Fathers as communicative companions to their twin and non-twin infants

Markodimitraki M. [1], **Kokkinaki Th.**[2]

[1] *Department of Preschool Education, University of Crete, (GREECE)*
[2] *Department of Psychology, University of Crete, (GREECE)*
e-mail: markodim@edc.uoc.gr, kokkinaki@uoc.gr

Abstract

We compared basic aspects of imitation (such as the frequency across the age range of the study, direction, structure and the kind) in spontaneous dyadic interactions of non-twin and twin infants with their fathers in the course of early infancy. Five father-non-twin infant and five father-twin infant dyads from Crete, Greece, were observed during natural interactions at home from the second to the sixth month of life. Interactions of fathers with their non-twin and twin infants were evidenced to be *similar* in the frequency, the direction and the kinds of imitated expressive behaviors and to *differ* in the structure of imitative sequences and the developmental trajectories of imitation across the age range of this study. In the frame of the theory of Innate Intersubjectivity, we assume that: a) *differences* in certain aspects of imitation may be related to variations in three fundamental dimensions of infant – Significant Other communication: 'kinematics' (temporal patterns), 'physiognomics' (form) and 'energetics' (effort); b) *similarities* in other aspects of imitation may be according to innately determined self-organizing development. These patterns provide evidence that fathers of non-twin and twin infants are as capable and sensitive as communicative companions as are mothers.

Keywords: imitation, twin infant, father, innate intersubjectivity

Introduction

There is an agreement on the innate ability and the communicative function of imitation in a naturalistic frame during early infancy among the majority of developmental researchers (see Kokkinaki, 1998 for a review). Comparative studies between twin- and non-twin infant-mother spontaneous interactions have shown *similarities* in basic aspects of imitation such as: (a) the *direction of imitation*: mothers imitate their twin and non-twin infants more than vice versa; (b) the *structure of imitation*: imitations occur more frequently in turn-takings (my turn-pause-your turn) than in co-actions; (c) the *kind of imitated behavior*: vocal imitations predominated over the rest imitated expressive behaviors; and (d) the *developmental trajectory* of imitation (Markodimitraki, 2003; Pateraki, 2011).The proposition that fathers are as capable and sensitive as imitators as are mothers has been acknowledged (Kokkinaki and Kugiumutzakis, 2000). To the authors' knowledge, evidence on imitation in spontaneous father-twin infant interaction is restricted to Markodimitraki's case study (2003). This study provided evidence that dyadic interactions of the father with his infant twin-girl and his infant twin-boy were: a) *similar* in the kinds of imitated expressions (vocal imitations predominated over the rest imitated expressions) and in the structure of imitative sequences (turn takings predominated over coactions) while they b) *differed* in the direction of imitative sequences; the father imitated the infant twin-girl significantly more than the infant twin-boy. The current study improves the methodology of the Markodimitraki's case study (2003) on the number of participants and extends the comparison of basic aspects of imitation in spontaneous dyadic interactions of non-twin and twin infants with their fathers in the course of early infancy.

Our study was conceived within the frame of the theory of Innate Intersubjectivity (Trevarthen, 1993), according to which imitative intersubjective encounters with infants reveal within- and between-subjects coordination in three essential dimensions of communication that motivate learning in a human community: 'kinematics' (the temporal patterns of movements), 'physiognomics' (changes in the shape of the body) and 'energetics' (variations in the intensity) (Trevarthen, 1986).

Comparing basic aspects of imitation in spontaneous dyadic interactions of fathers with their non-twin and twin infants in the course of early infancy is important because it may extent our understanding: a) on the effect of the unique intra-uterine experience of twins on self-other organization; and b) on the way fathers

constitute an actual figure of intimacy for the developing non-twin and twin infants, who co-"creates" with them, gradually but systematically, their intersubjective companion.

Methods

2.1. Sample

Participants were part of a longitudinal and naturalistic study which aimed to compare basic aspects of spontaneous imitation in interactions of fathers with their non-twin and twin infants (Note). Five non-twin infants (3 boys and 2 girls) and five dizygotic twin infants (2 boys and 1 girl of opposite-sex pairs and 1 boy and 1 girl of same-sex pairs) with their fathers (N=20), from Crete, Greece, participated in this study. All non-twin and twin infants were first-borns due to differences in the brain structure between first-born and second-born twins (Pol, Posthuma, Baare, De Geus, Schnack, van Haren, van Oel, Kahn and Boomsma, 2002). All infants were healthy and born without complications. They came from families in which at least one parent was employed and fathers were >29 years of age. No twins who were in medical risk or with birth weight less than 1.700 gr. or with gestational age less than 34 weeks were selected. Opposite-sex twin infant pairs were classified as dizygotic on the basis of the sex difference (Wilson, 1983). For same-sex twin infant pairs, zygosity was established according to the Zygosity Questionnaire for Young Twins (Goldsmith, 1991).

2.2. Procedure

Parents were approached either before, or after birth in the maternity clinic, or at home through the obstetricians and pediatricians, who opened access at birth records. After parents approved their participation in the study, an introductory discussion took place at their home. The first visit was arranged at a time suitable for the fathers, when the infant was likely to be fed, relaxed and alert, and a time usually amenable to social games (Kugiumutzakis, 1993). Video recordings were made at 30-day intervals starting when the infant was 2 months old until she/he was 6 months old. Each video-recording lasted 7 minutes. A total of 50 video-recordings were made [(5 twin infants X 5 age points) + (5 non-twin infants X 5 age points)], or 350 minutes (50 video recordings X 7 minutes) of spontaneous dyadic interactions. All recordings were made with a Handy Cam SONY DCR-HC90E digital video camera recorder. The only instruction given to the fathers was "Please, play as you normally do with your baby".

2.3. Coding

An *imitative sequence* was defined as a period from the moment that the start of the model's expressive behavior until the completion of the imitator's last imitative activity. An i*mitation* occurred when one partner's vocal, kinetic, facial expression or any combination of these expressions, that had not been expressed by either father or infant in the immediately preceding 10 seconds, is 'recreated or reproduced' by the partner within a 10-second interval and with no other intervening activities. In the present study, the following aspects of imitation were analyzed: (a) The *frequency* of imitation as an entire sequence across the age range of the study; (b) The d*irection* of the imitative sequence, which indicates who it is that is the initiator of the modeled behavior and who gives the first imitative response; (c) The *structure* of the imitative sequence, which indicates the timing between the model's and the imitator's expressive behavior. Imitative sequences were categorized in three types: turn-taking, co-action and multiple exchange (turn-taking with co-action); and (d) The *kinds* of imitative expressive behaviors, which were as follows: vocal imitations, facial imitations, non speech sound imitations, hand imitations, body movement imitations and combinations of the above imitated behaviors (Kokkinaki, 1998, 2011).

Statistical Analysis

Chi-square tests were used to determine possible relationships between pairs of variables. In cases where proportions of two-outcome analyses were assessed (i.e. frequency of imitation in father-non-twin and father-twin infant dyads), Binomial tests were used to test equality of outcomes. The significance level for chi-square test was set at 1%, as a safeguard against false rejections of the null hypothesis. The significance level for the Binomial test was set at 5%. All analyses were performed using the SPSS statistical package (Version 17.0, 2008).

Results

Frequency of Imitation: No significant differences were found in the frequency of imitations in father-non-twin [191 (51.4%)] and father-twin infant dyads [167 (46.6%)] (p=0.224, two-tailed Binomial test).

Direction of Imitation: No significant differences were found in the direction of imitative sequences in father-non twin and father-twin infant dyads. Non-twin infants modeled expressive behaviors that were then imitated by the father almost as frequently as twin infants (χ^2 =0.019, df=1, p=0.890). Similarly, imitations by non-twin infants were almost as frequent as imitations by twin infants (χ^2 =0.02, df=1, p=0.873).

Structure of Imitation: Imitative sequences in father-non-twin infant dyads were structured more in turn-takings than in co-actions, while co-actions were more frequent than turn-takings in father-twin infant pairs (χ^2=9.562, df=2, p=0.008).
Kinds of Imitative Expressive Behaviors: No differences were found in the kinds of imitated expressive behaviours between father-non-twin infant dyads and father–twin infant pairs (χ^2=10.752, df=4, p=0.029).
The Developmental Pattern of Imitative Sequences: Imitation follows different developmental patterns (χ^2=19.106, df=4, p=0.001) in interactions of fathers with their non-twin and twin infants. Figure 1 shows that the frequency of imitations in father-non twin infant pairs decreased after the 3rd month, while imitations in father-twin infant dyads increased about two months later, that is, at the 5th month.

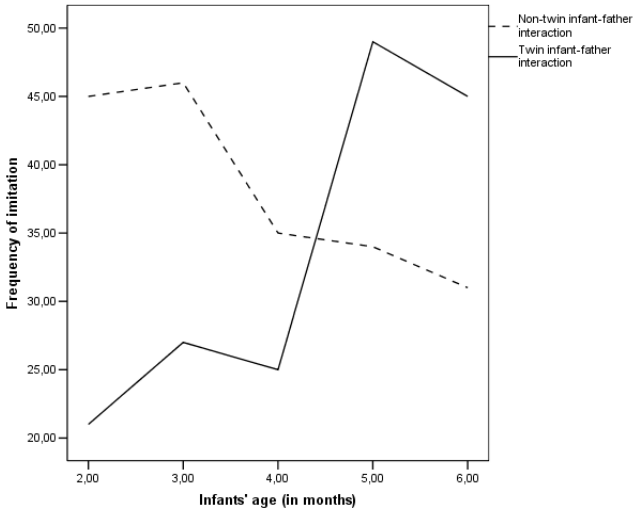

Figure 1: Developmental trajectories of the frequency of imitation in interactions of fathers with their non-twin and twin infants from the 2nd to the 6th month of infants' life.

Discussion

The comparison of certain basic aspects of imitation in spontaneous dyadic interactions of non-twin and twin infants with their fathers in the course of early infancy provided evidence of *similarity* in the frequency, the direction and the kinds of imitated expressive behaviors, and *differences* in the structure of imitative sequences and the developmental trajectories of imitation across the age range of this study.

Similarity in the frequency of imitation implies that the extent of direct inter-motive attraction does not differ according to early family interaction histories in interactions of fathers with their non-twin and twin infants. Given that imitation is not the only mean of communication available to the young infant and human communication is regulated by an integrated system of equivalent expressions (Kugiumutzakis, 1985; Trevarthen, 1993), the 'asymmetric' imitative participation by non twin and twin infants – as evidenced by the *similarity* in the direction of imitative sequences - is explained by the suggestion that infants may express sympathetic communicative feelings in other ways. *Similarity* in the kinds of imitated behaviors implies, indirectly, invariant 'physiognomics', that is, adjustment of spatial patterns in interactions of fathers with their non-twin and twin infants. These *similarities* may be according to innately determined self-organizing development (Trevarthen, 1993). *Differences* in the structure of imitation presuppose that non-twin infants, twin infants and their fathers make different timing adjustments to obtain inter-synchrony. Based on the speculation that co-actions constitute: "…an index of the intensity of affective arousal, regardless of quality" (Beebe, 1982, p. 194), *differences* in the structure of imitation may imply variations in 'energetics' between the two groups. *Differences* in the non-linear developmental trajectories of imitation in interactions of fathers with their non twin and twin infants from the 2nd to the 6th month of infants' life might be due to variations in periodic reorganizations in the infants' motivational system leading either to corresponding motivational changes in father and / or to changes in Significant Others' perceptions of the infant's interests and emotions (Kokkinaki, 1998; Kugiumutzakis, 1993; Trevarthen, 2005).

In sum, this preliminary study provided evidence that: a) *differences* in certain aspects of imitation may be related to variations in three fundamental dimensions of infant – Significant Other communication: 'kinematics' (temporal patterns), 'physiognomics' (form) and 'energetics' (effort); b) *similarities* in other aspects of imitation may be according to innately determined self-organizing development. These patterns may have implications for the ability of all partners to regulate and negotiate interpersonal challenges throughout their lives. In connection to these, fathers seem to constitute one more Significant Other - along with mothers - who offers infant a sense of partner stability with similar and predictable behaviors and interactions to mothers and variations which may reflect differences in the fathers' individual styles, personality and relationship history.

These data describe imitation in a restricted sample of Greek white middle-class infants with their fathers. The participant twins' families are representative of families who volunteer and meet certain inclusion criteria. Obviously, generalization of these findings to a larger sample of other socio-economical and cultural populations is limited.

Note

This work was supported by a Research Grant entitled: 'Temporal organization of facial expressions of emotion in infant-parent spontaneous interaction', of the Special Account of Research of the University of Crete [Grant Number: 4070, reference of Approval: 421/28-2-14].

References

[1] Kokkinaki, T. (1998). Emotion and imitation in early infant–parent interaction: A longitudinal and cross – cultural study. Ph.D. –Thesis. Department of Psychology, University of Edinburgh, Scotland, UK.

[2] Kokkinaki, T. & Kugiumutzakis, G, (2000). Basic aspects of vocal imitation in infant-parent interaction during the first six months. Journal of Reproductive and Infant Psychology 18(3), pp. 173-187.

[3] Kugiumutzakis, G. (1985). The origin, development and function of the early infant imitation. Ph.D. – Thesis. Department of Psychology, University of Uppsala, Sweden.

[4] Kugiumutzakis, G. (1993). Intersubjective vocal imitation in early mother-infant interaction. In: J. Nadel & L. Camaioni (Eds), New perspectives in early communicative development (pp. 23-47). London: Routledge.

[5] Markodimitraki, M. (2003). Psychology of twins: Mimesis and emotions in one pair of non-identical twins. Ph.D. –Thesis. Department of Philosophy and Social Studies, University of Crete, Greece. [http://elocus.lib.uoc.gr//dlib/c/d/7/metadata-dlib-1333705977-814820-32597.tkl]

[6] Trevarthen, C. (1986). Development of intersubjective motor control in infants. In: M. G. Wade & H. T. A. Whiting (Eds), Motor development in children: aspects of coordination and control (pp. 209-261). Dordrecht: Marthinus Nijhof.

[7] Trevarthen, C. (1986). The function of emotions in early infant communication and development. In: J. Nadel & L. Camaioni (Eds), New perspectives in early communicative development (pp. 48-81). London: Routledge.