ACTA PÆDIATRICA
NURTURING THE CHILD

Acta Pædiatrica ISSN 0803-5253

REGULAR ARTICLE

Children's abilities to communicate with both parents in infancy were related to their social competence at the age of 15

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Keywords
Communication, Family triads, Lausanne Trilogue Play, Social competence

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Received
9 October 2017; revised 17 May 2018; accepted 31 May 2018.

DOI:10.1111/apa.14430

ABSTRACT

Aim: Studies of children's early ability to communicate have mainly focused on mother-child dyads. That is why this study analysed the long-term effects of triadic interactions involving both parents.

Method: This prospective pilot study monitored child-mother-father communication in 19 families from the general population in Sweden using the standardised Lausanne Trilogue Play method in a video studio. The families and their first-born child were initially followed from three months to 48 months of age. Preschool teachers assessed the children at the age of four using the Preschool Behaviour Questionnaire and then their teachers assessed the subjects at the age of 15 using the Strengths and Difficulties Questionnaire. Early communication was analysed in relation to the children's social competence at the age of 15.

Results: The child's skills in initiating turn-taking sequences and their parents' responses to this correlated with the child's social competence at the age of four, as reported in a previous study from our group, and at the age of 15, as reported here.

Conclusion: The results of this study indicated that stimulating children's capacity to initiate turn-taking sequences in infancy improved their social competence at the age of 15, confirming positive results at four years of age.

BACKGROUND

The family environments that children live in are responsible for providing them with opportunities to develop social competence and they help them to interact with other people. A number of child development studies have been based on the family systems theory, in which individuals are seen as part of an emotional family unit rather than just as individuals. However, these have tended to focus on dyadic interactions, especially between mothers and children. It is rare to see studies that have focused on triadic interactions, which included fathers as well as mothers. However, the role of the father is changing in today's Western societies, as many have started to play an active role from birth and take more responsibility for child rearing. Despite this growing paternal role, little is actually known about the long-term effects of child interactions that involve both mothers and fathers.

The theoretical background for our study goes back to initial studies and hypotheses put forward by Bowlby (1), Winnicott (2), Stern (3), Trevarthen (4), Tomasello (5), McHale and Fivaz-Depuersinge (6) on the child's needs for good parenting, good attachment and mutual emotional stimulation for their development. It also includes how child-mother-father interactions have been assessed using the Lausanne Trilogue Play (LTP) method introduced by Elisabeth Fivaz-Depuersinge and her team in 1996 (7).

This paper reports the findings of a longitudinal, prospective study that started with parental interviews during pregnancy and prospectively followed 19 children and their families from birth until the child was 15 years old.

The aims of the study were to examine the development of a child's capacity to interact in a communicative way with his or her mother and father when they were between

Abbreviations
CPICS, The Child and Parents Interaction Coding System in Dyads and Triads; LTP, The Lausanne Trilogue Play; PBQ, The Preschool Behaviour Questionnaire; SDQ, The Strengths and Difficulties Questionnaire.

Key notes

- This study analysed the effects of triadic interactions involving both parents as previous studies have focused on mother-child dyads.
- We focused on 19 families from the Swedish general population and videotaped them while we used the Lausanne Trilogue Play method.
- The child's skills in initiating turn-taking sequences, and the parents' responses, correlated with the child's social competence at the ages of four and 15.

three and 48 months old. It also looked at the child's peer competence and social competence during preschool activities at the age of four years and the child's social competence and behaviour at the age of 15. Our hypothesis was that children who functioned well at the age of four would still do so at the age of 15.

METHODS

Study cohort

Nineteen consecutive families living in Stockholm were recruited from the general population in (study date is missing and needs to be added), when they were waiting for their first child and were attending one of the maternity health care clinics in West Stockholm. The assessments started when the women were pregnant and carried on until the children were 15 years of age in (include date).

Midwives at the clinic were informed about the project and were asked to give written information about the project to all families visiting the clinic for the first time over a five-week period. The inclusion criteria were parents who were living together, could speak Swedish and were expecting their first baby. In Sweden, most expectant parents visit maternity health care clinics and fathers accompany mothers to some of the appointments.

During the study period, 22 couples who met the inclusion criteria were informed about the study and 20 agreed to take part. One family did not want to take part in the study after the baby was born and only participated in the first interview during pregnancy. As this occurred at an early stage in the data collection, another family was enrolled to the study. This meant that 20 newborn babies, along with their mothers and fathers, took part in the prospective, longitudinal series of observations. One of the children was diagnosed with an autism spectrum disorder just before four years of age and did not take part in the following monitoring of the children's communication skills and performance. However, the other 19 families continued to take part in the study.

The mean age of the expectant fathers was 30 years (range 24–42) and the mean age of the expectant mothers was 27 years (range 21–32), which was as expected based on the general Swedish population at the time. However, the level of education was higher in our cohort as nine of the men and 10 of the women had completed a college or university education. In addition, five of the men and eight of the women had completed senior high school and the remaining six men and two women had completed their lower or compulsory school education. We found that 19/20 of the men and 18/20 of the women in the sample had a Swedish ethnic and cultural background. One man was originally from Australia, one woman was originally from Finland and another woman was from Brazil. The majority of the couples (60%) were living together and the remainder were married.

The majority of the children in the study, 12/20, were boys. One baby was born 10 weeks premature and her age was corrected in the study. All of the other babies were born healthy: one by Caesarean section and the others by vaginal delivery. The average marital satisfaction of the couples was high, as determined by the Swedish version of the Evaluating & Nurturing Relationship Issues, Communication, Happiness Marital Inventory (7).

The LTP paradigm

An important element of this study was the use of the LTP paradigm that was developed by Dr Elisabeth Fivaz-Depeursinge and has been described in detail in papers by Fivaz-Depeursinge et al. (8,9). The LTP uses video sessions to assess triadic interactions between a child and its mother and father, where the mother, the father and the child are working together on a task, but may play different roles in that task. The family is placed in a triangle and instructed to play and interact in the following four situations: one parent with the child, the other parent with the child, the mother-father and the child take part all together and finally the parents interact with each other. In three of the four situations, one family member is not active, but simply present.

In our study, the child and his or her mother and father were videotaped in LTP situations when they were three, nine, 18 and 48 months of age.

The LTP sessions were assessed using the Child and Parents Interaction Coding System in Dyads and Triads (10), which was specifically developed to assess the triadic interactions from the LTP video sessions using quantitative information and qualitative data from the videotapes. Contributions, turns, turn-taking sequences and affirmations were assessed by focusing on how the mother, the father and the child contributed to establishing an interactive flow.

Contributions and initiatives made by the children were assessed in a qualitative way from the following: positive, negative or neutral facial expressions; seeking eye contact; movements; directing attention towards parents/objects; emitting positive, negative or neutral vocalisation and coughing, sighing and hiccupping.

Turns and turn-taking sequences were assessed using a quantitative approach, with the number of turns and turn-taking sequences counted following a contribution from either the child or one of the parents.

Affirmations were measured using a quantitative approach, based on when the parents used verbal and non-verbal methods to confirm, affirm and support contributions from their child. The means of the mother's and the father's use of verbal and non-verbal affirmations were respectively assessed.

Synchronisation was measured in a qualitative way to describe the process of regulating and directing the way in which time was being used during the play. It was coded in four categories, 1–4, where four meant not being at all synchronised.

The longitudinal approach

During the 48 months when the first part of the study was taking place, four couples split up and one family moved

from the Stockholm area. Two families did not want to participate in the video sessions at 48 months and another two children did not participate in the 18-month follow-up. However, with informed consent, we obtained data from the preschool teachers on all the children at the age of four years. This means that we had complete assessment at all time points, plus the preschool teachers' assessment, for 15 of the 19 families.

Between four years and 15 years, another couple split up and another family moved out of the Stockholm Area. This means that 17 families, the 15 with complete data up to the age of four and two others with partial data, were eligible to participate. Two of the original 19 teenagers did not want to participate at the age of 15 and not all of the teachers filled in The Strengths and Difficulties Questionnaire (SDQ) (11). This meant that participation in the 15-year follow-up was 17 teenagers, 17 mothers, 16 fathers and 14 teachers. Only one of the subjects was an only child as the rest had siblings: in two families the index child had three siblings, in another two families the index child had half-siblings and in the remaining families one sibling was born. So far, no analyses have included their siblings.

The Preschool Behaviour Questionnaire

At the age of four, the children's preschool teachers, who were responsible for the children during their daily activities, assessed their social competence using the Preschool Behaviour Questionnaire that had been developed and validated for the use in Sweden (12). The PBQ has 43 questions that fall into eight categories, including peer competence and social competence.

The Strengths and Difficulties Questionnaire

The SDQ has been translated and adapted for use in Sweden in accordance with the original scales presented by Goodman (11). There is a self-report questionnaire as well as forms for the parents and teachers and we used the Swedish version of these forms in our study.

Statistical methods

The statistical work was carried out in cooperation with Statisticon AB – Statistics & Research who as based in Uppsala, Sweden. Inter-rater agreement was measured with Pearson's correlation coefficient. Friedman's test was used to evaluate any changes over time within a group, for example the children plus their mothers or fathers, and the Mann–Whitney two-sample test was used for differences between groups. Spearman's rank correlation was used to analyse associations between continuous variables. A p value of ≤ 0.05 was considered significant.

Ethical approval

The study and the ongoing follow-up when the children were 15 years of age received ethical approval from the Ethical Committee at the Karolinska Institutet (Dnr 95-289;00-050;01-447) and from the Regional Ethical Council in Stockholm (Dnr 2011/384-31/5).

RESULTS

The correlations between the PBQ and SDQ questionnaires

In the PBQ, the peer competence variable assesses how the individual is interacting with his or her peers during preschool activities, while in the SDQ, the peer problems variable assesses the individual's difficulties in interacting with peers. The degree of correlation using Spearman's rank correlation coefficient is illustrated in Figure 1. When the scores from the mothers, fathers and teachers were combined, the correlation was 0.51 ($p = 0.000$), which indicated that the two scales could be used for comparisons.

The social competence variable in the PBQ is defined as promoting positive social interactions and taking social initiatives and the prosocial behaviour variable in the SDQ is defined as being considerate of others' feelings, sharing readily with other children and being helpful and kind. The degree of correlation using Spearman's rank correlation coefficient is illustrated in Figure 2. When the scores from the mothers, fathers and teachers were combined, the correlation was 0.30 ($p = 0.05$). But when the scores from just the teachers were used, the correlation was 0.84 ($p = 0.00$). The results indicated that the two scales could be used for comparisons.

Child communication and adolescent social competence at age 15

We analysed the children's early capacity to communicate with their later social competence by analysing the LTP sessions using the Child and Parents Interaction Coding System in Dyads and Triads (CPICS) and their peer competence and social competence at the age of 15 years with the SDQ. Strong correlations were found when the communication between the children and their mothers and the fathers were analysed in relation to the children's social capacity and behaviour at the age 15. Synchronisation in the LTP child-mother-father triad at nine months of age correlated strongly with SDQ prosocial behaviour at

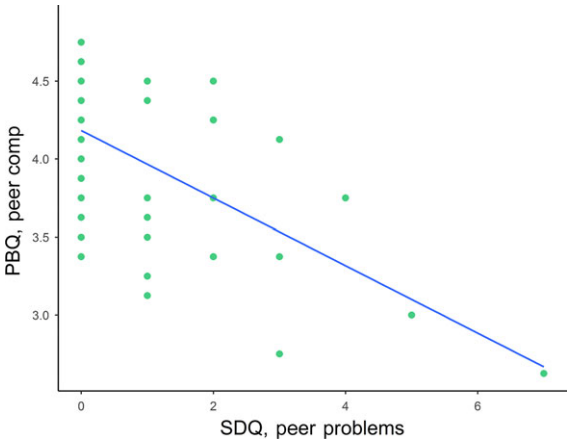

Figure 1 The Preschool Behaviour Questionnaire peer competence variable versus the Strengths and Difficulties Questionnaire peer problems variable.

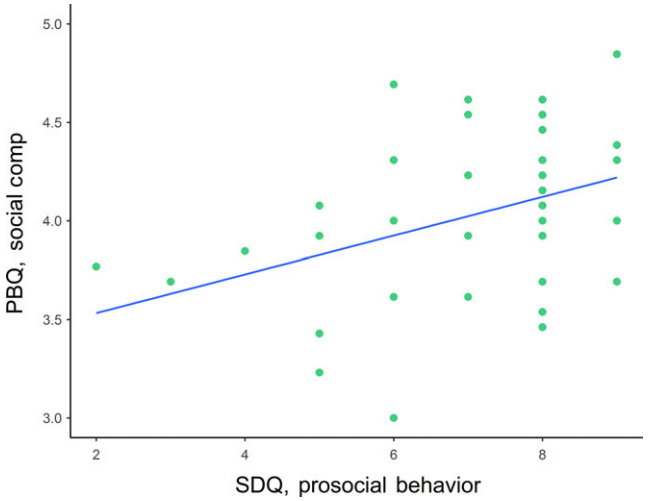

Figure 2 The Preschool Behaviour Questionnaire social competence variable versus the Strengths and Difficulties Questionnaire prosocial behaviour variable.

15 years and correlated weakly with the SDQ variables of conduct disorder (0.19), hyperactivity (0.12) and peer problems (0.36). There was a strong correlation between the SDQ prosocial behaviour variable and the parents' affirmation of the communication in the triad when the children were nine months of age. This was 0.64 for the father and 0.68 for the mother.

DISCUSSION

Our aim was to explore if the early interaction in the child-mother-father triad could be linked to the child's later behaviour with regard to peer problems and social behaviour, as assessed by their teachers. We studied co-habiting and married couples from the average population and had no intention of comparing the children's outcomes with children from single-parent families or other family models. As the sample was small, it was not possible to analyse any differences between boys and girls.

Although a small sample was used, we found that the child's capacity to initiate turn-taking sequences early in life, and the parents' responsiveness to this, was correlated to the child's peer competence and social competence both at the preschool age of four (13) and in junior high school at the age of 15.

Based on the background described above, and using micro-analytic coding to understand the balance between the child, mother and father with regard to the contribution, turn-taking and synchronisation variables, the results supported the hypothesis put forward. There was a relationship between the child initiating an early contribution, namely turn-taking sequences at nine months old, social and peer competence at four years of age and prosocial behaviour and fewer peer problems at the age of 15.

Turn-taking sequences observed in the family triad after the child initiated a contribution seemed to be a measure of the child's communicative capacity and, or, social competence within the family. The child's activity supported Tomasello's (5) suggestion of the nine-month revolutionary age, but could also be interpreted as mothers and fathers with good co-parenting activity allowing their child initiate triadic communication.

The findings of our study agree with previous research. Stern (14), Trevarthen (15) and Hsu and Fogel (16) have described the importance of parents playing an active role in generating communication with their child and making the child an active partner. Trevarthen stated that communication with two-month-old infants aimed to create and maintain contact and that language flowed one way, from the mother to the child. Tronick (17) described similar effects and introduced the dyadic consciousness hypothesis to explain the intense connectedness and mutual dependence that characterises communication in the mother-child dyad. A parent-child relationship that is high in positive mutuality has been shown to allow for a smoother and more positive socialisation process in which children learn social, emotional and cognitive skills (18–20).

Our findings are also supported by ongoing research on the child's brain and mental capacity, which indicates how the newborn infant's brain takes part in communication and the important effects of the mutual stimulation between infants and their parents. Moon et al. (21) found that foetuses reacted to their mother's voice in the womb and that affected their perception of their native language.

Using functional magnetic resonance imaging techniques, Lloyd-Fox et al. (22) found when parents employed the combination of child-directed speech and direct gaze, this led to enhanced brain activation in six-month-old infants. Using event-related potential measures in a group of 84 infants at the age of nine months, Otte et al. (23) found that that the processing of emotional information in a parent's voice was modulated by the emotional expression in the parent's face. The authors stated that: 'Infants responded with larger auditory event-related potentials after fearful compared to happy facial primes'. Grossmann et al. (24) found that the successful initiation and maintenance of joint attention when communicating with infants was related to language development as it increased learning opportunities from social interactions. In a series of studies, Feldman et al. (25–27) used videotaped assessments of infant-mother-father interactions to study the biology of these interactions in relation to oxytocin. They proposed that: 'Although preliminary, these findings demonstrate synchrony in the brain response of two individuals within an attachment relationship, and may suggest that human attachment develops within the matrix of biological attunement and brain-to-brain synchrony between attachment partners'.

Clinical implications of the findings

It is of particular interest that when the child was nine months old the parents often reacted to the child's focus of attention when the child looked at an object or at the parents. This reaction from the parents affirmed the child's

actions and initiated the way they took turns in the triad. When the child's overall contributions at this age were to initiate turn-taking sequences in the triads, the children had better prosocial behaviour at 15 years of age and less peer problems as measured by the SDQ. It is not clear if this finding was the result of some competent individual children having the capacity to initiate and take part in triadic turns or if it resulted from attentive, supportive affirming parents helping their children to take part in interactions, but holding back and allowing the child a free reign.

A review of four coding systems referring to family interactions has been published and this emphasised the importance of mutuality (28), which is defined as interactions back and forth. This is an important variable for encouraging children′s positive socialisation and development (22,23,29). However, the studies that we have reviewed in this paper have tended to focus on dyadic interaction. In our study of triadic interaction with the LTP, it was possible to assess mutuality between the three participants using the CPICS, the coding system developed to assess triadic interactions.

Triadic interactions are likely to be more demanding for the child, but they also provide a model of group interaction. Gordon and Feldman pointed to the need to investigate triadic interaction as a unique setting to be studied and assessed in relation to development (29).

We found that the children′s ability to perform turn-taking sequences at three, nine and 18 months had strong correlations with their ability to communicate with peers and generally relate to other people at the ages of four and 15 years. This was in line with longitudinal studies that used the LTP and indicated that a highly stable alliance predicted better outcomes in children at five years of age (6).

The teachers assessed the children with the SDQ questionnaire at 15 years of age.

This showed that the synchronisation variable that was analysed at nine months of age correlated strongly with the prosocial behaviour variable at 15 years of age and had a p value of zero. Synchronisation correlated weakly with the conduct disorder variable (0.19), hyperactivity (0.12) and peer problems (0.36). The number of turn-taking sequences and the child's contribution at nine months was related to both the child's peer competence and their social competence at the age of four, as measured by the PBQ. The categories social competence and peer competence were closely related to prosocial behaviour and peer competence and only weakly related to peer problems.

Strengths and limitations of the study

The strengths of the study were the longitudinal, prospective design, covering the time from the start of the pregnancy until the children were 15 years of age and the consecutive recruitment of families from the general population. However, there was only a small group of participants, with an attrition rate, and the study should be considered as a pilot study. At 48 months of age, we were able to obtain complete data from 15 of the 20 original families and 17 of the 20 families took part when the children reached the age of 15. Other limitations were the length of the video recordings, which varied between the different triads. However, the analyses of the families' performances, which were based on these varying recording lengths, did not indicate systematic effects on frequency differences regarding contributions per minute and on turn-taking sequences per contribution.

CONCLUSION

These results, based on a small sample and using a longitudinal prospective approach, indicated that the Lausanne Trilogue Play could be used during infancy and childhood in order to improve children's later social competence. It did this by stimulating the children's awareness, namely their ability to initiate turn-taking sequences, and to stimulate their parents' responsiveness to this. However, further studies are needed to provide better knowledge on these matters.

CONFLICT OF INTEREST

The authors have no conflict of interests to declare.

FINANCE

The study was partly funded by the Swedish National Institute of Public Health, the Stiftelsen Kempe-Carlgrenska Fonden, the Stiftelsen Clas Groschinskys Minnesfond, the Solstickan Foundation and Stockholm County Council.

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