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PREMATURITY AND THE TRANSITION TO SELF-FEEDING:

A longitudinal study on mother-child interactions from 18 to 30 months

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Overview of the present dissertation

Focus of this research was to explore the quality of preterm mother-child interactions during the transition to self-feeding through a longitudinal case-control study from 18 to 30 months of the child. This area has been poorly studied in the preterm population especially in this particular period. Preterm children are at increased risk to show feeding problems following their birth. They can experience difficulties during breastfeeding and weaning, and mismatched interactions with their mothers (Latmiral & Lombardo, 2000; Reyna, Brown, Pickler, Myers, & Younger, 2012; Singer, Fulton, Davillier, Koshy, Salvador, & Baley, & 2003). The transition to self-feeding represents a critical moment for the onset of feeding disorders in infancy and early childhood, which are connected to issues related to the child's emerging autonomy and to his/her emotional and affective individuation (Chatoor, 2002, Chatoor & Macaoay, 2008; Lichtenberg, Lachman, & Fossage, 2010; Trombini, 2010). Maternal intrusiveness and over-control, obstructing the child's autonomy, is associated with conflicts during meals and with the child's food refusal (Ammaniti, Ambruzzi, Lucarelli, Cimino, & D'Olimpio, 2004; Atzaba-Poria, Meiri, Millikovsky, Barkai, Dunaevsky-Idan, & Yerushalmi, 2010; Lucarelli, Ambruzzi, Cimino, D'Olimpio, & Finistrella, 2003). Therefore, exploring the quality of mother-child interactions during the transition to self-feeding in the preterm population is extremely relevant for its clinical implications.

Aim of the study was to expand on the literature available and to investigate whether the transition to self-feeding might represent a critical time for the onset of dysfunctional mother-child interactive behaviours in preterm dyads. At this purpose mother-child interactions were observed at 18, 24, and 30 months of the child, in two situations: during feeding (Study 1) and during a Doll-Play scenario representing feeding (Study 2). The contribution of maternal and infant factors was also considered.

The first part of the dissertation presents a review of the literature about prematurity and feeding disorders of infancy and early childhood.

Chapter 1 focuses on the definition of prematurity. First, data about the incidence and epidemiology of preterm birth are described. Following, the chapter presents results of the studies that investigated the effect of prematurity on the child's development, on parental affective state and on mother-child interactions.

Chapter 2 illustrates the thematic of feeding disorders of infancy and early childhood. First, the chapter presents the contribution of Infant Research on mother-child feeding interactions and the description of the stages that characterise the transition to self-feeding. Secondly, the chapter describes the studies conducted on children with feeding disorders of infancy and early childhood. In particular, the definition, epidemiology, aetiology and course of the disorder is examined, focusing on the contributions of the transactional model and on the current perspectives.

Chapter 3 summarizes literature contributions that investigated the occurrence of feeding problems in the preterm population. Both infant risk factors and parental risk factors are described. Last, an overview of the research conducted on mother-child feeding interactions in samples of preterm infant and their mothers is presented.

The second part of the dissertation presents the research. First, a general introduction summarizes the main contributions of the literature and presents the research question that trigged the present study. Following, aims, methodology and results of Study 1 and Study 2 are presented.

Study 1 presents data on the analysis of mother-child feeding interactions in preterm and full-term dyads at 18, 24, and 30 months. Furthermore, data on the child's acquisition of eating autonomy were gathered and longitudinal differences between groups are described. The contribution of maternal (maternal anxiety and depression) and infant (child's development, breastfeeding, weaning, and medical history of reflux) factors is also presented.

Study 2 illustrates results on mother-child emotional availability during a Doll-Play situation representing feeding at 18, 24, and 30 months. Moreover, the study presents data on the effect of maternal depression, maternal anxiety, and of the child's development on mother-child interactions.

Last, results of the current research are discussed and general conclusions are drawn suggesting directions for future research and clinical interventions.

PART I: LITERATURE REVIEW

CHAPTER 1

Prematurity

1.1 Definition and epidemiology

Prematurity is defined as the condition of all babies born alive before 37 weeks of pregnancy are completed (WHO, 2012). Prematurity is one of the leading causes of infant mortality, paediatric morbidity, and long-term disability (Aarnoudse-Moens, Weisglas-Kupers, Van Goudoever, & Oosterlan, 2009; McCormick et al., 2011). It has been estimated that more than 1 out of 10 babies around the world are born preterm. Rates of preterm birth fluctuate between 5-9% in Europe and Oceania and between 10-12% in USA (Beck et al., 2010; Goldenberg et al., 2008). A series of studies revealed that mortality affects mostly children weighing less than 700 grams and born before 25 weeks of gestation (Sansavini & Faldella, 2013). The probability of survival is around 30-40% for babies born with a birth weight of 500 grams and gradually increases reaching over 90% of probability for children born with a neonatal weight above 1000 grams. Thanks to the continued advancement of medical care and technologies, however, perinatal survivals of premature infants are steadily increasing (Saigal & Doyle, 2008; Arpi & Ferrari, 2013).

The scientific community has identified different categories to describe the severity of prematurity based on gestational age (GA) and on birth weight (BW) (Sansavini e Guarini, 2013; Goldberg, Culhane, Iams, & Romero, 2008).

Definition based on gestational age includes:

- *Extremely preterm*: Infants born before the 28th week of gestation;
- *Very preterm*: Infants born between the 28th and the 32nd week of gestation;
- *Moderately preterm*: Infants born between the 32nd and the 34th week of gestation;
- *Late preterm*: Infants born between the 34th and 36th week of gestation.

Research distinguishes also, based on birth weight, among:

- *Extremely low birth weight* (ELBW): Infants born with a birth weight below 1000 grams;
- *Very low birth weight* (VLBW): Born with a birth weight between 1000-1500 grams;
- *Low birth weight* (LBW): Born with a birth weight between 2000-1500 grams.

For many years birth weight has been the most used parameter to evaluate the severity of prematurity as associated to the proper functioning of the newborn's organs (Baldini, Albino, Ottaviano, & Casadei, 2002). However, in the last decade clinicians and researchers have given more importance to gestational age as it allows the evaluation of the child's physical and neurological development. Between the 23rd and 40th week of gestation important changes to the central nervous system and to the motor and sensory apparatus of the foetus occur. Moreover, research has highlighted that the intra-uterine development of the foetus is different from the development that takes place in the extra-uterine environment, with different effects depending on the child's birth weight and gestational age (Als et al. 2004; Rakik, 2006).

At this purpose, Mohr & Barteleme (1930) introduced the concept of "corrected age" and "chronological age" to differentiate between the age that preterm children would have had if born at term and their actual age. The child's corrected age can be computed by detracting the number of days or weeks of prematurity from the child's chronological age. Corrected age is commonly used in follow-up programs to assess the child's development during the first two years of life. The use of corrected or chronological age has undergone through divergent opinions. Some authors pointed out that the use of the corrected age could hide potential catch-ups or delays in the child's development (Capobianco & Descovi, 2007). Despite this, the use of corrected age is common and largely used in clinical settings as the use of chronological age in infants born with very low gestational age may create unnecessary worries in the parents (Baldini, Albino, Ottaviano & Casadei, 2002; Wilson & Cradock, 2004).

In addition to the child's GA and BW, another important parameter for the child's developmental outcomes is the proportion between the child's neonatal birth weight and gestational age. Based on that it is possible to distinguish among the following categories: Appropriate for Gestational Age (AGA; adequate birth weight for GA, between the 10° and 90° percentile); Large for Gestational Age (LGA; birth weight above the 90° percentile); Small for Gestational Age (SGA; birth weight below the 10° percentile) (Sansavini & Faldella, 2013). Small for gestational age new-borns are at increased risk for adverse outcomes (Claas et al., 2011).

Last, other neonatal risk factors associated with prematurity are the presence of neurological or sensory impairments (Retinopathy of prematurity – ROP; intraventricular hemorrhage – IVH; periventricular leukomalacia - PVL, and hydrocephalus), which highly increase the risk of negative developmental outcomes (Aylward, 2009).

As birth conditions of preterm children might impact on their future development, the correct use of these parameters is extremely important to identify children at risk and carry out appropriate follow-up interventions (Costabile, 2000).

1.2 **Effects on the child's development**

A vast number of contributions have highlighted an increased risk in preterm children for long-term adverse outcomes, which include cognitive delay, motor and sensory impairments, learning problems, attention deficits, behavioural and regulatory problems, including sleeping and eating disorders (Arpi & Ferrari, 2013; Pierrehumbert, Nicole, Muller-Nix, Forcada-Guex, & Ansermet, 2003; Perricone & Morales, 2011; Saigal & Doyle, 2008; Sansavini, Guarini & Castelli, 2011).

For what concern the child's general level of development a meta-analysis by Buttha et al. (2002) has shown that preterm children present lower general quotient scores (GQ) than full-term children. Other authors pointed out that the development of preterm children seems to follow atypical trajectories of development compared to that of full-term children in the first two years of

life (Guarini & Sansavini, 2010; Sansavini & Guarini, 2010; Sansavini et. al, 2011). However, research also agree in finding a high inter-individual variability among the population of preterm children, with an increased risk for those born extremely preterm or with neurological deficits (Arnoudse-Moens et al., 2009; Marlow, Hennessy, Bracewell, & Wolke, 2005). Moreover, many children born very preterm present cognitive and linguistic GQ scores that are on average for their corrected age, even though lower than the one of control groups (Dall'Oglio, Paris, & Cuttini, 2010; Ortiz-Mantilla, Choudhury, Leevers, & Benasich, 2008; Sansavini et al., 2011). Inter-individual differences become stronger in preschool and school age children, with some children that may show specific learning difficulties (e.g. attention deficits, writing and reading difficulties) and others that do not show any (Anderson & Dewey, 2011; Marlow, 2004). However, in children born extremely preterm cognitive and learning damages tend to be more stable and can sometimes persist until adolescence (Bhutta, Claves, Casey, Cradock, & Anand, 2002; Saigal, Szatmari, Rosenbaum, Campbell, King, 1991; Saigal, Hoult, Streiner, Stoskopf, & Rosenbaum, 2000).

Another important aspect to consider concerns the temperamental traits and behavioural characteristics of preterm children (Hughes, Shultz, McGrath, & Medoff-Cooper, 2002; Langkamp & Pascoe, 2001). Compared to full-term infants, preterm infants are at increased risk to show difficult temperamental traits[1] and problems in state regulation in the first year of life, such as fussy crying, irritability, lower adaptation to new circumstances, distractibility, alteration of the sleep-wake cycle and hunger-satiety cycle (Pierrehumbert, Nicole, Muller-Nix, Forcada-Guex, & Ansermet, 2003; Schädler, G., Süss-Burghart, Toschke, von Voss, & von Kries, 2007; Schmid, Schreier, Meyer, & Wolke, 2011; Weiss, Jonn-Seed, & Wilson, 2004).

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[1] Temperament reflects the way an individual experiences and reacts to the environment (Fox, Henderson, & Marshall, 2001; McCrae et al., 2000). Thomas & Chess (1986) identified three temperament types: easy babies (40% of infants), difficult babies (10% of infants), slow-to-warm-up-babies (15% of infants) (Chess & Thomas, 1991; 1996; Thomas and Chess, 1986). Compared the others, difficult babies are slower to adjust to new experiences and more likely to negatively and intensely adapt to stimuli or events (Chess & Thomas, 1991; 1996; Huges et al., 2002).

Neurological immaturity, brain injuries, gestational age, birth weight, and the child's medical conditions can be associated to a higher risk of difficult temperament (Perricone & Morales, 2011; Bernbaum & Hoffman-Williamson, 1991; Langkamp, Kim, & Pascoe, 1998). Research has shown that temperament is biologically based but can be modified by environmental factors such as parental response (Chess & Thomas, 1991). The temperamental characteristics of the child can influence and can be influenced by mother child-interactions over time (Bakeman & Brown, 1980; Bozzette, 2007).

A recent meta-analysis showed that starting from early childhood premature children show a higher prevalence of behavioural problems than children born at term with no significant association with low gestational age (Arpi & Ferrari, 2013). The authors found that the prolonged hospitalization in the neonatal intensive care unit, the unfavourable social conditions and possible not optimal mother-infant interaction were associated to a greater risk of behavioural issues (Arpi & Ferrari, 2013). Other contributions have found that children born prematurely show a higher risk of internalizing problems compared to children born at term such as withdrawn, depression, anxiety, and somatic complaints (Anderson et al., 2003; Bhutta et al., 2002). Moreover, research found also a higher incidence of externalising problems in preterm toddlers, including attention deficit disorders, hyperactivity, and oppositional and aggressive behaviour (Bhutta et al., 2002; Poehlmann et al., 2012). Behavioural problems observed in preterm children during childhood may coexist with other developmental impairments, typical of children born prematurely, and could potentially be predictive of later behavioural problems and psychiatric disorders (Arpi & Ferrari, 2013).

Both biological and relational factors may impact on preterm children's cognitive and socio-emotional development (Aylward, 2009). Biological factors are linked to the specific situation of preterm children, such as gestational age, birth weight, or other biological complications at birth. As mentioned already, the risk of adverse outcomes is higher for very preterm children and children born with VLBW compared to moderately preterm children (Bracewell & Marlow, 2002; Mwaniki et al., 2012; Saigal & Doyle, 2008) and increases in extremely preterm children (Saigal, Hoult,

Streiner, Stoskopf, & Rosenbaum, 2000; Sansavini, Guarini, & Caselli, 2011). Relational factors are linked to the child's environment, starting from the medical staff attitude and procedures directed to the child during the hospitalization in the Neonatal Care Intensive Unit (Als, 1992; Fava Vizziello, Zorzi, & Bottos, 1992; Guarini & Sansavini, 2011; Negri, 2012) to the family socio-economical status, parental mental health, and mother/father-child interactions (Aylward, 2009; Bozzette, 2007; Landry, Smith, & Swank, 2006; Neri, Agostini, Salvatori, Biasini, & Monti, 2015).

1.3 **Effects on parental mental health**

Along with the objective risk for the baby's health, prematurity is a traumatic event for the parents as well (Magrini, 2002; Monti, Agostini, & Neri, 2013). Parents often perceive premature birth as an "unexpected event that shatters their expectations about how things should be, leaving them disoriented and frightened" (Lasiuk, Comeau, & Newburn-Cook, 2013, p. 4). Parents of preterm infants might report feelings of guilt, grief and anxiety following the birth of their baby (Mendelsonh, 2005; Lasiuk et al., 2013; Shah, Clements, & Poehlmann, 2011). Literature has identified mothers of very preterm infants to be at greater risk of developing psychological distress in the early postpartum than non-preterm mothers (Marinopolous, 2005; Jackson, Ternestedt, Magnuson, & Schollin, 2007). Parental stress can be so high to reach post-traumatic stress disorder in 24% of mothers and can interfere with parental functions (DeMier, Hynan, Hatfield,Varner, Harris, & Maniello, 2000; Kersting et al., 2004; Pierrehumbert et al., 2003). Some authors have also evidenced that unresolved grief regarding the infant's preterm birth can persist long after the baby's discharge (Grunau et al., 2009; Kersting et al., 2004; Shah et al., 2011; Singer, Salvator, Guo, Collin, Lilien, & Baley, 1999).

Moreover, a vast contribution of studies have highlighted that parents of preterm infants are at high risk to report symptoms of depression and anxiety following their infant's birth (Brandon et al., 2011; Carter, Mulder, Frampton, & Darlow, 2007; Voegtline et al., 2010).

Incidence rate of postpartum depression is around 32-50% in mothers of preterm infants, which is higher than rates detected in mothers of full-term infants (Mehler, Wendrich, Kissgen, Roth, Oberthuer, Pillekamp, & Kribs, 2011; Miles, Holditch-Davis, Schwartz, & Scher, 2007; Padovani, Duarte, Martinez, & Linhares, 2004, Poehlmann, Schwichtenberg, Bolt, & Dilworth-Bart, 2009). Moreover the incidence is greater in mothers of children born at high risk (Carter, Mulder, Frampton, & Darlow, 2007; Feldman, 2007; Vigod, Villegas, Dennis, & Ross, 2010). A higher risk of maternal depression has also been associated to past psychological disorders (Korja et al., 2008), perceived low support from the staff of the NICU (Davis, Edwards, Mohay, & Wollin, 2003), and child's gestational age below 33 weeks (Carter, Mulder, Bartram, & Darlow, 2005). However, rates of maternal depression have found to be moderately high also in mothers of moderately preterm babies (born between the 34th and the 36th week of gestation), with 10% of incidence of dysphoria and 14% of incidence of depression (Padovani, Duarte, Martinez, & Linhares, 2004). A research by Miles et al. (2007) has shown that after the discharge of the baby from the Neonatal Intensive Care Unit (NICU), levels of maternal depression tend to diminish till 6 months postpartum, when they stabilize. However, the remission of depressive symptoms is lower when maternal, infantile and family risk factors coexist (Pohleman et al., 2009).

Research has shown that, compared to controls, the incidence of depression is high also in fathers of preterm babies (Carter et al., 2007), though the rate of paternal depression is lower than that detected in mothers (Huhtala et al., 2011).

For what concern maternal anxiety, literature has shown that rates of anxiety in mothers of preterm infants are higher than those of mothers of full-term infants, especially at time of the child's discharge, when 1 out of 4 mothers present high levels of anxiety (Brandon et al., 2011; Carter, 2007; Voegletine et al., 2010). A study by Auslander et al. (2013) has shown that between 12 months and 3 years of the child the levels of anxiety in mothers of low risk children tend to normalize whereas those in mothers of children at high risk tend to persist. Some levels of anxiety have been detected also in fathers of preterm children (Doering, Moser, & Dracup, 2000;

Zelkowitz, Bardin, & Papageorgiou, 2007). Maternal risk factors seem associated to low levels of social support (such as being single and foreigner) and to the infant's extremely low gestational age (Zelkovitz et al., 2007), whereas infant's birth weight, infant's gender, and maternal socio-demographical characteristics (age, socio-economical status, and parity) seem not to be predictive of anxiety in mothers (Schmücker, Brisch, Köhntop, Betzler, Österle, Pohlandt, 2005; Zelkovitz et al., 2007). Contrary, the infant's gender (male), father's age (high) and perceived low support from the medical staff of the NICU seem to be risk factors for paternal anxiety (Zelkovitz et al., 2007).

The quality of medical care and attitudes of the medical staff during the infant's hospitalization in the NICU can reduce the risk of parental distress, anxiety and depression, especially in mothers of preterm children (Montirosso, Provenzi, Calciolari, & Borgatti, 2012; Trombini, Surcinelli, Piccioni, Alessandroni, & Faldella, 2008). Since maternal anxiety and depression have been associated to negative outcomes for mother-child interactions and for the child's development, prompt and adequate support to parents of preterm infants during and after the child's hospitalization is extremely important (Agostini, Neri, Dellabartola, Biasini, & Monti, 2014; Poehlmann & Fiese, 2001).

1.4 **Effects on mother-child interactions**

In the last 30 years research has contributed to highlight the effect of premature birth on the mother-infant relationship (Bozzette, 2007; Bilgin & Wolke, 2015; Korja, Latva, & Lehtonen, 2012; Goldenberg & Di Vitto, 1995).

A number of studies have documented different interactional patterns that distinguish preterm mother-infant dyads from term mother-infant dyads (Bozzette, 2007; Feldman, 2007; Forcada-Guex, Pierrehumbert, Borghini, Moessinger, & Muller-Nix, 2006; Potharst, Schuengel, Last, van Wassenaer, Kok, & Houtzager, 2012). Overall, the quality of the interaction seems to be lower in preterm dyads, with less synchrony and less coordination in very low birth weight groups (Feldman, 2007; Feldman & Eidelman, 2007).

Studies conducted in the late 1970s and 1980s showed that preterm infants were less attentive, less expressive and less responsive during the interaction with their mothers, they looked at their mothers less, vocalised less and displayed more emotional negativity than term-born infants (Crnic, Greenberg, Ragozin, Robinson, & Basham, 1978; Goldberg, 1978; Minde, Whitelaw, Brown, & Fitzhardinge, 1983). These results are confirmed also by recent literature, which shows that very preterm infants display less facial expression, less looking behaviours and a lower level of activity than term infants (Davis, Edwards, Mohay, & Wollin, 2003; Montirosso, Borgatti, Trojan, Zanini, & Tronick, 2010; Korja et al., 2012; Singer, Fulton, Davillier, Koshy, Salvatori, & Baley, 2003).

In turn, mothers of very preterm infants have been described as viewing their infants as more vulnerable than mothers of full-term children and expecting them to perform less well than other infants (Bozzette, 2007). Concerning the effect of prematurity on maternal patterns of interaction research boast a vast number of contributions, however results are not always convergent. Some studies have found that mothers of preterm children are less sensitive toward their babies during the interaction than mothers of full-term infants, while other authors fail to find significant differences (Agostini et al., 2014; Montirosso et al., 2010; Korja et al., 2008; Rahkonen et al., 2014). A recent meta-analysis (Bilgin & Wolke, 2015) that included 34 studies showed a high heterogeneity in maternal sensitivity that was not explained by prematurity. Mothers of preterm children were not found to be less sensitive or responsive than mothers of full-term children.

Studies also highlighted that mothers of premature children tend to be more intrusive and controlling than mothers of full-term children (Feldman & Eidelman, 2007; Forcada-Guex et al., 2006; Muller-Nix, Forcada-Guex, Pierrehumbert, Jaunin, Borgini & Anserment, 2004) and less supportive of the child's autonomy during toddlerhood (Potharts et al., 2012). Some authors hypothesised that maternal over-active behaviour could be a response to preterm infant's low levels of activity, or a compensatory interactive behaviour (Crnic, Friedrich, & Greenberg, 1983; Singer et al., 2003). Other authors view maternal intrusiveness as maternal reduced capacity to sensitively

interact with the infant consequent to the traumatic stress experienced by mothers of preterm children (Forcada-Guex et al., 2006, Muller-Nix et al., 2004).

Indeed, both infantile and maternal factors might influence maternal attitudes toward the child. Mothers with high-risk children seem to be less sensitive and more intrusive than mothers of full-term children (Muller-Nix et al., 2004). At the same time, low risk preterm children seem to be more responsive during interactions in the postpartum than high-risk children (Singer et al., 2003). Dysfunctional maternal interactive behaviours might be associated to maternal characteristics such as socio-demographical, psychological and relational factors. For what concern socio-demographical maternal characteristics, higher risk has been identified for mothers with low socio-economic status (Fuertes, Faria, Soares, & Crittenden, 2009), low education (Bigelow, McLean, Proctor, Myatt, Gillis, Power, 2010; Holditch-Davis, Schwartz, Black, & Sher, 2007; Zelkowitz, Bardin, & Papageorgeou, 2007), low age (Bigelow et al., 2010; Holditch-Davis et al., 2007), and primiparous (Holditch-Davis et al., 2007). Psychological and relational factors associated with low levels of maternal levels of sensitivity concerns maternal psychopathology (high levels of distress, depression, anxiety, or personality disorders) (Agostini, Monti, & Salvatori, 2009; Holditch-Davis et al., 2007; Feldman & Eidelman, 2007) and low levels of social and marital support (Amankwaa, Pickler, & Boonmee, 2007; Cho et al., 2009; Zelkowitz et al., 2007).

An Italian study by Coppola et al. (2007) found that at 3 months of the child maternal sensitivity in mothers of very low birth weight children (VLBW) was mediated by maternal attachment to the child. The authors found that the child's risk had an effect on insecure mothers but not on secure attached mothers, as if the traumatic experience of the premature birth could reactivate a past traumatic experience (Coppola, Cassiba, & Costantini, 2007). However, Korja et al. (2012) did not find any effect of prematurity in mediating between maternal representation and interactive behaviour. Even if this association was not confirmed, indeed maternal trauma may represent a risk factor for maternal parenting behaviour (Monti, Agostini, & Neri, 2013; Magrini, 2002; Muller-Nix et al., 2004; Forcada-Guex et al., 2006). Literature agrees in underlying the

importance of early interventions directed to support the mother-child relationship during the infant's hospitalization in the NICU: infant massage, kangaroo care, psychological support directed have been found to improve mother-child early interactions with positive outcomes on the child's development (Bigelow et al., 2010; Ferber et al., 2005; Feldman & Eidelman, 2003; Feldman, Eidelman, Sirota, & Weller, 2002; Montirosso et al., 2012; Trombini et al., 2008).

CHAPTER 2

Feeding disorders of infancy and early childhood

2.1 Infant Research and mother-child feeding interactions

The term "Feeding" is generally used to emphasize the dyadic nature of eating in infants and young children (Chatoor, 2002).

Feeding represents a very important time in the child's life, as the social and affective exchanges with the caregiver that occur during the meal-time are essential for the child's affective and emotional development (Ammaniti et al., 2012; Stern, 1985). During feeding interactions with the caregiver the child can experience his/her emerging autonomy (A. Freud, 1965; Lichtenberg, 1989, Lichtenberg, Lachmann, & Fosshage, 2010; Trombini, 2010; Trombini & Trombini, 2007).

Infant research has shown that breastfeeding is characterised by a *turn taking* activity between the mother and the child (Kaye, 1982): babies present rhythmic sucking and non-rhythmic burst-pause cycles and mothers adjust to their baby's sucking activity by reserving stimulations during the infant's nipple-out pauses from nursing. The baby's pauses in feeding appear important as a "regulatory function that is optimally initiated and controlled by the infant" (Satter, 1990, p. 353). Mothers may talk, smile and engage with the infant (e.g. jiggling the bottle) during pauses, whereas they remain more passive to facilitate the child's sucking activity when the baby is nursing. Field (1977) called this maternal adjustment to the baby's sucking rhythm as "sensitive timing". Ainsworth (1969) defined the psychological rhythm of feeding as characterised by three main concepts: *Timing*, which refers to the mutual regulation of the feeding rhythms, *Pacing*, which refers to the regulation of feeding rhythm that considers the child's pace and readiness to suck/eat, *Termination of Feeding*, which refers to a flexible termination of the meal based on the child's cues and signals of satiety more than on an arbitrary duration. Maternal role is, therefore, to "frame" the child's experience during these dyadic exchanges (Kaye, 1982).

Contributions by Infant Research have highlighted that mother and child exchanges during the interaction are characterised by times of match, or synchrony between the child and the mother, and times of mismatch, when the mother's and the child's need are not reciprocally met (Beebe & Lachmann, 2002). For example, during feeding we can observe a situation of "match" when the child is ready to eat and the mother offers food (bottle, breast, or spoon). The child would then have his/her needs met and experience positive affect. Differently, if the mother offers food when the child is not ready/or does not offer food when the child is ready, the dyad would experience a situation of mismatch, where mutual needs are not satisfied, and experience negative affect (Field, 1977). Interactions are characterised by the alternation of matches and mismatches, however, in healthy dyads the mother is able to "correct" her behaviour in a sufficient time to repair the mismatch and adjust her behaviour to the infant's need (Beebe & Lachmann, 2002). Maternal psychopathology or distress (e.g. eating disorders, depression, and anxiety) may obstacle maternal capacity to understand and respond to the child's need (Murray, Cooper, Creswell, Schofield, & Sack, 2007; Ramsay & Gisel, 1996). This situation would create a context of unrepaired mismatches where the dyad experiences a lack of reciprocity and a majority of negative affect during the interaction (Tronick, 2007, 2008).

The turn-taking that characterises mother-child interactions during breastfeeding represents the first form of social communication and influences future interpersonal and social exchanges (verbal and non-verbal ones) (Keye, 1982; Satter, 1990). The psychological rhythms of feeding change as the child grows; during the transition to spoon- and self-feeding the child and the mother need to re-organise their interactions (Ammaniti, Lucarelli, Cimino, & D'Olimpio, 2004; Lucarelli et al., 2002). The child becomes more active and the mother has to adjust to his/her growing autonomy (Lichtenberg, 1989, Lichtenberg, et al., 2010; Trombini, 2007). In the first three years of life, therefore, the child's feeding is intrinsically related to the relationship with the caregiver. Satter (1986) proposed the term feeding relationship to describe, "the complex of interactions that

transpire between parent (or primary caregiver) and child as they engage in food selection, ingestion, and regulation" (p. 353).

2.2 **The transition to self-feeding**

The transition to autonomous feeding sees the passage from different feeding milestones that are strictly connected to the child's sensorimotor and neurological maturation and to the social and affective experiences with the caregiver (Chatoor & Macaoay, 2008). Table 1, summarizes the literature contributions presenting the age-related acquisitions of feeding skills during childhood, from 0 to 30 months. During this period the child passes from sucking, to chewing and swallowing, to developing more autonomous feeding skills and reach internal regulation of huger-satiety cycles (Ammaniti et al., 2004, 2006; Lucarelli et al., 2002, 2003; Chatoor, 2002, 2009; Trombini & Trombini, 2006, 2007; Trombini, 2010). Parental support to facilitate the transition from one to the other feeding milestones is fundamental to the child's development of autonomous skills, self-efficacy and independency (Lichtenberg, 1989, Lichtenberg et al., 2010; Trombini, 2010).

Children's first attempts at self-feeding occur a few months after weaning is completed. Around 7-9 months children start establishing a first independent contact with food, which can be observed in the first attempts to grab food with their hands. Around 12 months the child initiates to show an active search for food and for autonomy during the meal, which progressively increase through 18 months when the child's behaviours of self-feeding arise drove by a growing motivation for autonomy. At this time, due to the their increasing motor and cognitive skills, children can bring food to their mouth, start handling a spoon, learning how to feed themselves. Moreover, they develop clear food preferences. During the second year of life (18-24 months) the child's gradually increases his/her self-feeding skills and autonomy, becoming able of eating with spoon and fork. It is common at this time that the child refuses parental help for his favourites food, but still accepts to be fed for unlinked foods. Around 30-36 months the child's can eat almost independently and takes part to the family's meal.

Parental behaviour during the child's meal can support or obstacle the passage from one to the other stage of the process (Lichtenberg, 1989, Lichtenberg, et al., 2010; Trombini, 2010). From breastfeeding, through weaning and through the acquisition of eating autonomy, the child passes from a situation of dependence from the mother, where the mother regulates the infant's feeding, to a situation of relative independence, where the child regulates his/her own eating behaviour (Chatoor, 2002, 2009; Freud, 1965; Metzger, 1967). The different steps that conduct towards feeding autonomy are, therefore, strictly connected to the process of separation-individuation from the mother (Freud, 1965; Mahler, Pine, & Bergman, 1975).

I. Chatoor (2002) describes the process of internal autonomous regulation of feeding that characterises the first three years of life and leads the child to be aware of his/her hunger-satiety needs and correctly communicate them to the caregiver. This process goes through three stages: the first is characterised by the achievement of homeostasis, between 0 and 2 months the child developmental task is to achieve and maintain a state of calm and alertness. The second phase (3-6 months) is characterised by the achievement of dyadic reciprocity. At this time the child-caregiver interactions become more rich and complex, the child's begins to communicate more intentionally his hunger and satiety (through vocalizations, smiles, body movements) and food exchanges become a mutually regulated process. Finally, the third stage, between 6 months and 3 years of the child, mark the gradual acquisition of independent regulation of eating that accompanies the process of separation-individuation form the attachment figures (Chatoor, 2002).

During the toddlerhood age (18-30 months) children attempt to individuate and to experience themselves as a separate person from the mother (Mahler Pine, & Bergman, 1975). They become oppositional and their growing initiative can lead to protests during the meal such as, refusing food or throwing food away, or spitting. Arfelli Galli (2006, 2009) points out that already Klamma in 1957 had provided empirical evidence to the child's motivation for autonomy during the second year, defined as a strong request to do by him/herself, associated with the rejection of the adult's help. Generally, after the first difficulties encountered in the performance, the child desists

in its intentions and asks the help he had previously refused. This behaviour is generally observed until age four of the child. The child's motivation for autonomy, although not yet motivated to get a successful result, is strictly linked to a sense of being and of being the cause of his/her own actions (Klamma, 1957). G. Trombini (1968a, 1968b, 1969, 1970) had already shown that the motivation for autonomy emerges in the context of feeding (in the second and third year of life) and successively during toilet training (in the third year of life).

Parental capacity to understand the child's need for autonomy, allowing the child to experiment with food, grab the spoon and attempt at self-feeding is fundamental to the construction of the child's individuation (Lichtenberg, 1989, Lichtenberg et al., 2010; Trombini & Trombini 2006, 2007; Trombini, 2010). Excessive parental control and strict regulation of food intake may turn the mealtime into a "struggle for control" (Ammaniti, Ambruzzi, Lucarelli, Cimino, & D'Olimpio, 2004; Chatoor, 1996; Lucarelli, Ambruzzi, Cimino, D'Olimpio, & Finestrella, 2003). The negotiation of conflict during feeding is, therefore, fundamental during a time when the child's aggressive and oppositional behaviours start emerging (Satter, 1990; Stein, Woolley, & McPherson, 1990; Lichtenberg, 1989, Lichtenberg et al., 2010). As it will be later discussed in this chapter, parental pressure, even if positive, can negatively influence the child's food acceptance. The mother-child relationship appears to have an effect on the child's food intake: Research shows greater unresolved conflicts and parental control in families with children that suffer from feeding disorders (Ammaniti, et al., 2004; Atzaba-Poria, Meri, Millikovsky, & Barkai, 2010; Chatoor, Hirsh, Ganiban, Persinger, & Hamburger, 1998). Mothers difficulties in understanding and sensitively respond to the child's attempt of autonomy during the second year of life (such as intrusiveness and over-control) can lead to negative affect and protests in the child, impacting on the successful transition to self-feeding (Chatoor 1996; Chatoor & Macaoay, 2008; Gueron-Sela, Atzaba-Poria, Meiri, Yerushalmi, 2011; Trombini & Trombini, 2006, 2007; Trombini, 2010).

Table 1. Feeding milestones during the first three years of life: Explicatory summary of the literature

0 – 3 months	Awakening/crying for food, onset of internal regulation and dyadic adjustment
	Rhythmic sucking/sustained by turn-taking and pause cycle
4 – 6 months	Experimentation of food, mother-child interaction and negotiation of weaning
	Tries semi-solid foods, new flavours, and different texture
7 – 11 months	Active search for food, first attempts of grabbing food with hands, structuring of weaning dynamics
	Beginning of chewing-swallowing coordination; chewing competences increase
12 – 18 months	Active search for food, self-feeding behaviours (hand-eating) associated with an increasing motivation for autonomy. Mother-child interaction: negotiation of autonomy and interactive conflicts
	Preference of certain foods accompanied with verbal request and progressive maturation of masticatory skills
19-24 months	Maturation of self-feeding skills, the child is able to hold the spoon and feed him/herself
	Increasing child's autonomy. Refusal of parental help for favourite foods, may accept help for unwanted food
25-36 months	Can eat by him/herself with spoon and fork
	Want to participate in family meals (third year)

2.3 **Definition and incidence of feeding disorders**

Feeding difficulties (FD) are quite common in childhood and can be associated to specific life changes (Lindberg, Bohlin, & Hagekull, 1991; Linscheid, Budd, & Rasnake 2009). It has been estimated that 80% of children can experience "perturbations" of their eating behaviour, transient difficulties that generally withdrawn without interventions (Bryant-Waugh; Markham, Kreipe, & Walsh, 2010), while between 6 and 25–45% of children can develop feeding disorders (FD) of various type and severity (Benoit, 2000; Bryant-Waugh et al., 2010; Lyons-Ruth, Zeanah, & Benoit, 2006), with 1–2% suffering from severe feeding difficulties associated with poor weight gain (Chatoor & Macaoay, 2008).

The Zero-to-Three Diagnostic Classification (CD: 0-3R) (2005) defines eating disorders of infancy and early childhood as the child's difficulty in establishing a regular feeding pattern, meaning the child is not able to adjust his/her diet according to the physiological states of hunger and satiety. The definition of "Early Feeding Problems" includes a wide range of problems with different aetiology and outcomes, which include: Organic and Non-Organic Failure to Thrive, Food Refusal, Pica, Rumination and Hyperphagia (Bryant-Waugh et al., 2010; Benoit, 2000 Chatoor, 2002; Douglas, 2002; Manikam & Perman, 2000).

Failure to Thrive (FTT) indicates the child's growth failure, both for weigh and high (Bryant-Waugh et al., 2010; Chatoor, 1996). FTT can be diagnosed based on three symptoms occurring for more than a month: weight below the 5° percentile for the child's age, the child's stop to gain weight, the proportion weight/height is below the 90°. Historically FTT has been differentiated in organic and non-organic. The first refer to organic pathologies of the child that obstacle the food intake or absorption. The second situation refers to a child's growth failure that is not explained by physical causes. Non organic-FTT has often been observed in social or relational pathological context, for example in cases of maltreatment and maternal deprivation (Chatoor et al., 2002).

The second definition "Food Refusal" refers to the child's specific behaviour of food refusal, which can be selective or extended to any kind of food (Field, Garland, & Williams, 2003). Chatoor (2002, 2003, 2009) indicated different disorders characterised by food refusal that will be later discussed, among which: Infantile Anorexia, Food Selectivity, Post-Traumatic Feeding Disorders and disorders comorbid with medical conditions. In all these disorders, food intake is very limited and not appropriate. Generally, the child's food refusal behaviours include: refusing to open the mouth, throwing food away, spitting, vomiting, or excessive chewing (Lindberg, Bohlin, Hagekull, & Thunström, 1994).

The "Pica" disorder refers to the ingestion of uneatable food (paper, soil, wall plaster, etc.), while "Rumination" disorder refers to the compulsive chewing of food that has been previously ingested and regurgitated. Both disorders are often comorbid to cognitive impairments or very deprived situations (APA, 2013).

The latter terms, "Hyperphagia" refers to the excessive ingestion of food (Manikam & Perman, 2000) and it is a common problem in childhood, often associated to obesity in adulthood and to dysfunctional emotional regulation (Benoit, 2000; DeCampora, D'Onofrio, & Zavattini, 2014).

Diagnostic manuals provide different classifications of feeding disorders in infancy and childhood; The ICD-10 (WHO, 1992) distinguishes between "Other Feeding Disorders of Infancy and Early Childhood" (which includes rumination disorder, non organic failure to thrive, and food refusal) and "Pica of infancy and early childhood". The DSM-IV and DSM-IV-TR (APA, 1994; 2000) included feeding disorders of infancy and early childhood in the section "Feeding and Eating Disorders of Infancy or Early Childhood", which included the Pica and Rumination disorders and Non-Organic Failure to Thrive. The last version of DSM (DSM-V, APA, 2013; Italian version published in 2014) incorporates the diagnosis of "Infantile Anorexia", "Sensory Food Aversion", and "Feeding disorders associated to insults of gastro-intestinal tract" in the sub-category "Avoidant and Restrictive Food Intake Disorders" (ARFID). The classification proposed in DSM-V introduces

relevant changes to the one used by DSM-IV (APA, 2000). First, feeding/eating disorders of childhood and adulthood are part of the same category ("Feeding and Eating Disorders"). This choice has been introduced to underline the important relationship between feeding problems in infancy and childhood and later occurrence of eating problems during adolescence and adulthood (Bryant-Waugh et al., 2010). Secondly, the manual introduces the possibility of rate the disorder severity on a scale 0-4, where 0 is the absence of symptoms, 1 indicates only some of the criteria are satisfied and 2, 3, 4 diagnose the disorder but based on different levels of severity (based on the nutritional deficit and on social and relational impairments) (Lucarelli, Cimino, & Ammaniti, 2012).

The diagnosis of feeding disorders in childhood presents, however, many limits. Young children are constantly developing and pathological situations may change or be related to a certain and restricted developmental aspect of the child's life. At this purpose the classification proposed by I. Chatoor (2002, 2003, 2009) and incorporated into the Zero-To-Three Diagnostic Classification (DC: 0-3R, 2005) defines six feeding disorders according to the child's developmental age. Moreover, the mother-child relationship is considered in the aetiology of the disorder and included in the diagnosis. The Pica and Rumination disorders are not incorporated in the DC:0-3R (2005) and the manual refer to DSM-V or ICD-10 for these disorders. The six disorders included in the DC: 0-3R (2005) comprise:

- *Feeding Disorder of State Regulation* (onset during the age range 0-3 months): Characterised by difficulties of the infant in reaching and maintaining a state of calm during feeding (e.g. infant is too sleepy, too agitated, and/or too distressed to feed). Feeding difficulties start in the new-born period and infant fails to gain or looses weight;
- *Feeding Disorder of Caregiver-Infant Reciprocity* (onset during the age range 3-6 months): Diagnosed when the infant does not display developmental appropriate signs of social reciprocity (e.g. eye contact, smiling, vocalizing) with the primary caregiver

during feeding. The infant shows a significant growth deficiency, which is not due solely to a physical disorder or to a pervasive developmental disorder;

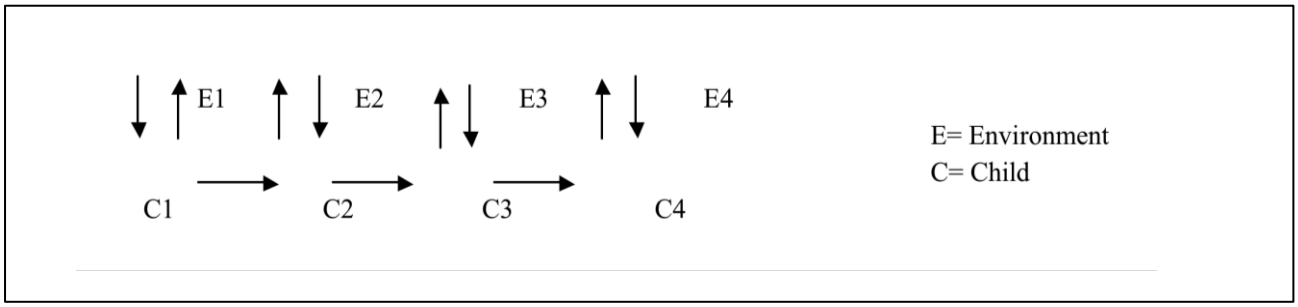
- *Infantile Anorexia* (onset between 6 and 3 years of the child): Characterised by the child's persistent food refusal, lack of hunger and lack of interest in food. The disorder is diagnosed when the child does not eat adequate amount of food for at least a month and shows growth deficiency (high or weight or both). The food refusal does not follow a traumatic event and it is not due to an underlying medical illness;
- *Sensory Food Aversion*: Characterised by the child's refusal to eat a certain type of food (the child eats without difficulties when offered preferred food). The onset generally occurs with the introduction of new foods (e.g. may drink milk but refuses baby food, or may drink one type of milk but not the other). The food refusal causes specific nutritional deficits or delay of the oral-motor development;
- *Feeding Disorders Associated to a Concurrent Medical Condition*: Characterised by compromised feeding when the child has a concurrent medical condition that the clinician judged to be the causes of the distress (e.g. gastro-oesophageal reflux), however medical management may improve but not completely resolve the problems with feeding. The infant or young child generally initiates feeding, but shows distress in the course of feeding and refuses to continue feeding;
- *Feeding Disorders Associated with Insult to the Gastrointestinal Tract*: The child's food refusal follows a major event or repeated noxious insult to the oropharynx or gastrointestinal tract (e.g. chocking, severe vomiting, reflux, insertion of the nasogastric or endotracheal tubes, suctioning) that trigger intense distress in the infant or young child. The infant shows intense distress when positioned for feeding (e.g. crying, screaming, arching) and resist intensely when the caregiver tries to position the bottle or food or resist to swallowing the food. The food refusal poses an acute or long-term threat to the child's nutrition.

2.4 **The transactional model and current perspectives**

For what concern the aetiology of feeding disorders of infancy and early childhood, research has investigated the role of both the child and the caregiver factors (Farrow & Blisset, 2006).

Associations have been found between the child's characteristics and maternal psychopathology and research underlines the importance of considering a transactional multi-risk model to understand and explain feeding disorders of infancy and early childhood (Ammaniti, Ambruzzi, Lucarelli, Cimino, & D'Olimpo, 2004); Farrow & Blisset, 2006; Sameroff & Emde, 1989) (Figure 1).

Figure 1. Transactional Model (Sameroff & Emde, 1989)



For what concern the child's risk factors, the child's difficult temperament seems to be associated to a higher risk of developing feeding disorders (Ammaniti, Lucarelli, Cimino, D'Olimpio, & Chatoor, 2010; Chatoor, Ganiban, Hirsh, Borman-Spurrell, & Mrazek, 2000). Children with Infantile Anorexia show higher levels of physiological arousal, higher distractibility, poor physiological regulation and higher levels of emotional negativity than children without feeding disorders (Chatoor, Ganiban, Surles, & Doussard-Roosvelt, 2004; Lucarelli, Cimino, D'Olimpio & Ammaniti, 2013). At the same time, difficult temperamental traits have been associated to parental controlling feeding behaviors (Blisset & Farrow, 2007; Horn, Galloway, Webba, & Gagnon, 2011) and high levels of parental control seem to be associated with more difficulties in the child to regulate his/her nutritional intake (Jonson & Birch, 1994). Another study found an interesting association between temperament of infants with eating problems and maternal

sensitivity: Children with less sensitive mothers reported more eating problems at 10 months, while in children with highly sensitive mothers, temperamental difficulties were not associated with eating problems (Hagekull, Bohlin, & Rydell, 1997). Therefore, these studies show how child's temperamental traits and maternal sensitivity might contribute to the development and the maintenance of a wide range of food problems. The child's temperament can therefore be considered a risk factor that together with other contextual variables can be associated to the future development of eating disturbances, may they be on the overweight (Agras, Hammer, McNicholas, & Kraemer, 2004) or on the anorectic side (Farrow & Blisset, 2006).

For what concern maternal and environmental factors, research has highlighted the association between maternal psychopathology and the development of psychopathology in the child (Park, Senior, & Stein, 2003). The effect of maternal psychopathology on the child's seem to depend more on the duration and severity of the symptoms than on the specific diagnosis (Candelori & Mancone, 2001). Moreover, it seems that the association between maternal psychopathology and the development of psychopathological symptoms in the child may be mediated by maternal parental attitudes. Maternal psychopathology is associated to an increase in parental dysfunctional behaviours (e.g. lack of sensitivity and responsiveness, intrusiveness, over-control, detachment, hostility), which in turn increases the risk of psychopathological outcomes in the child (Johnson, Cohen, Kasen, Smailes & Brook, 2001; Karen, Dollberg, Koster, Danini & Feldman, 2010).

For what concern the specific area of feeding disorders, maternal eating disorders seem to predict the child's eating disorders (Park et al., 2013). In fact, maternal eating disorders impact on maternal attitudes in feeding the child (e.g. strict control on the amount of food intake, preoccupation concerning food, disorganised and unpleasant meals), which in turn affects the child's eating behaviour (Agras, Hammer, & Nicholas, 1999; Cooper, Whelan, Woolgar, Morrell, & Murray, 2004; Micali, Simonhoff, Stahl, & Treasure, 2011).

Maternal affective disorders, reducing maternal capacity to sensitively recognise and respond to the child's cues during feeding, have also been considered as risk factors for the

occurrence of eating problems in children (Ammaniti et al., 2010; Ramsey, Gisel, McCusker, Bellanvance, & Plat, 2002; Whelan & Cooper, 2000; Lucarelli, Cimino, D'olimpio & Ammaniti, 2013). However, studies are discordant on this. While some research show an association between depression, anxiety and feeding disorders in infancy/childhood (Ammaniti et al., 2010; Lucarelli et al., 2013), others fail to find any relationship between the variables (Ramsey et al., 2002; Whelan & Cooper, 2000). Moreover, maternal preoccupations about the child's weigh and food intake have also been associated with feeding and eating disorders of infancy and early childhood (Gueron-Sela Atzaba-Poria, Meiri, & Yerushalmi 2011).

Last, another important factor that seems to be associated to an increased risk of feeding disorders in children is insecure attachment (Chatoor et al., 2000). Data show that in children with eating disorder arising before age three there is an increasing risk of presenting insecure attachment in both members of the dyad (Chatoor, Ganiban, Colin, Plummer, & Harmon, 1998a; Ward, Kessler, & Altman, 1993; Ward, Lee, & Lipper, 2000). Having attachment patterns that are not optimal, also, increases the risk of eating problems in childhood and establishes a basis for the chronicity of the child's malnutrition (Chatoor et al., 1998a; Ward et al., 2000). The patterns of attachment of both the parent and child result predictive of a potential dysfunction in the child's eating behaviour, and, therefore, it is important to carefully examine them (Cimino, 2011).

The described contributions seem therefore to confirm the importance of a multifactorial aetiological system for the diagnosis and treatment of eating disorders in childhood that considers both the child's, the mother's factors, and their interaction. In this context, the feeding disorder is a behavioural pattern that the child develops in response to the interactions with his/her caregivers, past experiences with feeding, temperamental traits and medical history (Douglas, 2002). The occurrence of the disorder is nested in the mother-child relationship and sustained by dysfunctional interactions during the mealtime (Satter, 1990; Chatoor, 1996; Chatoor et al., 2000) (Figure 3). The analysis of mother-child interactions in family with children with eating disorders has allowed highlighting dysfunctional behaviours that characterize those dyads during the mealtime.

Children with eating disorders experience feeding interactions with their mothers that are characterised by high levels of conflicts and a sort of struggle for control, where the more the mother presses the child to eat the more the child's refuses the food. The child's behaviour, in turns, sustains maternal preoccupation, increasing maternal anxiety and pressure on the child (Chatoor, Hirsh, Ganiban, Persinger, &Hamburger, 1998b, Satter, 1990; Trombini, 2010) (Figure 3). This chain of dysfunctional maternal and child's behaviours is the context that maintains the infantile feeding disorder. Typical behaviours that can be observed in the mother are maternal intrusiveness (e.g. force-feeding the child) and over-control (limitations to the child's autonomy, preoccupation about food messiness, rigid termination of feeding) (Lucarelli et al., 2003; Stein, Wooley, & McPherson, 1999). In children with eating disorders food refusal can take different, shapes as already mentioned, including shaking the head, running away, crying, arching, spitting or throwing food, and refusal to swallow (Ammaniti et al., 2004; Chatoor et al., 1998b; Trombini, 2010).

Figure 2. Transactional Model for the Development of Infantile Anorexia (Chatoor, 1996)

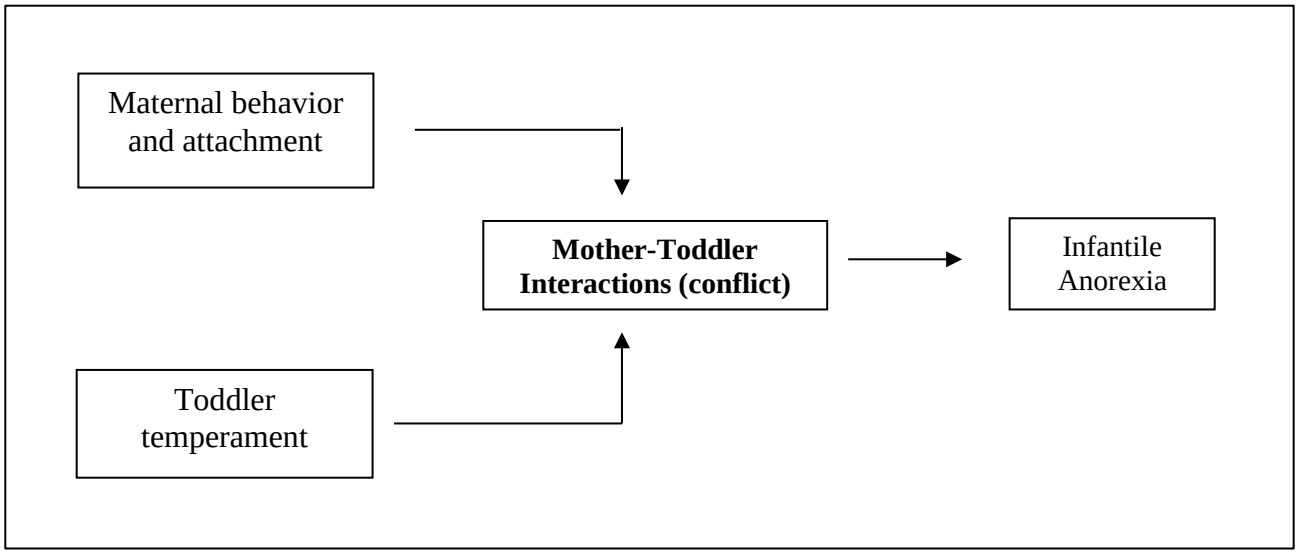
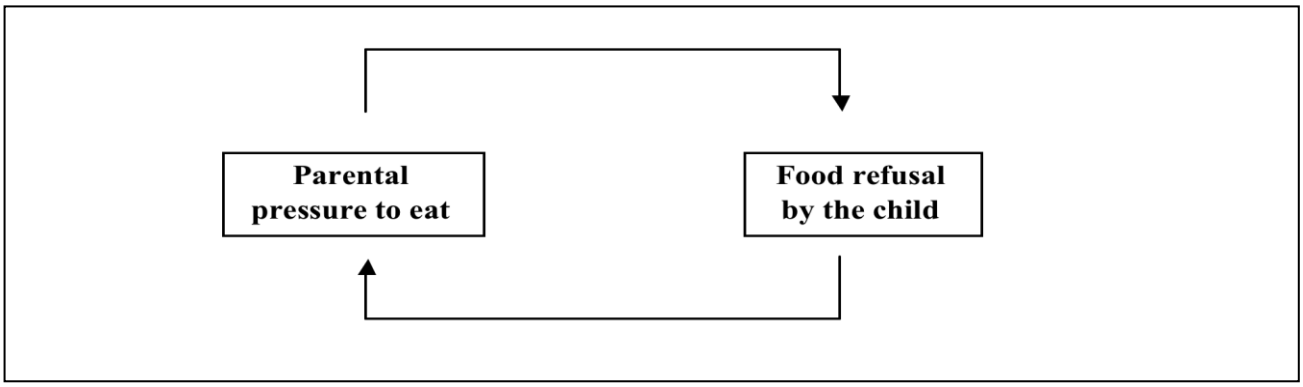


Figure 3. Exemplification of the transactional model by I. Chatoor (1996)



2.5 **Course of feeding disorders and long-term outcomes**

While some of feeding difficulties in childhood may be transient and associated to specific life changes, acute feeding problems are associated with severe consequences for the child's health and development, including susceptibility to chronic illness, growth failures, cognitive deficits, behavioural problems and future eating disorders (Chatoor & Macaoay, 2008; Manikam & Perman, 2000). Research has shown that generally, even in non-clinical groups, food refusal and food issues are moderately stable over time (Dahl, 1987a; Lindberg, Bohlin, Hagekull, & Thunström, 1994; Hagekull, Bohlin, & Rydell, 1997). A wide longitudinal study conducted by Marchi & Cohen (1990) on 659 children over 10 years, revealed that picky eaters and children with gastro-intestinal problems (vomit, constipation, diarrhoea, stomach pain) were more exposed to develop Anorexia Nervosa, while pica and conflicts during the meal were predictive of Bulimia Nervosa. Another quite recent longitudinal study (Kotler, Cohen, Davis, Pine, & Walsh, 2001) has highlighted that food conflicts, struggles for food, and unpleasant meals during childhood predict a later diagnosis of Anorexia Nervosa. Moreover, a diagnosis of Bulimia Nervosa in adolescence was predicted by the disinterest in food, while bulimia occurring in adulthood by struggles at mealtimes during childhood. Moreover, a recent Italian study (Ammaniti, Lucarelli, Cimino, D'Olimpio, & Chatoor, 2012) that followed children with eating disorders up to 8 years showed that even when the

nutritional state of the child may improve over time, the child's eating behaviours remains problematic in absence of a previous treatment. Follow-up at 4-6 years and at 8 years showed that children with past feeding behaviours were more scared of trying new foods, slow eaters, and 5-60% of children was showing a delay in eating autonomously (Ammaniti et al., 2012).

Consequences of feeding disorders concern not only the child's physical health and eating behaviour but also his/her emotional and affective development. Recent research has shown that non-organic eating disorders detected in seven months infants developed into successive relationship problems (De Gangi, Breinbauer, Roosevelt, Porges, & Greenspan, 2000). Moreover, literature shows that children with feeding disorders are more prone to show internalizing and externalizing behavioural problems during middle childhood such as: Separation anxiety, sleeping disorders, somatic complaints, oppositional behaviours and social withdrawn (Ammaniti et al., 2012; Hemmi, Wolke, & Schneider, 2011; Winsper & Wolke, 2013).

CHAPTER 3

Prematurity and feeding disorders: Risk factors associated to preterm birth

3.1 Child's risk factors

Especially for extremely and very preterm children nutrition may represent a problematic area (Dodrill et al, 2004; Pierrehumbert et al., 2003; Thoyre, 2007). These children's first feeding experiences are very different from the ones experienced by full-term infants (Latmiral & Lombardo, 2000, Trombini, 2007).

Well infants of gestational age >34 weeks are usually able to coordinate sucking, swallowing, and breathing, and so also establish breast or bottle-feeding (Arvedson, Clark, Lazarus, Schooling, & Frymark 2010; Barlow, 2009; Kenner & McGrath, 2004; Thoyre, 2003). When infants are born before the 33th week of gestation, oral feeding may not be safe or possible because of neurological immaturity or respiratory complications. In these infants milk can be given through a nasogastric tube (NG feeding; also called "*Gavage*") that passes via nose or mouth to the stomach (McGuire, Anderson, & Fowlie, 2008) or intravenously ("*Parenteral Feeding*").

The first nutritional experiences of these infants occur then as a mechanical and passive event, hunger vanishes even before the infant has experienced it and without any active behaviour by the child. The nutrient cycle in these children is punctuated by the medical routine and unrelated to any contact with the caregiver (Latmiral & Lombardo, 2000). Also, unlike full-term born children, who can be breastfed immediately be attached to maternal breast immediately after their birth, premature babies are prematurely separated from their mother (Lee, Lee, & Kuo, 2009). During the hospitalization in the Neonatal Intensive Care Unit (NICU), as the child is attached to medical machines (respiratory and oral feeding tubes), nurses are usually the main caregivers responsible for the child's feeding and general care. Mothers are often left to observe and can touch or interact with the child only when his/her condition have stabilized. Breastfeeding is not always

possible, as a consequence of preterm birth is often a poor maternal lactation, however, when possible, breastfeeding is recommended as seems to be a protective factor not only for the child's growth but also for mother-child interactions (King, 2005).

The invasive medical complications and lack of positive experiences with food associated to preterm birth can further impact on the child's feeding behaviour. Preterm children can find difficult to adjust their skills to successful oral feeding; for example, they may develop issues in the regulation of the hunger-satiety cycle (Schädler, Süss-Burghart, Toschke, von Voss, H., & von Kries, 2007; Schmid, Schreier, Meyer, & Wolke, 2011), in the rythmicity of sucking, and in the oral-motor organization and coordination of the sucking-swallowing-and breathing cycle (Medoff-Cooper & Ratcliffe, 2005; Palmer, Crawley, & Blanco, 1993; Silberstein, Geva, Feldman, Gardner, & Karmel. 2009; Torola et al., 2012). Research have found preterm infants with an history of NG feeding may display alterated oral sensitivity and facial defensiveness behaviours, such as the use of avoidance tactics in anticipation of approaching food or contact with the face such as crying, spitting food, head turning, gagging or pushing food away (Vogel, 1986; Bazyk, 1990; Adverson & Brodsky, 2002; Morris & Klein, 2000). Moreover, some studies have found a trend of delayed feeding development in preterm children compared to full-term children such as: disorganized sucking patterns, weak jaw movement in biting, poor swallowing of semi-solids, prolonged duration of the mealtime (Adverson & Brodsky, 2002; Dondrill, McMahon, Ward, Weir, Donovan, Riddle, & 2004). Contributions seem to agree that preterm children might experience difficulties in breastfeeding and weaning (Burklow et al., 2002; Zanardo, Gambina, Begley, Litta, Cosmi, Giustardi, & Trevisanuto, 2011, Fanaro, Borsari, & Vigi, 2007) while less is known about the transition to self-feeding in preterm children (Cerro et al., 2000).

Nevertheless many studies found an association between past medical history and feeding problems in preterm children, Crapnell et al. (2003), in a more recent contribution, failed in finding an association between medical factors in the Neonatal Intensive Care Unit (NICU) and feeding problems in the child at age 2. In addition, an association with low socioeconomic status of the

family and feeding problems in preterm infants was found. This data might reflect a result of the changing trends in neonatal care, where infants are kept on respiratory and feeding support for fewer days than in the past, or could mean that other factors play a larger role in adverse feeding behaviours of preterm children (Crapnell, Rogers, Neil, Inder, Woodward, & Pineda, 2003).

Longitudinal studies on preterm children's feeding behaviour in childhood, adolescence and adulthood are not numerous. Some authors found that an increased risk of anorexia nervosa in adulthood was associated with being born less than 32 weeks of gestation (Cnattingious, Hultman, Dahl, & Sparen, 1999) and lower gestational age (Foley, Neale & Kendler, 2000). Moreover, both Anorexia Nervosa (AN) and Bulimia Nervosa (BN) were associated with preterm birth in data-linkage studies (Favaro, Tenconi, & Santonastaso, 2006; Nosarti et al., 2012). A recent study by Micali et al. (2015) confirmed these results, finding that individuals that were born very preterm (less than 33 weeks of gestation) reported higher levels of eating disorders (ED) psychopathology, especially body dissatisfaction and compensatory behaviour at age 21 years.

In contrast to these investigations, other studies failed in finding associations between preterm birth and eating disorders in adulthood (Feingold, Sheir-Ness, Melnychk, Bachrach, & Paul, 2002; Wehlkalampi et al., 2010). Wehlkalampi et al. (2010) even found that preterm adults were showing less ED symptomatology that individuals born full-term. Last, a recent meta-analysis by Krug et al. (2013), found no significant effect of premature birth on eating disorders in adulthood, highlighting that data on eating disorders in preterm individuals seem still unclear.

Other studies have instead found an association between premature birth and high body mass in preterm children and adolescences (Vasylyeva, Barche, Chennasamudram, Sheehan, Singh, & Okogbo, 2013). Obesity was related to higher gestational age and birth weight. Mechanism is still unclear but could be related to appetite regulation and to maternal over-feeding practices (Armitage, Taylor, & Poston, 2005; Erikson & Swenne, 1982; Portha, Chavey, & Movassat, 2011). However, most preterm infants, especially those born very preterm with ELBW, are not fed

sufficient amounts of nutrients to produce normal fat rates of growth after birth and might end up growth-restricted during their hospital period (Hay, 2008).

Overall, these study seem to suggest an increased risk in individuals born preterm to experience eating disorders in childhood, adolescence and adulthood. However, literature is still contradictory. Moreover, the causes and evolution of these problems are unclear, suggesting the need to further explore the connection between prematurity, feeding disorders, and longitudinal outcomes.

3.2 **Parental risk factors**

For parents of preterm infants feeding can represent a particularly distressing area. Preterm children immaturity and low birth weight represent an objective risk for the baby's health during the hospitalization in the NICU. However, the issue of weight gain remains for parents of preterm children an important index of the child's well being even when the child is older (Latmiral & Lombardo, 2000; Negri, 1994). Magrini (2002) observed that the child's weight gain represented for parents of preterm children a way out from the death anxiety related to the premature birth of their children. Mothers of preterm children, might therefore, report more concerns related to the child's eating behaviour and weight even beyond the first year postpartum (Cerro, Zeunert, Simmer, & Daniels, 2002). Studies have shown that parental concerns about their child's weight can influence parental attitudes in feeding the child, thus being an important predictor of the child's future eating behaviour (Gueron-Sela et al., 2011; Park et al., 2013).

Research seems to confirm an influence of maternal distress and worries on preterm children's nutrition. A study by Pierrhumbert et al. (2003) found that regulatory problems in preterm children at 18 months, such as difficult sleeping and feeding patterns, were mediated by parental responses to the premature birth. High parental stress was associated to a higher risk for these children (Pierrehumbert, Nicole, Muller-Nix, Forcada-Guex, & Ansermet, 2003). Another contribution (Zanardo et al., 2011) has found that high levels of distress, anxiety and depression in

mothers of preterm infants were associated to negative lactation performances. Moreover, a study by Ravn et al. (2012) showed that psychological interventions and support to mothers extended the period of breastfeeding in mothers of preterm infants.

Cerro et al. (2002) assessed parental perception of their premature toddlers (from 1.5 to 3.5 years) eating behaviours through a wide self-administered questionnaire based study and evidenced parents of preterm children to be more concerned for the child's growth and health than parents of full term children, more likely to control the quantity of food eaten and to use more coercive tactics than do parents of toddlers born at term. Seventy-eight per cent of preterm parents reported that they were worried for the quality of the child's eating intake and 69% of parents did not agree to let the child decide what to eat. Moreover, 58% of parents reported their children showed food refusal behaviours. Last, parents of children with disability or tube feeding reported a higher level of concerns and difficulties (Cerro et al., 2002).

This study suggests that parents of preterm children seem then to respond to slow growth or infant feeding difficulties by becoming overactive in the feeding process, which has in turn been associated with reduced food intake and growth (Satter, 1990).

The study by Cerro et al. (2002) represents an interesting contribution for the understanding of the dynamics that might be hidden behind feeding problems in preterm children during the transition to self-feeding. However, these results limit to the parental perception of their children's behaviour.

Moreover, given the many concerns and difficulties that parents of premature babies face, a huge American study in 2000 showed that between 32 and 43% of parents expressed the need to expand the education on nutrition directed to their children (Victorian Department of Human Services, 2000). Studies presented in this section seem therefore to underlie that in the context of preterm birth, parent of preterm children may present a negative perception of the child's eating behaviour and may report many worries about the child's eating. In this context, it becomes essential to help parents of preterm children both in the short and in the long term (Thoyre, 2007).

3.3 **Mother-child feeding interactions in preterm dyads**

As already explained in Chapter 2, feeding is an essential opportunity for the development of the mother-child synchrony during early interactions and, therefore, for the construction of the attachment relationship (Holdich-Davis, Miles, & Belyea, 2000). However, learning to feed a preterm infant might not be an easy task and requires the mother to adequately recognize and respond to her infant's signals (Thoyre, 2001; Trombini, 2007).

Research has shown that, in the first year of life, preterm infants seem less responsive and show less clear clues than full-term children during feeding interactions with their mothers (Davis, Edwards, & Mohay, 2003; Singer, Fulton, Davillier, Koshy, Salvator, & Baley, 2003). They might also require more help from their parents to reach and maintain a state of calm and alertness during the feeding (Schadler et al., 2007; Schmidt et al., 2011). This process of adjusting to the infant's needs for preterm mother starts in the NICU but extends into the early discharge period and beyond, as premature infants gradually mature their sucking patterns and feeding ability (Reyna, Pickler, & Thompson, 2006). Moreover, it is only after the discharge from the NICU that mothers thoroughly assume full responsibility in feeding the child and in taking care of him as this role was left to the NICU medical staff during the infant's hospitalization (Latmiral & Lombardo, 2000; Reyna et al., 2006).

A study by Vandenberg (2006) found that synchrony between mothers and their preterm infants prior to the discharge was minimal and mothers had difficulties in reading and respond to the child's cues. Although they watched closed the baby, their capacity to attune to the child was inconsistent, and they engaged poorly. Similar results were found by another recent study (Reyna, Brown, Pickler, Myers, & Younger, 2012). Preterm mothers, were found to be excessively engaging in intrusive feeding behaviours such as forcefully inserting the nipple in the infant's mouth or pulling on the nipple. Singer (2003) also found that mothers of very-low-birth-weight infants were

more active and stimulating during feeding than mothers of full-term infants. However, the authors found that by 8 and 12 months maternal growth fostering behaviours toward the child diminished compared to those of full-term infants' mothers. Crnic (1983) also found this pattern of change from a more active to a less active behavioural pattern in mothers of preterm infants. Authors have differently interpreted maternal over-activity towards preterm infants; some study conceptualized maternal over-stimulating behaviour as an intrusive behaviour related to a lack of maternal responsiveness and sensitivity, while others as compensatory practice of these mothers that would be motivated to provide more active stimulation due to concerns about their child's health and development (Bozzette, 2007).

Even though interpretations of these behaviours may contrast, overall, this finding seem to agree in finding differences between feeding practices in mothers of preterm compared to mothers of full-term children. However, most of contributions explored mother-infant synchrony during feeding in the first year postpartum, and less is known about the evolution of mother-child feeding interactions in early childhood.

PART II: THE RESEARCH

Introduction

The literature has highlighted that feeding disorders (FD) occurring during infancy and early childhood are strictly associated with the mother-child relationship (Ammaniti, 2004, 2006; Chatoor, 1996, 2002, 2009; Chatoor & Macaoay, 2008; Satter, 1990; Trombini, 2010). A healthy eating behaviour depends on the integration of a wide range of physical functions and interpersonal relationships during early childhood, while difficulties in one or more of these areas can cause a dysfunctional relationship with food (Bryant-Waugh et al. 2010). Both the child's characteristics (temperament, neonatal or developmental complications, traumatic experiences with food or insults of the gastro-esophageal tract) and maternal attitudes during feeding (eating behaviour, sensitivity toward the child's developmental needs, intrusiveness and control during the meal, affective state, preoccupation for the child's weight gain) may concur to develop the disorder (Blisset & Farrow, 2007; Chatoor et al., 2000; Horn et al., 2011; Gueron-Sela et al., 2011; Stein, 1999). Low emotional availability, lack of dyadic reciprocity and unresolved dyadic conflicts seem to characterize the interaction of children with eating disorders and their mothers (Atzaba-Poria et al., 2010; Chatoor et al., 1998b; Lucarelli et al., 2002; Wiefel et al., 2005). Moreover, literature highlighted coherence between feeding and playing interactive patterns, underlying that difficulties observed during feeding might extend to other contexts (Fadda et al., 2014; Stern, 1995; 1998).

Premature children might be exceptionally vulnerable for the development of feeding problems, particularly those born with very low birth weight and very low gestational age (Pierrehumbert et al., 2003; Thoyre, 2007; Torola et al., 2012). Compared to full-term children, preterm ones are more exposed to feeding complications since their birth (Medoff-Cooper &

Ratcliffe, 2005; Silberstein et al., 2009). They can experience difficulties in breastfeeding (Zanardo et al., 2011; Torola et al., 2012) and weaning (Mathisen et al., 2000; Bruklow et al., 2002). They might also require more help from their parents to reach and maintain a state of calm and alertness during the meal (Schadler et al., 2007; Schmidt et al., 2011). In turn, their mothers show greater preoccupation about the child's nutrition and weight gain compared to mothers of full-term children (Cerro et al., 2000; Latmiral & Lombardo, 2000) and they may find difficult to adequately recognize and respond to the infant's signal during the meal (Thoyre, 2001; Vandenberg, 2006; Reyna et al., 2012).

Some studies have found that feeding interactions between preterm infants and their mothers tend to be less synchronous than those of full-term dyads, with less pleasure and reciprocity during breast- and bottle-feeding (Davis et al., 2003; Vandenberg, 2006). Mothers of preterm infants tend to over-stimulate the infant during breastfeeding and may be more intrusive than mothers of full-term babies (Singer et al., 2003; Reyna et al., 2012). At the same time, preterm infants are less responsive and show less clear feeding behaviours than full-term infants (Davis et al., 2003; Singer et al., 2003). However, most of studies investigated preterm children feeding behaviour in the first year of life, exploring the characteristics of the infant's oral-motor skills (sucking, chewing and swallowing), and the role of neonatal complications on the development of feeding disorders (Crapnell et al., 2003; Silberstein et al., 2009; Torola et al., 2012). Fewer studies are available on preterm children's behaviour during toddlerhood, and, to our knowledge, there is a lack of observational studies that explored mother-child interactions during the transition to self feeding in the second year of the child's life.

As discussed in previous chapters, the transition to self-feeding might represent a pivot time for the onset of Infantile Anorexia, which is characterized by issues related to autonomy, control, and dependency (Ammaniti et al., 2004, 2010; Chatoor, 1989, 1998; Chatoor & Macaoay, 2008; Lucarelli et al., 2002, 2003). Maternal lack of support to the child's autonomous initiatives, and particularly, maternal intrusive behaviour, such as strict control on the child's eating modalities and

food intake, may lead to high levels of conflicts during meals and impact on the transition to self-feeding (Ammainiti et al., 2004; Atzaba-Poria et al., 2010; Chatoor, 1996, 2002).

On the light of the contributions presented, the transition to self-feeding may represent a particularly challenging time for preterm children and their mothers. Mothers of preterm children might find difficult to adjust to the child's growing autonomy (e.g. the child's refusal of certain type foods or desire to eat by him/herself) and sensitively negotiate conflicts (Cerro et al., 2002), in a time when this is essential to the child's development (Lichtenberg, 1989, Lichtenberg et al., 2010). Potharst (2012), for example found that mothers of preterm children were less supportive to the child's autonomy during play at age 2.

The need to further explore this area is supported by studies that highlight the importance of concentrating efforts on the age range 0-3 in order to set up early interventions, especially in vulnerable populations (Diagnostic Classification: Zero-To-Three, 2005).

This work therefore aimed to expand on the literature and explore the quality of mother-child interactions during the transition to self-feeding from 18 to 30 months in the population of preterm children. At this purpose, a longitudinal case-control study was undertook in order to respond to the following research question:

Does the transition to self-feeding represent a critical time for the onset of dysfunctional mother-child interactive behaviours around feeding in preterm dyads?

We investigated the effect of prematurity in two situations: mother-child interactions during meals (Study 1) and mother-child interactions during a Doll-Play (DP) scenario representing feeding (Study 2). Assessment of mother-child interactions took place at three main points in time: 18, 24 and 30 months. This temporal frame was chosen for the high relevance in the studied effects (Ammaniti et al., 2006; Chatoor et al., 1997, 1998b; Lucarelli et al., 2002, 2003).

STUDY 1

Mother-child feeding interactions in preterm and full-term dyads at 18, 24, and 30 months

1.1 Aims & rational

In light of the afore-discussed considerations, this study, expanding on previous research, examined a transactional multi – risk model, investigating the child's eating behaviour, maternal attitudes, and the quality of mother-child feeding interactions comparing preterm to full-term dyads during the transition to self feeding (18-30 months). The contribution of different parental and child's factors on mother-child feeding interactions was also considered.

First, as preterm children are at higher risk of experiencing difficulties with breastfeeding and weaning and to report gastroesophageal reflux following nasogastric-tube feeding (Burklow et al., 2002; Dondrill et al., 2004; Monahhan, Shapiro, & Fox, 1988; Hyman, 1994; Torola et al., 2012; Zanardo et al., 2011) we controlled the effect of these variables on the objectives investigated by the study.

Second, the effect of the child's level of development, maternal anxiety and maternal depression was assessed due to the high vulnerability of the preterm population to experience problems in these areas (Buttha et al., 2002; Kersting et al., 2004; Voegtline et al., 2010; Vigod et al., 2010). As literature highlights a higher occurrence of feeding disorders in children with developmental delays (Benoit, 2000) and in children of mothers with affective disorders (Ammaniti et al., 2010; Chatoor, 1989; Gorman et al. 1993; Polan et al. 1991) we considered relevant to control the effect of these variables in our model.

Specifically, the study aimed:

I. To investigate differences in the acquisition of eating autonomy between preterm and full-term children from 18 to 30 months, controlling for the child's past feeding history, child's level of development, and maternal affective state (anxiety and depression);

II. To assess differences in the global quality of mother-child interactions during the meal between the preterm and the full-term group from 18 to 30 months. As for the previous objective, the effect of infant (child's past feeding history and level of development) and maternal factors (anxiety and depression) was controlled;

III. To examine differences in the specific patterns of mother-child feeding interactions between preterm and full-term dyads, investigating at each assessment (18, 24, and 30 months): the mother's affective state, the child's behaviour and affect, the level of dyadic conflict, and the dyadic reciprocity during meals. Again, the effect of the child's past feeding history, the child's level of development, maternal anxiety and depression was considered.

With respect to the described objectives we hypothesized that:

I. The percentage of preterm children eating alone would be lower in the preterm group than in the full-term group from 18 to 30 months;

II. Preterm mother-child dyads would show a higher frequency of dysfunctional feeding interactions compared to full-term dyads during the transition to self-feeding. We expected to observe a stability of this effect from 18 to 30 months;

III. Mothers in the preterm group would show higher levels of negative affective state, more intrusiveness, and less support to the child's autonomy compared to mothers of full-term children. We expected children to show higher levels of distress and food refusal and to observe a greater level of conflicts and lower reciprocity in preterm dyads compared to full-term ones. These interactive patterns were also expected to remain consistent from 18 to 30 months.

1.2 **Method**

1.2.1 Participants

Sixty-nine mother-toddler dyads (44 preterm, 25 full-term) participated in the study.

The preterm group (PG) was recruited at the Neonatal Unit of the Bufalini Hospital in Cesena (Italy). All children enrolled in the follow-up program of the hospital and born with a gestational age (GA) ≤32 weeks and/or birth weight ≤1500 grams were considered eligible for the study. Preterm toddlers and their mothers were consecutively recruited over the period March 2013-March 2014. Exclusion criteria for the PG were: a) child's major cerebral damage (intraventricular hemorrhage (IVH) > III or IV grade, periventricular leukomalacia (PVL), retinopathy of prematurity (ROP), and hydrocephalus) or genetic syndrome; b) parents' past or present psychiatric history or the presence of neurological disorders; c) parents' past or present history of eating disorders (anorexia nervosa, bulimia nervosa, binge eating); d) parent's lack of proficiency in the Italian language.

Preterm children's mean gestational age was 29.33 (SD = 2.40) and their mean birth weight was 1141.75 grams (SD = 314.173). Eighteen children were males (40.9%) and twenty-six females (69.1%). The highest percentage of children was born with a caesarean (84.1%; n = 37) and only seven with a spontaneous delivery (15.9%). Moreover, nine children (20.5%) were small for gestational age (SGA). Length of the stay in the Neonatal Intensive Care Unit (NICU) for the PG ranged between 20 days and 76 days (M_{time} = 43.04, SD = 16.71). During the admission to the NICU, 86.4% of preterm children were fed through parenteral feeding and 13.6% through tube feeding.

Most of preterm mothers (M_{age} = 37.05, SD = 5.43 years) were employed (90.5%), either married or cohabiting with the father of the child (90.9%), and Italian (84.6%). With regard to education, 46.2% had a university degree, 38.5% a high school diploma and 15.4% a secondary school certificate. Thirty-four mothers (77.3%) were primiparous at the time of the first assessment.

For what concern the control group of full-term dyads (FG), between April 2013 and April 2014, 60 mothers of full term infants enrolled in preschools in Cesena (Italy) were proposed to voluntary participate in the study. Among these, 30 mothers declined their participation due to the inability to accommodate into the time schedule of the study and 5 did not match the inclusion criteria of the study, which included: Infant birth weight > 2500 grams; gestational age > 36 weeks; absence of child's birth complications, cerebral damage, disabilities or genetic syndromes; absence of parental past or present psychiatric disorders and neurological disorders; absence of parental past or present history of eating disorders; parental fluency in the Italian language.

A total of 25 dyads was finally included in the study. All full-term children were born healthy, after the 37^{th} week of gestation ($M_{\text{gestational age}} = 39.67$, $SD = 1.23$), and with a birth weight over 2500 grams ($M_{\text{birth weight}} = 3405.00$, $SD = 438.65$). Moreover, most children were born with a spontaneous delivery (72.0%). All mothers ($M_{\text{age}} = 36.50$, $SD = 4.86$ years) were married or cohabiting with the father of the child. Moreover, most of them were Italian (96%), employed (96%), primiparous (84.0%), and had a university degree (60.0%).

1.2.2 Procedure

The research was approved by the Ethic Committee of the University of Bologna (Italy).

Preterm dyads were recruited during the follow-up program of the Bufalini Hospital at 15 months of the child's corrected age. In that situation, a psychologist presented the research to the parents that satisfied the inclusion criteria of the study and they were asked to participate.

Recruitment of full-term dyads took place in the preschools of the Cesena area. The same psychologist that recruited the preterm group presented the research and mothers that were interested to participate scheduled an appointment at 18 months of the child's age.

After signing an informed written consent, all dyads were assessed at 18, 24, and 30 months (corrected age for preterm children) at the Psychodynamic Research Laboratory "Anna Martini" of the University of Bologna (Cesena, Italy).

Each assessment was scheduled according to the following procedure:

Assessment of mother-child interaction: First, twenty minutes of feeding interaction were videotaped from behind a one-way mirror and later coded by two raters blind to the child's condition. Observations of the feeding time were scheduled during the morning/afternoon snack time in agreement with each mother in order to respect their child's eating habits. Prior to the assessment, mothers were instructed to bring the child's usual snack and to behave as they would normally do at home. This situation was chosen as it represents a privileged setting to observe the dyads' relational patterns, possible psychosomatic protest of the child and the dynamics between the child's bids for autonomy and maternal behaviours in supporting the child's attempts (Chatoor, 1997; Lucarelli et al., 2002; Trombini, 2010).

After the feeding session, the mother and the child were asked to play for ten minutes at feeding baby dolls. This procedure and data on mother-child play interactions will be presented in Study 2.

Assessment of the child's level of development: A psychologist assessed the child's global level of development through the administration of a series of tasks addressed to the evaluation of the child's motor, linguistic, attentive, and personal-social skills. Depending on the child's capacity and age, duration of the evaluation lasted between 15-30 minutes.

Collection of maternal and child's data: At the end of each assessment, mothers were asked to complete a battery of self-report questionnaires aimed at assessing maternal levels of depression and anxiety and at gathering information about the mother's background, the family socio-economic situation, and the child's past feeding history and eating habits.

1.2.3 Measures

Demographic and obstetrical variables: Relevant data on the child (e.g., gestational age, birth weight, past and recent clinical history) were collected from the infant's medical records.

Socio-demographic information about the mother and the father (e.g., age, nationality, parity, level of education, marital status, occupation, past and present psychiatric and medical history, and occurrence of past or present eating disorders) were instead collected using an ad hoc designed questionnaire. The family socio-economic status (SES) was assessed through the Hollingshead four factors index of SES (Hollingshead, 1957, 1971), considering educational and occupational level of both parents. Using the Hollingshead Index of social position, reported parental education and occupation were coded based on a seven-point Likert scale ranging from 1 (higher executives, major professional; professional degrees) to 7 (unskilled employees; less than seven years of school). The SES score ranges between 0 and 90, where lower scores correspond to lower SES.

Child's feeding history: Information about the child's past feeding history and actual eating habits was gathered trough an anamnestic questionnaire built *ad Hoc* and administered to the mother. The questionnaire consisted of closed and open questions and investigated the following areas: 1) past feeding history: characteristics of breastfeeding and weaning, and history of reflux (Items 1 to 5); 2) present eating habits: main caregiver in charge of the child's feeding, food preferences of the child, child's autonomy during meals (Items 6 to 8).

Moreover, Item 8 was specifically created to investigate the child's behaviour concerning his/her emerging autonomy during feeding. The question asked to indicate whether the child was eating alone or spoon-fed and was administered at each assessment.

The full questionnaire is presented in Appendix.

Child's level of development: The child's level of development was measured through the Griffiths Mental Development Scales (GMDS). The version 0-2 years (GMDS 0-2; Griffiths, 1996) was used for the assessment at 18 and 24 months, whereas the version 2-8 years (GMDS 2-8; Griffiths, 2006) was used to evaluate children's development at 30 months.

The GMDS provides indication on the child's mental and psychomotor development. Five areas are evaluated through the following subscales: Motor Development (54 items), Personal-

Social (58 items), Hearing and Speech (56 items), Eye-Hand Coordination (54 items), Performance (54 items). Moreover, the version 2-8 years adds a sixth scale (Practical Reasoning) to the five scales comprising the measure for the early years. Specifically, this scale tests the child's ability to solve practical problems and his/her understanding of basic mathematical concepts and of moral issues. Higher scores to each of the six scales correspond to a superior development in a specific cognitive domain. Raw scores are computed for each individual sub-scale and can be converted into percentiles, which allow a reliable measure of the child's improvements and acquisitions over time. Usage of percentiles in assessing the child's development is ideal for consecutive assessments such as in chronic disorders or neonatal follow-up programs (Griffiths, 2006).

In our study, the child's row scores on each scale were converted into percentile scores. Percentiles scores indicate where the development of that particular child collocates itself among the general population of children in his/her age-range. The 50° percentile indicates the mean score for that particular age-range. Scores below or above the 50° percentile indicate that less of fifty percent of the population obtains that lower or higher score (Griffiths, 2006).

Maternal depression: The occurrence and the severity of maternal depression were evaluated with the Beck Depression Inventory (BDI-II; Beck & Steer, 1996; Italian version by Benvenuti et al., 1999). The BDI-II is a 21-item self-report questionnaire, designed to assess the severity of depression in clinical and non-clinical populations. Each item is rated on a 4-point Likert scale ranging from 0 to 3; answers are given with reference to the previous two weeks. A cut-off score of 13 was used to evaluate the severity of the depressive symptoms (low depression: 14-19; mild depression: 19-29; severe depression: 30-63; Beck et al., 1996).

The BDI-II has high reliability and content validity, and it has shown to be effective in differentiating between clinical and non-clinical depression (Rickards et al., 2011).

Maternal anxiety: Maternal anxiety was measured through the State and Trait Anxiety Inventory (STAI; Spielberg, 1983; Italian version by Pedrabissi & Santinello, 2011). The STAI is a self-administered questionnaire largely used to measure the level of anxiety in clinical settings. It is

also often used in research as an indicator of caregivers' distress. The form Y, the most current and used version, is available in 12 languages and is divided in two parts: the first part is composed by 20 items (STAI-Y1) and assesses the presence of state anxiety; the second has 20 items and assesses trait anxiety (STAI-Y2). All items are rated on a 4-point scale (e.g. from "Almost never" to "Almost always" for the trait anxiety scale and from "Not at all" to "Very much so" for the state scale). Higher scores indicate higher levels of anxiety (cut off > 40). Internal consistency coefficient ranges from 0.86 to 0.95 and test-retest coefficients range from 0.65 to 0.75 over a 2-month interval (Spielberg, 1983).

For the purpose of the present study only the 20 items concerning the state anxiety measure were administered to the mothers. This decision was supported by the aim of the study, as we were interested in measuring the level of maternal anxiety at the time of the assessment rather than her constitutional level of anxiety. State anxiety items ask to answer based on the previous two weeks and include questions such as: "I am tense; I am worried" and "I feel calm; I feel secure."

Mother-child feeding interactions: Mother-child feeding interactions were evaluated according to the "Feeding Scale - Observational Scale for Mother-Infant Interaction during Feeding (Chatoor, Getson, Menvielle, Brasseaux, O' Donnell, Rivera e Mrazek, 1997; Chatoor, Getson, Loeffler, McGee e Menvielle, 1998) with the Italian validated version "Scala di Valutazione dell'Interazione Alimentare Madre-Bambino" – SVIA (Ammaniti, Lucarelli, Cimino e D'Olimpio, 2004, 2006; Ammaniti et al., 2010; Lucarelli, Cimino, Perucchini, Speranza, Ammaniti e Ercolani, 2002)[2].

The instrument is an observational scale, which allows the identification of the child's and the mother's dysfunctional behaviours during the meal in the age range 0-36 months. The Italian validate version comprises 41 items and 4 dimensions: Affective State of the Mother, Interactional

[2] In the Italian adaptation of the Feeding Scale, reliability between coders, construct validity and discriminant validity of the measure were assessed on a sample of 275 mother-infant dyads in a first study (Lucarelli et al., 2002), and on 614 dyads in a second study (Ammaniti et al., 2006).

Conflict, Food Refusal Behaviour of the Child, and Affective State of the Dyad. Higher scores at each dimension indicate less healthy interactive patterns. Each item is rated on a 4 point Likert Scale (0 = None, 1 = A Little, 2 = Pretty Much, 3 = Very Much) based on the intensity and frequency of the behaviour observed. An exemplification of the SVIA scoring sheet is presented in appendix at the end of the dissertation.

The subscale "**Affective State of the Mother**" measures the quality of maternal affect when feeding the child. Maternal affective state is evaluated based on maternal facial expression, tone of voice, and maternal verbal and non-verbal means (e.g. Item 1: Show pleasure towards infant in gaze or voice; Item 2: Appears cheerful; Item 5: Positions infant for reciprocal exchange). High scores in this scale indicate a lack of pleasure and a prevalence of maternal negative affect, such as sadness, anger, and distress during the child's meal.

The subscale "**Interactional Conflicts**" evaluates the presence and intensity of conflicts between the mother and the child during the meal. High scores in this scale indicates the presence of intrusive maternal behaviours and high levels of control (e.g. Item 33: Controls feeding by overriding infant's cues; Item 20: Tells infant to eat, to do, or not to do; Item 17: Position or hold the infant with restriction of appropriate movement) and the child's food refusal and oppositional behaviour in response to maternal intrusiveness during the feeding exchanges (e.g. Item 25: Cries when food offered; Item 26: Refuses to open the mouth; Item 29: Spits food out; Item 30: Holds food in mouth).

The subscale "**Food Refusal Behaviour of the Child**" explores the characteristics of the child's eating behaviour and emotions during the meal. High scores on the scale indicate the child's difficult internal regulation during the meal (ipo-regulation or hyper-regulation, for example the infant may be too sleepy to fed or too distracted and hyper-aroused in the latter case) and poor food intake (e.g. Item 32: Falls asleep and stops feeding; Item 33: Appears easily distracted during feeding).

Finally, the subscale "**Affective State of the Dyad**" evaluates the quality of affect in the mother-child relationship during feeding. Particularly, some items evaluate maternal capacity to support the child's autonomous initiatives and self-regulatory capacities during the meal (e.g. Item 36: Waits for infant to initiate the interaction; Item 37: Distracts or allows infant to distract during feeding; Item 39: Forces bottle or food into infant's mouth). Other items evaluate the child's negative involvement during the feeding interaction (e.g. Item 40: Appears angry; Item 41: Cries when bottle or food is taken away). High scores indicate a negative affective experience for the dyad and low dyadic reciprocity. The mother does not support the child's autonomous initiatives and shows controlling behaviours, insistent requests, and criticism during the meal. The child displays distress and anger in response to the mother's behaviour.

In addition to the four subscales, the SVIA allows evaluating the global quality of mother-child interaction. This evaluation can be computed by comparing the scores of the four subscales with the normative scores of the Italian sample (Ammaniti et al., 2006; Ammaniti et al., 2010; Lucarelli et al., 2002), as follow:

- T scores below 60 in all the subscales identify "**Functional Dyads**". This category indicates mother-child interactions that are characterised by a good reciprocity and by maternal adequate support to the child's affective needs and eating behaviour, in line with his/her developmental stage;
- T scores above 60 in 2 of the 4 subscales indicate a situation of "**Transient Dysfunction**". These dyads present dysfunctional patterns of interaction that are not yet pathological, but should be watched. Compared to Functional Dyads, these interactions are characterized by less reciprocity and greater interactional conflicts, with less maternal responsive behaviour and less adequate attempts to support the child's autonomy. On his/her part, the child's shows higher distress and greater oppositional behaviours. This category identifies a dystonic relationship and negative affect in the dyad. However, at this level some positive

communication between the mother and the child during feeding interaction can still be observed (Fadda et al., 2014);

- T scores above 60 in all the 4 subscales identify a situation of "**Dyadic Maladjustment**" and should be of concern and require clinical intervention. These dyads are characterized by very poor exchanges during feeding interactions, which do not support the child's socio-emotional development.

The SVIA showed good stability, inter-rater agreement and construct validity (Chatoor et al., 1997; Lucarelli et al., 2002). In the present study, observations of mother-child interactions were coded by two trained raters, blind to the child's condition, which had previously obtained the reliability with the authors of the SVIA (scoring 91% and 90% of agreement). For the present study, using the average absolute agreement parameter, Interclass Correlation Coefficient (ICC; McGraw & Wong, 1996) between the two raters was found to be very good for research purposes and ranged between 0.73 and 0.91 (mean=0.85).

1.3 **Statistical Analysis**

Data analysis was performed using SPSS (version 23).

Pearson's Chi-Square test and Student's t test were run to investigate differences between full-term and preterm mothers in demographic (maternal mean age, nationality, marital status, education, occupation, family's socio economical status (SES), and parity) and obstetric variables (child's mean gestational age and neonatal birth weight, child's gender, type of delivery, Small for Gestational Age - SGA).

Similar tests were also used to analyse baseline (18 months) group differences in the child's past feeding history, for the following items of the anamnestic questionnaire: breastfeeding, weaning, history of reflux, main caregiver in charge of the child's feeding, child's food preferences.

Differences between groups on longitudinal data on the specific objectives of the study were tested using Generalized Linear Mixed Models (GLMM), when dependent variables were

categorical, and with Linear Mixed Models (LMM), when dependent variables were continuous. The use of Mixed Models was considered the best to fit our data as they allow the time points when measurements are collected to vary for different subjects and represent a very flexible analytic tool for longitudinal data (West, Welch, & Gatecki, 2007).

First, LMMs (two-levels with random intercept) were run to measure the effect of Group, Time and their interaction on confounding variables (STAI-Y1, BDI-II, and Griffiths total percentile scores).

For what concern the main objectives of the study, in order to test the first hypothesis, a two-level binomial GLMM with random intercept was used to measure the effects of Group (preterm vs. full-term), Time of assessments (18, 24 and 30 months), and their interaction on the child's eating autonomy (eating alone/spoon-fed). The model controlled for the effects of infant (breastfed/non-breastfed, age of weaning, medical history of reflux, Griffiths total percentile score) and maternal factors (STAI-Y1 and BDI-II scores).

Regarding the second hypothesis about the global quality of mother-child interactions during meals, first, descriptive statistics were run to evaluate the distribution of "Dysfunctional", "With Transient Dysfunction" and "Functional" dyads (Ammaniti et al., 2006; Fadda, Lucarelli, & Parisi, 2014) in each group (preterm and full term). Due to the low frequency of the first category, a binary variable was created to indicate the global quality of mother-child interactions: The value of 1 was assigned to "Dyads with Transient Dysfunction" (including dyads with T scores > 60 in at least 2 of the 4 subscales), while the value of 2 was assigned to "Functional Dyads" (T scores < 60 in all the 4 subscales). The effect of Group (preterm vs. full-term), Time of assessment (18, 24 and 30 months) and their interaction on the SVIA global functioning (Dyads with Transient Dysfunction/Functional Dyads) was measured through the Generalized Linear Mixed Model (two-levels binomial GLMM, with random intercept). Infant (breastfeeding, weaning, reflux, and Griffiths total percentile score) and maternal variables (STAI-Y1 and BDI-II scores) were

incorporated into the analysis due to their potential effect on feeding interactions (Ammaniti et al., 2010; Chatoor et al., 2000).

Last, for what concern the third hypothesis, differences between groups in the SVIA dimensions (Affective State of the Mother, Interactional Conflict, Child's Food Refusal, Affective State of the Dyad) were measured through two-level LMMs with random intercept. Effect of Group (preterm vs. full term), Time, and their interactions were measured for each of the SVIA dimension. Moreover, the model controlled for maternal (STAI-Y1 and BDI-II scores) and infant confounding variables (breastfeeding, weaning, medical history of reflux, Griffiths total percentile score).

1.4 **Results**

1.4.1 Demographic and obstetrical variables

Demographic characteristics of the study sample are displayed in Table 1.

No significant differences emerged between groups in maternal mean age, nationality, marital status, level of education, occupational status, and parity (Table 1). Moreover, no differences emerged in the family SES calculated through the Hollingshead's Index (Hollingshead, 1971).

With respect to the child's clinical variables, significant differences emerged in the following variables associated to prematurity: birth weight (BW), gestational age (GA), small for gestational age index (SGA), type of delivery, and twin birth (Table 1). No significant differences emerged in the child's gender between groups [$X^2(1) = 2.329$, $p = 0.127$].

Table 1. Socio-demographic and obstetric characteristic of the sample

	Preterm Group (N=44)	***Full-Term Group (N=25)***	***t/X²***
Child's Characteristics			
Gender			
Male, *n*(%)	18 (49.9)	15 (60.0)	2.329
Female, *n*(%)	26 (59.1)	10 (40.0)	
Gestational Age, weeks (m±sd)	29.33±2.40	39.67±1.23	23.243***
Birth Weight, grams (m±sd)	1141.75±314.17	3405.00±438.65	24.847***
Length of Hospitalization, days, (m±sd)	43.04±16.71	//	
Twin Status			
Yes, *n*(%)	16 (36.4)	0 (0.0)	11.835**
No, *n*(%)	28(63.6)	0 (0.0)	
SGA			
Yes, *n*(%)	9 (20.5)	0 (0.0)	5.881*
No, *n*(%)	35 (79.5)	0 (0.0)	
Type of Delivery			
Spontaneous, *n*(%)	7 (15.9)	18 (72.0)	21.709***
Cesarean, *n*(%)	37 (84.1)	7 (28.0)	
Maternal Characteristics			
Age, years (m±sd)	37.05±5.43	36.50±4.86	0.409
Hollingshead SES, score (m±sd)	38.95±16.63	42.60±16.14	0.846
Nationality			
Italian, *n*(%)	38 (86.4)		1.624
Foreign, *n*(%)	6 (13.6)		
Marital Status			
married/cohabiting, *n*(%)	40 (99.9)	24 (100)	2.413
Other, *n*(%)	4 (9.1)	0 (0.0)	
Education			
University, *n*(%)	18 (46.3)	15 (60.0)	1.408
High School, *n*(%)	15 (38.5)	8 (32.0)	
Secondary school, *n*(%)	6 (15.2)	2 (8.0)	
Primary school, *n*(%)	0 (0.0)	0 (0.0)	
Occupation			
Employed, *n*(%)	38 (90.5)	24 (96.0)	0.692
Unemployed, *n*(%)	4 (9.5)	1(4.0)	
Parity			
Primiparous, *n*(%)	34 (77.3)	21 (84.0)	0.446
Multiparous, *n*(%)	10 (22.7)	4 (16.0)	

***** p < 0.0001; ** p < 0.010; * p < 0.050**

1.4.2 Descriptive data on the child's past feeding history and eating habits

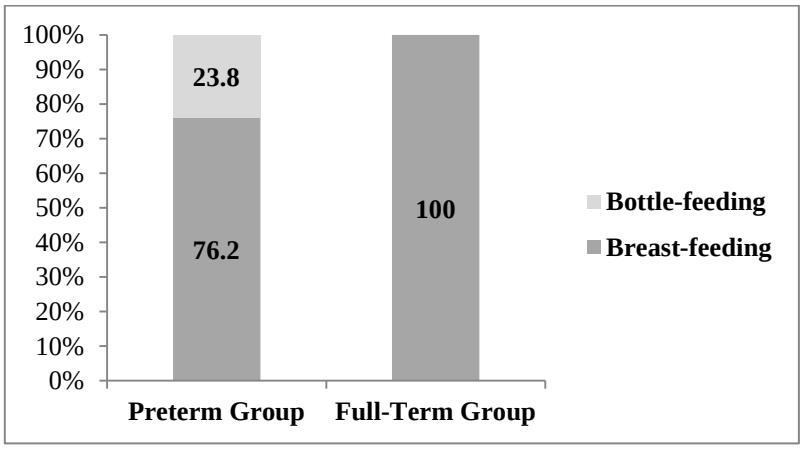
Breastfeeding

The percentage of children breastfed in the two groups was explored through item 1 of the anamnestic questionnaire (see Appendix). The two answers "exclusively breastfeeding" and "mixed

breastfeeding" were considered together as we were interested in detecting information on maternal emotional involvement with the child more than on the nutrient effect of the milk. Results show that the percentage of children breastfed was significantly higher in the group of children born full-term (N = 25) compared to preterm ones (N=41) [$X^2(2) = 31.478$; $p<0.001$] (Figure 1). Moreover, the mean duration of breastfeeding was longer in the full-term group (M_{age} = 10.46, *SD* = 6.11, Range = 1-20 months) than in the preterm group (M_{age} = 4.63, *SD* = 5.04 months, Range = 0-19 months) [$t(53) = 3.857$; $p<0.001$].

Despite these disparities, no significant differences emerged when the mother was asked to describe the experience of breastfeeding [$X^2(1) = 0.591$; $p = 0.442$]. Eighteen mothers in the preterm group (40.9%) versus only a slightly higher, but not significant, percentage of full-term mothers (56.0%; *n* = 14) reported that the experience of breastfeeding had been mainly easy (see Question 2 of the Anamnestic Questionnaire, in Appendix).

Figure 1. Percentage of breast-fed and bottle-fed children in the preterm and in the full-term group



Weaning

When considering the corrected age of preterm children, introduction of solid foods started between 4 and 9 months of corrected age of the child (M_{age} = 6.41, *SD* = 1.25 months). When considering the chronological age of the child, mean age to start weaning in the preterm group was

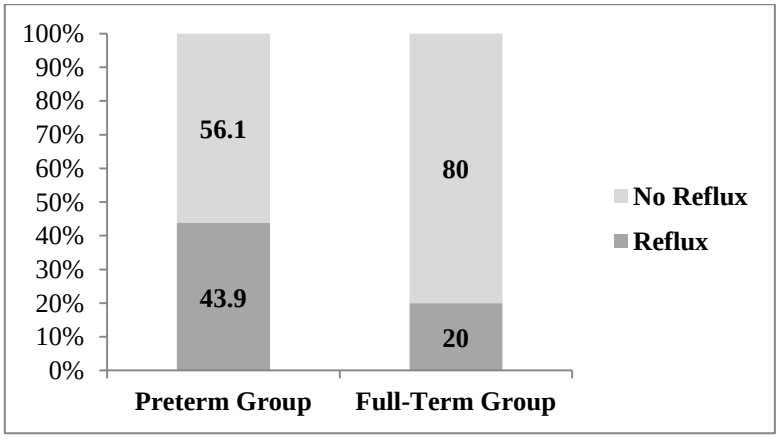
7.32 ± 1.86 (Range 5-12 months). Considering both the corrected age [(t(65) = 2.278, p = 0.026] and the chronological age [t (65) = 4.457, p<0.0001] of preterm children, weaning stared significantly later in the preterm group (N = 42) compared to the full-term group (N = 25) (M_{age}= 5.88, *SD* = 0.74 months; Range = 4.5-8 months).

However, 68.2% (*n* = 30) of mothers in the preterm group and 92% (*n* = 25) of mothers in the full-term group reported at item 4 of the anamnestic questionnaire (see Appendix) that they experienced no major problems with the child during weaning, with no significant differences between groups [X^2 (1) = 2.954; p = 0.086].

History of reflux

Among preterm children (N = 41), 43.9% (*n* = 18) suffered of Gastroesophageal Reflux (GR). The incidence of GR was significantly lower in the full-term group (N = 25) [X^2(1) = 3.908, p = 0.048], with only 20% (*n* = 5) of the children reporting an history of reflux (Figure 2). For what concern the course of GR (see question 5, Appendix), duration of reflux ranged between 1 and 15 month in the preterm group ($M_{duration}$ = 2.56, *SD* = 4.38 months) and between 1 and 12 months in the full-term group ($M_{duration}$ = 0.94, *SD* = 2.59 months). No differences emerged in this variable [t(65) = 1.913, p = 0.060].

Figure 2. Percentage of children reporting a history of reflux in the preterm and in the full-term group



Caregiver in charge of the child's feeding

Item 6 of the anamnestic questionnaire asked mothers to indicate who was the main caregiver in charge of the child's feeding (see Appendix). Due to the small percentage of answers that identified another caregiver instead of the mother to be in charge of the child's feeding, we considered only two answers: "mother" and "others". The latter category grouped together all other answer than mothers (father, grandfather, grandmother, babysitter, others).

Thirty-six out of 41 (87.8%) mothers in the preterm group and 23 out of 25 (92%) mothers in the full term group answered they were the main caregiver following the child's feeding and no differences emerged between the two groups [$X^2(1) = 0.288$, $p = 0.591$].

Child's food preferences

With respect to the child's food preferences (Item 7, Appendix), no differences emerged between preterm and full-term children [$X^2(1) = 3.171$, $p = 0.075$]. As reported by their mothers, at 18 months most of preterm children signalled their food preferences (81.8%, $n = 36$) and all full term children had clear food likings (100%, $n = 25$).

1.4.3 Maternal and child's factors

Child's development

For what concern the child's global level of development, a significant effect of Group [$F(1,62.851) = 16.118$, $p < 0.0001$], Time [$F(2, 113.330) = 6.240$, $p = 0.003$] and of their interaction [$F(2, 113.330) = 6.443$, $p = 0.002$] was detected.

With respect to Group, preterm children (PG) total percentile score on the Griffiths scales was significantly lower than the one of full-term group (FG) ($M_{global\ score\ PG} = 49.91 \pm 2.39$; $M_{global\ score\ FG} = 65.41 \pm 3.02$). Moreover, scores of both groups decreased significantly from 24 (T2) to 30

(T3) months ($M_{global\ score\ T2}$ = 61.82 ± 2.37; $M_{global\ score\ T3}$ = 52.91 ± 2.48; p = 0.002), indicating a drop in the child's performances at 30 months, independently of the group.

Bonferroni comparison revealed that differences between groups were significant only at 24 ($M_{score\ PG*T2}$ = 54.68 ± 2.96; $M_{score\ FG*T2}$ = 68.96 ± 3.70; p = 0.003) and at 30 months ($M_{score\ PG*T3}$ = 40.34 ± 3.23; $M_{score\ FG*T3}$ = 65.49 ± 3.76; p < 0.0001), with lower scores in the preterm compared to the full-term group (Table 2). Moreover, only in the preterm group scores decreased significantly from 18 to 30 months ($M_{score\ PG*T1}$ = 54.72 ± 2.88; $M_{score\ PG*T3}$ = 40.34 ± 3.23; p < 0.0001) and from 24 to 30 months ($M_{score\ PG*T2}$ = 54.68 ± 2.96; $M_{score\ PG*T3}$ = 40.34 ± 3.23, p < 0.0001), whereas no significant differences were detected in the in the full-term group over time (all p > 0.050) (Table 2).

Table 2. Griffiths total percentile mean scores and standard deviations in the preterm and in the full-term group at 18, 24, and 30 months

	Preterm Group (N = 44) (*M ± SD)*	**Full-Term Group (N = 25)** *(M ± SD)*
18 months	54.72 ± 2.88	61.78 ± 3.76
24 months	54.68 ± 2.96	68.96 ± 3.70
30 months	40.34 ± 3.23	65.49 ± 3.76

Maternal Depression

Group mean scores on the BDI-II at each time of assessment are reported in Table 3.

LMM analysis showed no main effect of Group [F (1,60.333) = 0.033, p = 0.875] or Time of assessment [F (2,92.641) = 0.330, p = 0.720].

However, a significant interaction between Time and Group [F (2,92.641) = 3.926, p = 0.023] was observed. Bonferroni correction showed that scores significantly decreased from 18 to 24 months in the preterm group only ($M_{score\ T1*PG}$ = 8.48 ± 1.06; $M_{score\ T2*PG}$ = 6.64 ± 1.12; p =

0.034), whereas scores in the full-term group remained almost unvaried over time (All $p > 0.050$) (Table 3).

Table 3. BDI-II mean scores and standard deviations in the preterm and in the full-term group at 18, 24, and 30 months

	Preterm Group (N = 44) (*M ± SD)*	**Full-Term Group (N = 25)** *(M ± SD)*
18 months	8.48 ± 1.06	7.13 ± 1.38
24 months	6.64 ± 1.12	8.10 ± 1.39
30 months	8.04 ± 1.13	7.03 ± 1.43

Maternal Anxiety

Group mean scores on the STAI-Y1 at each time of assessment are reported in Table 4.

Analysis by LMM showed no main effect of Group on maternal levels of state anxiety [$F(1,62.338) = 0.033$, $p = 0.857$]. However, a marginally significant effect of Time [$F(2,97.284) = 3.132$, $p = 0.048$] and an interaction between Group and Time [$F(2,97.284) = 3.294$, $p = 0.041$] emerged. Bonferroni correction revealed that the level of anxiety increased independently of the group from 24 (T2) to 30 months (T3) ($M_{global\ score\ T2} = 34.53 \pm 1.27$; $M_{global\ score\ T3} = 37.08 \pm 1.08$; $p = 0.042$). Moreover, with respect to the interaction between Time and Group, Bonferroni correction showed a marginally significant decrease in the levels of maternal anxiety from 18 to 24 months in the preterm group ($M_{score\ T1*PG} = 36.98 \pm 1.19$; $M_{score\ T2*PG} = 33.98 \pm 1.34$; $p = 0.050$), whereas no significant changes emerged in the full-term group over time (All $p > 0.050$).

Table 4. STAI-Y1 mean scores and standard deviations in the preterm and in the full-term group at 18, 24, and 30 months

	Preterm Group (N = 44)	**Full-Term Group (N = 25)**
	(M ± SD)	*(M ± SD)*
18 months	36.98 ± 1.19	34.96 ± 1.55
24 months	33.98 ± 1.34	35.07 ± 1.55
30 months	35.91 ± 1.35	38.26 ± 1.69

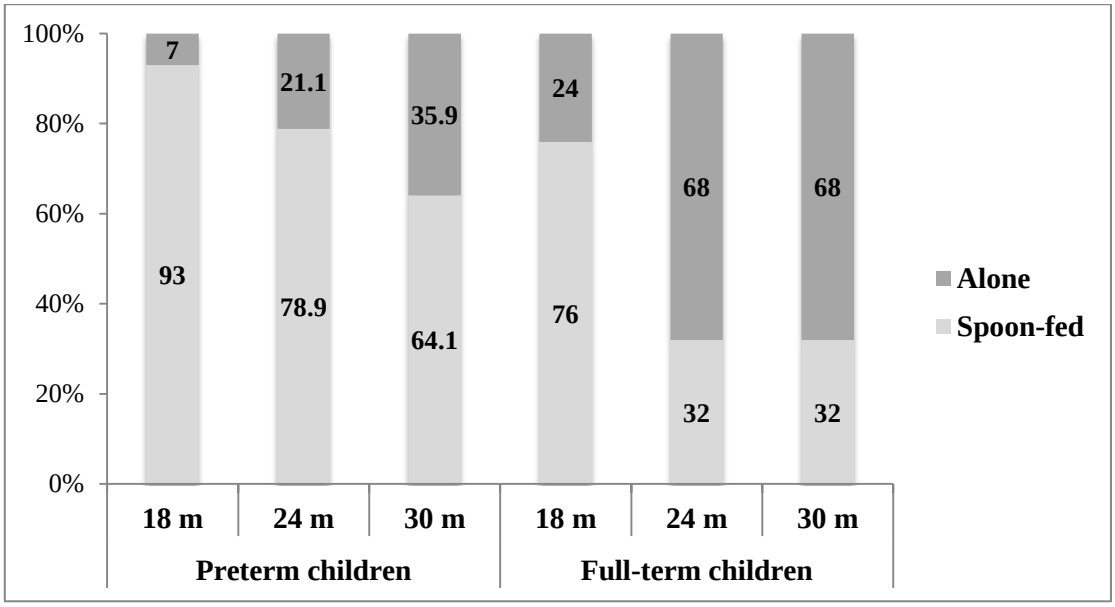
1.4.4 Preterm and full-term children's eating autonomy at 18, 24, and 30 months

[Objective 1]

When analysing data from item 8 of the anamnestic questionnaire (see Appendix) on the child's autonomy during eating, the "Spoon-fed" and "Both alone and spoon-fed" categories were aggregated, due to the low frequency of the first response. The consequent binary variable identified whether the child had achieved full autonomy while eating. The analysis, controlling for infant and maternal factors (breastfeeding, mean age of weaning, reflux, child's development, maternal anxiety and depression), showed a significant main effect of Group [$F(1,138) = 5.271$, $p = 0.023$]. The percentage of children eating fully autonomously was lower in the preterm group compared to the full-term group at each time of assessment (Figure 3). Moreover a significant main effect of Time was found [$F(2,138) = 10.767$, $p < 0.0001$], indicating that child's self-feeding skills increased over time, independently of the group. Bonferroni adjustment showed that eating autonomy was significantly higher at 24 months than at 18 months (39.7 % vs 13.2%) and at 30 months compared to 18 months (48.4% vs 13.2%) (All $p < 0.050$). No significant difference emerged between the assessment at 24 and at 30 months ($p > 0.050$).

For what concern the interaction between Time and Group no significant effect emerged [$F(2,138) = 0.286$, $p = 0.752$]. Last, none of the covariates included in the analysis was significant (all $p > 0.050$).

Figure 3. Percentage of children eating alone vs spoon-fed in the preterm and in the full-term group at each time of assessment



1.4.5 Global quality of mother-child feeding interactions in the preterm and in the full-term group: SVIA global scores [Objective 2]

In order to define global differences on mother-child feeding interactions between groups we first considered the SVIA global scores at each time of assessment (18, 24 and 30 months). Scores of the preterm and full-term group presented mainly two different patterns of interactions: "Functional Dyads" (T score of all the subscales < 60) and "Dyads with Transient Dysfunction" (T scores of at least 2 subscales > 60). Only in the preterm group we found the occurrence of Dyads with "Dyadic Maladjustment" (T scores of all subscales > 60). However, the frequency of that pattern was quite low (11.4% at 18 months, 15.9 % at 24 months and 9.1% at 30 months). Therefore, in order to run more reliable analysis, these dyads were incorporated into the category "Dyads with Transient Dysfunction".

Percentages of "Functional Dyads" and "Dyads with Transient Dysfunction" at 18, 24 and 30 months in each group (preterm and full-term) are presented in Figure 4.

Generalized Linear Mixed Model, controlling for infant and maternal variables (breastfeeding, mean age of weaning, reflux, child's development, maternal anxiety and depression), showed a significant effect of Group [$F(1,136) = 4.074$, $p = 0.046$] with a higher number of "Dyads with Transient Dysfunction" in the preterm than in the full-term group (Figure 4).

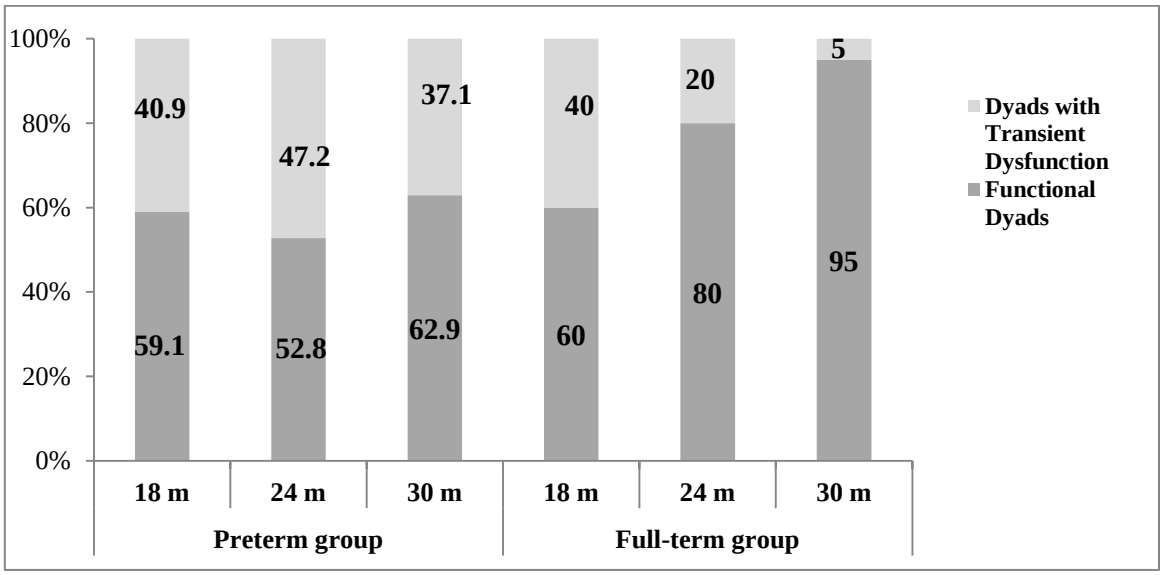
No effect of Time [$F(2,136) = 1.832$, $p = 0.164$] or interaction between Time and Group emerged [$F(2,136) = 2.068$, $p = 0.130$].

With respect to covariates, the child's development was significantly negatively associated to the dyadic functioning during feeding [$b = - 0.039$, $SE = 0.014$, $F(1,136) = 7.410$, $p = 0.007$], indicating that a lower level of child's development was associated to higher risk of showing dysfunctional interactions during feeding.

Last, we observed a marginally significant effect of weaning, which was positively associated to the dyadic functioning during meals [$b = 0.457$, $SE = 0.240$, $F(1, 136) = 3.631$, $p = 0.059$]. Thus, the higher was the age for the introduction of weaning the higher the probability of observing dysfunctional feeding interactions.

The other confounding variables included in the model (maternal anxiety, maternal depression, breastfeeding, and reflux) were not significant (All $p > 0.05$).

Figure 4. Percentage of "Functional Dyads" and "Dyads with Transient Dysfunction" in the preterm and in the full-term group at each time of assessment



1.4.6 Specific patterns of mother-child feeding interactions in the preterm and in the full-term group: SVIA subscales [Objective 3]

Mean scores for each dimension of the SVIA at 18, 24 and 30 months are presented in Table 5. Controlling for infant and maternal variables (breastfeeding, mean age of weaning, reflux, child's development, maternal anxiety and depression), results for the Mother's Affective State dimension revealed a significant main effect of group [$F(1,51.303) = 30.956$, $p < 0.0001$], with mothers of the pre-term group scoring higher than mothers of the full-term group (see Figure 5). This score indicates mothers of preterm children more often expressed negative emotions such as anger, sadness and distress than mothers of full-term children during meals. Moreover, for what concern the covariates, maternal depression was significantly positively associated to the mother's affective state during feeding [$b = 0.156$, $SE = 0.070$, $F(1,100.878) = 4.923$, $p = 0.029$], indicating greater negative affect in mothers with higher levels of depression. Last, no effect of Time or interaction between Time and Group emerged (Table 5).

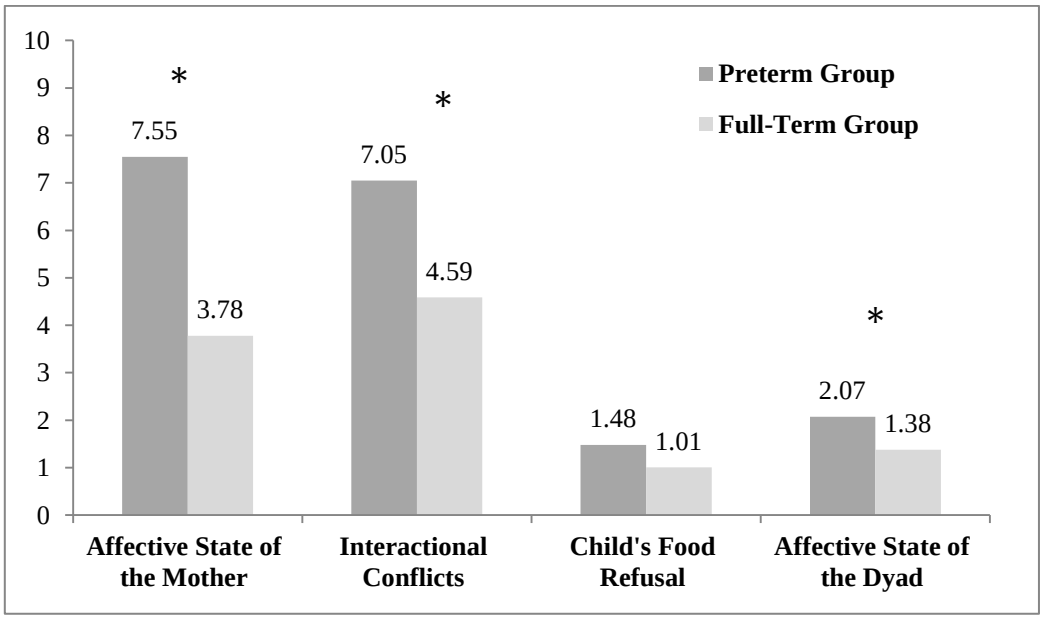
Regarding the Interactional Conflict dimension, main effects of Group [$F(1,49.398) = 9.057$, $p = 0.004$] and Time of assessment [$F(2,84.317) = 8.799$, $p < 0.0001$] were found controlling for maternal and infant variables. In this case, for both groups, a significant decrease in Interactional Conflict scores from 18 to 30 months ($p < 0.0001$) emerged. However, the preterm group showed higher scores in this dimension compared to the full-term group ($p = 0.004$), indicating greater overall levels of interactional conflict between pre-term children and their mothers compared to full-term dyads. No interaction between Time and Group emerged (Table 5). Moreover, maternal depression was significantly positively associated to the level of interactional conflict [$b = 0.212$, $SE = 0.079$, $F(1,113.499) = 7.056$, $p = 0.009$], suggesting greater conflicts in dyads with mothers reporting higher levels of depression.

With respect to Food Refusal, controlling for infant and maternal factors, no effect of Group [$F(1,49.164) = 3.033$, $p = 0.088$], Time [$F(2,91.159) = 0.128$, $p = 0.880$], or their interaction [$F(2,93.069) = 0.744$, $p = 0.478$] was found. However, for this dimension, an effect of breastfeeding [$F(1,43.102) = 7.811$, $p = 0.008$], medical history of reflux [$F(1,43.613) = 5.262$, $p = 0.027$], and child's level of development was found [$F(1,94.909) = 4.314$, $p = 0.041$]. Mean scores on the scale Food Refusal of the child were higher for children's that received bottle-feeding (18 Months: 1.60 ± 1.07; 24 Months: 2.11 ± 1.71; 30 Months: 2.22 ± 1.71) than for children that received breast-feeding (18 Months: 1.79 ± 1.65; 24 Months: 1.80 ± 1.56; 30 Months: 1.90 ± 1.55). Moreover, children's with a medical history of reflux scored higher in this dimension (18 Months: 1.87 ± 1.66; 24 Months: 2.20 ± 1.64; 30 Months: 2.35 ± 1.70) than children without history of reflux (18 Months: 1.74 ± 1.54; 24 Months: 1.71 ± 1.52; 30 Months: 1.70 ± 1.24). For what concern the child's level of development, lower scores on the Griffiths were associated to greater child's food refusal ($b = - 0.013$, $SE = 0.006$, $p = 0.041$).

Regarding the last SVIA dimension, the Dyad's Affective State, controlling for infant and maternal factors, only an effect of Group emerged [$F(1,51.462) = 6.231$, $p = 0.016$] (See Figure 4, Table 5). Preterm mother-child dyads more often showed more intense negative dyadic emotions,

such as lack of reciprocity during feeding, expressed through maternal difficulties in supporting the child's autonomy and the child's distress. With respect to covariates, the child's level was significantly negatively associated to the dyad's affective state [b = - 0.019, SE = 0.006, F(1,89.026) = 7.639, p = 0.007], indicating that lower scores on the Griffiths were associated to greater problems in the dimension.

Figure 5. Effect of Group and global mean scores of the preterm and full term group on the SVIA dimensions



* p < 0.050

Table 5. Mean scores, effect of Group, Time, and interaction in the preterm and in the full-term group on the SVIA dimensions

	Preterm Group (N=44)			Full-Term Group (N=25)			Group	Time	Time X Group
	18 m	**24 m**	**30 m**	**18 m**	**24 m**	**30 m**			
	M ± *SD*	*M* ± *SD*	*M* ± *SD*	*M* ± *SD*	*M* ± *SD*	*M* ± *SD*	*F*	*F*	*F*
Affective State of the Mother	7.87 ± 0.63	7.58 ± 0.71	7.20 ± 0.78	4.50 ± 0.79	3.59 ± 0.80	3.25 ± 0.93	30.956***	1.401	0.184
Interactional Conflicts	7.92 ± 0.72	7.58 ± 0.81	5.64 ± 0.87	6.28 ± 0.92	3.98 ± 0.93	3.52 ± 1.05	9.057 *	8.799[a]***	1.615
Child's Food Refusal	1.36 ± 0.26	1.60 ± 0.30	1.48 ± 0.33	1.25 ± 0.33	0.89 ± 0.34	0.85 ± 0.40	3.033	0.128	0.744
Affective State of the Dyad	2.13 ± 0.27	2.55 ± 0.32	1.53 ± 0.35	1.53 ± 0.34	1.28 ± 0.35	1.31 ± 0.41	6.231*	1.405	1.571

*****p< 0.0001, ** p < 0.010, * p < 0.050**

[a] Bonferroni significant (18 < 30months)

STUDY 2

Mother-child emotional availability during a doll-play scenario representing feeding in preterm and full-term dyads at 18, 24, and 30 months

2.1 Aims & Rational

It is internationally recognized that feeding disorders of infancy and early childhood are rooted in the broader dynamics of the mother-child relationship (Ammaniti et al., 2004; Atzaba-Poria et al., 2010; Satter, 1990; Chatoor & Macaoay, 2008). Investigating such aspects has relevant clinical implications for therapeutic interventions (Fadda, Lucarelli, & Parisi, 2014; Sameroff, Donough, & Rosenblum, 2006; Trombini & Trombini, 2006, 2007; Trombini, 2010). In this framework, mother-child play is an exceptional opportunity to observe mother-child patterns of interactions and the quality of their affective relationship (Biringen, 2000; Biringen & Esterbrooks, 2012; Emde, 1980, 2000; Eserbrooks & Biringen, 2000). Both structured and unstructured procedures have been largely used in different clinical samples to explore maternal sensitivity and responsiveness toward the child, as well as the child's level of engagement and affectivity during the interaction. Emotional availability between the child and the mother during mother-child play has been found to be very low in dyads with feeding disorders (Wiefel, Wollenweber, Oepen, Lenz, & Lehmkuhl, 2005). The concept of "emotional availability" (EA) refers to the dyadic quality of the relationship between a caregiver and an infant (Biringen & Robinson, & Emde, 1998; Biringen, 2000) and has been found to be a good indicator of the mother-child relationship in clinical and non-clinical groups (Bornstein, Gini, Suwalsky, Leach, & Maurince, 2006; Wiefel et al., 2005).

On the light of these considerations, it is clinically relevant to investigate whether and how mother-child difficulties observed in preterm dyads during the transition to self-feeding might extend to the play context. In Study 1 we found preterm mother-child dyads to experience more

difficult interactions during the transition to self-feeding than full-term dyads. To have a deeper understanding of the mother's and child's affectivity around feeding, Study 2 aimed at exploring mother-child emotional availability during a sequence of symbolic play through the methodology of the Doll-Play technique (DP). This situation was chosen as the DP technique allows accessing the child's and the mother's internal representation elicited by the narratives of the play (Murray et al., 1999; Pass et al., 2012). Starting form the second year of the child's life, the child's capacity of symbolization grows allowing children to represent their everyday life issues through play (Baumgartner, 2002; Fonagy, 2001; Mc-Cune-Nicolich, 1981; Piaget & Inhedler, 1969; Piaget, 1972). There is a long clinical tradition of using symbolic play to access young children's inner worlds and in the last twenty years there has been a growing research interest in using doll-play as a means of examining children's experience in clinical studies (Murray, Woolgar, Briers, & Hipwell, 1999; Pass, Arteche, Cooper, Creswell, & Murray, 2012). Examining the literature contributions that used the DP technique in clinical research, it is worthy to mention the study by Uddenberg & Englesson (1978), pioneer in this field. The authors found that DP produced material from depressed mothers' children about the nature of their family experience (Uddenberg & Englesson, 1978). Moreover, DP has been found a good tool to evaluate aspects of the child's behaviour such as internalising and externalising problems (Laible et al. 2004; Dodd et al., 2011; Warren, et al. 1996, 2000). Pass et al. (2012) in a recent research used doll-play to assess fears concerning starting school in children of mothers with social phobia.

These evidences inspired our second study. The level of "Emotional Availability" (EA) displayed by the mother and the child during a doll-play scenario representing feeding was considered as a general indicator of the mother's and the child's affectivity elicited by the play. This choice was based on the theoretical conceptualization of EA. In fact, in the EA framework the "emotional range" displayed during the interaction by the mother and the child, forms a background for the understanding of the mother-child relationship, which permeates both clinical practice and relationship-based research (Biringen & Esterbrook, 2012). Moreover, high levels of EA,

characterised by high levels of maternal sensitivity and child's involvement, and low levels of maternal hostility have been found to differentiate between low versus high-risk samples (Pipp-Siegel, 1996; Stack, Serbin, Girouard, Enns, Bentley, Ledingham, & Schwartzman, 2012). Based on these considerations, we hypothesised that our sample of preterm mother-child dyads would display lower emotional availability during DP representing feeding than the control group of full-term mother-child dyads. Following an organizational perspective (Sroufe & Waters, & Oppenheim 1977), we distinguished between a dimensional level of analysis, such as that captured by the specific EAS scales, and a higher order, holistic level of analysis that was based on the patterning of the interaction (or global level of EA) (Oppenheim, 2012). Due to their potential influence on mother-child interactions (Holditch-Davis et al., 2007; Feldman & Heidelman, 2007; Murray, Cooper, Creswell, Schofield & Sack, 2007; Potharst et al., 2012) we also controlled the effect of maternal anxiety, depression, and child's level of development on the objectives investigated by the study).

Specifically, objectives of the study were:

I. To investigate differences between preterm and full-term dyads in the global level of emotional availability displayed during mother-child DP interactions from 18 to 30 months, controlling for the child's development, maternal anxiety and maternal depression;

II. To explore specific differences between groups in maternal dimensions of the EAS (Sensitivity, Structuring, Non-Intrusiveness, and Non-Hostility) during DP interactions from 18 to 30 months, controlling for the child's development, maternal anxiety and maternal depression;

III. To investigate differences between groups in the child's dimensions of the EAS (Responsiveness and Involvement) during DP from 18 to 30 months, controlling for the child's development, maternal anxiety and maternal depression.

With respect to the objectives of the study we hypothesized:

I. Preterm mother-child dyads would show overall less emotional availability during doll-play interactions representing feeding compared to full-term dyads. We expected a stability in the patterns observed from 18 to 30 months;

II. Mothers of preterm children would show lower levels of maternal sensitivity and structuring, and greater intrusiveness and hostility than mothers of full-term children during play. Moreover, we expected that maternal behaviours would be stable from 18 to 30 months;

III. With respect to children, we expected preterm children would be less responsive and less involved in the interaction compared to full-term children from 18 to 30 months. As for maternal dimensions we expected the differences hypothesized would be stable from 18 to 30 months.

2.2 **Method**

2.2.1 Participants

The study involved the same sample that participated in Study 1, which comprised 69 mother-child dyads (44 preterm and 25 full-term[3]). All preterm children were recruited during the follow-up program of the Bufalini Hospital (Cesena, Italy), and were born with gestational age (GA) $\leq$ 32 weeks and/or birth weight (BW) $\leq$ 1500 grams; without major neurological complications or genetic syndrome. Full-term dyads were recruited from pre-schools in the Cesena area; children were born healthy, without major neurological complications or genetic syndrome, after the 37th week of gestation and with birth weight > 2500 grams.

[3] Detailed information on the socio-demographic characteristics of the sample can be found in Study 1 (p. 46-48)

The sample was mainly composed of Italian mothers with a middle-high socio-economical status (middle-high education, married/cohabiting with the father of the child, and with a permanent occupation) (See Table 1, p. 56). All mothers that participated in the study were healthy (absence of past or present major psychiatric disorders or physical illness) and fluent in the Italian language.

2.2.2 Procedure

The study was approved by the Ethic Committee of the University of Bologna, as part of the longitudinal research presented in this dissertation. The recruitment procedure has been thoroughly described in Study 1 (p. 48). All dyads participating in the study were assessed at 18, 24, and 30 months at the Laboratory "Anna Martini" of the Psychodynamic Research Unit, Department of Psychology, University of Bologna (Cesena, Italy) and were asked to sign a written consent prior to their participation.

During each assessment ten minutes of mother-child playing interaction were videotaped from behind a one-way mirror and later coded by two trained raters. The play material given to the mother and the child was composed of: an adult doll representing the mother, a baby doll representing the child, two play-dough plates of food, and some extra play-dough (See Figure 6). The experimenter, following the same standardized procedure every time, presented the play material to the mother and to the child, as follow: "The mother and her child are very hungry and would like to eat some food together. Would you and your mummy like to play to feed these baby-dolls?". Following, the mother was told to play for ten minutes with her child to the proposed play. After the presentation of the procedure, the experimenter left the room and ten minutes of mother-child interactions were videotaped and observed from a one-way mirror.

Later, the child's level of development was assessed through the Griffiths scales and mothers were asked to fill some self-report questionnaires to gather information about the mother's socio-demographic characteristics and psychological state.

Figure 6. DP material set-up

2.2.3 Measures

Socio-demographic characteristics: This data were gathered through an ad Hoc questionnaire administered to the mother and from the child's medical records.

Child's development: The child's level of development was assessed through the Griffiths Scale (Griffiths, 1996; Griffiths, 2006). Further details on the measure may be found in Study 1 (p. 49).

Maternal Anxiety: Maternal levels of state anxiety were assessed through the STAI-Y1, (Spielberg, 1983) and a full description of the measure can be found in Study 1 (p. 50).

Maternal Depression: The presence and severity of maternal depression was measured through the BDI-II (Beck & Steer, 1996). Psychometric characteristics of the measures are presented in Study 1 (p. 51).

Mother-child interactions during doll-play: Emotional availability (EA) in mother–child dyads at 18, 24 and 30 months was evaluated from the videotaped interactions of the Doll-Play session of the child with the mother using the Emotional Availability Scales: Infancy to Early Childhood Version, 4th Edition (EAS; Biringen, 2008).

Emotional Availability (EA) refers to the dyad's capacity of emotional connection and to the extent to which the connection between the mother and the child is affectively genuine (Barone & Biringen, 2007). The Emotional Availability Scales operationalize the concept of emotional

availability and comprise four adult components (Sensitivity, Structuring, Non-Intrusiveness, Non-Hostility) and two child components (Responsiveness, Involvement). Each scale comprises 7 items and provides a total score, computed by summing up scores obtained at each item, and direct score assigned directly on a 1-7 point Likert scale, where lower scores represent lower levels of emotional availability. Direct scores are more commonly used for research purposes as they provide a more immediate indication of the level of emotional availability displayed by the dyad (Biringen, 2000, 2005, 2008).

Following, the EAS dimensions are thoroughly described:

Adult Sensitivity: This scale evaluates the adult's appropriate and positive affective exchanges, which include adequate perception of emotions, responsiveness to the child's cues, ability to handle conflictual situations, and awareness of timing. Direct score is given on a 1-7 Likert scale, where the high-end scores represent optimal sensitivity; the mid-point "apparent sensitivity"; and the lower scores represent emotional detachment.

Adult Structuring*:* This dimension evaluates maternal scaffolding capacity, and refers to the extent to which the adult is able to adequately guide the child during play. Direct score is assigned based on a 1-7 Likert scale. Highest scores indicate optimal structuring; the mid-point indicates inconsistent structuring (mismatch between the mother and the child, for example there may be too much structuring in a way the child's cannot absorb it); and the lowest scores represent a lack of structuring in the interactions.

Adult Non-Intrusiveness*:* This scale measures the absence of over-directions, overstimulation, interferences or over-protection in maternal behaviour. Hence, this scale is also a measure of maternal capacity to support or obstruct the child's autonomy. The score assigned consider also the child's reaction to maternal behaviour, thus mother can be considered intrusive only if the child responds in a way that indicates so. As for the other EA scales, direct score is assigned on a 1-7 Likert scale, where high-end scores indicate the adult is a non intrusive a

supportive presence; middle-range scores represent benign intrusiveness and over protectiveness; low-end score indicate adult intrusiveness and physical intrusion.

Adult Non-Hostility: This dimension evaluates on a 1-7 Likert scale the absence of hostile behaviours (covert or overt) towards the child. Hostile behaviours include verbal or physical aggressiveness, like demeaning comments, impatience, boredom, and critics, or manipulating the child in a rough and violent way. High scores indicate a lack of any hostility in face, voice or bodily actions; middle range scores indicate covert hostility; and lower scores indicate overt hostility.

Child's Responsiveness: This scale evaluates on a 1-7 Likert scale the quality of the child's affect and responsiveness to the adult. The high-end score refer to a child's that is able to appropriately connect to the adult, in an age-appropriate way. This scale is indicative of the "secure base" or "attachment-exploration balance" behaviour proposed by Ainsworth et al. (1979) (Biringen & Esterbrook, 2012). Middle range scores indicate a child that is connected but tends to be over solicitous to the adult's directions, to the exclusion of the child's autonomy. Low-end scores indicate either and over-connected or under-connected child that may/or may not reflect a disorganised-traumatised affective relationship with the caregiver.

Child's Involvement*:* This scale refers to the child's capacity to engage and include the adult in the interaction. Direct scores are assigned, as for the other scales on a 1-7 Likert scale, high scores indicate the child's ability and interest in taking initiative in the interaction; middle-point scores reflect the child's way to engage the adult is characterised by negative emotions, distress or crisis scenarios. Low-range scores indicate the child's passivity or lack of interest in the relationship.

Clinical Screener Score: In addition to the subscales scores, an overall evaluation of mother-child emotional availability during the interaction can be computed through the Clinical Screener Score. This index is a 0-100 scale and score is assigned based on the global interaction.

Scores between 100 and 81 (**"High EA"**) indicate the dyad presents a high level of EA, with high maternal sensitivity, non-intrusiveness, optimal child's responsiveness and involvement (to assign this scores all subscales scores should be higher than 6).

Scores comprised between 80 and 61 ("**Complicated EA**") indicate a middle range EA (subscales scores are around 4). Interactions that fall into this category are characterised by inconsistent maternal and child's behaviours (e.g. mother is warm but fails to do what is ultimately good for the child's development, shows inconsistent structuring or benign intrusiveness, the child display negative attention seeking behaviours, dependency, or over-connection).

Low scores comprised between 60 and 41 ("**Low EA**") indicate a detachment and low EA displayed by both the mother and the child and scores in the range 40-10 ("**Problematic EA**") indicate a seriously problematic relationship (which may be indicative of maltreatment, abuse, and should be closely assessed).

The EA scales have been largely used in research settings to evaluate the quality of the mother-child relationship in populations at risk (Moehler, Biringen, & Poustka, 2007; Little & Carted, 2005), including samples with atypical development (Biringen, Fidler, Barret, & Kubicek, 2005; Wiefel et al., 2005). Moreover the instrument has demonstrated good stability and reliability (Bornstein et al., 2006; Biringen, 2008). For the rating of mother-child interactions videotaped in the present study, two independent coders were first trained on the EAS to obtain satisfactory interrater reliability with the authors of the EAS (80% of agreement) (Biringen, 2005). Moreover, inter-rater reliability between the two coders on EAS subscales and on the Clinical Screener was assessed using the average absolute agreement intraclass correlation coefficients (ICC; McGraw & Wong, 1996). ICC for the EAS subscales ranged from 0.70 to 0.86 (mean = 0.80) and ICC for the clinical screener ranged between 0.67 and 0.92 (mean = 0.85), which is good for research purposes (Biringen, 2005).

2.3 **Statistical Analysis**

Data analysis was performed using SPSS (version 23).

Pearson's Chi-Square test and Student's t test were run to investigate differences between full-term and preterm mothers in demographic and obstetric variables.

Data about the child's level of development, maternal anxiety and depression were analysed using Linear Mixed Models. The effect of group (preterm vs. full-term) and Time of assessment (18, 24 and 30 moths), and their interactions on the mentioned data was measured through two-levels LMMs with random intercept.

For what concern the first objective of the study, first, we categorized mother-child dyads based on the Clinical Screener score in 3 categories (Biringen, 2008; Bornstein et al., 2006): "High EA", "Complicated EA" and "Low EA". Since the percentage of dyads categorized in the "Low EA" category was very low in both groups, only two groups were considered for further analysis: "High EA" and "Complicated EA". The latter included dyads with middle and low range scores. Secondly, we evaluated longitudinal differences in the distribution of the categories "High EA" and "Complicated EA" in the two groups. The effect of Group (preterm vs. full-term), Time of assessment (18, 24, and 30 months) and their interaction was measured through a two-levels Generalized Linear Mixed Model with random intercept. The effect of the child's development (Griffiths total percentile score), maternal state anxiety (STAI-Y1), and maternal depression (BDI-II) were also controlled in the analysis.

For what concern the second objective of the study about differences between the two groups in scores obtained from 18 to 30 months on maternal (Sensitivity, Structuring, Non-Intrusiveness, Non-Hostility) and child's dimensions (Responsiveness, Involvement) of the EAS, data were analysed using Linear Mixed Models (LMMs). For each subscale, the effect of Group (preterm vs. full-term), Time (18, 24, and 30 months) and their interaction was measured through a two-levels LMM with random intercept. In addition, the child's level of development, maternal

state anxiety, and maternal depression were added to the model as covariates. Last, Bonferroni correction was used for multiple comparison adjustments.

2.4 **Results**

2.4.1 Socio-demographic data

Socio-demographic characteristics of the sample and differences between groups on the variables child's development, maternal anxiety, and maternal depression are presented in Study 1 (Table 1, p. 56-57). Data analysis showed that the two groups were homogeneous for what concern maternal age, socio-economical status, and parity. Moreover, differences between groups were detected in the child's variables related to prematurity (gestational age, birth weight, twin birth, small for gestational age), whereas no differences emerged for the child's gender between groups.

2.4.2 Maternal and child's factors

Child's development

The LMMs showed an effect of Group, Time and their interaction on the child's general level of development (see Study 1, p.60-61, for further details on the statistics). The preterm group reported lower scores than the full-term group in the total percentile score (Table 2, p. 60).

Maternal anxiety and depression

For what concern maternal state anxiety (See Study 1, p. 61) and depression (See Study 1, p. 62), no effect of Group emerged, meaning no differences in the levels of maternal state anxiety and depression between the two groups were detected. However an interaction between Time and Group emerged on both variables indicating a significant decrease in scores of the preterm group from 18 to 24 months.

2.4.3 Global level of EA in the preterm and in the full-term group from 18 to 30 months [Objective 1]

Below are reported descriptive statistics concerning the distribution of "High EA", "Complicated EA" and "Low EA" dyads in the preterm (Table 6) and in the full-term group (Table 7):

Table 6. Distribution of "High EA", "Complicated EA" and "Low EA" in the preterm group

	High EA	**Complicated EA**	**Low EA**
18 months	55.8% (*n* = 24)	37.2% (*n* = 16)	7% (*n* = 3)
24 months	59% (*n* = 23)	33.3% (*n* = 13)	7.7% (*n* = 3)
30 months	66.7% (*n* = 24)	27.8% (*n* = 10)	5.6% (*n* = 2)

Table 7. Distribution of "High EA", "Complicated EA" and "Low EA" in the full-term group

	High EA	**Complicated EA**	**Low EA**
18 months	84% (*n* = 21)	16% (*n* = 4)	0% (*n* = 0)
24 months	96 % (*n* = 24)	4% (*n* = 1)	0% (*n* = 0)
30 months	96% (*n* = 24)	4% (*n* = 1)	0% (*n* = 0)

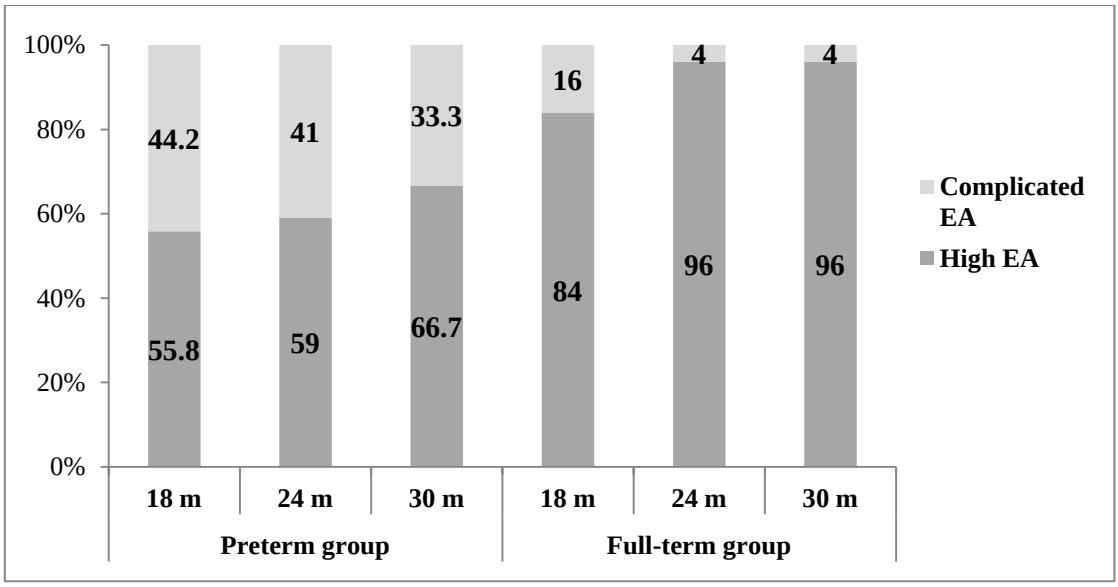
Results of GLMM reported below considered only two categories (High EA and Complicated EA) because of the low frequency of the category Low EA (these dyads were included in the category Complicated EA).

Controlling for the effect of the child's development, maternal anxiety and depression, GLMM analysis showed a main effect of Group [$F(1,147) = 4.548$, $p = 0.035$] on mother-child global level of EA during doll-play. The frequency of dyads with "High EA" was higher in the full-term than in the preterm group (Figure 7).

No effect of Time [F(2,147) = 1.374, p = 0.256] or interaction between Time and Group emerged [F(2,147) = 0.915, p =0.403], indicating that no significant difference was detected over time.

For what concern the covariates, an effect of maternal depression was found, indicating that scores on the BDI-II were negatively associated to the global quality of mother-child playing interactions [b = - 0.173, SE = 0.080, F(1,147) = 4.683, p = 0.032]. Therefore, higher levels of maternal depression were associated to a lower level of global EA.

Figure 7. Percentage of Dyads with "High EA" and "Complicated EA" in the preterm and full-term group at each time of assessment



2.4.4 Maternal scores on the EAS dimensions in the preterm and in the full-term group

[Objective 2]

Table 8 reports mean scores on maternal dimensions of the EAS at 18, 24 and 30 months.

For what concern the scale "Maternal Sensitivity", controlling for maternal anxiety, maternal depression and child's development, analysis by LMM showed a main effect of Group [F(1,56.575) = 4.495, p = 0.038]. Global group mean scores were lower in the preterm group ($M_{\text{global score PG}}$ = 5.42 ± 0.16) than in the full-term group ($M_{\text{global score FG}}$ = 5.97 ± 0.19), indicating an

overall lower level of sensitivity in mothers of preterm children compared to mothers of full-term children during DP (Figure 8). No effect of Time [F(2,84.904) = 0.601, p = 0.550] or any interaction between Time and Group [F(2,85.982) = 0.843, p = 0.434] was observed. Moreover, the child's level of development was significantly positively associated to maternal sensitivity [b = 0.008, SE = 0.003, F(1,124.830) = 4.405, p = 0.038], indicating that maternal sensitivity during DP increased when the child's showed higher scores on the Griffiths scales.

Regarding the scale "Maternal Structuring", analysis, controlling for maternal and infant factors, showed no effect of Group [F(1,61.798) = 2.170, p = 0.146] or Time of assessment [F(2,93.637) = 2.170, p = 0.106], nor any interaction between Time and Group [F(2,94.421) = 1.162, p = 0.317]. However, a significant effect of maternal depression [F(1,135.389) = 4.769, p = 0.031] and of the child's level of development on this dimension was found [F(1,146.616) = 5.544, p = 0.020]. Maternal depression was negatively associated to maternal structuring (b = - 0.047, SE = 0.215), indicating that higher levels of depression were associated to lower maternal structuring during DP. For the child's development, instead, higher levels of development of the child were associated to greater maternal structuring behaviours (b = 0.011, SE = 0.004).

Results concerning "Maternal Non-Intrusiveness" scale highlighted a main effect of Group [F(1,57.531) = 5.452, p= 0.023], controlling for maternal and infantile factors. Preterm mothers received significantly global lower scores than mothers of full-term children (See figure 8), meaning they were more intrusive during the play task with their children. No main effect of Time [F(2,87.382) = 0.241, p = 0.786] or interaction between Time and Group [F(2,88.363) = 1.268, p = 0.287] was detected. Moreover, for this dimension, none of the covariates had a significant effect (All p > 0.050).

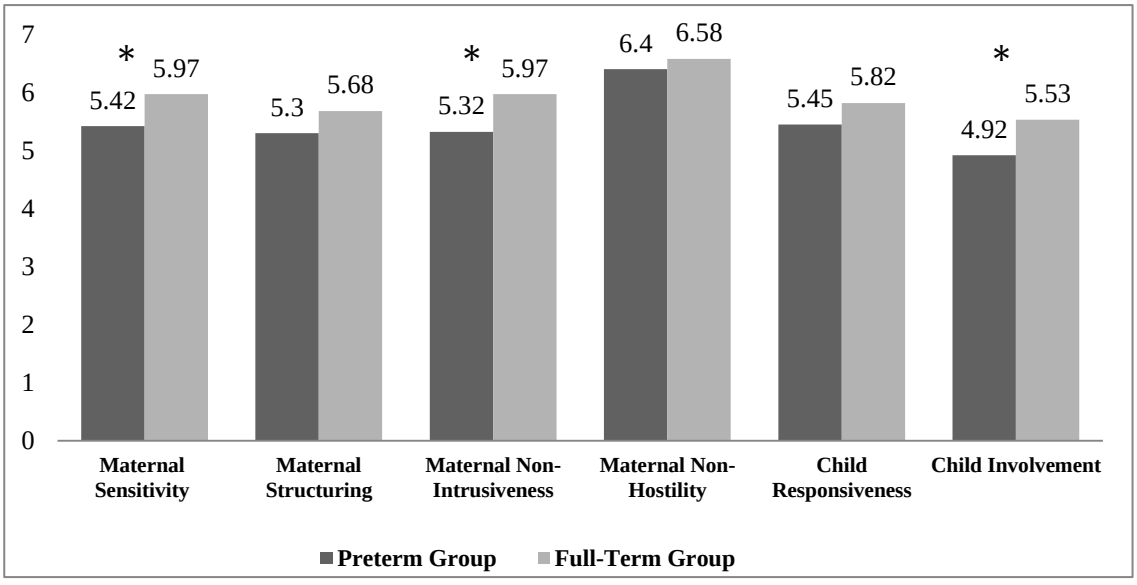
Regarding the scale "Maternal Non-Hostility", which evaluates the absence of maternal hostile behaviours toward the child during play, controlling for infantile and maternal variables no effect of Group [F(1,54.258) = 0.952, p = 0.333], Time [F(2,84.840) = 1.577, p = 0.213] or of their

interaction emerged [F(2,85.770) = 2.135, p = 0.125]. Moreover, none of the covariates had a significant effect (All p > 0.050).

Table 8. Mean scores on maternal dimensions of the EAS in the preterm and in the full-term group at each time of assessment

	Preterm Group (N = 44)			**Full-Term Group (N = 25)**		
	18 months	24 months	30 months	18 months	24 months	30 months
Sensitivity	5.32±0.17	5.37±0.18	5.57±1.19	6.03±0.21	5.91±0.21	5.98±0.23
Structuring	5.18±1.17	5.11±0.20	5.61±0.21	5.52±0.22	5.75±0.23	5.77±0.25
Non-Intrusiveness	5.18±0.18	5.29±0.20	5.48±0.22	6.08±0.23	5.90±0.24	5.92±0.26
Non-Hostility	6.23±0.12	6.33±0.41	6.62±0.15	6.56±0.15	6.63±0.16	6.54±0.17

Figure 8. Effect of Group and global mean scores in the preterm and full-term group on each of the EAS dimensions



* p < 0.050

2.4.5 Children's scores on the EAS dimensions in the preterm and in the full-term group [Objective 3]

For what concern the dimension "Child Responsiveness", analysis showed that, controlling for maternal anxiety, maternal depression, and the child's development, only the effect of Time was significant [F(2,92.802) = 4.109, p = 0.020]. Bonferroni correction indicated that scores increased from 18 (T1) to 30 months (T3) ($M_{\text{global score T1}}$ = 5.44 ± 0.13; $M_{\text{global score T3}}$ = 5.86 ± 0.15; p = 0.015), thus meaning an overall improvement of child's responsiveness over time, independently of the group (Figure 9). Moreover, the child's global level of development was significantly positively associated to the child's responsiveness during DP [b = 0.012, SE = 0.004, F(1,146.703) = 7.497, p = 0.007], indicating an increased responsiveness was associated to increased levels of development of the child. No effect of Group [F(1,60.840) = 2.564, p = 0.115] or interaction between Time and Group was observed [F(2,93.585) = 1.800, p = 0.171].

For what concern the last dimension, "Child Involvement", analysis showed a main effect Group [F(1,62.292) = 7.191, p= 0.009] and Time [F(2,95.268) = 18.979, p < 0.0001], controlling for maternal and infant factors (maternal anxiety, maternal depression, child's development). Mean scores indicated that the child's involving and engaging behaviours were lower in preterm ($M_{\text{global score PG}}$ = 4.92 ± 0.14) compared to full-term children ($M_{\text{global score FG}}$ = 5.53 ± 0.17) (See Figure 8, p.84). A significant increase in the child's level of involvement over time was however detected, independently of the group (Figure 10). Bonferroni correction showed that scores increased significantly from 18 (T1) to 24 (T2) months ($M_{\text{global score T1}}$ = 4.74 ± 0.13; $M_{\text{global score T2}}$ = 5.27 ± 0.13, p = 0.001) and from 24 (T2) to 30 (T3) months ($M_{\text{global score T2}}$ = 5.27 ± 0.13; $M_{\text{global score T3}}$ = 5.65 ± 0.15, p < 0.0001). No interaction between Time and Group emerged [F(2,95.960) = 1.353, p = 0.263]. Finally, as for the Child Responsiveness scale, the child's development was positively associated to scores on the Child Involvement dimension, indicating a greater child's involvement associated to higher levels of child's development [b = 0.009, SE = 0.004, F(1,146.711) = 4.185, p = 0.043].

Figure 9. Mean scores on the Child Responsiveness scale at each time of assessment in the preterm and full-term group

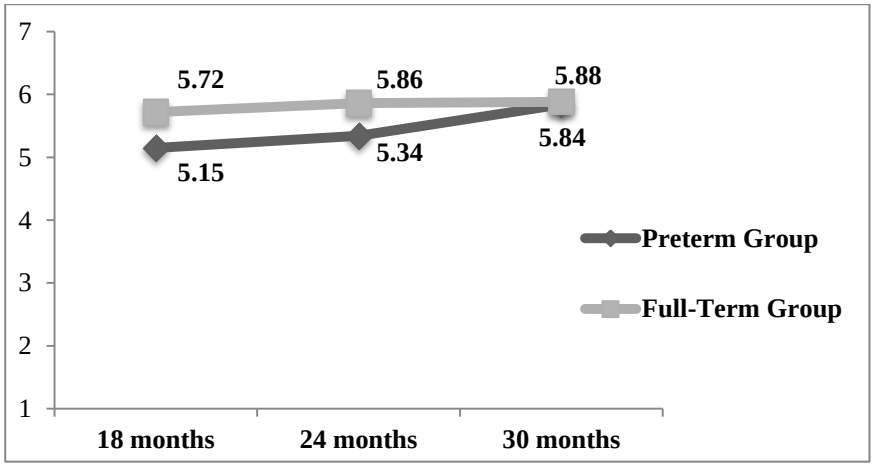
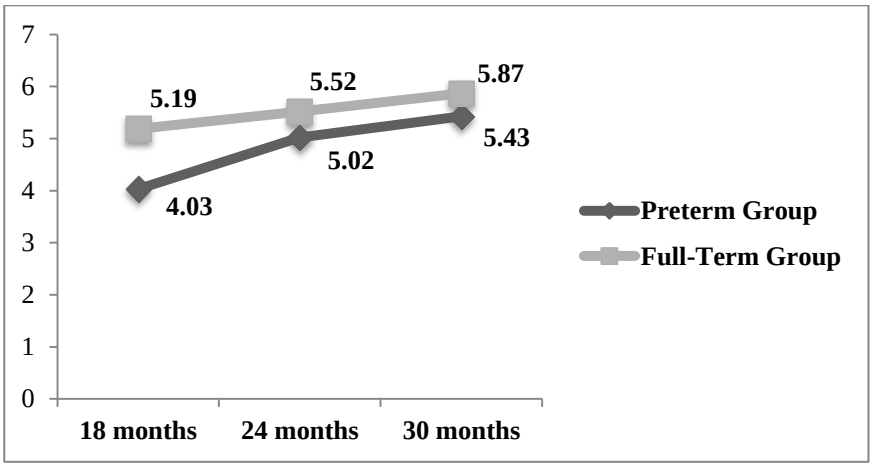


Figure 10. Mean scores on the Child Involvement scale at each time of assessment in the preterm and full-term group



Discussion

Research has highlighted that feeding disorders of infancy and early childhood are nested in the broader mother-child relationships and not only linked to the child's physical condition (Chatoor, 1996, 2002, 2009; Chatoor & Macaoay, 2008; Satter, 1990; Trombini, 2010). Moreover, longitudinal studies have shown continuity between feeding disorders in infancy and early childhood and future eating behaviour, with adverse outcomes on the individual's affective and behavioural development (Ammaniti et al., 2010; Bryant-Waugh et al., 2010; Marchi & Cohen, 1990). Particularly, the transition to self-feeding represents an extremely vulnerable time for the onset of feeding disorders in childhood, which are connected to the child's growing autonomy and to dependency issues (Ammaniti et al., 2004; Chatoor, 1989, 2002; Lucarelli et al., 2002, 2003; Trombini & Trombini, 2006, 2007; Trombini, 2010). Preterm children might be particularly vulnerable at this purpose, as they are at increased risk for experiencing feeding difficulties and mismatched mother-child feeding interactions during infancy (Davis et al., 2003; Pierrehumbert et al., 2003; Reyna et al., 2006; Singer et al., 2003; Thoyre, 2007; Torola et al., 2012; Vandenberg; 2006). However, literature lacks of contribution that explored the feeding behaviour of preterm toddlers during the transition to self-feeding by means of observational studies.

The present research aimed at expanding on the literature, investigating, through a transactional multi-risk model, the characteristics of mother-child interactions during the transition to self-feeding (18-30 months) in the population of preterm children. We explored this objective through two levels of analysis: First we looked at differences in mother-child interactions between preterm and full-term dyads during meals at 18, 24, and 30 months (Study 1). This allowed us to observe the mother's and the child's behaviour during the actual feeding situations and to gather information about the child's eating autonomy. Second, in the same time-frame (18, 24 and 30 months) we explored differences between groups in the mother's and the child's level of emotional availability (EA) displayed during a Doll-Play (DP) situation representing feeding (Study 2). This

situation allowed us to explore the mother's and the child's representation and affectivity around feeding. As largely recognized, mother-child play is an exceptional opportunity to observe mother-child patterns of interactions and the quality of their affective relationship (Biringen et, 2000). Moreover, the DP technique has been largely used in psychotherapy, and increasingly appreciated in clinical research, to elicit material concerning the child's relationships (Murray et al., 1999; Pass et al., 2012). Therefore, this methodology was chosen as the most adequate to explore the research question of the study.

We hypothesised that mother-child dyads in the preterm group would show more difficult interactions than the full-term group both in the feeding (Study 1) and in the playing situation (Study 2). Globally, our results seem to be in line with our hypothesis. In fact, preterm mother-child dyads participating in our study presented greater difficulties than full-term dyads during meals (Study 1) and lower levels of emotional availability during DP interactions (Study 2) from 18 to 30 months. In both situations, scores received by the preterm group were indicative of a situation that, although did not represent clinical major problems in the areas investigated, reflected a condition of risk that should be watched (Ammaniti et al., 2006; Biringen, 2008).

Following, results obtained from the Study 1 and 2 will be discussed in details on the light of the existing literature.

In study 1 we looked first at the child's eating autonomy (Objective 1), hypothesising that preterm children would show lower eating autonomy than full term children in the time frame 18-30 months. Second, we explored differences in the dyadic global functioning of mother-child interactions during meals at 18, 24, and 30 months comparing preterm and full-term dyads (Objective 2). With respect to this objective, we hypothesised that preterm dyads would show more problematic interactions than full-term dyads. Third, we investigated specific aspects of the maternal behaviour, the child's behaviour, and the mother-child interactive dynamics during

feeding (Objective 3), hypothesising worse patterns in the preterm groups compared to the full-term group in each domain.

With respect to the first objective, results confirmed our hypothesis showing that the percentage of children that were reported to reach a complete eating autonomy between 18 to 30 months was lower in the preterm than in the full-term group. Descriptive statistics showed that by 30 months most of full-term children were eating alone, whereas a good portion of preterm children (64.1%) were still spoon-fed by their mother at this time. However, our results showed an effect of time, indicating that the number of children that reached eating autonomy increased at 24 and 30 months compared to 18 months, independently of the group. Our findings suggests therefore that development of eating autonomy may follow the same trajectory in both groups, even though preterm children seem to become fully autonomous later than full-term children. This result seem to confirm a delay in the acquisition of feeding milestones in preterm children, as already suggested by other authors (Dodrill et al., 2004; Torola et al., 2012).

For what concern the second objective of the study, results confirmed our hypothesis. In fact, an effect of group was observed, indicating that, during the timeframe 18-30 months, a higher number of dyads in the preterm group than in the full-term group were classified as "Dyad with Transient Dysfunction". No effect of Time or interaction between time and group was detected, meaning a stability of this pattern over time. We defined the conditions of "Dyads with Transient Dysfunction" in line with the definition of the authors of the SVIA (Ammaniti et al., 2006; Chatoor et al. 1997, 1998c) and recently used by Fadda et al. (2014), to refer to a situation that might be due to a contingent issue rather than to a permanent problem linked to maternal personality or affective disorders. Compared to the interactions of Functional Dyads, these interactions are characterized by less reciprocity and greater interactional conflicts, with less maternal sensitive behaviour and less adequate attempts to support the child's autonomy. Moreover, the child's attitude during meals is characterized by higher distress and greater oppositional behaviours. This category identifies a dystonic relationship and negative affect in the dyad. The distribution of functional and

dysfunctional dyads we found, might then reflect a more difficult adjustment of preterm dyads to the challenges that the transition to self-feeding pose to the mother and to the child. However, at this level some positive communication between the mother and the child during feeding interaction can still be observed (Fadda et al., 2014). Moreover, it is important to underline that, even though preterm dyads were found to globally show more problematic interactions than full-term dyads, more than half of dyads in the preterm group were still presenting a functional pattern of interaction (59.1% at 18 months, 52.8% at 24 months, and 62.9% at 30 months). It would therefore be relevant to further investigate differences between dyads that presented functional interactions and dyads with dysfunctional interactions in the preterm group, to understand which factors may contribute to the differences observed.

In addition, an effect of the child's development and a marginally significant effect of weaning on the global functioning of the dyad were detected. This result seems to confirm a higher risk for children with developmental delays to experience more problematic feeding interactions (Benoit, 2000; Lindenberg et al., 1991). Moreover, the effect of weaning seem to suggest that delays in the preceding developmental stages might impact on the quality of mother-child feeding interactions during later stages. Therefore, a delayed weaning might be associated to mother-child difficult feeding interactions during the transition to self-feeding. However, since information on the child's weaning in our study were gathered retrospectively through maternal reports, further studies should be directed to explore the association between mother-child interactions during weaning and during the transition to self-feeding.

For what concern the third objective of the study, about the dimensional investigations on the SVIA subscales, results partially confirmed our hypothesis. For what concern the effect of Group we found significantly worse scores in the preterm compared to the full-term group on the following dimensions: Affective State of the Mother, Interactional Conflicts and Affective State of the Dyad. Differently, contrary to what we expected, no differences emerged in the scale Food Refusal Behaviour of the Child.

With regard to the scale "*Affective State of the Mother*", findings showed that mothers of preterm children were more distressed during meals than mothers of full-term children (with higher levels of sadness, anger and anxiety) and less empathic towards the child's needs. Moreover, in addiction of being higher than those of the full-term group, scores of the preterm group also exceeded the SVIA cut-off of the normative Italian population (Ammaniti et al., 2006). This result seem to confirm that feeding may represent a distressful task for mothers of preterm children as underlined already by other authors (Cerro et al., 2002; Latmiral & Lomnardo, 2000; Zanardo et al., 2011). Moreover, as no effect of Time or interaction between time and group on the scale was detected, results indicate that the quality of maternal affective state was stable over the three times of assessments (18, 24, and 30 months). In addition, maternal depression measured through the BDI-II (Beck & Steer, 1996) was positively associated to maternal affective state on the SVIA. This means that higher levels of maternal depression were associated to higher and more problematic scores on the SVIA dimension. This result seems to confirm that high levels of depression can impact on maternal behaviours towards the child during the interaction, as already suggested by other authors (Agostini et al., 2014; Ammaniti et al., 2010; Lucarelli et al., 2013).

Results obtained for the dimension *"Interactional Conflict*" indicate that preterm dyads reported greater conflicts during the meal form 18 to 30 months compared to full-term dyads. Mothers of preterm children were more intrusive and controlling during feeding exchanges (e.g. control the meals without considering the child's signals), in turn preterm children showed greater oppositional behaviours and food refusal than full-term children (e.g. as spitting, throwing food away, tighten the mouth to avoid food intake, turn the head away, and crying). This result seems to confirm that mothers of preterm children are more intrusive and controlling than full-term mothers during feeding as already found by other studies at earlier developmental stages, in particular during breastfeeding (Singer et al., 2003; Reyna et al., 2012). This result seems also in line with the findings by Cerro (2002). The author found that mothers of preterm toddlers reported to use more coercive tactics than mothers of full-term toddlers in order to control the amount of food eaten by

the child. Moreover, in the same research mothers of preterm children showed less satisfaction about the child's eating behaviour and were more reluctant to let the child decide what to eat. Literature has highlighted that high levels of maternal control and dyadic conflict during meals are strictly connected to the occurrence of food refusal in toddlerhood and may impact on the successful transition to self-feeding (Ammaniti et al., 2004, 2006; Atzaba-Poria et al., 2010; Chatoor, 1989, 1996, 2002; Chatoor & Macaoay, 2008; Lucarelli, 2002, 2003). Our results seem therefore in line with the literature, enhancing a greater risk for preterm than for full-term children.

In addition to the effect of Group, an effect of Time on the scale Interactional Conflict was detected, indicating that scores diminished from 18 to 30 months, independently of the group. This result suggests an improvement in dyadic conflicts after 18 months of the child, in line with other studies (Ammaniti et al., 2006; Lucarelli et al., 2003; Chatoor et al., 1997; 1998). Authors of the SVIA have found that scores on the Interactional Conflict scale appears to change in fashion with age. The age range 12-18 months appears to be associated with a rise in dyadic conflict. During this time most toddlers start the transition to self-feeding. Scores gradually decrease in the age range 24-36 months with the adjustment of mother-child interactions to the new developmental acquisitions of the child (Ammaniti et al., 2004, 2006; Lucarelli et al., 2003). However, in our sample, though decreasing, scores of the preterm group remained higher than those of the full-term group. Moreover, at each time of assessment scores of the preterm group exceed the cut-off score of the normative sample, suggesting that the level of interactional conflict detected in the preterm group was symptomatic of main difficulties in the area (Ammaniti et al., 2006).

Moreover, similarly to what we observed on the scale Affective State of the Mother, maternal depression was significantly positively associated to scores on the Interactional Conflict scale. This result seem to confirm that mother with higher levels of depression may display greater intrusiveness and less sensitive behaviours during the interaction with their child as previously addressed in the literature (Agostini et al., 2014; Ammaniti et al., 2010; Field, 1977; Field, 1984; Murray et al., 1996). Moreover, a longitudinal study that was carried out to investigate the

relationships between maternal mood and child's food refusal highlighted that maternal tendency to respond to the child's food refusal with anxiety or depression may prolong or worsen the problem (Coulthard, & Harris, 2003). Our results may show a connection to what previously found by the mentioned study as the Interactional Conflicts scale evaluates both maternal intrusiveness and the child's opposition and food refusal behaviour.

Scores on the scale *"Affective State of the Dyad"* of the SVIA confirmed our hypothesis and showed a lack of reciprocity and greater dyadic negative affectivity during meals in the preterm compared to the full-term group. Dyadic mismatch was due to greater difficulties in mothers of preterm children in supporting the child's autonomous initiatives during feeding from 18 to 30 months and to greater distress and avoidance of dyadic exchanges in the child in response to maternal behaviour. Moreover, no effect of Time or interaction between Time and Group was detected showing that scores of the two groups were almost stable over time. Again, this result seems to confirm previous studies that highlighted lower synchrony and higher mismatch in preterm, compared to full-term, mother-child feeding interactions, particularly during breastfeeding (Davis et al., 2003; Singer et al., 2003; Reyna et al., 2012, Vandenberg et al., 2006). Our results might therefore reflect a persistence of this mismatched dyadic pattern during feeding in the preterm population. However, this hypothesis should be better explored.

In addition, an effect of the child's development on the scale Affective State of the Dyads was found. The direction of the association indicated that lower levels of child's development were associated to higher scores on the scale, meaning lower reciprocity and greater negative dyadic affect. Our finding suggests therefore an effect of both the child's development and prematurity on mother-child reciprocity during meals and on maternal support to the child's autonomy. This result seems in line with the study of Potharst (2012), which reported mothers of preterm children supported less their toddlers initiatives than mothers of full-term toddlers, especially when they showed developmental delays.

Last, contrary to what we expected no effect of group was detected on the scale *"Child's Food Refusal"*. This dimension evaluates the child's feeding behaviour and high scores on this scale indicate difficulties in the child's state regulation (e.g. ipo or iper reactivity, easy to distract, lack of hunger, lack of interest on food) and poor eating. As literature highlighted that preterm children experience more difficulties in the hunger satiety-cycle and present higher arousal than full term children (Schadler et al., 2011; Schmid et al., 2011) we expected to observe an effect of prematurity on this scale, confirming the stability of regulatory problems over time (Hemmi, Wolke, & Scneider, 2011). However, our finding seemed to highlight that in our sample the child's internal regulation was not impaired by prematurity. This was as also suggested by mean scores of the preterm group, which were perfectly in line with those of the normal population (Ammaniti et al., 2004; Ammaniti et al., 2006; Lucarelli et al., 2002). The child's history of reflux and breastfeeding, and the child's general level of development seemed instead to have a main effect on the child's eating behaviour, with poorer eating for children that experienced more problems in these areas. This result seems in line with what previously evidenced by authors that found an association between the child's past feeding history and eating outcomes in childhood (Bryant-Waugh et al., 2010; Krug et al., 2013, Silberstein et al., 2009). For what concern breastfeeding, some studies highlighted that bottle-feeding, compared to breast-feeding, tend not to solicit and poorly promote self-regulatory skills of the child. In a circular perspective, this would affect the child's internal regulation capacities (Chatoor et al., 2004; Chatoor, 2002, 2009). This factor might explain at least partially the effect of breastfeeding on the child's eating behaviour detected in our study. Results pertaining the child's history of reflux seem to confirm what already largely evidenced by literature about the effect of previous traumatic or painful medical experiences connected to oral feeding on the child's eating behaviour (Chatoor et al., 2002; Dellert et al., 1993; Dondrill et al., 2004; Monahhan, Shapiro, & Fox, 1988; Hyman, 1994). Last, the association between the child's level of development and food refusal underline the importance of considering the impact that the child's psychomotor development can play in mother-child feeding exchanges.

Globally, results for the Food Refusal of the Child scale might suggest that other factors, like past feeding history and medical experiences and the child's development, would influence the child's eating behaviour more than the condition of being premature or not. However, a higher occurrence of problems in these areas was detected in our sample of preterm children indicating that they might be at higher risk of experiencing eating difficulties and confirming other studies (Ardvedson et al., 2010; Barlow, 2009; Kenner and McGrath, 2004; Thoyre, 2007). Moreover, maternal behaviours in feeding the child have been found to be a strong predictor of negative outcomes for the child's eating patterns and could represent a potential risk for the child's internal regulation and future eating behaviour (Gueron-Sela et al., 2011; Micali et al., 2011; Whelan et al. 2004). Therefore, further research should be directed to better understand which factors may impact on the eating behaviour of preterm children and to which extent. Moreover, future contribution should consider also the role played by the severity of prematurity and by the child's temperament. These factors have been found to increase the risk of feeding disorders in infancy and early childhood and, therefore, might be more associated with internal regulatory problems (Pierrehumbert et al., 2003; Schadler et al., 2011; Schmid et al., 2011). We advise that this aspect should be further investigated in future research.

In Study 2 we explored mother-child emotional availability (EA) during a Doll Play (DP) situation representing feeding. We hypothesised that dyads in the preterm group would show less EA than full-term dyads during the DP scenario. Therefore, confirming that prematurity would play an effect not only on mother-child interactions during meals (as found in Study 1), but also on the broader mother-child relationship and internal representation around feeding. Following an organizational perspective (Sroufe & Waters, & Oppenheim 1977; Oppenheim, 2012), we explored first the differences between groups on the global level of EA displayed during DP from 18 to 30 months (Objective 1), and, second, the differences between groups on maternal (Objective 2) and infant (Objective 3) dimensions of the EAS during the same time frame.

For what concern the first objective, results were in line with our hypothesis evidencing that preterm dyads obtained lower global EA scores than full-term dyads during the DP interaction representing feeding from 18 to 30 months. Descriptive statistics showed that in the preterm group a great percentage of dyads presented a "complicated EA" pattern during DP, meaning that mother-child interactions were characterized by mismatched maternal and child's behaviours and inconsistent affectivity. Complicated EA indicates a situation where the child's autonomy during play is less supported by the mother than in dyads with High EA (Biringen, 2008). This pattern underlines some difficulties in maternal capacity to do what is ultimately good for the child in the play situation, and child's higher distress, lowered autonomy, dependency and over-connection toward the mother. This result seem therefore to confirm that preterm mother-child dyads might report more difficulties related to dependency issues than full-term dyads during the timeframe 18-30 months. This period is fundamental for the child's emotional and affective development as strictly connected to the child's development of autonomy, separation-individuation from the mother and construction of Self (Ainsworth et al., 1979; Mahler, Pine, & Bergman, 1975; Lichtenber, 1989, Lichtenberg et al., 2010; Stern, 1985). Moreover, our data are in line with studies that found lower levels of emotional availability in populations of children with eating disorders (Atzaba-Poria et al., 2010; Gueron-Sela et al., 2009; Wiefel et al., 2005). Although our sample of preterm children did not present full-blown feeding problems, preterm dyads reported a situation of higher risk compared to full-term dyads in our first study. In line with that, the overall lower scores obtained at the EA by the preterm group suggest coherence between feeding and playing interactions. This result seems in line with research that highlighted that maternal and infant patterns of interactions tend to generalize to different contexts (Fadda et al., 2014; Stern, 1995; 1998).

Moreover, an effect of maternal depression on the global level of EA displayed during the interaction was found, confirming again that maternal depression might affect the global quality of the mother-child relationship in different context of interaction (Agostini et al., 2009; Korjia et al.,

2008; Tronick, 2007, 2008). This result also suggests the importance of monitoring maternal affective state, especially in high-risk situations.

Regarding dimensional investigations on maternal EA subscales (Objective 2), our results showed an effect of group on Maternal Sensitivity and Non-Intrusiveness scales. Mean scores revealed that mothers of preterm children displayed less sensitivity and more intrusiveness than mothers of full-term children during the DP situation representing feeding.

When compared to the broader literature available on mother-child interactions in the preterm population, our findings seem to confirm that mothers of preterm toddlers tend to be more controlling, less supporting of and more interfering with the child's initiatives during the interaction (Bozzette, 2007; Forcada-Guex et al., 2006; Potharst et al., 2012). For what concern maternal sensitivity, however, literature shows some inconsistency. If some research highlighted lower levels of sensitivity in mothers of preterm children, others failed in detecting and effect of prematurity on maternal sensitivity (Bilgin & Wolke, 2015). Moreover, some authors explained the highest level of maternal stimulation toward the child in preterm mothers as the mother attempts to involve an under-responsive child, thus not considering maternal behaviour as intrusive. However, two concepts must be considered at that purpose. First, our research explored maternal attitudes in a specific situation aimed at elicit the mother's and the child's representation about feeding. Therefore, what we observed couldn't be extended to general consideration. Second, the EA provide a dyadic measurement of maternal and children's behaviours, which means the mother cannot be rated as sensitive if the child does not show to be appropriately and positively involved and connected to the adult. Similarly, mothers wouldn't be rated as intrusive without observing the child's response indicating that the mother is being intrusive (Biringen, 2008). What we observed was therefore a joint effect of the mother's and the child's responses in the specific situation created by the DP scenario. Our findings revealed that preterm mothers were less able to sensitively respond to the child's cues during the doll-play situation and were more protective and solicitous than mothers of full-term children. Moreover, in our study the child's development was

significantly positively associated to maternal sensitivity indicating that higher levels of maternal sensitivity were associated to higher performances of the child's on the Griffiths scales. Other studies highlighted that sensitive mothers, able to connect with the child's state and to stimulate the child in an appropriate way, can compensate and reduce the developmental difficulties linked to preterm birth (Feldman & Eidelman, 2006; Forcada-Guex et al., 2006; Neri et al., 2015; Treyvuard, Rogers, Matthews, & Allen, 2009).

For what regards the Maternal Non-Hostile and Structuring scales, even though scores were slightly lower in the preterm group, LMMs analysis indicated a lack of significant differences between groups. Moreover, no effect of time or interaction between time and group emerged for the scales. This result might suggest that these aspects of maternal behaviour were less influenced by prematurity and by the context elicited by the play. This would be at least partially supported by the fact that studies on the EAS found that, among all maternal scales, Maternal Non-Hostility is the most influenced by constitutional personality characteristics of the mother and by maternal previous history of abuse and maltreatment (Bornstein et al., 2006; Moheler, Biringen, & Poutstka, 2007; Stack et al., 2012). Results on these dimensions, would therefore highlight that preterm mothers in our sample were still presenting some good parental responses as they showed lack of hostility towards their children and were, on average, appropriately structuring the interactions. However, an effect of maternal depression and of the child's development on maternal structuring emerged. The direction of the effects indicated that higher levels of depression and lower scores on the Griffiths were associated to less appropriate maternal structuring behaviours. This result suggests a higher risk for those situations where maternal and infant factors concur (Poehlmann et al., 2009).

For what concern the child's dimensions of the EAS (Objective 3), our results partly confirmed our hypothesis. Although global scores were lower in the preterm group, preterm children were found to be less involved in mother-child interactions but not less responsive. Moreover, scores on both scales increased significantly from 18 to 30 months showing an improvement in the child's responsiveness and involvement over time. Two recent studies that used

the Emotional Availability Scale to evaluate mother-child interactions found that the child's responsiveness was strictly connected to the adult's capacity to adequately structure the interaction, while maternal sensitivity was associated to the child's involvement (Biringen et al. 2012, Stack et al., 2012). In our sample, although scores were lower for the preterm group compared to the full-term group, no differences emerged in maternal structuring behaviours between groups. Differently, preterm mothers displayed significantly less sensitivity than full-term mothers. Our result may therefore reflect a similar effect. However, this hypothesis was not directly assessed in our study, therefore, the relationship between maternal and child's behaviours should be further explored.

Moreover, the Child Involvement scale measures the balances between child's autonomy in play and interest in initiating involvement of the mother in play (Biringen, 2008). The effect of group may therefore suggest both less interest and greater difficulty in preterm children autonomy during the play-task. A recent Italian study (Salerni & Suriano, 2013) showed that prematurity influenced both the child's productivity and modalities of play at 18 and 24 months. At 18 months preterm children showed a lower production of symbolic play than their full-term counterpart. However, at 24 months differences were not any longer significant (Salerni & Suriano, 2013). This data would at least partially explain the effect of Time we found on both the Child Responsiveness and the Child Involvement scale. Scores increased in both groups at 24 and 30 months compared to 18 months. This might reflect an improvement in the child's competences and involvement during the play-task from 18 to 30 months. Moreover, studies on the EAS psychometric properties confirmed that maternal dimensions of the EAS tend to be more stable over time (as maternal attitudes towards the child represent a more stable trait), whereas the child's dimensions are more flexible, and more easily influenced by the context and by the child's age and social abilities (Biringen, 2008; Bornstein et al., 2006; Stack et al., 2012). Last, our findings showed a positive association between child's scores on the Griffiths scales and scores on the Child Responsiveness and Child Involvement scales of the EAS. This finding is coherent with the hypothesis that the

child's affect and involvement during DP play may have been influenced also by his/her cognitive competences and social abilities.

In addition, for what concern maternal (depression, anxiety) and infant factors (child's development), our findings seem in line with the literature.

Regarding the child's level of development, our data confirmed that preterm children tend to show poorer global developmental profiles than full-term children, as already largely documented in literature (Aylward, 2009; Buttha et al., 2002; Sansavini et al., 2010). However, mean scores obtained by preterm children indicated that, even though lower of those of the full-term group, they were on average for the child's age and development. Similar results were obtained by other studies (Dall'Oglio et al., 2010; Guarini et al., 2009, 2010; Ortiz-Mantilla et al., 2008; Sansavini et al., 2010, 2011) and confirm that the psychomotor development of preterm children is characterised by a vast heterogeneity and inter-variability associated to the child's neurological maturation and interactions with the familiar-social environment (Biasini et al., 2015; Claas et al., 2001; Marlow et al., 2005; Sansavini et al., 2011; Stoinska & Gadzinowski, 2011).

Regarding analysis on maternal depression and anxiety, our findings did not show any significant difference between pre- and full- term mothers. For both groups, mean scores on the BDI-II and STAI-Y1 were below clinically relevant levels. Moreover, in both groups scores on the BDI-II and STAI-Y1 decreased in the preterm group from 18 to 24 months, indicating and improvement of maternal psychological state. Although we did not drove specific hypothesis on maternal anxious and depressive symptomatology, this result was not unexpected. In fact, literature highlights that mother of preterm infants report higher levels of anxiety and depression mainly in the early postpartum period, following the birth of their baby (Carter et al., 2007; Vigod et al., 2009; Voegtline et al., 2010). Fewer contributions have explored the course of maternal anxiety and depression during the child's toddlerhood age, but they seem to agree in finding a decrease in maternal depressive and anxious symptomatology over time, especially when child's conditions

stabilized (Miles et al., 2007; Singer et al., 1999). However, it has to be noted that our sample was mainly characterised by wealthy and educated women, mostly married or cohabiting with the father of the child. This might have influenced our results as research shows that remission of mood disorders symptomatology is lower when infant, maternal, and familiar risk factors are concurrent (Poehlmann et al., 2009).

Last, the broad effect we found of maternal depression and child's development on several of the dimensions assessed by the SVIA (Ammaniti et al., 2006) and by the EAS (Biringen, 2008) suggests the need to keep monitored these factors in the assessment of mother-child interactions in follow-up studies and in clinical interventions.

Limitations

Some limitations of the study must be considered when interpreting our findings.

First, due to the small sample size, all results should be replicated on larger samples with a more numerous control group.

Second, we did not consider some important characteristics of the child, such as the severity of prematurity (e.g. differences among ELBW, VLBW or very and extremely preterm children), temperamental difficulties, and behavioural problems of the child, which might have played a role on the pattern of feeding and playing observed (Ammaniti et al., 2010; Bozzette, 2007; Chatoor et. al., 2000; Thoyre, 2007). Future studies are recommended to further explore these aspects.

Third, even though we excluded from the sample parents with a previous history of eating disorders, we did not investigate maternal attitudes towards food, which have been shown to influence maternal feeding practices (Agras et al., 1999; Cooper, et al., 2004; Micali, et al., 2011). Therefore, future research would benefit from further controlling this effect.

Last, due to time constraints of the parents that participated in the study we could not investigate the quality of father-child interactions. The choice to favour mothers was supported by the evidence that during the first years of life of the child mothers are more commonly in charge of

the child's feeding than fathers. This was also supported by data we gathered through the anamnestic questionnaire. However, the role of the father has gained increasing attention in literature as found to play an important role on mother-child feeding interactions and on the child's development (Cimino et al., 2011). Therefore, future research would benefit of further exploring father-child feeding interactions and their possible effect on the child's feeding behaviour in the preterm population.

Finally, it would be clinically relevant to understand, through further longitudinal studies, how the pattern of mother-child interactions observed in the present study would evolve in a longitudinal way.

Conclusion

Despite some limitations, our study had the value to investigate an unexplored aspect of the mother-child relationship in the preterm population: the transition to self-feeding.

This period represents a fundamental step for the child's future development, not only for the impact on his/her feeding behaviour but also for his/her socio-emotional development (Ammaniti et al., 2012; Lichtenberg, 1989, Lichtenberg et al., 2010; Chatoor & Macaoay, 2008; Marchi & Cohen, 1990). In fact, the transition to self-feeding is strictly connected with the separation-individuation of the child from the mother (Freud, 1965; Mahler, Pine, & Bergman, 1975; Chatoor, 1989, 2002) and with the construction of the individual's Self (Ammaniti et al., 2004; Feldman, 2007; Stern, 1985). Problems with feeding during this transition (i.e. Infantile Anorexia) represent a risk factor for the development of eating disorders during adolescence and adulthood (Anorexia Nervosa, Bulimia Nervosa, Binge Eating Disorder) (Marchi & Cohen, 1990; Kotler et al., 2001). Moreover, children with feeding disorders during early childhood are more exposed to develop relational issues, such as internalizing or externalizing problems (Ammaniti et al., 2012; DeGangi et al., 2000).

The present longitudinal study seems to confirm the hypothesis of a greater risk for preterm mother-child dyads compared to full term mother-child dyads during this transition (18-30 months).

Results of the Study 1 indicate a significant higher occurrence of dysfunctional interactions during meals from 18 to 30 months in the preterm than the in the full-term group. Particularly, preterm mother-child interactions were characterised by greater maternal negative affect (sadness, anger and distress), higher interactional conflict (expressed through maternal intrusiveness and child's food refusal), and lower dyadic reciprocity (expressed through maternal low support to the child's autonomous initiatives and child's distress) compared to the full term group. Moreover, preterm children were reported to be less autonomous than full-term children by their mothers, as a significantly lower percentage of children in the preterm group reached eating autonomy during the

timeframe 18-30 months compared to full-term children. Difficulties during the transition to self-feeding in the preterm population seem, therefore, to concern both children's development of autonomy and the mother-child dyadic relationship, which is characterised by less pleasure and greater conflicts during meals compared to controls. Moreover, adverse past feeding history (difficult breastfeeding and reflux) and lower total scores on the Griffiths were associated to a higher risk of child's food refusal, underlying the need to further consider these factors in the assessment of feeding disorders in childhood.

Results of Study 2 showed that preterm mother-child dyads displayed overall lower levels of emotional availability (EA) than full-term dyads during a Doll-Play (DP) scenario representing feeding. Particularly, in the preterm group we observed a high incidence of the pattern "Complicated EA", characterised by mid-rage scores (Biringen, 2008), at all the assessments. This result indicated that a high portion of preterm dyads was showing a relationship that was not entirely healthy as characterized by over-connection and dependency (Complicated EA- Biringen, 2008). Preterm mothers tended to be over-protective and less supportive to the child's autonomous initiatives during DP, showing similar patterns to the ones we observed during feeding. This was confirmed by dimensional analysis that showed lower scores in the preterm group in maternal sensitivity, maternal non-intrusiveness and child's involvement during DP. This finding is coherent with a recent study that found consistency between maternal and child's behaviours during the feeding and the playing situation (Fadda et al., 2014), confirming what emerged from previous research (Stern, 1995, 1998). Despite this, it is relevant to remember that some positive communication between the mother and the child during feeding interaction and during play could still be observed in our sample of preterm children. As suggested by descriptive data, some dyads were still functionally interacting during meals and during play. However, globally, our results indicate a higher risk for preterm than for full-term dyads, which was observed both during feeding interactions and on the broader mother-child emotional availability during play. Moreover, scores

obtained by the preterm group in both interactive situations suggest a situation of risk for these dyads that should be watched and followed up (Ammaniti et al., 2006; Biringen, 2008).

In addition to these findings, an effect of maternal depression and of the child's development on the interactive feeding and playing patterns emerged. Higher levels of maternal depression were associated to higher interactional conflicts and greater maternal negative affective state during meals, and to higher maternal intrusiveness and lower structuring during play. Moreover, maternal depression was associated to lower global levels of emotional availability during play. Lower child's development was instead associated to higher food refusal behaviours and lower dyadic reciprocity during meals, and to lower maternal sensitivity, child's responsiveness, and involvement during play.

To conclude, findings of the present research advise that special attention should be paid to mother-child interactions during the transition to self-feeding from 18 to 30 months in the preterm population. Moreover, the assessment of mother-child interactions should consider the role played by maternal and infant factors such as maternal psychological state, child's level of development and past feeding history.

Efforts should be directed to develop and strengthen focused intervention during the follow-up programs of preterm children in order to support the transition to self-feeding in this population. Intervention should focus on increasing maternal sensitivity and support towards the child's autonomous initiatives during this period, intervening both on feeding and on playing interactions. Focused interventions would help to lower conflicts and increase dyadic reciprocity in preterm dyads, thus fostering the broader mother-child relationship and promoting the child's healthy eating behaviour and adequate emotional and affective development.

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Appendix – Study Measures

Informed Consent

ALMA MATER STUDIORUM
UNIVERSITA' di BOLOGNA

Dipartimento di Psicologia
Università di Bologna
Direttore Prof. Bruno Baldaro

U.O. Neonatologia
Ospedale Bufalini Cesena
Direttore Prof. Augusto Biasini

Gentili Genitori,
da molti anni è attiva una fruttuosa collaborazione tra il Dipartimento di Psicologia dell'Università di Bologna (direttore Prof. Bruno Baldaro) e l'U.O. di Neonatologia dell'Ospedale Bufalini di Cesena (direttore Prof. Biasini).
Tale collaborazione ha permesso di ampliare le conoscenze inerenti le tappe dello sviluppo psico-fisico di nati prematuri e nati a termine e di strutturare, ove necessario, interventi di supporto per genitori e bambini.

In questo contesto, desideriamo chiedere la Vostra partecipazione a un progetto (responsabile Prof.ssa Elena Trombini) che riguarda la valutazione dello sviluppo dell'autonomia in campo alimentare nei bambini nati prematuri e nati a termine. Il passaggio all'alimentazione autonoma è, infatti, una tappa fondamentale dello sviluppo del bambino e l'ambiente famigliare svolge un ruolo determinante nell'incoraggiare il bambino a imparare a mangiare da solo.
Il progetto prevede l'osservazione videoregistrata degli scambi interattivi madre-bambino (a 18, 24 e 30 mesi) durante la merenda e durante una breve sequenza di gioco (durata complessiva: 25-30 minuti). Verranno inoltre valutati lo sviluppo del bambino, i suoi comportamenti quotidiani e verranno somministrati ai genitori brevi questionari, che possono esserci di aiuto.
Le videoregistrazioni e le somministrazioni, coordinate dalla Dott.ssa Paola Salvatori, verranno effettuate presso il Laboratorio di Psicodinamica dello Sviluppo "Anna Martini" di Cesena (responsabile Prof.ssa Fiorella Monti).
I dati raccolti saranno utilizzati unicamente a scopo d'indagine scientifica, in forma anonima e in pieno rispetto delle normative sulla privacy.

Chiedendo la Sua gentile collaborazione, La ringraziamo fin d'ora per la disponibilità e restiamo a Sua disposizione per ulteriori chiarimenti.

Io sottoscritto (nome e cognome del padre)

_____

Io sottoscritta (nome e cognome della madre)

_____

Genitori di (nome e cognome del figlio/a)

_____

Autorizziamo la Prof.ssa Elena Trombini e i suoi collaboratori a somministrare i questionari e a videoregistrare gli incontri relativi alla ricerca sopra descritta e ad utilizzarne i dati per uso di ricerca.

Consenso informato

Le informazioni qui riportate saranno usate in forma anonima e nel rispetto della legge 196/2003 sulla riservatezza dei dati personali.

Li, _____

firma del padre

_____

firma della madre

_____

Anamnestic Questionnaire

La preghiamo di rispondere alle seguenti domande:

1. Ha allattato il suo bambino al seno? ☐Si ☐No

Se si: ☐Esclusivo ☐Misto

Per quanto tempo? ……..

2. Come definirebbe l'allattamento del suo bambino? ☐Facile ☐Difficile

Perché?.....

3. A che età del bambino ha iniziato lo svezzamento?.....…….

4. Come definirebbe lo svezzamento del suo bambino? ☐Facile ☐Difficile

Perché? ……

5. Il bambino ha sofferto di rigurgito? ☐Si ☐No

Se si, per quanto tempo? …….

6. Chi segue prevalentemente l'alimentazione del bambino?

☐Mamma ☐Papà ☐Nonno ☐Nonna ☐ Dada

☐ Altro (specificare) ……..

7. Il bambino manifesta i suoi gusti alimentari? ☐Si ☐No

Se si, descrivere.....

8. Il bambino come mangia?

☐Da solo ☐Imboccato ☐In entrambe i modi

Beck Depression Inventory (BDI-II; Beck & Steer, 1996)

Italian version by Benvenuti et al., 1999

Istruzioni. Il presente questionario consiste di 21 gruppi di affermazioni. Per favore legga attentamente le affermazioni di ciascun gruppo. Per ogni gruppo scelga quella che meglio descrive come Lei si è sentito nelle ultime due settimane (incluso oggi). Faccia una crocetta sul numero corrispondente all'affermazione da Lei scelta. Se più di una affermazione dello stesso gruppo descrive ugualmente bene come Lei si sente, faccia una crocetta sul numero più elevato per quel gruppo. Non scelga più di una affermazione per ciascun gruppo, incluse la domanda 16 ("Sonno") e la domanda 18 ("Appetito"). È importante che non ci sono risposte giuste o sbagliate. Non si soffermi troppo su ogni affermazione: la prima risposta è spesso la più accurata. Grazie.

1. Tristezza
0. Non mi sento triste.
1. Mi sento triste per la maggior parte del tempo
2. Mi sento sempre triste
3. Mi sento così triste o infelice da non poterlo sopportare.

2. Pessimismo
0. Non sono scoraggiato riguardo al mio futuro.
1. Mi sento più scoraggiato riguardo al mio. futuro rispetto al solito.
2. Non mi aspetto nulla di buono per me.
3. Sento che il mio futuro è senza speranza e che continuerà a peggiorare.

3. Fallimento
0. Non mi sento un fallito.
1. Ho fallito più di quanto avrei dovuto.
2. Se ripenso alla mia vita riesco a vedere solo una serie di fallimenti.
3. Ho la sensazione di essere un fallimento totale come persona.

4. Perdita di piacere
0. Traggo lo stesso piacere di sempre dalle cose che faccio.
1. Non traggo più piacere dalle cose come un. tempo.
2. Traggo molto poco piacere dalle cose che di solito mi divertivano.
3. Non riesco a trarre alcun piacere dalle cose che una volta mi piacevano.

5. Senso di colpa
0. Non mi sento particolarmente in colpa.
1. Mi sento in colpa per molte cose che ho fatto o che avrei dovuto fare.
2. Mi sento molto spesso in colpa.
3. Mi sento sempre in colpa.

6. Sentimenti di punizione
0. Non mi sento come se stessi subendo una punizione.
1. Sento che potrei essere punito.
2. Mi aspetto di essere punito.
3. Mi sento come se stessi subendo una punizione.

7. Autostima
0. Considero me stesso come ho sempre fatto
1. Credo meno in me stesso
2. Sono deluso di me stesso.
3. Mi detesto.

8. Autocritica
0. Non mi critico né mi biasimo più del solito.
1. Mi critico più spesso del solito.
2. Mi critico per tutte le mie colpe.
3. Mi biasimo per ogni cosa brutta che mi accade.

9. Suicidio
0. Non ho alcun pensiero suicida
1.Ho pensieri suicidi ma non li realizzerei
2. Sento che starei meglio se morissi.
3. Se mi si presentasse l'occasione, non esiterei ad uccidermi

10. Pianto
0. Non piango più del solito.
1. Piango più del solito.
2. Piango per ogni minima cosa.
3. Ho spesso voglia di piangere ma non ci riesco.

11. Agitazione
0. Non mi sento più agitato o teso del solito.
1. Mi sento più agitato o teso del solito.
2. Sono così nervoso o agitato al punto che mi è difficile rimanere fermo.
3. Sono così nervoso o agitato che devo continuare a muovermi o fare qualcosa.

12. Perdita di interessi
0. Non ho perso interesse verso le altre persone o verso le attività.
1. Sono meno interessato agli altri o alle cose rispetto a prima.
2. Ho perso la maggior parte dell'interesse verso le altre persone o cose.
3. Mi risulta difficile interessarmi a qualsiasi cosa.

13. Indecisione
0. Prendo decisioni come sempre.
1. Trovo più difficoltà del solito nel prendere decisioni.
2. Ho molte più difficoltà nel prendere decisioni rispetto al solito.
3. Non riesco a prendere nessuna decisione.

14. Senso di inutilità
0. Non mi sento inutile.
1. Non mi sento valido e utile come un tempo.
2. Mi sento più inutile delle altre persone.
3. Mi sento completamente inutile. su qualsiasi cosa.

15. Perdita di energia
0. Ho la stessa energia di sempre.
1. Ho meno energia del solito.
2. Non ho energia sufficiente per fare la maggior parte delle cose.
3. Ho così poca energia che non riesco a fare nulla.

16. Sonno
0. Non ho notato alcun cambiamento nel mio modo di dormire.
1a. Dormo un po' più del solito.
1b. Dormo un po' meno del solito.
2a. Dormo molto più del solito.
2b. Dormo molto meno del solito.
3a. Dormo quasi tutto il giorno.
3b. Mi sveglio 1-2 ore prima e non riesco a riaddormentarmi.

17. Irritabilità
0. Non sono più irritabile del solito.
1. Sono più irritabile del solito.
2. Sono molto più irritabile del solito.
3. Sono sempre irritabile.

18. Appetito
0. Non ho notato alcun cambiamento nel mio appetito.
1a. Il mio appetito è un po' diminuito rispetto al solito.
1b. Il mio appetito è un po' aumentato rispetto al solito
2a. Il mi appetito è molto diminuito rispetto al solito
2b. Il mio appetito è molto aumentato rispetto al solito.
3a. Non ho per niente appetito.
3b. Mangerei in qualsiasi momento

19. Concentrazione
0. Riesco a concentrarmi come sempre.
1. Non riesco a concentrarmi come al solito.
2. Trovo difficile concentrarmi per molto tempo
3. Non riesco a concentrarmi su nulla.

20. Fatica
0. Non sono più stanco o affaticato del solito.
1. Mi stanco e mi affatico più facilmente del solito.
2. Sono così stanco e affaticato che non riesco a fare molte delle cose che facevo prima.
3. Sono talmente stanco e affaticato che non riesco più a fare nessuna delle cose che facevo prima.

21. Sesso
0. Non ho notato alcun cambiamento recente nel mio interesse verso il sesso.
1. Sono meno interessato al sesso rispetto a prima.
2. Ora sono molto meno interessante al sesso.
3. Ho completamente perso l'interesse verso il sesso.

State Trait Anxiety Inventory (Y1 Form) (STAI-Y1, Spielberger, 1983)

Italian version by Pedrabissi & Santinello, 2011

Sono qui di seguito riportate alcune frasi che le persone spesso usano per descriversi. Legga ciascuna frase e poi contrassegni con una crocetta il numero che indica come lei si sente adesso, cioè **in questo momento**. Non ci sono risposte giuste o sbagliate. Non impieghi troppo tempo per rispondere alle domande e dia la risposta che le sembra descrivere meglio **i suoi attuali stati d'animo**.

(1 = per nulla, 2 = un po', 3 = abbastanza, 4 = moltissimo)

1. Mi sento calma	1	2	3	4
2. Mi sento sicura	1	2	3	4
3. Sono tesa	1	2	3	4
4. Mi sento sotto pressione	1	2	3	4
3. Mi sento tranquilla	1	2	3	4
6. Mi sento turbata	1	2	3	4
7. Sono attualmente preoccupata per possibili disgrazie	1	2	3	4
8. Mi sento soddisfatta	1	2	3	4
9. Mi sento intimorita	1	2	3	4
10. Mi sento a mio agio	1	2	3	4
11. Mi sento sicura di me	1	2	3	4
12. Mi sento nervosa	1	2	3	4
13. Sono agitata	1	2	3	4
14. Mi sento indecisa	1	2	3	4
13. Sono rilassata	1	2	3	4
16. Mi sento contenta	1	2	3	4
17. Sono preoccupata	1	2	3	4
18. Mi sento confusa	1	2	3	4
19. Mi sento distesa	1	2	3	4
20. Mi sento bene	1	2	3	4

Scala di Valutazione dell'Interazione Alimentare Madre-Bambino

Ammaniti M., Lucarelli L., Cimino S., D'Olimpio F., 2006
Italian adaptation of the **Feeding Scale**, Chatoor I., Loefller C., Mc Gee M., Menvielle, E., 1998

EXEMPLIFICATION OF THE CODING SHEET

AFFECTIVE STATE OF THE MOTHER					
	NONE	**A LITTE**	**PRETTY MUCH**	**VERY MUCH**	**SCORE**
1.Show pleasure toward infants in face or voice (M)	0	1	2	3	
2 Appears cheerful (M)	0	1	2	3	
5. Position infants for reciprocal exchange (M)	0	1	2	3	
INTERACTIONAL CONFLICT					
	NONE	**A LITTE**	**PRETTY MUCH**	**VERY MUCH**	**SCORE**
17. Position or hold the infant with restriction of appropriate movement (M)	0	1	2	3	
20.Tells infant to do, or not tot o do (M)	0	1	2	3	
26. Refuses to open the mouth (C)	0	1	2	3	
FOOD REFUSAL BEHAVIOUR OF THE CHILD					
	NONE	**A LITTE**	**PRETTY MUCH**	**VERY MUCH**	**SCORE**
32. Falls asleep and stops feeding (C)	0	1	2	3	
33.Appears easily distracted during feeding (C)	0	1	2	3	
AFFECTIVE STATE OF THE DYAD					
	NONE	**A LITTE**	**PRETTY MUCH**	**VERY MUCH**	**SCORE**
36.Waits for infant to initiate the interaction (M)	0	1	2	3	
37.Distracts or allows infant to distract during feeding (M)	0	1	2	3	
41.Cries when bottle or food is taken away (C)	0	1	2	3	

Emotional Availability Scale

Infancy to Early Childhood Version, 4th Edition (EAS; Biringen, 2008).

Emotional Availability Scale - Scoring Sheet

Screener:

Sensitivity	Affect	
	Clarity of Perceptions	
Total	Timing	
	Flexibility	
	Acceptance	
Direct	Amount of Interaction	
	Conflict	

Non-Hostility	Lack negativity	
	Lack ridiculing	
Total	Lack threats of separation	
	Loose cool	
	Frightening	
Direct	Silence	
	Themes	

Structuring	Guidance	
	Success	
Total	Amount of Structure	
	Limit setting	
	Firm in Pressure	
Direct	(Non)verbal structuring	
	Peer vs. Adult	

Child Responsiveness	Affect	
	Responsiveness	
Total	Autonomy	
	Physical Positioning	
	Role-reversal	
Direct	Lack of avoidance	
	Task oriented	

Non-Intrusiveness	Following Child leads	
	Ports of entry	
Total	Commands	
	Talking	
	Didactic Teaching	
Direct	Interferences	
	Feel Intrusive	

Child Involvement	Simple Initiative	
	Elaborative Initiative	
Total	Use of Adult	
	Lack of over-involvement	
	Eye contact	
Direct	Body positioning	
	Verbal involvement	