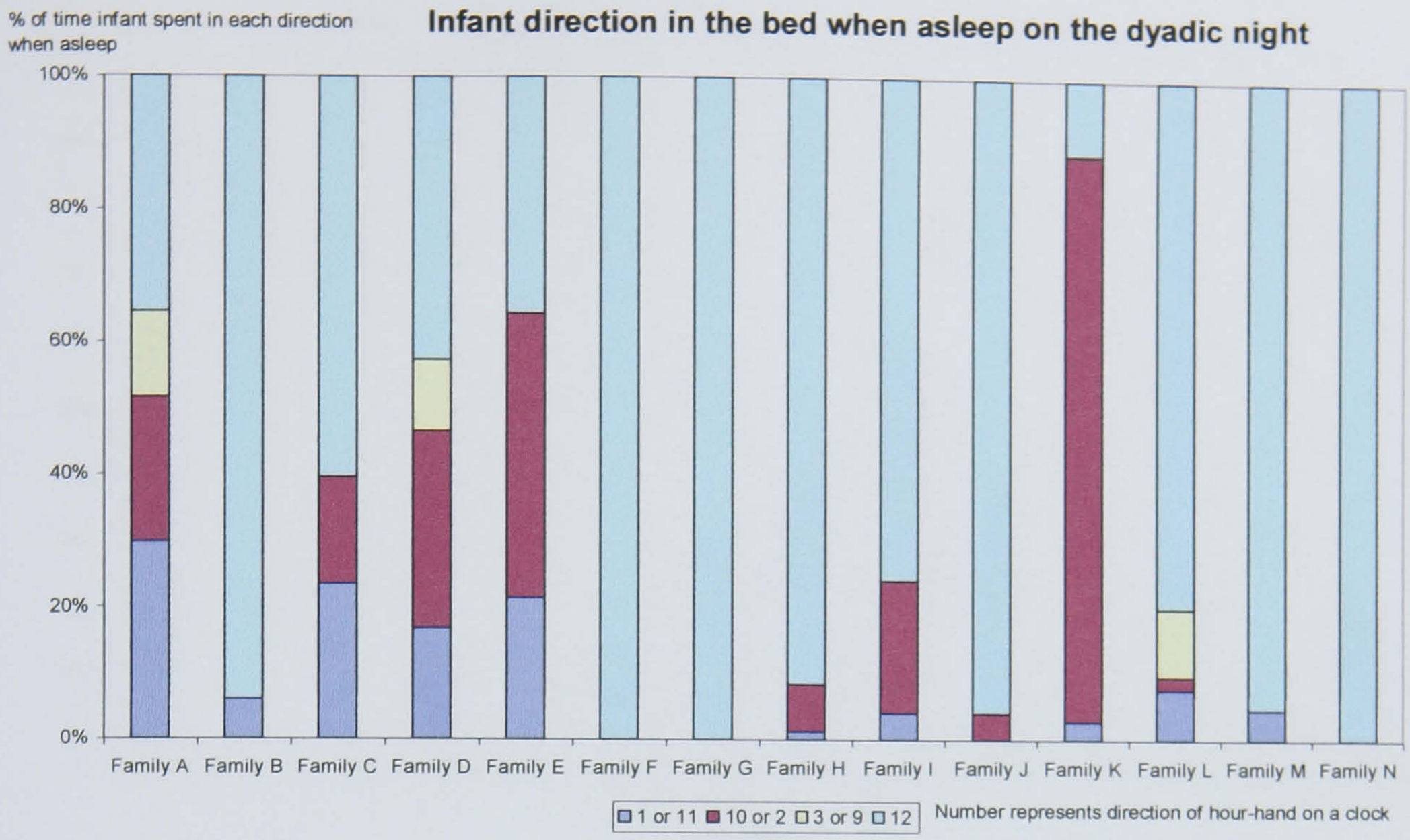


Figure 4.20

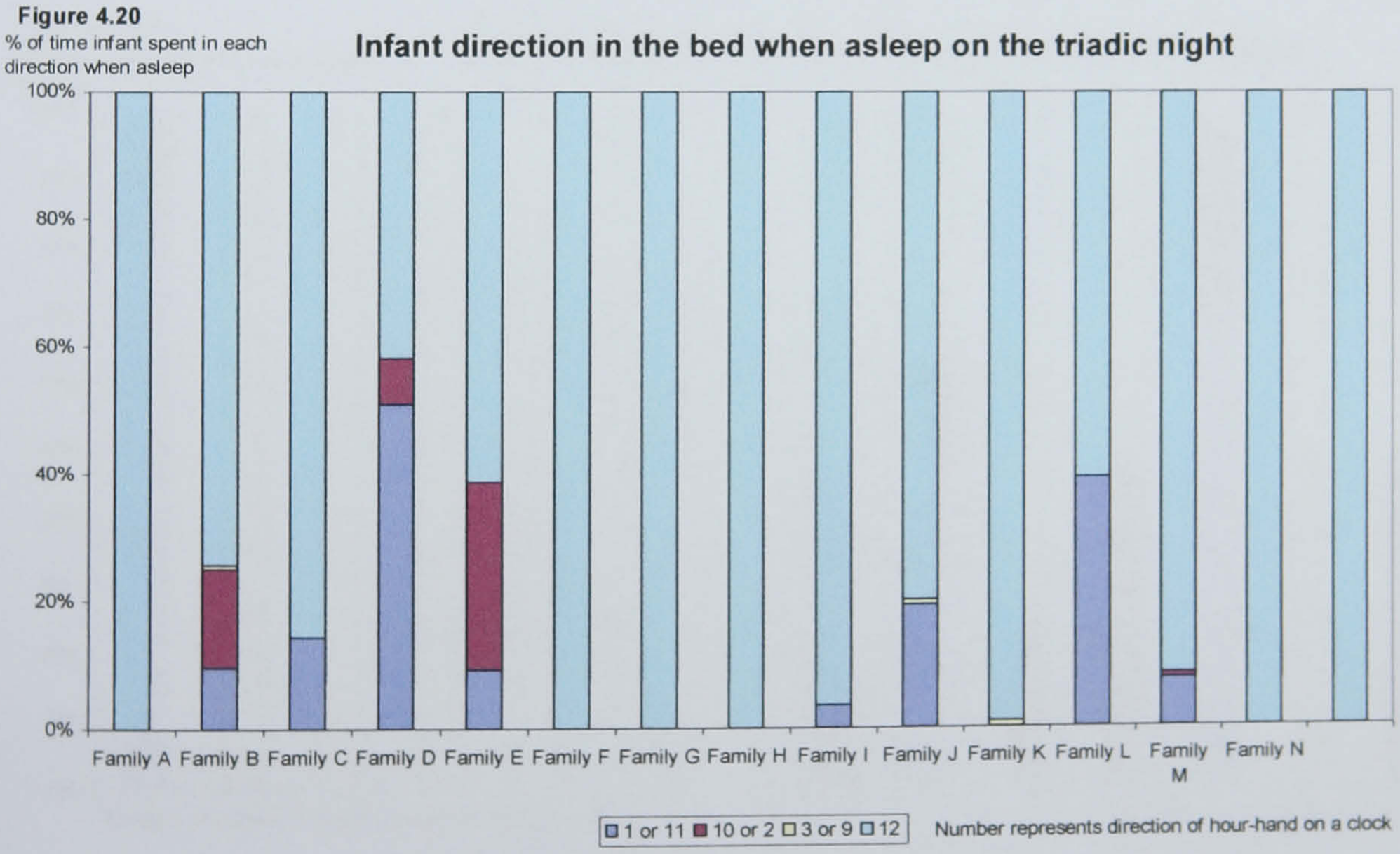


Figure 4.21

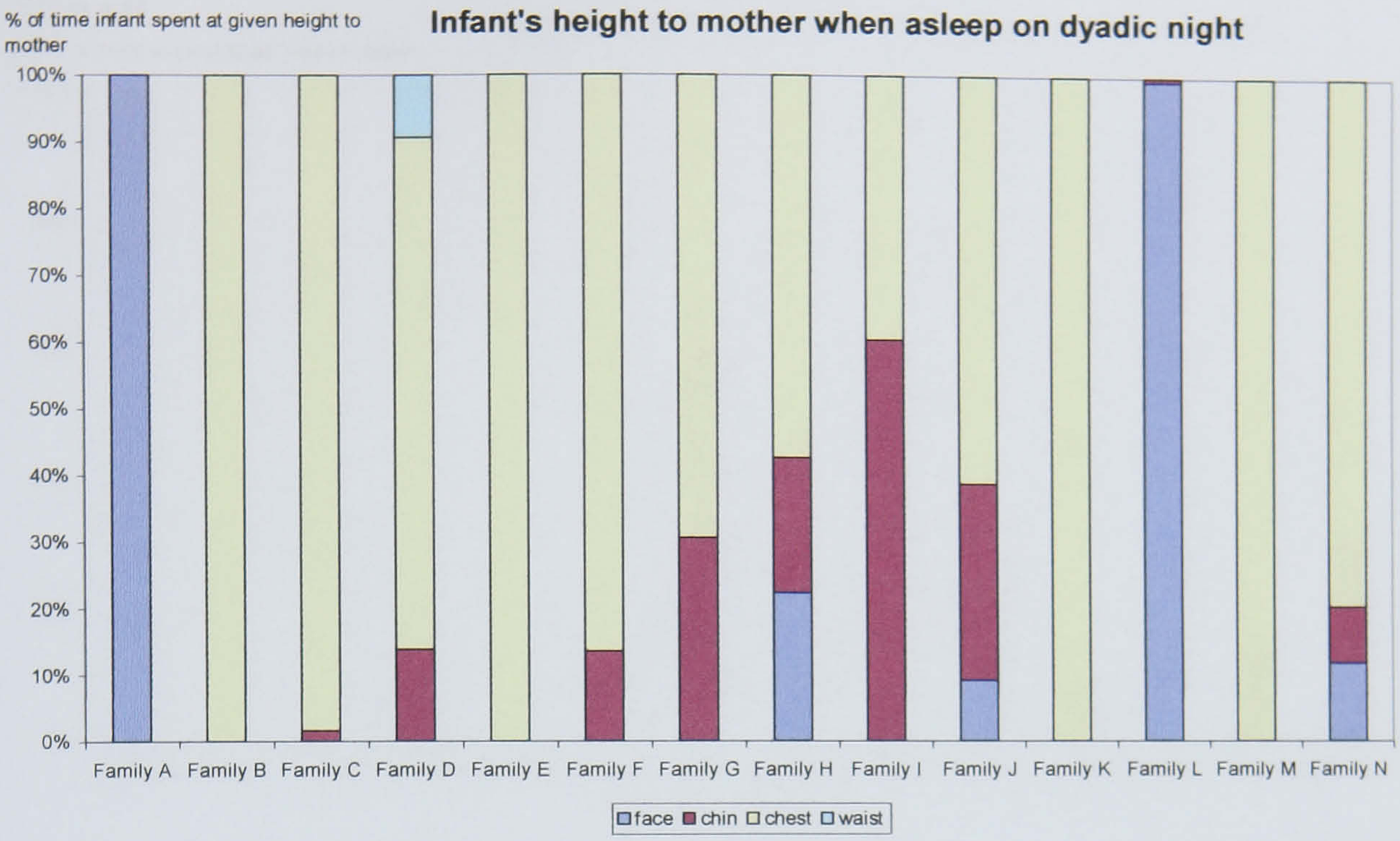


Figure 4.22

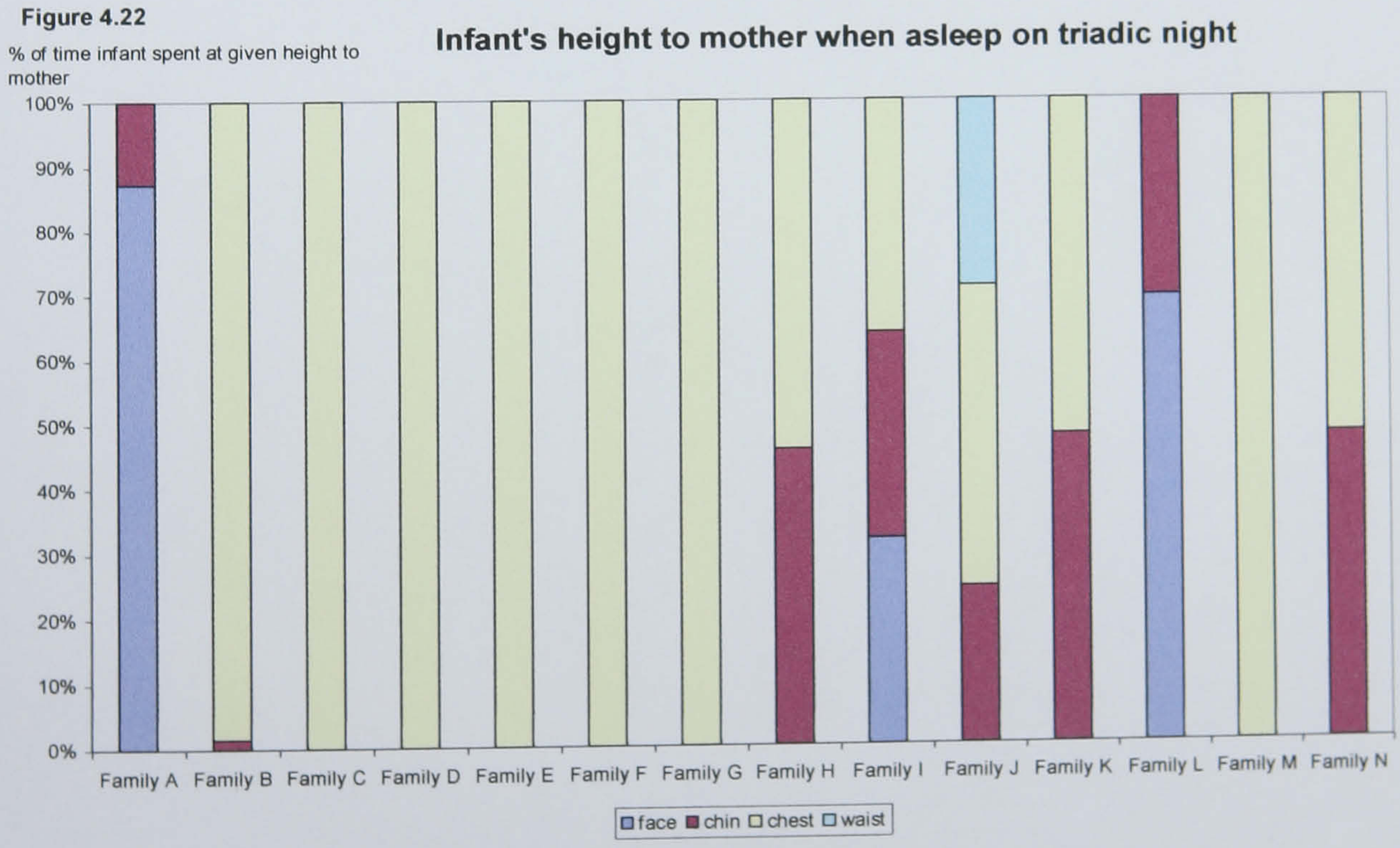
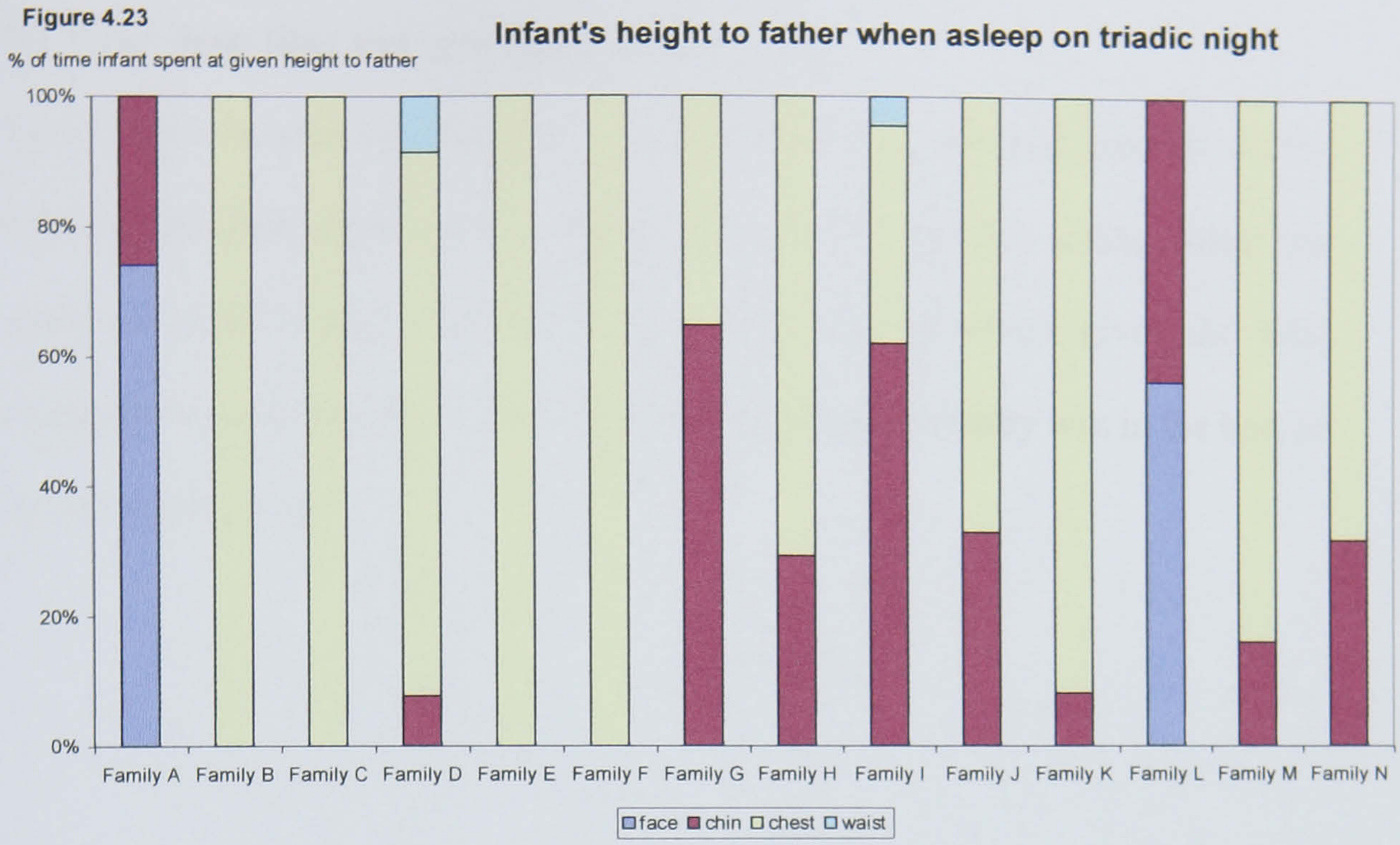


Figure 4.23


Infant's height to father when asleep on triadic night
% of time infant spent at given height to father
100%
80%
60%
40%
20%
0%
Family A
Family B
Family C
Family D
Family E
Family F
Family G
Family H
Family I
Family J
Family K
Family L
Family M
Family N
face
chin
chest
waist

3.5 Total sleep time and synchronous sleep states

To calculate the amount of sleep time achieved by the individual members of the families involved, three-minute scans were collected for the coding categories appeared asleep (aslp) and asleep (slp), the sum of which gives the total observable sleep times for each individual parent when the baby was in the bed, as shown in table VIII.

Table VII Total sleep time of families involved in the video recordings

(How long asleep per night-aslp and slp)

Family	Night	Mother	Father	Infant
A	**Triadic**	7hrs 45 min	7hrs 33 min	7hrs 48mins
	Dyadic	5hrs 42 min		6hrs 18mins
B	**Triadic**	6hrs 30mins	6hrs 42mins	6hrs 36 min
	Dyadic	5hrs 30mins		6hrs 6mins
C	**Triadic**	3hrs 18mins	3hrs 21mins	2hrs 45mins
	Dyadic	6hrs 15mins		6hrs 12mins
D	**Triadic**	7hrs 45mins	5hrs 48mins	7hrs 24mins
	Dyadic	6hrs 57min		6hrs 54mins
E	**Triadic**	3hrs 24mins	3hrs 36mins	3hrs 6mins
	Dyadic	42 min		42 min
F	**Triadic**	6hrs	6hrs 33mins	6hrs 6mins
	Dyadic	7hrs 39mins		7hrs 48mins
G	**Triadic**	7hrs 51min	4hrs 24mins	8hrs 6mins
	Dyadic	7hrs 45mins		8hrs

Table V II

continued

H	**Triadic**	7hrs 27mins	7hrs 54mins	7hrs 9mins
	Dyadic	7hrs 45mins		8hrs 18mins
I	**Triadic**	6hrs 6mins	7hrs 39mins	6hrs 45mins
	Dyadic	6hrs 9mins		6hrs 12mins
J	**Triadic**	5hrs 42mins	5hrs 39mins	5hrs 9mins
	Dyadic	5hrs 18mins		4hrs 54mins
K	**Triadic**	7hrs 57mins	5hrs 30mins	7hrs 54mins
	Dyadic	6hrs 42mins		7hrs 9mins
L	**Triadic**	6hrs 30mins	6hrs 33mins	6hrs 39mins
	Dyadic	7hrs 33mins		7hrs 45mins
M	**Triadic**	6hrs 3mins	6hrs 48mins	6hrs 39mins
	Dyadic	6hrs 18mins		6hrs 27mins
N	**Triadic**	7hrs 39mins	8hrs 6mins	7hrs 39mins
	Dyadic	7hrs 24mins		7hrs 36mins

The results show variation in participant sleep time across dyadic and triadic nights. Families A, B, D, E, G, I, J, K and N had more observed sleep on the triadic night whereas families C, F, H, and L had less observed sleep time. The mother from family M had slightly more sleep on the dyadic night whereas her infant had more observed sleep on the triadic night. The variability for two of the families who experienced less sleep on the triadic night can be explained by the infant from family C entering the parental bed for the early morning feed, (3.20am) and family E recordings being reduced by the infrared lamp failure. The father from family G slept elsewhere for part of the triadic night, which reduced his observed sleep time, whilst the father from family K had to leave the bed early to go to work. One father (family D) did not retire to bed until much later than his wife and infant and family J had less than six hours sleep during both nights.

Figure 4.24

Family 'A' sleep states : dyadic night

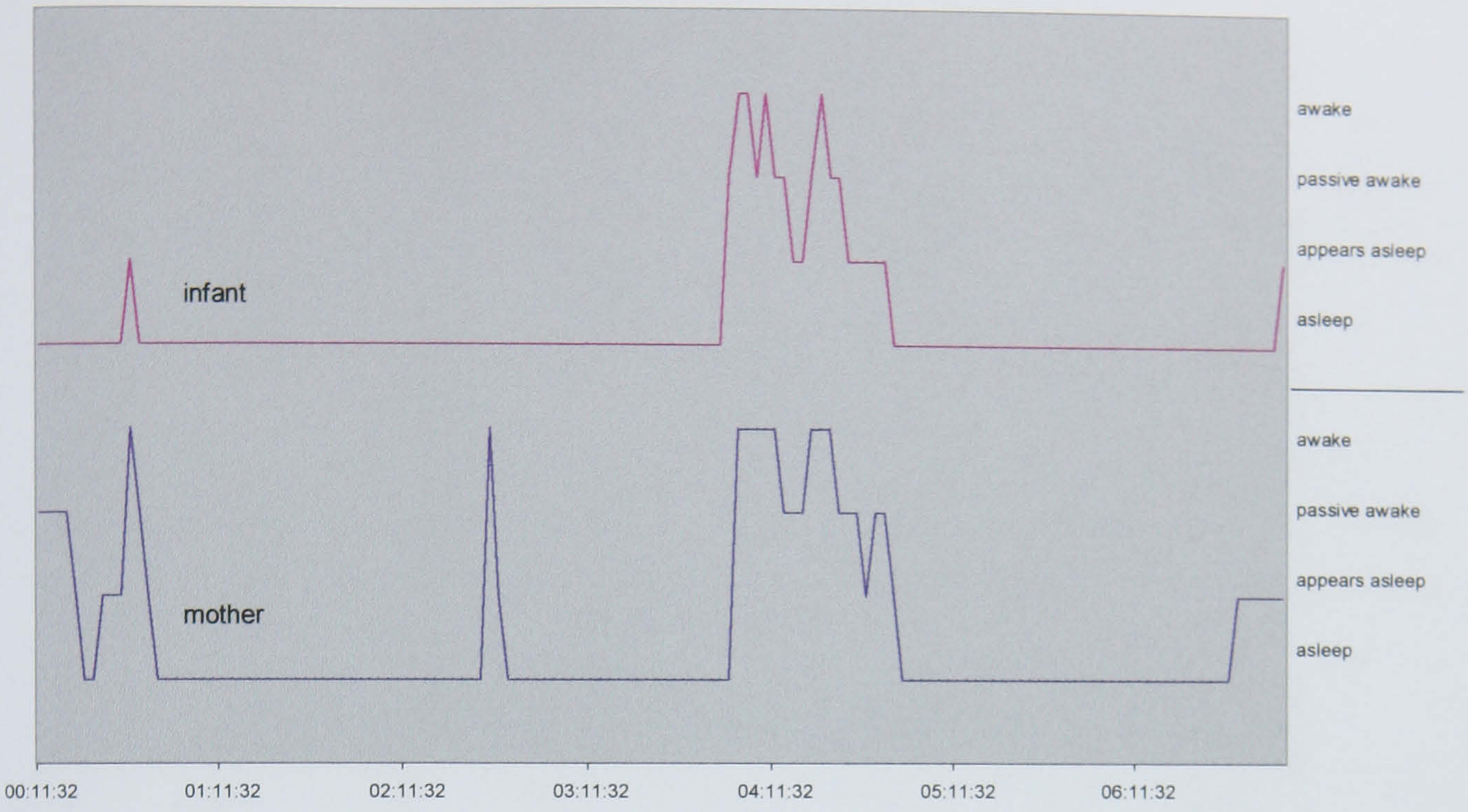


Figure 4.25

Family 'A' sleep states : triadic night

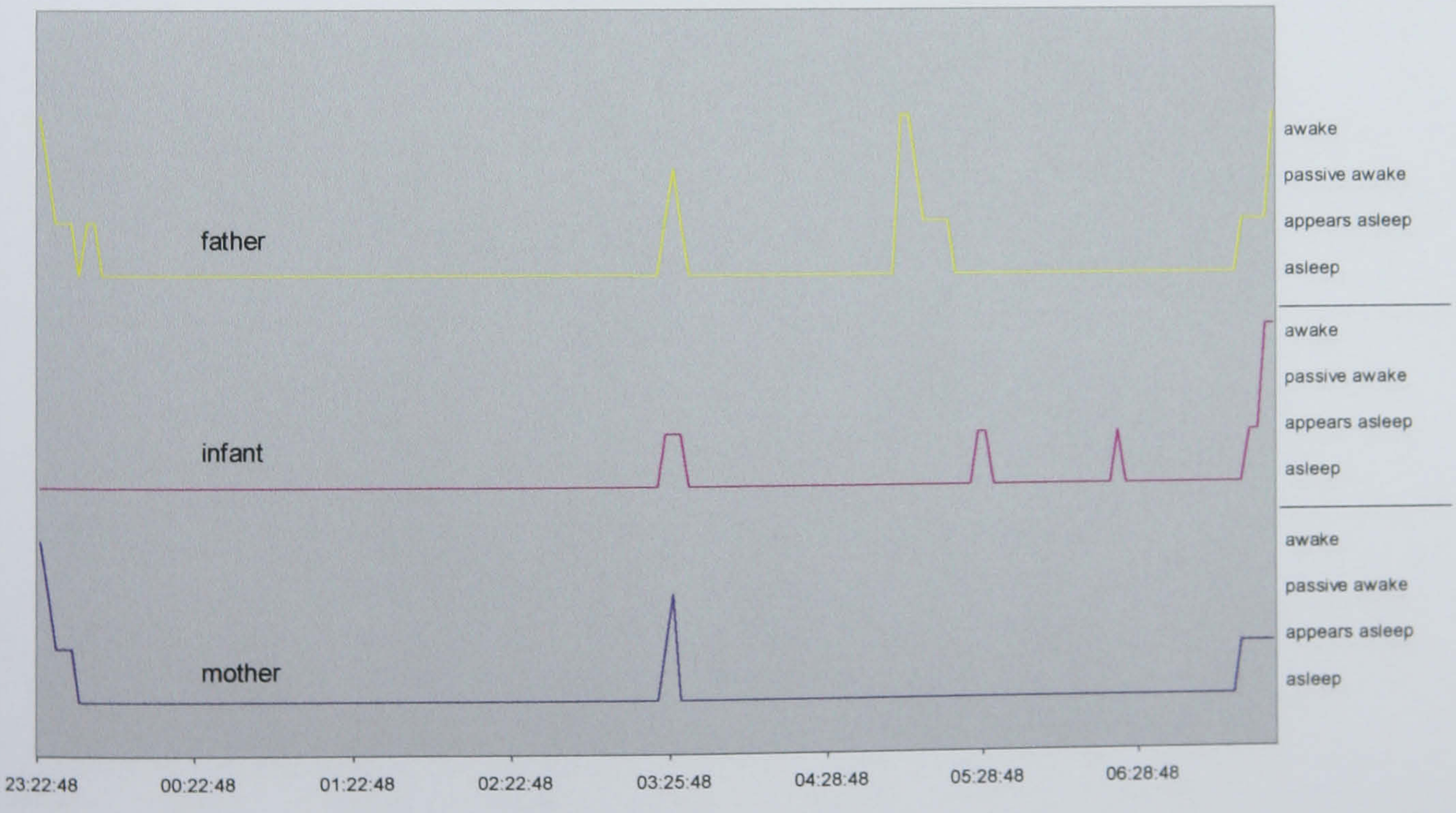


Figure 4.26

Family 'B' sleep states : dyadic night

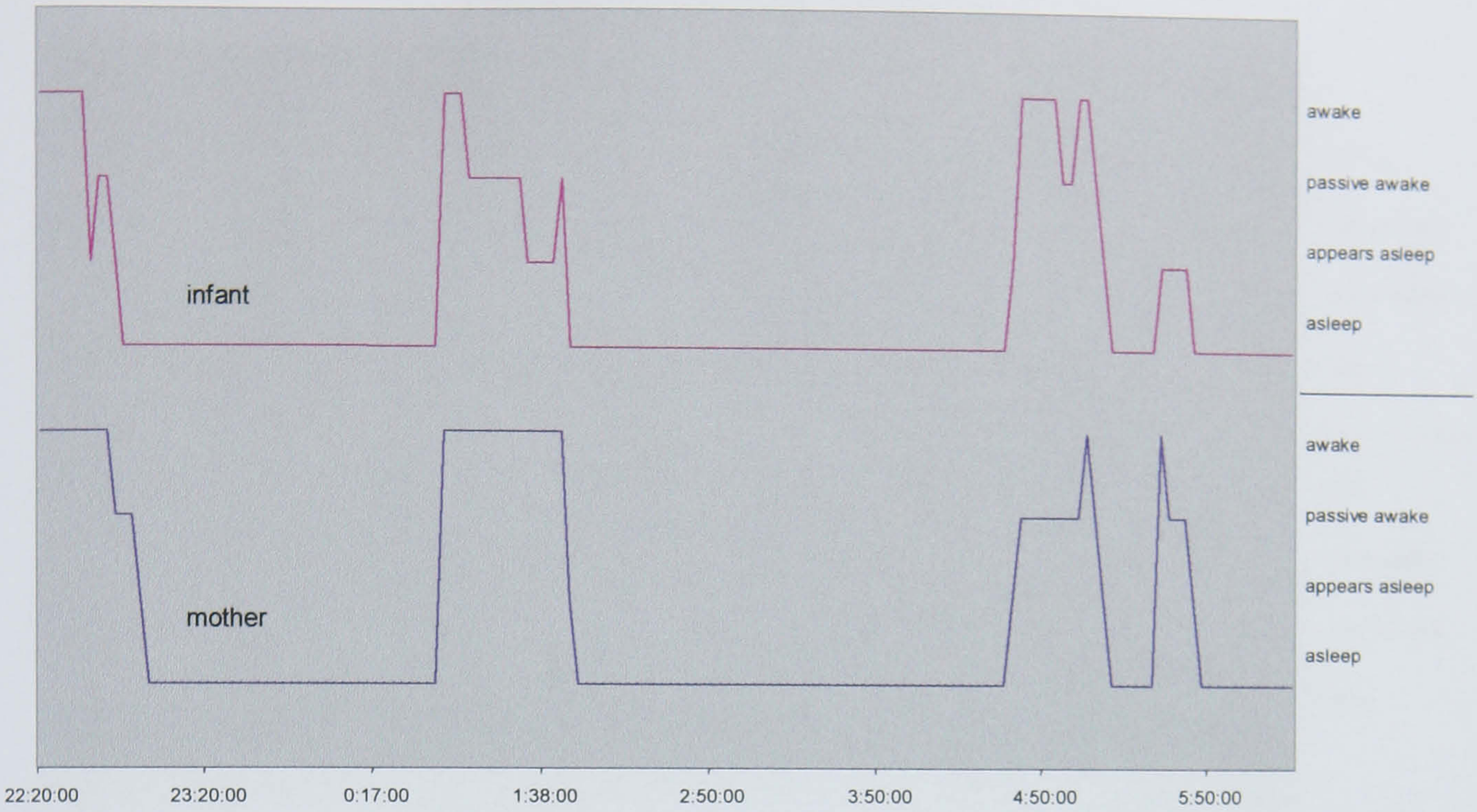


Figure 4.27

Family 'B' sleep states : triadic night

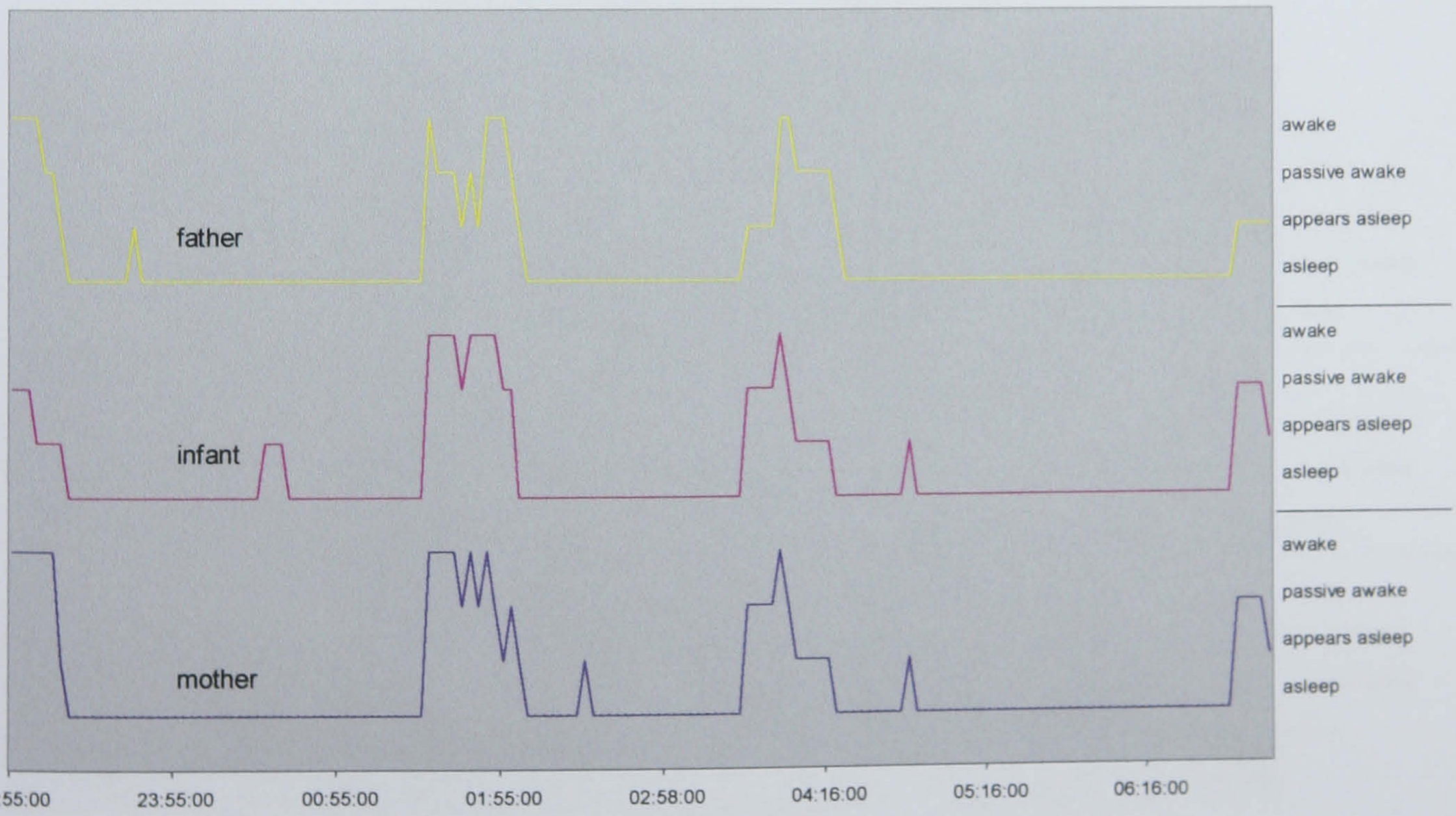


Figure 4.28

Family 'C' sleep states : dyadic night

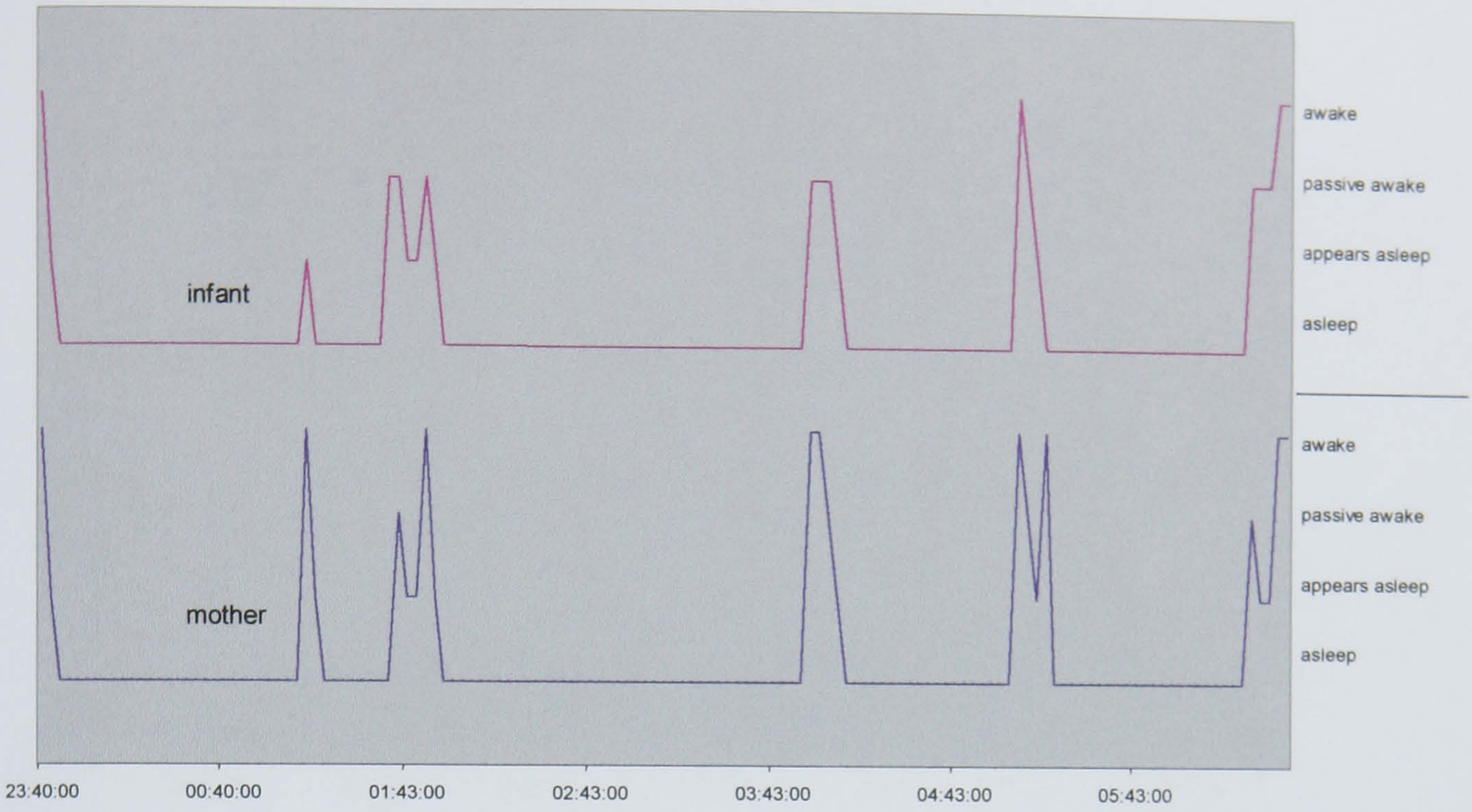


Figure 4.29

Family 'C' sleep states : triadic night

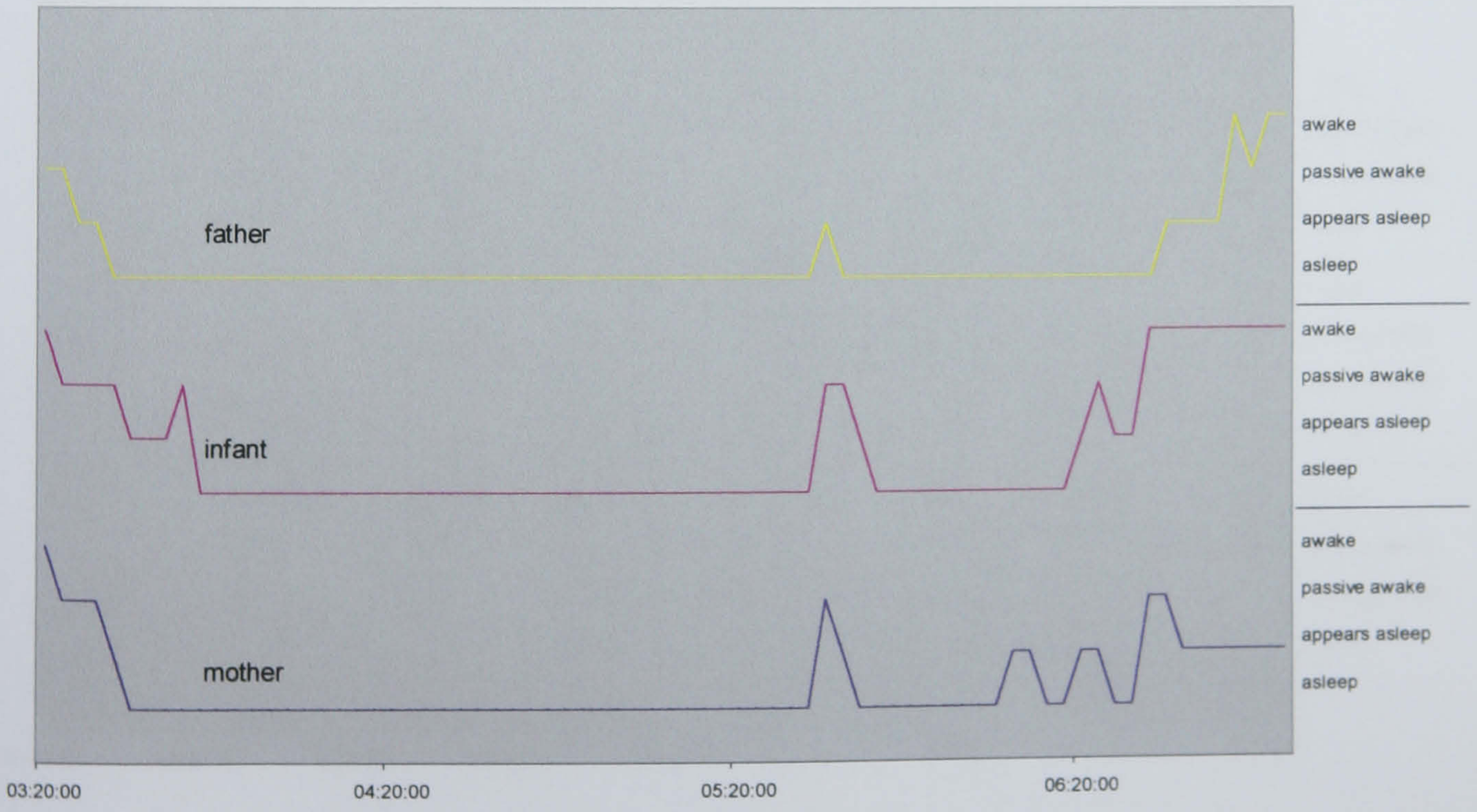


Figure 4.30

Family 'D' sleep states : dyadic night

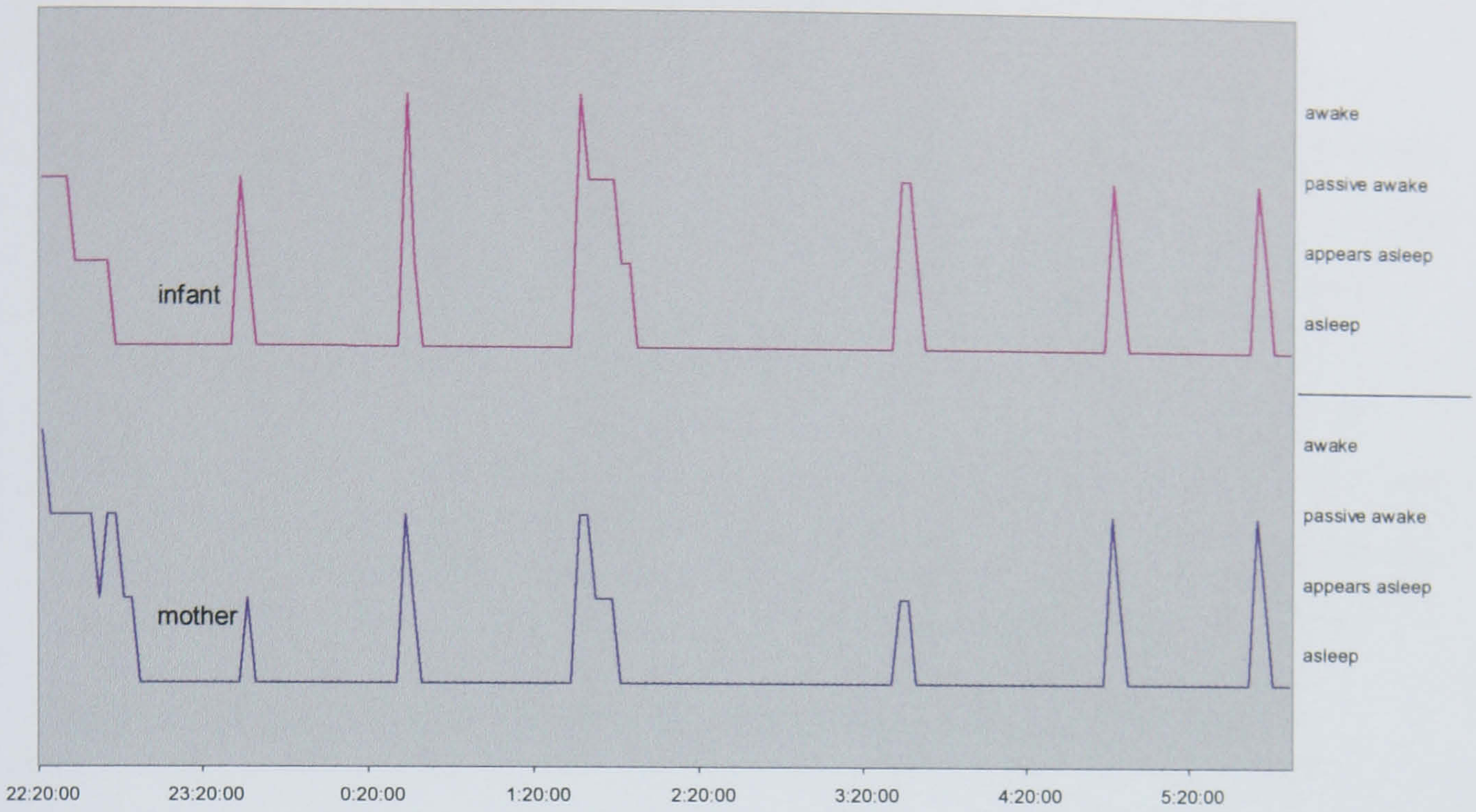


Figure 4.31

Family 'D' sleep states : triadic night

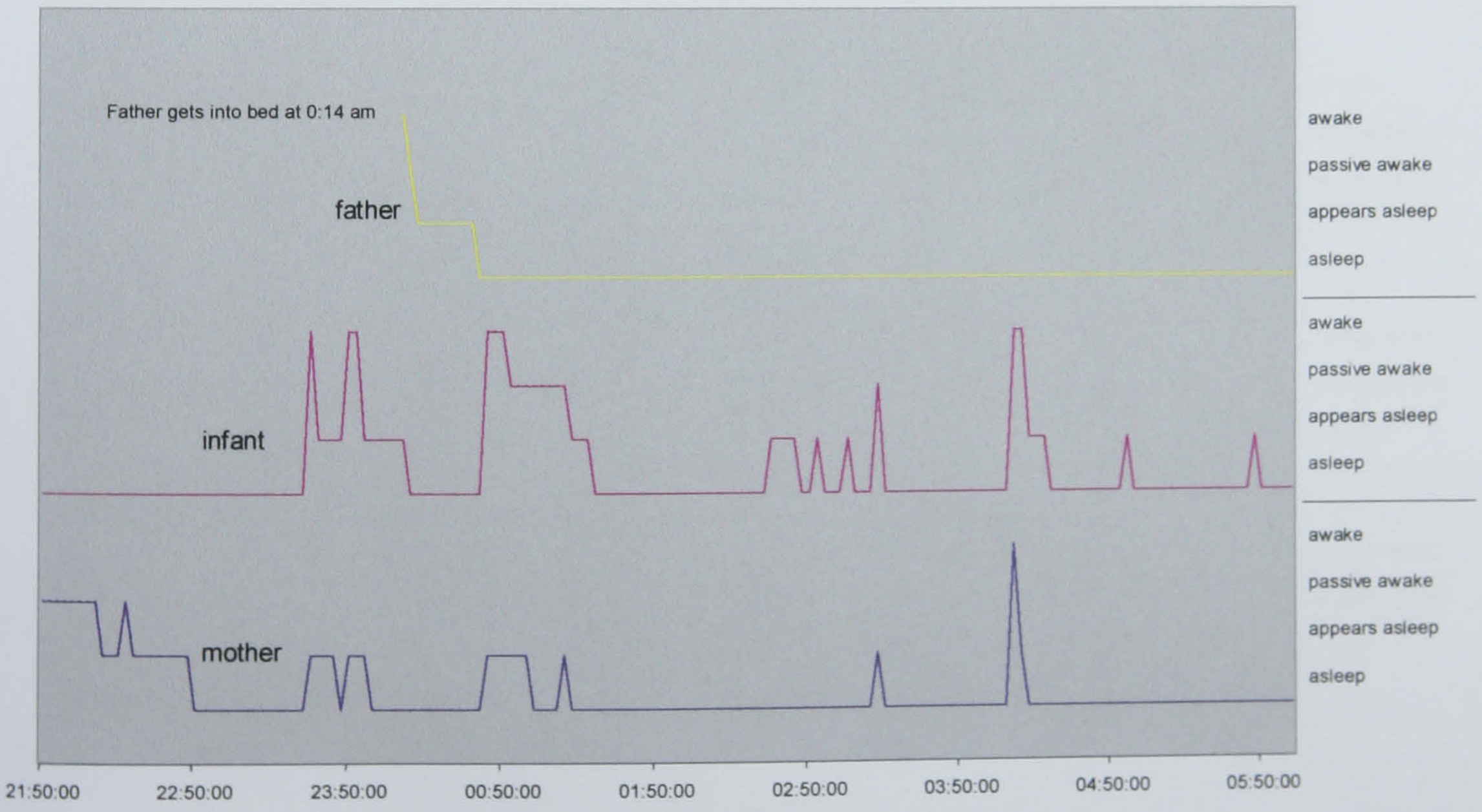


Figure 4.32

Family 'E' sleep states : dyadic night

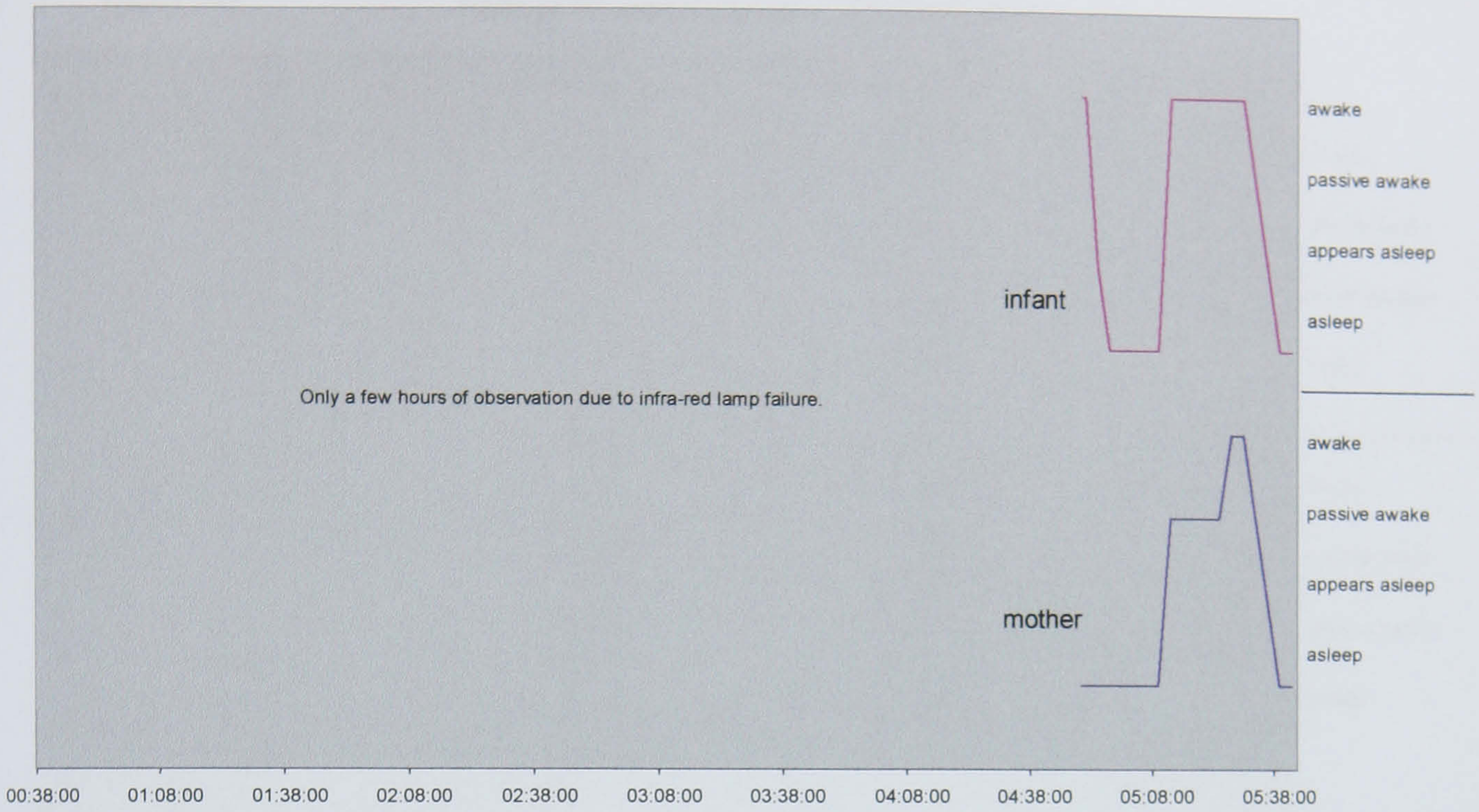


Figure 4.33

Family 'E' sleep states : triadic night

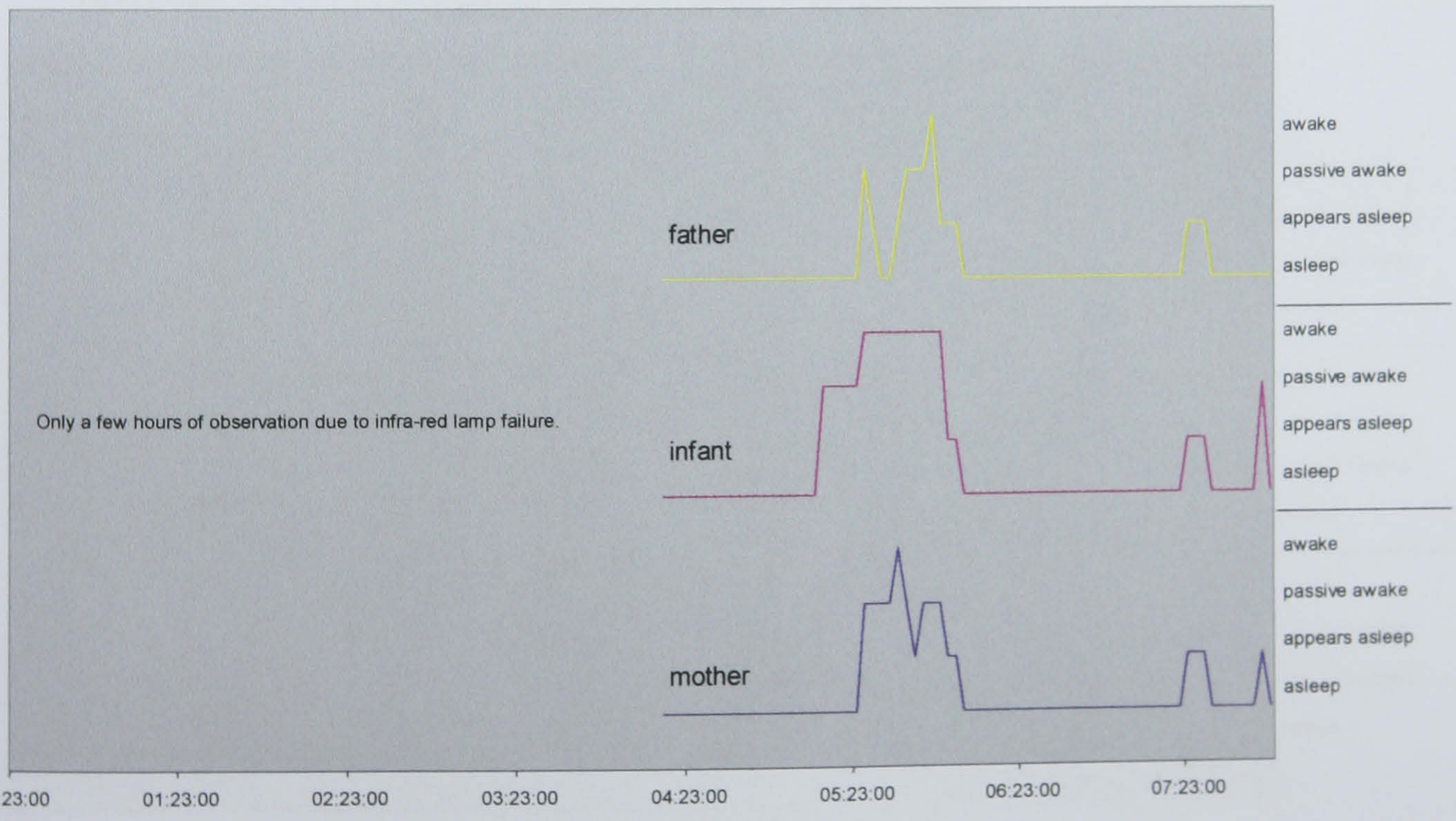


Figure 4.34

Family 'F' sleep states : dyadic night

Figure 4.35

Family 'F' sleep states : triadic night

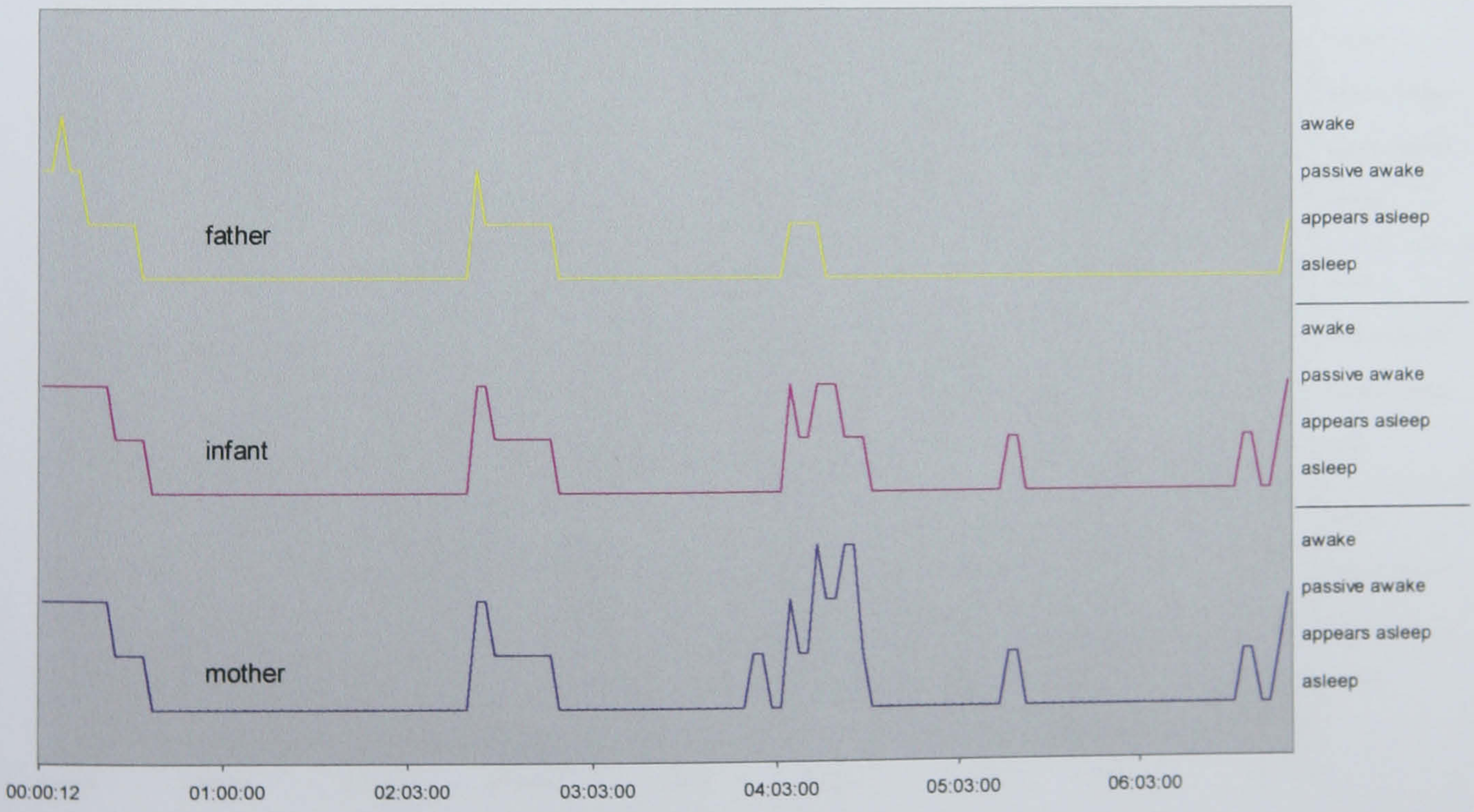


Figure 4.36

Family 'G' sleep states : dyadic night

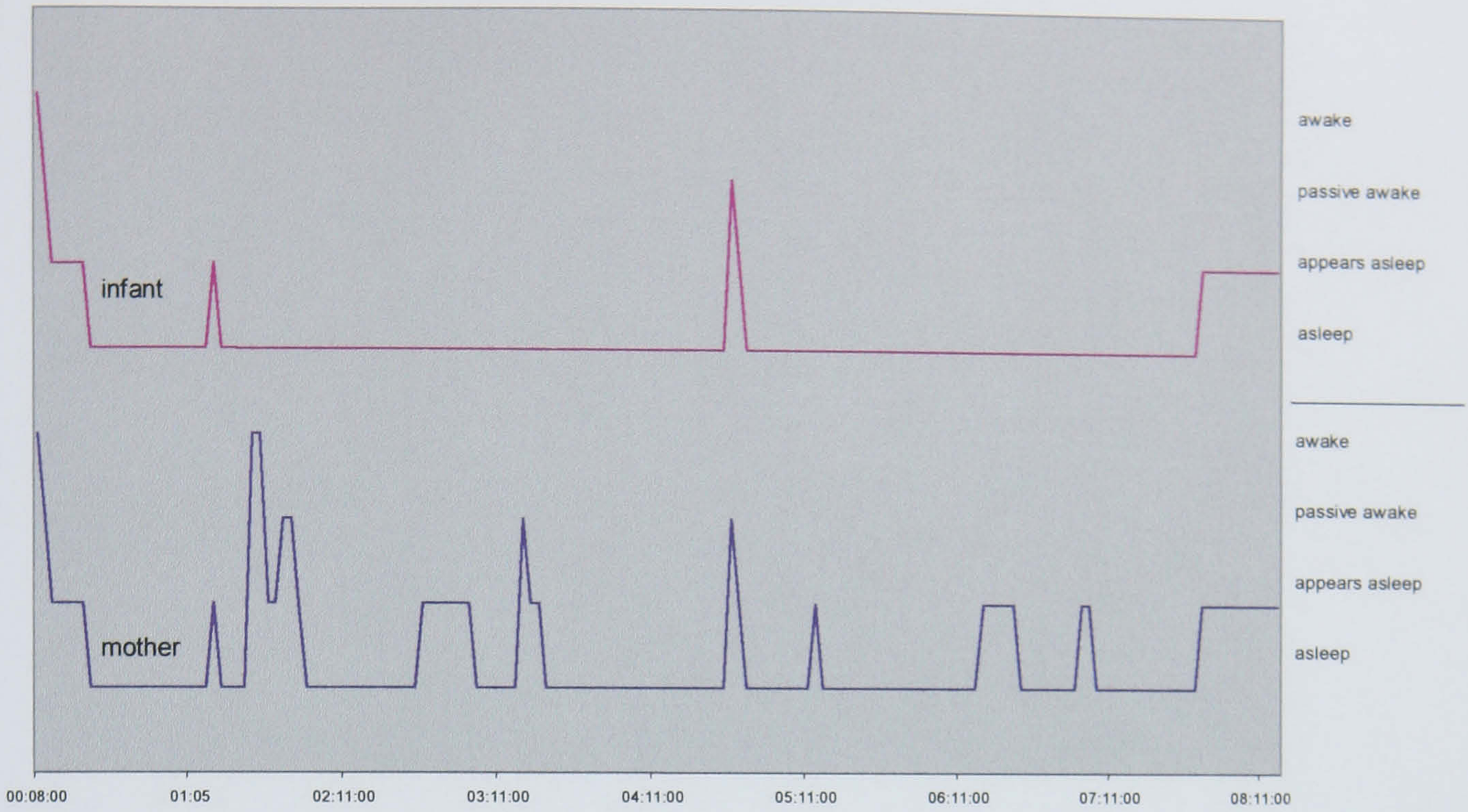


Figure 4.37

Family 'G' sleep states : triadic night

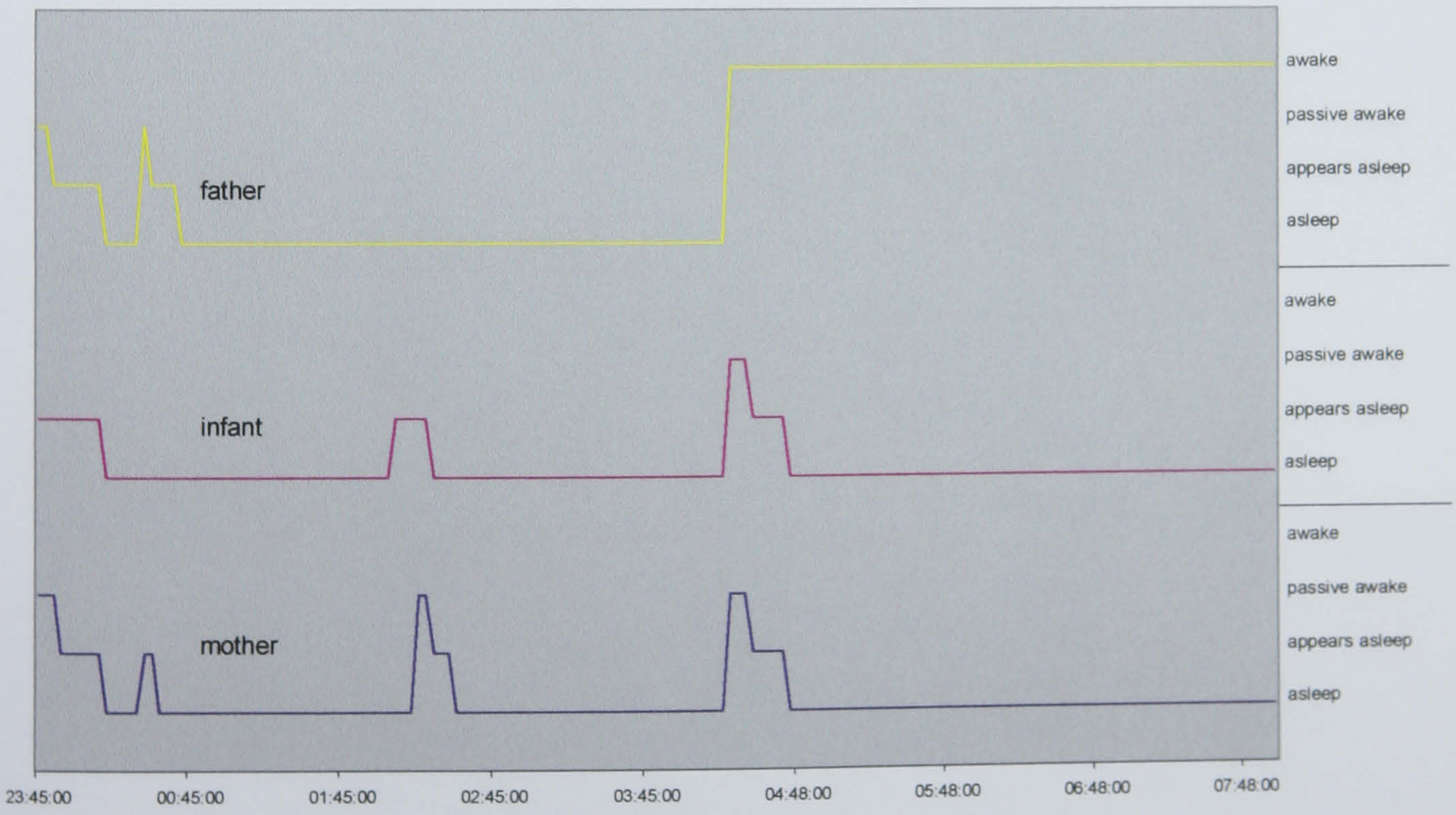


Figure 4.38

Family 'H' sleep states : dyadic night

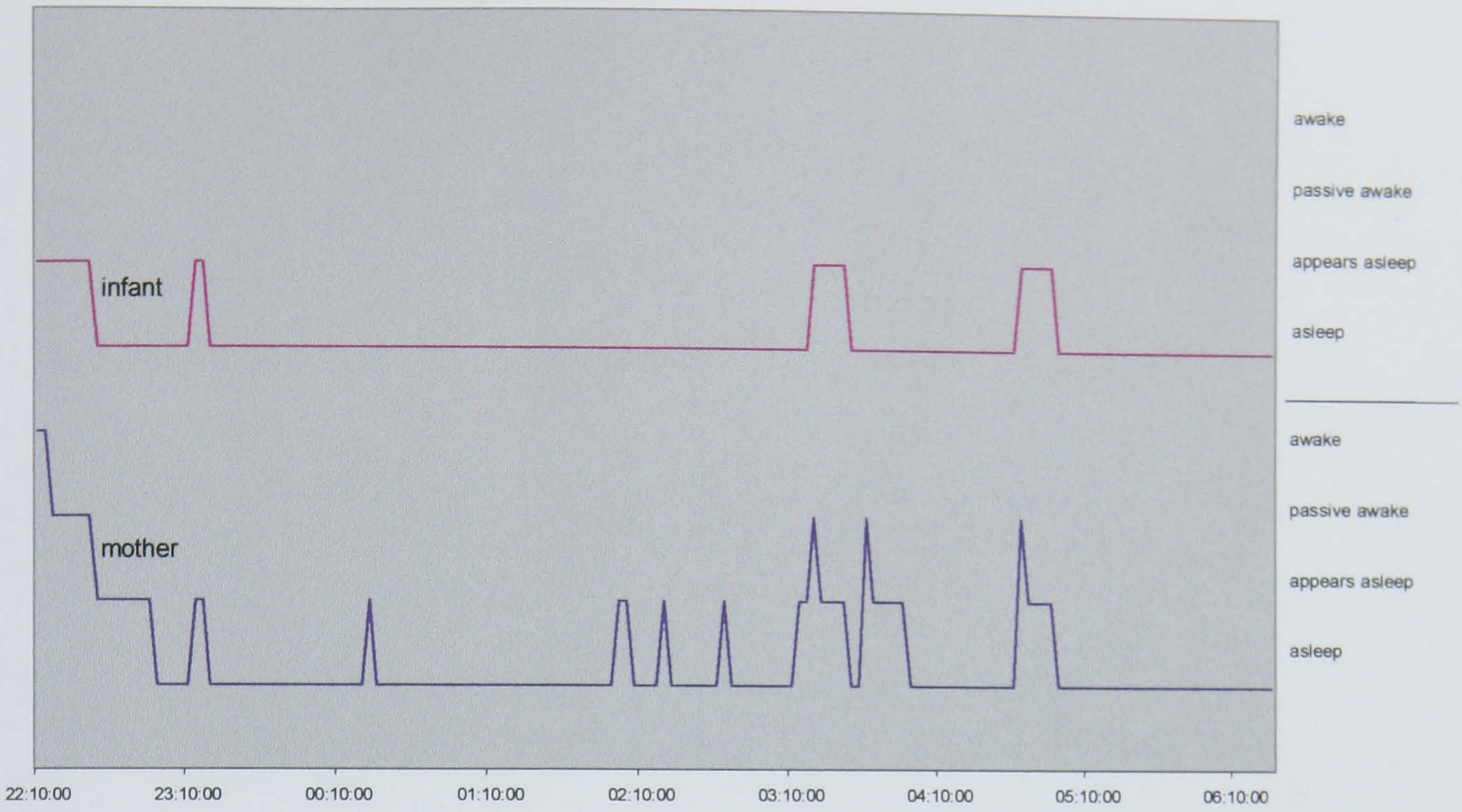


Figure 4.39

Family 'H' sleep states : triadic night

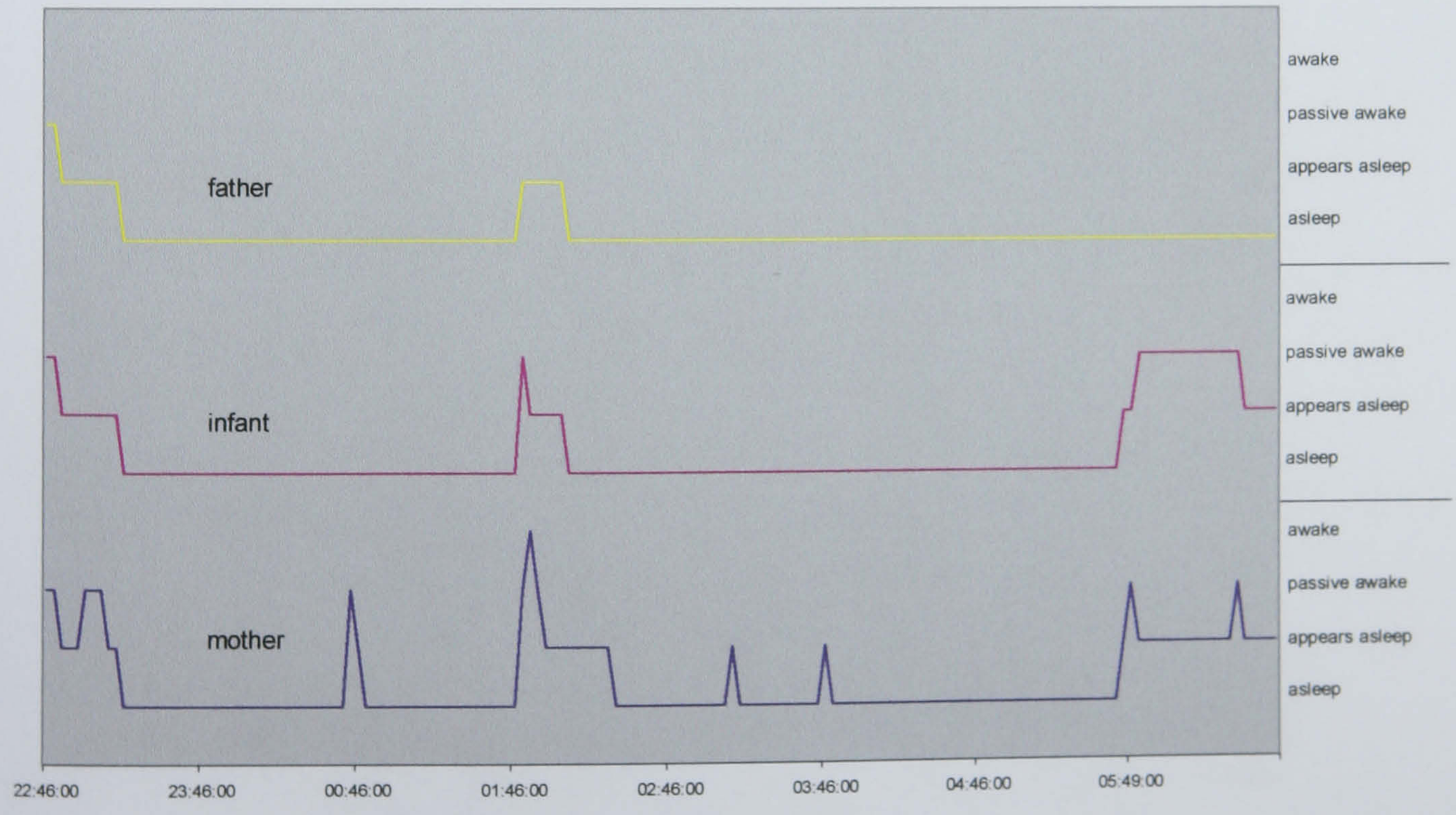


Figure 4.40

Family 'I' sleep states : dyadic night

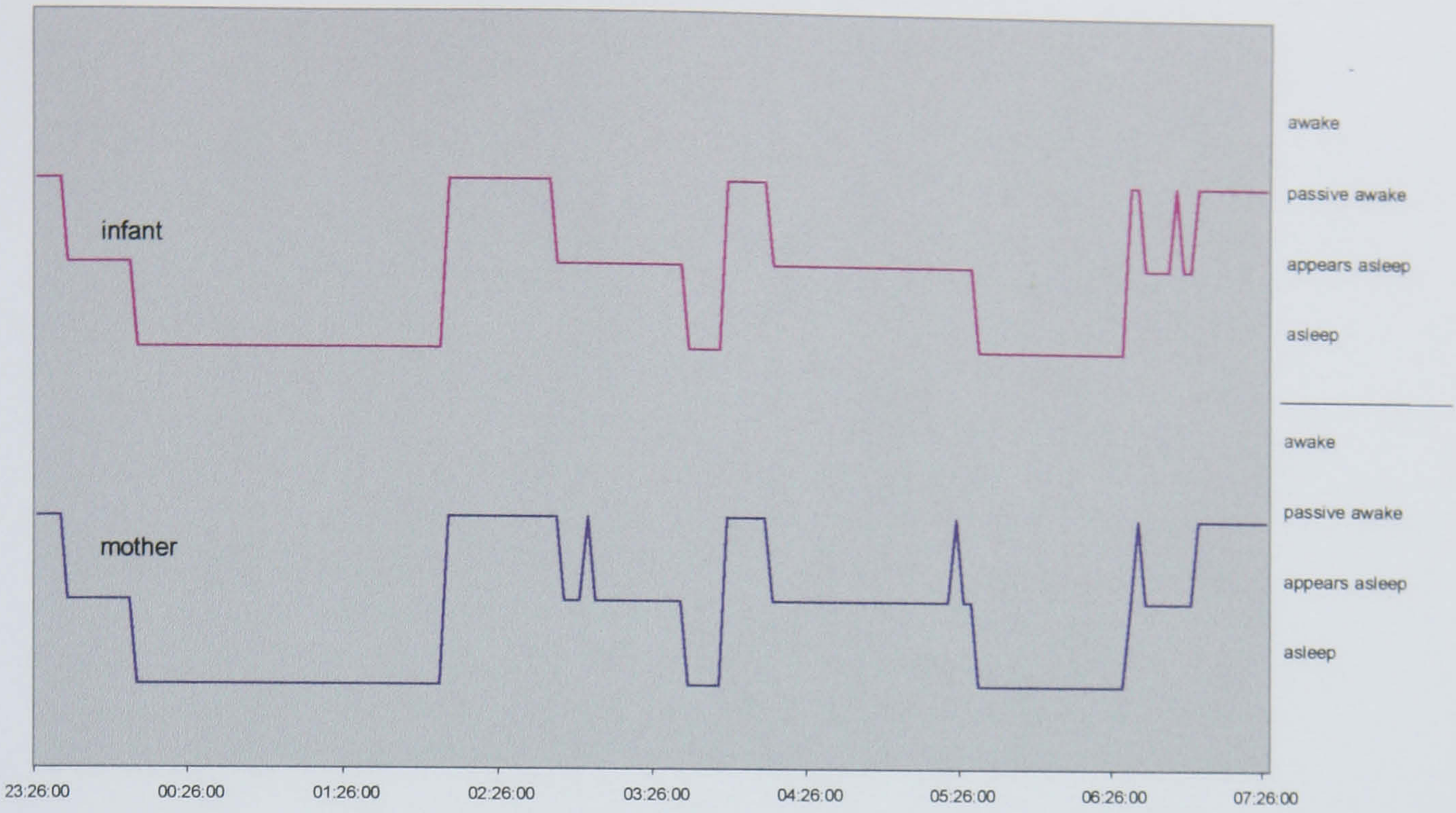


Figure 4.41

Family 'I' sleep states : triadic night

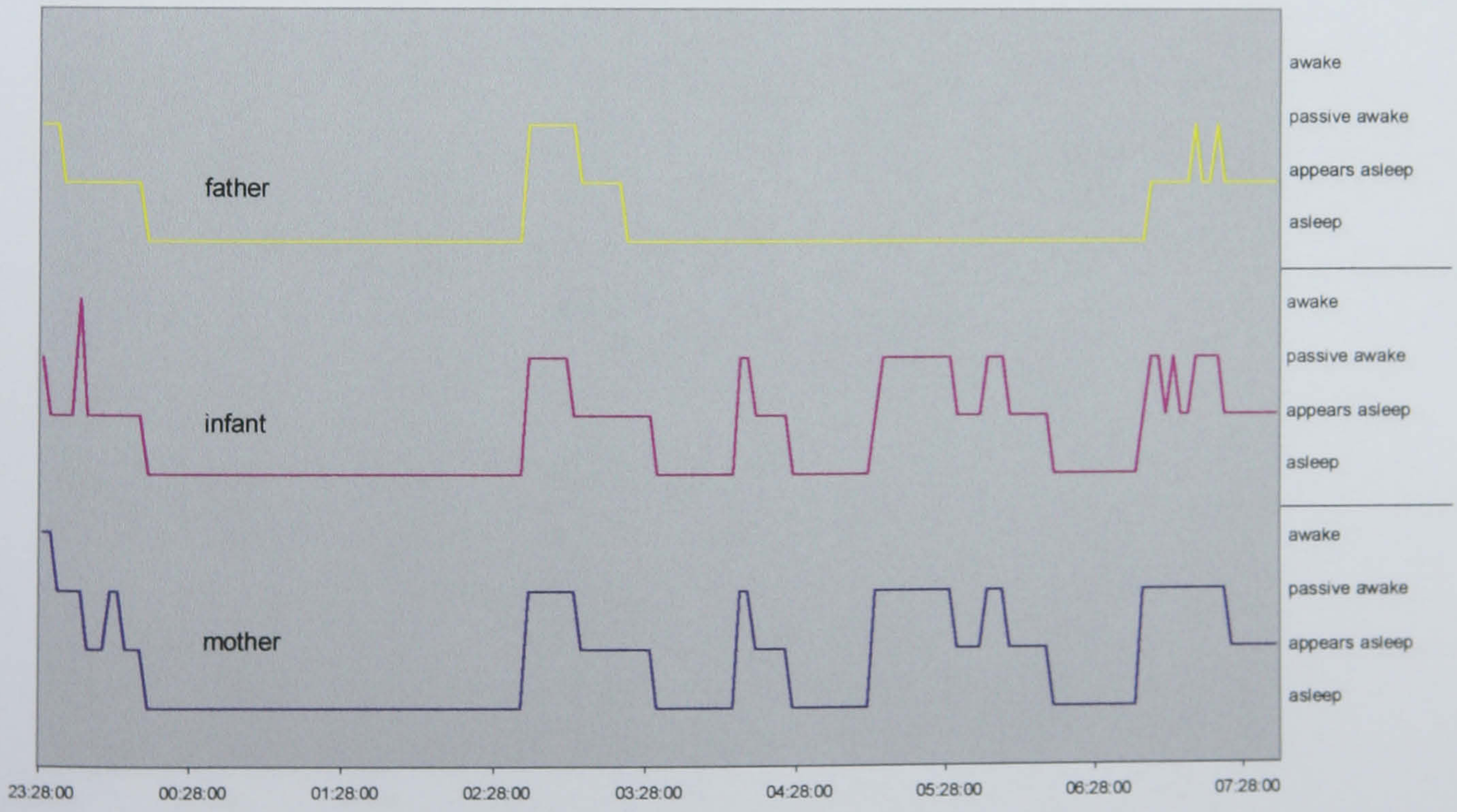


Figure 4.42

Family 'J' sleep states : dyadic night

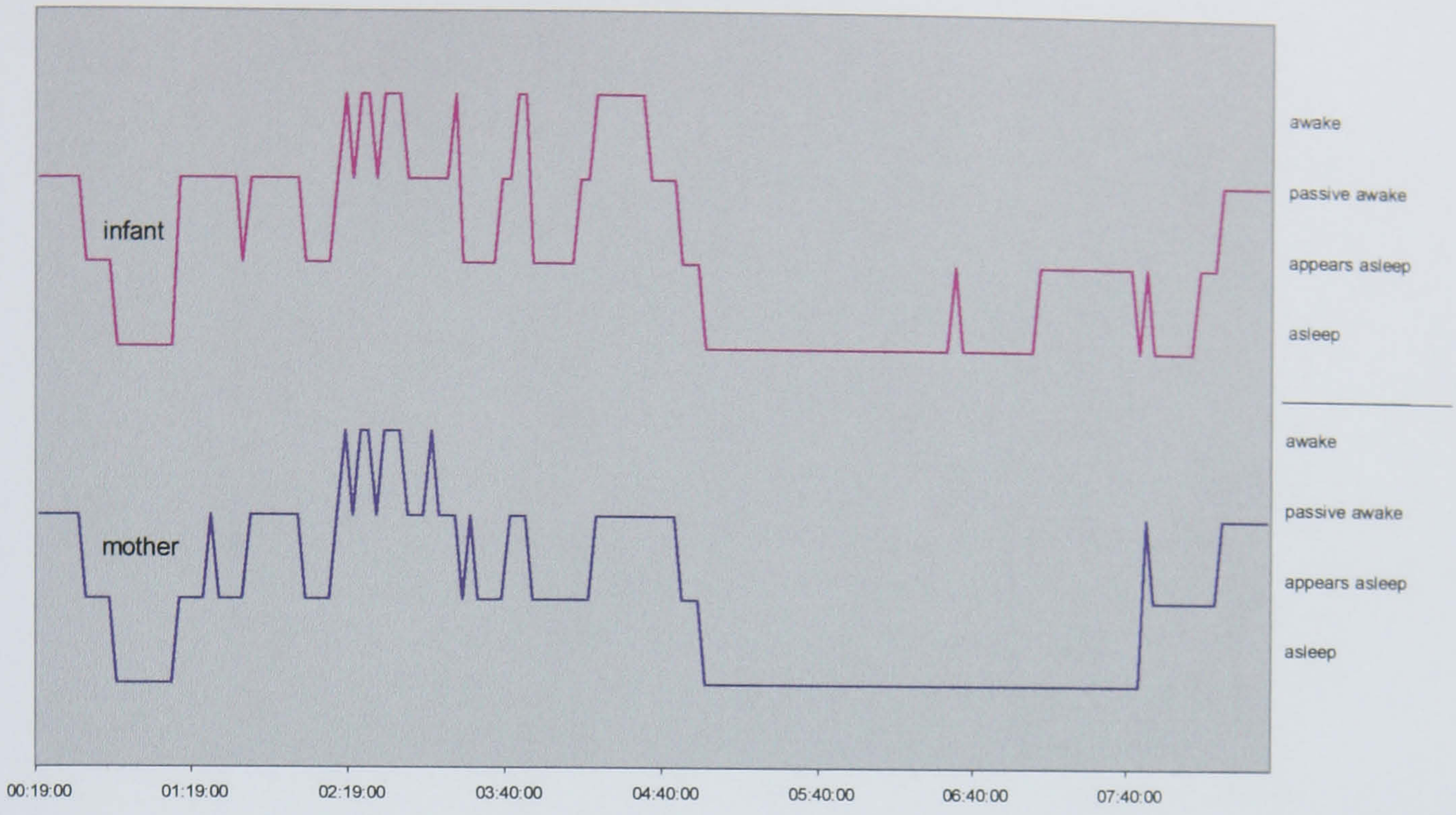


Figure 4.43

Family 'J' sleep states : triadic night

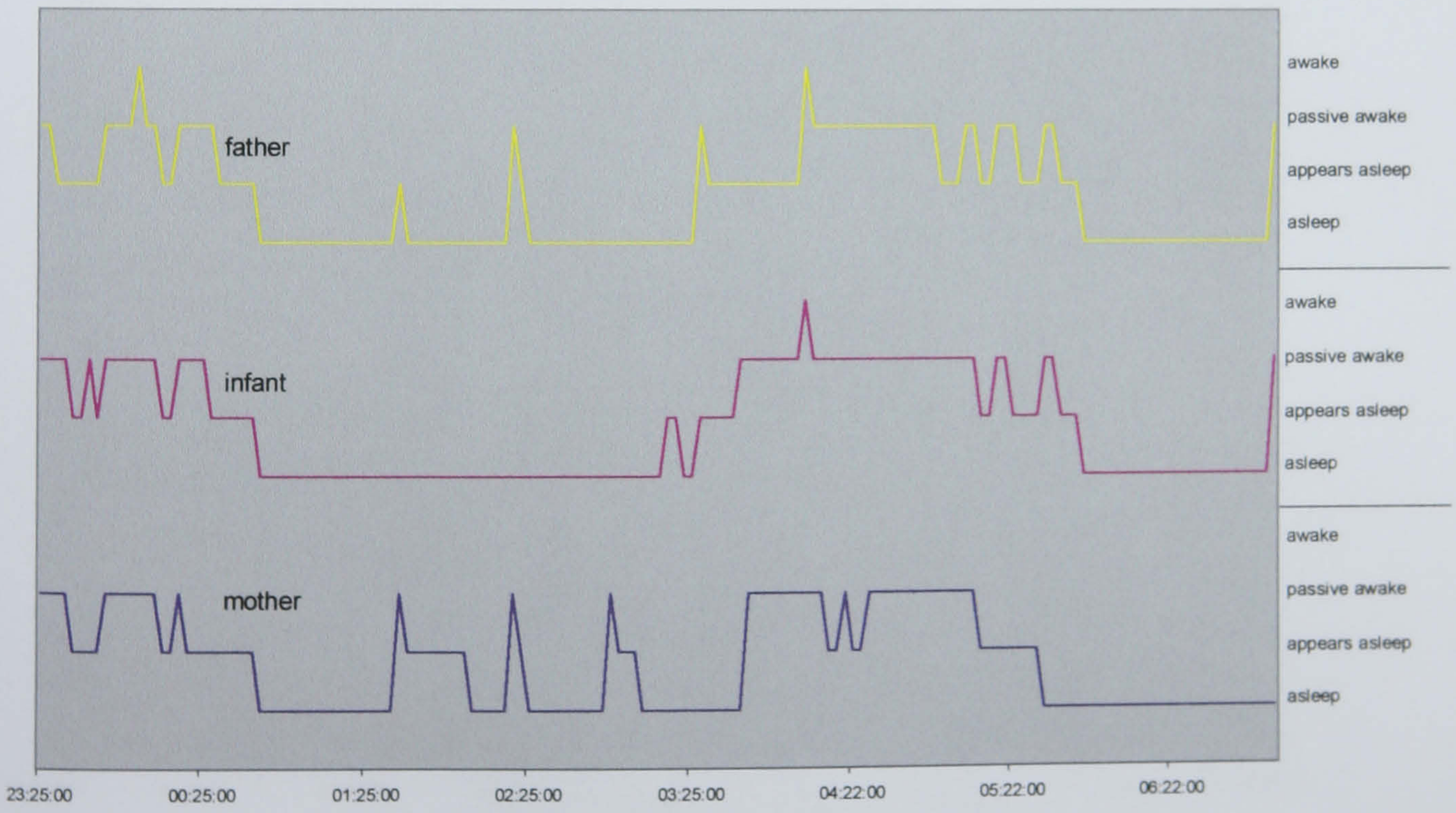


Figure 4.44

Family 'K' sleep states : dyadic night

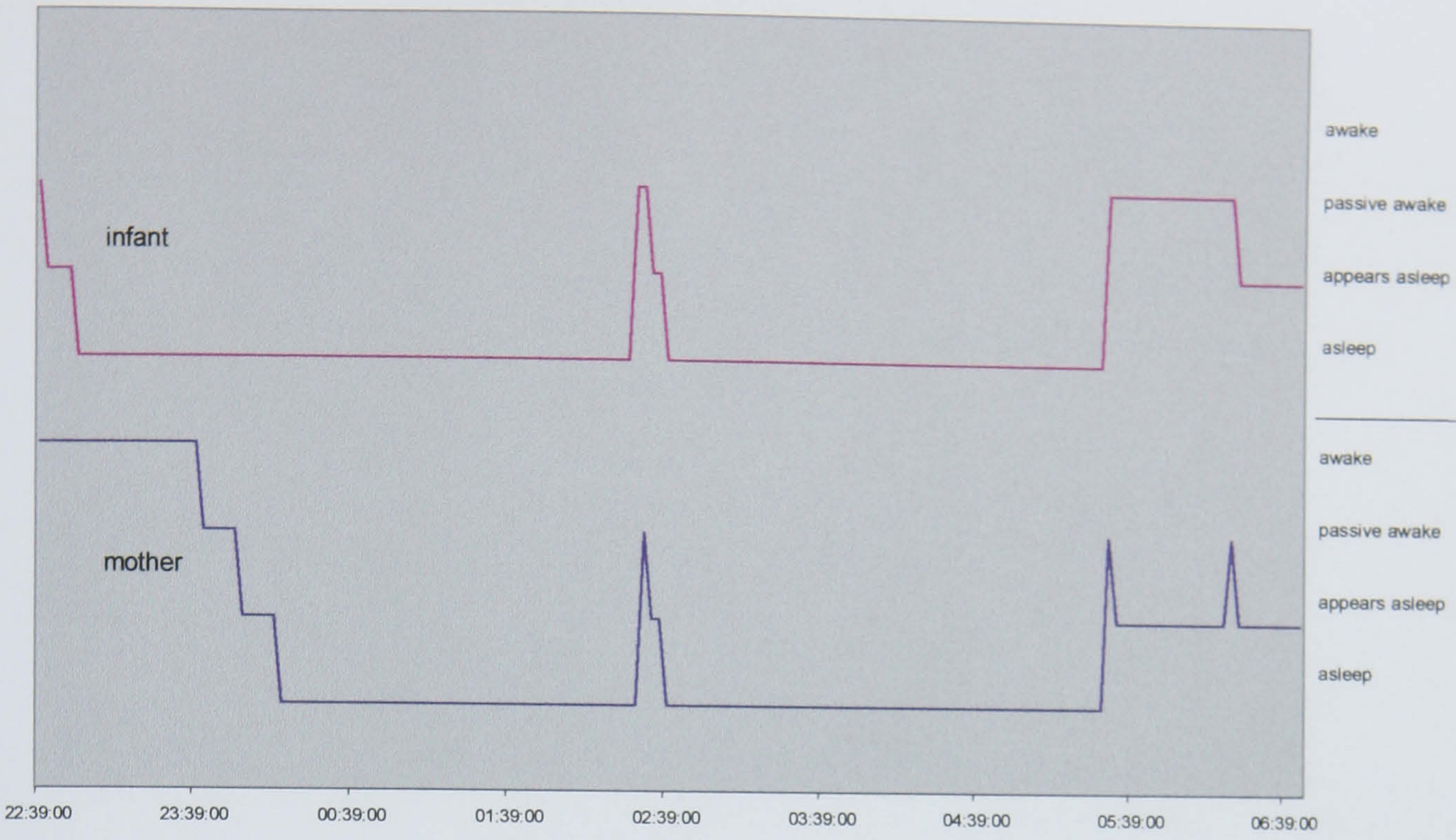


Figure 4.45

Family 'K' sleep states : triadic night

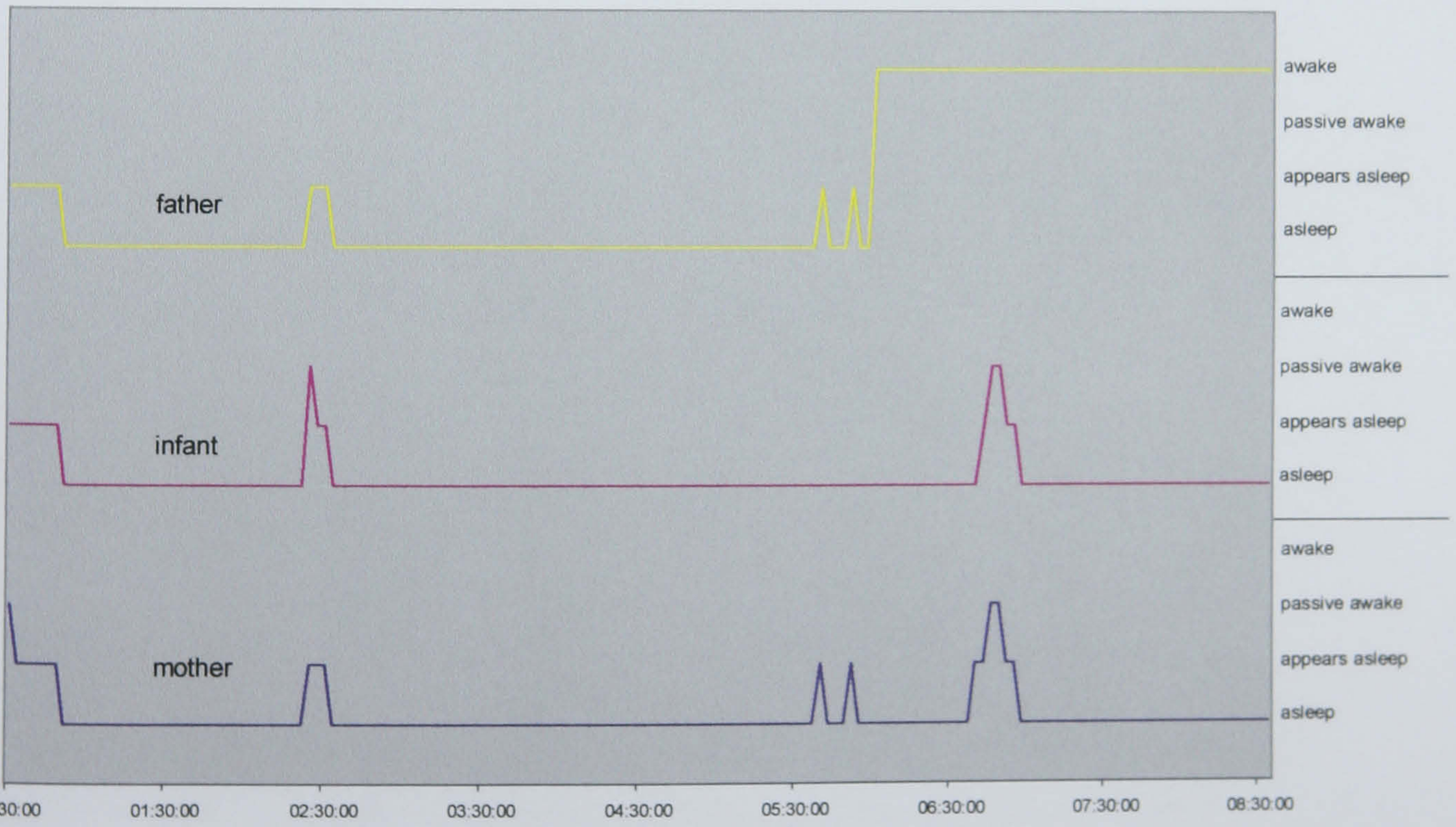


Figure 4.46

Family 'L' sleep states : dyadic night

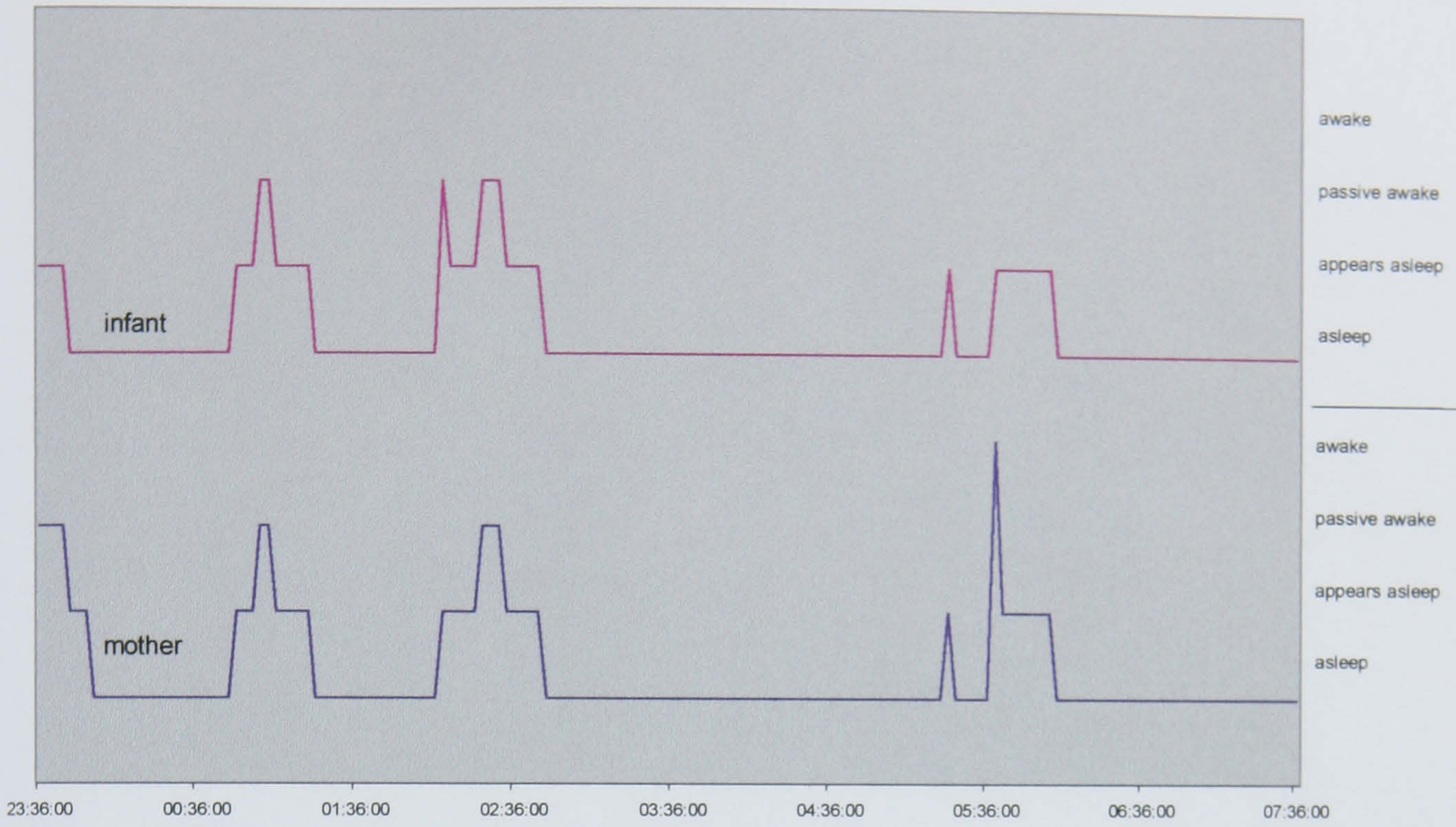


Figure 4.47

Family 'L' sleep states : triadic night

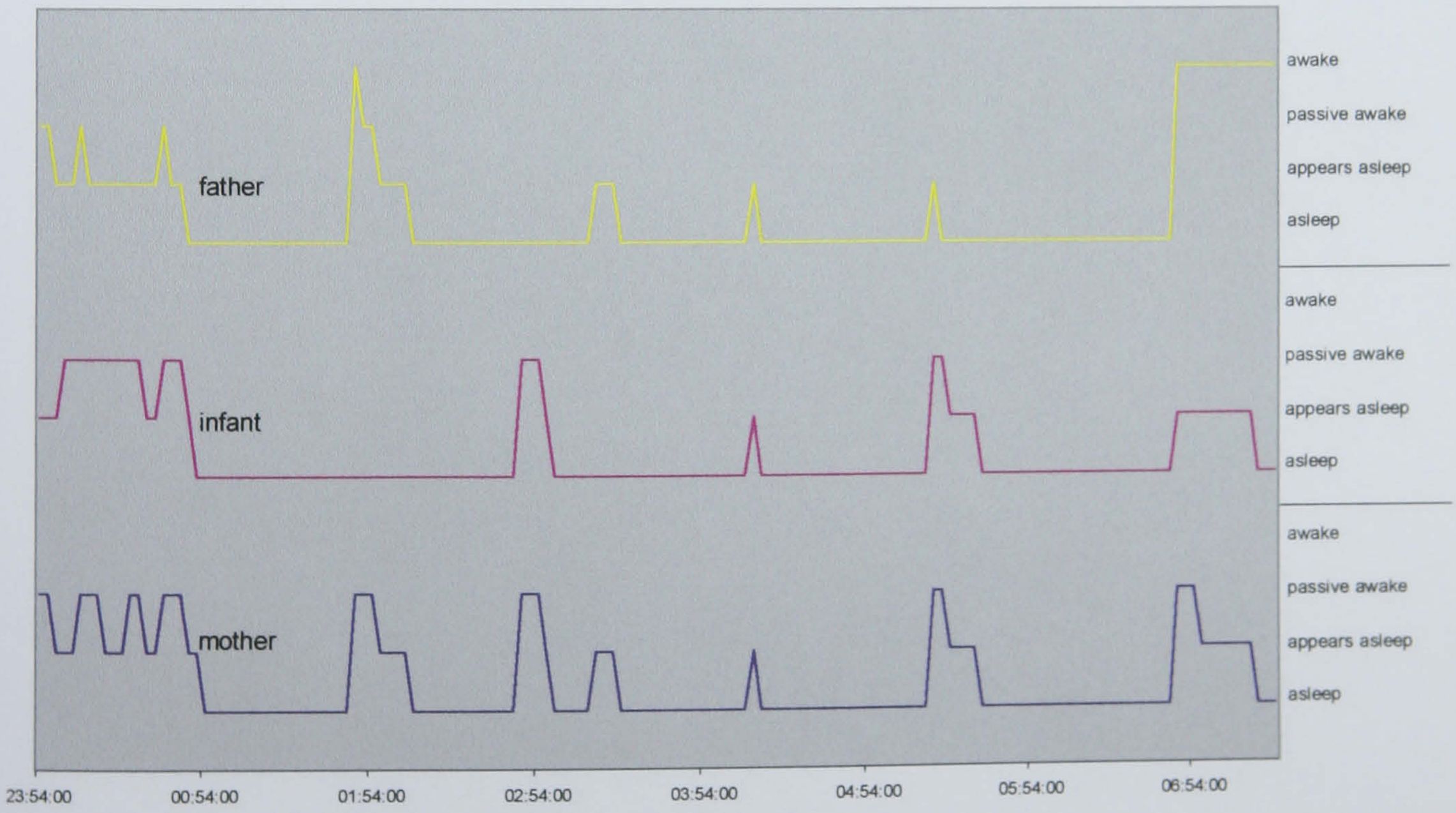


Figure 4.48

Family 'M' sleep states : dyadic night

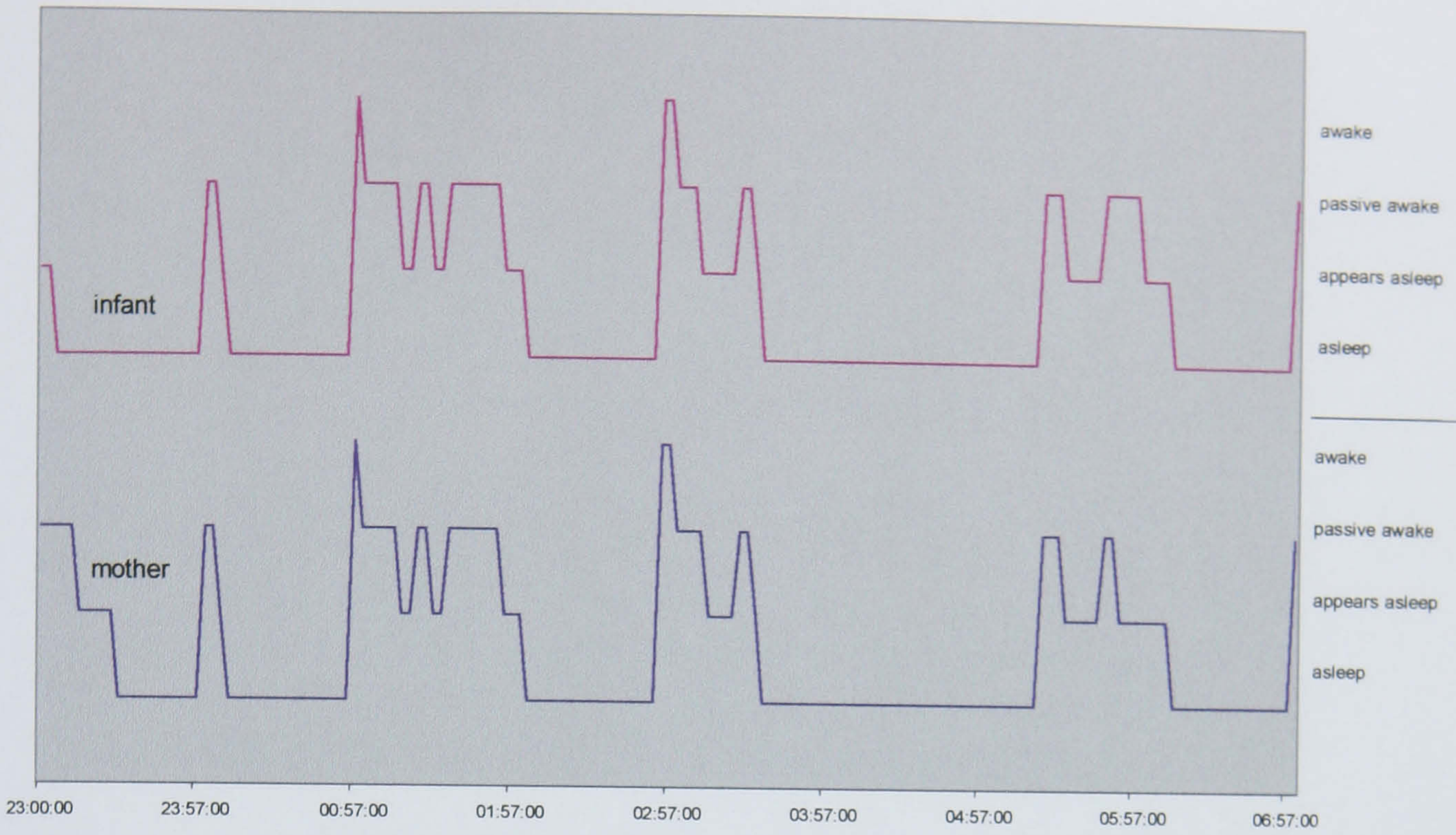


Figure 4.49

Family 'M' sleep states : triadic night

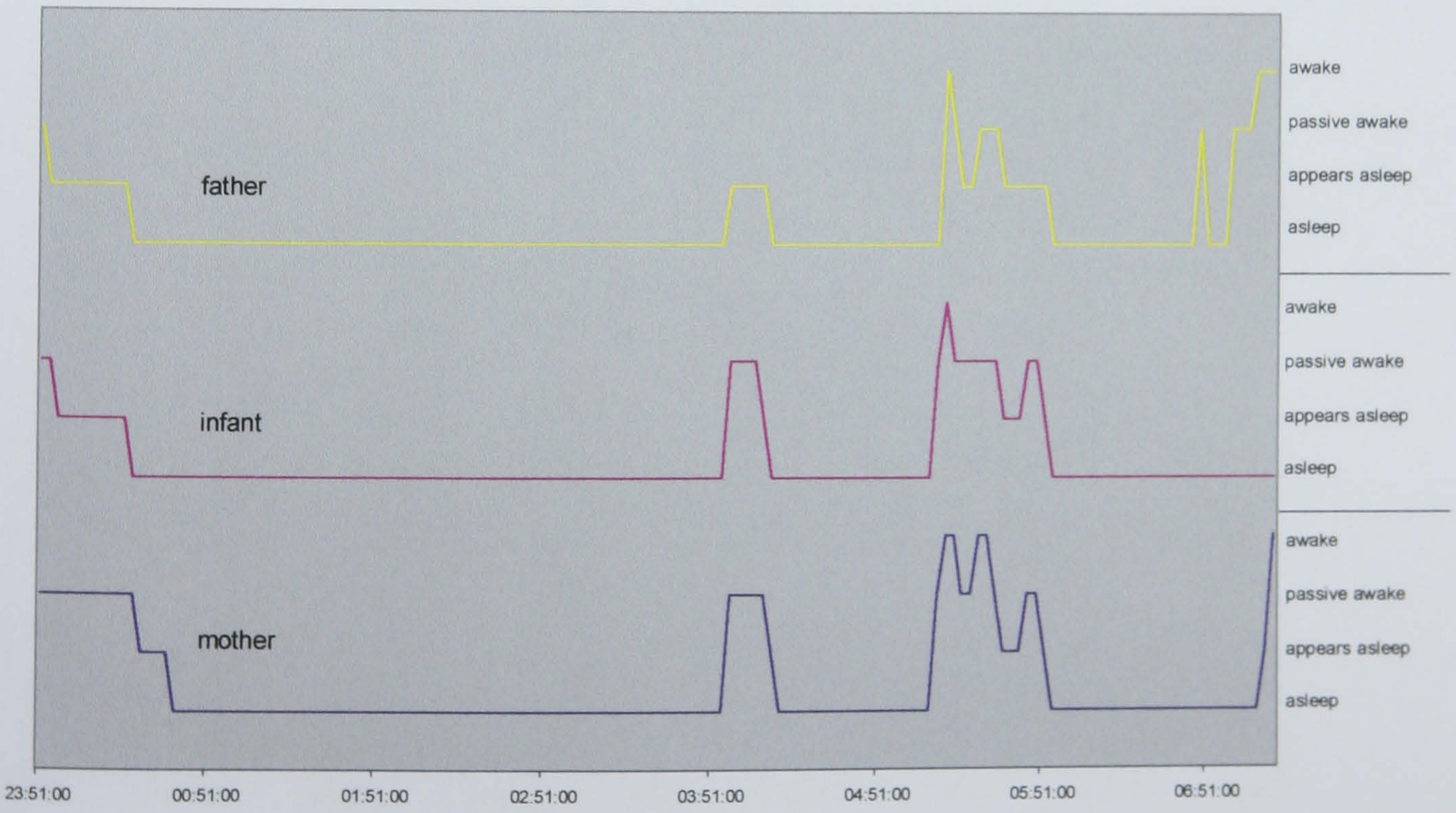


Figure 4.50

Family 'N' sleep states : dyadic night

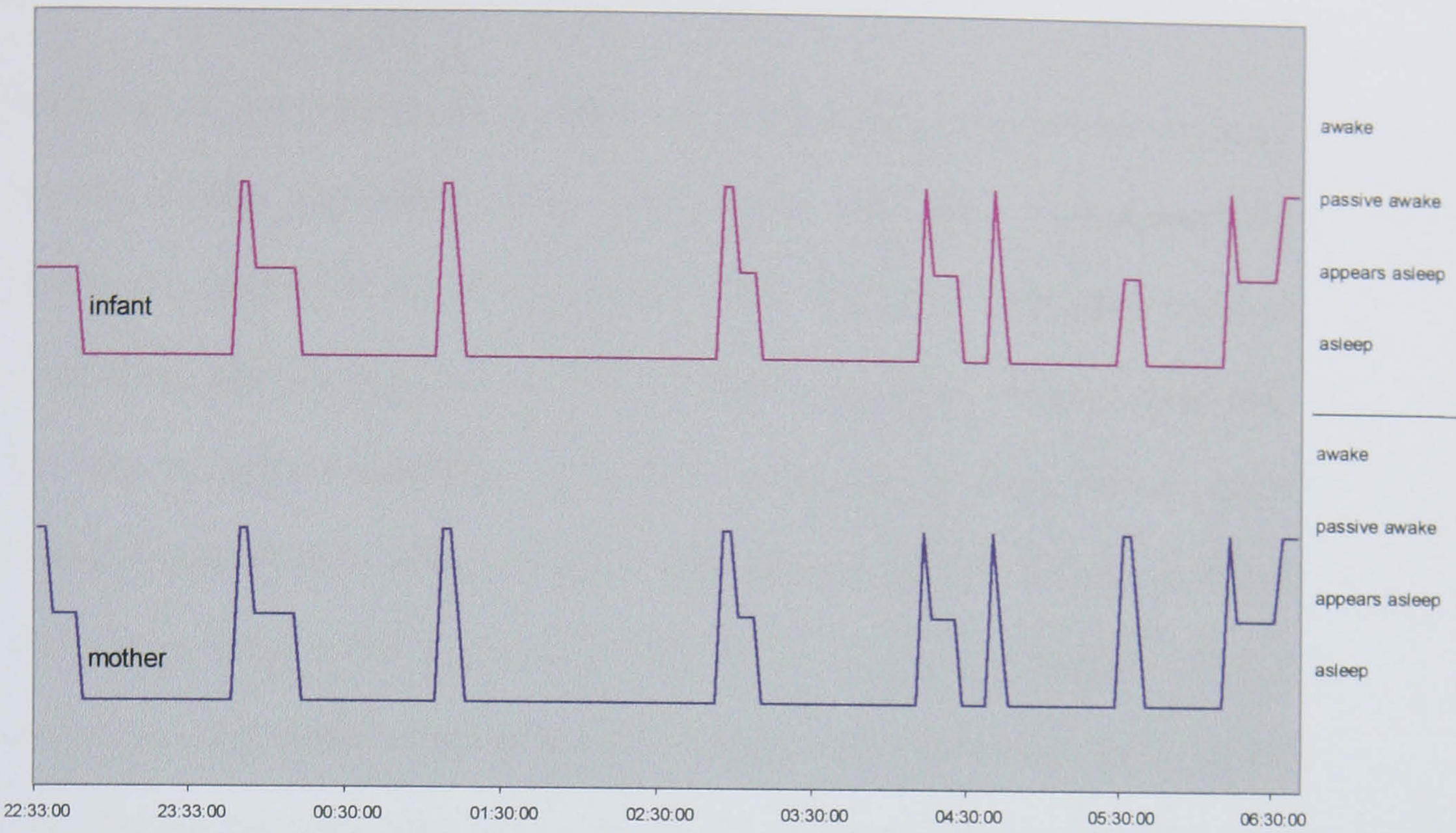
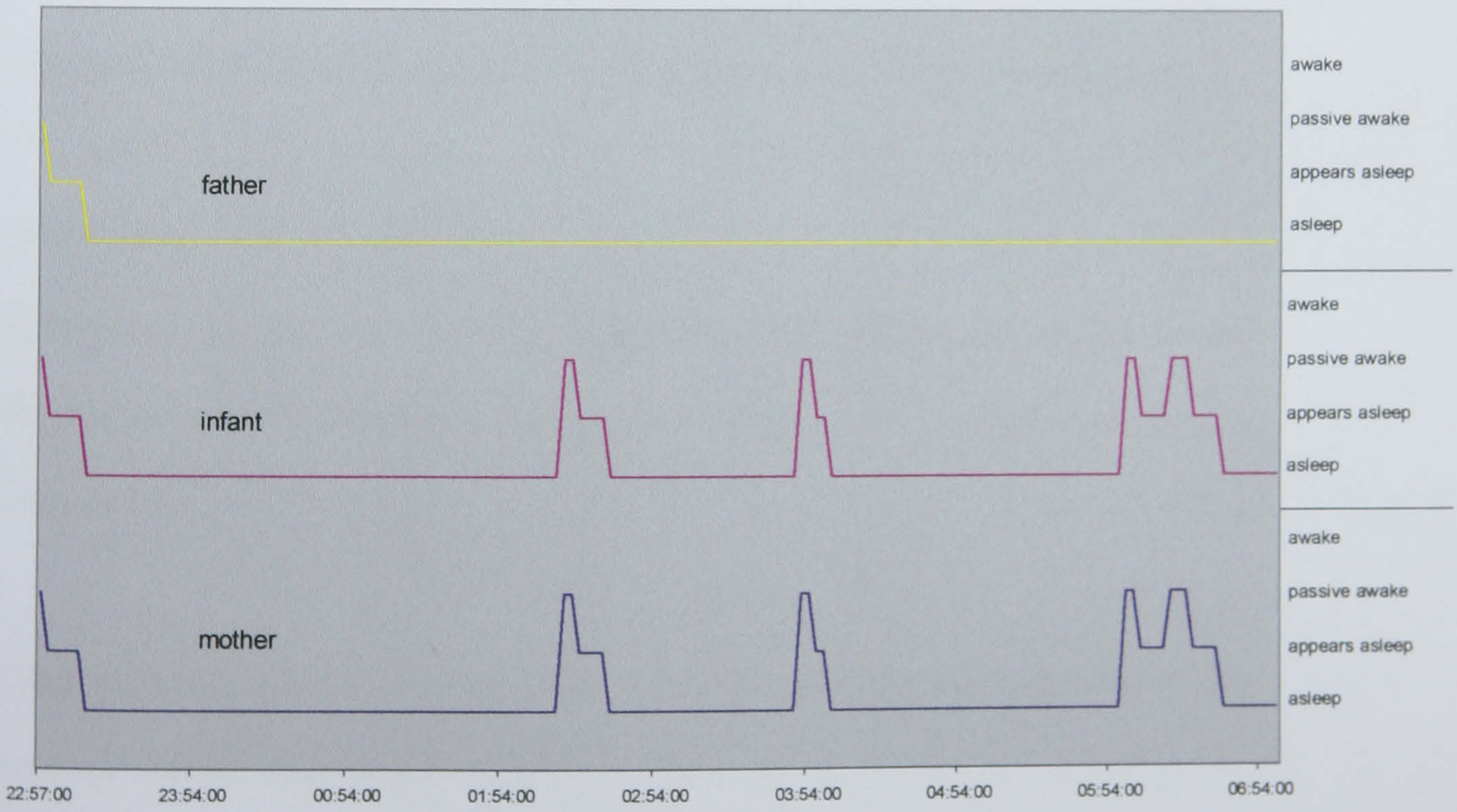


Figure 4.51

Family 'N' sleep states : triadic night



Synchronous, overlapping sleep states and arousals have been shown to occur between mother and infant pairs, sleeping in a laboratory environment, by McKenna's team in the US (Mosko et al. 1997). However, sleep states recorded in the home environment, and inclusive of fathers, have not yet been examined. The use of polysomnography, as used by McKenna, does allow for exact measurements of sleep stages, whereas, observational studies can only estimate where sleep/wake states begin and end. In an attempt to discover all the observable sleep states of the mother-infant pair versus the mother-father-infant triad, the various sleep states were coded and interpreted using graphs shown in figures 4.24 to 4.51.

Mothers exhibited consistently synchronous sleeping and arousal patterns with their infants on dyadic and triadic nights, as did most fathers on the triadic night. Fathers D and N, however exhibited no synchrony with the mother-infant pair.

3.6 Feeding

Hypothesis: parents who cosleep with their infant and employ either breast-feeding or formula-feeding will experience differences in night-time feeding interactions.

I had predicted that the frequency and duration of feeding episodes would vary between triadic and dyadic nights and between breast-feeders and formula-

feeders. Also that fathers would affect feeding interactions and that father of infants who were bottle fed would carry out night-time feeding episodes.

Ten of the infants were exclusive breast-feeders (from families B, C, D, F, G, I, J, K, M and N) whilst two infants (infants E and H) had been breast-fed initially but had changed to being bottle-fed (infant E in preparation for the mother's return to work and infant H after 11 weeks). The infants from family A (father the primary care-giver) and L were exclusively bottle-fed from birth. In comparing family A's dyadic vs. triadic nights for infant feeding I found no difference in formula-feeding frequency and duration. The baby was fed once during sleep time for a period of 16 minutes on the dyadic night and 15 minutes on the triadic night. However, there is a marked difference in the time of the feed, who was responsible for feeding and substance fed between the dyadic and triadic nights. On the dyadic night the baby was offered water at 3.59am, by the mother who was lying down, and appeared to be reluctant to drink, pushing the teat in and out. On the triadic night the father fed his infant a milk bottle starting at 7.56am. The father was sitting up with the baby in bed whilst the mother appeared to be asleep.

Another formula-feeding family (family E) followed a similar strategy to that of family A, in that on the triadic night it was the father who fed the baby. He began feeding at 5.40am for a period of 9 minutes during which time the mother was passive awake at the beginning but appeared asleep during the feed. However, when the father had finished feeding the baby it was the mother who 'burped' the baby and continued to interact with her for several minutes. The infant did not

feed on the dyadic night although both mother and infant were awake at 5.02am and the mother did appear to be going to feed her baby (she fiddled with the bottle warmer) but the baby went back off to sleep and did not feed. The bottle-fed infant from family H, did not feed at all during both dyadic and triadic nights, which could have been due to her age, of 6 months, at the time of the video recording.

There was no paternal involvement during the formula-feeding episodes for infant L on the triadic night. During the night the mother fed the infant three times whilst the father remained asleep during all three feeding bouts. Well prepared the mother had everything ready and close by, enabling feeding to take place with minimum effort. She also managed to feed the infant whilst remaining laying down, a successful strategy also employed by the breast-feeding mothers. All three formula-feeding episodes on the triadic night were relatively short, with an average duration of eight minutes. During the dyadic night the mother and infant dyad were only involved in one feeding episode, which began at 2:15am and was terminated at 2:23am.

For breast-feeding infants the frequency of feeding was greater than those who were bottle-fed. For family B the frequency of feeding was the same for the two nights. The mother fed the baby, who was one of the younger infants of the group (2½ months), 3 times at three hourly intervals. On the dyadic night the infant fed on both breasts for all three feeds for an average duration of 18 minutes. The mother was sitting up in the bed to feed the baby for two of the feeds but for the

final feed remained lying down. On the triadic night the first feed was over one hour later than the dyadic night which left a 2 hour interval between feeds 1 and 2 but then reverted to a 3 hour interval between feeds 2 and 3. There was a slight drop in the average duration of the feeds on the triadic night to 10 minutes. The father from family B was passive awake for the first feed at 1.27am but appeared asleep for the following 2 feeds. After the 3.25am feed he did wake at 3.40am and took the baby from the bed, returning to the bed (with the baby) at 4 am.

For one family (family C) the baby does not begin the triadic night sleeping in the bed but is brought into the bed for the first early morning feed at 3.20 am. This pattern is not consistent or dependant upon the time of the last feed as on the dyadic night the mother is in bed for an hour on her own before the father brings the baby up to mum to be fed at 23.40pm. On the triadic night the mother feeds the infant at 3.20am for 11 minutes and then quickly goes back to sleep within one minute of ceasing breast-feeding. The father who initially appeared passive awake during this first breast-feeding episode soon went back to sleep whilst the mother-infant pair were occupied. The infant feeds again just over 2 hours later (2 hours 14 min) at 5.34am for 6 minutes during which the father remains asleep and there is another short feed at 6.20am but everyone is back to sleep by 6.26am. This pattern of feeding for quick, short spurts is emphasised on the dyadic night when the infant is fed five times. After the initial 22:40pm feed (for 3 minutes) on the dyadic night, the infant is fed at 1:38 am for 10 minutes, then at 3:55am for 6 minutes, again at 5:02am for 8 minutes and finally at 6:20am for 9 minutes. For

three of the feeds (23:50pm, 1:38am and 5:02am) feeding was not properly terminated and mother and infant both just fell back to sleep.

Illustration 4.6 Family C demonstrating the ease of breast-feeding.

The most frequent breast-feeder was the infant from family D, who fed 7 times on the triadic night, followed by 6 feeds on the dyadic night, although the average length of the feeds was short, being 4½ and 7 minutes respectively. In conversation with the mother after the video recording, the mother commented that she thought she had fed the infant 3-4 times per night. On the triadic night the baby was fed at 0:45am, 0:53am, 2:35am, 2:51am, 3:04am, 3:15am, 4:11am, with the time spent feeding ranging from 20 minutes to 25 seconds. The father was asleep throughout the feeding episodes, indeed for three of the intervals the

mother appeared asleep also, managing to feed her infant whilst remaining lying down. This strategy for feeding continues during the dyadic night when the infant was fed at 22:20pm, 23:32pm, a suspected episode at 0:31am, 1:35am, 5:12am and 6:29am. Although the average feeding duration was longer (7 minutes, ranging from 17 min to 2 seconds) on the dyadic night, during four of the feeds the mother and infant appear asleep, and feeding on these occasions is not definitely terminated. As on the triadic night the mother and infant feed lying down, and it is often difficult to distinguish between actual feeding and passive comfort sucking.

The breast-feeding infant from family F also employs comfort sucking rather than actual feeding for a few minutes at the beginning of the triadic night. She begins to feed at 12 midnight when both parents are passive awake (they have all just gone to bed). The baby starts and stops sucking but then feeds for 4mins, stopping for another minute, and then resumes for a further 6 min, (until 17 min past midnight), by which time the father appears asleep. Mother and infant both appear asleep by 24 min past midnight. The infant feeds twice more during the triadic night, but the timing of the feeds may mean that it can be counted as one feeding episode. The father is asleep throughout both episodes timed at 4:04am until 4:07am and 4:18 am until terminating at 4:23am. The baby appears unsettled between the feeds and although the mother appears asleep she presents the nipple to the baby for the second feed. Both mother and infant, who have remained lying down throughout the feeding episodes, are asleep 2 minutes after feeding ends. There is a similar pattern on the dyadic night when the baby is

fed/comforted one hour earlier, for a few seconds, on getting into bed but both mother and baby are asleep 6 minutes later. The infant roots for the nipple at 4:38 am when both mother and infant are awake and feeds for 15 min with a one-minute break in between. Feeding terminates at 4:53am and both are asleep again in 3 minutes.

The infant from family G breast-feeds only once on both dyadic and triadic nights. On the dyadic night, mother and infant began the night with a feeding episode, which appeared to settle both down for the night, as feeding was not obviously terminated before both mother and infant fell asleep. During the triadic night the infant woke at 4:20am for a feed that lasted for 15minutes. The episode appears to be the catalyst for the father to leave the family bed as he woke with the mother and infant but promptly left the bed and did not return.

Many of the breast-feeding episodes observed did not seem to have consistent intervals or timing and appeared to be completely 'on demand'. The youngest infant in the group from family I, for example, fed twice on the dyadic night and three times during the triadic, at very different times. Feeding began on the dyadic night at 2:02am, with both mother and infant lying down, continuing on and off for 40 minutes, until 2:40am. After a sleep interval, the infant woke to be fed again at 3:52 am and as with many of the breast-feeding episodes observed, was not properly terminated, but ended with the mother and infant returning to sleep. During the triadic night the infant fed three times, at 2:39 until 2:51am, with mother, father and infant all awake during this period. However, the father

from family I did not wake for the following feeding sessions at 5am, which continued on and off for 50 minutes or the final feeding bout which occurred at 7am until 7:13am.

Infant J fed 3 times during the dyadic night and twice on the triadic night. Breast-feeding bouts began at 7 minutes past midnight on the dyadic night, and lasted for 8 minutes. The infant (aged 2 moths old) was fed again at 1:43am for 10 minutes, with the final feed of the night beginning at 4:33am and was not properly terminated before mother and infant fell back to sleep. During the breast-feeding episodes on the triadic night the father was awake for the first feed which occurred at 23:24pm and continued on and off for 40 minutes. The mother and infant were involved in another feeding session at 3:45am until 3:58am but the father remained asleep during this event.

The breast-fed infant from family K did not feed at all during the dyadic night and briefly awoke on the triadic night for a feed at 2:30am. The father of infant K was not disturbed during this feeding episode and the mother and infant appeared to be asleep soon after feeding had began.

The quantity of night-time breast-feeds for the infant from family M, measured 4 during the dyadic night compared with 3 feeds during the triadic night. For the dyadic night the feeds occurred at 23:00 for 6 minutes, with a longer episode taking place at 1:19 until 1:54. The infant had another short feed at 3:20am for 10 minutes and the final feed took place at 5:42am lasting 20 minutes until 6:03 am.

Mother and infant began the triadic night with a feeding bout at 23:51 for which the father was awake, but he soon fell asleep, followed closely by the mother and infant who terminated feeding at 00:03. Father M was not disturbed for the next short feed which occurred at 3:54 for 15 minutes. An early morning feeding episode occurred at 5:18 where the infant fed on and off for 30 minutes, mother and father were both passive awake throughout the feed.

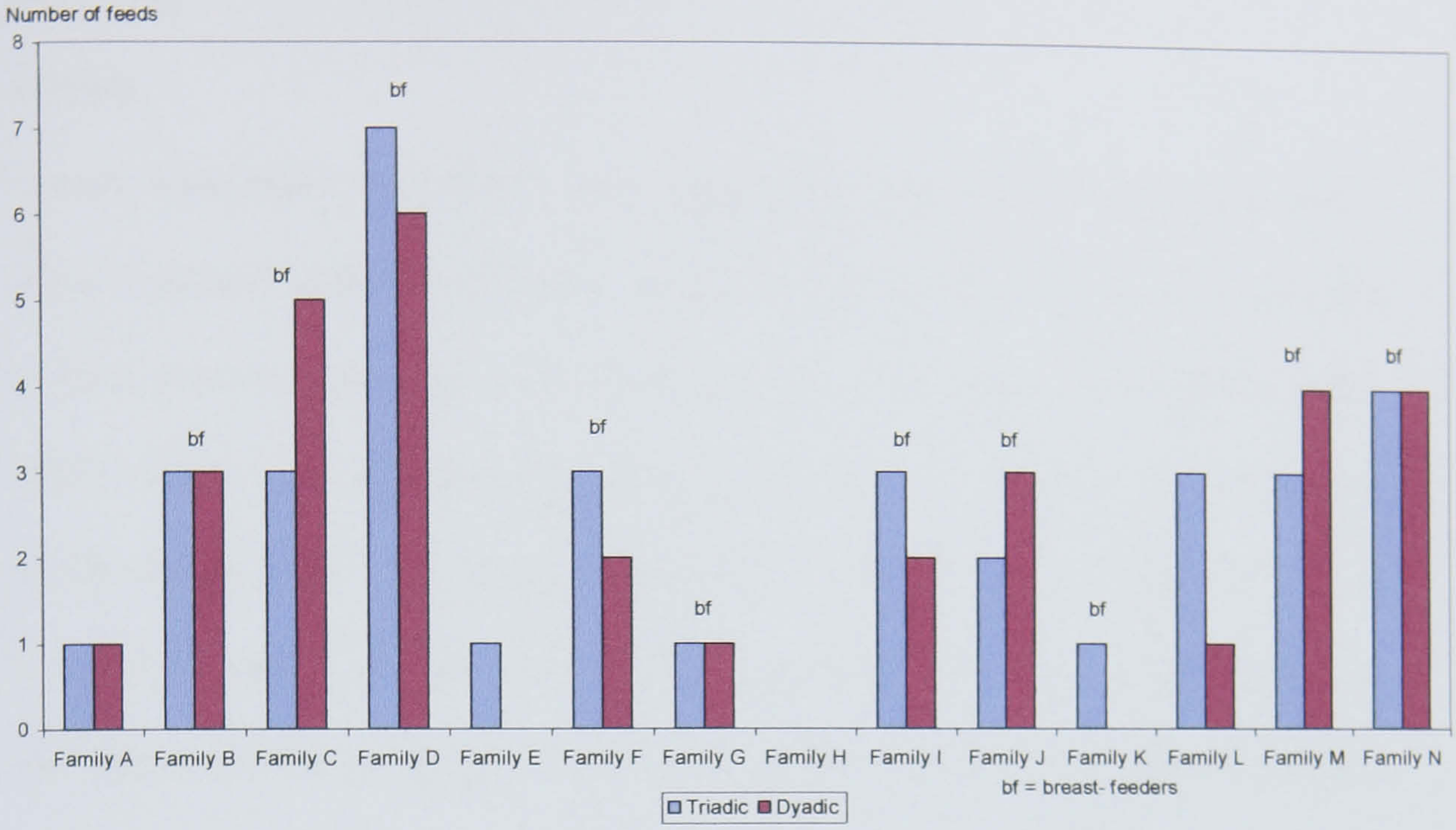
The infant from family N was observed breast-feeding four times on both dyadic and triadic nights and considering her age of seven months shows that breast-feeding (or comfort sucking) can still be frequent for older babies, during the night. During the dyadic night the infant woke to be fed at 23:47, 1:04, 2:52 and 6:10am. All the feeds except for the final feed were not terminated but the mother and infant were observed to start a feed and then both fell back to sleep quite quickly. This could question whether feeding was actually taking place or it could have been an example of comfort sucking for the infant. The breast-feeding episodes during the triadic night were relatively short in duration but were completed. A feed to settle the infant occurred at 22:54 when mother, father and infant were observed awake but for the following 3 feeds throughout the night the father appeared asleep. The feeding bouts occurred at 2:16 lasting for 10 minutes, 3:38 am until 3:57 and finally at 6:16 for 11 minutes until 6:27am.

Figure 4.52 shows that for feeding frequency 4 infants (A, B, G and N) were fed the same number of times on both dyadic and triadic nights, 2 infants (E and K) fed only once during the triadic night and did not feed during the dyadic night, 3

infants (C, J and M) fed more on the dyadic night whereas 4 infants (D, F, I and L) fed more frequently on the triadic night. The infant from family H did not feed during either night. Using a Wilcoxon signed rank test there was no significant difference in the frequency of infant feeds between the dyadic and triadic nights ($T+ = 34$, $N = 9$, $p = 0.1016$).

Figure 4.52

Frequency of infant feeding bouts on dyadic and triadic nights



3.8 Safety

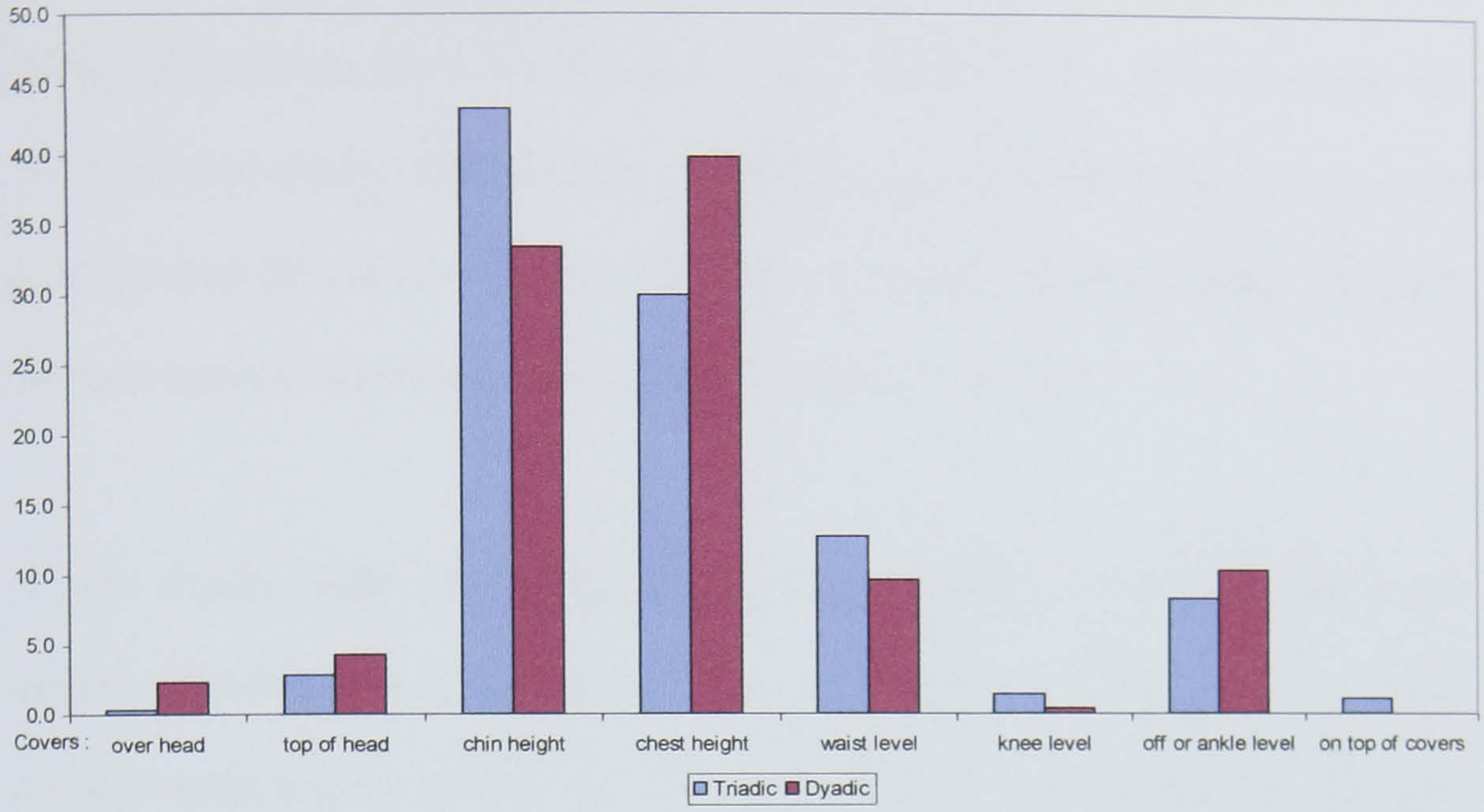
Covers

Covers were higher on babies, when the parents were asleep, during the triadic night compared to the dyadic night. Figure 4.53 shows that the overall proportion of time infants spent with covers at chin height was greater on the triadic night. While infants spent proportionally more time with covers placed at chest height on the dyadic night. No babies were on top of the covers on the dyadic night however 2 were outside the covers during the triadic night. One baby (family D) was observed with the covers over his head for part of both nights, but for a longer interval on the dyadic night (statistically significant $p = 0.0027$). On further examination, to consider if such incidences appear to be risk events, coding shows that on the triadic night there were two separate 'cover over the head' occasions. The first one occurred when the father was not in the bed (he had yet to come to bed) at 23:35pm when the mother appears to be asleep. The baby was placed in the middle of the bed, with mother and infant facing one another, in touching proximity. After a period of unsettled behaviour by the infant the covers, which were positioned at mother's chest, momentarily cover the baby's face. The infant kicks, which causes the mother to visually inspect and then reposition the baby. The second such event occurred when the father was in the bed, at 00:56am, with the infant positioned on the right side of the mother (not in the middle of the bed). The covers were over the baby's head for a much longer period, six consecutive, 3-minute intervals (18 minutes).

Figure 4.53

% of time cover positioned on infant at each level

Comparison of cover position on infant when parents were asleep



Mother and infant were facing each other, the father had his back to the mother-infant pair and was more than 8 inches away. Both parents appeared asleep but the baby was awake. The situation appeared to occur because the covers were positioned on the parents' chest and the baby was at chest level feeding. The over the head interval ceased when the infant terminated feeding.

On the dyadic night there were three separate infant cover 'over the head' incidences, concerning the infant from family D, lasting for a total of 55 minutes. The first event was the longest (34 minutes) and occurred just before 1am with the infant placed on the left of his mother, in touching proximity. Both mother and infant were asleep, and the infant was positioned at his mothers waist height, in a horizontal position (clock position "9"). The covers were positioned at the mother's waist level, consequently the covers remained over the baby's head. The second incident occurred during a breast-feeding bout, lasting for 12 minutes. The infant was in a vertical position at the right breast but the covers were pulled up to the mother's chin and thus over the infant's head. A similar situation transpired for the final event beginning at 5:29am, lasting for 9 minutes, with the mother-infant touching pair asleep, the infant positioned level with his mother's chest but with the covers pulled up to the mothers chin, so the covers were over the baby's head.

From the data presented I examined how the presence of the father in the bed affected cover position on the baby, when the parents were asleep? Examining whether, covers were more frequently above chest height when fathers were in the

bed than when they were not, and using Wilcoxon signed ranks test (for matched pairs), I found no significant difference in the frequency of covers above parents' chest level, when parents were asleep between dyadic and triadic nights (T + = 55, N = 13, p = 0.2709).

When examining cover position on mothers when infants were asleep, 5 mothers (A, E, K, L, M and N) have the covers level with their chin for over 70% of the dyadic night (figure 4.54). However, breast-feeding mothers (C, D, F, G and M) appear to favour keeping the covers at chest height. The mothers from families B, H, and J preferred their covers at waist level, whilst the mother from family I displayed a variety of cover choice. The mother from family E (a formula-feeder) preferred to keep the covers up to her chin on the dyadic night but had her preferences altered drastically when the father got into the bed on the triadic night, to having the covers at her chest (figure 4.55). Another mother also appeared to have her choice affected by the presence of the father in the bed on the triadic night. During the dyadic night the mother from family B appeared to prefer the covers to remain at her waist level but during the triadic night the covers were at the mothers chest level for the majority of the time. The cover position on the mother from family F also contrasted between dyadic and triadic nights but in the opposite way to the previous example. On the dyadic night cover position was split almost 50-50 (%) between covers at waist level and covers at chest level. However on the triadic night the covers were placed predominantly at waist height when her infant was asleep.

Figure 4.54

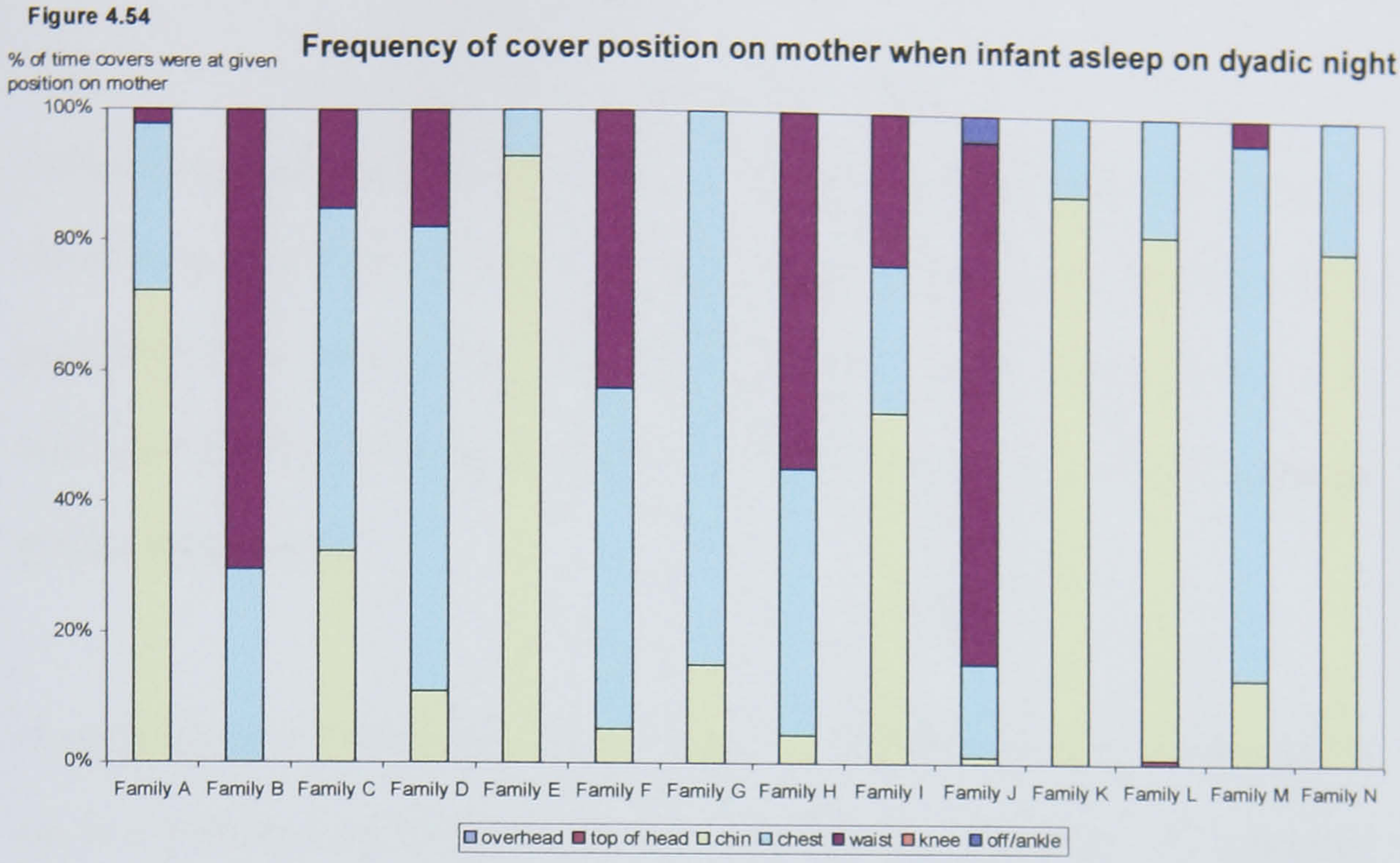
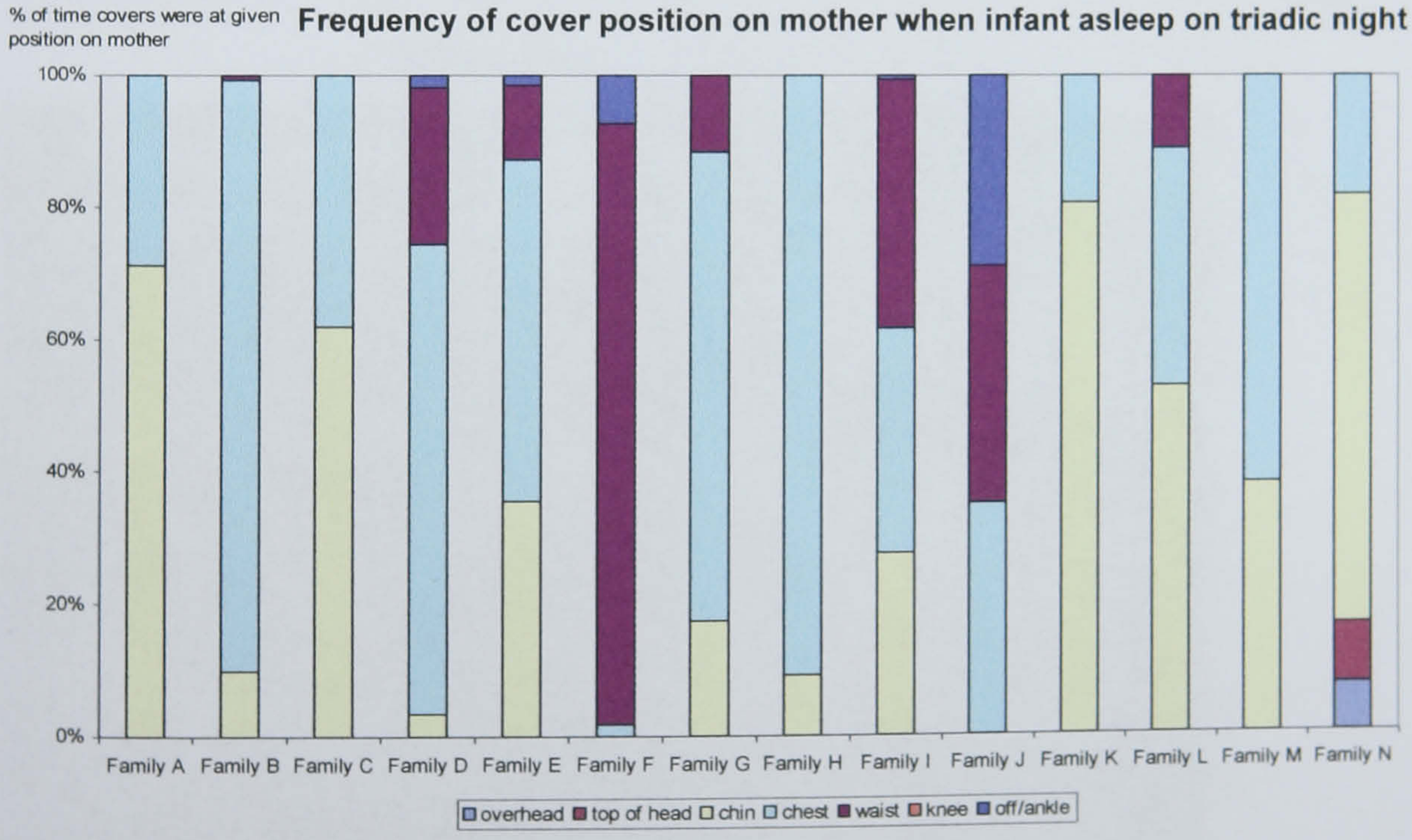


Figure 4.55



In summary, figure 4.56 reveals that covers at chest height appeared to be the favoured position for mothers involved in the video study, followed by a preference for covers at chin height and then waist level. Although there were individual marked differences, overall nothing much changes when comparing dyadic-triadic nights.

Comparing the cover position on the father when baby was asleep (figure 4.57) we find nothing identifiable in the individual results. However, the summary chart (figure 4.58) reveals that the covers were placed mainly at fathers chest and chin level when the baby was asleep, illustrating that fathers had the covers pulled higher up than the mothers.

Illustration 4.7 Family F demonstrating differences in cover position during cosleeping

Figure 4.56

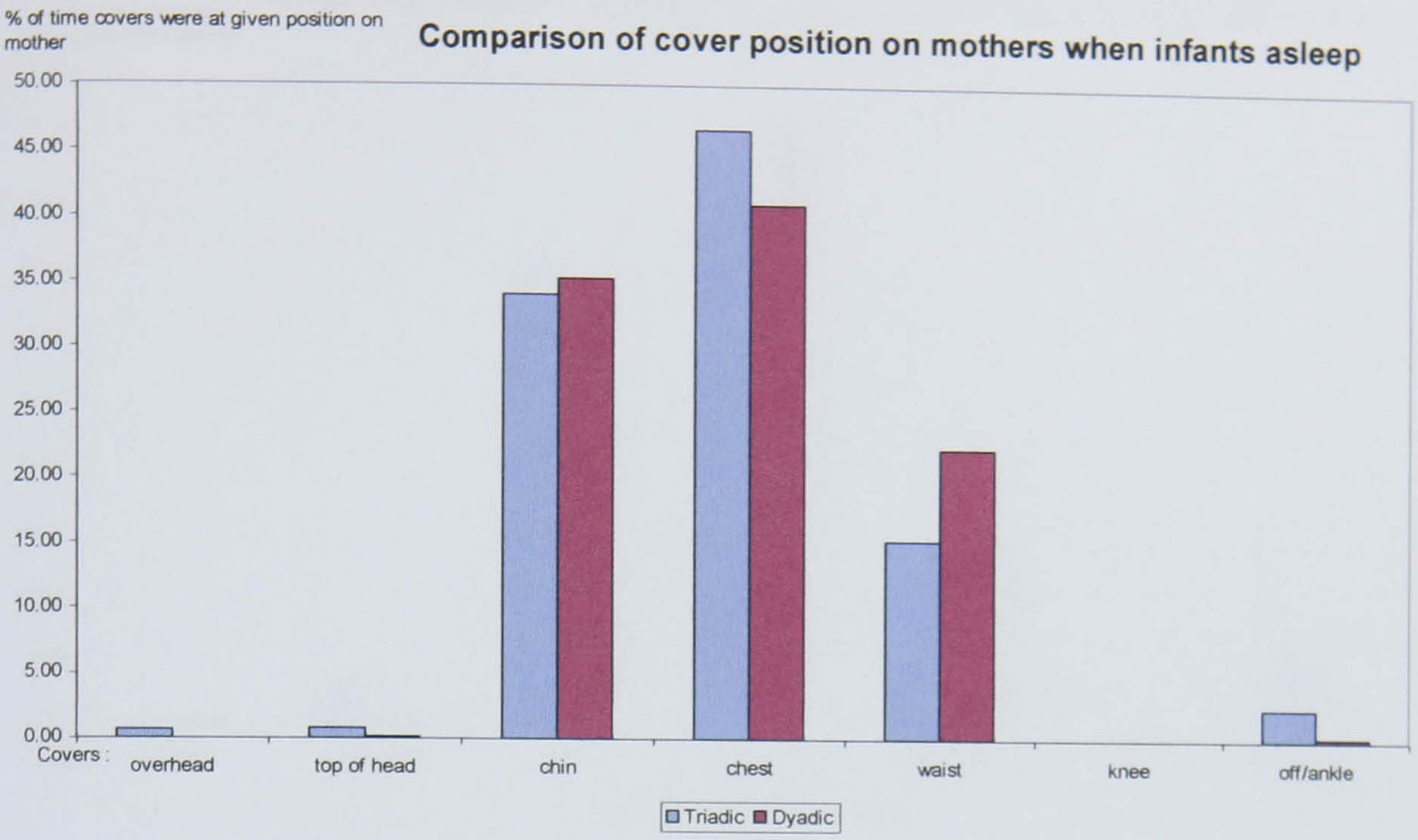


Figure 4.57

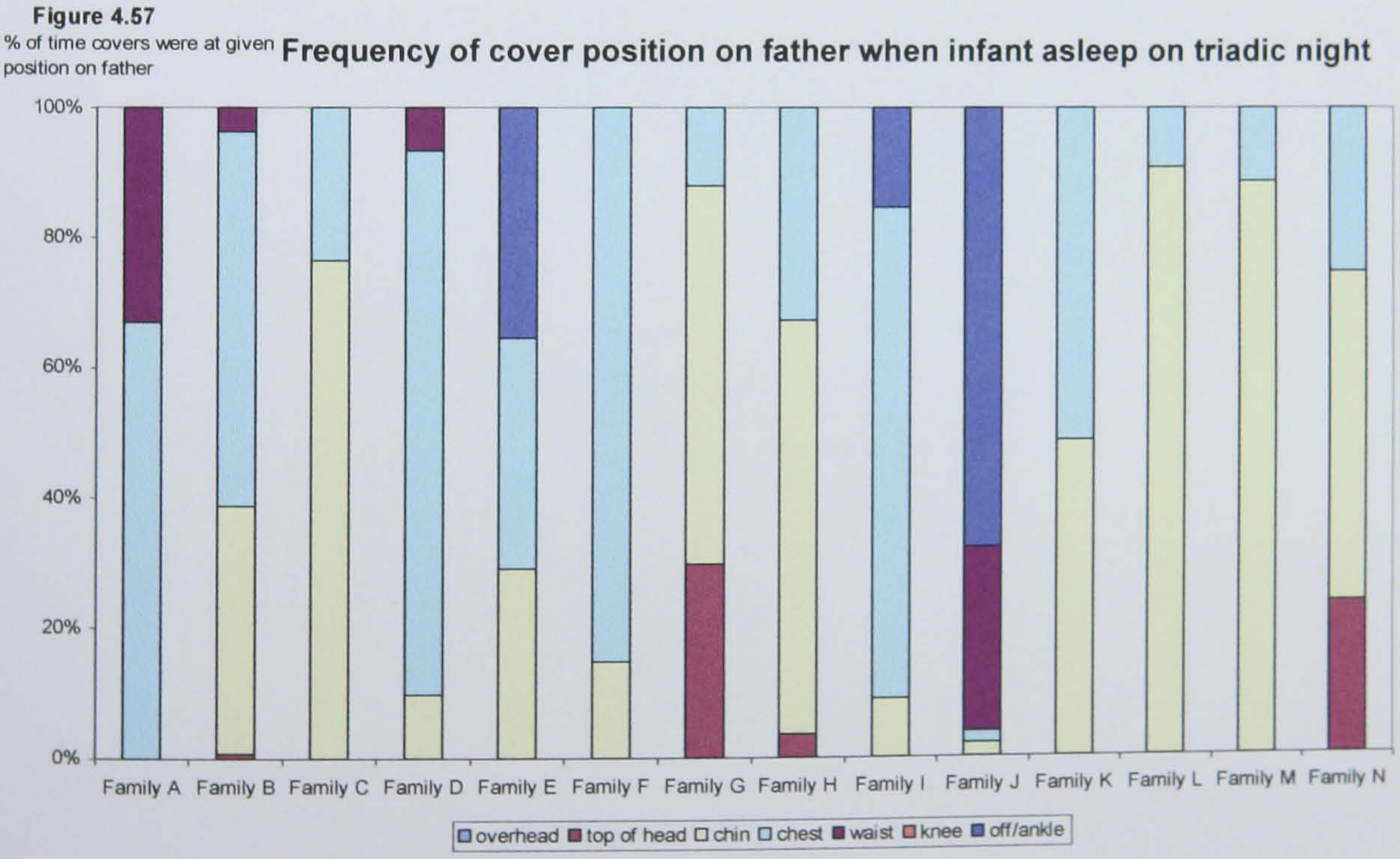
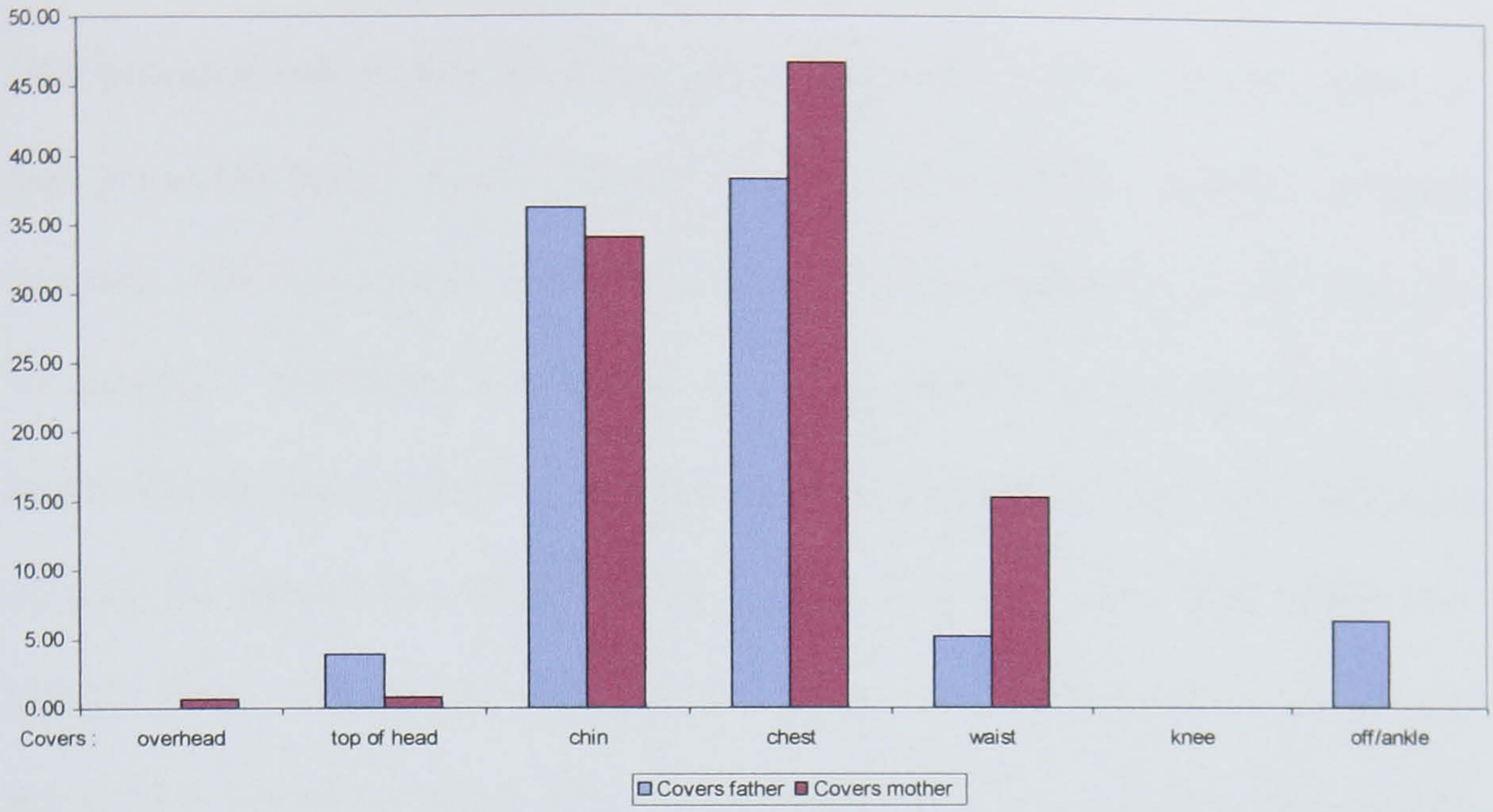


Figure 4.58
% of time covers were at given position on parents

Comparison of cover position on mothers and fathers on the tridaic night when infants asleep



Overlaying

Two potential risk events involving infants were observed in over 205 hours of data presented here. Both occurred during triadic nights, involving different families. The first occurred when a mother's arm lay across her infant's face for 15 minutes. The infant was placed on the outside of the mother following a breast-feeding interval and the episode was terminated when the infant squirmed causing the mother to change position and remove her arm from across her infant's face. The second potential risk event concerned a father whose arm appeared to squash his infant who was sleeping between her parents. This caused the infant to cry out ensuring that the father moved his arm, seemingly still asleep and not disturbing the mother.

Illustration 4.8 – Family E

3.9 Sleep Diary Analysis

Sleep diaries were given to the families involved in the video project to assess whether the video recordings were an accurate reflectionof the normal night-time behaviour of those families involved in the video study. Participants were asked to complete structured diaries (sleep logs, see appendix I) regarding their night-time parenting for one week during, before and sometimes after the time when the video was used in the home. The diaries were designed to be and were usually completed in the morning with information about the previous night. They documented details concerning when the infant and parents fell asleep, where they slept, whether sleeping location changed during the night, how many times infants woke and were fed, which parent attended to the infant. Also details documenting infants sleeping environment were sought, what infants wore to bed, how many covers etc, whether parents drank in the evening and whether/how much parents smoked during the night. Diaries were entered into Excel spreadsheets and averages of specific categories for each family are recorded below. These are compared with the video observations from each family's triadic night.

Diaries were not completed by families B, K, and L and are therefore not included in the analysis.

Family A baby's age = 6 months old **month recorded = September**

	Time mother went to bed	Time mother went to sleep	Time mother woke the next morning	Time father went to bed	Time father went to sleep	Time father woke the next morning
Diary Average of 7 entries	21:47	23:17	7:25	21:40	23:34	7:10
Recording 1 night	tape starts @ 23:21	23:28	7:57	23:22	23:28	7:56

	Where baby fell asleep	Position baby fell asleep in	Time baby fell asleep	Place and position of baby when parents went to bed	Baby slept in more than one place	Baby slept with parents
Diary Average of 7 entries	in fathers arms	cradled	21:31pm	in bed on side	no	yes
Recording 1 night	already in bed asleep	unknown	unknown	in bed on side	no	yes

	Baby slept with both parents	Place where baby slept in bed	Quality of infant sleep	Time and type of infant feed before bed	Number of times baby woke during night	Number of feeds during the night
Diary Average of 7 entries	yes	between parents	slept well	21:15pm formula	x 1	x 1
Recording 1 night	yes	between parents	slept well	unknown	x 1	x 1

	Number of times mother woke for feeds- whether feeder or not	Number of times father woke for feeds- whether feeder or not	Number of times mother woke to comfort or check infant	Number of times father woke to comfort or check infant	Clothes worn by baby for bed	Covers used where baby slept
Diary Average of 7 entries	x 1	x 1	x 4	x 7	sleep suit	parents duvet
Recording 1 night	none	x 1	x 5	x 6	sleep suit	parents duvet

	Heating in bedroom	Condition of baby (was baby sweaty)	Weather during the night	Parents smoke	Parents drink
Diary Average of 7 entries	yes	not sweaty	cool	no	mother=1 unit per
Recording 1 night	n/a	n/a	n/a	n/a	n/a

Family C baby's age = 6 months old **month recorded = September**

	Time mother went to bed	Time mother went to sleep	Time mother woke the next morning	Time father went to bed	Time father went to sleep	Time father woke the next morning
Diary Average of 7 entries	22:50	23:29	6:54	23:26	23:37	6:39
Recording 1 night	tape starts @ 23:35	unknown baby brought into bed @ 3:35	6:52	tape starts @ 23:35	unknown baby brought into bed @ 3:35	6:47

	Where baby fell asleep	Position baby fell asleep in	Time baby fell asleep	Place and position of baby when parents went to bed	Baby slept in more than one place	Baby slept with parents
Diary Average of 7 entries	in mothers arms	cradled	22:50	in cot - supine	yes	yes
Recording 1 night	unknown	unknown	unknown	unknown baby brought into bed @ 3:35	yes	brought into bed @3:35

	Baby slept with both parents	Place where baby slept in bed	Quality of infant sleep	Time and type of infant feed before bed	Number of times baby woke during night	Number of feeds during the night
Diary Average of 7 entries	yes	between parents	slept well	22:12 breast-feed	x 3	x 2
Recording 1 night	yes	between parents	slept well	unknown	x 3	x 3

	Number of times mother woke for feeds- whether feeder or not	Number of times father woke for feeds- whether feeder or not	Number of times mother woke to comfort or check infant	Number of times father woke to comfort or check infant	Clothes worn by baby for bed	Covers used where baby slept
Diary Average of 7 entries	x 2	none	x 2	none	baby gro	duvet
Recording 1 night	x 3	x 1	x 1	x 1	baby gro	duvet

	Heating in bedroom	Condition of baby (was baby sweaty)	Weather during the night	Parents smoke	Parents drink
Diary Average of 7 entries	no	not sweaty	cool	no	no
Recording 1 night	n/a	n/a	n/a	n/a	n/a

Family D baby's age = 6 months old **month recorded = August**

	Time mother went to bed	Time mother went to sleep	Time mother woke the next morning	Time father went to bed	Time father went to sleep	Time father woke the next morning
Diary Average of 7 entries	21:30	22:03	7:07	23:08	23:39	6:30
Recording 1 night	tape starts @ 21:50	22:14	asleep when tape ends @ 6:04	00:12	00:17	asleep when tape ends @ 6:04

	Where baby fell asleep	Position baby fell asleep in	Time baby fell asleep	Place and position of baby when parents went to bed	Baby slept in more than one place	Baby slept with parents
Diary Average of 7 entries	in mothers arms	on side	21:02	in bed on side	no	yes
Recording 1 night	unknown	unknown	unknown	in bed on side	no	yes

	Baby slept with both parents	Place where baby slept in bed	Quality of infant sleep	Time and type of infant feed before bed	Number of times baby woke during night	Number of feeds during the night
Diary Average of 7 entries	yes	between parents	poor	20:47 breast-feed	x 3	x 1
Recording 1 night	yes	between parents	slept well	unknown	x 4	x 4

	Number of times mother woke for feeds- whether feeder or not	Number of times father woke for feeds- whether feeder or not	Number of times mother woke to comfort or check infant	Number of times father woke to comfort or check infant	Clothes worn by baby for bed	Covers used where baby slept
Diary Average of 7 entries	x 1	none	x 3	x 1	vest	duvet
Recording 1 night	x 4	none	none	none	vest	duvet

	Heating in bedroom	Condition of baby (was baby sweaty)	Weather during the night	Parents smoke	Parents drink
Diary Average of 7 entries	no	no	cool	no	2 units once per week
Recording 1 night	n/a	n/a	n/a	n/a	n/a

Family E baby's age = 4 months old **month recorded = June**
(Infra-red lamp failure on triadic night)

	Time mother went to bed	Time mother went to sleep	Time mother woke the next morning	Time father went to bed	Time father went to sleep	Time father woke the next morning
Diary Average of 7 entries	23:30	23:55	5:25	23:55	00:10	6:00
Recording 1 night	tape starts @ 00:20	unknown- infra red lamp failure	7:54	tape starts @ 00:20	unknown- infra red lamp failure	7:54

	Where baby fell asleep	Position baby fell asleep in	Time baby fell asleep	Place and position of baby when parents went to bed	Baby slept in more than one place	Baby slept with parents
Diary Average of 7 entries	in dads arms	cuddled	20:25	in bed supine	yes, started in cot in own room	yes
Recording 1 night	unknown	unknown	unknown	in bed supine	unknown	yes

	Baby slept with both parents	Place where baby slept in bed	Quality of infant sleep	Time and type of infant feed before bed	Number of times baby woke during night	Number of feeds during the night
Diary Average of 7 entries	yes	between parents	slept well	19:45 formula feed	none	none
Recording 1 night	yes	between parents	slept well	unknown	x 1	x 1

	Number of times mother woke for feeds- whether feeder or not	Number of times father woke for feeds- whether feeder or not	Number of times mother woke to comfort or check infant	Number of times father woke to comfort or check infant	Clothes worn by baby for bed	Covers used where baby slept
Diary Average of 7 entries	none	none	x 1	none	vest and baby gro	duvet
Recording 1 night	x 1	x 1	x 1	x 1	vest and baby gro	duvet

	Heating in bedroom	Condition of baby (was baby sweaty)	Weather during the night	Parents smoke	Parents drink
Diary Average of 7 entries	no	no	cool	no	no
Recording 1 night	n/a	n/a	n/a	n/a	n/a

Family F baby's age = 6 months old **month recorded = October**

	Time mother went to bed	Time mother went to sleep	Time mother woke the next morning	Time father went to bed	Time father went to sleep	Time father woke the next morning
Diary Average of 7 entries	23:15	23:20	6:25	23:55	00:02	6:52
Recording 1 night	tape starts @ 00:00 midnight	00:24	6:51	tape starts @ 00:00 midnight	00:15	6:51

	Where baby fell asleep	Position baby fell asleep in	Time baby fell asleep	Place and position of baby when parents went to bed	Baby slept in more than one place	Baby slept with parents
Diary Average of 7 entries	in cot	on side	19:48	in bed supine	yes	yes
Recording 1 night	unknown	unknown	unknown	in bed on side	unknown	yes

	Baby slept with both parents	Place where baby slept in bed	Quality of infant sleep	Time and type of infant feed before bed	Number of times baby woke during night	Number of feeds during the night
Diary Average of 7 entries	yes	outside mother	slept well	18:33 breast milk and baby food	x 2	x 2
Recording 1 night	yes	between parents	slept well	unknown	x 3	x 3

	Number of times mother woke for feeds- whether feeder or not	Number of times father woke for feeds- whether feeder or not	Number of times mother woke to comfort or check infant	Number of times father woke to comfort or check infant	Clothes worn by baby for bed	Covers used where baby slept
Diary Average of 7 entries	x 2	x 1	none	none	vest and baby gro	blankets and sheet
Recording 1 night	x 3	x 3	none	none	vest and baby gro	blankets and sheet

	Heating in bedroom	Condition of baby (was baby sweaty)	Weather during the night	Parents smoke	Parents drink
Diary Average of 7 entries	no	no	cool	no	1 unit per night
Recording 1 night	n/a	n/a	n/a	n/a	n/a

Family G baby's age = 4 months old **month recorded = February**

	Time mother went to bed	Time mother went to sleep	Time mother woke the next morning	Time father went to bed	Time father went to sleep	Time father woke the next morning
Diary Average of 7 entries	22:49	00:19	7:12	23:01	23:44	6:32
Recording 1 night	tape starts @ 23:44	23:54	mother asleep when tape finishes @ 8:01	23:51	tape starts @ 23:44	father sleeping elsewhere from 4:21

	Where baby fell asleep	Position baby fell asleep in	Time baby fell asleep	Place and position of baby when parents went to bed	Baby slept in more than one place	Baby slept with parents
Diary Average of 7 entries	in parents bed	on side	23:34	in bed on side	no	yes
Recording 1 night	unknown	unknown	unknown	in bed supine	unknown	yes

	Baby slept with both parents	Place where baby slept in bed	Quality of infant sleep	Time and type of infant feed before bed	Number of times baby woke during night	Number of feeds during the night
Diary Average of 7 entries	yes	outside mum and between parents	slept well	22:47 breast-feed	x 2	x 2
Recording 1 night	yes	outside mum and between parents	slept well	unknown	x 1	x 1

	Number of times mother woke for feeds- whether feeder or not	Number of times father woke for feeds- whether feeder or not	Number of times mother woke to comfort or check infant	Number of times father woke to comfort or check infant	Clothes worn by baby for bed	Covers used where baby slept
Diary Average of 7 entries	x 2	x 2	none	x 1	vest and baby gro	duvet
Recording 1 night	x 1	x 1	x 1	x 1	vest and baby gro	duvet

	Heating in bedroom	Condition of baby (was baby sweaty)	Weather during the night	Parents smoke	Parents drink
Diary Average of 7 entries	no	no	cool	no	at least 1 unit per night
Recording 1 night	n/a	n/a	n/a	n/a	n/a

Family H baby's age = 6 months old **month recorded = February**

	Time mother went to bed	Time mother went to sleep	Time mother woke the next morning	Time father went to bed	Time father went to sleep	Time father woke the next morning
Diary Average of 7 entries	23:00	23:38	6:00	not there	not there	not there
Recording 1 night	tape starts @ 22:38	22:52	mother asleep when tape finishes @ 6:48	tape starts @ 22:38	22:52	father asleep when tape finishes @ 6:48

	Where baby fell asleep	Position baby fell asleep in	Time baby fell asleep	Place and position of baby when parents went to bed	Baby slept in more than one place	Baby slept with parents
Diary Average of 7 entries	in mothers arms	on side	19:55	in bed supine	yes, began night in cot	yes
Recording 1 night	unknown	unknown	unknown	in bed supine	unknown	yes

	Baby slept with both parents	Place where baby slept in bed	Quality of infant sleep	Time and type of infant feed before bed	Number of times baby woke during night	Number of feeds during the night
Diary Average of 7 entries	no, usually the mother as father away	outside mother	slept well	17:30 formula feed	x 1	x 1
Recording 1 night	yes	outside mum and between parents	slept well	unknown	x 2	none

	Number of times mother woke for feeds- whether feeder or not	Number of times father woke for feeds- whether feeder or not	Number of times mother woke to comfort or check infant	Number of times father woke to comfort or check infant	Clothes worn by baby for bed	Covers used where baby slept
Diary Average of 7 entries	x 1	father not there	x 3	father not there	vest and baby gro	blankets and sheets
Recording 1 night	none	none	x 2	none	vest and baby gro	blankets and sheets

	Heating in bedroom	Condition of baby (was baby sweaty)	Weather during the night	Parents smoke	Parents drink
Diary Average of 7 entries	yes	no	cool	mother at least one cigarette per night	mother = 2 units per night father = 2 units per week
Recording 1 night	n/a	n/a	n/a	n/a	n/a

Family I baby's age = 1 month old **month recorded = July**

	Time mother went to bed	Time mother went to sleep	Time mother woke the next morning	Time father went to bed	Time father went to sleep	Time father woke the next morning
Diary Average of 7 entries	23:17	23:32	6:02	23:15	23:26	6:04
Recording 1 night	23:28	23:46	mother asleep when tape finished @ 7 :41	tape starts @ 23:27	23:37	father asleep when tape finished @ 7 :41

	Where baby fell asleep	Position baby fell asleep in	Time baby fell asleep	Place and position of baby when parents went to bed	Baby slept in more than one place	Baby slept with parents
Diary Average of 7 entries	in mothers arms	supine	23:10	in parents bed supine	yes, started night in cot in own room	yes
Recording 1 night	unknown	unknown	unknown	in parents bed on side	unknown	yes

	Baby slept with both parents	Place where baby slept in bed	Quality of infant sleep	Time and type of infant feed before bed	Number of times baby woke during night	Number of feeds during the night
Diary Average of 7 entries	yes	between parents	slept well	22:40 breast-feed	x 5	x 5
Recording 1 night	yes	between parents	slept well	unknown	x 3	x 3

	Number of times mother woke for feeds- whether feeder or not	Number of times father woke for feeds- whether feeder or not	Number of times mother woke to comfort or check infant	Number of times father woke to comfort or check infant	Clothes worn by baby for bed	Covers used where baby slept
Diary Average of 7 entries	x 5	none	none	none	vest	a sheet
Recording 1 night	x 3	x 1	x 3	none	vest	sheet and blanket

	Heating in bedroom	Condition of baby (was baby sweaty)	Weather during the night	Parents smoke	Parents drink
Diary Average of 7 entries	no	no	warm	no	mother=2units per week father =1 unit per night
Recording 1 night	n/a	n/a	n/a	n/a	no n/a

Family J baby's age = 2 months old **month recorded = September**

	Time mother went to bed	Time mother went to sleep	Time mother woke the next morning	Time father went to bed	Time father went to sleep	Time father woke the next morning
Diary Average of 7 entries	22:47	23:38	8:38	22:47	23:37	7:42
Recording 1 night	tape starts @ 22:49	00:19	mother asleep when tape finished @ 7 :01	22:56	23:31	7:00

	Where baby fell asleep	Position baby fell asleep in	Time baby fell asleep	Place and position of baby when parents went to bed	Baby slept in more than one place	Baby slept with parents
Diary Average of 7 entries	Moses basket by bed	on side	23:17	in bed supine	yes, in Moses basket by bed and in bed	yes
Recording 1 night	Moses basket by bed	unknown	23:37	in bed on side	yes, in Moses basket by bed and in bed	yes

	Baby slept with both parents	Place where baby slept in bed	Quality of infant sleep	Time and type of infant feed before bed	Number of times baby woke during night	Number of feeds during the night
Diary Average of 7 entries	yes	between parents/outside mother	slept well	22:27 breast-feed	x 1	x 1
Recording 1 night	yes	between parents/outside mother/ on dad	unsettled	unknown	x 4	x 2

	Number of times mother woke for feeds- whether feeder or not	Number of times father woke for feeds- whether feeder or not	Number of times mother woke to comfort or check infant	Number of times father woke to comfort or check infant	Clothes worn by baby for bed	Covers used where baby slept
Diary Average of 7 entries	x 1	none	x 2	none	sleep suit	sheet and blanket
Recording 1 night	x 2	x 1	x 5	x 4	sleep suit	sheet and blanket

	Heating in bedroom	Condition of baby (was baby sweaty)	Weather during the night	Parents smoke	Parents drink
Diary Average of 7 entries	no	no	warm	father smokes but not during night	mother=2 units per week father =2 units per night
Recording 1 night	n/a	n/a	n/a	n/a	n/a

Family M baby's age = 2 months old **month recorded = January**

	Time mother went to bed	Time mother went to sleep	Time mother woke the next morning	Time father went to bed	Time father went to sleep	Time father woke the next morning
Diary Average of 7 entries	23:17	24:00 midnight	7:12	23:17	23:36	7:15
Recording 1 night	tape starts @ 23:48	00:27	7:15	tape starts @ 23:48	23:54	7:00

	Where baby fell asleep	Position baby fell asleep in	Time baby fell asleep	Place and position of baby when parents went to bed	Baby slept in more than one place	Baby slept with parents
Diary Average of 7 entries	in bed on mother	on side	23:17	in parents bed on side	no	yes
Recording 1 night	in bed on mother	on side	23:57	in parents bed on side	no	yes

	Baby slept with both parents	Place where baby slept in bed	Quality of infant sleep	Time and type of infant feed before bed	Number of times baby woke during night	Number of feeds during the night
Diary Average of 7 entries	yes	outside mother	slept well	20:50 breast-feed	x 3	x 3
Recording 1 night	yes	outside mother	slept well	23:51 breast-feed	x 3	x 3

	Number of times mother woke for feeds- whether feeder or not	Number of times father woke for feeds- whether feeder or not	Number of times mother woke to comfort or check infant	Number of times father woke to comfort or check infant	Clothes worn by baby for bed	Covers used where baby slept
Diary Average of 7 entries	x 3	x 2	x 2	x 1	vest and baby gro	duvet
Recording 1 night	x 3	x 2	none	none	vest and baby gro	duvet

	Heating in bedroom	Condition of baby (was baby sweaty)	Weather during the night	Parents smoke	Parents drink
Diary Average of 7 entries	no	no	cold	no	mother=2 units per week father =6 units per night on sat/sun
Recording 1 night	n/a	n/a	n/a	n/a	n/a

Family N baby's age = 7 months old **month recorded = February**

	Time mother went to bed	Time mother went to sleep	Time mother woke the next morning	Time father went to bed	Time father went to sleep	Time father woke the next morning
Diary Average of 7 entries	23:09	23:43	7:05	23:29	23:52	7:26
Recording 1 night	tape starts @ 22:53	23:00	mother asleep when tape finished @ 7 :02	tape starts @ 22:53	23:00	father asleep when tape finished @ 7 :02

	Where baby fell asleep	Position baby fell asleep in	Time baby fell asleep	Place and position of baby when parents went to bed	Baby slept in more than one place	Baby slept with parents
Diary Average of 7 entries	futon mattress next to parents bed	supine	22:17	on parents futon supine	yes, started the night next to parents futon	yes
Recording 1 night	on parents futon	on side	23:00	on parents futon on side	no	yes

	Baby slept with both parents	Place where baby slept in bed	Quality of infant sleep	Time and type of infant feed before bed	Number of times baby woke during night	Number of feeds during the night
Diary Average of 7 entries	yes	outside of mother	slept well	22:28 breast-feed	x 3	x 2
Recording 1 night	yes	outside of mother	slept well	22:54 breast-feed	x 4	x 4

	Number of times mother woke for feeds- whether feeder or not	Number of times father woke for feeds- whether feeder or not	Number of times mother woke to comfort or check infant	Number of times father woke to comfort or check infant	Clothes worn by baby for bed	Covers used where baby slept
Diary Average of 7 entries	x 2	none	x 1	none	vest and baby gro	duvet
Recording 1 night	x 4	none	none	none	vest and baby gro	duvet

	Heating in bedroom	Condition of baby (was baby sweaty)	Weather during the night	Parents smoke	Parents drink
Diary Average of 7 entries	yes	no	cool	no	2 units per night
Recording 1 night	n/a	n/a	n/a	n/a	n/a

The completed sleep logs were used to determine the extent to which different types of sleeping arrangements and environments were part of the normal night-time experience of the families who took part in the video study. They also were designed to validate the observations from the video recordings so that some sense of a 'normal' night of parenting would be achieved. From the results it would appear that they achieved both.

There were a few individual differences when comparing the average events from the sleep logs with the observations from the video data, these were mainly concerned with the self-reports of parent/baby waking and feeding events. When comparing the feeding bouts observed with those reported on the sleep logs they were the same for two families (A and M), within one feed for six families (C, E, F, G, H, and J). For two families (I and N) there was a discrepancy of two feeds difference between the reported and observed feeds. There were also non-comparable differences between the reported number of times parents woke to check or comfort their infant with the observations from the videos nearly all failing to agree.

Other information from the sleep diaries confirmed that mothers generally went to bed before fathers (only 3 mothers went to bed after fathers) but that some mothers did not fall asleep before fathers due to either feeding or settling their infant. A feeding bout was observed to be the way parents generally settled their infants and this was confirmed by the sleep logs, both for time and type.

Variation in the time parents woke the following morning was recorded during the video observations and the sleep diaries.

Similarities between sleep diaries and video data were recorded for the place and position of infant when the parents went to bed and the place where infants slept in the bed. Parents completing the sleep logs described the clothing the baby wore during the night and the type of bedcovers used and these endorsed the observed sleeping environments of the infants involved.

Cosleeping type was also confirmed by the sleep logs as observed during the video recordings. Not all infants began the night in the parents' bed but were placed in a separate sleeping place, usually in the parents' room, and then brought into the parents' bed when they retired. Eleven infants combined sleeping in the parental bed with beginning the night sleeping elsewhere. However all the infants shared the same sleeping surface once the parents had gone to bed.

Only one infant was observed to have an unsettled night during the video study, which was comparable with one infant whose mother reported more than 4 consecutive unsettled nights in one week of sleep diaries.

The information gathered in the final part of the sleep diaries relating to the heating in the bedroom, the condition of the baby and the weather during the night cannot be compared with observations from the video recordings but provides a useful insight into home sleeping environments. The information concerning

parental smoking and alcohol consumption is an important indicator that infants were exposed to parental behaviours that are deemed to be incompatible with cosleeping, parental behaviours that were not identified during the video observations. The most frequent 'risky' behaviour reported was alcohol consumption whilst bed sharing. Only two parents did not consume any alcohol whilst cosleeping. Nine parents reported that they drank at least 2 units per week with some consuming 2 units per night.

Discussion

At the conclusion of the interview study, I identified several issues worthy of further investigation that could be examined using detailed observation of the parents and infants during the video study:

- The diversity of cosleeping arrangements, and in particular how cosleeping is practised in the home environment.
- The association between breast-feeding and cosleeping, for instance how breast-feeding, cosleeping mothers managed night-time breast-feeding episodes
- The presence of the father in the bed, and specifically how the mother-infant cosleeping relationship may be affected by the father's presence/absence.

The practice of cosleeping in the home environment

The results of this video study, the first to examine triadic cosleeping and to do so in context of the home environment, provides evidence in support of McKenna's assertion that cosleeping is not a unitary phenomenon and requires clarification (McKenna 1994). The diversity of cosleeping arrangements found in our small sample of parents, and their infants, support the suggestion that previous classification of sleeping arrangements as binary (bed share, yes or no) is overly simplified. Each family has its own needs and requirements and the diversity these engender need to be acknowledged, as do the implications of this diversity.

The cosleeping environments for the babies involved in this study were all different, with the parental strategies employed ranging from cosleeping as something that 'just happened' to something parents planned with precision. For none of the 14 families were the sleeping environments the same. Sizes of bedrooms ranged from small (family C) to sprawling (family A), with the others somewhere in between. There was also variation in bed size, and the diversity of sleeping arrangements was extended to bedding (as shown in table V). Parents had modified their sleeping arrangements to accommodate the baby, both in terms of practical arrangements for infant care and what the parents' considered to be a safe environment for their baby.

Total sleep time

When discussing issues concerning cosleeping with parents during the interview study, those parents opposed to the idea offered several justifications. One reason given questioned the quality of sleep that the parents expected to obtain, as several imagined the presence of the baby in the bed would keep them awake. Results of the video study, however, suggest this assumption is incorrect. Our findings support Mosko et al (1997b) and Swaczenco et al (1997) argument that the effect of cosleeping on maternal sleep is moderate. The findings of this study suggest that sleeping with the father also may allow the mother more time asleep. It could be that mothers sleep longer knowing that the father is in the bed, perhaps because the baby may be doubly monitored. Alternatively, due to the prolonged effect of sharing a bed with someone (another adult), the mothers may have become

accustomed to sleeping with their partners, and simply sleep better in their presence.

Infant sleep duration corresponded with parental sleep where 10 of the infants slept longer on the triadic night than they did on the dyadic night, in one case as much as 90 minutes longer.

The synchronous sleep and arousal patterns between mother and infant cosleeping pairs that were exhibited during the present video study supports the research of both McKenna et al. (1994) and Young (1999). In addition to the findings that mutual sleep-wake states and arousals occur between mother-infant cosleeping pairs, from the observations of the video study, I can propose that this synchrony extended to the majority of fathers involved with triadic cosleeping. However, these may be variable and idiosyncratic as three fathers observed exhibited no synchrony with the mother and infant pair.

Infant sleep position

The association between prone sleep position and the increased risk of SIDS has been well documented over several years. Following high profile campaigns, which have stressed avoiding placing infants in the prone position for sleep, dramatic falls in SIDS rates have been registered, for instance in New Zealand, UK and Holland (De Jonge 1989; Mitchell 1992; Fleming 1993.). A community based survey of infant sleep position in the United States, which followed the publication of American Academy of Paediatrics recommendation of the supine or

side position for infant sleep, found that there had been a change in infant sleep positioning but found that 54% were still being put to sleep prone (Chessare et al. 1994). McKenna reported that when cosleeping, mothers never placed their infants in a prone sleeping position (1997). It is unclear from McKenna's papers however, whether infants (although not placed prone at the beginning of the night) ever slept prone on their cosleeping night. In the present study no cosleeping infants were placed prone to sleep, a finding that corresponds with McKenna's work. Furthermore infants were observed sleeping prone for only a short time, with no difference between dyadic and triadic nights. The instances of prone sleeping observed concerned placement by the mother during periods where the infant was unsettled, in one case the infant was placed onto the mother's chest in the prone position. There were two occasions where infants managed to turn themselves to sleep in the prone position.

In McKenna's study it is unclear whether non-prone sleeping infants were predominately in a supine or lateral position. Lateral (side) sleeping was the favoured sleep position for the breast-feeding infants involved in this study, whilst the bottle-fed babies tended to sleep supine, especially on the mother-infant night. On the triadic night instances of side sleeping were slightly fewer than on the dyadic night among some of the breast-feeders, but we found no significant effect associated with the presence of the father in the bed. Some of the babies in this study were old enough to roll from back to side and vice versa, and tended to be slightly older than those in the US study, so mobility, and infants' ability to turn themselves, could be a factor. One benefit of triadic cosleeping over dyadic,

might, however, be the propensity for infants to spend more of the night sleeping in a supine position rather than a lateral one, with a concomitant reduction in SIDS risk.

Parent/infant sleep orientation

Richards et al. (1996) reported that on the bed sharing night, 7 of the 12 infants remained orientated to their mothers for the entire night and the majority of all the mother-infant pairs slept face to face, and close together. While maternal sleep position was not mentioned by Richards et al. (1996), in the present study we found a tendency for mothers to sleep curled up around their baby, forming a protective 'nest' with their bodies. This occurred for large portions of sleep time (over 50% in most cases) on both triadic and dyadic nights. We could speculate that this is some kind of protective position, an evolutionary adaptation to protect a sleeping infant at night. The fact that the majority of mothers (12) assumed this position on the dyadic and triadic night is an interesting result and worthy of further investigation in future studies. It could possibly be linked to feeding strategies, in this position babies are optimally positioned for access to the breast. Video tapes of larger numbers of breast and formula-feeding cosleepers would be needed in order to test this intriguing possibility of an 'innate' maternal sleep position. Fathers predominantly faced away from their infants during sleep time – a significant difference from mothers.

Whatever their orientation, however, cosleeping parents and infants are in close physical contact with one another whilst sleeping. The results show that mothers

were in closer physical contact to their infants than the fathers, during both nights. On the dyadic night, the majority of mothers (apart from 2) slept touching their infants for over 40%, (with some between 60-80%) of the night, which increased to over 70 % on the triadic night – a statistically significant difference. The father's absence from the bed could have afforded the mother and infant pair more room. All of the mothers remained in close contact and were never more than 4 inches away, except for the non-care giving mother who was more than 8 inches away for the majority of the dyadic night. Again, this supports what Richards et al. (1996) found in their study, the Latino mothers slept less than 30cm apart from their infants, with appreciable amounts of time sleeping less than 20cm away. It would be expected that by introducing another person into the bed all three bedmates should be closer on the triadic night, as another body in the bed would necessitate closer contact. Given the size of some of the beds slept in by the families in the present study (see table V) it would be difficult to sleep three-in-a-bed without touching. Close sleeping proximity presumably means that parents can respond quickly to their infant's needs. Quick parental responsiveness is not possible when the infant sleeps in a separate room, which corresponds with Young's (1999) findings that bed sharing mothers responded to their infants more quickly than when the baby was in a cot by the bed.

Breast-feeding

Cernoch and Porter (cited in Richard et al. 1996) have suggested that breast-feeding infants generally spend much more time in close proximity to mothers than do formula-feeding infants. Richards et al. (1996) found that all their breast-

feeding, cosleeping, mother-infant pairs slept in close proximity. Swazcenco et al. (1998) also found that 2 mothers studied, who regularly bed shared, slept in direct or close proximity for prolonged periods, and again these were breast-feeders. The sensory exchange between breast-feeders is well documented employing olfactory and other stimuli associated with breast-feeding causing infants to orient preferentially to their mother's breasts. However, there may be sensory exchanges for formula-feeders also, which may indicate that infants gravitate towards their primary caregiver regardless of feeding strategy. For instance, there was a marked difference between the non-primary caregiving mother and the other mothers. She spent most of the night more than 8 inches away from her infant, although the unusual size of her bed allowed for this. Interestingly, when we look at her partner's proximity with the infant, he was in close contact for much of the night, and spent more time than some fathers touching his infant. It would be instructive in future studies to attempt to tease apart the proximity relationship and determine whether it is related more strongly with feeding type or primary caregiving familiarity.

Many of the mothers involved in the interview study who had not expected to cosleep had found themselves cosleeping for ease of breast-feeding. McKenna's studies have all employed mother-infant pairs who were exclusively breast-feeding. He suggests that as breast-feeding is thought to be protective against SIDS, then environmental and child care factors that actively promote breast-feeding will also be beneficial in reducing infant vulnerability to SIDS. Using videotape data from their studies, his team demonstrated that routinely bed

sharing infants breast-fed for about three times longer duration than infants who routinely slept alone. This was brought about by an increase in the duration of the feeding episodes that averaged 39% longer duration amongst bed sharers. I found a difference between breast-feeders and the formula-feeders in the frequency of infant feeds at night, but I could not do any solitary sleeping, breast-feeding comparisons, as none of our infants were solitary sleepers.

The formula-feeders in the present study did not feed as often as the breast-feeders, but the parental effort involved (preparation of food, time spent feeding, level of awakeness required) appeared much greater. The breast-feeders ability to remain 'nearly' asleep while feeding was not an option for some formula-feeders. To formula-feed their infant at night, the parents observed had to collect a bottle and then physically warm the feed using a bottle warmer, which usually involved the parents fully waking up. It also meant that the baby was fully awake by the time s/he was fed. However, one formula-feeder involved in the study was so well prepared for a feeding bout that she could formula-feed her infant the minimum disturbance to herself or the infant. Nocturnal breast-feeding interactions allowed the mothers to feed their infants with much less disruption and therefore, less arousal from sleep. Mothers were often observed breast-feeding their infants lying down. This meant that after the baby had latched on the mother could continue to rest and, even fall back to sleep. The pattern of feeding was found to be in quick short spurts, often with feeding not being 'completely' terminated before the infant and mother went back to sleep. It was often difficult to determine from observations, whether feeding was true or the

baby was suckling for comfort, especially with four of the mother-infant pairs (families C, D, F and N). My subjective impression of these observed interactions was that mothers and their breast-fed infants returned to sleep much faster than the formula-feeding parents and infants. This impression cannot be reliably tested, however, in the absence of physiological monitoring.

Mothers' perceptions of feeding was discussed in the interview following video taping and the mother from family D highlighted something that McKenna had found in his breast-feeding mothers when he reported that 'the number of breast-feeds reported at home halved that measured in the lab' (McKenna et al. 1997 pg. 10). In discussion with mother D, she reported that on average she fed 3 or 4 times when in fact, on the observed nights, she fed 6/7 times. However she did admit that she did not always wake up to feed and described herself as often being in a 'half asleep/ half awake state'.

Safety

As far as we are aware no other study has reported on the diverse arrangement of cosleeping as practised in the home environment so comparisons with other studies are difficult. If cosleeping is to be encouraged then safe sleeping environments for infants are to be encouraged. Drago and Dannenberg (1999) suggests overlying presents an increasing problem, whether in a bed or on a sofa. They go further to explain estimated mortality rates in 1991-1995 being nearly twice the rate for 1986-1990 and a possible explanation for this being an increase in parent-infant cosleeping, due to the reported benefits of increased breast-

feeding and reduction of SIDS. Controversy can only be extinguished by clarification. The position of the baby in respect to both parents in the bed, the orientation of the baby with regard to its parents and the position of the covers are all relevant, when considering infant safety. Until infant physiology can be measured whilst cosleeping (with both parents) then determination of what can be construed as risks or benefits to the infant cannot be quantified.

Sleep diaries

The sleep diaries collected to accompany the video recordings presented evidence of a parental behaviour, which has currently been classified as a risk factor for bed sharing infants, behaviour that was not identified by the video observations. Some of the infants were exposed to parental behaviour deemed incompatible with cosleeping, alcohol consumption. Targeting bed sharing safety information specifically in the areas of parental smoking, alcohol consumption, medications that affect sleep and drug use would create safer sleeping environments for cosleeping infants.

Summary

Important findings from the video study provide evidence that: cosleeping environments are very diverse making blanket recommendations difficult, supporting hypothesis 1. Cosleeping had no disruptive effects on sleep and seems to be a beneficial strategy for parents and infants, at a time when sleep deprivation is common, refuting hypothesis 3. Cosleeping mother and infant pairs generally slept face to face, in close proximity and often in physical contact, with the mother curled up around her infant. There was some evidence of close physical contact between father and infant pairs, on the triadic night, but fathers generally faced away from their infant and did not sleep as close as mothers to their infants. However, fathers' presence did influence and affect cosleeping environments, supporting hypothesis 2. Infants who were breast-fed favoured the side sleeping position whereas the two infants were bottle-fed tended to sleep supine. There were very few instances of infants either being placed to sleep in the prone position or turning prone. Infants who were bottle-fed did not feed as often as those who were breast-fed, however, feeding interactions were less disruptive (less waking) for the breast-feeding infants, which supports hypothesis 4. Paternal involvement during formula-feeding episodes was apparent, also predicted - hypothesis 4. The presence of the father in the bed did not affect sleep-wake states or arousal synchrony between the mother and infants and some fathers exhibited similar sleep-wake synchrony to their partner and infant. Issues of infant safety concerning cover position require further examination during triadic cosleeping, as observations from the present study suggested that the fathers

involved tended to keep bed covers higher. The overall picture of cosleeping that emerges therefore is a positive one for both parents and infants.

Chapter 5

Perspectives on cosleeping

Considered from an evolutionary perspective, close contact cosleeping must surely have evolved as a means for our ancestors to protect and nurture their young and we are left to question why cosleeping is deemed such an unnatural practice in modern parenting. The patterns of infant care shown by the other primates reinforce the notion that human childcare, particularly in a Western industrialised setting, no longer serves its primary role – to ensure survival of the infant. The physiology of human infants born today is essentially mammalian infant physiology, a pattern that evolved many million years ago. Most new-born infants can cope adequately with the stress of birth and the first few months of life, even though they are neurologically immature. However, these physiological processes have evolved in the context of the infant being in close proximity to a caregiver. Natural selection will have favoured responsive caregivers and equally responsive infants. Positive, physiological effects for infants in close contact with their mothers' i.e. skin-to skin (the kangaroo method of infant care) increase the infants' skin temperature, stabilises heart rates and reduces crying (McKenna 1996). In the context of infant sleep this would suggest that to deny or ignore the vulnerabilities of infants who are separated from their adult caregiver may well spell danger for infants who are placed in solitary sleeping environments. The adoption of infant care practices that have developed in Western societies may be unnatural in an evolutionary context. This raises the issue as to whether the biological best interests of babies are being jeopardised by the social best interests of parents (McKenna et al. 1990).

Reasons for cosleeping

The benefits of cosleeping, as articulated by parents who participated in the interview study presented in Chapter 3, were in accordance with the benefits reported by several studies and listed by Medoff and Schaefer (1993). These benefits include: a belief that infants require continual close contact with their mother; the convenience for breast-feeding; easier night-time management (particularly in times of illness); and a belief that cosleeping creates happiness, security, and an ultimately less dependent child. The concerns of parents regarding the effects on their infant of cosleeping reflected some, but not all, of those cited in the literature (e.g. Medoff and Schaefer 1993). While the latter drew attention to concerns such as cosleeping interfering with the development of a child's autonomy; the possibility of sexual stimulation, or of a child witnessing sexual intercourse; and cosleeping triggering disturbances in marital or parent-child relationships -- these were not mentioned by parents (either cosleepers or non-cosleepers) during interviews. Parents in this study most commonly cited their fears of cosleeping becoming a hard habit to break; the risk of causing physical harm to a cosleeping infant (e.g. overlaying or suffocation); and the assumption that cosleeping disturbs parental sleep.

The parents who participated in this study who coslept, rationalised their choice of sleeping arrangement with reasons that ranged from practical caregiving to instinctive bonding. Whether or not a given baby would sleep in its parents bed, however, was dependant upon a number of variables such as parental experience;

expectations regarding the importance of achieving uninterrupted sleep; caregiving styles; and practical notions of night-time infant care, such as caregiving strategies in 'stressful' circumstances such as infant illness. The most widespread reason for cosleeping is breast-feeding, and the relationship between breast-feeding and cosleeping is discussed later in this chapter. Below I will summarise data on the other major reasons why parents in this study coslept.

Keeping the baby close

Results of the interview study indicate that solitary sleeping arrangements for infants, as recommended between the fifties and the seventies in the UK. are no longer part of normative infant care. Parents expressed the desire to keep their baby close at night, sleeping in their bedrooms, for quite lengthy periods of time. Parents' prenatal intentions were very clear on the question of night-time proximity and where their new baby would sleep: preceding the birth only 5% said they would employ a solitary sleeping environment for their infants and postnatally only 11% actually did so. Trevathan and McKenna (1994) have summarised the results of 59 studies, which illustrate why parent-infant sleep contact 'feels natural'. These range from the benefits of bonding and attachment through frequent suckling, sensory cues that regulate breathing, the physiological effects of touch (skin to skin contact), to the soothing effects on infants of vestibular stimulation and sound of maternal heart beat. Although generally unaware of the range of developmental, psychological and physiological benefits of parent-infant close contact during sleep, the parental practice of keeping their baby close is nowadays highly prevalent. Comparative cross cultural research in

the late 60's revealed that for 30 American families, 17 infants slept alone in a separate room while 13 slept in the parent's room (in a crib) (Caudill and Weinstien, 1969). In the present study, however, 88% of families interviewed were employing close proximity sleeping environments, either in a cot by the bed (19 infants) or in the parental bed (18 infants), sometimes both. Confirmation of room sharing as a common infant care strategy in Britain is provided by the data from the CESDI study e.g. Blair et al. (1999) and Fleming et al. (1999) who found that 39% of the population room shared with their infants, compared to 29% of infants who bed shared and 32% who were placed a separate room to sleep.

Cosleeping is the ultimate way to keep an infant close at night -- and the intimate contact so afforded reassures some parents that they will have an enhanced ability to ensure that the baby is protected from any harm and to discover and intervene if presented with a potentially dangerous situation or condition. Data obtained from the video study, presented in Chapter 4, illustrates the nature of the sleep contact between infants and their cosleeping parents and confirms that when a baby sleeps in its parents' bed parents and infants are in close physical contact with one another for long periods of time while sleeping. The fact that mother-infant pairs were in close contact for large amounts of sleep time has also been found in other studies (Richard et al. 1996; Young 1999). Richard et al. (1996) reported that mother-infant bed sharing pairs commonly slept at very close distances, however, this result could have been due to the fact that this study used a single bed for the mother and infant pairs, thus restricting sleeping space. Young (1999), using a larger, double bed, found that there were differences between the routine bed

sharing pairs and the routine room sharing pairs, on bed sharing nights, regarding head distance. The routine bed sharing pairs slept with their heads less than 20 cm apart whereas routine room sharers spent substantial periods of time with head distances greater than 60cm apart on bed sharing nights. Body distances between the mother-infant pairs followed similar patterns to the head distances (Young 1999, pg166). What the video study presented here adds to this picture is that during triadic cosleeping mothers were in closer contact to the infant than were fathers. There were exceptions, however, for example the primary care giving father was in closer physical contact with his infant during the night than her mother who was observed to be more than 8 inches away from her infant for the majority of the dyadic night, thus demonstrating the flexibility of nurturing roles.

Management of infant illness

Although some parents preferred to keep their infant as close as possible at all times, others were willing to bring their baby into bed only under specific circumstances. Among those families practising occasional cosleeping, for instance, settling a baby who was 'twisty' or irritable and having trouble sleeping was a fairly common reason for bringing the baby into bed. Unsettled infants who were experiencing a period of illness were often taken into the parental bed for sleep, even if this was not their usual sleeping arrangement. This observation may have implications for our understanding of some infant deaths that occur in parental beds.

The CESDI report stated that few parents whose SIDS infant had been found in the parental bed had bed shared because the infant was unwell (1.2% of cases vs. 3.7% controls) (Blair et al. 1999, Fleming et al. 2000). In more recent work, however, we have generated data that suggest that bed sharing in response to infant irritability may precede clinical signs or symptoms of overt illness (Ball, FSID talk 2000). It is possible to speculate, therefore, that some infants in the CESDI study who bed shared on the night of death, but did not normally do so, may have been in the 'prodromal' phase of an illness that had not been recognised by the parents. If it is the case that infants who are 'brewing' an infection are less easily settled and the parental response to unsettled infants is to bring them into bed, then there may be a link between SIDS in the parental bed and infant illness that has so far remained undocumented in epidemiological studies. In order to investigate this possibility further it would be necessary to undertake a large-scale study of infant irritability and inability to settle in relation to subsequent illness in order to determine the relationship between irritability, illness, and night-time care strategies.

Security and dependency

The debate about the long-term consequences of infant sleeping arrangements has been both opinion rich and data poor. Although there has been much speculation on the topic of cosleeping, autonomy and attachment, no clear-cut data have been generated to date. Some commentators argue that cosleeping creates dependent infants who are unwilling and unable to sleep alone (Ferber 1985), while others suggest that cosleeping promotes infant attachment (Sears 1985; Jackson 1999).

One study (a US thesis) of cosleeping and attachment concluded that the results were ambiguous (Wagner 1996). Although no clear association was demonstrated between cosleeping and mother-infant attachment measures there were a number of methodological issues (self-selection of subjects, use of non-standard measures of attachment etc), that the author considered may have affected her results. Parents in the interview study occasionally mentioned security of attachment as a positive reason for cosleeping, however the issue of attachment and dependency is one that is beyond the scope of the present study. It would be interesting to address this issue in further research.

Ways of cosleeping

McKenna (1994) has stated that cosleeping environments are diverse and require clear classification in order that epidemiological data on cosleeping may be consistent. This study has captured enormous diversity in cosleeping arrangements, demonstrating that even within a broadly homogeneous sample (white, urban families from the North of England) cosleeping is not practised in a uniform way. As discussed above research in sleep laboratories cannot characterise such diversity as they are fixed environments, contrived to simulate 'at home' conditions. This study has described cosleeping environments in UK bedrooms and both the interview and the video portions of this study provide evidence that cosleeping is not practised homogeneously.

Infant safety

Much of the diversity of sleeping arrangements involved parents' concerns for infant safety. Indeed, as discussed in the previous section, many strategies evolved from a parental desire to keep the baby safe and for easier night-time management. For the regular cosleepers involved in the video study, individual sleeping environments had been created with a view to protect their infants. The bed rail purchased by family D, the practice of the mother from family M securing the covers under the mattress under the baby and the positioning of the bed on the floor by families F and N were all designed to prevent the infant falling out of the bed, or ensuring that if they did so infants did not fall far or hurt themselves. The use of blankets rather than a duvet by family B and the use of individual covers for the infant (as in family L) were responses to concerns that babies may overheat with adult bedding. The purchase of king size beds by families E and G reflect fears of overlaying and an attempt to give the baby plenty of space in the bed. These are all examples of parental strategies that occurred to allay concerns for infant safety. Issues involved with infant safety (other than benefit or risk for SIDS) have not figured prominently in other cosleeping studies, which is rather suprising when it appears high on the list of parents' priorities.

Although bed size ranged from standard to king size, all the families who were video-taped sleeping with their infants at home slept in double beds, which is in marked contrast to McKenna and Mosko's use of a single bed for the mother-infant pairs involved in their studies. The Bristol study used a double bed for their bed sharing mothers and infants, but there was no obvious variation regarding

covers, as the choice of duvet and pillows was already predetermined (Young 1999). The employment of a single bed for the US study may mean that the reports of close contact during sleep documented in several of their publications could possibly be an example of a lack of space rather than preferred close physical contact during sleep. However, the findings from the present study, and the study from Bristol, both utilise larger beds and confirm McKenna et al's findings that most mothers and infants sleep in close physical contact when cosleeping, regardless of bed size.

The diversity of cosleeping environments found in this study is further complicated by the amount and type of cosleeping that occurs. We have repeatedly found that, as McKenna (1996) suggests, cosleeping is not a unitary phenomenon and occurs in different ways and for differing lengths of time. Unlike some New Zealand studies that have described cosleeping as ranging from same bed to same room we defined cosleeping specifically, as having the infant sleep with the parents, in their bed, while they were asleep (see Chapter 3).

The practice by parents of taking the baby into the parental bed for part of the night, after the early morning feed, a phenomenon we termed combination cosleeping, is not something that other studies have reported on. A survey in rural New England (Hayes et al. 1996) concerning parent-infant cosleeping in a sample of 51 3-5 year old children, included retrospective questions about sleeping in infancy. The practices of infants remaining in the parent's bed after breast-feeding was recorded in this survey but was not classified by these authors as cosleeping.

This is a discrepancy that raises an important point for those involved in infant sleep research: the significance of determining all the places an infant sleeps during the night and not just identifying the place where the infant starts the night. Twenty nine per cent of parents in our interview study contacted after the birth of their baby, found this form of combination cosleeping to be a very practical way to care for their infants during the night.

Breast and formula feeders

Not only did the mothers involved in the video study sleep in close physical contact to their infants they also oriented themselves towards their infant either with their head or with their whole body for most of the time, with the notable exception of the non primary caregiving mother. Much has been made of this face-to-face, mother and infant orientation in the cosleeping environment, as this type of proximity has been proposed as promoting various types of sensory exchanges. Richard et al. (1997) explains that certain physiological stimuli such as visual, auditory, olfactory, tactile, vestibular and thermal will all be enhanced for the infant by close face to face bed sharing. The suggestion that breast-feeding infants orient themselves to their mothers' breast odour (Macfarlane 1975; Cernoch and Porter 1985 cited in Richard 1997) is generally accepted in the literature. One might expect, if the proximity and orientation of infants to mothers is related to breast odour, that formula-fed infants might not show the same pattern. I found no notable difference, however, between the formula-feeders and the breast-feeders regarding infants sleep orientation. However, our sample included only 4 formula-feeders, who were unrepresentative of the population in

general. Two had only recently terminated breast-feeding (thus mother and infant might be expected to behave more like a breast-feeding pair), while another formula-fed infant was primarily cared for by the father. An important contrast that only this study can discuss is the orientation of three bedfellows, mother, father and infant. Most mothers spent most of the time curled around to face their infant. Infants faced their mothers for large parts of the sleep time, including the infant whose father was the primary caregiver. When comparing infant orientation on the triadic night, we found that babies faced their mothers more than their fathers, and that most fathers spent most of the triadic nights with their backs turned towards their infants.

Concerns about cosleeping

Discussions with parents who did not cosleep often reflected different concerns about risks associated with cosleeping than did discussions with parents who practised cosleeping. Parental concerns, in both cases, tended to focus on different issues than those addressed by researchers. Non-cosleeping parents cited disruption to their own sleep, possibility of overlaying and 'making a rod for their own back' as concerns that inhibited them from cosleeping. Cosleeping parents were concerned about overlaying, but as shown previously took precautions to avoid this. They also mentioned infants overheating and falling out of bed as cause for concern. Researchers, on the other hand, have tended to discuss cosleeping in terms of SIDS risk and accidental death due to suffocation or entrapment (Nakamura 2000 et al., Drago and Dannenberg 1999, Byard 1994, Scragg and Mitchell 1993).

Affect on parental sleep

The sleep time of parents involved in the video study was measured both with the video recordings and via sleep diaries and can be used to assess disruption while sleeping with an infant. Mosko et al. (1997) reported that there was widespread belief that parent-infant cosleeping impacted negatively on the quality of adult sleep, however there is really no evidence to support this belief as previous sleep studies have concentrated only on adults sleeping together (Monroe 1969; Aaronson et al. 1980; Pankhurst and Horne 1994). With their research, Mosko et al. (1997) demonstrated that cosleeping mothers' total sleep time was not decreased when bed sharing compared to when sleeping apart from their infant, and that mothers' self-reported sleep 'satisfaction' was greater on the bed sharing night. As I did not measure infant or adult physiology, I cannot make direct comparisons but can confirm that the cosleeping mothers in our video study slept, on average for 7 hours per night, a seemingly reasonable amount of sleep for the mothers of small infants.

Danger to the infant

Overlaying or 'squashing the baby' was an often-stated concern of prospective parents when considering cosleeping and figures prominently in newspaper reports of infant deaths in parental beds. Several authors have documented cases of infant deaths involving overlaying (e.g. Drago and Dannenberg 1999. Nakamura et al. 2000, Byard 1994, Gilbert-Barness et al. 1991), however some of these reports have been strongly criticised due to their failure to identify the circumstances of overlaying and whether drugs or alcohol consumption was

involved. The possibility of the infant re breathing CO_2 (carbon dioxide) whilst cosleeping has also become a major concern of those involved in paediatric research into the cosleeping environment (Sawczenco et al. 1997, Young et al. 1999), as has the possibility that an infant might overheat in bed with both parents (Tuffnell et al. 1996).

Parents, particularly fathers, from the interview study, who had initially articulated a concern that they might roll on their baby while asleep, subsequently discovered after their babies were born that they were somehow aware of their infants' presence, even when asleep. Most parents who tried cosleeping reported that they quickly realised they would not roll on their infant. Likewise in the video study no parents were observed to roll or lie on their infants. In two instances parents' arms appeared to lie across infant bodies -- on one occasion seemingly causing the infant no discomfort and on the other the infant immediately cried, causing the father to reposition his arm.

In the video study discussed here it was also possible to quantify issues related to infant safety in adult beds, such as cover position, and position of the infant in the bed. Cover position while cosleeping was discussed in the Bristol study but no mention was made of cover position in the cosleeping studies conducted in California. Young (1999) reported on subtle differences in the placement of covers by the mothers when bed sharing with their infants. Mothers in this study commonly placed bedding so that the highest level was secured under their own armpit, preventing movement of the covers up over the mother's shoulder during

sleep, when the baby was in the bed, in comparison to mothers sleeping alone who frequently positioned the bedding so that arms and shoulders were covered. This, the author argues, indicates that mothers are aware of avoiding such situations in which the infant's head may become covered. This adjustment of covers when bed sharing reduces the chances of an infant being completely covered by bedding. The results from the video study presented here confirm this maternal awareness and practice of keeping the covers lower over their infant. It would appear that not only did the mothers in the study monitor cover position whilst cosleeping, to protect their infant, but from observations on the triadic night, they prevented the fathers from pulling the covers further up over their infant. Fathers more commonly had the covers pulled up higher to their chest and chin level. Although mothers and fathers kept the covers at different heights on their body, mothers ensured that covers did not move too high on the baby.

Infant position in the bed was quantified in two ways -- infant height relative to the parents and infant direction of sleeping (i.e. perpendicular to headboard and degree of tilt towards horizontal). When fathers were present in the bed, infants were more likely to remain in a perpendicular position than when fathers were absent. On the dyadic night more infants rotated sideways in the bed, increasing the possibility of disappearing under the bedcovers. The presence of the father did not influence the height of the baby in the bed, who (among breast-feeders) was predominantly located at mother's chest height. Formula-fed infants' height in the bed was more variable. For those infants who rotated sideways in the bed on dyadic nights, or those for whom covers were pulled above their heads (e.g.

breast-fed infants sleeping at chest-level), the issues of overheating and re-breathing CO_2 might be relevant areas for concern, however physiological monitoring (such as that currently being conducted in the Durham Sleep Lab.) would be necessary.

SIDS risk

The relationship between cosleeping and SIDS risk is a particularly clouded area. On the one hand, as discussed in Chapter 2, McKenna has suggested that cosleeping in a safe social and physical environment might help infants resist some forms of SIDS. Most commentators, however, argue the reverse, pointing to epidemiological data that have linked cosleeping with an increased risk of SIDS, particularly among smokers (Blair et al. 2000, Scragg and Mitchell 1993). While the present study is unable to address the issues of cosleeping in association with smoking and alcohol consumption (as parents did not drink excessively when cosleeping), there is one area where cosleeping and SIDS-risk are inter-twined that can be addressed directly here -- that of infant sleep position. (Other issues possibly related to SIDS-risk, such as the relationship between cosleeping and infant illness, and cosleeping and breast-feeding are discussed elsewhere in this chapter).

Prone sleeping for infants has been shown to be a significant risk factor for SIDS (Mitchell 1992, Fleming 1993) although the exact mechanisms for this are unknown (Richard et al.1996). Epidemiological studies involved in SIDS research (CESDI study) often record sleeping position in terms of how the infant

was put down to sleep or the position in which the infant was found (at death). What these studies fail to determine and which video recording of parent-infant sleep, can clarify, is the variety of sleep positions used by both the infants and the parents throughout the night.

The favoured position for infant sleep observed in the video study, was split between two categories. The breast-feeding infants predominantly slept in a lateral position whereas the formula-feeding infants were observed to sleep supine. New-born babies depend upon their mothers or primary care givers to place them in a safe sleeping position but as they get older mobility becomes evident and infants develop some control over their movements. Young (1999) reported that breast-feeding infants who regularly coslept spent more sleep time in a lateral position compared to routine room sharers, but only 13-20% of total sleep time. The routine room sharing infants, involved in the study (although breast-fed) were rarely observed to be placed on their side by their mother or to position themselves into a side lying position. Richard et al. (1996) reported that the most common body position for infants to be placed in for sleep in the California cosleeping studies was the supine position, however he did not report whether infant position altered during the course of the night or the proportion of the night spent in each position.

One important aspect of infant sleep position that was confirmed by the video study, which had been previously determined by the other two observational cosleeping studies was that infants were never placed in a prone position to sleep

and were rarely observed sleeping in this position. This confirms what the interview study suggested, that parents generally placed their infants on their backs or side but never on their tummies. It would appear that parents are receiving advice regarding the dangers of infant prone sleep position and are cautious when placing their infant down to sleep.

There have been suggestions that infant side sleeping could be an independent risk factor for SIDS (Fleming et al. 1996, Mitchell et al. 1997), which makes the supine position the safest for infant sleep. If bed sharing infants predominantly sleep laterally (as this study found), perhaps this is why some studies have associated an increased SIDS risk with cosleeping.

Breast-feeding and cosleeping

Breast-feeding is an important starting point for cosleeping, and many of the mothers involved in the interview study began to cosleep because of the ease of breast-feeding. This behaviour has also been identified by other studies (e.g. Morelli et al. 1992) and is a major influence on parents' sleeping environments world-wide. Many mothers involved in the interview study who had not considered cosleeping as a night-time caregiving strategy (before their baby was born), subsequently did so purely because of the ease of breast-feeding, which provided the ability to feed their infant at night with the least disruption to both themselves and their sleeping partner. In hospital several mothers in the interview study were shown how to breast-feed lying down. We know from the interview study that many did not return the baby to the crib but allowed the baby to remain in the bed, as shown with the prevalence of combination cosleeping, where almost

half of the cosleeping parents took the baby into bed with them on a regular basis, for the early morning feed (around 2-3am).

The sleep diaries kept by each family prior to taping had already indicated that the breast-feeding infants involved in the video study fed more frequently than the formula-feeders during the night. This was confirmed by the data from the videos and provides evidence that what we observed was a true representation of the families' usual night-time events. No consistent patterns emerged among the breast-feeding infants regarding the number of feeding bouts but variation in age may have been a factor. However, compared to the formula-fed infants, the breast-feeders fed more frequently, and for shorter periods of time. This pattern of short sleep bouts with frequent waking shown by the breast-feeding infants involved in the video study has been identified in other studies (Elias et al. 1986) but the frequency of nocturnal breast-feeding whilst cosleeping has only recently been documented by McKenna et al. (1997). Their study involving comparisons of breast-feeding behaviour and bed sharing among 20 routinely bed sharing mother-infant pairs and 15 routinely solitary sleeping mother-infant pairs (infants aged 3-4 months) was the first to demonstrate that cosleeping promotes breast-feeding.

The infants involved in the present video study also displayed the frequent feeding, short sleep-bout pattern throughout the night, which McKenna identified (1997). In the present study the range of breast-feeding bouts varied considerably from an infant being fed every 3 hours to an infant who fed almost hourly on the

triadic night. When comparing feeding frequency for the 4 formula-feeders involved in the study, we see that they fed only once and slept for much longer periods of the night. It is not difficult to understand why this could be a preferred care-giving strategy, as it involves more sleep and less time spent feeding. However, sleeping with an infant means that successful nocturnal feeding can be much easier than a single formula feed that involves the mother waking fully to collect and warm a bottle. Breast-feeding education needs to ensure that mothers are made aware of these essential differences.

With their mother-infant cosleeping comparisons McKenna et al. (1997) and Young et al. (1999) found similarities and differences in breast-feeding behaviour. An important similarity was that routine bed sharers breast-fed twice as frequently as routine room sharing infants (Young 1999) and solitary sleeping infants (McKenna et al. 1997). However, the Bristol study found that feeds were significantly shorter in duration than the US study. The results from the video study illustrate that cosleeping, breast-fed infants' feed more frequently than formula-fed infants, that older infants' breast-feeding patterns do not appear to change much, and that cosleeping can be particularly helpful for frequent feeding during the night.

There are a number of reasons why the cosleeping environment may provide a breast-feeding friendly zone. The opportunity to feed quickly and conveniently benefits both mother and infant. Furthermore regular breast-feeding at night stimulates milk production. Many mothers involved in the interview study,

mentioned the ability to remain in a partially sleepy state whilst feeding lying down, a finding compatible with the reports of the Mayan mothers (Morelli et al. 1992). Close proximity sleeping, whilst breast-feeding, also means that the mother-infant pair share the same sleep wake states (which the formula-feeders did not always share as fathers involved in the study fed their infants). The concordance in sleep-wake states and increased mother-infant interactions during breast-feeding, which the present study identified, have been observed by other researchers (McKenna et al. 1997, Young et al. 1999). This is the first study to confirm these concordant states in the presence of a third person in the bed.

Fathers' involvement in cosleeping

In 1930 anthropologist Margaret Mead stated "Fathers are a biological necessity but a social accident" (Margaret Mead, 1930), a sentiment that has been perpetuated in the dearth of studies examining father-newborn interactions. Ninio and Rinlott (1988) explain that it is well known that [Western] fathers are much less involved in infant care than mothers, in not just one but several areas, such as responsibility, availability, time spent in interaction or performance of care-taking activities. This may be due, in part, to the fact that research does not always find that fathers are available for study (due to work commitments) or that psychologists consider fathers to be unimportant to child rearing and make less of an effort to study them (Rebelsky and Hanks 1971). Effort has been concentrated into describing paternal attitudes towards infant/child care and the changing role of the father, by various disciplines (Greenberg and Morris 1974; Lamb 1987; Jackson 1987; Hossain et al. 1997) but few have concentrated on everyday

interactions between fathers and infants. There are a few exceptions that examine the effects that father-infant interactions have on the cognitive development of the child.

Rebelsky and Hanks (1971) found that, in comparison to mothers, fathers spent relatively little time interacting with their infants. The authors also identified that the number of interactions between father and infant varied by age and gender of infant and the activity involved during the interaction. Likewise Ninio and Rinott (1988) found that, on average, fathers were available to their infants 2.75 hours per weekday and spent 45-50 minutes interacting with them. They also found that fathers only took responsibility for their infants, on average, 1 in 10 days and that fathers performed one care-taking activity per day.

Other academic data concerning everyday care practices are available but appear to be contradictory. Sixty five per cent of a sample of 45 American fathers of six week old infants had changed their infant's nappy and had soothed their baby to sleep during the previous week, when interviewed, whereas, fewer than 30% of those questioned had bathed their infant (Mannion 1977 cited in Cronenwett 1982). Later research, which presented data on the care-giving activities of Irish fathers with their 1 month old babies, reported that 71% of the sample had put their baby to bed at least once or twice a week and that 74% had attended to their crying baby during the night (Nugent 1987). Progressing to the nineties, data collected in the mid-west of America, via repeated interviews over the course of the infant's first year, found that only 33% of first time fathers and 16% of

multiple time fathers attended to their infant during the night (Rustia and Abbott 1993).

In the interview study reported here, discussions with both parents at interview revealed that many fathers had suggested cosleeping or bringing the baby into bed. Whether these were pre-determined suggestions for infant care or a reactive mechanism to achieve sleep after considerable sleep deprivation is hard to tell. We know, however, from the comments of fathers involved in the interview study, cosleeping was perceived as a very positive experience and allowed them to be close to their infant during sleep when many had been apart from their infant during the day, due to work commitments. The experience of the young father, who had to cope with a 5-week-old infant after his wife had been rushed back into hospital, was a very positive example of the cosleeping experience. For this father, cosleeping was his way of coping with a stressful situation, although he experienced criticism for doing so from both his mother and his mother-in-law.

The case of one of the fathers in the video study was an exceptional example of a father willing to provide most of the care for his infant. It provides evidence to show that, apart from the obvious biological differences, both parent and infant can adapt to circumstances that are not 'the norm'. The fact that the infant slept closer to her father in the triadic cosleeping environment, rather than the mother, indicated her father was the focus of her primary attachment behaviour. The video evidence is striking in revealing proximity, orientation and interaction

between father and infant that reflected the characteristics of mother-infant cosleeping relationships in the other families involved in the video study.

Effect of fathers' presence in the bed

The fact that 93% of the cosleeping infants involved in the interview study were brought into bed with both parents signifies that cosleeping research must address cosleeping environments that include two parents in the bed. Not only has infant sleep been calibrated in solitary sleeping environments, research on cosleeping environments have failed, so far, to examine the effect of the father sleeping in the bed.

McKenna had already suggested that the results of breast-feeding interactions during the night might be modified if a father (or other family member) was involved in bed sharing with the mother and infant pair, adding that this was an unstudied factor from his research (McKenna 1997). Although the numbers of subjects involved was small, the fathers of the breast-feeding infants observed in the present video study did not appear to affect the breast-feeding interactions between mothers and infants, (there was no significant difference in the frequency of infant feeding between the dyadic and triadic nights).

We already had a notion of fathers' night-time interactions with their infants from the interview study and it was very clear that mothers who breast-fed, usually carried out feeding episodes on their own. Mothers frequently commented that fathers could not help with breast-feeding and so generally did not bother to wake

up, unaware of the number of times a mother and baby woke to feed in the night. Many mothers who were breast-feeding were also not employed outside the home due to the infants' age, and felt that it was correct that they did not disturb the father, as he had to go to work. On the other hand, parents of formula-fed infants interviewed tended to both be involved in night-time feeding: a) because the father could assist the mother with artificial feeding and b) formula-fed infants fed less and were more inclined to sleep for longer periods of time. There is a much more pronounced concept of shared night-time feeding interactions among parents of formula-fed infants which does not appear to exist with those families who choose to breast-feed their babies.

The data from the videotapes supported this finding and revealed a fundamental difference in night-time care-giving arrangements between the formula vs. breast-feeding families, even within a cosleeping environment. During the triadic night the fathers of the breast-fed infants remained asleep whilst the mother and infant pair were breast-feeding. The video recordings show very clearly (and quite comically) how fathers of breast-fed infants always managed to turn their backs away from the mother-infant pair when involved with feeding. Two fathers of formula-fed infants interacted with and were more physically close to, their infants at night, than the cosleeping fathers of breast-fed infants. This reflects the fact that these fathers were able (and willing) to share night-time feeding tasks with the mother whereas fathers of breast-fed infants could not. For instance two fathers of formula-fed infants were observed feeding their infants, while the mothers remained asleep. Both instances occurred late in the morning (5:40am

and 7:56am). Obviously further research will be required to clarify these differences in feeding strategies.

I had hypothesised that a father's presence in the bed may be disruptive, predicting that this would cause the mother and infant sharing the bed, to have less sleep than on the dyadic night (e.g. father might disturb infant, leading to infant disturbing mother). In reality this did not occur for the families observed. Generally mothers slept better when the father was sleeping with them than when sleeping with the infant alone (71% of mothers slept for longer on the triadic night). Likewise 80% of infants spent longer asleep on the triadic night than the dyadic night (see Chapter 4). Neither did the presence of the father in the bed cause any disruption to breast-feeding frequency, with infants feeding as frequently on the triadic night as they did on the dyadic night.

Father infant interactions, when cosleeping, have not been the subject of detailed study before, as have mother-infant cosleeping interactions. The practice of parent-infant triadic cosleeping provides a night-time caregiving environment that allows fathers the opportunity for close physical contact with their baby. This study has shown that triadic cosleeping is commonly practised and that those who employed this night-time care giving strategy found it to be more pleasurable than disruptive. The predictions that fathers would somehow affect the mother and infant cosleeping environment have not been supported. The fathers' presence in the bed has not proved to be a major disruption that caused the mother and infant to have less sleep. In fact, their presence suggested increased amounts of sleep for

all. Fathers' presence had also not affected mother and infant feeding interactions and only appeared to slightly influence the sleeping position of the infant (see above).

Evaluation of the current study

The preceding chapters have presented data on attitudes and practices regarding parent-infant cosleeping in a northern UK town. Using two forms of data collection (interviews and video observations) I was able to examine the antenatal and post-natal expectations and experiences of night-time care-giving and the effects of one care-giving strategy upon parents and their infants. The studies involved several unique components that have allowed me to address issues that had remained unstudied to date.

- In the interview portion of this thesis, the combination of prospective interviews for obtaining data on parents' expectations, with retrospective interviews with the same parents regarding their subsequent experiences was a novel methodology. Previous interview studies and surveys of cosleeping behaviour have predominantly used retrospective interviews, sometimes several years after the behaviour occurred, or have employed waiting room or telephone surveys that provide little scope for detailed answers (e.g. Forbes et al. 1992, Farooqi et al. 1991, Chessare et al. 1995). The use of in-depth anthropological interviews in a semi-structured format allowed me to explore a variety of issues with parents, to follow-up on interesting comments, and to obtain examples of their own experiences.

- Due to the in-depth nature of the interviews (above) it was possible to explore parent-infant sleeping strategies in far greater detail than had been done previously. This allowed documentation of degrees of cosleeping that had not previously been recognised, particularly with regard to combination cosleeping among breast-feeders and the tendency of occasional cosleepers to bring their infant into bed during periods of illness.

- The in-home video observations were both innovative and challenging. Much time and effort was expended recruiting parents who were willing to take part and allaying fears. Once I had reassured parents I was able to obtain the kind of information as to how cosleeping is practised at home that had never been obtained before. As Wailoo has commented, the infant should be studied in its natural environment! This gives the present study a more realistic focus than studies of cosleeping conducted in the artificial environment of a sleep lab. Not only were families sleeping in their own bed but their normal routines were unaffected by their participation and their infants behaviour less likely to be altered. Furthermore as parents and infants were monitored by infra red video only, there were no electrodes or leads necessary for physiological monitoring to provide encumbrance.

- Having overcome the technological obstacles to filming in the dark for eight hours and relying on parents to operate the equipment. I developed a behavioural coding taxonomy to analyse the video data I had obtained. Although the Californian and Bristol studies had both used behavioural taxonomies neither of these had incorporated fathers so an original contribution was made in classifying paternal night-time behaviour that can be used as a tool in future studies.

- No previous studies had examined fathers' attitudes to cosleeping, or included observations of triadic cosleeping. In doing so the present study has demonstrated the ways in which fathers participate in night-time care giving and the effects of their presence on mother infant cosleeping.

So why is cosleeping deemed to be so unnatural in our society? When I began this study health professionals hardly ever recommended bringing the baby into the parental bed and many of the regular cosleepers involved with both the interview and video study had been criticised by their families and peers. From the parenting advice of the 'baby experts' in the 1950's we can ascertain how western sleeping arrangements reflect cultural preferences of autonomy and independence (Spock 1955) but this is in direct conflict with infant physiology. Inherent in conventional Western understanding of 'normal' infant sleep is the assumption that a particular sleep management strategy is recommended for all. However, the diversity of infant sleeping practices found in this study demonstrate that parents tackle the challenges of night-time parenting in a variety of ways. Some parents manage to sort it out for themselves, either by trail and error or by having the confidence in their own 'natural' ability. Those who turn to others for advice find themselves barraged with conflicting opinions.

Jordan (1997) has proposed that it is authoritative knowledge that is the primary cause of much of the conflict concerning childbirth, which I would argue, continues to infant care. Authoritative knowledge in Western childbirth not only involves high technology but is accompanied by power relations and social interactions that suppress the biological nature and knowledge of birthing mothers. It is this authoritative knowledge that has compelled Greek women to demand and rely upon ultra sound scans to endorse their pregnancy (Georges 1997) and seduced both Western and non-western women into embracing formula feeding (Maher 1992). Powerful, authoritative knowledge completely transcend maternal/female knowledge and parents at the end of the twentieth century may be

so detached from their own instincts involving their biological being and that of their infant, that they do not have the confidence to trust their own innate infant care giving abilities. As technological and cultural interference have imposed itself on Western birthing experiences and infant feeding practices, so they have insinuated themselves within the night-time relationship between parents and infants. Modern parents, and especially mothers, who disregard authoritative knowledge and trust their own instincts or 'maternal knowledge' and do what 'feels' right are made, by society at large, to feel as if they are doing something wrong. By not caring for their infant the 'technological or modern way' they are deemed to be putting their baby at risk by shunning culturally specific devices designed for infant sleep, e.g. cots and technological devices that are supposed to allay parental fears, e.g. baby monitors.

Conclusion

Parent infant cosleeping, although an understudied area of parenting behaviour, is a form of night-time caregiving that parents in the UK frequently employ for a variety of reasons, ranging from planned practices to a last resort. For many of the parents whose practices have been scrutinised during this study cosleeping was found it to be the 'intuitive' response when faced with the reality of parenting a new-born infant.

An evolutionary perspective on human infant sleep physiology suggests that parent-infant cosleeping, practised under safe conditions, might be beneficial to mothers and infants. Although solitary sleeping is a historically novel form of infant sleep, it has been the preferred arrangement (directed by 'authoritative knowledge') for infant sleep for two centuries. Therefore, it was interesting to discover from the interview study that there seems to be a shift away from solitary sleeping for infants and a desire by parents to keep their infant close in the late 20^{th} century.

During the interview study breast-feeding was found to be a prime motivator for cosleeping, with mothers who did not imagine cosleeping doing so purely for ease of feeding and finding the environment to be conducive to night-time care. This was further endorsed and demonstrated during the video study. Breast-feeding mothers involved in the video study fed their infants more frequently compared to the formula-feeders (with examples of morning formula feeding, involving the fathers). These findings have major implications for breast-feeding education.

Mothers require the information on sleeping arrangements to make informed choices regarding nocturnal feeding and if they are to be supported in their choice to breast-feed then they require the correct information in order to make that choice.

The diversity involved with cosleeping both in terms of cosleeping environments and the heterogeneity of practices was evident in both the interview study the video study. Parents who discussed their cosleeping strategies during the interview study described an array of practices. The interesting finding that many parents employ a combination of 'infant by the bed' and 'infant in the bed' for parts of a given night, emerged from the interview study. The diversity of physical cosleeping environments was observed from recordings from the video study. Although the study sample involved in the video study was small, no two families had arranged their cosleeping environment in exactly the same way.

A unique contribution of this research was the involvement of fathers. Their opinions, involvement in decision-making, and their actual involvement in their infant's night-time parenting have been the subject of particular interest during both of the studies. The major finding from the interview study that cosleeping in our culture is triadic means that fathers' presence in the bed can no longer be excluded from cosleeping research. One would expect, from reading popular parenting magazines, that 'nineties' fathers interactions with their infants are frequent and involve bathing, holding, and soothing and that the roles of mothers and fathers overlap much more than they did before the age of the 'new man'.

However, fathers' interactions with their infants in Western settings are another understudied area of parenting. The opportunity to look at an exceptional situation, where the father was the primary caregiver, was not something that I had planned when designing the study. However it provided a number of insightful and illuminating viewpoints, most importantly demonstrating that a cosleeping infant's preferred proximity and orientation does not have towards be the mother.

Fathers' presence in the bed did not appear to affect or disrupt the mother-infant sleep state or synchrony, and all but two fathers involved in the study displayed synchronous sleep-wake states with their partner and infant. The cosleeping triads generally slept in close physical contact and mothers slept curled up around their infant whereas fathers tended to face away. Issues concerning infants' safety were examined. There appeared to be a positive effect of having the father in the bed, in that his presence kept the baby upright in the bed, rather than allowing the infant more room to rotate sideways across the bed, increasing the possibility of disappearing under the bed covers. However, the fathers involved in this study also tended to keep the covers pulled up higher on the bed, whilst mothers were vigilant in keeping the covers from covering the infants.

Many of the cosleeping parents from both the interview and video study felt very strongly about the benefits of cosleeping and often harboured severe anger and resentment towards a mixture of health professionals, relatives and complete strangers, who had voiced their opinion that parents and infants should not

cosleep. These parents felt passionately that cosleeping with their infant really worked for them and was 'natural'. Evidence from the present study suggest that, with continued research made accessible to parents, more families will be able to practice infant centred sleep arrangements, promoting positive night-time experiences for parents and infants.

Appendix A

Consent form for interview study

CONSENT FORM

RESEARCH PROJECT: North Tees Night-time Parenting Study

This is to confirm that I have read the sheet of information for parents about this study and have agreed that we are willing to take part.

I have been given information telling me how to contact the study team if I wish to ask any questions.

I understand that we may withdraw from the study at any time, without giving a reason. I confirm that the above statements are correct and give consent to take part in the study.

BABY'S NAME.....

BABY'S DATE OF BIRTH.....

ADDRESS.....

.....

.....

.....

PHONE NUMBER.....

PARENT(S) NAME(S).....

.....

SIGNATURE.....

DATE.....

University of Durham

Department of Anthropology
43 Old Elvet
Durham
DH1 3HN

Appendix B

Initial antenatal questionnaire used in the interview study.

Case Number: **Date:**

Contact number		**Name**	
Age Male		**Occupation Male**	
Age Female		**Occupation Female**	
Weeks to go		**Type of feeding**	
Other Children		**Status**	
Smoker		**Admitted For**	

Cosleeping ?	**In Parent's Bedroom?**	**Own Nursery?**
Position Laid Down To Sleep :		

1. Practices of other children.

2. What plans have you made for this baby's sleeping arrangement? Do you intend to stick rigidly to it?

3. How did you choose this strategy-the ideas behind it and did/do you have alternative scenarios?

4. Transmission of education-did your plans come from peers, family, literature or health workers?

5. Do you question information given?

6. Planned pregnancy & type of birth.

7. Do you ever imagine yourself sleeping with your baby (or even having it in the bed e . easier to breast-feed, baby ill or partners influence.)?

Appendix C

Re-contact questionnaire for parents involved in the interview study

Questions for re-contacting parents

Case no. Name Date
Date of interview
Address

1	Date and type of delivery	
2	Sex/name of baby	
3	If parents are smokers, how much smoke is the baby being exposed to?	
4	Babies sleeping arrangement	
5	Did you stick to it?	
6	Position to sleep-did baby decide?	
7	Feeding, has it changed in the last 3 months?	
8	Partners influence to sleeping arrangement	
9	Other children's reaction to the new baby's sleeping arrangement	
10	Does reality differ from your expectations of sleeping patterns?	
11	First time mums -has it been how you imagined?	

Appendix C continued…

12	How much cosleeping has occurred or occurs?	
13	Where and how long-log instances?	
14	For feeding?	
15	If husband was away, what happened? How did this affect night time parenting?	
16	If the baby has been ill or unsettled and not sleeping, what have you done?	
17	How has any disruption to sleep affected the parents- physically & psychologically?	
18	Have you had to change your sleeping strategy at any time?	
	Related questions	Along with sleeping strategies are questions referring to the other bedroom business i.e. sex. Are you willing to answer a few questions on this?
19	How has having a baby affected sex? Duration of post-partum abstinence.	
20	Has any advice been given and if yes who by?	
21	Who instigated sex first?	
22	Are you feeding on demand? How many times?	

Appendix D

Poster calling for volunteers for the video study

Can you help?

If you sleep, or intend to sleep with your baby, occasionally or all the time.....then we need to hear from you.

This research is being carried out by the University of Durham. For more information please contact:
Elaine Hooker on 01642 335001 and ask for details on the 'North Tees Cosleeping Project'.

Appendix E

A selection of newspaper articles concerning media coverage for volunteers.

NEWCASTLE UPON TYNE JOURNAL
27 JUN 97
Page 7

Sharing bed with baby may prevent cot deaths

TV will monitor families

By JOANNE WELFORD

Health Editor

FAMILIES are to be monitored with TV cameras in a bid find out if sharing a bed with babies can help prevent cot death.

Researchers at Durham University are looking for volunteers for a project to help provide clearer advice to parents on how to prevent Sudden Infant Death Syndrome.

The study team is basing its research on practices in many developing countries where newborn babies sleep in the same bed as their mothers rather than in a separate cot.

The Durham University team, working at University College, Stockton, want 40 volunteer couples who will be filmed as they sleep with their young babies for three nights, by means of a small infra-red video camera that will be placed in their bedroom.

They want to study the natural interaction between parents and babies during the night looking at mother and baby and father, and mother and baby.

Researcher Elaine Hooker said: "We have already conducted surveys which show that 88pc of babies are taken at some stage into their parents' bed to sleep though for some it only happens occasionally.

"Where co-sleeping is common, it is usually with both parents and there has been very little research in that area."

Ms Hooker is working with anthropology lecturer Dr Helen Ball on the study, their initial research has covered the North Tees health district and they are hoping to recruit families for the next stage from that area.

The project has already involved local health visitors from the North Tees area and has the backing of paediatricians from Bristol University's Department of Child Health who are also working on a co-sleeping and cot-death study.

The results, they hope, will help to provide clearer information on co-sleeping for parents and health professionals.

Current advice for cutting the risk of cot death includes putting babies to sleep on their backs, not letting them get too hot, keeping them away from cigarette smoke and keeping their heads uncovered.

A spokeswoman for the Foundation for the Study of Infant Deaths said the issue of co-sleeping and whether it can affect the risks of cot death is still being researched.

She said: "We advise parents who call us not to co-sleep if they are smokers.

"We also say put the baby in a cot next to the parent's bed because of the issue of whether the baby will get too hot in a bed with two adults."

■ Parents from the North Tees area who have children under five months old can contact Elaine Hooker at University College, Stockton on (01642) 335001 if they are interested in volunteering. All video studies will be carried out in confidence.

■ **All together now:** Dr Helen Ball and her baby Rhianna and Elaine Hooker, who plan to carry out the study.

CAMPAIGNS HIGHLIGHTED THE DANGERS

SEVERAL campaigns have been launched to highlight the dangers of cot death.

In 1991 the Back to Sleep campaign urged parents to put their babies down to sleep on their backs to reduce the risks. It halved the deaths from Sudden Infant Death Syndrome.

Last year, the focus of the campaign switched to smoking after research revealed a link between cot death and exposure to tobacco smoke was published in the *British Medical Journal*. Parents were urged to stop smoking around their baby.

Cot deaths claim the lives of around 500 British babies a year. 80pc occur in the first six months, with a peak at two or three months. TV presenter Anne Diamond has been a key figure in publicity campaigns warning of cot death after her son Sebastian died from it.

Three years ago there was a scare involving baby mattresses containing antimony after a TV programme said it could produce a lethal gas when it combined with body fluids.

But the theory was discredited by the Foundation for the Study of Infant Deaths. Central to the mattress theory was that the chemical is rarely encountered anywhere else, the FSID said it is present in ordinary household dust.

Plea over strokes toll

HEALTH chiefs in Cumbria are emphasising the importance of regular blood pressure checks for adults in a bid to reduce the death toll from stroke and heart disease.

North Cumbria Health Authority has issued a new set of guidelines for GPs which highlight the importance of treating people with high blood pressure, particularly older people.

The guidelines include reminders about avoiding stress, losing weight and stopping smoking to control the condition.

Dr Robert Walker, the authority's director of primary and community care, said: "It is important to realise that diagnosing and treating high blood pressure is probably the most important measure to prevent strokes."

Appendix E continued

Cleveland Evening Gazette July 1997

■ APPEAL: Elaine Hooker, right, with Dr Helen Ball and baby Rhianna, are appealing for families with babies to come forward

Picture by BRIAN ROBINSON

Sleeping partners

■ A Study is under way into the natural interaction between parents and babies sleeping together

Report by AMANDA TODD

SLUMBERING parents and their young babies are to be captured on camera.

And the eyes of researchers will be watching every move!

As part of an in-depth project by the University of Durham, a 'sleep study' is under way in Teesside.

It aims to examine the natural interaction between parents and babies when they are asleep together.

Cot death solution?

And it could prove to be an essential tool in preventing Sudden Infant Death Syndrome or cot death.

Now, the search is on for 40 volunteer families with babies under five months old from the North Tees area.

For three nights they will be required to have a small infra-red video camera in the bedroom of their homes.

The first is really to settle them in but the following will monitor mum and baby, then both parents and their child.

Elaine Hooker, based at the University College Stockton, is conducting the project along with Dr Helen Ball, a lecturer in anthropology.

"Similar research is being done but no-one has yet gone out into the community and got fathers involved as well," said Elaine who is doing a doctorate.

"The study itself is very confidential - there are no names, it's all coded.

"Hopefully this will help us provide health administrators, the professionals and parents with clearer information.

"From talking to the midwives themselves, they feel there's not enough research done on this."

Elaine is in her third year of research. She says North Tees is an ideal area because of its varying population.

Already she has interviewed mums at nurseries and mother and toddler groups.

Risks and benefits

She then spoke to 60 'expecting' parents about how they intended to let their babies sleep - followed up later with post-natal interviews.

Those surveys revealed 88pc of babies were taken at some stage into their parents' beds.

Recent American studies examining the risks and benefits of parents sleeping with their babies have also suggested it can help reduce the risk of cot death.

Anyone from Stockton, Norton, Billingham, Eaglescliffe, Yarm, Thornaby and Ingleby Barwick who would like to take part should ring 01642 335001.

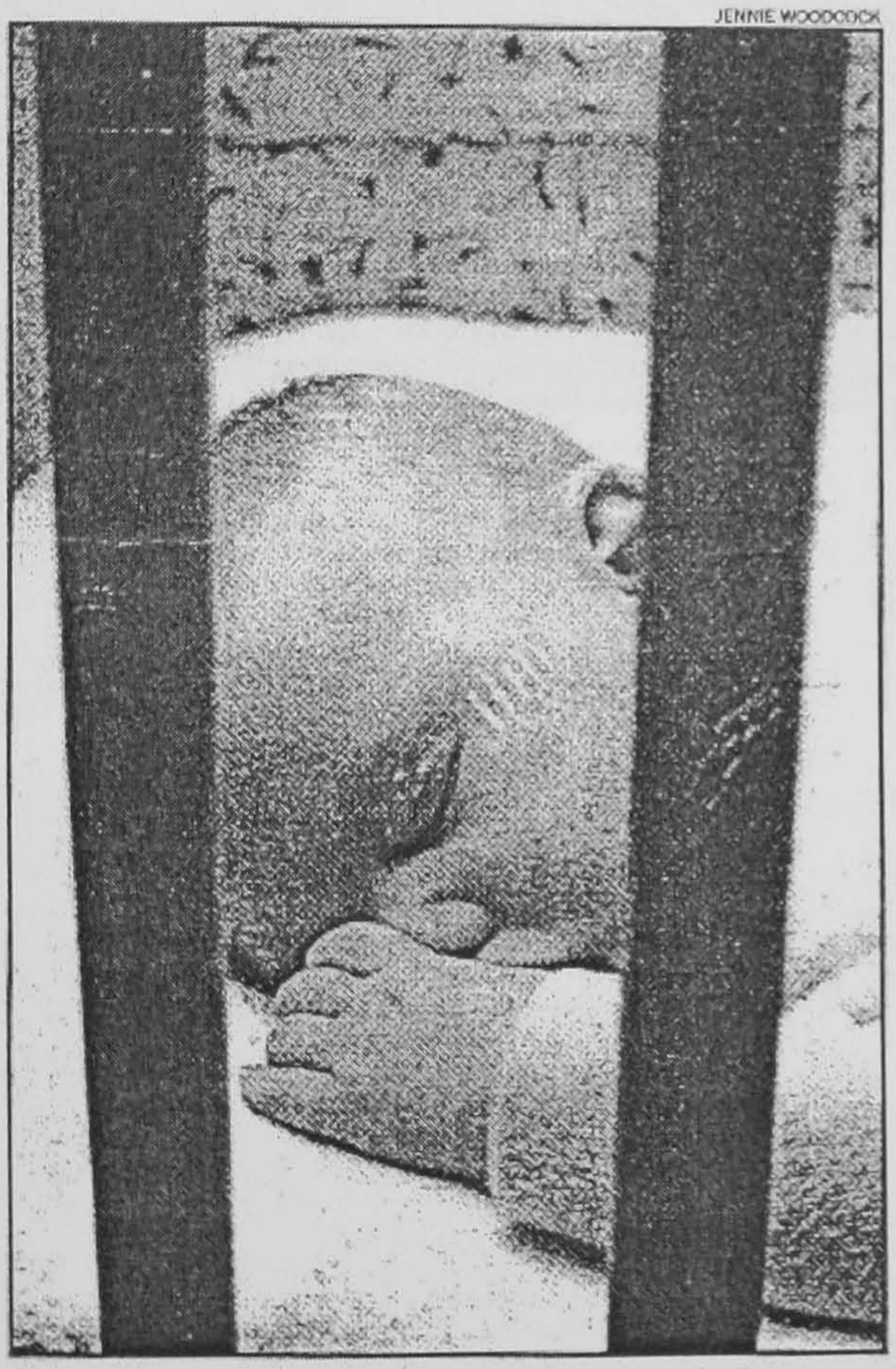
GET A
FROM
ALL T
SUMM
...THE LATEST
READER TRAVEL
SUPPLEMENT IS
FREE
ON MON
JULY 7T

Appendix E continued

THE TIMES HIGHER EDUCATION SUPPLEMENT
18 JUL 97
Page 9

Medicine and mountains: both are benefiting from anthropology studies

Sleeping with baby may make sense


JENNIE WOODCOCK

Babe in the wood: Infants have slept on their own only since Victorian times when this rapidly became part of modern culture

ALISON UTLEY

INFRA-RED cameras installed in the bedrooms of families in north-east England could shed light on modern sleeping behaviour and determine whether or not it is safer for a baby to sleep alone or with its parents.

The American anthropologist James McKenna has argued that continuous mother-infant contact is vital to the well-being of babies, and that this contact is particularly important during the night. He suggests that co-sleeping arrangements might protect babies against cot death or sudden infant death syndrome (SIDS).

In non-western cultures, newborn infants commonly sleep with their mothers. Intricate physiological and behavioural relationships have been demonstrated to exist between mother and infant co-sleeping pairs which could be protective to the child. But the theory is controversial and as much evidence exists supporting the opposite view, that those infants sharing a bed with their parents may be more at risk of SIDS.

'The idea of the infant as an independent entity may be out of touch with evolution'

Anthropologists in Durham are filming parents and babies who do sleep together at night to learn more about the practice and its implications. Forty families are taking part in the research.

Helen Ball, who is leading the project from Durham University, says the study was comparing the impact on infants of sleeping with their mothers only, compared to sleeping with both parents. Although both arrangements constitute minority behaviours, the latter is more common.

"Throughout our evolutionary history humans were never left alone to sleep," Dr Ball says. "It is only very recently, in Victorian times, that babies began to sleep in their own beds, often in their own rooms, and that this rapidly became part of modern culture."

But the western idea of the infant as an independent entity may be out of touch with evolution. In the vast majority of cultures, Dr Ball says, babies sleep with their mothers and there is evidence that the child's and parent's physiological behaviour becomes synchronised in the night. Heart beat, breathing rates, body temperature and brain waves seem to be closely influenced by the mother, all factors that could have a protective effect for the child.

Dr Ball's hypothesis is that the presence of the father in the bed will influence the pattern of mother-infant interactions during the night. "One might predict that the presence of the father means the baby is doubly monitored by both parents during the night," she says. "Alternatively, the baby could experience less monitoring if the both father and mother assume that the other parent is paying attention." Dr Ball has discovered, through her research, that none of the new parents studied had, before the birth, anticipated co-sleeping with their babies. However, at the post-natal interviews more than two-thirds were at least occasionally co-sleeping. It was found that all breast-feeding babies co-slept with their parents.

The videos made during the research, funded by the Nuffield Foundation, are being analysed to explore sleeping positions, the orientation of the baby and proximity to parents. The researchers will monitor the frequency and duration of parent-infant interactions, the sequencing of feeding, soothing and position change. If the research shows that children who sleep with their parents have a better chance of surviving to adulthood, the finding could slot neatly into other evolutionary theories.

Caroline Ross, a biological anthropologist from the Roehampton Institute, says: "The behaviour mechanisms that have developed in western societies may be unnatural in an evolutionary context."

Appendix E continued

Newspaper article taken from the Daily Mail Wednesday April 1st 1998

Parents can sleep easy with baby in bed, say scientists

By EMILY WILSON
Medical Reporter

BABIES are better off sharing a bed with their parents than sleeping alone in a cot, scientists said yesterday.

New research using video cameras shows fears that babies may be crushed or suffocated by sleeping with both their mother and father are unfounded.

In fact, scientists at the University of Durham have found evidence that keeping a baby in the parental bed may reduce the risk of 'cot death' or Sudden Infant Death Syndrome.

Anthropologist Dr Helen Hall, co-author of the report, said babies sleeping with their parents did not match sleep patterns associated with cot deaths.

She said: 'We found that both the mother and the baby interrupted each other's sleep. A baby sleeping with its mother didn't appear to go into long deep sleep patterns in the same way as a child sleeping on its own. It tended to move into light sleep and also woke to be breastfed.

'This is important for babies because it is believed that sudden infant death is linked to deep sleep patterns.'

Using specialist infrared video equipment, the researchers filmed five babies sleeping with their mothers, and then with both their mother and father, on two successive nights.

The results showed that the presence of the father made no difference at all to the mother and baby's sleeping patterns.

Mothers tended to curl up protectively around their infants for up to 80 per cent of the time during the night and, if present, the father tended to sleep some distance from the baby. Mother and baby would also tend to wake up at the same time.

The scientists were also interested in whether a baby might overheat, but none of the infants studied seemed unusually sweaty even when sleeping between both parents.

Dr Elaine Hooker, who also worked on the study, said: 'We hope the research we are undertaking will provide policy-makers, health care professionals and parents with clearer information. Until now research in America and Britain has been inconclusive about the risks and benefits of sleeping with your baby.'

Appendix F

Information for parents concerning the observational video study

INFORMATION FOR PARENTS

RESEARCH PROJECT
PARENT-INFANT SLEEP PROJECT

Background

Before birth babies are in a warm, protected environment, where all their needs are met by their mothers. After birth babies learn to adapt to the external world, but for many months remain vulnerable, depending on the constant care (night & day) of one or both parents. From our previous research we have learnt that some parents cope with care through the night by taking the baby into bed with them (cosleeping), either to settle the baby to sleep, to feed or for longer periods, in some cases all night. We do not fully understand the interactions involved between parents and their babies during sleep, but we know there are both biological and behavioural pieces to the puzzle.

The Research Project

The aim of the study, being carried out by researchers from the University of Durham, is to learn more about the night-time interactions between mothers and healthy babies and fathers/mothers and babies. If you are permanent or occasional cosleepers with your baby, and are willing to take part in our research, we would like to set up infra-red video equipment in your bedroom for 3 nights in a row. The equipment is quite small and will only be pointed at the bed (we will come and set it up), you will also be able to turn the camera off at any time. We would like to videotape mother-infant cosleeping and mother/father-infant cosleeping, on alternate nights. The temperature of the bedroom will be monitored with a small thermometer, and you will be asked to keep a sleep-diary (indicating the sleep habits of you and your baby) for 1 week prior to videotaping. We will not ask you to attach any equipment to yourselves or your baby, or ask you to do anything that you do not normally do with your baby at night-time. We are interested in observing how you and your baby interact when you are asleep in the bed together.

Confidentiality

No information that could identify you or your infant, will be released by us to anyone without your full written consent. Your name will appear on the consent forms only, which will be separated from the data collected. All videotapes, sleep logs and computerised information will be identified by codes, your names will not be included. Anonymous information only will be used for scientific presentations. You will have the opportunity to review the tapes and erase any portions you do not want us to see before giving your final consent. As a matter of courtesy we suggest that you should inform your General Practitioner of your participation in this study.

Other Information

If you are asked to take part in this important study we do hope that you will give it serious consideration. If you do not wish to participate, or decide to withdraw from the study, you do not have to give us a reason. The equipment will be brought to your house and set up, and then collected later by a member of the research team, at a time that is convenient to you.

If you would like any further information please don't hesitate to contact us.

University of Durham

Ms. Elaine Hooker,
01642 335367

Dr. Helen Ball
0191 374 2841

Appendix G

Consent form for observational video study

CONSENT FORM

RESEARCH PROJECT: **Parent-infant cosleeping in the home environment: an observational study**

This is to confirm that I have read the sheet of information for parents about this study and have agreed that I am willing to take part.

I have spoken to .....(one of the research team) who has fully explained the project to me and he/she has given me the opportunity to ask questions.

I understand that I may withdraw from the study at any time, without giving a reason.
I confirm that the above statements are correct and give consent to take part in the study.

BABY'S NAME.....

BABY'S DATE OF BIRTH.....

MOTHER'S NAME.....

FATHER'S NAME.....

PARENTS' SIGNATURES.....

.....

DATE.....

University of Durham

Department Of Anthropology
43 Old Elvet,
Durham,
DH1 3HN

Appendix H

Instructions given for cosleeping parents involved in the video study

North Tees Parent-Infant Sleep Project

Hi Eleanor and Martin, just a couple of points to note:

- Don't forget that you can turn the camera off at any time. There is a remote so that you don't have to get out of bed!

- Can you make sure that the infra red lamp is turned on before you switch out your light and please could you make sure that it is switched off every morning.

- The infra red lamp unit gets hot, so take care.

- The video player is switched to long play (LP) which means that a 4 hour tape will last 8 hours, which is sufficient for a single nights study. When the tape is finished, in the mornings, please can you put a new tape in to begin each night. Can you also make sure that the video player is set to AV 1 so that it will record.

- Can you record the temperature in your bedroom last thing at night and then first thing in the morning.

- Everything can be switched off during the day.

The camera is set up to film your bed, so if possible try not to move the tripod.

Thanks again for agreeing to take part in the study, sweet dreams and if you do have any problems you can ring me on (01642 335367).

Elaine

Temperatures:

Friday night =
Saturday morning =
Saturday night =
Sunday morning =
Sunday night =
Monday morning =

Appendix I

STUDY NUMBER

University of Durham

NORTH TEES COSLEEPING STUDY

SLEEP DIARY

DATE: | DAY OF WEEK: | BABY'S AGE [WKS & DAYS]

Please answer each question with reference to last night's sleep:

What time did MOTHER go to bed? | What time did FATHER go to bed?

What time did MOTHER go to sleep? | What time did FATHER go to sleep?

What time did MOTHER wake in morning? | What time did FATHER wake in morning?

Where did your baby sleep last night?

Where did your baby fall asleep? _____

What position was your baby in when s/he fell asleep? (please tick):

Back ☐ Tummy ☐ Side ☐ Sitting/Reclining ☐ Don't Know ☐ Other _____

What time did your baby fall asleep? ☐

Where did you put your baby when YOU went to bed? _____

What position did you place your baby in when YOU went to bed? (Please tick):

Back ☐ Tummy ☐ Side ☐ Didn't move baby ☐ Don't Know ☐

During the night, after you had gone to bed, did your baby sleep in more than one place? Yes ☐ No ☐

During the night, after you had gone to bed, did your baby sleep with anyone? Yes ☐ No ☐

If yes, please describe where your baby slept, who s/he slpt with, and approximately how long:

Did your baby sleep in the bed with both mother & father at the same time? Yes ☐ No ☐

If yes, where did your baby sleep most of the time?

In between both adults ☐ on outside of mother ☐ On outside of father ☐

Did your baby sleep well last night? Yes ☐ No ☐

If no, please explain why, and what happened:

PLEASE TURN OVER

Appendix I continued…

What time did you feed your baby before s/he went to sleep or to bed? ☐

What did you give him/her ? (Please tick all that apply)

Breastmilk ☐ Formula ☐ Baby Cereal ☐ Fruit/vegetable baby food ☐ Other _____

How many times did your baby wake in the night?_____

How many times did your baby feed during the night? Breastfeed _____ Bottlefeed_____

How many times did you wake for feed (whether or not you were feeder)? MOTHER ___ FATHER __

How many times did you wake to COMFORT, but not feed, your baby? MOTHER ___ FATHER __

How many times did you wake for to check your baby while s/he was asleep? MOTHER ___ FATHER __

What clothes did your baby wear to bed last night?

Please list the number and type, e.g. vest, babygro/nightie, bonnet, socks etc.

What sorts and what number of covers were used where your baby slept?

e.g. how many sheets, blankets, duvets etc.

Was the heating on in the room(s) where your baby slept last night? Yes ☐ No ☐

Did your baby feel or look sweaty during the night or when s/he woke up? Yes ☐ No ☐

What was the weather like last night? (e.g. cool, windy, hot & humid etc.)_____

Did you smoke during the night? If so, please describe how many times and where you smoked:

Mother:

Father:

Did you drink any alcohol yesterday evening or night? If so, please describe what, when and how much:

Mother:

Father:

Appendix J

Video study questionnaire on aspects of parenting/cosleeping

study no.

Personal details

Contact number:		
	Mother	Father
DOB		
Occupation		
Amount of education		
Currently employed		
Shift work/hours		
Ethnicity		
How long together?		

Medical/substance history

Are you taking medication?		
If so what & why?		
Any medical conditions?		
Does it affect sleep?		
Do you smoke now?		
If in the past-when stopped?		
How much alcohol?(upw)		

Sleep patterns (parents)

Any previous sleep problems?		
What are present sleep problems?		
Do you nap through the day?		
How long and how often?		

Other Children

Number	1	2	3	4	5
Ages					
Gender					

Did/or do you have sleep problems with any of your other children?
Where did they normally sleep?
Aged: 0-3mnths
Aged 3-6mnths
Aged 9-12mnths
How frequently did you cosleep?
Describe changes between this and other babies and why?

Appendix J continued…

This baby's pregnancy

Any problems during pregnancy?	
Did you take any medication. If so what?	
Did you smoke during pregnancy?	
Did you drink alcohol during your pregnancy?	
Did you use any unprescribed drugs?	

Birth details

Type of delivery?	
Any complications?	
Straight forward labour?	
Where did you give birth?	
How long in hospital?	
Where did the baby sleep in hospital?	
Was any advice given in hospital regarding cosleeping?	
Breast-feeding Y/N	
Frequency night and day	
How long did you breast-feed for?	

Baby's details

DOB	
Gender	
Birth weight	
Gestation length	
Use of dummy	
Any health problems?	
Any medication	
Sleep problems (if any)	
Problems with colic (when how long etc.)	

Appendix J continued…

Questions on cosleeping

What made you decide to cosleep?	
Was any advice given?	
Has anyone commented (adversely/positively)?	
Are you covert about it?	
Do you think there are risks associated with cosleeping?	
What are the benefits?	
Any negative feelings on cosleeping?	
Who decided the sleeping arrangement?	Mum Dad Joint decision
Have you changed opinion with practice?	
Has partner been absent at any time?	
Did absence affect sleeping?	
How frequently has either partner slept alone with baby & for how long?	
Any anxiety over cot death? (on a 1 - 10 scale.)	
Do you know the current advice on cosleeping and SIDS?	

Any other comments

Appendix K

Observational video study

Behavioural taxonomy for scoring triadic and dyadic cosleeping

Feeding: breast-bottle feeding behaviours

Start	feeding commences
Stop	feeding terminates
Swnip	switch nipple
Pani, pabot	passive nipple / bottle contact (no obvious signs of sucking /swallowing)
Irni, irbot etc)	infant refuses nipple / bottle (turns had away, clamps lips shut
Iroot	infant roots for nipple / bottle (mouthing / nuzzling movements)
Iattn	infant attempts to nurse (e.g. while mother is asleep)
Iterm	infant terminates feeding (detaches from nipple / bottle, turns away)
Mterm, fterm	mother / father terminates feeding (removes nipple / bottle from infant's mouth)
Mprnip /	mother presents nipple (places nipple near or against infant's lips cheek)
Mprbot, fprbot	mother / father presents bottle (places bottle against infant's lips / cheek)

Caregiving behaviours

Protective Behaviours

Mvi, fvi	mother / father visually inspects infant
mrel, frel	mother / father relocates infant (lifts infant entirely and replaces)
mrpo, frpo	mother / father repositions infant (drags or pushes infant's whole body or limbs)
mrbl, frbl	mother / father reblankets infant (repositions covers over infant)
mrdr, frdr	mother / father redresses infant (removes and replaces clothing)
Mdu / fdu	mother / father 'inserts' dummy
mcl, fcl	mother / father cleans infant (self explanatory)
mfan, ffan	mother / father fans infant (with hand or covers attempts to cool infant)
mac, fac	mother / father adjusts covers (slightly moves covers up or down infant's body)
map, fap	mother / father moves pillows away from infant (pushes pillows away from infant's head / face)

Affectionate Behaviours

mhug, fhug	mother / father hugs infant
mkiss, fkiss	mother / father kisses infant
mpat, fpat	mother / father pats infant
mpou, fpou	mother / father pounds infant on back (e.g. to 'wind' infant)

mcar, fcar	mother / father caresses infant
mwh, fwh	mother / father whispers to infant
mhh, fhh	mother / father holds hands with infant
mtou, ftou	mother / father touches infant (e.g. momentarily places hand on chest, head etc.)
mstr, fstr	mother / father strokes infant
mch, fch.	mother / father hold infant on chest (in ventro-ventral position)

Movements

mta, fta, ita	mother / father / infant turns away (from whoever they were previously facing)
mma, fma, ima,	mother / father / infant move away (from whoever they were previously close to)
mti, fti, itm, itf	mother /father turns towards infant or infant turns towards mother / father
mmi, fmi, imm, imf	mother /father moves towards infant or infant moves towards mother / father
msrm, fsrm, isrm	mother / father / infant sleep related movement
mca, fca	mother / father carry infant (out of bed, walking around)
ifl,	infant flail (arms)
iki,	infant kick (legs)
ihr	infant head rock
isl	infant slaps (qualified by object -- covers, bed, mother etc)
iex	infant explore / play
ilook	infant looking around
mst, fst, ist	mother / father / infant stretch
mjk, fjk, ijk	mother / father / infant jerks (involuntary 'jump' (whole body) in sleep, may or may not cause subject to wake)
mtw, ftw, itw,	mother / father / infant twitch (involuntary movement of limb(s) as opposed to whole body)
iarb	infant arches back

General behaviours

msc, fsc, isc	mother / father / infant scratches themselves
mwa, fwa, iwa	mother / father / infant watching (qualified with object being watched if attribution possible -- eg fwatv = father watches tv. mwai = mother watches infant)
mya, fya, iya	mother / father / infant yawns
mbb, fbb,	mother / father bathroom break (leaves field of view of camera)
ioos	infant out of sight (e.g. taken away for nappy changing)
mret, fret, iret	mother / father / infant returns

Sleep 'states'

mslp, fslp, islp	mother / father / infant asleep
maslp, faslp, iaslp	mother / father / infant appears asleep (eyes closed, no movement for 3 minutes)
fpawk, mpawk, ipawk	mother / father / infant passive awake (eyes open / periodicaly open and closed)
mawak, fawak, iawak	mother / father / infant active awake (eyes open, moving around)

Location of infant in bed

Betw	infant located between parents
Outm	infant located on outside of mother
Outf	infant located on outside of father
Mbed	infant in middle of bed (father absent)
Onm / onf	infant lying on mother / father

Orientation

mfi, ffi	mother / father facing infant
ifm, iff ifn	infant facing mother / father / neutral
mfa, ffa	mother / father / infant facing away (infant can face 'away' from mother when father absent from bed, or infant on outside of mother)
mfn, ffn	mother /father facing neutral (neither one side or other)

Proximity

To	touching (physical contact between any part of infant's body and any part of parent's body)
< 4	closest parts of infant's and parent's bodies less than 4 inches (10cm) apart
4-8	closest parts of infant's and parent's bodies between 4 & 8 inches (10-20 cm) apart
> 8	closest parts of infant's and parent's bodies greater than 8 inches (20cm) apart

Sleep position (recorded for all subjects)

Pr	prone (sleeping on stomach, face down or to the side)
Su	supine (sleeping on back, face up or to the side)
Si	side (sleeping on side, curled up or straight)

Position of arms (recorded for mother and father)

Ad	arm(s) down
Au	arm(s) up
Auh	arm(s) under head
Enc	arm(s) encircling infant

Position of legs (recorded for mother and father)

Kt	knee tuck (legs bent but obtuse angle between trunk & femur)
Cup	curled up (legs drawn up to trunk making acute angle)
Cupi	curled up round infant (parent's legs generally drawn up to touch infant's feet)
Ls	legs straight

Height of infant relative to mother and father, infant face level with

Eye	mother's / father's eye level
Chn	mother's / father's chin / shoulder level
Cht	mother's / father's chest
Wst	mother's / father's waist

Direction of infant in bed

Use clock positions,
12 = vertical between mother and father
11/1 = tilted slightly to left or right
10/2 = tilted markedly to left or right
9/3 = horiztonal in bed relative to parent(s)

Height of covers for mother, father, infant:

Ank	covers at ankle height
Kn	covers at knee height
Wst	covers at waist height
Cht	covers at chest height
Chn	covers at chin height
Ohd	covers at overhead height
Otc	infant lying on top of covers
Off	covers pushed off, below feet level

Appendix L

Study num	e-time	r-time	feed	care	move	gen'l	st-mo	st-fa	st-in	pla-in	orient -mo	orient -fa	orient -in	prox-mo	prox-fa	pos-mo	pos-fa	pos-in	arms-mo	arms-fa	legs-mo	legs-fa	ht-mo	ht-fa	dir-in	cov-mo	cov-fa	cov-in
	4:39:	02:29					slp	slp	slp	outm	mfi	ffa	ifm	to	<8	si	si	su	au	ad	cupi	ls	cht	cht	12	cht	cht	chn
	4:39:	02:29			ifl																							
	4:42:	02:32					slp	slp	slp	outm	mfi	ffa	ifm	to	<8	si	si	su	au	ad	cupi	ls	cht	cht	12	cht	cht	chn
	4:42:	02:32			isrm																							
	4:44:	02:34			fmo																							
	4:44:	02:34			mmo																							
	4:44:	02:34			imo																							
	4:44:	02:34			istr																							
	4:45:	02:35					slp	slp	aslp	outm	mfi	ffa	ifn	to	<8	si	si	su	au	ad	cupi	kt	cht	cht	12	cht	cht	chn
	4:45:	02:35				icry																						
	4:45:	02:35			mup																							
	4:45:	02:35		mvi																								
	4:45:	02:35	prnip																									
	4:45:	02:35	start																									
	4:45:	02:35			mdow																							
	4:48:	02:38	bf?				slp	slp	aslp	outm	mfi	ffa	ifm	to	<8	si	si	su	au	ad	cupi	kt	cht	cht	12	cht	cht	chn
	4:51:	02:41	bf?				slp	slp	aslp	outm	mfi	ffa	ifm	to	<8	si	si	su	au	ad	cupi	kt	cht	cht	12	cht	cht	chn
	4:54:	02:44	bf?				slp	slp	aslp	outm	mfi	ffa	ifm	to	<8	si	si	su	au	ad	cupi	kt	cht	cht	12	cht	cht	chn
	4:57:	02:47	bf?				slp	slp	slp	outm	mfi	ffa	ifm	to	<8	si	si	su	au	ad	cupi	kt	cht	cht	12	cht	cht	chn
	5:00:	02:50					slp	slp	slp	outm	mfi	ffa	ifm	to	<8	si	si	su	au	ad	cupi	kt	cht	cht	12	cht	cht	chn
	5:01:	02:51			fsrm																							
	5:01:	02:51			fsrtr																							
	5:01:	02:51			msrm																							
	5:01:	02:51			isrm																							
	5:01:	02:51	iroot																									
	5:01:	02:51	start																									
	5:03:	02:53	bf				slp	slp	aslp	outm	mfi	ffa	ifm	to	<8	si	su	si	enc	au/ad	cupi	ls	cht	cht	12	wst	cht	cht
	5:04:	02:54			fsrm																							
	5:05:	02:55			fsrm																							
	5:06:	02:56					slp	slp	slp	outm	mfi	ffa	ifm	to	<8	si	su	si	enc	ad	cupi	ls	cht	cht	12	wst	cht	cht
	5:09:	02:59					slp	slp	slp	outm	mfi	ffa	ifm	to	<8	si	su	si	enc	ad	cupi	ls	cht	cht	12	wst	cht	cht
	5:11:	03:01			fsrm																							
	5:12:	03:02					slp	slp	slp	outm	mfi	ffa	ifm	to	<8	si	su	si	enc	ad	cupi	ls	cht	cht	12	wst	cht	cht

Appendix L continued...

Study num	e-time	r-time	feed	care	move	gen'l	st-mo	st-fa	st-in	pla-in	orient -mo	orient -fa	orient -in	prox-mo	prox-fa	pos-mo	pos-fa	pos-in	arms-mo	arms-fa	legs-mo	legs-fa	ht-mo	ht-fa	dir-in	cov-mo	cov-fa	cov-in

Bibliography

Aaroson, S. T., S. Rashed, M. P. Biber, and J. A. Hobson. 1980. Sleeping together: videotape look at couple's sleep. *Sleep Research* 1980:9-120.

Abbot, S. 1992 Holding on and pushing away: Comparative perspectives on an Eastern Kentucky child-rearing practice. *Ethos* 20(1): 33-65

Anders, T. F. 1979. Night waking in infants during the first year of life. *Pediatrics* 63:860-64.

Anders, T. F., L. F. Halpern, and J. Hua. 1992. Sleeping through the night: a developmental perspective. *Pediatrics* 90:554-59.

Anderson, E. S., M. P. Wailoo, and S. Peterson. 1990. Use of thermographic imaging to study babies sleeping at home. *Archives of Diseases in Childhood* 65:1266-67.

Balarajan, R., V. S. Raleigh, and B. Botting. 1989. Sudden infant death syndrome and postneonatal mortality in immigrants in England and Wales. *British Medical Journal* 298:716-20.

Ball, H. L., and E. Hooker. 1998. What happens to infants who sleep with their parents? Paper presented at Annual Meetings of American Association of Physical Anthropologists, Salt Lake City, Utah - March 31st-April 4th 1998.

Ball, H. L., E. Hooker, and P. J. Kelly. 1999. Where will the baby sleep? Attitudes and practices of new and experienced parents regarding cosleeping with their new-born infants. *American Anthropologist* 10 (1):143-51.

Ball, T. M., and A. L. Wright. 1999. Health care costs of formula-feeding in the first year of life. *Pediatrics* 103 (4):870-76.

Barry, H., and L. M. Paxson. 1971. Infancy and early childhood: cross-cultural codes 2. *Ethnology* 10:466-508.

Bass, M., R. E. Kravath, and L. Glass. 1986. Death-scene investigation in sudden infant death. *The New England Journal of Medicine* 315(2):100-105.

Beal, S. 1988. Sleeping Position and SIDS. *Lancet*:512.

Byard, R. W. 1994. Is co-sleeping in infancy a desirable or dangerous practice? *Journal of Paediatric Child Health* 30:198-99.

Carpenter, R. G. 1972. Sudden and unexpected deaths in infancy (cot death). *In Sudden unexpected deaths in infancy (cot deaths)*, ed. F. E. Camps and R. G. Carpenter. 7-15. Bristol: John Wright.

Caudill, W., and D. Plath. 1966 Who sleeps by whom? Parent-child involvement in urban Japanese families. *Psychiatry* 29: 344-366.

Caudill, W., and H. Weinstein. 1969. Maternal care and infant behaviour in Japan and America. *Psychiatry* 32:12-43.

Cernoch, J. M., and R. H. Porter. 1985. Recognition of maternal axillary odours by infants. *Journal of Child Development* 56 (6):1593-98.

Chessare, J.B., C.E. Hunt and C. Bourguignon. 1995. A community based survey of infant sleep position. *Pediatrics* 96:893-896

Chisholm, J. 1983. *Navajo Infancy*. New York: Aldine Publishing Company

Culbertson, J. Krous, H. Bendell, D. 1988. *Sudden Infant Death Syndrome: Medical Aspects and Psychological Management.* London Melbourne Auckland: Edward Arnold.

Cronenwett, L. R. 1982. Father participation in child care: a critical review. Research in *Nursing & Health* 5:63-72.

Culbertson, J., H. Krous, and D. Bendell. 1988. *Sudden infant death syndrome: medical aspects and psychological management*. London, Melbourne, Auckland: Edward Arnold.

Davies, D. P. 1985. Cot Death in Hong Kong: A Rare Problem? *Lancet*:1346-48.

---. 1994. Ethnicity and SIDS: What have we learnt? *Early Human Development* 38:215-20.

Dayton, L. 1992. Cot death studies hampered by imprecise terms. *New Scientist* 1810:15.

de Jonge, G. A., A. C. Engelberts, A. J. M. Koomen-Liefting, and P. J. Kostense. 1989. Cot death and prone sleeping position in the Netherlands. *British Medical Journal* 298:722.

Dettwyler, K. A. 1992. Infant feeding practices and growth. *Annual Review Of Anthropology* 21:171-204.

---. 1995. Beauty and the breast: the cultural context of breastfeeding in the United States. *In Breastfeeding: biocultural perspectives*, ed. P. Stuart-Macadam and K. A. Dettwyler, 167-216. New York: Aldine de Gruyter.

Drago, D. and A. Dannenberg. 1999. Infant mechanical suffocation deaths in the united States, 1980-1997. *Pediatrics* vol 103 no 5

Eaton, S. B., M. Shostak, and M. Konner. 1988. *The Paleolithic Prescription*. New York: Harper & Row.

Eibel-Eibesfeldt, I. 1975 *Ethology: the biology of behaviour*. 2nd edition. New York: Holt, Rienhart and Winston Inc.

Elias, M. F., N. A. Nicolson, C. Bora, and J. Johnston. 1986. Sleep/wake patterns of breast-fed infants in the first 2 years of life. *Pediatrics* 77:322-29.

Employment Department Group Office of Population Censuses and Surveys. 1990. Standard occupational classification volume 1. London HMSO Publication.

Eyer, D. E. 1994. Mother-infant bonding. *Human Nature* 5:69-94.

Farooqi, S., I. J. Perry, and D. G. Beevers. 1991. Ethnic differences in sleeping position and in risk of cot death. *Lancet* 338:1455.

Fildes. 1988. *Wetnursing: a history from antiquity to the present*. Oxford: Blackwell.

Fleming, P. J., R. Gilbert, Y. Azaz, P. J. Berry, P. T. Rudd, A. Stewart, and E. Hall. 1990. Interaction between bedding and sleeping position in the sudden infant death syndrome: A population based case-control study. *British Medical Journal* 301:85-89.

Fleming, P. J., C. Bacon, J. Berry, and M. MacIntosh. 1993-1996. The CESDI study 1993-1996. The maternity and child health research consortium London *HMSO.*

Fleming, P. J., P. S. Blair, C. Bacon, D. Bensley, I. Smith, E. Taylor, J. Berry, J. Golding, and J. Tripp. 1996. Environment of infants during sleep and risk of the sudden infant death syndrome: results of 1993-5 case-control study for confidential inquiry into stillbirths and deaths in infancy. *British Medical Journal* 313 no.7051 (July):191-94.

Forbes, J. F., D. S. Weiss, and R. A. Folen. 1992. The cosleeping habits of military children. *Military Medicine* 157:196-200.

Foundation for the Study of Infant Deaths. ?1998. Information Pack: Foundation for the study of infant deaths. London.

Gantley, M. 1994. Ethnicity and the sudden infant death syndrome: Anthropological perspectives. *Early Human Development* 38(3):203-8.

Gantley, M., D. P. Davies, and A. Murcott. 1993. Sudden infant death syndrome: Links with infant care practices. *British Medical Journal* 306:16-19.

Gillham, P. 1998. A randomised control trial to compare alternative strategies for preventing crying and sleep problems in the first 3 months of life. Paper presented at the Inaugural International Conference on Women's Reproductive Health at Churchill College, Cambridge, UK.

Golding, J., S. Limerick, and A. Macfarlane. 1985. *Sudden infant death: patterns, puzzles and problems.* Shepton Mallet: Open Book Publishing.

Georges, E. 1997. Fetal ultrasound imaging and the production of authoritative knowledge in Greece. *In childbirth and authoritative knowledge: cross cultural perspectives* ed by R. E Davies-Floyd and C.F. Sargent. Regents of University of California. US

Greenberg, M., and N. Morris. 1974. Engrossment: the new-born's impact upon the father. *American Journal of Orthopsychiatry* 44:520-31.

Halpern, L. F., T. F. Anders, C. G. Coll, and J. Hua. 1994. Infant temperament: is there a relationship to sleep-wake states and maternal night-time behaviour? *Infant Behaviour and Development* 17:255-63.

Hanks, C. C., and F. G. Rebelsky. 1977. Mommy and the midnight visitor: a study of occasional cosleeping. *Psychiatry* 40:277-80.

Hauck, F. R., and J. S. Kemp. 1998 Bedsharing promotes breastfeeding and AAP Task Force on Infant Positioning and SIDS (letter). *Pediatrics* 102:662-64

Hayes, M. J., S. M. Roberts, and R. Stowe. 1996. Early childhood co-sleeping: parent-child and parent-infant night-time interactions. *Infant Mental Health Journal* 17:348-57.

Heron, P. 1994. Nonreactive co-sleeping and child behaviour: getting a good night's sleep all night every night. Masters Thesis, University of Bristol.

Hewlett, B. S. 1987. Intimate fathers: patterns of paternal holding among Aka pygmies. *In The father's role -- cross cultural perspectives,* ed. M. E. Lamb, 295-330. Hillsdale, New Jersey: Lawrence Erlbaum Associates.

---. 1992. Husband-wife reciprocity and the father-infant relationship among Aka pygmies. *In Father-child relations*, ed. B. S. Hewlett, 153-76. New York: Aldine.

Hoffman, H. J., K. Damus, L. Hillman, and E. Krongrad. 1986. Risk factors for SIDS: results of the National Institute of Child Health and Human Development SIDS co-operative epidemiological study. *Annals of the New York Academy of Science* 533:13-31.

Hoppenbrouwers, T., and J. Hodgman. 1986. Commentary on an anthropological perspective on the sudden infant death syndrome: the role of parental breathing cues and speech breathing adaptations by James McKenna. *Medical Anthropology*: special issue 10 (1):61-64.

Hoppenbrouwers, T., J. Hodgman, K. Arakawa, and M. B. Sterman. 1989. Polysomnographic sleep and waking states are similar in subsequent siblings of SIDS and control infants during the first six months of life. *Sleep* 12(3):265-76.

Hossain, Z., T. Field, J. Pickens, J. Malphurs, and C. Del Valle. 1997. Fathers' caregiving in low-income African-American and Hispanic-American families. *Early Development and Parenting* 6:73-82.

Jackson, D. 1990. *Three in a bed*. New York: Avon Books.

Jackson, S. 1987. Great Britain. *In The father's role -- cross cultural perspectives*, ed. M. E. Lamb, 29-58. Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Jordan, B. 1997. Authoritative knowledge and its construction. *In childbirth and authoritative knowledge: cross cultural perspectives* ed by R. E Davies-Floyd and C.F. Sargent. Regents of University of California. US

Kagan, J. 1984. *The nature of the child*. New York: Basic Books.

Kaplan, S. L., and E. Pozanski. 1974. Child psychiatric patients who share a bed with a parent. *Journal of American Academy of Child Psychiatry* 13:344-56.

Klonoff-Cohen, H., and S. Edelstein. 1995. Bed Sharing and the sudden infant death syndrome. *British Medical Journal* 311:1269-72.

Knight, B. 1983. *Sudden death in infancy - the 'cot death' syndrome*. London: Faber & Faber.

Konner, M. J., and C. M. Super. 1987. Sudden infant death syndrome: an anthropological hypothesis. *The role of culture in developmental disorder*, ed. C. M. Super, 95-108. San Diego: Academic Press.

Lamb, M. E., ed. 1987a. In *The father's role -- cross cultural perspectives*. Hillsdale, New Jersey: Lawrence Erlbaum Associates.

---. 1987b. Introduction: the emergent American father. In *The father's role -- cross cultural perspectives,* ed. M. E. Lamb, 3-26. Hillsdale, New Jersey: Lawrence rlbaum Associates.

Latz, S., A. W. Wolf, and B. Lozoff. 1999. Cosleeping in context - sleep practices and problems in young children in Japan and the United States. *Archives of Pediatrics and Adolescent Medicine* 153:339-46.

Lee, K. 1992. Pattern of night waking and crying of Korean infants from 3 months to 2 years old and its relation with various factors. *Developmental and Behavioural Pediatrics* 13:326-30.

Lee, N. N. Y., Y. F. Chan, D. P. Davies, E. Lau, and D. C. P. Yip. 1989. Sudden infant death syndrome in Hong Kong: Confirmation of low incidence. *British Medical Journal* 298:721.

Lehner, P. N. 1996. *The handbook of ethological methods*. Cambridge: Cambridge University Press.

Lieberman, L. 1992. . In *The Cambridge encyclopaedia of human evolution*, ed. Jones, Martin, and Pilbeam, 135. Cambridge: Cambridge University Press.

Liedloff, J. 1975. *The continuum concept*. Bristol: Duckworth.

Lomax, E., J. Kagen, and B. Rosenkrantz. 1978. *Science and patterns of child care*. San Francisco: W.H. Freeman and Company.

Lozoff, B., G. L. Askew, and A. W. Wolf. 1996. Cosleeping and early childhood sleep problems - effects of ethnicity and socio-economic status. *Developmental and Behavioural Pediatrics* 17:9-15.

Lozoff, B., A. W. Wolf, and N. S. Davis. 1984. Cosleeping in urban families with young children in the United States. *Pediatrics* 74:171-82.

Lozzof, B., and G. Brittenham. 1979. Infant care: Cache or carry? *Journal of Pediatrics* 95(3): 478-483.

Madansky, D., and C. Edelbrock. 1990. Cosleeping in a community sample of 2- and 3-year-old children. *Pediatrics* 86(2):197-203.

Maher, V., ed. 1992a. *The Anthropology of Breast-Feeding*. Oxford: Berg Publishers Ltd.

McKenna, J. J. 1986. An anthropological perspective on the sudden infant death syndrome (SIDS): The role of parental breathing cues and speech breathing adaptations. Medical Anthropology 10(1) : 9-53

McKenna, J. J. 1990a. Evolution and sudden infant death syndrome (SIDS): Part 1: Infant responsivity to parental contact. *Human Nature* 1:145-77.

---. 1990b. Evolution and sudden infant death syndrome (SIDS): Part II: Why human infants? *Human Nature* 1:179-206.

---. 1995. The potential benefits of infant-parent co-sleeping in relation to SIDS prevention: overview and critique of epidemiological bed sharing studies. *In Sudden Infant Death Syndrome. New Trends in the Nineties*, ed. T. O. Rognum, 255-65. : Scandinavian University Press.

---. 1996. Sudden infant death syndrome in cross-cultural perspective: is infant-parents cosleeping protective? *Annual Review Of Anthropology* 25:201-16.

McKenna, J. J., and N. J. Bernshaw. 1995. Breast-feeding and infant-parent cosleeping as adaptive strategies: are they protective against SIDS. *In Biocultural Perspectives,* ed. P. Stuart-Macadam and K. Dettwyler, 265-305. New York: Aldine De Gruyter.

McKenna, J. J., and S. S. Mosko. 1990. Evolution and sudden infant death syndrome (SIDS): Part III: Infant arousal and parent-infant co-sleeping. *Human Nature* 1(3):291-330.

McKenna, J. J., and S. Mosko. 1993. Evolution and infant sleep: an experimental study of infant-parent co-sleeping and its implications for SIDS. *Acta Paediatrica Supplement* 389:31-36.

McKenna, J. J., and S. S. Mosko. 1994. Sleep and arousal, synchrony and independence, among mothers and infants sleeping apart and together (same bed): an experiment in evolutionary medicine. *Acta Paediatric Supplement* 397:94-102.

McKenna, J. J., S. S. Mosko, and C. A. Richard. 1997. Bedsharing promotes breast-feeding. *Pediatrics* 100:214-19.

McKenna, J. J., S. Mosko, C. Dungy, and J. McAninch. 1990. Sleep and arousal patterns of co-sleeping human mother/infant pairs: a preliminary physiological

study with implications for the study of infant death syndrome (SIDS). *American Journal of Physical Anthropology* 83:331-47.

McKenna, J. J., E. B. Thoman, T. F. Anders, A. Sadeh, V. L. Schechtman, and S. F. Glotzbach. 1993. Infant-parent co-sleeping in an evolutionary perspective: implications for understanding infant sleep development and the Sudden Infant Death Syndrome. *Sleep* 16:263-81.

McKenna, J. J., S. Mosko, C. Richard, S. Drummond, L. Hunt, M. B. Cetel, and J. Arpaia. 1994. Experimental studies of infant-parent co-sleeping: mutual physiological and behavioural influences and their relevance to SIDS. *Early Human Development* 38:187-201.

McKenzie, S. 1991. 'Troublesome crying in infants: effect of advice to reduce stimulation. *Archives of Disease in Childhood* 66:1416-20.

Medoff, D., and C. E. Schaefter. 1993. Children sharing the parental bed: a review of the advantages and disadvantages of cosleeping. *Psychology* 30:1-9.

Mitchell, E. A., R. P. K. Ford, and B. J. Taylor. 1992. Further evidence supporting a causal relationship between prone sleeping and SIDS. *Journal of Paediatric Child Health* 28 (supp 1) (5):9-12.

Mitchell, E. A., and R. Scragg. 1993. Are infants sharing a bed with another person at increased risk of Sudden Infant Death Syndrome? *Sleep* 16:387-89.

Mitchell, E. A., P. G. Tuohy, J. M. Brunt, J. M. D. S. Thompson AW, M. S. Clements, R. P. K. Ford, and B. J. Taylor. 1997. Risk factors for sudden infant death syndrome following the prevention campaign in New Zealand: a prospective study. *Pediatrics* 100 (5):835-40.

Morelli, G. A., B. Rogoff, D. Oppenheim, and D. Goldsmith. 1992. Cultural variations in infants' sleeping arrangements: questions of independence. *Developmental Psychology* 28(4):604-13.

Mosko, S., C. Richard, and J. McKenna. 1997a. Infant arousals during mother-infant bedsharing: implications for infant sleep and SIDS research. *Pediatrics.*

---. 1997b. Maternal sleep and arousals during bedsharing with infants. *Sleep* 20:142-50.

Mosko, S., C. Richards, and J. McKenna. 1997. Infant arousals during mother infant bed sharing : implications for infant sleep and sudden infant death syndrome research. *Pediatrics* 100:841-50.

Mosko, S., C. Richard, J. McKenna, and S. Drummond. 1996. Infant sleep architecture during bedsharing and possible implications for SIDS. *Sleep* 19:677-84.

Mosko, S., C. Richard, M. James, S. Drummond, and D. Mukai. 1997a. Maternal proximity and co2 environment during bedsharing and possible implications for SIDS research. *American Journal of Physical Anthropology* 103.

Mosko, S., C. Richard, J. McKenna, S. Drummond, and D. Mukai. 1997b. Maternal proximity and infant CO2 environment during bedsharing and possible implications for SIDS research. *American Journal of Physical Anthropology* 103:315-28.

Munroe, R. L., and R. H. Munroe. 1992. Fathers in children's environments: a four culture study. *In Father-child relations: cultural and biosocial contexts*, ed. B. S. Hewlett, 213-30. New York: Aldine de Gruyter.

Murdock, G. P., and D. R. White. 1969. Standard cross cultural sample. *Ethnology* 8:329-69.

Naeye, L. 1980. Sudden infant death. *Scientific American* 242:52-57.

Nakamura, S., M. Wind, and M.A. Danello. 1999. Review of hazards associated with children placed in adult beds. *Arch. Pediatra. Adolesce.* Med. Vol 153.

Nelson, E. A. S., and P. H. Chan. 1996. Child care practices and cot death in Hong Kong. *New Zealand Medical Journal* 109:144-46.

Newson, J., and E. Newson. 1966. *Patterns of infant care in an urban community.* Middlesex, UK: Penguin.

Ninio, and Rinlott. 1988. Fathers 'involvement in the care of their infants and their attributions of cognitive competence to infants. *Child Development* 59:652-63.

Nugent, K. 1987. The father's role in early Irish socialisation: historical and empirical perspectives. *In The father's role -- cross cultural perspectives*, ed. M. E. Lamb, 169-94. Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Okami, P. 1995. Childhood exposure to parental nudity, parent-child co-sleeping, and "primal scenes": A review of clinical opinion and empirical evidence. *The Journal of Sex Research* 32:51-64.

Oleinick, M. S., A. K. Bahn, L. Eisenberg, and A. M. Lilienfeld. 1966. Early socialisation experiences and intrafamilial environment. *Arch Gen Psychiat* 15:344-53.

Pankhurst, F. P., and J. A. Horne. 1994. The influence of bed partners on movement during sleep. *Sleep* 17 (4):308-15.

Pinilla, T., and L. L. Birch. 1993. Help me make it through the night: behavioural entrainment of breast-fed infants' sleep patterns. *Pediatrics* 91:436-44.

Ponsonby, A., T. Dwyer, L. E. Gibbons, J. F. Cochrane, M. E. Jones, and M. J. McCall. 1992. Thermal environment and sudden infant death syndrome: Case control study. *British Medical Journal* 304:277-81.

Ponsonby, A. L., T. Dwyer, L. E. Gibbons, J. A. Cochrane, and Y. G. Wang. 1993. Factors potentiating the risk of sudden infant death syndrome associated with the prone position. *The New England Journal of Medicine* 329 (6) Aug 5:377-82.

Rath, F. H., and M. E. Okum. 1995. Parents and children sleeping together: cosleeping prevalence and concerns. *American Journal of Orthopsychiatry* 65:411-18.

Rebelsky, and Hanks. 1971. Fathers' verbal interaction with infants in the first three months of life. *Child Development* 42:63-68.

Richard, C., S. Mosko, J. McKenna, and S. Drummond. 1996. Sleeping position, orientation, and proximity in bedsharing infants and mothers. *Sleep* 19:685-90.

Rosenberg, K. R. 1992. The evolution of modern childbirth. *Yearbook of Physical Anthropology* 35:89-124.

Rustia, J. G., and D. Abbott. 1993. Father involvement in infant care: two longitudinal studies. *International Journal of Nursing Studies* 30:467-76.

Sadeh, A. 1994. Assessment of intervention for infant night waking: parental reports and activity-based home monitoring. *Journal of Consulting and Clinical Psychology* 62 (1):63-68.

Sadeh, A., and T. F. Anders. 1993. Infant sleep problems: origins, assessment, interventions. *Infant Mental Health Journal* 14:17-34.

Sawczenko, A., P.J. Fleming, and J. Young. 1997 Variation of night-time infant body temperature associated with diurnal rhythm and sleep state. *Early Human Development* 49(3): 207-208.

Schachter, F. F., M. L. Fuchs, P. E. Bijur, and R. K. Stone. 1989. Cosleeping and sleep problems in Hispanic-American urban young children. *Pediatrics* 84:522-30.

Scragg, R., E. A. Mitchell, B. J. Taylor, A. W. Stewart, R. P. K. Ford, J. M. D. Thompson, E. M. Allen, and D. M. O. Becroft. 1993. Bed sharing, smoking, and alcohol in the Sudden Infant Death Syndrome. *British Medical Journal* 307:1312-18.

Scragg, R. K. R., E. A. Mitchell, A. W. Stewart, R. P. K. Ford, B. J. Taylor, I. B. Hassall, S. M. Williams, and J. M. D. Thompson. 1996. Infant room-sharing and prone sleep position in sudden infant death syndrome. *Lancet* 347:7-12.

Siegel, S. and J. Castellan. 1988. *Nonparametric statistics for the behavioural sciences.* McGraw-Hill International editions.

Southall, D. P., and M. P. Samuels. 1992. Reducing risks in the sudden infant death syndrome: current interventions and socio-economic factors need monitoring. *British Medical Journal* 304:265-66.

Spock, B. 1955. *Baby and child care.* London: The Bodley Head.

Stuart-Macadam, P., and K. A. Dettwyler. 1995. *Breastfeeding - biocultural perspectives.* New York: Aldine De Gruyter.

The Bible Societies. 1976. *Good News Bible.* : Fontana: Collins.

The Foundation for the study of Infant Deaths. 1993. Bedsharing research briefing 22.6.

Trevathan, W. R. 1987. *Human Birth An Evolutionary Perspective*. New York: Aldine De Gruyter.

Trevathan, W. R., and J. J. McKenna. 1994. Evolutionary environments of human birth and infancy: insights to apply to contemporary life. *Children's Environments* 11:88-104.

Tuffnell, C. S., S. A. Peterson, and M. P. Wailoo. 1994. Higher rectal temperatures in cosleeping infants. Unpublished manuscript.

Wagner, S. 1996. The effect of cosleeping on infant and mother attachment and rates of transitional object use. PhD. Thesis, The California School of Professional Psychology. US.

Wailoo, M. P., S. A. Petersen, and H. Whitaker. 1990. Disturbed nights and 3-4 month old infants: the effects of feeding and thermal environment. *Archives of Disease in Childhood* 65:499-501.

Wailoo, M. P., S. A. Petersen, H. Whittaker, and P. Goodenough. 1989a. Sleeping body temperatures in 3-4 month old infants. *Archives of Disease in Childhood* 64:596-99.

---. 1989b. The thermal environment in which 3-4 month old infants sleep at home. *Archives of Disease in Childhood* 64:600-604.

Whiting, J. W. M., and B. B. Whiting. 1975. Aloofness and intimacy of husbands and wives. *Ethos* 3:183-207.

Wigfield, R. E., P. J. Fleming, P. J. Berry, P. T. Rudd, and J. Golding. 1992. Can the fall in Avon's sudden infant death rate be explained by changes in sleeping position? *British Medical Journal* 304:282-83.

Wolfson, A., A. Futterman, and P. Lacks. 1992. Effects of parent training on infant sleeping patterns, parents stress and perceived parental competence. *Journal of Consulting and Clinical Psychology* 60:41-48.

Wolke, D., R. Meyer, B. Ohrt, and K. Riegel. 1995. Co-morbidity of crying and feeding problems with sleeping problems in infancy: concurrent and predictive associations. *Early Development and Parenting* 4:191-207.

Wright, E. 1972. *The new childhood*. London: Tandem.

Young, J. 1999. Night-time behaviour and interactions between mothers and their infants of low risk for SIDS: a longitudinal study of room sharing and bedsharing. Ph.D. Dissertation, University of Bristol.