

Chapter 6

Emotions in early mimesis

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Introduction

The aim of the present chapter is to stress the role of emotion as one of the main components of imitation. Within this framework, we will describe evidence of emotions observed before, during and after imitative encounters in naturalistic or experimental settings, from birth up to 10 months of age (Kugiumutzakis, 1985, 1993, 1998, 1999; Kokkinaki, 1998; Trevarthen *et al.*, 1999; Kokkinaki and Kuginmutzakis, 2000; Vitalaki, 2002; Markodimitraki, 2003).

According to ancient Greek thinkers, mimesis could not occur between emotionless persons (Kugiumutzakis, 1998; Bruner, 2002). Over the last 100 years, the emotional aspect of early mimesis has been noted by many developmentalists. Baldwin (1896) described the emotional origin of circular reaction/self-imitation—a non-random response ‘selected’ because of its increased vitality, represented by *pleasure*. Freud (1921) noted that there exists a path leading from identification by way of imitation to empathy and that identification is the original form of emotional tie with an ‘object’. Guillaume (1926) considered mimesis in the context of smiles, fear, sympathy, etc., concluding that, while early imitation leads to sympathy, sympathy does not constitute the emotional aspect of early mimesis. Wallon described the sharing of emotions (through bodily and facial expressions) between adults and infants after their third month of life, and noted the emotional nature of early imitation, which he regarded as source of sympathy (see Nadel, 1994; Tremblay *et al.*, this volume). Later, the hypothesis of a strong link between emotion and imitation was forgotten under the influence of Piaget.

The emotionless mimesis of the object

As Bruner (1983) notes, Piaget’s contribution to our understanding of how the child’s mind grows is tremendous. Piaget (1950, 1968; Piaget and Inhelder, 1969) gives equal status to cognitive and emotional aspects of every action. He assumes that the cognitive aspect provides the structure, and the emotional aspect provides the motives and the energetic force of behaviour. At the same time Piaget stresses that the source of

motive for infant imitation, namely, the source of the emotion of 'interest' has a purely cognitive origin. In Stage IV of sensorimotor imitation he notes:

The interest thus appears to come from a kind of conflict between the partial resemblance which makes the child want to assimilate, and the partial difference which attracts his attention the more because it is an obstacle to immediate reproduction. It is therefore this two-fold character of resemblance and opposition which seems to be the incentive for imitation' (Piaget, 1962, p. 51).

Not merely the interest of the infant in imitation, but mimesis itself results from intrapsychic, individual processes, which according to Piaget (1962, p. 2) dominate and lead to inter-personal relationships. At the root of Piaget's cognitivism is Baldwin's notion of initial a-dualism, Freud's notion of narcissism (but without Narcissus) and the core idea of circular reaction/self-imitation. For Piaget, circular reaction is not to be equated with Baldwin's 'loose sense' of the term, but with Wallon's 'limited sense', namely, '... the functional use leading to the preservation or the rediscovery of a new result' (1936, p. 70). Unlike Piaget, however, both Baldwin and Wallon considered the emotional aspect of circular reaction/self-imitation. Piaget ignored emotion or, when he recognized it, it had to lead in automatic contagious crying (1962, p. 10) or (as in the case of interest) to have a cognitive origin.

Indeed, Piaget's views on the 'emotional' aspect of infant mimesis are in full agreement with his radical, emotionless, and utilitarian cognitivism. For Piaget (1968, p. 128), the common element between his cognitivism and Marx's 'primary proposition' is the interaction between the properties of human productivity and the properties of the object. It was the mimesis of an object (not of a person) that interested Piaget. For more than 40 years he emphasized the role played by imitation of an object and its usable properties in the genesis of representation and language (Piaget, 1936, pp. 375–6; 1962, pp. 65–6; 1980, p. 166). He portrayed the human infant as a lone, egocentric, chaotic, asocial, emotionless being, '... in a world of objects that he must array in space, time and causal relations ...', as Bruner (1983) correctly observed. His baby was unable to discriminate the self from the other/model, because the object notion had not yet been formed, and for that reason mimesis of objects, up to the fourth stage, was both a part of circular reactions and accompanied by a 'causality through imitation, which is itself a device for making what looks interesting continue' (Piaget, 1962, pp. 71, 85). It was not a real, human baby. It was a constructed baby, at the mercy of a constructed a-dualism, 'amid the chaos of impressions by which he is beset' (Piaget, 1962, p. 83). It was the object notion and the imitation of objects that interested the constructed Piagetian baby—not the social reciprocity that Wallon discussed, the same Wallon who was accused by Piaget of leaping suddenly from neurology to sociology (Piaget, 1962, p. 68; Hobson, 2002, pp. 103–4)!

Wallon's voice was ignored in Anglophone Psychology (Nadel, 1994; Nadel and Butterworth, 1999) and the predominance of the Piagetian theory in Developmental Psychology brought about a long period of apathetic cognitivism. For many followers

of Piaget, this characterization may appear to be unduly harsh, but in our opinion, it is obviously true for the following reason. Piaget (1962) made 58 general observations and more than 533 specific observations on infant imitation. Only seven of these observations were imitations of objects while the rest involved either imitation of persons ($n = 479$) or imitation of persons and objects ($n = 47$). However, Piaget focused on the object imitations. The rest were important to him only to stress, on the one hand, the role of assimilation in early cognitive development and, on the other hand, the way mimesis gives rise to representations. For Piaget (1962) the most interesting model was not an acting or interacting person, but the properties of an object. The most 'striking example of intelligent investigation' was when L tried to depict the solution she sought by mimicking with her mouth the opening of a match-box (Piaget, 1962, p. 65). We cannot imagine that his own three infants, as well as their mother and father (and some other persons in the family), did not smile or laugh during these 533 imitative episodes. However, Piaget (1962) only observed smiling in his own three infants on 13 occasions (obs. 2, 6, 8, 10, 23, 27, 34, 37), laughter on 20 occasions (obs. 4, 9, 14, 18, 20, 22, 23, 24, 25, 28, 40, 49), pleasure on three occasions (obs. 11, 44, 58), and crying on six occasions (obs. 1, 2). Emotions had to be there, but were ignored by Piaget, despite his thesis that all behaviour presupposes intelligence and motives in the form of emotions (1968, p. 15).

To paraphrase Bruner (1990, p. 1), in the last 30 years a silent (infant), but very expressive revolution has brought the inter-subjective infant mind back into the human sciences after a long period of apathetic cognitivism (e.g. Trevarthen 1977; Murray and Trevarthen, 1985; Stern, 1985; Nadel, 1994; Reddy *et al.*, 1997; Braten, 1998; Butterworth, 1999; Reddy, 1999; Bruner, 2002; Hobson, 2002). Even students and supporters of Piaget admit that he disregarded the social and emotional factors of human development (Maratos, 1996, 1998).

Over the last 30 years there have been a number of comprehensive reviews of infant imitation (e.g. Zazzo, 1957; Maratos, 1973, 1982; Meltzoff and Moore, 1983; Nadel and Butterworth, 1999; Uzgiris, 1999). The majority of the studies cited were experimental attempts to establish the existence of neonatal mimesis, and its development during infancy and early childhood in both typical and atypical human populations, and in non-human species. Here, we present observations concerning the emotions that accompany mimesis during the first 10 months of human infancy.

Studying early mimesis

In an effort to understand the genesis and development of human mimesis we have conducted 11 empirical studies. Given the general aim of this chapter, we can only summarize the main results, especially those that are related to the emotional aspects of mimesis. In Table 6.1 there is a description of basic characteristics of each study.

In the first four experimental studies the neonates were examined in the maternity hospital immediately after birth and in the rest seven, longitudinal studies (Studies 5–11)

Table 6.1 The 11 studies on early imitation

Studies	Kind of study	Partners	n	Range of infant age	Kind of imitation	Study of emotions	Place
1. Kugiumutzakis 1985	Experimental cross-sectional	Neonate–experimenter	98	10–45 min	Facial	Descriptive	Crete
2. Kugiumutzakis 1985	Experimental cross-sectional	Neonate–experimenter	11	15–40 min	Facial	Descriptive	Crete
3. Kugiumutzakis 1985	Experimental cross-sectional	Neonate–experimenter	12	13–35 min	Facial	Descriptive	Crete
4. Kugiumutzakis 1985	Experimental cross-sectional	Neonate–experimenter	49	14–42 min	Facial, vocal	Descriptive	Crete
5. Kugiumutzakis 1985	Field study longitudinal	Infant–experimenter	14	1st h–6 months	Facial, vocal	Descriptive	Crete
6. Kugiumutzakis 1993	Naturalistic longitudinal	Mother–infant	42	15 days–6 months	Vocal	Descriptive	Crete
7. Kokkinaki 1998	Naturalistic longitudinal	Mother–infant, father–infant	45	2–6 months	All kinds	Systematic	Scotland
8. Kokkinaki 1998	Naturalistic longitudinal	Mother–infant, father–infant	45	2–6 months	All kinds	Systematic	Crete
9. Vitalaki 2002	Naturalistic longitudinal	Grandmother–infant, mother–infant	48	2–10 months	All kinds	Descriptive	Crete
10. Vitalaki 2002	Naturalistic longitudinal	Mother–infant	26	2–10 months	All kinds	Descriptive	Crete
11. Markodimitraki 2003	Naturalistic longitudinal	Twin–twin, each twin with each parent and grandparent	8	1–10 months	All kinds	Systematic	Crete

we investigated the development of imitation, in the home setting, every 15 days, in dyadic interactions of the infants with the experimenter (Study 5) and with their mothers, fathers, grandmothers (Studies 6–10). In Study 11 we investigated the development of mimesis in the inter-actions of one pair of non-identical twins (a girl and a boy), as well as in the interactions of each twin with her/his mother, father, maternal grandmother and grandfather, and paternal grandmother and grandfather.

In the first three experimental studies neonates, regardless of whether they were born vaginally or by caesarian section and regardless of whether they were full- or preterms (32 weeks) imitated the facial models of tongue protrusion (TP) and mouth opening (MO). In the fourth experimental study, in addition to the above two models, full-term neonates imitated the model of eye movements (EM) and they clearly tried to imitate the vowel ‘a’, but not the consonant ‘m’ and the complex sound ‘ang’.

The infant imitators used two strategies of attention to the models and three forms of reproductive behaviour. The fifth, longitudinal study added the finding that infant imitative ability remains constant during the first 6 months, but what will or will not be imitated changes. Imitation of TP and MO develops according to a U-shaped curve, imitation of the vocal models in an inversely U-shaped manner and imitation of EM in a negative linear fashion (Kugiumutzakis, 1985, 1998, 1999).

In the above six studies (Studies 6–11) parents and grandparents tended to imitate infants significantly more than *vice versa*. Vocal imitations were significantly more frequent than the other kinds of mimesis (facial imitation, etc.). The majority of the vocal sounds imitated were vowels (about 70%), and the remainder was consonant and vowel-consonant sounds. Mimesis took place more often in turn-takings than in co-actions or in combinations of turn-takings with co-actions. The ability of infants and adults to imitate remained constant during the first 10 months (Kugiumutzakis, 1985, 1993, 1998, 1999; Kokkinaki, 1998; Trevarthen *et al.*, 1999; Vitalaki, 2002; Markodimitraki, 2003).

Emotions in early mimesis: 'uncontrolled observations'

Elsewhere (Kugiumutzakis, 1983, 1985, 1998) we have described the relevance of the ancient 'anecdotal' observations on early imitation made by Darwin (1872), Preyer (1892), and other observers during the last three centuries. These observations have been confirmed in the last 30 years (Butterworth, 1999). What are missing are reports of the complex regulatory behaviour that accompany target behaviours in experimental studies of imitation which go mostly unnoted and unreported. To his credit, Trevarthen (1977) has stressed the value of descriptive observations of these collateral behaviours some of which we will discuss below.

'Interest' as part of neonatal imitation

The following three observations indicate that the emotion of interest is present before imitation, and directs the infant's attention either to the moving part of the experimenter's face in the case of the facial models or to the source of the sound in the case of the vocal models. It is also present during imitation, when the infant explores, corrects, or stops the imitative activity. During the model's action, the infant's interest functions in an inter-mental level, while during the reproduction of the models it functions intra-mentally. In both cases, interest seems to be a precondition for neonatal mimesis (Kugiumutzakis, 1985, 1988, 1998).

Observation 1

The great majority of the neonates directed their attention, in an effortful way, to the moving part of the adult model's face during presentations of tongue protrusion (TP), mouth-opening (MO), and eye movements (EM). The infants' attention intensified from a relatively fixed gaze to selective visual exploration of the moving part of the experimenter's face with clear interest

while frowning. Visual exploration and frowning of preterm neonates lasted longer than those of full-term newborns. According to Darwin 'the frown shows that the mind is intent on one object'. (Darwin, 1938, in *N Notebook*, obs. 58, cited in Gruber, 1974, p. 341; see also Darwin, 1872, pp. 220–6)

Observation 2

During the presentation of the vocal model for 'a', we observed that the majority of imitators turned their heads to localize the sound source that was accompanied by eye widening and elevated brows. According to Rinn (1984) the latter expressions occur in attentive listening.

Observation 3

We noticed three forms of reproductive behaviour of the adult's facial expressions. In the first form, they simply approximated a replication of the facial model. In the second form, called 'improvement of imitation after several trials', the neonates reproduced the model a number of times, and on each successive trial they converged towards a more precise match. To achieve this aim their attention had to be directed upon every step in their imitative activity and their face looked very 'serious' during these moments. In the third form, we called 'deterioration of imitation after several trials', the first imitative effort was a satisfactory reproduction of the model, but as the newborns continued their actions, they did not produce a more accurate replication of the model's expressions. Instead, in every additional 'effort' they depart more and more from their first successful effort, as if they had lost interest in imitating the model. The fleeting nature of interest during this form of imitation seemed apparent.

Bodily postures in neonatal imitation

Observation 4

The postural comfort of the neonates was crucial during the presentation of the facial models. During the presentation of the vocal models the neonates were lying down on their bed. It seems that this posture helped them more than the upright position to observe and reproduce the sound 'a'.

Observation 5

The imitative responses to sound 'a' were strained. The neonates appeared to be trying hard to emit the sound; the result was usually an intense explosion of a prolonged and unstructured 'a' sound. The response of the neonates frequently was accompanied by stretching hand movements and closed eyes. Not only their face, but their whole body appeared to be involved in this selective imitation of sound.

The above two observations indicate that an appropriate posture during testing seems to be a precondition for the appearance of Behavioural State 3 (open eyes, regular respiration, and lack of gross movements and vocalization) and for the emergence of interest. Posture may help or hinder the neonate ability to perceive and react to the

model's target behaviour. Furthermore, along with parts of the face the whole body participates in neonatal facial imitation; this occurs to an even greater extent during vocal mimesis of 'a' (Kugiumutzakis, 1985, 1988, 1998). Our observations support Wallon's thesis concerning the role of bodily postures in emotional expression and in the regulation of the intensity of social involvement (see Nadel, 1994, p. 180).

Pleasure in early mimesis

In Study 5 we observed the first appearance of infant pleasure before, during and after imitation, mimesis of the rhythm of the vocal models, as well as clear avoidance reactions. Additional examples are given in the next three observations.

Observation 6

The first appearance of infant smiling in response to the models was observed 15 days after birth. After this age, the smile appeared continuously through 6 months of age; many infants smiled before, during, and after mimesis—which we interpreted to reflect their pleasure associated with the interaction. Almost 10 years after the completion of Study 5, we observed a smile after the presentation of the model to a 2-day-old (Kugiumutzakis, 1994). It was not an endogenous, but an exogenous, social smile, addressed to the experimenter (not the mother) in the maternity hospital. This newborn infant violated the doctrine stating that the exogenous smile is not present at birth, but begins to appear around the first or the second month of life (Plutchik, 1994, p. 208). We wonder whether it was only this neonate (and not many generations of newborns) that had violated this theoretical rule.

Observation 7

When imitation decreased as a response to the modeling of different facial models, the infants, instead of imitating, smiled to the experimenter or reacted by cooing and clear vocalizations, as if they wanted to 'express something' when they could not imitate him. During periods of both increased and decreased vocal imitation several infants reacted with *mimesis of the rhythm* of the vocal models. Thus, the smile (with or without vocal responses) either accompanied imitation or substituted for it, and the imitation of the rhythm likewise either accompanied vocal mimesis or substituted for it.

Observation 8

Sometimes, infants, even neonates, showed avoidance responses when an adult modeled an action. They moved their heads or their eyes or turned their whole body away from the experimenter's face. The message was clear to the experimenter, who either had to wait a few minutes until the baby re-engaged in the interaction or had to give up testing until the next day. The infants' involvement in the inter-subjective imitative games clearly depended on their transient emotions at the moment of the test.

The last three observations make several points. First, for the infant, by 15 days of age (if not earlier), the imitative interaction is usually a pleasurable experience, evidenced

by clear, exogenous, social smiles, which either accompany mimesis (with or without vocal sounds) or substitute for it. Secondly, the substitution itself, during periods of decreased infant mimesis, may indicate intrinsic regulation of infant awareness (Trevvarthen, 1998) as they display emotions of enjoyment and interest. The message received by the adult models is: 'At present I cannot share with you the same action, but still there exists something communicable between us—the pleasure to be, feel and act together, and its expression are my ways to sustain our communication'. Of course, adultomorphic terms cannot express precisely either the meaning of the infants' smiles or the feelings of the experimenter during the moments of substitution which may be something like: 'She/he is participating by offering "something" in our contact, she/he is "in"; *we are* an interacting unit'. And this "something" probably is equally, or even more, important to sharing the same action as the model. Thirdly, the mimesis of rhythm of the vocal models by a minority of infants both neonates (<45 minutes old) and older babies may indicate that an infant's musical and imitative abilities are somehow connected from the start (see Trevvarthen, 2000, 2001, this volume). Fourthly, the intentional avoidance responses clearly indicate the core role of the infants' emotions in initiating and maintaining imitative communication—an infant's willingness to participate in imitative contacts seems to be regulated by her/his transient emotions or mood at the time of the test (Kugiumutzakis, 1985, 1988, 1998).

Confirming an 'uncontrolled' observation

Charles Darwin, when his son was a few days over six months of age, made the following observation:

'... when a child cries or laughs, he knows in a general manner what he is doing and what he feels ... When a few days over six months old, his nurse pretended to cry, and I saw that his face instantly assumed a melancholy expression, with the corners of the mouth strongly depressed; now this child could rarely have seen any other child crying, never a grown-up person crying, and I should doubt whether at so early an age he could have reasoned on the subject. Therefore it seems to me that an innate feeling must have told him that the pretended crying of his nurse expressed grief; and this through the instinct of sympathy excited grief in him. (Darwin, 1872, pp. 357–358)

In our naturalistic Study 9, Vitalaki (2002) made the following observation.

Observation 9

The infant (six-and-half months old) and her grandmother enjoyed a very playful communication. The grandmother, suddenly, with a smiling face, asked the baby 'Shall we pretend to cry?' and she started pretending to cry. For tenths of a second the baby's face assumed an expression of a 'mocking smile', and then, while the grandmother continued pretending to cry, the infant's face assumed an expression of sadness and she started crying. The grandmother stopped her 'crying' and instantly the infant did the same. The grandmother [as so often Piaget (1962) did] repeated the 'experiment' and the infant's reactions were the same—a mocking smile followed by an

expression of sadness and then crying. After the 'confirmation of her hypothesis', the grandmother initiated other playful activities and the interaction ended with laughs. (Vitalaki, 2002, p. 256)

The above observation is similar to the one Darwin made 130 years ago. The only difference is that the infant in Crete initially seemed to understand that the grandmother was only pretending, as evidenced by her mocking smile, but when the grandmother continued to 'cry', the infant expressed sympathy. Elsewhere, Kugiumutzakis (1993, 1998) suggested that emotions involved in early mimesis can be either 'negative or 'positive' and that detection of another's sorrow, specified from the acoustical and visual invariants, cannot be excluded. When neonates imitate other newborns' cries they appear to attempt empathic communication (Sagi and Hoffman, 1976; Martin and Clark, 1982). Mimesis in early infancy appears to be mainly a pleasurable experience, but both infants and adult partners also exhibit moments of sympathetic imitation of sad feelings. The effects of a mother's depression on the behaviour of an infant is well known (e.g. Field, 1992; Murray, 1998; Chatzinikolaou, 2002).

Emotions in mimesis of twins

In the majority of cases imitation between the non-identical twins (Study 11; Markodimitraki, 2003) was accompanied by more or less the same emotions shared by both infants (mostly interest, pleasure and a mixture of the two emotions, see below). However, there were a few cases when the twins' emotions with mimesis were not similar, as in the following example.

Observation 10

One summer afternoon, the twin 3-month-olds were sitting half-naked on a sofa looking at each other. The girl started pushing the soles of her feet (first the right and then the left) rhythmically against the boy's legs and soles of his feet. The boy instantly imitated his sister. The girl appeared to enjoy this imitative game, but her brother's face remained very serious. After several mutual mimeses, the boy stopped imitating his sister, but the girl continued her rhythmical movements. The boy looked directly at her eyes. His unmoving body, his frozen face, but mainly his censorious eyes expressed a kind of 'restrained anger', which extinguished the communicative interest of his sister, who stopped moving her legs and looked away from her twin brother.

The above observation indicates that the twins' emotions before and during imitation were clearly different. Although they shared the same action of mutual mimesis, they did not share the same emotions. Probably the lack of emotional sharing put an end to their communication. Not only in adult-infant mimesis, but also in infant-infant imitation, as Fiamenghi (1997) and Trevarthen *et al.* (1999) have shown, emotions are *there* all the time to make the imitative interaction possible or to negate it. The same held true in the imitative interaction of the twins in our sample (Markodimitraki, 2003), although in the case of the twins one must take into account certain critical aspects peculiar to twinship (Piontelli, 2002).

Adult pleasure expressed during imitative communications with infants

Observation 11

In Study 7 (Kokkinaki, 1998), a father and his three-and-half-month-old son had a pleasurable interaction. The infant uttered a prolonged, well-structured vowel sound 'aa-aa-aa-aa-aa', coming from the back of the mouth. Father, laughed and imitated the model, adding a movement to it (he raised the head up). The infant instantly laughed and imitated the complex model. In this very long imitative episode (it lasted 3 minutes), the more the father repeated the funny model the more the infant imitated him and the more both partners laughed. At the end, in their 'confluent', hilarious laughter we cannot discriminate who enjoyed this imitative interaction the most. According to the researcher and other observers the paternal model produced the sounds and characteristic movements of a very alert billy goat—later we were informed that father was from a Cretan mountain village, where he spent his childhood years. In Crete villages, the young often imitate the funny expressions of many animals, including billy-goats. Our observation was of a very 'male' mimesis: from male infant vocal model to a paternal, funny, animal-like imitation/new model, which was, in turn, imitated by his son, and so on. In such a case parent–infant mimesis is a social event that mixes emotions from the past with the present, both of which are shared with the infant. We assume that the infant vocal model gave rise to a paternal, playful, comical memory of the characteristic vocal and facial expressions of an animal. Not the content of the paternal memory, but its emotional quality was shared by the infant. The original, natural model for the father was probably an animal expression—a case of inter-species mimesis nicely described by Democritus (humans imitate animals, see Kugiumutzakis, 1998) and Darwin (1872—dogs imitate humans), and recently by Bard (1998; Bard and Russell, 1999), who has documented inter-species inter-subjectivity between newborn chimpanzees and their human caretakers. Imitation seems to be a very ancient inter-subjective mode of 'transference' of actions, knowledge, and emotions at intra-species, inter-generational, and sometimes even inter-species levels.

Observation 12

In our naturalistic studies we have observed cases where, after a successful infant mimesis, parents and grandparents both asked and answered their own questions, in a virtual dialogue with their real, but non-verbal baby. In one case (Study 6, Kugiumutzakis, 1993) after the successful vocal imitation of her daughter, one mother said: 'Is that you talking little one? Are you talking to mummy? Yes-yes-yes-yes, mummy, it's me. What did you think? Did you think I'm dumb?'. Such 'virtual dialogues' are very simple, but common, forms of parental and grandparental empathy, originating from successful infant mimesis and expressing expectations about the mental and language development of the non-speaking infant.

The last two observations serve to remind us, that the adults' pleasure (approving remarks, smiles, laughs, virtual empathic dialogues, expression of expectations, comments expressing strong emotions like parental love, teasing, etc.) is so obvious and so common that it escapes our notice—one just accepts that parents and grandparents enjoy the imitative communication 'more' than their infants. Also, the personal emotional memories and the expectations of the parents and grandparents for the infant's future are often present in the 'immediate' mimesis, emotions that are usually shared by the infants. When parental memories are pleasurable and funny, imitative interactions are pleasurable and comical for the baby as well—even though the baby does not know the content of the adult memory, which may involve activities or experiences the adult has had with human adults and other animals.

Emotions in early mimesis: systematic observations

In six naturalistic studies (Studies 6–11, see Table 6.1) we tested Darwin's (1872) hypothesis about the emotional nature of mimesis; in three naturalistic studies (Studies 7, 8, 11, see Table 6.1) we investigated the emotions before, during, and after imitation.

Vowels expressing emotions

Vocal imitation was regarded by Aristotle (1964, *Rhetoric*, 1140A) as the most precise form of mimesis, because the vocal organs are the most accurately reproductive of all parts of the body. Darwin (1872, pp. 83–93) assumed that the vocal organs are efficient in the highest degree as a means of expression and that vowel sounds carry the affective values important for inter-personal exchanges.

In the fourth experimental study (see Table 6.1; Kugiumutzakis, 1985), we found that neonates tried to imitate only the sound 'a'. Moreover, micro-analyses and statistical analyses of the data from the six naturalistic studies (Studies 6–11; see Table 6.1) indicated that vocal imitation prevailed over other kinds of mimesis and that more than 50% of the vocal imitations were of vowel sounds (range: 52–76%). In Table 6.2 we summarize (in relative frequencies) the findings from the six studies.

Table 6.2 Categories of vocal sounds imitated in the six naturalistic studies

Naturalistic longitudinal studies	n	Vowels		Consonants		Vowel-consonant combinations	
		n	%	n	%	n	%
6 Kugiumutzakis (1993)	42	572	76	25	3	150	21
7/8 Kokkinaki (1998)	90	1036	61.7	314	18.7	329	19.6
9 and 10 Vitalaki (2002)	74	686	52	85	6	554	42
11 Markodimitraki (2003)	8	220	71.4	9	2.9	79	25.7

If we take into account that vowels also appeared in combination with consonants, then vowel sounds (alone or in combination) appeared in more than 80% of vocal mimeses across the six studies (range: 81.3–97%, in Table 6.2). Although there is no satisfactory standard coding for the emotional content for vocal expressions, the above results seem to support Darwin's (1872) suggestion that vowels, more than consonants, carry emotional meaning for intra-species interaction, including, in our case, imitative communication during early human infancy.

In one of our studies, we investigated systematically the different vocal sounds imitated during mother–infant interactions. A classification was employed to distinguish 36 Greek speech sounds and their standard phonetic equivalents. Among the vowel sounds with more than 10 occurrences in the 747 vocal imitative episodes the sounds 'a', 'e', 'o', and 'ae' occurred with statistically the same frequency for infant and maternal imitations (Kugiumutzakis, 1993, pp. 30–1). This finding supports Darwin's suggestion that the vowel sounds 'a', 'o', 'e', and 'i' appear in pleasurable communication, especially in laughter (1872, p. 88). The role of vowels in early mimesis seems to be extremely important.

Emotional matching in early mimesis

Ten years ago Kugiumutzakis (1994) proposed that the nature of early mimesis is emotional and that in dyadic interactions both partners feel at least two interacting emotions—enjoyment and interest—which motivate the inter-subjective game of imitation. The idea is, of course, very old; it is found in Brandl's question: 'Why does the infant imitate the acts of a person, but not the movements of a curtain?' (quoted by Guillaume, 1926).

In her naturalistic, longitudinal and inter-cultural studies (Studies 7 and 8) Kokkinaki (1998, 2001) coded the emotional expressions of infants and parents 10 seconds before imitation, during imitation, and 10 seconds after imitation. Microanalyses were conducted using a time-unit of a 25th of a second with Video-Logger Event Recorder software. Cohen's Kappas for intrascorer reliability ranged from $k = 0.82$ to 0.89 , and for the inter-scorer reliabilities from $k = 0.70$ to 0.85 (Kokkinaki, 1998, 2001).

Both infants' and adults' emotional expressive behaviour were coded before, during, and after imitation. The coding of the emotional expressions was based on observation of facial and vocal expressions. Pleasure or happy facial expression was coded when the face of one partner had open eyes, an elongated mouth that was closed or slightly open in the horizontal plane, while the corners of the mouth were drawn upwards, the lips were stretched causing wrinkles on each side of the mouth and the cheeks were slightly drawn upwards. Interest was defined according to eye contact, gaze, or orientation to the other partner's face or body, accompanied by an unsmiling face, open eyes, and lips usually open or at other times loosely closed. When the lips were open, the corners of the mouth were slightly downward, with the upper lip in a reversed U-shape, and the lower lip was relaxed or slightly stretched. In addition to gaze behaviour, one or

a combination of the following facial expressions also occurred: raised or knitted eyebrows, wide open eyes, blinking, cooing, or pre-speech mouth movements (for the infant), and other vocalizations or baby talk (for the parent). A neutral expression was coded when the infant or adult was not looking or orientating herself/himself to the partner's face or body. The expression was that of an unsmiling, relaxed face, with no signs of vocalizations or intent to vocalize (such as pre-speech mouth movements; for more details see Kokkinaki, 1998, 2001). Many emotions in single or combinatory form were observed. The great majority were 'positive', transient emotions. The emotions of pleasure, interest, and the non-emotional, 'neutral' expression prevailed before, during, and after imitation. Due to the low frequency or absence of other emotional expressions in many cells, we only considered the three categories defined above.

Kokkinaki found 'emotional matching', namely imitation of the emotions before, during and after mimesis. It was confirmed that:

- ◆ the emotions of interest and pleasure predominated and emotional matching preceded, accompanied and followed the reproduction of the models actions;
- ◆ when both partners (infant–father/mother) displayed interest or pleasure before mimesis, they were both likely to remain in the same emotional state during and after imitation;
- ◆ when the parent was showing pleasure and the infant was showing interest before imitation, it was more likely that both would show pleasure during mimesis;
- ◆ when both partners displayed interest during mimesis, it was more likely that the infant would remain in the same state and that parent would express pleasure after imitation;
- ◆ no significant differences were found in the emotional matching 'during', 'before-and-during', 'during-and-after', or 'before-and-after' mimesis between parents and infants of both sexes in Scotland and Crete.

The above results show that emotions may constitute the recognizable form of expression of partner's motives and that, for mimesis to begin, these motives must be reciprocated. We suggest that this is a case of direct perception and imitation/sharing of the other's motives (Kokkinaki, 1998, 2001; Kugiumutzakis, 1998; Trevarthen *et al.*, 1999, p. 129). Both parents and infants are able to share the emotions experienced, before making their first, accurate, imitative action, and this sharing of transient emotions is an ever-present element preceding imitation and cognition (Kugiumutzakis, 1994, 1998). The uniformity of the emotions in parent–infant mimesis in Scotland and Crete provides cross-cultural evidence for the universality of the inter-subjective nature of imitation during early human infancy.

Early mimesis 'swims' in emotions

In the naturalistic, longitudinal Study 11, Markodimitraki (2003) used the same method as Kokkinaki (1998). Cohen's Kappas for intrascorer reliability ranged from

$k = 0.80$ to 0.88 and for the inter-scorer reliabilities from $k = 0.79$ to 0.90 . Pleasure and interest predominated among the emotions observed before, during and after imitation. Additionally, Markodimitraki observed a 'mixed emotion', called 'pleasure-and-interest', namely, a transient emotional state involving elements of both pleasure (smile, with the mouth very slightly open) and interest (intense gazing at the partner's face or body) before, during, and after mimesis. During mimesis, this mixed emotion was found to increase, like pleasure, while interest and neutral expressions decreased (see Fig. 6.1.).

This pattern of increases and decreases remained stable:

- ◆ in imitation of the five kinds of models (vocal sounds, facial movements, non-speech sounds, body movements and combinations);
- ◆ in imitation occurring in the context of turn taking, co-action and combinations;
- ◆ in mimesis during the time of the study (from 1st to 10th months).

The emotional increases and decreases mentioned fluctuated from 58% (non-speech sounds) to 100% (vocal models) in the five kinds of models and in the three communicative structures they fluctuated from 58% (turn takings with co-actions) to 92% (co-actions) to 100% (turn takings). There was a steady increase of smiling and smile-interest emotions across age. For example, from the first to the 10th month, the pleasure during mimesis was found to increase in 12 out of 19 time points (63% stability of the pattern) and the mixed emotion during mimesis was found to increase in 16 out of 19 time points (84% stability of the pattern; for more details see Markodimitraki, 2003).

The above results indicate that mimesis in early infancy does not occur in an emotionless vacuum. When twins are tested, together and separately, with each parent and each grandparent share more or less the same actions and the same transient (usually 'positive') emotions. The stability of the pattern of increases and decreases of the four emotions as a function of the kinds of mimesis, and the timing of their occurrences during the study may indicate that the emotional sharing is a constituent part (a part of the content) of both mimesis itself and 'scaffolding' surrounding the imitative act for young infants. This scaffolding is both flexible, as indicated by the transient nature

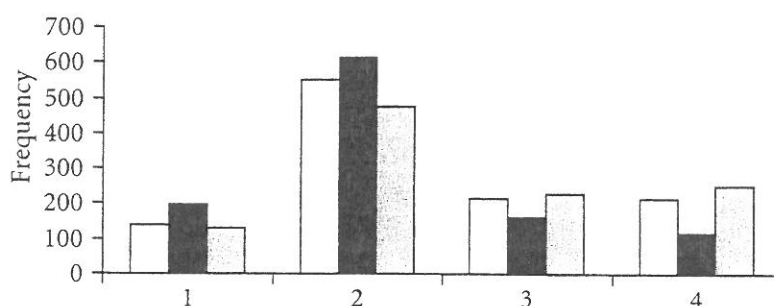


Fig. 6.1 Distribution of emotions before, during, and after imitation. 1, Pleasure; 2, mixed emotions; 3, interest; and 4, neutral expression. White bars, before; black bars, during; and grey bars, after imitation in Study 11.

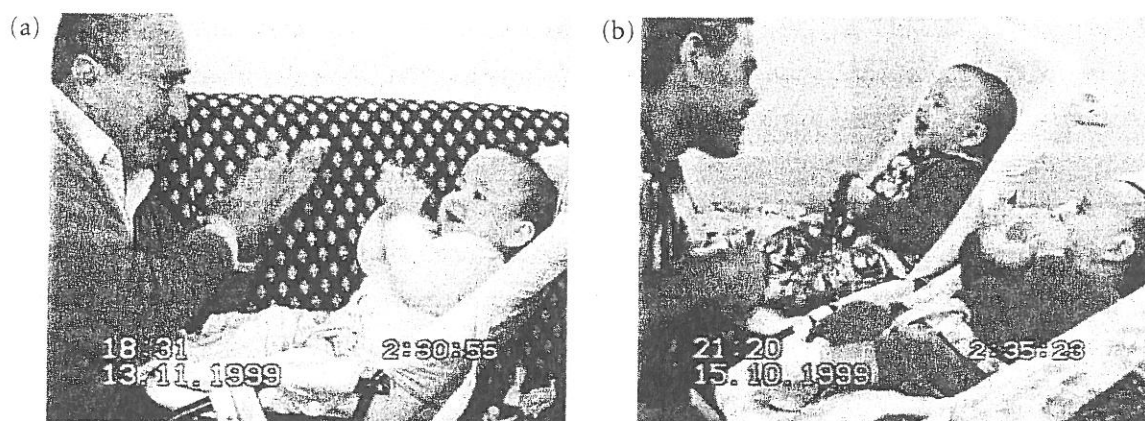


Fig. 6.2 (a) Twin boy (3.5 months old) is imitating the movements of his paternal grandfather. Both partners share the mixing emotion of 'pleasure-and-interest' (Markodimitraki, 2003). (b) Maternal grandfather is imitating the vowel sound of the twin girl (4 months old). Both partners display expressions of pleasure, while the twin boy watches with interest their dyadic communication in this triadic interaction (Markodimitraki, 2003).

of the emotions, and steady, as evidenced by the stability of the pattern of increases and decreases of the positive emotions during imitation. The sharing of the same pattern of increases and decreases of emotions suggests that this emotional scaffolding is built by both communicative partners—infant and parent/grandparent, or infant and her/his co-twin (Fig. 6.2; see also Fiamenghi, 1997). As seen in Fig. 6.1 (black bars) the act of mimesis itself 'swims' in emotions during the first ten months of life (Markodimitraki, 2003).

Discussion

Our quantitative data confirmed many of our qualitative observations. Both converge to the same conclusion: mimesis in infant–adult and infant–infant interaction is not an apathetic, sensorimotor event, but is a clear case of inter-subjective communication. The emotional nature of early mimesis is complex and has many interconnected aspects. Five aspects will be discussed next.

Redefining mimesis

Mimesis is defined as the reproduction of a model's action (Piaget, 1962, p. 2). From our own research and that of others' we know that the infant's reproduction of the model's action is rarely an exact copy of the model. We may characterize the reproduction as precise or 'good enough', but we must admit (indeed, we see or hear) that it is not an exact copy. Above, we described three types of reproductive behaviour. Only the first type characterizes the newborn's mimesis as being precise, and even that is not an exact copy. This is the reason why we often stress that in early mimesis the two partners share more or less the same action. As Trevarthen *et al.* (1999) emphasize, imitations are of greater interest when they are not exact copies of the model, because differences

between the imitator's and the model's actions 'may constitute not errors, but significant information in their co-operation' (p. 141). Piaget (1962, p. 84) also recognized that infant reproductions are 'more or less exact copies', although he used the metaphor of photographic art to describe the 'positives' of imitation, the 'negatives' of accommodation, and the 'printing' that is the result of reproductive assimilation.

Our observations suggest that surrounding more or less similar actions, communicative partners generally share similar emotions. Also, they share the intention and motivation for communication through mimesis, namely, both partners appear to perceive directly the intention and motivation attached in the model movements and sounds, and to return them with more or less the same actions and emotions by which they were perceived (Kugiumutzakis, 1985, 1998). Imitation in early infancy seems to be something more than simple reproductions of another's action. Thus, we propose a 'new' definition of imitation that replaces the notion of 'reproduction' with that of sharing, because this latter term better reflects the inter-subjective nature of neonatal and early mimesis, and because sharing in human evolution and development is as fundamental as the air we breathe (Kugiumutzakis, 2002). We suggest defining mimesis in early infancy as 'the sharing of more or less the same actions, intention, motivation and emotions between two communicating partners.' Partners in this sharing can be newborns or young infants and their significant others, including a twin.

Role of emotions

The core role of the emotional engagement between infants and mothers/others in the development of thought, self-awareness and language is described by Hobson (2002) in his thought-provoking, fascinating book entitled *The cradle of thought*. In this challenging work, after he describes our studies on neonatal mimesis, Hobson comments on our thesis about the phenomenon. We have assumed (Kugiumutzakis, 1998, p. 80) that the newborn baby's mimesis is the result of a drive for inter-mental and behavioural matching, originated in a neonatal exploratory motive system that seeks another *emotional being* to engage in a cooperative, complementary, inter-subjective game. Commenting on this thesis Hobson notes:

For many scientists this is going too far. Justified skepticism is a worthy hallmark of the scientific endeavor, and here is a case where skepticism is understandable. There is a wide gap between observations of an infant's imitation of someone else and claims about the infant's motives to seek engagement with another being. Besides, there is only so much we can say with confidence on the basis of studies of imitation alone. So we need to look elsewhere to corroborate or contradict the idea that infants engages in cooperative and complementary relations with others. (Hobson, 2002, p. 33)

Looking elsewhere, namely, at other infant research studies of the last 30 years as well as at studies on children with autism, Hobson (2002) concludes that even a very young infant has an organized mental life, which is 'expressed in behaviour that is innately fashioned to coordinate with the social behaviour of other people', that infants have an active

social life right from the start, which is highly emotional, and it is through emotional connectedness that an infant discovers the kind of thing a person is. He continues:

A person is the kind of thing with which one can feel and share things, and the kind of thing with which one can communicate (p. 59) ... We have a basic human response to expressions of feeling in others—a response that is more basic than thought. (Hobson, 2002, p. 60)

Hobson's theory is a good alternative to Piaget's object-orientated infant mind. In the present work, we have tried the cover part of the 'wide gap' of knowledge about the infant's motives to seek engagement with another emotional being. Given that we agree with Hobson (2002, p. 252) that human infants have to be endowed with the capacity to respond with feelings to the feelings of others (the first step towards understanding minds), we would like to add that this is exactly what seems to happen in early mimesis 'right from the start': sharing more or less the same feelings, plus sharing more or less the same action. In the experimental studies on neonatal imitation the sharing occurs not with the mother, but with the experimenter. It is an interpretive challenge, especially when it occurs in babies 10–45 minutes after their birth. Sharing appears before the understanding of sharing, as Hobson (2002) notes when he describes the developmental steps from the inter-personal cradle to symbolic and imaginative thought. Neonatal mimesis with persons less than 45 minutes old, is, as far as we know, a good example of this inter-subjective sharing (Trevvarthen, 1998; Trevvarthen *et al.* 1999). In order to reduce 'the scientific skepticism' and close part of the 'wide gap', we summarize below our observations and assumptions.

Pleasure and interest during mimesis

Our observations in a naturalistic context suggest that interest is present and functional in an inter-mental level before and in an intra-mental level during neonatal mimesis. The emotion of interest is a precondition for neonatal mimesis. The appearance of interest depends on the presence of another person/model and on the posture of the baby during the test. Posture seems to be a precondition for both interest and neonatal and early mimesis. Both facial parts and the whole body participate in neonatal mimesis, with the bodily postures expressing emotions and their intensity, as Wallon once suggested. Infant exogenous, social smiles, signifying pleasure, were observed during the first 15 days after delivery, either accompanying or substituting for mimesis, with substitution to denote the intrinsic regulation of the infant's awareness, by the interacting emotions of pleasure and interest. The infant mimesis of rhythm of the vocal models may indicate the common emotional core, and intuitive rhythms of both infant musicality and mimesis. The imitative communication often appears to have rhythmical movements and sounds from the model and the imitator, despite the fact that they are less melodic than the rhythms occurring in musical interactions. Infant intentional avoidance movements indicate the role of the transient emotions or even moods before or during imitation. Human infants are not apathetic copy machines. Most of the time early mimesis is a pleasurable experience, but often infants experience

moments of sympathetic imitation, as two 'uncontrolled' observations (Darwin, 1872; Vitalaki, 2002) and five systematic studies (Sagi and Hoffman, 1976; Martin and Clark, 1982; Field, 1992; Murray, 1998; Chatzinicolaou, 2003) show. The core role of the emotions in early mimesis is evidenced in the case of the twins, whose imitative interaction stopped because they could not share the same emotions (Markodimitraki, 2003). Imitative interaction is also pleasurable for parents and grandparents, as shown by their approving remarks, smiles, laughs, virtual empathic dialogues, and comments denoting expectations, love, teasing, etc. An infant's activities/models may give rise to the adult partner's pleasurable memories, the emotional quality of which is shared by the infant (Kugiumutzakis, 1985, 1992, 1998, 1999, 2002; Kokkinaki, 1998).

Our data confirm the central role for vowels in early mimesis (Darwin, 1872) and the predominance of the transient emotions of pleasure, interest, pleasure-and-interest, as well as neutral expressions before, during, and after mimetic act in naturalistic settings. Beyond their central role in imitative interactions, the uniformity of emotions in two cultures (Crete and Scotland) suggest that there is a common, unlearned origin and natural foundation for emotions during mimesis. As Aristotle once noted (Kugiumutzakis, 1995, 1998), emotions are embedded in the matter of the body. For seconds, or even tenths of a second, emotional matching starts before action matching, accompanies it, and continues after it. Emotional sharing seems to be an ever-present prior element of early inter-subjective mimesis. The stable pattern of increases in the expression of pleasure (and pleasure-interest), and decreases in interest and neutral expressions may show the flexibility and the stability of a common, built-in, emotional scaffolding, itself both a constitutive part and a 'sea' within which imitation 'swims', at least during the first 10 months of life (Kokkinaki, 1998; Kugiumutzakis, 2002; Markodimitraki, 2003). More naturalistic and more controlled studies are clearly desirable, using more specific coding systems, like Oster's FACS (see Oster, this volume) and investigating in parallel the 'vitality affects' (Stern, 1985) in naturalistic, dynamic contexts. We hope that this chapter will encourage the study of the emotional aspects of human mimesis, in order to regain the time lost during the long, apathetic cognitive period in developmental psychology.

Emotions in playfulness and musicality

Like Hobson (2002), we have 'looked elsewhere to corroborate or contradict the idea that infants engages in cooperative and complementary relations with others'. Two other members of our research group have investigated emotions before, during, and after playfulness and rhythmic activity in infants, and have found similar increases and decreases in the above emotions during such activities. Semitekolou (2003) studied from the seventh to the twelfth month the playful episodes in dyadic and triadic interactions (mother-infant, father-infant and mother-father-infant). It was found that during the occurrence of the playful communicative activities, in both dyadic and triadic interactions, pleasure and joy increased, while interest decreased and neutral and

negative emotions disappeared. Mazokopaki (unpublished) investigated, among other things, infant rhythmical activities in the absence and presence of musical stimulation during their second to the 10th month of life. In both conditions, it was found that during infant rhythmical body, dance movements, and rhythmical vocalizations, their pleasure and joy increased, while interest and neutral expressions decreased. Although more investigations are needed to clarify the crucial role of emotions in early development (Trevvarthen, 1993, 1998), it seems that this emotional pattern is to be found during inter-subjective imitation, playfulness, and infant rhythmic activity, throughout the first ten months of life.

A pluralist perspective

To understand by reason (up to a point) the fundamental role of emotions in human evolution, development and future, it is necessary to adopt a pluralist theoretical and methodological perspective, which has to go beyond biological reductionism and anthropological relativism. Such a perspective gives plenty of space for the role of emotion in areas as diverse as Poetry and Robotics. Darwin (1872) used many kinds of data, including the forgotten Voice of the Poets (Homer, Shakespeare) to persuade us, that emotions reveal intentions and thoughts of others 'more truly than do words' (p. 364). In the future we will understand more about the neuroanatomy and neurochemistry of our emotions, and this will be an extremely useful knowledge for our species. We already know that 'emotional' genes and 'emotional' neural systems do not have emotions. We, in our subjectivity and inter-subjectivity, exhibit our emotions and share them with others. Perhaps we share 'emotional' genes that help us to express spontaneously our feelings, but simultaneously we share 'imitative' genes and many 'mimetic'/theatrical cultural means to hide and deliberately control them (Bruner, 2002). Just as there is no reason for the primacy of cognition over emotion, perception and action (Kugiumutzakis, 1998), there is no reason for the primacy of biology over culture. In their endless inter-weaving, all voices are crucial, including the voice of the Poet (Elytis, 1979) who says (p. 150) to reductionists: 'with the traps you can capture birds, but you never capture their singing'.

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