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**PHYSIOLOGICAL AND BEHAVIOURAL ASPECTS OF
MOTHER - INFANT ATTACHMENT AND EMOTIONAL
AVAILABILITY: A STUDY ON FIVE MONTHS OLD
BABIES**

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ABSTRACT

Mother-infant bond is essential for the infant survival both physically and emotionally; in fact the attachment between mother and infant is a complex system of behaviours and feelings toward the one to the other that builds a relationship between both.

This relationship motivates mothers and infants to undertake behaviours that ensure the infant's survival, and it is on the base of all mammalian affiliations (Bowlby, 1969).

Mothers and infants are equipped with instinctive attachment behaviours that ensure maternal care and the wellbeing, protection and survival of infants. This behavioural system underlies the affiliative system that develops in adulthood and subsequently parental behaviour (Panksepp, 1994).

The development of the type of the attachment bond depends on how the mother was receptive to the needs of the child by providing the necessary care. Negayama et al. (2009), have

shown that the picking up of the baby is essential for its development because it allows the caregiver to transport him/her, to protect him/her and to love him/her.

In relation to this the purpose of this study is to investigate the physiological and behavioural responses of the child during the stimulation provided by the maternal carrying. In our previous study (Esposito et al. 2013) we found that during maternal *carrying* infants were calmer than during maternal *holding* (infant held by the mother while sitting). Each situation lasted 20s. Now we are interested in how both infants and mothers react during a longer stimulation of *carrying* and *holding*. Furthermore we are interested in mothers and infants quality of communication and connection between the parent and child. We want to deepen this by using the Emotional Availability Scale (EAs) (Biringhen, 1987) which is a research-based, scientifically driven way of understanding the quality of the interaction between the parent and the child. In this study also we aim to have

behaviourally and physiologically measures of the EAs.

Babies reduce the amount of voluntary movements, the episodes of crying and the heart rate during carrying. For what concern mother's the heart rate during free interaction there isn't any correlation between the heart rate of the baby and the mother's heart rate. What we found is that mothers do not get influenced about their own attachment to their parents for what concern their relationship with their baby. Furthermore the Emotional Availability (EA) is negatively correlated to personality domains of the mother (psychoticism and neuroticism).

Infants tend to adapt themselves and to cooperate with the mother during *carrying*. The calming response highlighted by the *carrying* has an adaptive value in mother-infant relationship and, as a consequence, in infant survival. Moreover, the present study provides implications for general parenting practices: how to interact optimally with the infant and the calming effect could be use in different situations.

PART I – THEORETICAL BACKGROUND

CHAPTER 1

INTRODUCTION

Mother-infant bond is a fundamental for the infant survival. In fact, this relationship motivates mothers and infants to undertake behaviours that ensure the infant's survival, and it is on the base of all mammalian affiliations (Bowlby, 1969).

Human ethology has given rise to the most influential theory on the development of mother - child, the Attachment Theory; this theory is the result of the joint work of John Bowlby (1969) and Mary Ainsworth (1972). This theory has established the different types of attachment that the child may establish with the mother, or caregiver, according to their relationship.

From Bowlby's point of view, the child is considered an active member of this relationship, collaborating and contributing to its development. The mother towards their babies has to be loving and available to satisfy all

needs, whether physiological - evolutionary socio - emotional to guarantee him/her a healthy development.

Numerous research approaches aim to investigate aspects of mother – child attachment. These studies range from socio-biology to anthropology, focusing on evolutionary aspects and in social psychology aspects.

It's in the last decades thanks to the advent of new investigative techniques, such as PET and fMRI, some of the underlying neurobiological foundations of The Attachment Theory have been discovered.

These data together with behavioural data and animals' models have allowed us to make important discoveries about the attachment and the brain areas that regulate it.

The attachment system that characterizes the child is composed of specific behaviours that are directed to a specific individual, normally the mother. The child performs other behaviours that are signal emotional distress during periods of separation from the caregiver. Children attach to caregivers instinctively to increase the probability of survival in stressful situations (Bowlby, 1969). Although the biological mother is the usual principal attachment figure, children prove to attach to any other consistent figure that is sensitive and responsive. The strength of the bond

of attachment that is between mother and child will determine later the probability of survival for children (Bowlby, 1969).

The attachment behaviour is a reciprocal system that depends specifically on an interaction.

Reciprocity in the dyad that is developing attachment is very important because not only does attachment affect the child's behaviour (for example, seeking the other when stressed), but it also affects the responses of the mother, who will respond producing caregiving behaviours (for example going to pick up the baby).

Mothers and infants are equipped with instinctive attachment behaviours that ensure maternal care and the wellbeing, protection and survival of infants. This behavioural system underlies the affiliative system that develops in adulthood and subsequently parental behaviour (Panksepp, 1994).

Harlow (1958) conducted experimental studies on newborn rhesus macaques, separated from their mother and placed in cages with surrogate mothers; these could be made of a soft cloth, or could be made of metal wires. In the experiment conducted by Harlow, the monkey was

placed in a cage with both surrogate mothers, but only one of the mothers a bottle with milk. With this experiment Harlow found that regardless of the location of the bottle, the monkey spent more time with the mother of soft cloth leaving her only to be feed from the metallic mother. This was also highlighted by the fact that during the nourishment provided to the monkey by the metallic mother, if the monkey is frightened, it immediately ran to the soft mother.

Moreover, in subsequent studies of monkeys raised by surrogate mothers, Harlow highlighted the inadequacy of these female monkeys to take care of their offspring. Harlow's experiments have demonstrated the importance of contact in the establishment of young monkey attachment and in their future development both as adult monkeys both as parents' monkeys.

All children seek physical contact with the mother, and all children want and need to feel comfort in being close to her. It is important for the psychological growth of children to be held, to be cuddled, to be rocked, to be stroked, by the caregiver (Ribble, 1944), and a lack of this close physical contact it is nothing more than a deprivation with possible serious consequences (Schaffer, 1964) as was demonstrated in Harlow's studies.

"Attachment theory is, in its essence, a spatial theory: when I'm around people I love I feel good when I am away from them I feel anxious, sad and alone" (Holmes, 1994).

The caregiver can establish physical contact with the infant in different ways, and the various sub-types of contact behaviours may affect infant development in unique ways, especially during the first months of life (Field, 2011).

It is because of this physical contact that arises gradually the relationship between the two members of the dyad. This relationship is created not only because of to these physical behaviours but also thanks to a genetic predisposition that favours the establishment of this link. In fact, the mechanisms comprising the mother-infant attachment relationship are the result of mammalian evolution and form the basis for all conspecific social bonds (Keverne, 1992; Nelson & Panksepp, 1998; Broad et al., 2006).

1.1 Emotional Availability of the mother and the infant

The Emotional availability is a concept used to refer to the quality of emotional exchanges between parent and infant.

It encompasses both emotional signalling and emotional understanding in each partner (Biringhen & Robinson, 1991). The attachment bond between mother and infant is a stable relationship that develops on the basis of interactive exchanges.

Bowlby's (1982) and Ainsworth, Blehar, Waters, and Wall's (1978) conceptualization of secure attachments as involving open emotional dialogue between partners, and lent convergent validity to the Emotional Availability Scales (EAS; Biringhen, Robinson, & Emde, 1993, 1998) as a measure of the overall quality of the observed emotional interactions between parents and their children.

Just like walking and crawling are developmental milestones that children reach at particular stages of life, the infant-parent attachment relationship is an “emotional milestone” that is reached by most infants at the end of the first year (Biringhen, 2004).

A scale developed by Zeinep Biringhen measures the Emotional Availability.

EA Scales is a method to evaluate the dyadic interactions between a caregiver and a child. They consist of four dimensions of emotional availability of the caregiver towards the child. The observer, previously trained in order to obtain a satisfactory reliability with one of the authors of the scale, must assign an overall score for each scale that goes from 1 to 7, the sum of the individual scores of the subscales of each dimension. Specific analysis of the individual scales, *Sensitivity* refers to the ability of the caregiver to be "emotionally" connected, in tune with the child; *Structuring* involves the ability of adults to structure the activity following the guidelines of the child and setting adequate limits; the *Non-intrusiveness* implies the ability of the adult not to interfere with the activities that the child is doing; the *not-hostility* did not have an attitude devaluing and emotionally negative (eg, impatient, bored, indifferent...) towards the child; *Responsiveness* refers to the child's ability to experience pleasure and involvement being in interaction with the caregiver; *Involvement* concerns the attempts of the child to engage and share activities with adults (Biringen, 2008).

1.2 Evolutionary function of Attachment

For Bowlby attachment behaviour that characterizes the mother – infant relationship can be understood only in an evolutionary context. This, because of the biological basis genetically transmitted to the baby (Venuti, 2007).

The attachment behaviours correspond to all those activities that aim to keep the proximity of the attachment figure: when the baby tends to the mother. These behaviours can be identified in the crying, in the recall, in the vocalization, the smile and research. The behaviours performed by the mother towards the child are defined behaviours of custody or parental care. (Holmes, 1994).

Attachment behaviour, of the animal species, has as its main purpose the protection of the offspring from predators. The approach of the pup to the mother reduces the percentage of risk of being attacked and captured. This data comes from several observations of species of birds and mammals, where an animal that wanders alone in the forest rather than in their herd, being attacked will have a greater probability. (Bowlby, 1969).

In addition, attachment behaviour is manifested most strongly in those animals that, because of age or certain physical characteristics, are more

vulnerable and fragile than other animals and predators than themselves.

The offspring of certain monkeys, since new-born, have the strength to support himself/herself and to cling to the mother. (Bowlby , 1969).

In humans, this physical feature is not present at birth, physical maturation in the infant must wait a longer development time and this makes the baby to be very vulnerable (Bowlby, 1969; Venuti, 2007).

In addition, the attachment behaviour in animals occurs mainly in alarm situations where they feel or suspect the presence of a predator. For what concern human beings, the protection from predators was a plausible scenario thousands of years ago. Currently, about how it has developed and is developing today's society, the protection of the child is not understood in terms of predators, but in terms of the necessary care so that such growth and healthy development so it gets to adulthood without difficulty.

The vulnerability, characteristic of the infant, makes even more important the role of the attachment, both in terms of emotional connection that in terms of physical behaviour, since the baby, is by far the most vulnerable “pup” in comparison to other species animals. (Bowlby , 1969).

Because of this immaturity the child needs a lot of care. During this period, the child's brain is very malleable towards learning, then through parental care, he/her will have the opportunity to learn an infinite number of realities: just think about the language (Venuti , 2007) .

This establishes a close relationship between maternal care and the ability to learn, this has been confirmed by numerous researchers (Greenspan, 1997b; Bornstein et al . 2002) .

PART I – THEORETICAL BACKGROUND

CHAPTER 2

THE ATTACHMENT BEHAVIOUR

The mother-infant bond is an essential relationship that stimulates mothers and infants to perform behaviours that ensure the infant's survival both physically and emotionally (Bowlby, 1969). The maternal attachment behaviours have been evolutionarily shaped and constitute the basis for all conspecific social bonds (Keverne, 1992; Nelson & Panksepp, 1998; Broad et al., 2006). Moreover, attachment behaviour is determined both by genetic predispositions and environmental influences (Adolphs, 2003).

The attachment system in the child is characterized by behaviours that are directed to a specific person, the caregiver normally the mother, and by behaviours that signal emotional distress during periods of separation from the mother. This behavioural system underlies the affiliative system that develops in adulthood and of parental behaviour (Panksepp, 1994).

The attachment behaviour depends on the interaction. In fact, it is a reciprocal system of behaviours between the baby and the mother. The term reciprocal is appropriate because not only does attachment affect the child's behaviour (for example, crying when stressed), but also affects the responses of the mother, who emits care-giving responses in the presence of signals from the infant. So, depending on how the child develops the attachment behaviours and depending on how the mother responds to those behaviours, it begins to outline attachment patterns divided into two categories: secure attachment and insecure attachment. The type of attachment that characterizes the internal working model of a child will affect his entire childhood and future adult life (Bowlby 1969, Anisworth 1972, Panksepp, 1994). The development of the type of the attachment bond depends on how the mother was receptive to the needs of the child by providing the necessary care. At birth the newborn is not able to "hold" close to itself the mother, but he has other ways that still effective as the lamentation, the vocalizations, the smile, the clinging. The way the infant will use will vary according to his/hers psycho – motor development. Not having a full maturity of the potential abilities of their

bodies the child cannot yet move in order to reach the mother or to call her (Bowlby, 1969; Ainsworth 1972). For this reason the first attachment behaviour of the child corresponds to the signalling behaviour, then these are added the approaches behaviours. Neither of these two types of behaviours are useful if the child has not yet acquired the orientated behaviour: the ability to discriminate the mother and follow its movements in order to monitor her movements. When over time the child acquires the ability to crawl and then to walk, he/she will tend to look for the mother. In response to this the mother, normally, will pick up the baby in her arms.

2.1 Attachment Signalling Behaviour: Crying

Crying is fundamentally universal (Eibl-ibesfeldt, 1997). Crying is the first way of communication that the baby has at birth. It manifests distress. It express the baby's need (Esposito & Venuti, 2010). The most vital functions of crying in early infancy appear to motivate caregiver proximity, prompt social interactions, and express needs (Wood & Gustafson, 2001), and these functions apply equally to typical and atypical development as

well as across cultures. In short, crying constitutes a universal basis for social development and a primary conduit for the expression of emotions (Rothganger, 2003). The baby in early life appears helpless and vulnerable, but even so he can cause an immediate effect on the people around him when he makes use of crying. In fact, when the baby cries evokes in the parent a physiological reaction that lead the action in order to relieve the stress and pain of the baby, thus creating a state of mutual attention between the two. The main function of crying is to activate a response behaviour of the mother (Gustafson, Wood and Green, 2000), resulting in proximity (Bowbly, 1969). For this reason, the crying was considered part of the behavioural system of the human species that regulates the relationship between mother and child ensuring the construction of a specific bond, which ensures the survival of the new-born eliciting the actions of others and leading initially to satisfaction of basic needs (Murray, 1979) and, subsequently, to the affective, cognitive and social. For these reasons, crying is considered an integral part of the kit of the human behaviour as it promotes the formation and subsequent adjustment of the mother - child relationship, which in turn will create a

deep bond between the two, which, if adequate, will ensure the survival of the infant by the satisfaction of his physical and emotional needs.

The baby's crying is produced by negative internal or external stimulations, and is produced by the co-ordination of different brain regions.

Crying is therefore a physiological response, highly organized and consists of four stages (exhale, rest, your inspiration, rest). The air passes through the larynx that contains the vocal cords and glottis.

The sound is obtained by means of phonation produced by the larynx during the exhalation phase. The fast opening and closing of the vocal cords due to air pressure creates a vibration that is perceived and seen as the peak of crying (La Gasse, 2005). On the basis of the different vibrations of the vocal cords and the alternation of respiratory phases there were identified three types of crying (Wolff, 1969; Golub, 1989; La Gasse, 2005), present in the same way in healthy infants of different cultures. The first is a basic crying, the pain crying and the anger crying. In light of this it is essential to understand the cry of the child so that the mother can respond in the best way. Many studies have been conducted regarding the crying about and understanding of it by parents and not parents. The pitch

of cries influences caregivers' perceptions: higher frequency cries are normally perceived as more aversive and distressing than lower frequency cries. These findings have emerged from experimental procedures in which acoustic parameters of the cry were modified, and participants asked to judge the stimuli. Cries with higher fundamental frequencies and shorter pauses are more likely to elicit perceptions of urgency and distress compared to cries with lower fundamental frequencies.

Bell and Ainsworth (1972) argued that a timely response from the mother to the crying of the baby during the first half of the first year of life reduces the frequency and duration of episodes of crying during the second half of the first year of life.

Moreover, it was found that those mothers who have been more receptive to their crying child, then having responded to their crying promptly have favoured the development of their babies: less use of crying, but rather children have developed other social communicative behaviours like gestures, facial expressions, smiles and vocalizations.

It is essential for an optimal development of the child that the parent is able to distinguish between the different cries that baby can perform because the correlation between the cry performed by the baby and the

ability of adults to perceive it promotes better levels of cognitive and linguistic development (La Gasse et al. 2005).

Crying reveals itself as the first communication behaviour of the child, with an important informative value of the physical and psychic aspects of the child than other behaviours.

From a biological and evolutionary point of view crying it is considered attachment behaviour. Specifically a signalling behaviour as it promotes closeness and contact with the mother. Unlike other signalling behaviours: babbling and smiles, crying occurs in times of stress and anxiety, this will cause on the mother the behaviour of protection, nourish and comfort the baby, usually picking up the baby in her arms. Excessive and prolonged crying, or particularly aversive-sounding crying, may exceed limits of tolerability and overly tax parent's abilities to withstand continuing high levels of emotional arousal (Hoffman, 1977).

Thanks to crying the child is able to communicate effectively with his/her mother and those around him, ensuring that these people going to activated in order to alleviate the stress. The relieve stress will cause the relaxation that will result will favour the establishment of a good mother-child relationship.

2.2 Attachment related to motor functions

As has been widely mentioned, in human beings, several types of behaviours mediate the attachment. The main forms can be grouped into two classes: signalling behaviours that produce the approach of the mother, and the approach behaviours that consist in the child going to approach the mother. (Bowlby, 1969).

The signalling behaviours are crying, smiling, babbling, calling and certain gestures that have as their purpose the obvious approach of mother to reach the child. Each of them, however, is expressed and manifested in specific circumstances. A message type, in fact, may have different triggers and each of these issues in the attachment figure figure different reactions. One of the signs that the child may make in order to attract the mother's attention is in lift the arm, seeing this gesture, normally, the mother promptly picky up the baby.

The approaching behaviour is represented by the get closer, with all the action at this gesture interconnected, and the following. (Bowlby , 1969)

At birth the baby has all it senses active and he/she possesses a motor repertoire, which consists of the posture, the position of the head and limbs and some reflexes.

Reflexes are innate behaviours, related to motor responses or involuntary muscle contractions implemented by the infant in order to relate in a more adequate way with the environment and the individuals around him. Mainly it is produced in response to sensory stimulation. These are completely automatic reactions generated by subcortical centres where the cortex has not inhibited this kind of action but this is useful for the creation and maintenance of the attachment bond as essential to the survival of the child. With the infant growth certain reflexes tend to disappear, other instead remains throughout life as necessary for survival. The loss of some the reflexes and the development of more and more voluntary movements is an indication of the maturation of the central nervous system of the new-born.

Reached the motor maturity that allows the child to move without any help, he/she will manifest the predisposition to approach and follow the mother. If the mother while the baby is trying to reaching her, moves or change direction suddenly, even the child will be able to shift and change direction almost immediate. When the child reaches a cognitive maturity he or she is also able to imagine where mother can be even not seeing

her, this allow them to locate her position even when it disappears from the field of vision.

In order to join the mother again, the child will make use of all his/her abilities to move: crawl, walking, running, jumping. If the child has physical problems he/she will use any other way he is able to use to reach the mother.

When the child is able to reach his/her mother according to the mood of the mother, will perform different patterns of behavioural responses.

As previously mentioned, the typical behaviour is to pick up the baby. The trigger for a custom regarding attachment behaviour from the child to the mother makes clear its preference to the mother itself, having then chosen her as the attachment figure beloved.

The importance of attachment behaviour is fundamental, both as an act of protection of the baby, and both as an aid that allows the formation of the attachment bond; which is also fundamental for the development of the infant. In these terms, as Bowlby argued, the creation of the mother - infant relationship is a reciprocal process where the child takes an active role in searching for her/his mother. The mother in response to this will adopt specific behaviours, parental care. In this way can be develop a

satisfactory attachment bond and a satisfactory development of the child emotionally and physically. Indeed, the development of attachment generates a circle or a sort of spiral, where the lack of one, for example the attachment behaviour, involve the variation of the other, that is, the attachment bond and vice versa (Figure 1).

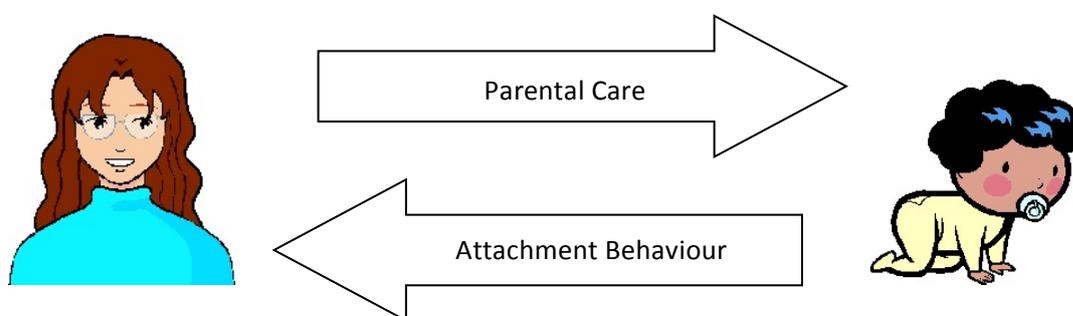


Figure 1

Representation of the development of the mother infant relationship

A receptive mother to the needs of her baby, for example when the baby cries, and in response to that cry the mother runs to provide for the children: picking him/her up and cuddle him/her, this establish a good relationship with the child. This is due to a bond, which is a virtuous circle between mother and baby.

Attachment related to motor functions corresponds, then, to all those physical and motor behaviours implemented by the child in order to

achieve and obtain the proximity of the mother, which follows in the child a sense of security and psychological well-being.

2.3 Transport Response

The child since birth implement behaviours that support parental care in they way to promote his/her survival, like some animal species. The mother takes care of the infant guaranteeing nourishment and protection from predators and from possible dangers. Just think about a puppy in relation to a predator, and for what concern a baby just think about to a chemical or atmospheric agent which the baby may come in contact.

These considerations are appropriate from an evolutionary point of view. Thinking in these terms then the child should be flexible and accommodating towards behaviours that the mother perform towards him/her; a child or a puppy that does not want to eat will not survive long, and a child or a puppy wriggles and shake as they do not want to be taken by the mother could face the death from a predator or another reasons.

Is for this reason that the reflexes play an important evolutionary role regarding the protection of the baby and in the development of the attachment bond with the figure that gives care.

In addition to reflexes we also discussed about the attachment behaviours that the child implements in order to reach the mother: so in order to survive. There is a specific behaviour of some mammalian species called *Transport Response*. When the mother has to provide to protect the safety of her baby, normally, she tends to pick him/her up. If the child struggles or convulse, the mother may not adequately fulfil the role of protector furthermore it could be a risk for the child, because it could be the mother itself the one who hurts the baby.

The behaviour of Transport Response (TR) was described by Brewster and Leon in 1980 and is derived from ethological studies carried out on animals, specifically rats. Some puppies and children after birth need of a high number of parental care. Parents normally tend to carry their young until they are able to do it yourself. For example, take the little ones to the sources of water and food or to the place where the cave is located. For what concern the human being we can call this behaviour the *Carrying Behaviour* because also human mothers carry their babies.

During the TR behaviour rat pups adopts a specific posture: collection of both forelimbs towards the body and by the drop of both hind limbs and tail (Figure 2).

When the pup is hanging in the air during transport it does not manifest any struggling behaviours against the mother intake by the moth instead while is carried it stays calm and firm.

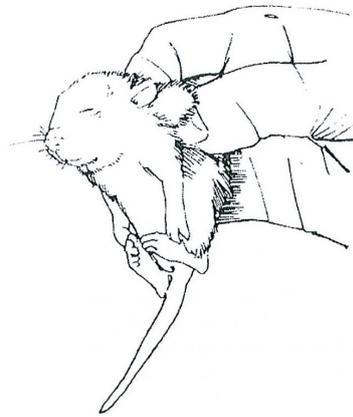


Figure 2: Rat that shows the TR Behaviour

In relation to various experiments of Brewster and Leon and other authors has emerged how when the pup is physically small despite not showing the behaviour of TR it is easily transportable, when in fact the pups begins to grow into adults, unless it shows the behaviour of TR, it will be very difficult for the mother to transport it.

From an evolutionary point of view the Transport Response proves to be crucial to the survival of the pup because if the pup does not exhibit it as

the mother is likely to stumble and even fall on the pup. Further studies have shown what systems of neurotransmitters are involved in the Transport Response, in fact, through the administration of antagonists and agonists to serotonergic systems (5 - HT) has shown how they can block or assist the submission of TR.

2.4 Maternal Carrying

Thanks to the studies on the Transport Response we might do a parallel with humans. In fact, as several mammals do, humans carry its babies for a long time since at birth they are not able to do it by themselves. The human's "pups" are also classified as the "little ones who are transported" (Sevon, 2007).

The babies then, being perpetually transported throughout the span of their physical immaturity, they may show behaviour to facilitate the transport due to the Transport Response when picked up by the mother.

Negayama et al. (2009), have shown that the picking up of the baby is essential for him/her as it allows the caregiver to transport him/her, to protect him/her and to love him/her. To the picking up of the baby participates not only the mother but participates also the baby clutching,

shifting or even dismissing those who seek to hold him/her. These authors have shown that the taking into arm is a complex interaction between mother and child regarding the positions of hands and legs of the baby and the mother. Thanks to the picking up of the baby performed by the mother, the mother – infant bond gets strengthened favouring a good development of the attachment between the two members of the dyad. In fact studies have shown that the picking up in arms performed by mothers who keep their babies in their arms in response to their needs, but not only, achieve to be more receptive to the child and by developing a secure attachment (Anisfeld et al. 1990).

In light of this evidence we can understand the importance from an evolutionary of the picking up and the carrying of the baby. In fact, since this parental behaviour promotes a good mother – baby attachment. The success of the establishment of that bond will enable mothers to fulfil her psycho – emotional and developmental responsibilities.

If we do a step back and think about the pup rat not helping the mother during transport it could not survive, then even a child who does not favour his/her mother on transport him/her so carrying hi/her is likely that this baby will not have the protection necessary for survival.

In these terms, the *animal Transport Response* and the *Maternal Carrying Behaviour* are ecologically and evolutionarily necessary to the preservation of the species not only physically but also emotionally. Indeed, in humans these behaviours have not only biological aspects but also have psycho – emotional aspects. In fact, although it is almost intrinsic characteristic of all the species safeguard the little ones, in humans such characteristic has a wider meaning. Where physical sustenance is not the only promoter of a growth and healthy development, indeed next to it, it must be an affective livelihood facilitating the creation of a bond that will endure for the whole life and, if well established, will guarantee the child a good physical and mental development.

PART II – RESEARCH

CHAPTER 3

Babies' responses during maternal carrying

In relation to what have been discussed and presented about the attachment behaviour above, we can say that these behaviours can be understood only thinking about an evolutionary perspective of the human development.

The research that will be described below is part of a research project at the RIKEN Brain Science Institute in Tokyo. The general study has been already approved by the ethical committee of the institute, and of the University of Trento provides stages of study on animals and humans. The observational and then the physiological part on human beings will be conducted in Italy. The study in Italy will be conducted at the Observation, Diagnoses and Education Laboratory (ODFLab) of the University of Trento.

3.1 Foreward

On my Master Degrees Thesis: “The attachment behaviour in the first six months of life: analysis of behavioural responses of the baby during maternal carrying”. In this previous study we found that during six different situations:

- Baby lying in a cot (COT): In this situation the child is lying in a cot without any kind of stimulation by the mother. The maximum duration of this situation is 2 minutes, after which we proceed to the next situation. However, the situation was ended prematurely by switching to the next situation if the child for a few seconds, showed episodes of crying.
- Baby lying in the cot with the mother (COTM): In this situation the child is lying in a cot and is stimulated by the touch of the mother. This stimulation occurs, however, without raising the child. The maximum duration, for this situation is of 3 minutes, after which it proceeds to the situation COT. However, the situation was ended prematurely by switching to the next situation if the child for a few seconds, showed episodes of crying.

- Baby in its mother's arms while the mother is sitting (SH): In this condition the baby is picked up by her mother and she just sit with the baby in her arms, so the baby is tactilely stimulated. This situation has a duration of 3 minutes.
- Baby in its mother's arms while the mother is standing (TH): in this situation the child is picked up by the mother while she is just standing with the baby in her arms. This situation has a duration of three minutes.
- Baby in the stroller (STROLLER): in this situation the mother takes the baby and leave him/her in the stroller. Then the mother pushes the stroller with a harmonic movement. So here there is not any tactile stimulation but just the vestibular stimulation. This situation has duration of 3 minutes.
- Child in his mother's arms while walking this (WH): In this situation the baby is pick up by the mother and then the mother starts walking. This situation has duration of three minutes.

Our dependent variables where “struggling”, “crying” and “sleep” so we coded 1 the presence of struggling, crying and sleep What we found was that the baby struggled the most during the COT condition on the

contrary, the situation most calm situation was the one where the mother was walking with the baby in her arms. For what concern the other situations, the most significant was the one where the mother had her child in her arms while she was seating. The other situations are the control situations. For this reason, in subsequent experiments it was decided to use only the COT situation, the Sitting while holding condition (SH), and the Walking while holding condition (WH).

3.2 Aim and Research Hypothesis

This research has the aim to evaluate, using the observational approach and using physiological measures, how the child reacts, to the mother's picking up.

This study is based on what has been previously described: the calming responses during maternal carrying performed by the baby discovered by Esposito et al. can be understood as a derivative of a phylogenetic behaviour that ensures the survival of the baby. Currently, in literature, this is the only study that deals with issue. What this study aims to do it is

to investigate the responses of the child in relation to the picking up of pick her mother the mother in longer situations.

The hypothesis of the study starts from the belief that the physiological and behavioural responses of the child should be modulated by stimulation pattern that the mother perform toward the baby. Generally, when the mother stimulates her child, the stimulation is tactile, vestibular, or it is the result from the combination of the two stimuli set out above. What is expected is that the mixed stimulation, so the maternal touch with the maternal carrying produces better behavioural responses. In summary, the initial hypothesis predicts that, the maternal carrying produces better behavioural and physiological responses than any other kind of stimulations. The better responses consist in the decrease of voluntary movements, in the decreased of crying episodes and decreasing of the heart rate.

3.3 Sample

Mother and infants up to 5 months of age the experiment. Mothers was outlined clearly the purpose and the experimental procedure and were

given the opportunity to suspend the experiment at any time without giving any reasons therefore.

Overall attended 15 mothers with their children, aged between 25 and 40 years. The participants were all married and living with her husband and baby. The family of the participants was basically composed of three the age of the children was between 5 months and 5 months and 25 days of age.

3.4 Method

3.4.1 Procedure

Before starting it was explained to all the mothers the whole procedure. After that the equipment was shown to the mother: the EKG, electrodes, towels, camera. After that the preparation procedure started cleaning the baby's chest with the towel then the five electrodes were positioned: one at the last rib bone on the left part of the chest, then two at the middle of rib bones on the left part of the trunk then the last two electrodes were positioned at the end of the collar bone in the right side of the body. After that

the electrodes were connected to the holter CardioMem 4000 Getemed.



Figure 3: Picture of the CardioMem 4000 Getemed

After that, the video camera was turned on and the holter monitor was pressed and then the holter recording started.



Figure 4: Picture of the Video Camera used to record the experiment

To each child was assigned a progressive code (See Appendix 1) and then was fill an informational form. To fill the informational form the experimenter asked the mothers: age of the baby, age of the mother, weight, height and last meal and last nap of the baby.

It was also given a form to the acquisition of consensus (see Appendix 2) together with the informative form of the research.

Video recordings were taken at mothers' home or at the Laboratory of Observation, Diagnoses and Education (ODFLab). Videos duration was of varying duration in predefined situations. The recording time was variable because it depended on the behavioural patterns performed by the baby. Video recording had a duration between 20 or 35 minutes.

The experimental situations were three:

- Baby lying in cot (CRIB): In this situation the child is lying in a cot without any kind of stimulation by the mother. The situation lasted for 5 minutes, after which we proceed to the next situation.
- Holding Condition (SH): In this situation the baby is pick up by the mother and then the mother sat down for 5 minutes.
- Carrying Condition (WH): In this situation the baby is pick up by the mother and then the mother starts walking. This situation has duration of 10 minutes.

In the transition from one situation to another there were few seconds where the baby was not entirely in physical contact on the mother but not completely in the cot. In order to ensure the sequentially between the situations, those seconds were considered part of the situation before or the situation after, according to the adhesion of the body of the baby in the mother's body.

For example when the mother began to move the baby from her body, the situation was considered the next one; when the child was in the cot, it was considered the beginning of the next situation the moment when the mother came into contact with the baby.

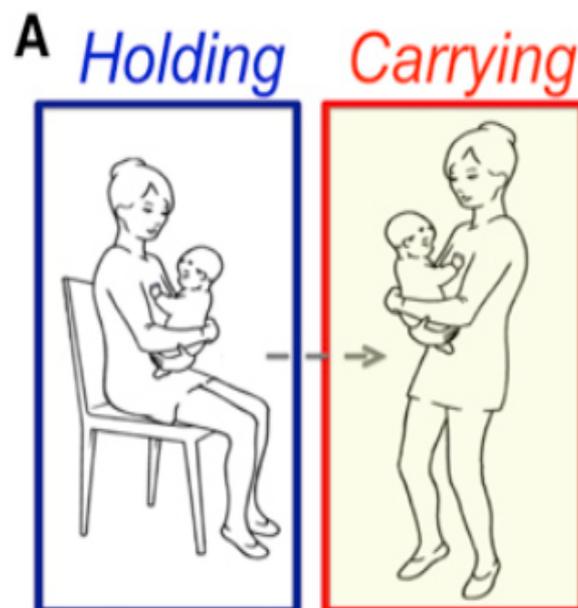


Figure 4: Representation of the task performed by the mothers

3.4.2 Coding:

In the coding phase was built an Excel file (See Appendix 3) inside of which were attributed to the corresponding values 1 and 0, respectively, depending on the presence or absence of a particular variable in that determined second. Each variable was coded according to the situation in which it took place.

Our dependent variables are: heart rate or Inter Beat Interval (IBI) which is the amount of time between a heart beat and another, the movement which was coded on a 0 to 10 scale were 0 was the absence of movement and 10 is incessant movement, the crying was coded in in a dichotomous way by using 0 for the absence of crying and 1 for the presence of crying, the variable sleep was coded the same as the variable crying.

3.5 Results and Discussion

Our results confirm our hypothesis, so the fact that there is decrease of the voluntary movements, a decrease of the crying episodes and a slowdown of the heart rate.

For the statistical analysis was used the Chi Square Test. This test is a statistical method appropriate in of nominal variables when the sample consists of counts of elements divided into specific categories, for example, 1 and 0. The coefficient of significance was of $p < 0.005$.

For what concern the heart rate analyses it was made a t student test were the coefficient of significance was of $p < 0.001$.

What we found for what concern the variable crying was a decrease of the amount of the episodes of crying over time in the maternal carrying condition.

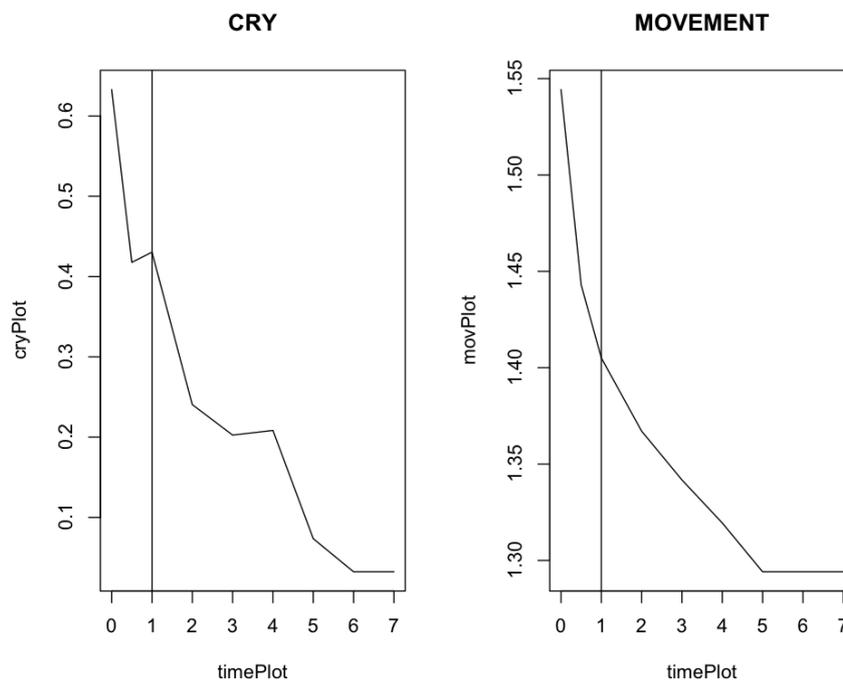


Figure 5: Graph that represents the amounts of episodes of crying and the voluntary movements during the maternal carrying condition

Specifically, in the x-axis, we found the time of the maternal carrying, while the y-axis, the ordinates axis, there is the amount of crying episodes in relation with the time. Specially, the graph shows that there is a trend of decrease of the episodes of crying as long as the mother keeps performing the maternal carrying. We can also see that after 5 minutes the performance is almost constant. This also happens to the variable movement; in fact the graph shows as for the crying that in the maternal carrying condition there is a decrease of the voluntary movements of the baby. We can see in both graphs how after just one minute of maternal carrying there is an important decrease of both variables: crying and movement. Furthermore after 5 minutes of maternal carrying there a stable performance of the baby on being behaviourally relaxed. In relation to this for what concern our variable heart rate and so Inter Beat Interval (IBI) the graph bellows show how there is also an important decrease of the heart rate and so an amount of the interval between each beat.

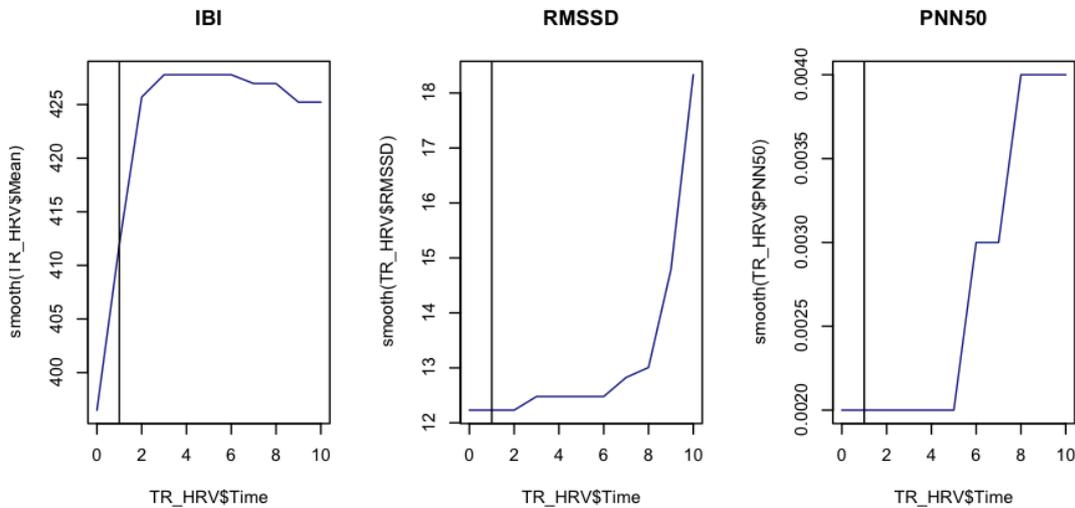


Figure 6: Graph that represents the mean of the movements during the maternal carrying

Furthermore we considered other indexes of the hear rate to go in deep with our considerations.

We focused our attention not only to the IBI but also to the RMSSD and to the PNN50, which are Indexes of activation of the Parasympathetic System. The Parasympathetic System is the involuntary nervous system that serves to slow the heart rate, increase intestinal and glandular activity, and relax the sphincter muscles. The parasympathetic nervous system, together with the sympathetic nervous system, constitutes the autonomic nervous system.

Heart rate variability analyses revealed that the index of parasympathetic activity rMSSD (square root of the mean of the sum of squares of

differences between adjacent Inter Beat intervals over the length of the analysis) and the PNN50 is the proportion of differences between adjacent Inter Beat Intervals over the 50ms, divided by total number of intervals was significantly higher during carrying than during holding $p < .001$.

These data suggest that infants were more relaxed during carrying than during holding, not only behaviourally but also physiologically.

The identified effects of carrying on parasympathetic activation and cry reduction are significant and robust. The maternal carrying can be approach to soothe crying caused by irritations or frightening stimuli. A scientific understanding of this physiological infant response could prevent parents from overreacting to infant crying.

PART II – RESEARCH

CHAPTER 4:

What happens to the babies and mothers after the maternal carrying stimulation?

In relation to the study described above, questions have been raised about what happened later after stimulation of maternal carrying. Specifically, the calm achieved by the child both physiological and behavioural point of view is extended in time. That is, the calming effect obtained in previous studies, including the one in the same processed remains although in a decreasing As we deviate temporarily from the situation of maternal carrying?

In order to answer this question, it was decided to carry out a further study. Even this study as above was carried out with the collaboration of Observation, Diagnoses and Education Laboratory (ODFLab) of the University of Trento.

4.1 Aim and Research Hypothesis

This research has the aim to evaluate, using the observational approach and using physiological measures, the child responses to the maternal carrying. Furthermore we wanted to deepen the mechanism by understanding if it was present after the maternal carrying.

So, this study is based on what has been previously described. If there is a state of calm following the stimulation derived from maternal carrying would be an important aspect of information for practicing parenting.

The hypothesis is that after the maternal carrying condition probably there is a kind of residual calming effect resulting from maternal carrying.

4.2 Method

4.2.1 Procedure

To the mothers was explained the whole experimental procedure. So, it was explained that mothers should walk, should sit and should leave the baby on the crib. Mothers were given a predetermined sequence provided by the investigator. After that the equipment was shown to the mother: the EKG, electrodes, towels, camera.

After that the preparation procedure started cleaning the baby's chest.

After the cleansing moment with the towel then five electrodes were taken and then positioned on the body. One electrode was positioned at the last rib bone on the left part of the chest, then two electrodes were positioned at the middle of rib bones on the left part of the chest then the last two electrodes were positioned at the end of the collar bone in the right side of the body. After that the electrodes were connected to the holter CardioMem 4000 Getemed.



Figure 7 : Picture of the CardioMem 4000 Getemed

After that, the video camera was turned on and the holter monitor was pressed and then the holter recording started.



Figure 8: Picture of the Video Camera used to record the experiment

To each child was assigned a progressive code and then was fill an informational form. To fill the informational form the experimenter asked the mothers: age of the baby, age of the mother, weight, height and last meal and last nap of the baby. It was also given a form to the acquisition of consensus (see Appendix 2) together with the informative form of the research.

Video recordings were taken at mothers' home or at the Laboratory of Observation, Diagnoses and Education (ODFLab). Videos duration was of varying duration in predefined situations. The recording time was variable because it depended on the behavioural patterns performed by the baby. Video recording had duration between 35 or 60 minutes.

The experimental situations were three:

- Baby lying in cot (CRIB): In this situation the child is lying in a cot without any kind of stimulation by the mother. The situation lasted for 5 minutes, after which we proceed to the next situation.
- Holding Condition (SH): In this condition the mother picked up the baby then she sat down with the baby in her arms. This situation has duration of 5 minutes.
- Carrying Condition (WH): In this situation the baby is pick up by the mother and then the mother starts walking. This situation has duration of 5 minutes.

In the transition from one situation to another there were few seconds were the baby was not entirely in physical contact on the mother but not completely in the cot. In order to ensure the sequentially between the situations, those seconds were considered part of the situation before or the situation after, according to the adhesion of the body of the baby in the mother's body. For example when the mother began to move the baby from her body, the situation was considered the next one; when the child was in the cot, it was considered the beginning of the next situation

the moment when the mother came into contact with the baby.

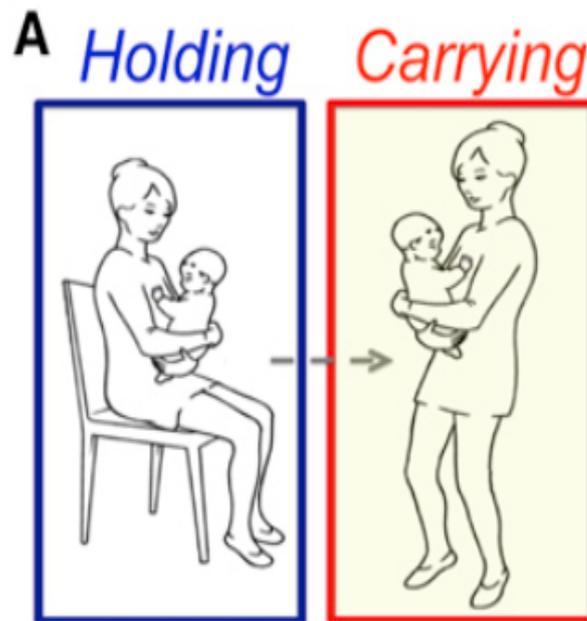


Figure 9: Representation of the task performed by the mothers

The experimental conditions were divided as follows: CRIB (5m), Holding (5m), Carrying (10m), Holding (5m), CRIB (5m), Holding (5m), Carrying (10m), Holding (5m), CRIB (10m).

4.2.2 Coding:

In the coding phase was built an Excel file (See Appendix 3) inside of which were attributed to the corresponding values 1 and 0, respectively, depending on the presence or absence of a particular variable in that determined second. Each variable was coded

according to the situation in which it took place. Our dependent variables are: heart rate or Inter Beat Interval (IBI) which is the amount of time between a heart beat and another, the movement which was coded on a 0 to 10 scale were 0 was the absence of movement and 10 is incessant movement, the crying was coded in a dichotomous way by using 0 for the absence of crying and 1 for the presence of crying, the variable sleep was coded the same as the variable crying.

4.3 Sample

Mother and infants up to 5 months of age the experiment. To mothers was outlined clearly the purpose and the experimental procedure and were given the opportunity to suspend the experiment at any time without giving any reasons therefore. Overall attended 30 mothers with their children, aged between 25 and 35 years. The participants were all married and living with her husband and baby. Family's of participants was composed of three people. Age of the children was between 5 months and 5 months and 25 days of age.

4.4 Results and Discussion

There is a decrease of the voluntary movement, crying episodes and a slowdown of the heart rate this confirms the data of the previous research.

HRVindex	1°min POST	5°min POST	t.test
Mean	M=426 SD=39.1	M=438 SD=48.5	t(53)= -2.04 p <.05
SDSD	M=19 SD=17.8	M=22.7 SD=29	ns
NN50	M=0.6 SD=1.5	M=1.5 SD=3.3	ns
RMSSD	M=19 SD=17.8	M=22.7 SD=29	ns

Table 1: Mean&SD (1°min POST vs 5°min POST)

Table 1 shows the significance of the decrease of the Inter beat interval (IBI) during the first and fifth minute of the carrying condition.

HRVindex	Time
Mean	F (1,415)=15.9 p <.001
SDSD	ns
NN50	ns
RMSSD	ns

Table 2: Generalized Linear Model of the carrying over the time

Table 2 shows the significance of the decrease of the Inter beat interval (IBI) all over the time. There is no an evidence that this response it is also evident in subsequent conditions.

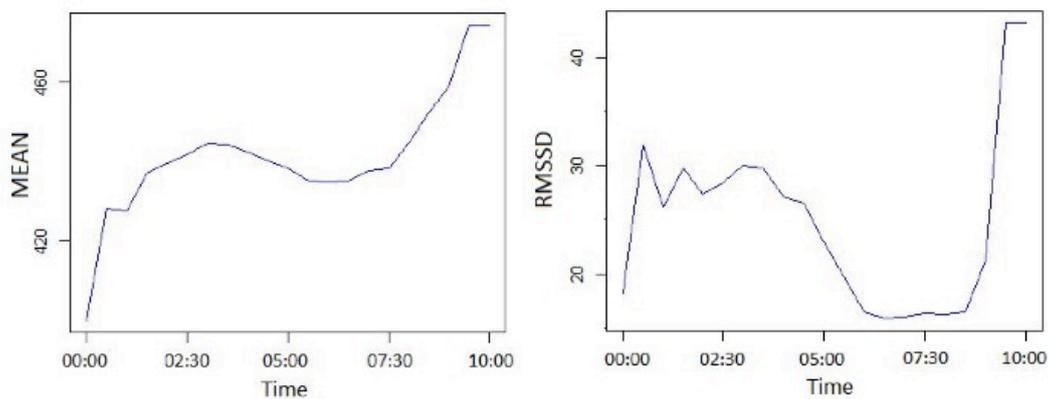


Figure 10: Graph that represents the Heart Rate over Time during the carrying condition.

In the x-axis there is the time and in the y-axis there is the Inter Beat Interval (IBI) in relation with the time. The graph shows that there is the decrease of the IBI as long as the mother keeps performing the maternal carrying. We focused our attention not only to the IBI but also to the RMSSD that is an index of the Parasympathetic activation. The parasympathetic system is the involuntary nervous system that serves to slow the heart rate, increase intestinal and glandular activity, and relax the sphincter muscles. The parasympathetic nervous system, together

with the sympathetic nervous system, constitutes the autonomic nervous system.

	Holding		Crib		
	Mean	SD	Mean	SD	t.test
IBI (sec)	0.41	0.06	0.43	0.1	ns

Table 3: Mean&SD of the IBI in the Holding and Crib condition

Table 3 demonstrate that there is no significance on the decrease of the Inter beat interval (IBI) during the conditions of holding and crib. In the graph below there is the representation of this.

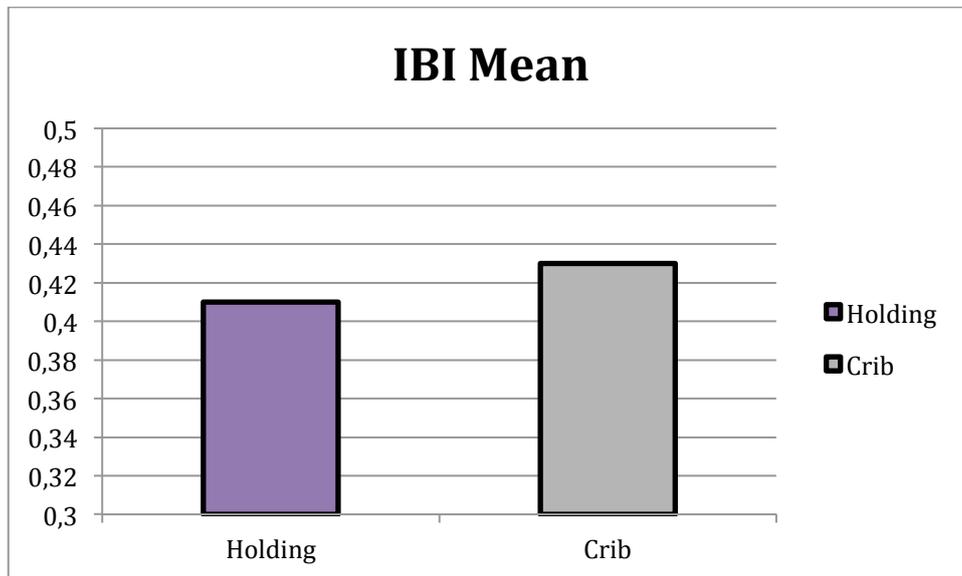


Figure 11: Graph representing the difference between the mean of the Inter Beat Interval (IBI) during holding and crib.

So as we can see even though there is not a statistical relevance in the IBI mean on the holding condition and in the crib condition, however, we can notice a different between the conditions.

Then, we focus on what happened behaviourally on the variables cry and sleep.

	PRE		POST		
	Mean	SD	Mean	SD	t.test
Cry	0.24	0.43	0.04	0.2	t (37)=3.3 p <.01
Sleep	0.03	0.2	0.08	0.3	ns

Table 4: Mean&SD of the behavioural responses

Table 4 shows the mean and standard deviation values of the variables cry and sleep before (pre) and during carrying (post). There is a significant reduction of crying between the pre carrying condition and during the carrying condition (post). Specifically, we found that children tend to cry more in the conditions previous to carrying than in the carrying condition itself. This result is not found regarding the variable sleep in fact there is not a statistical relevance. The graph below shows the statistical relevance between the pre and post. Even though there is not a statistical relevance

on the variable sleep we can see how the sleeping state performed by the baby increase during the carrying condition.

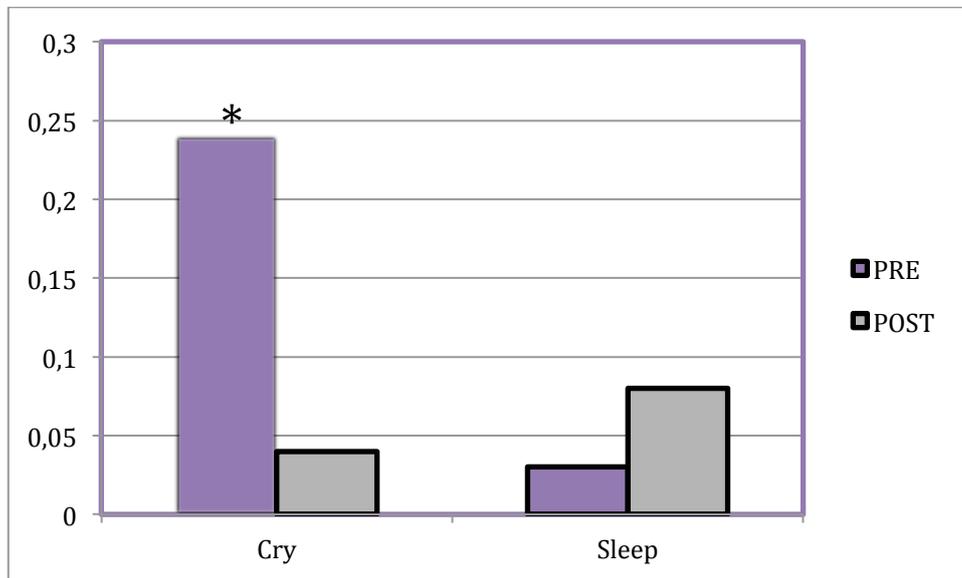


Figure 12: Graph representing the difference between the mean of the Cry and Sleep before and after the carrying situation

So our main hypothesis was not completely confirmed. The calming response of the baby during the maternal carrying manifests not in subsequent situations but there is the decrease of voluntary movements and crying after the conditions of maternal carrying. For what concern the baby’s voluntary movement there is a statistical significance about the fact that they decrease (Table 6).

	PRE		POST		t.test
	Mean	SD	Mean	SD	
Mov	0,45	0,19	0,37	0,18	t (27)=0.49 p <.05

Table 5: Mean&SD of the voluntary movements

in the the carrying condition

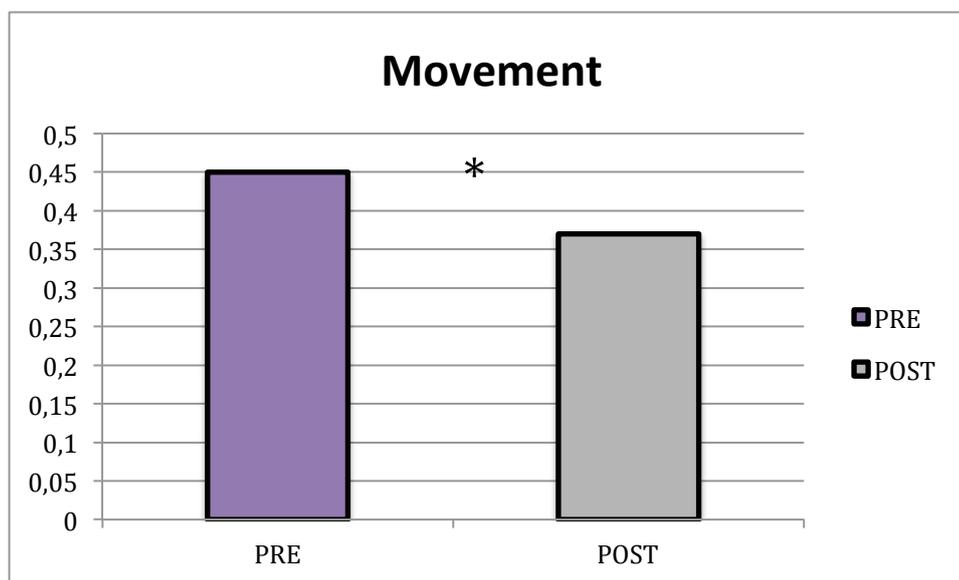


Figure 13: Graph representing the difference between the first carrying and the second carrying.

As we can see from the graph there is a statistical significance that demonstrate that there are less voluntary movements in the second carrying in relation to the first.

PART II – RESEARCH**CHAPTER 5:*****Discussion about the maternal carrying***

Infants, under 5 months of age carried by a walking mother immediately stopped voluntary movement and crying and exhibited a rapid heart rate decrease, compared with holding by a sitting mother.

In a variety of mammalian species such as cats, dogs, rats, it has been acknowledged that maternal oral transport induces a passive and compact posture: the adduction of the limbs and tail towards the inside while carried. Brewster and Leon studied this postural response to the maternal carrying experimentally in the '80s. They called this position that the mouse pup assumed as "Transport Response".

Based on the results found in the studies of Brewster and Leon, there are several studies on the behaviour of Transport response in animals. However, so far no one had ever thought of making a parallel between the

response of transport response observed in animals and the calming response performed by the infant when the mother carried him. This study, for the first time, correlates the phylogenetic traits of the response to mother picking up in animals, specifically in mammals, and the innate response to take the baby into the mother's arms. This study is the first to establish the striking similarities of the carrying induced calm state between human infants and mouse pups as an orchestration of reduced mobility, distress vocalizations, and heart rate. This finding is consistent with previous literature reporting that maternal touch and rhythmic rocking (vestibular-proprioceptive stimulation) is calming to human infants. Maternal walking may be the most ethologically relevant stimulation and provides infants with calming sensory inputs in a synergic manner, which may be more effective in calming infants than other kinds of rhythmic motion such as mechanical rocking.

If we think at the calming response performed by the baby during maternal carrying it is of particular importance in the context of evolution. In dangerous situations where mothers just need to escape to survive the mother to protect the child picks him/her up and carries him/her to escape.

The escape of the dyad is facilitated if the child performs the calming response that supports the mother in transport. So the conservation of this calming response in mammalian species supports the adaptive value of this behaviour in mother-infant relationship and, as a consequence, infant survival.

Furthermore, the calming response of the baby has also a beneficial effect in the relationship with the mother. If the mother see and perceives a relaxation of the child in response to the walking she will be reassured about her role and will implement a more proactive attitude towards the child. To give a concrete example just think of a mother walking with her son, if he squirms and shake the mother will undoubtedly stressed and this will impact negatively on their relationship.

Together with current findings and these results, we propose that carrying-induced calming represents a canonical set of behavioural and physiological responses.

The present study postulates implications for general parenting practices. The identified effects of carrying were significant and robust, so that a carrying period could be an effective approach to soothe baby's crying. However, because the calming effect was limited to the period of actual

maternal walking, the infant could resume crying if the cause that produced the crying stills existing.

There is the common belief that hold the baby for a long time while walking or while sitting has a negative effect on education, bringing it to show repetitive behaviours likely to be comforted by his mother even when it is not necessary.

Through this study we have demonstrated the importance of the evolutionary significance of the calming response, which triggers a physiological response in the child useful to enhance a stronger relationship with the mother and not as popular belief as a tool with which the baby has an active control on the maternal behaviour.

A scientific understanding of this physiological infant response could prevent parents from overreacting to infant crying. Crying is the first and the only one way of communication with which the child can interact with its parents. Through crying episodes baby express its basic needs such as hunger, cold and pain. This study may help parents understand children's needs and provide them appropriate response to their needs. The awareness of the importance of the maternal carrying stimulation as an evolutionary behaviour and an evolutionary response can help parents to

be more relaxed in picking up their baby. This popular misconception has a sad ending because often the child that through crying or other signalling behaviours search the satisfaction of the hunger or simply search the contact with the mother will not be satisfied.

Furthermore, such understanding would be beneficial to parents by reducing frustration, because unsoothable crying is a major risk factor for child abuse.

Shaking Baby Syndrome (SBS) or Abusive Head Trauma (AHT) is one of the major abuses that occur in infants. The SBS or AHT can be caused shaking insistently a child, this is the leading cause of death in child abuse cases. Specifically, Abusive Head Trauma is the result from hurts caused by someone (often the caregiver) vigorously shaking or striking the child's head against a surface. In many cases, the caregiver cannot get the baby to stop crying and, out of frustration or anger, will shake the baby. Unfortunately, the shaking may have the desired effect: the baby stop crying as the brain is damaged. When someone vehemently shakes a baby, the child's head rotates uncontrollably: this because infants' neck muscles aren't well developed. So, these muscles provide little support for their heads. This violent movement pitches the infant's brain back and

forth within the skull, sometimes rupturing blood vessels and nerves throughout the brain and tearing the brain tissue. The brain may strike the inside of the skull, causing bruising and bleeding to the brain. In the light of what SBS is, a method to alleviate the stress of the parents might be to walk with the baby in her arms.

Additionally, our simple carrying assay of human infants might be utilized in evaluation of the autonomic functions and sensory integrations of neurological dis-orders in early infancy, such as autism spectrum disorders (ASDs): infants with ASDs are reported to have difficulties in cooperative adjustment of their body to parental holding.

PART II – RESEARCH

CHAPTER 6

What happens to mothers and babies during free interaction?

Mother infant relationship is fundamental for baby's development. Emotional availability (EA) is a concept used to refer to the quality of emotional exchanges between parent and infant, encompasses both emotional signaling and emotional understanding in each partner (Biringhen & Robinson, 1991). The attachment bond between mother and infant is a stable relationship that develops on the basis of interactive exchanges.

Using this construct, some researches show that both parent and child components of EA relate to key aspects of the parent-child relationship, but there is not a study that investigated the Emotional Availability along with physiological responses.

6.1 Aim and Research Hypothesis

We want to aim to investigate, both behaviourally and physiologically, mothers and infant emotional connection in their relationship by using the Emotional Availability Scale (Biringhen, 1987). Furthermore we aim to investigate, by using self report questionnaires mother's attachment to her own mother and mother's personality. We want to investigate this because we believe that the quality of mother-child interaction can be affected by the mother's attachment to her own parents and by personality structure.

The hypothesis is that there is a better mother infant interaction evaluated by the Emotional Availability Scales (EA's) in relation to a better pattern of attachment of the mother to her own parents and in relation low psychoticism and neuroticism traits of personality. Furthermore we hypothesize that there is a synchrony between the mothers' heart rate and the babies' heart rate during the whole interaction.

6.2 **Method**

6.2.1 Procedure

To the mothers was explained the whole experimental procedure. So, it was explained that mothers should interact freely for 15 minutes. Then mother were asked to fill some questionnaires the: Parental Bonding Index (PBI) of Parker G., Tumbling, H. & Brown, LB (1979), the Italian version edited by P. Migone, that is a questionnaire consisting of 50 items, which evaluates the perception of the bond of attachment to parents during childhood. It explores two dimensions: "Care" (affective elements) and "overprotection" (level of control exercised by the parent) from which they are constructed clusters within which to classify the type of attachment. For the allocation of scores it was used a 4-point Likert scale, which classifies 4 types of attachment: "affectionate constraint" (has high care and high overprotection), "affectionless control" (consisting of a low-care and high overprotection) "optimal parenting" (high care and low overprotection) and "neglectful parenting" (low care and low overprotection).

The other questionnaire is the Eysenck Personality Questionnaire-Revised (EPQ-R) developed by H.J. Eysenck and Sybil B.J. Eysenck (1991) that measures the three major dimensions of personality that account for most of the variance in personality. The EPQ-R is an excellent choice when you're administering a test battery and need a brief instrument representing the personality domain. It has 48 questions that can be answer by marking “yes” or “no”.

The three dimensions are: Extraversion/Introversion (Extraversion: is characterized by being outgoing, talkative, high on positive affect (feeling good), and in need of external stimulation); Neuroticism/Stability (Neuroticism: is characterized by high levels of negative affect such as depression and anxiety. Neurotic people are easily nervous or upset); Psychoticism/Socialization (Psychoticism: is associated not only with the liability to have a psychotic episode (or break with reality), but also with aggression. Psychotic behaviour is rooted in the characteristics of tough-mindedness, non-conformity, inconsideration, recklessness, hostility, anger and impulsiveness).

For what concern the EA Scales they describe and assess six dimensions, with four on the adult side—sensitivity, structuring,

nonintrusiveness, and nonhostility, and two on the child side – responsiveness to adult and involvement of adult. An asset of the EA Scales is that two dimensions measure child qualities—child responsiveness to the caregiver and the child’s involvement with the caregiver, thus capturing not only the adult’s side of the relationship, but also the child’s side of the relationship. The key to the success of this instrument is that, although culture impacts how parents and children interact with one another, the emphasis on the presence of an emotional *connection* makes this tool an important one, even in varying cultural contexts. In fact, the EA Scales have been utilized in over 20 countries, including European and Asian countries. (e.g., Aviezer, Sagi, Joels, & Ziv, 1999; Biringen, 2000; Biringen, 2004; Biringen et al., 2005; Bornstein, Gini, Leach, Haynes, Painter, & Suwalsky, in press; Bornstein, Gini, Suwalsky, Leach, & Haynes, in press; Easterbrooks & Biringen, 2000; Easterbrooks & Biringen, 2005).

The **Sensitivity Scale (Adult)** refers to various qualities of the adult that exploit the ability to be warm and emotionally connected with the baby: knowing how to read and respond appropriately to signals

of the child, knowing how to harmoniously resolve conflicts, appropriate and genuine affection. Adult can not look good without the child .

The **Structuring Scales (Adult)** refers to the ability of the adult to provide a frame of reference and a scaffold for the interaction and also the ability to put limits and provide rules. And the grade to which the adult structure appropriately the child's play by taking care of the child and providing a guide to putting limits for proper behaviour of the child. These efforts have to be successful.

The **NonIntrusiveness (Adult)** refers to the ability of adults to follow the guidance of the child. The adult leaves the right space exploration son not interfering abruptly but respecting the child.

The **NonHostility (Adult)** measures the degree of hostility in a continuum between no observations of hostility (7) forms of hostility blanket (4) to open forms of hostility (1).

The **Involvement (Infant)** Is the degree to which the child involves and looks for the adult. We focus on the initiative and involvement of the baby/infant.

The **Responsiveness (Infant)** It reflects two aspects of the child's behaviour: (1) Babies satisfaction and positive affect: the child shows to experience pleasure in the interaction; (2) Responsiveness: desire to engage the adult following her suggestions and its offerings of mutual exchange. We focus on affect and how the child reacts.

In the procedure was measured the heart rate activity both of mothers and infants was measured by using for the infant an holter CardioMem 4000 Getemed and for the mother a heart rate monitor belt (Polar H7). Then the equipment was shown to the mother: the EKG, electrodes, towels, camera and heart rate monitor. After that the preparation procedure started cleaning the baby's chest. After the cleansing moment with the towel then five electrodes were taken and then positioned on the body. One electrode was positioned at the last rib bone on the left part of the chest, then two electrodes were positioned at the middle of rib bones on the left part of the chest then the last two electrodes were positioned at the end of the collar bone in the right side of the body. After that the electrodes were connected to the holter

Then the heart rate monitor belt (Figure 14) was shown to the mother and it was explained to her that she should wear it in order to have it close and tight but not as much as to feel pain.

After that the video camera Sony HD (Figure 15) was shown to the mother.

The holter, was the first to be turned on then the video camera. With the videocamera was recorded the switching of the holter. Subsequently was turned on the application that regulated the setup of the heart rate monitor. Also here with the videocamera was recorded the switching of the heart rate monitor.

To each child was assigned a progressive code and then was fill an informational form. It was also given a form to the acquisition of consensus (see Appendix 2) together with the informative form of the research. Video recordings were taken at mothers' home and last 15 minutes each.

6.2.2 Coding:

In the coding phase was built an Excel file (See Appendix 4) inside of inside which were included the scores of the Parental Bonding

Inventory (PBI) and the Eysenck Personality Questionnaire – Revised (EPQ-R) and the Emotional Availability Scales (EAs) score.

The coding of the test has taken place through the transformation of raw scores obtained from the sum of Likert scales of each test.

The transformation was made possible by special tables of conversions from raw score they provided scores T.

The encoding of the Emotional Availability Scales (EAs) is done by assigning a score that can range from 1 to 7 or 1 to 3 depending on the specific question of the scale.

The EA scales are 6: 4 scales for the adults and 2 for the children.

Obtained the whole score of each scale it will be transformed into a score that will go from 1 to 7. Where 1 means very low and 7 very high.

6.3 Sample

Mother and infants up to 5 months of age the experiment. To mothers was outlined clearly the purpose and the experimental procedure and were given the opportunity to suspend the experiment at any time without giving any reasons therefore. Overall attended 17 mothers with

their children, aged between 25 and 35 years. The participants were all married and living with her husband and baby. Age of the children was between 5 months and 5 months and 25 days of age.

6.4 Results

There is not a correlation between mother's heart rate and baby's heart rate. And there is not a correlation between the EAS scales and the mother's heart rate and the baby's heart rate.

Even though there is not a correlation of the heart rates with Emotional Availability Scales, there is a positive correlation between the four adults scales EAs: sensitivity, structuring, nonintrusiveness, nonhostility; and the two babies scales: involvement and responsiveness.

EAS(mum)	EAS(baby)	
	Responsiveness	Involvement
Sensitivity	t (11)=5.05 p <.001, r =0.8	t (11)=3.0 p <.05, r =0.7
Structure	t (11)=3.6 p <.01, r =0.7	t (11)=2.3 p <.05, r =0.6
Non-Intrusive	t (11)=3.4 p <.01, r =0.7	t (11)=4.2 p <.01, r =0.8
Non-Hostile	t (11)=2.7 p <.05, r =0.6	t (11)=3.6 p <.01, r =0.7

Table 6: Correlation between EAS (mum) and EAS (baby).

In the graph below there is the representation of the trend of the correlations of the scales. In the x axis there is the score of the adult scales and in the y -axis there is the score of the babies scales. The correlation is positive. So for our entire sample at the increase of one scale there is the increase of the other one.

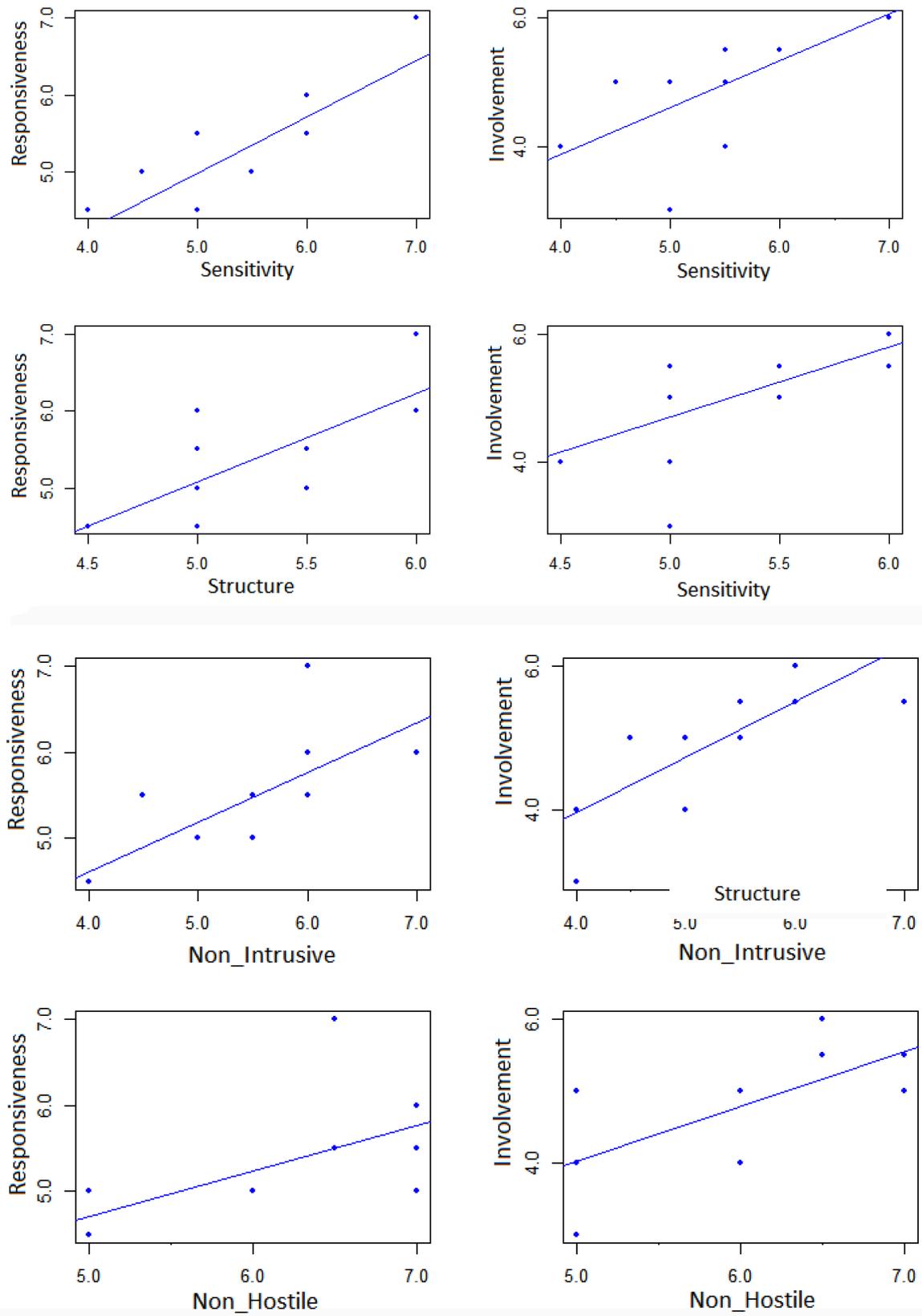


Figure 16: Correlation between EAS Adult Scales and EAS Babies Scales

There is not a correlation between the PBI so the Parental Bonding Index and Emotional Availability Scales (EAs). But there is the correlation between EPQ domains and EAs: Sensitivity and NonHostility (Table 7).

PBI&ESQ	EAS(mum)			
	Sensitivity	Structure	Non-Intrusive	Non-Hostile
M_CARE	ns	ns	ns	ns
M_OVER	ns	ns	ns	ns
P_CARE	ns	ns	ns	ns
P_OVER	ns	ns	ns	ns
Psychoticism	t (11)=-5.0 p <.001, r =-0.8	t (11)=-2.9 p <.05, r =-0.7	t (11)=-2.4 p <.05, r =-0.6	t (11)=-6.7 p <.001, r =-0.9
Neuroticism	t (11)=-2.4 p <.05, r =-0.6	ns	t (11)=-3.4 p <.01, r =-0.7	t (11)=-2.3 p <.05, r =-0.6
Extraversion	ns	ns	ns	ns

Table 7: Correlation between EAS (mum) and EPQ and PBI

ESQ vs EAS(mum): Psychoticism

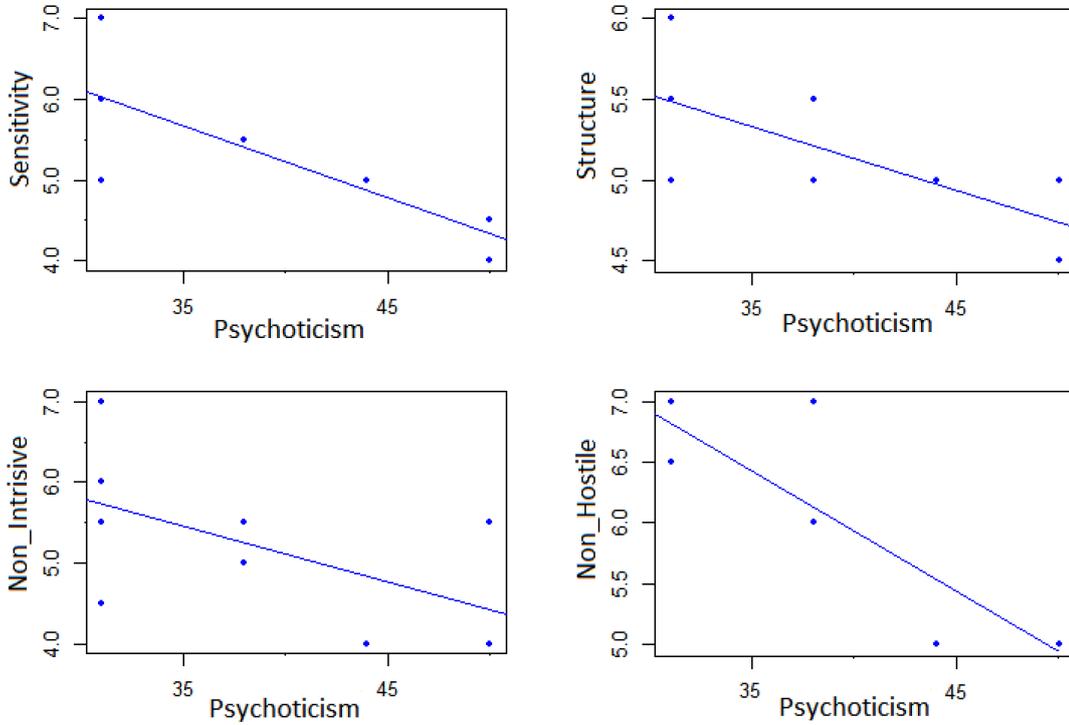


Figure 17: Correlation between EAS (mum) and EPQ (Psychotism)

ESQ vs EAS(mum): Neuroticism

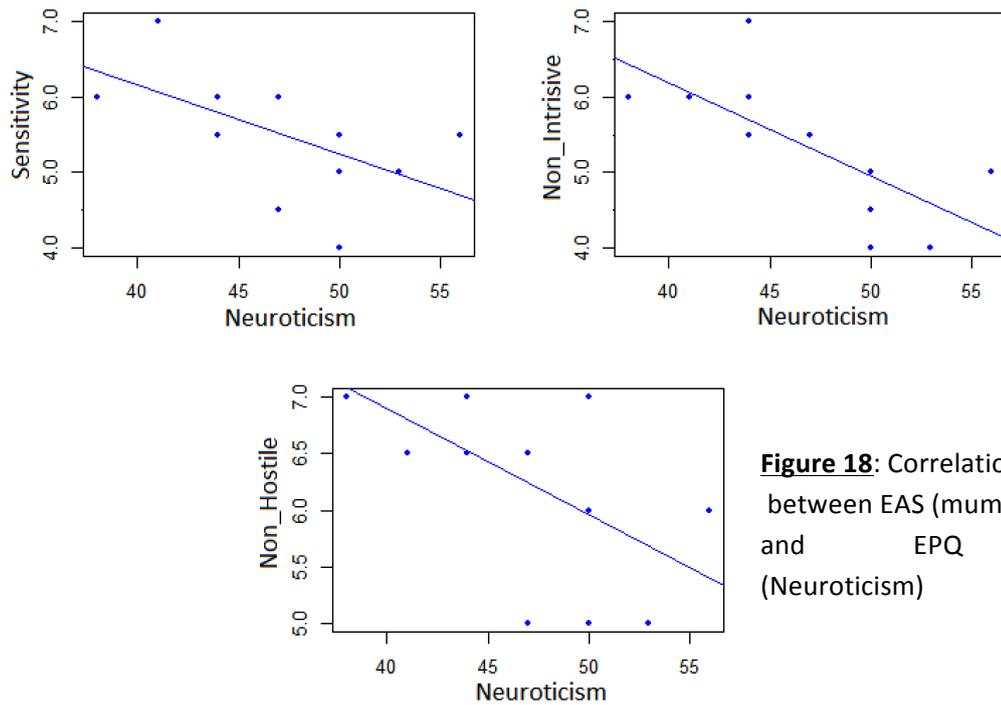


Figure 18: Correlation between EAS (mum) and EPQ (Neuroticism)

6.5 Discussion

The central hypothesis of the study has not been confirmed in our results; in fact, the baby's heart rate does not find a significant correlation with the heartbeat of the mother. This is probably due to the fact that the mother, even given the age of the subjects, which was 5 months, is highly concentrated into meet the needs of the child. Furthermore given the context: presence of the camera and the experimenter in only 15 minutes of video interaction do not allow the mother to get used to the presence of a stranger in her own spaces. To avoid this it might be an interesting study to repeat the experimental procedure for a longer time: one hour or more and the it might interesting by replicating it by using a static camera that films the scene while the experimenter leaves the room. The presence of the investigator in fact could affect the state of arousal of the mother that will try in every way to show the experimenter to be an attentive mother to any needs of her child.

The second hypothesis is that there is a higher Emotional Availability (EA) if the mother's attachment to her own parents is good and if the personality domains highlighted by the EPQ-R are well balanced. The hypothesis was confirmed with regard to the structure of personality; in

fact, it was found that mothers with high levels of psychoticism (P) have the worst results in all EA Scales (Sensitivity, Structuring, NonIntrusiveness, NonHostility, Involvement, Responsiveness).

Mothers with high levels of neuroticism (N) provide worst results in specific EA Scales: Sensitivity, NonIntrusiveness and NonHostility. These results are in line with our expectations in fact they show that there is a causal link between the personality domains of the mothers and the Emotional Availability to the child and vice versa. The fact that even the Emotional Availability Scales of Involvement and Responsiveness, which are those concerning the baby, shows a significant negative correlation with psychoticism (P) that demonstrate how the structure of the personality of the mother can also affect the baby's responses to the free interaction.

For what concerns the mother's attachment to her own parents it was found that the Emotional Availability between mother and infant are not affected. In relation to the Parental Bonding Inventory (PBI) there is not a correlation between any of the kinds of attachment highlighted ("affectionate constraint" (has high care and high overprotection), "affectionless control" (consisting of a low-care and high overprotection)

"optimal parenting" (high care and low overprotection) and "neglectful parenting" (low care and low overprotection) with the EA Scales, demonstrating the absence of a causal link between the two variables. This result, contrary to the expectations provides some exploring reflections: we would think that the attachment bond with mother's own parents would influence, positively or negatively, her way to interact and to approach her son/daughter. We would probably think that those mothers who did not have a good relationship with her parents will try to improve their attention to the children and those who have built a good attachment relationship with their own parents has the "natural ability" to pay special attention to her/his baby. In reality, according to our data, this does not happen and the absence of causality in the two variables shows the exclusivity and the inescapable subjectivity of Emotional Availability of the parent toward its baby.

Another result that emerged from the study is related to EAS scales: all the mothers' scales (Sensitivity, Structuring, NonIntrusiveness, NonHostility) positively correlate with the baby's scales (involvement and responsiveness). This shows that the mother's attitude also affects the baby's response. A mother with high scores in the EA Scales will ensure a

good Responsiveness and a good Involvement of the baby, with undeniable advantages in relation to each other.

This study enhances the knowledge about the mother – infants' relationship and clarifies how the bond that the mother has with her child is the result of her personality rather than being influenced by her personal attachment experience.

The study opens the way to numerous possible insights for example to investigate further what are the personality traits that most influence the responses of the baby during the free interaction. Furthermore it could be interesting to avoid the most the influence of the video camera by fixing it and by making longer videos to let the mother get use to the equipment.

PART II – RESEARCH

CHAPTER 7

Conclusion

Being a parent involves a series of difficulties, a series of choices, approaches, educational methodologies and contact towards their own baby. Many figures on parents' life provide tips and trainings about some specific methodologies to use to their own child.

The large quantity and variability of the information provided to parents, often not supported by scientific evidence, but rather is the result of people talks or of common sense, it puts parents to be bombed with opinions and advices, often conflicting, which often influence the way they act.

It is just to try to provide scientific support to parents in establishing a positive relationship and a good attachment with their babies that the studies that have proposed on this thesis were born.

The study in fact immediately debunked the popular belief that picking up the baby leading to spoil, proving scientifically instead the evolutionary significance of this behaviour and the great importance of this to the mother and child bond.

The baby, in fact, communicate their needs through crying and then the mother has to understand what need is expressing her own child, providing to satisfy the need. In the first months of life in fact the child is totally depending on the mother and will be specially at this point that the mother will have to show her willingness to her baby, thus creating a good attachment relationship.

The picking in arms of the mother is fundamental on this, demonstrating to be able to have a calming and soothing effect on the baby.

The identified effects of carrying on parasympathetic activation and cry reduction are significant and tough, so a brief period of carrying could be effective in soothing infants who are distressed by transient irritations such as vaccinations or frightening noises. However, because the calming effect is only limited to the period of ambulatory carrying, the infant may resume crying if the stress or the pain remains after the carrying ends. Unsoothable crying is a major risk factor for child abuse (Reijneveld et al.,

2004) so knowing how to at the moment calm the baby would be very helpful for parents.

The comparison also with other animal species allowed us to understand the evolving nature of the maternal carrying and its in the preservation of species and in the reaction to the danger.

To be able to understand how infants respond physiologically to caregiver holding may have useful applications: on psychopathology as an assessment tool. Early malfunctioning of the infant responses to maternal carrying can potentially be used as an early biomarker of Autism Spectrum Disorders (ASDs), and may also provide an opportunity for an early estimation of the prognosis for infants with perinatal brain disorders (PBDs, i.e., Cerebral Palsy). Parents of infants with ASD report that their infants have difficulties in regulating and adjusting their body to being held (Kanner, 1943; Teitelbaum et al., 1998, 2004; Esposito et al., 2009, 2011; Esposito, 2011; Esposito and Paşca, 2013), r parents sometimes make remarks such as, “I feel as if I were holding a stone or a sac of flour, not a baby.” Thus it would be an interesting future research direction to examine whether the atypicality in the responses to maternal carrying may be an early biomarker of ASD.

Many studies have highlighted that early diagnosis can lead to a substantial improvement in the life conditions of people with ASDs (Yirmiya and Charman, 2010). For this reason, the search for early biomarkers of the syndrome is extremely important, and is made even more pertinent by the consideration that current diagnosis methods are based on behavioural observation and can be reliable only when the child has at least 18 months of age.

The study also provides guidance on the subjectivity of the mother-child relationship, excluding the influence of the relationship established with their parents in the creation of the relationship with their child .

Through a questionnaire it was assessed that the perception of the relationship of the mothers to their own parents was associated with physiological responses given by children during the interaction with the mother. We thought that there would be a causal relationship between mothers quality of attachment and Emotional Availability (EA) to their baby: results showed that there is no causal link between the two variables.

Parenthood is a huge and complex responsibility that incorporates itself individual aspects regarding the subjective idea of how to be a parent and

aspects of torque that is the relational mode that partners share in carrying out this specific task.

Attachment theory postulates that mothers and their infants possess some basic physiological mechanisms that favour their caregiver–infant dyadic interaction and bonding. In line with the predictions of the Attachment theory, we demonstrate that carrying-induced calming responses consist of a canonical set of behavioural and physiological responses in altricial mammalian infants which functions to facilitate an effective mother–infant relationship. Taking the lead from John Bowlby’s work, we believe that integrating studies from both psychological and physiological domains will provide better understanding into behaviours that create a manageable and rewarding caregiver–infant interaction, which may ultimately contribute to a good attachment relationship (Esposito, 2015).

APPENDIX 1

ID: ZZX01

Nome: X

Data di Nascita: 01/01/2015

Data: 01/06/2015

Peso alla Nascita: 3000

Peso Attuale: 6000

Lunghezza alla Nascita: 48

Lunghezza Attuale: 52

Ultimo pasto: 12:00 PM

Ultimo sonno: 12:00 AM – 8:00 AM (8h)

Tipo di Parto: Naturale

Contatto Pelle a Pelle: Si

APPENDIX 2

INFORMATIVA AL TRATTAMENTO DEI DATI PERSONALI E RACCOLTA DEL CONSENSO

ai sensi dell'art. 13 del D.lgs 196/2003

Il D.lgs. n. 196 del 30 giugno 2003 (Codice in materia di protezione dei dati personali, d'ora in poi "Codice") prevede la tutela delle persone e di altri soggetti rispetto al trattamento dei dati personali. Secondo la normativa indicata, tale trattamento sarà improntato ai principi di correttezza, liceità, trasparenza e tutela della Sua riservatezza e dei Suoi diritti.

In qualità di "Interessato" al conferimento dei Suoi dati personali che verranno trattati dal Laboratorio di Osservazione Diagnosi e Formazione presso il DPSC dell'Università degli Studi di Trento, ai sensi dell'art. 13 del citato D. lgs. 196/2003, **La informiamo di quanto segue:**

1. Finalità del trattamento cui sono destinati i dati

1.1 I dati personali raccolti sono trattati al fine di rendere le seguenti prestazioni:

- Scopi di ricerca**
- consultazione psicologica**
- valutazione diagnostica ed eventuale psicoterapia/intervento**
- psicoterapia**
- altra attività riabilitativa (specificare)_____**

Nello svolgimento della prestazione professionale richiesta (attività di prevenzione, diagnosi, abilitazione-riabilitazione e di sostegno in ambito psicologico) potranno essere usati strumenti conoscitivi e di intervento, tra cui l'eventuale videoregistrazione delle sedute e/o l'analisi degli home-video consegnati direttamente dall'interessato al Laboratorio.

Gli strumenti principali di intervento saranno, in particolare, l'osservazione, il colloquio clinico ed i test psicodiagnostici.

1.2 I dati personali raccolti potranno altresì essere utilizzati, previo Suo espresso consenso, per finalità di ricerca scientifica svolta dal Laboratorio medesimo nei seguenti ambiti, sviluppo tipico e atipico (genitorialità, sviluppo cognitivo e motorio del bambino), efficacia degli interventi (confronto pre - post consulenza e pre- post trattamento), sviluppo di nuovi strumenti diagnostici.

2. Modalità di trattamento e natura del conferimento dei dati.

Il trattamento dei Suoi dati personali sarà effettuato con sistemi manuali e/o elettronici atti a memorizzare, gestire e trasmettere i dati stessi, con logiche strettamente correlate alle finalità stesse ed in ogni caso, idonee a proteggerne la riservatezza, nel rispetto delle norme vigenti e del segreto professionale.

I dati personali saranno trattati in modo da escludere il rischio di accesso da parte di soggetti non autorizzati e il rischio di distruzione e/o perdita anche accidentale degli stessi.

Il conferimento dei dati personali per lo svolgimento della prestazione professionale richiesta di cui al punto 1.1 dell'informativa è necessario per l'instaurazione e la prosecuzione del rapporto professionale.

Il conferimento dei dati personali relativi all'attività di ricerca di cui al punto 1.2 è facoltativo.

3. Ambito di comunicazione e diffusione dei dati

I dati personali trattati per le sole finalità sopra esposte potranno essere trasmessi ai soggetti cui la comunicazione è prevista per legge e/o per regolamento.

Ai sensi del combinato disposto degli artt. 22, comma 8 e 26, comma 5 del Codice i dati idonei a rilevare lo stato di salute non saranno diffusi.

I dati personali oggetto di trattamento nell'ambito dell'attività di ricerca di cui al punto 1.2, se oggetto di comunicazione e/o diffusione a terzi non includeranno informazioni che La possono identificare in maniera diretta. In particolare, ai sensi del disposto dell'art. 100, comma 1 del Codice, tali dati verranno trattati solo in forma rigorosamente anonima, ad esempio attraverso pubblicazioni scientifiche, statistiche nonché convegni didattici e scientifici. Previo Suo espresso consenso scritto, l'ambito della comunicazione potrà essere esteso a favore di soggetti specificatamente indicati, in particolare ai propri familiari, alle istituzioni scolastiche, al proprio medico curante, all'assistente sociale.

4. Titolare del trattamento

Il Titolare¹ del trattamento è **l'Università degli Studi di Trento, via Belenzani 12, 38122 Trento (TN).**

Per ogni ulteriore informazioni e/o chiarimento è possibile contattare il Laboratorio di Osservazione Diagnosi e Formazione al numero di telefono 0464/808115, oppure al numero di fax 0464/808102.

¹ Il titolare è il soggetto cui competono le decisioni in ordine alle finalità, alle modalità del trattamento di dati personali e agli strumenti utilizzati, ivi compreso il profilo della sicurezza.

In ogni momento l'interessato potrà esercitare nei confronti del Titolare i propri diritti ai sensi dell'art. 7 e ss. del D. Lgs. n. 196 del 30.06.2003 (Codice della privacy) di seguito indicati:

DIRITTI DELL'INTERESSATO

Art. 7

(Diritto di accesso ai dati personali ed altri diritti)

1. L'interessato ha diritto di ottenere la conferma dell'esistenza o meno di dati personali che lo riguardano, anche se non ancora registrati, e la loro comunicazione in forma intelligibile.

2. L'interessato ha diritto di ottenere l'indicazione:

a) dell'origine dei dati personali;

b) delle finalità e modalità del trattamento;

c) della logica applicata in caso di trattamento effettuato con l'ausilio di strumenti elettronici;

d) degli estremi identificativi del titolare, dei responsabili e del rappresentante designato ai sensi dell'articolo 5, comma 2;

e) dei soggetti o delle categorie di soggetti ai quali i dati personali possono essere comunicati o che possono venirne a conoscenza in qualità di rappresentante designato nel territorio dello Stato, di responsabili o incaricati.

3. L'interessato ha diritto di ottenere:

a) l'aggiornamento, la rettificazione ovvero, quando vi ha interesse, l'integrazione dei dati;

b) la cancellazione, la trasformazione in forma anonima o il blocco dei dati trattati in violazione di legge, compresi quelli di cui non è necessaria la conservazione in relazione agli scopi per i quali i dati sono stati raccolti o successivamente trattati;

c) l'attestazione che le operazioni di cui alle lettere a) e b) sono state portate a conoscenza, anche per quanto riguarda il loro contenuto, di coloro ai quali i dati sono stati comunicati o diffusi, eccettuato il caso in cui tale adempimento si rivela impossibile o comporta un impiego di mezzi manifestamente sproporzionato rispetto al diritto tutelato.

4. L'interessato ha diritto di opporsi, in tutto o in parte:

a) per motivi legittimi al trattamento dei dati personali che lo riguardano, ancorché pertinenti allo scopo della raccolta;

b) al trattamento di dati personali che lo riguardano a fini di invio di materiale pubblicitario o di vendita diretta o per il compimento di ricerche di mercato o di comunicazione commerciale.

Art. 8

(Esercizio dei diritti)

I diritti di cui all'articolo sopra citato sono esercitati con richiesta rivolta senza formalità al titolare o al responsabile, anche per il tramite di un incaricato, alla quale è fornito idoneo riscontro senza ritardo.

La richiesta rivolta al titolare o al responsabile può essere trasmessa anche mediante lettera raccomandata, telefax o posta elettronica.

Nell'esercizio dei diritti di cui all'articolo 7 sopra citato l'interessato può conferire, per iscritto, delega o procura a persone fisiche, enti, associazioni od organismi. L'interessato può, altresì, farsi assistere da una persona di fiducia.

CONSENSO PER PRESTAZIONI SANITARIE

ai sensi degli artt. 23, 76 e ss. del D. Lgs. 196/ 2003

Ricevuta l' informativa ex art. 13 del D. lgs. 196/2003 di cui sopra,

io

sottoscritto/a

dichiaro

di autorizzare il **Laboratorio di Osservazione Diagnosi e Formazione presso il DIPSCO dell'Università degli Studi di Trento** al trattamento dei miei dati personali anche sensibili, in qualsiasi forma raccolti e/o conservati (ad es. VHS, DVD, memorie esterne) ai fini dell'espletamento delle prestazioni terapeutiche indicate al punto 1.1 dell' informativa sopra riportata ed in conformità delle prescrizioni fissate dal Garante per la protezione dei dati personali nell'apposita autorizzazione Generale n. 2/2009 e ss.mm.ii. che il titolare si impegna a rispettare. Dichiaro altresì che i dati personali, anche sensibili, possano essere comunicati:

- ai propri familiari _____
- alle istituzioni scolastiche _____
- agli assistenti sociali _____
- al medico di base e/o specialista _____
- a nessuno

do il consenso
consenso

nego il

IN CASO DI VIDEOREGISTRAZIONE DELLE SEDUTE

Esprimo altresì il consenso alla videoregistrazione delle sedute terapeutiche ed al trattamento (registrazione, utilizzo, conservazione ed archiviazione) dei dati personali,

anche sensibili, ivi comprese le immagini, in esse contenute ai fini dell'espletamento delle prestazioni terapeutiche indicate al punto 1.1 dell'informativa riportata.

do il consenso
consenso

nego il

Rovereto , li
dell'interessato

Firma

SOLO in caso di minore età, incapacità d'agire, incapacità di intendere e volere, impossibilità fisica, si richiede il consenso di:

- q tutore, curatore, **entrambi i genitori**
- q coniuge, convivente o prossimo congiunto
- q responsabile della struttura presso la quale l'interessato/a dimora

Rovereto , li

Firma

Firma

CONSENSO PER ATTIVITA' DI RICERCA
ai sensi dell'art. 97 e ss. del D. Lgs. 196/ 2003

Il filmato a cui lei ha preso verrà utilizzato unicamente a scopo di ricerca onde effettuare analisi approfondite di alcuni pattern: il movimento del bambino. L'analisi avverrà secondo per secondo e verrà analizzato il movimento di ogni singolo arto (braccio destro, braccio sinistro, gamba destra, gamba sinistra, testa), per questo motivo vi è la necessità di videoregistrare l'intera sessione sperimentale.

Il filmato verrà unicamente utilizzato a scopi di ricerca e non verrà mai trasmesso, proiettato o fatto visionare a personale non coinvolte nella ricerca (Dott.ssa Maria Rostagno e Responsabile di Ricerca: Dott. Gianluca Esposito).

Ricevuta l'informativa ex art. 13 del D. lgs. 196/2003 di cui sopra,

io _____ sottoscritto/a
dichiaro

di autorizzare **il Laboratorio di Osservazione Diagnosi e Formazione presso il DiPSCO dell'Università degli Studi di Trento** al trattamento dei miei dati personali anche sensibili, in qualsiasi forma raccolti e/o conservati (ad es. VHS, DVD, memorie esterne) ai fini dell'espletamento delle finalità di ricerca indicate al punto 1.2 dell'informativa sopra riportata ed in conformità alle disposizioni del codice di deontologia e di buona condotta per i trattamenti di dati personali per scopi statistici e scientifici emanato con il provvedimento n. 2 del 16 giugno 2004 che il titolare si impegna a rispettare.

do il consenso
consenso

nego il

Rovereto , li
dell'interessato

Firma

SOLO in caso di minore età, incapacità d'agire, incapacità di intendere e volere, impossibilità fisica, si richiede il consenso di:

- q tutore, curatore, **entrambi i genitori**
- q coniuge, convivente o prossimo congiunto
- q responsabile della struttura presso la quale l'interessato/a dimora

Rovereto , li

Firma

Firma

SCHEDA INFORMATIVA

 <p>UNIVERSITÀ DEGLI STUDI DI TRENTO</p>	<p>Laboratorio di Osservazione Diagnosi e Formazione</p> <p>Via Matteo del Ben 5b, 38068</p> <p>Rovereto (TN) – ITALY</p> <p>telefono 0039 0464 - 80 8115/16</p> <p>fax 0039 0464 - 80 8102</p> <p>Email: diagnosticafunzionale@unitn.it</p>
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FOGLIO INFORMATIVO PER LA RICHIESTA DI CONSENSO

Titolo dello Studio

Analisi fisiologica e comportamentale del trasporto materno su mamme e bambini.

Gentile signore, Gentile Signora

al fine di svolgere questa ricerca abbiamo bisogno della Sua preziosa collaborazione. Prima che Lei decida se aderire o meno allo studio, la preghiamo di leggere attentamente quanto segue tenendo presente che siamo a sua disposizione per fornirLe qualunque chiarimento desideri ricevere. Il presente studio verrà condotto presso il Laboratorio di Osservazione Diagnosi e Formazione (ODFLab) o presso la sua abitazione.

Scopo dello Studio

Con questo studio intendiamo valutare quali siano le risposte fisiche e fisiologiche del bambino nei primi mesi di vita, durante la presa in braccio in diverse situazioni.

Le Valutazioni Effettuate Durante lo Studio

La partecipazione a questo studio comporta che Lei sia impegnata in una situazione strutturata con suo/a figlio/a per una durata massima di 45 minuti. L'intera sequenza sarà strutturata nel seguente modo:

- 5 minuti Le sarà richiesto di posizionare il neonato nella culla;
- 5 minuti Le sarà richiesto di stare seduta con il neonato in braccio;
- 5 minuti Le sarà richiesto di alzarsi e camminare con il neonato in braccio;

Queste situazioni verranno alternate e ripetute su indicazione della psicologa sperimentatrice.

Effettueremo una videoregistrazione dell'interazione con suo figlio/a e registreremo il battito cardiaco suo e del suo bambino e la sua conduttanza cutanea. Per quanto riguarda la frequenza cardiaca del suo bambino verrà applicato un Holter (elettrocardiogramma portatile) a 5 elettrodi al suo bambino/a. Per ogni bambino verranno utilizzati degli elettrodi nuovi che saranno smaltiti al termine di ogni registrazione.

Per quanto concerne la sua frequenza cardiaca verrà utilizzato un cardiofrequenzimetro dispositivo in grado di rilevare istantaneamente la frequenza cardiaca, grazie ad un semplice sensore posto all'interno di una fascia toracica il cardiofrequenzimetro trasmette dei segnali elettromagnetici che verranno opportunamente codificati ed elaborati da un antenna ricevente posta su un tablet.

Al termine di ogni sessione i materiali vengono lavati e disinfettati in ogni sua parte.

Ci teniamo a precisarLe che Lei potrà chiedere di sospendere lo studio in qualsiasi momento senza fornire alcuna spiegazione. Infine vogliamo informarla che lo studio qui presentato ha valenza unicamente conoscitiva e non diagnostica.

Rischi Derivanti dalla Partecipazione allo Studio e Copertura Assicurativa

Non ci sono rischi né per Suo figlio né per Lei nello svolgimento dei compiti richiesti durante lo studio. Gli unici possibili disagi potrebbero essere un leggero senso di spossatezza dopo aver camminato con il neonato in braccio e un temporaneo arrossamento della pelle del neonato dopo la rimozione degli elettrodi. L'apparecchio che registrerà l'attività cardiaca è stato approvato e testato e rispetta tutte le norme di sicurezza CE. L'apparecchio non risulta invasivo in alcun modo.

Trattamento dei Dati Personali (Legge sulla Privacy)

Se deciderà di prendere parte allo studio le chiederemo di firmare un modulo per il consenso al trattamento dei Suoi dati personali. Ogni informazione raccolta sarà resa anonima e trattata come confidenziale. Solo i ricercatori coinvolti nello studio avranno accesso ai suoi dati che saranno trattati nel pieno rispetto della vigente normativa sulla privacy.

I risultati della ricerca potranno essere resi pubblici attraverso articoli su riviste, presentazioni a congressi, ed ogni altra modalità di scambio e divulgazione delle informazioni scientifiche che si ritengano idonee. **Tuttavia i suoi dati personali, quelli di suo figlio, il filmato, né parti di esso, verranno MAI in nessun caso resi pubblici e quindi nessun dato potrà essere ricondotto alla sua persona.**

Vantaggi della Partecipazione Allo Studio

Con la partecipazione a questo studio Lei offrirà un prezioso contributo alla ricerca scientifica ed al processo di conoscenza delle interazioni genitore-bambino nei primi mesi di vita di quest'ultimo.

Problemi e Domande

Per qualunque ulteriore informazione o comunicazione relativa a questo studio, in particolare in relazione ai suoi diritti come persona partecipante ad un progetto di ricerca potrà contattare il Responsabile del progetto di ricerca: Dottor Gianluca Esposito (0464 - 80 8643) , oppure potrà contattare lo sperimentatore Dott.ssa Maria Rostagno (0464 – 808136 / 3921561048).

Questo studio è stato approvato dal Comitato Etico dell'Università di Trento e sarà condotto secondo i principi della dichiarazione di Helsinki.

LE SUGGERIAMO DI TENERE UNA COPIA DEL PRESENTE FOGLIO INFORMATIVO PER POTERLO CONSULTARE IN FUTURO

Modulo per l'acquisizione di consenso

 <p>UNIVERSITÀ DEGLI STUDI DI TRENTO</p>	<p>Laboratorio di Osservazione Diagnosi e Formazione</p>
	<p>Via Matteo del Ben 5b, 38068 Rovereto (TN) – ITALY telefono 0039 0464 - 80 8115/16 fax 0039 0464 - 80 8102 Email: diagnosticafunzionale@unitn.it</p>

DICHIARAZIONE DI CONSENSO

Io sottoscritto _____
dichiaro:

Cognome

Nome

Data nascita

Io sottoscritto _____
dichiaro:

Cognome

Nome

Data nascita

di avere preso visione del modulo informativo concernente lo studio dal titolo: **Analisi fisiologica e comportamentale del trasporto materno su mamme e bambini.**

- che finalità e modalità di svolgimento mi sono state illustrati in maniera chiara e dettagliata dalla Dott.ssa Rostagno Maria;

- che ho avuto modo di esporre le mie eventuali considerazioni e richiedere eventuali ulteriori precisazioni, nonché di avere avuto il tempo necessario per prendere una decisione spontanea, ponderata e non sollecitata.
- di essere a conoscenza di poter ritirare mio/a figlio/a dallo studio in ogni momento senza dovere fornire alcuna spiegazione,
- di essere a conoscenza del fatto che lo studio è stato approvato dal Comitato Etico per la Sperimentazione con l'essere umano dell'Università di Trento.

Pertanto, sono consapevole delle attività previste e delle modalità di una mia adesione. Ciò premesso:

- dò il mio consenso a partecipare allo studio proposto;

Data _____

Firma della Madre

Firma del Padre

La persona che ha fornito le informazioni: (nome e cognome e firma):

APPENDIX 3

	IBI	HRTIME	MovieTime	SIT	Cry	Sleep	Mov
0,426757813	0,375976563	00:00:00					
0,799804688	0,373046875	00:00:00					
1,186523438	0,38671875	00:00:01					
1,577148438	0,390625	00:00:01					
1,965820313	0,388671875	00:00:01					
2,358398438	0,392578125	00:00:02					
2,755859375	0,397460938	00:00:02					
3,163085938	0,407226563	00:00:03					
3,575195313	0,412109375	00:00:03					
3,98046875	0,405273438	00:00:03					
4,399414063	0,418945313	00:00:04					
4,80859375	0,409179688	00:00:04					
5,219726563	0,411132813	00:00:05					
5,616210938	0,396484375	00:00:05					
6,028320313	0,412109375	00:00:06					
6,428710938	0,400390625	00:00:06					
6,830078125	0,401367188	00:00:06					

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