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# PATERNAL INVOLVEMENT AND ATTENTION SHARING IN INTERACTIONS OF PREMATURE AND FULL-TERM INFANTS WITH FATHERS: A BRIEF REPORT

The aim of this study was to analyze possible links between paternal involvement and children's competence in coordinated joint attention (CJA) in preterm versus full-term 12-month-old babies. Paternal involvement was measured through the amount of time fathers allocated to different activities with their infants, whereas children's capacity for CJA was inferred on the basis of episodes of joint attention (EJA), empirically derived from father-infant interactions. Fifty-nine father-infant dyads participated in the study. Father-infant interactions in free-play situations, diaries of infant activities, and semi-structured family interviews were analyzed. Episodes of joint attention were more frequent in interactions of fathers with full-term babies in comparison to extremely premature babies, and in the case of preterm infants, in dyads with highly involved fathers as compared to those with a relatively low level of involvement.

*Key words*: paternal involvement, joint attention, prematurity, father-infant interaction

## Introduction

Over the past three decades, fathers' involvement in family life and child rearing has become a focus of growing interest of researchers and scholars in the field of social sciences, including psychology. This is in line with the changing role of fathers in modern societies, due, in turn, to many interrelated factors such as changes in family structure, increasing participation of women in the labor market, etc. Various multidimensional models of paternal involvement

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have been proposed (e.g. Lamb et al., 1987; Palkovitz, 1997; Cabrera et al., 2007), encompassing both direct and indirect effects of fathering, and varied levels of analysis, i.e. father-child interactions, paternal accessibility or availability, as well as responsibility (Lamb & Lewis, 2013). The simplest, if not simplistic, way of defining paternal involvement is with reference to the time fathers actually spend with their children (sometimes relative to the time spent by mothers) (Gaertner, Spinrad, Eisenberg & Greving, 2007). Despite some immanent drawbacks of such an approach, the advantage is a clear focus on the structure as well as the quantitative and qualitative features of real time fathers engage with their offspring.

Although the vital role of fathers in children's social, cognitive and language development is widely recognized nowadays (Sarkadi, Kristiansson, Oberklaid & Bremberg, 2008; Leidy, Schofield & Parke, 2013; Tamis-LeMonda, Baumwell & Cabrera, 2013), it is still insufficiently studied with regard to children at risk for developmental disorders, including premature infants. Developmental outcomes of premature children have been a focus of continuous interest of researchers and clinicians for many years, but it is only relatively recently that a more fine-tuned and consistent picture of possible mechanisms underlying their specific difficulties has emerged. The mechanism in question is attention regulation, and specifically attention regulation in social contexts (see for example Harel, Gordon, Geva & Feldman, 2011; De Schuymer, de Groote, Desoete & Roeyers, 2012). One of the major milestones in early social cognitive development is the capacity for coordinated joint attention (Butterworth, 2006), i.e. the ability to share a focus of attention on an object or event with another person. Obviously, coordinated joint attention (CJA) can be regarded as the end product of the processes of joint attention development, with two distinct pathways for initiating joint attention *versus* responding to joint attention (Carpenter, Nagell & Tomasello, 1998; Mundy & Jarrold, 2010). Processes involved in CJA are relevant for our understanding of both typical and atypical development (Nichols, Fox & Mundy, 2005). As research results suggest (Mundy, 2003), CJA is linked to dorsal-medial frontal brain systems that are implicated in self-monitoring which, in turn, may be crucial for self-regulation and executive attention – the very core of problems of many prematurely born children.

Our aim in this study is to analyze possible links between paternal involvement and children's competence in coordinated joint attention in preterm versus full-term 12-month-old babies. Paternal involvement is measured through the amount of time fathers allocate to different activities with their infants, whereas children's capacity for CJA is inferred on the basis of episodes of joint attention (EJA), empirically derived from father-infant interactions.

Episodes of joint attention are understood here in terms of dyadic processes resulting from a complex interplay of self- and interactive regulation, including processes of coordinating and finely attuning cycles of attention on the part of both partners (Kmita, 2013). It is also assumed that since in Polish culture father-

infant interactions are relatively less frequent than interactions with mothers, they may also require more "negotiation of meaning," in which the processes of coordinating attention around a shared object, event or topic might be of utmost importance.

The objectives of the study were: 1) to explore and compare fathers' time allocation to everyday activities with premature versus full-term infants, 2) to analyze father-infant interactions in order to identify and compare episodes of attention sharing around some common object, topic or event in dyads with preterm versus full-term babies, and 3) to examine the relationship between paternal involvement and preterm vs. full-term children's capacity for coordinated joint attention as evidenced in interactions with fathers.

## Participants

The subjects were 59 fathers and their 12-month-old infants out of an initial group of 90 families invited to a larger, prospective study[1]. The families were recruited from the Warsaw metropolitan area. The following subgroups of the initial sample were included in the analysis:

- 14 father-infant dyads out of 30 families with babies born with extreme prematurity, i.e. before the 29th gestational week (group p1),
- 23 father-infant dyads out of 30 families with babies born between the 29th and 34th week (group p2),
- 22 father-infant dyads out of 30 families with babies born at term (group c).

Informed consent and the willingness of both parents to participate in the study were the primary criteria of inclusion. Additional inclusion criteria for this part of the project were:

- high quality of video recordings of father-infant interactions, with both participants visible for at least 95% of the time;
- a complete set of data from *Daily Diary of Infant Activities* obtained from the parents.

Exclusion criteria were teenage parenting and congenital malformations/genetic syndromes. Apart from that, three infants with extreme prematurity and severe medical and developmental problems were excluded. The three initial subgroups of fathers were comparable in terms of age, education and socioeconomic status.

## Method

The design of the initial study is outlined in Table 1. The material presented in this paper was collected during the fourth meeting with participating families,

[1] The original study was supported by a grant from the Polish Ministry of Science and Higher Education: NN 106 045734.

Table 1. Study design of the original project. Data collected during the fourth meeting were the basis for analyses presented in this paper

| | When?* | Where? | Procedures & techniques |
|---|---|---|---|
| Meeting 1 | 1 m | Home | 1. The Neonatal Behavioral Assessment Scale (NBAS)<br>2. Semi-structured interview with parents<br>3. Measuring basic level of cortisol from saliva |
| Meeting 2 | 3 m 15 d ± 15 d | Home | 1. Recording of parents-child interactions (dyadic and triadic)<br>2. The Infant Behavior Questionnaire Revised (IBQ-R) – both parents<br>3. The Edinburgh Postnatal Depression Scale (EPDS)<br>4. Measuring basic level of cortisol from saliva |
| Meeting 3 | 6 m ± 15 d | Playroom / Laboratory setting | 1. Observational procedure<br>2. EPDS<br>3. Semi-structured interview with parents<br>4. Measuring basic level of cortisol from saliva |
| Meeting 4 | 12-13 m | Playroom / Laboratory setting | 1. Observational procedure<br>2. Diary of child's activities<br>3. Semi-structured interview with parents<br>4. Measuring basic level of cortisol from saliva |
| Meeting 5 | 12-13 m | Outpatient clinic | 1. Assessment of child's mental development with Infantile Developmental Scale (Dziecięca Skala Rozwojowa, DSR) |

when infants were 12 months of age[2]. Fathers' involvement was assessed using the daily diary method and on the basis of data from semi-structured interviews with both parents. A specially designed *Daily Diary of Infant Activities* was used. This tool was inspired by the works of Charles Super and Sara Harkness (Harkness & Super, 2006, Harkness et al., 2011). A working version of the diary was developed by Kozlowska and Kmita (Kozlowska, 2010) and then modified by Kmita and colleagues[3]. The diary provides a 24-hour record of infant and family activities for three days: two weekdays and either Saturday or Sunday.

[2] In the case of preterm infants, meetings were always arranged according to children's corrected/adjusted age, i.e. the age calculated by means of the following formulae:
CoA = ChA – (40-GA)
CoA – corrected age (in weeks); ChA – chronological age (in weeks); GA – gestational age (in weeks); 40 weeks = full-term gestation.

[3] Unpublished report of the project supported by the statutory fund of the Faculty of Psychology, University of Warsaw: BST1545 27/2010.

In addition, it also contains four open-ended questions about practices related to feeding, sleep, play, crying and comforting. The following measures of paternal involvement were used:

- total time spent with the baby (in hours) – TT
- time spent playing with the baby (in hours) – TP
- time spent on other activities with the baby (going for a walk, bathing, etc.) – TO

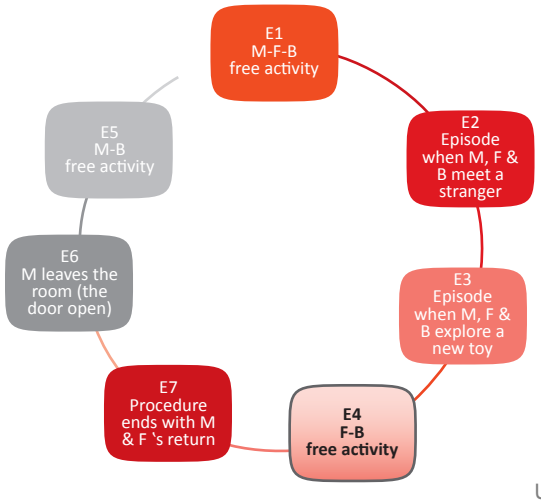
The above measures have been standardized for purposes of statistical analysis.

High paternal involvement was operationally defined as TT equal to or above 10 hours, both TP and TO above the mean, and TP or TO more than one standard deviation above the mean.

Moderate paternal involvement was defined as TT ranging from 4 to 9 hours, and both TP and TO within one standard deviation of the mean. Consequently, low involvement implied TT less than four hours, TP and TO below the mean, and TP or TO more than one standard deviation below the mean. These data were checked against the qualitative data gathered in semi-structured interviews with both parents, pertaining to various aspects of child development and care.

Interactions of parents with infants were recorded with two cameras in a playroom at the Therapeutic Centre for Children, Faculty of Psychology, University of Warsaw. Father-infant interactions comprised the fourth element in the chain of episodes in a specially designed observational procedure (see Figure 1)

Figure 1. Observational procedure: subsequent interactive episodes (E1 – E7), each lasting approximately 3 minutes (except for E6 and E7, which are one minute long). M = mother, F = father, B = baby. Episode 4 (E4) was the basis for the presented analyses



(Kmita, 2013). They lasted approximately three minutes and were preceded by the mother's departure to an adjacent room. In order to identify episodes of joint attention, i.e. interactive attention sharing, a macro-analysis[4] of the video recordings was performed. An episode of joint attention (EJA) was operationally defined as any sequence of socially oriented behaviors in which the partners coordinate attention around the same object, event or topic.

Indicators of EJA comprised:

- gaze shifting from the partner (father) to an object (and back again); only objects that the partner was looking at/ holding/ giving/ talking about were considered
- gaze shifting from an object to the partner and back again followed by the partner's response (looking at the same object, talking about it, etc.)
- proto-imperative and proto-declarative pointing clearly addressed to the partner and followed by his response
- giving an object to the partner (with eye contact)
- receiving an object from the partner (with eye contact)
- pointing to objects in a book while "reading" together, etc.

The end of an episode was marked by a change of object/ activity or by gaze aversion. The total number of EJA was counted for each dyad. On that basis the infants were divided into two groups: 1) relatively more competent with respect to coordinated joint attention ("EJA+"), with results above the first or lower quartile (at least three episodes of joint attention observed), and 2) relatively less competent in coordinating joint attention ("EJA?"), with results in the lower quartile (up to two episodes of joint attention noted).

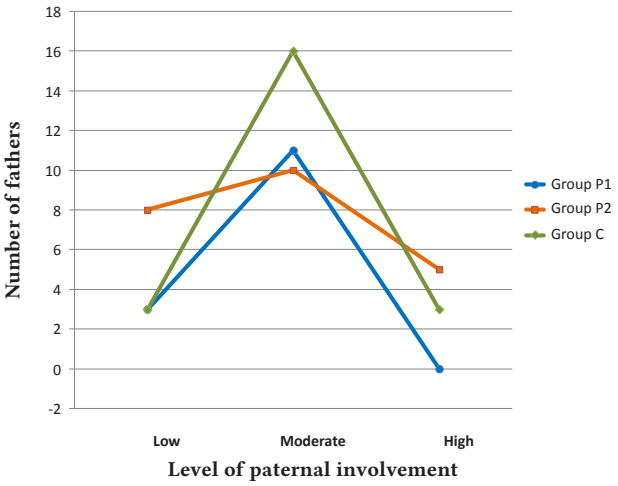
The results were controlled for the children's developmental status, medical/ biological risk factors, socio-economic variables, temperament as well as parental depression. Statistical analysis was performed with STATISTICA 10.0.

## Results

Interviews with fathers revealed qualitatively distinct features of the experience of parenting a preterm baby, especially in the case of extreme prematurity, but no significant intergroup differences could be found in either the level of paternal involvement (high, moderate and low; see Figure 2) or in the amount of total time spent with the child, or the time allocated to playing with the child versus other activities with him or her. It should be underscored that non-involved fathers were probably underrepresented in our study due to the specific subject selection procedure, which promoted highly motivated families willing to take part in as many as five meetings within the first year of their child's life. What is more, even our least involved fathers were actually quite active participants in

[4] Microanalysis of father-infant interactions and infant directed speech is still in progress and is being conducted using Observer XT 9 by Noldus.

Figure 2. Levels of paternal involvement in the three groups under study




their child's life and under no circumstances could be treated as "non-involved". A moderate level of paternal involvement prevailed (almost 57% of fathers in groups p1 and p2 taken together, and as many as 73% of fathers of full-term babies).

The number of episodes of joint attention differentiated the three groups of father-infant dyads (Figure 3), which was in line with our expectations, Kruskal-

Figure 3. Episodes of joint attention in father-infant interactions – frequencies in dyads with extremely preterm infants (Group P1), very and moderately preterm infants (Group P2) and full-term infants (Group C)

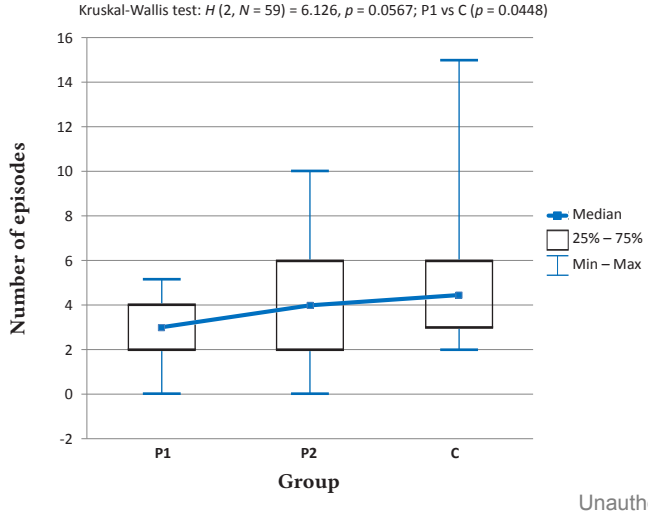
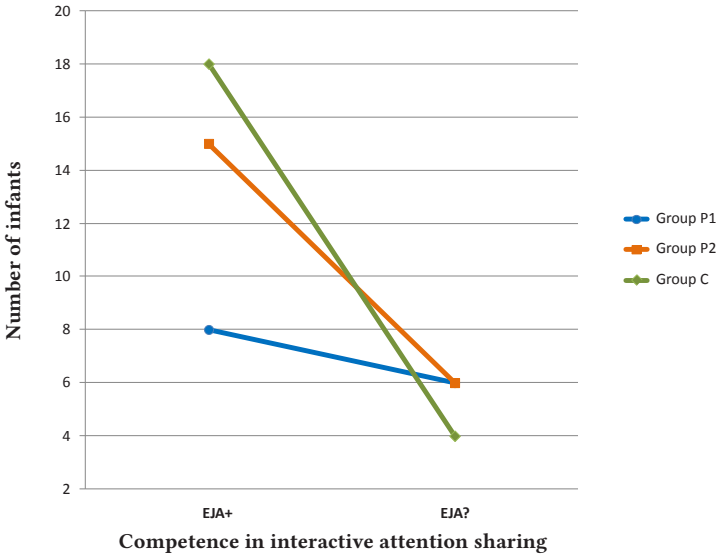


Figure 4. Competence in interactive attention sharing as measured with dichotomized index "EJA+" (competence – evident) versus "EJA?" (competence – questioned) in the three groups of father-infant dyads




Wallis test: $H$ (2, $N$ = 59) = 6.126, $p$ = 0.0467. Significant differences were found between dyads with extremely premature infants (group p1) versus full-term infants (group c) ($p$ = 0.0448). Episodes of joint attention were more frequent in interactions of fathers with full-term babies than with infants born with extreme prematurity.

In terms of the dichotomized index of infant competence in joint attention (Figure 4), as many as 43% of extremely premature infants were categorized as less competent (EJA?), in contrast to only 26% and 18% of group p2 and c, respectively, but this result did not reach accepted levels of statistical significance.

Significant differences were also found in the number of EJA in dyads with preterm infants (p1+p2) and fathers of varied level of involvement (low, moderate & high), Kruskal-Wallis test: $H$ (2, $N$ = 37) = 9.249, $p$ = 0.0098. Specifically, in the case of infants born prematurely, higher indices of episodes of joint attention occurred in dyads with highly involved fathers as compared to dyads with fathers representing a relatively low level of paternal involvement ($p$ = 0.008).

A moderate positive relationship was found between indices of interactive attention sharing (standardized number of episodes of joint attention) and child developmental results as measured using the *Infantile Developmental Scale* (Dziecięca Skala Rozwojowa – DSR), Spearman's *rho* = 0.413, $\alpha$ = 0.05. In ad-

dition, interactive attention sharing correlated negatively but weakly with the standardized index of medical risk, Spearmen's *rho* = -0.356, $\alpha = 0.05$.

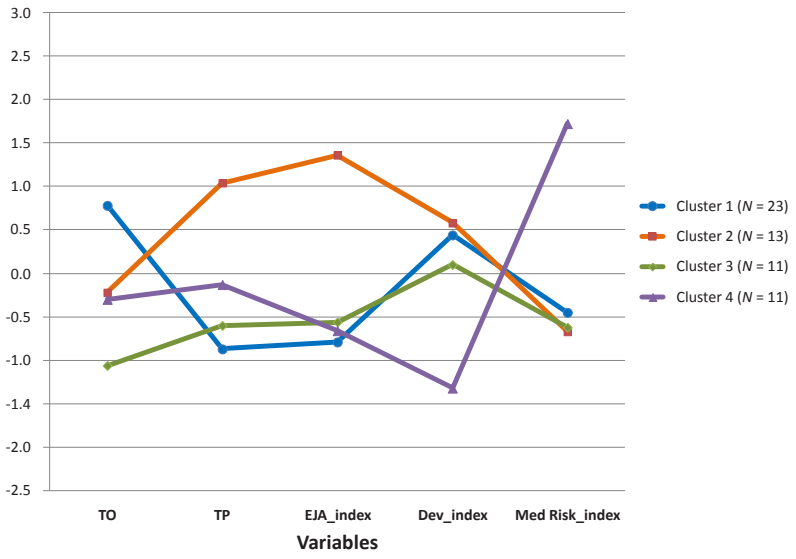
An exploratory analysis was performed with the aim of discerning patterns in our data that could reflect differing levels of paternal involvement and children's capacity for coordinated joint attention (as inferred from the number of observed episodes of joint attention). At the same time, we were looking for a constellation of other variables that characterized the resultant distinct subsets of father-infant dyads. Four clusters of dyads were empirically distinguished on the basis of k-means cluster analysis. They were distinct with reference to the following variables: measures of father's involvement (time spent playing with the baby – TP, time spent on other activities with the baby – TO), interactive attention sharing (EJA_index), child's developmental status (Dev_index), and medical/ biological risk (MedRisk_index).

*Cluster 1 (C1)* and *Cluster 2 (C2)* consist of developmentally competent infants, with low biological risk, and at least moderately involved fathers. The difference lies in the structure of paternal involvement (more of TP in *C1* vs. more of TO in *C2*) and the frequency of EJA, which seems to be higher in *C2* as compared to *C1*. These two clusters are mainly composed of group p2 and c (only 2 p1 dyads in *C1*, and no p1 dyads in *C2*). *Cluster 3 (C3)* represents relatively less involved fathers with infants mainly from group p2 (only one infant from group p1, and 3 infants from group c with low levels of biological risk. In contrast, *Cluster 4 (C4)* consists of relatively engaged fathers and high-risk infants of group p1. Despite developmental problems these babies engage in EJA with fathers at a similar level as their less biologically and developmentally vulnerable peers of *C3*, which is a rather striking result.

Table 2. Results of k-means cluster analysis – variables discriminating four clusters. TP – time spent by father on playful activities with his child, TO – time spent by father on other activities with his child, EJA_index – total number of episodes of joint attention, Dev index – child's developmental index as measured with DSR, MedRisk_index – summarized index of medical risk

| Variable | SS between groups | *df* | SS within groups | *df* | *F* | *p* |
|---|---|---|---|---|---|---|
| TP | 27.480 | 3 | 29.872 | 54 | 16.559 | 0.000 |
| TO | 19.094 | 3 | 37.213 | 54 | 9.236 | 0.000 |
| EJA_index | 33.836 | 3 | 23.916 | 54 | 25.467 | 0.000 |
| Dev_index | 25.344 | 3 | 31.656 | 54 | 14.411 | 0.000 |
| MedRisk_index | 47.114 | 3 | 6.503 | 54 | 130.403 | 0.000 |

Figure 5. K-means clustering results – graph illustrating mean values of each variable (dimension) that discriminates the four clusters. Variables: TP – time spent by father on playful activities with his child, TO – time spent by father on other activities with his child, EJA_index – total number of episodes of joint attention, Dev index – child's developmental index as measured with DSR, MedRisk_index – summarized index of medical risk. All variables were standardized




An attempt was also made to look for a model of variables that would best explain children's competence in coordinating attention around a shared object/ event or topic in interactions with their father. Generalized linear modeling was used, although with some reservations due to the small sample size. It turned out that the best-fit model of variables to explain or predict values of the dependent variable, i.e. the amount of interactive attention sharing, included "total time spent by father with the child – TT" and "medical/ biological risk index" (Pearson's $Chi^2 = 55.276$, $df = 51$ Stat/$df = 1.08$)[5]. The child's developmental index, although included at first, was then eliminated in the process of model building. Both higher paternal involvement (in terms of TT) and lower medical/ biological risk increased the chances for competent coordination of attention around an object/ event or topic shared with the father (Wald statistic for paternal in-

[5] The dependent variable's distribution was assumed to be a Poisson distribution (Chi-square goodness of fit test $Ch^2 = 6.49008$, $df = 4$, $p = 0.16542$); the LOG link function was used. Standard diagnostic checks did not show any severe violations of the model assumptions.

volvement = 6.833, $p = 0.009$ and for medical/ biological risk = 5.772, $p = 0.016$). Nonetheless, this model should be treated with great caution as the observed effects, although significant, seem rather weak.

## Conclusions & limitations

The results of our study, although based on simple measures, seem to support the hypothesis of paternal involvement as a factor contributing to preterm infants' social cognitive competence as evidenced in episodes of joint attention. Nonetheless, the picture that we have obtained of a model of variables that could best predict such competence is definitely incomplete. We can hypothesize that another model of variables might exist that could be more efficient in this respect. Perhaps the biggest problem with the proposed model is that it neglects the very fact of paternal involvement being embedded in a broader network of family relationships, as posited by many authors (Gaertner, Spinrad, Eisenberg & Greving, 2007; Lamb & Lewis, 2013). Further analyses are needed, on a larger group of subjects, and with due consideration given to both fathers' involvement and measures of maternal responsiveness, co-parenting, etc. It should be emphasized that the complex interplay of biological and relational factors should be considered in order to explain the processes of attention sharing in father-infant dyads.

In light of our results, a more varied structure of paternal involvement, including not only time for father-infant play but also participation in other activities with the child, seems to promote infants' engagement in episodes of joint attention. The first two clusters, out of four that were identified in the exploratory analysis, might represent optimal although differing patterns of paternal involvement in the case of healthy, typically developing infants. The last identified cluster may suggest that moderate to high paternal involvement can serve as a protective factor in the case of biologically and developmentally vulnerable, extremely premature infants. This statement can only be regarded as a hypothesis still awaiting empirical verification.

Further studies are needed to better understand fathers' perspective on premature birth and the phenomenon of their parental involvement and engagement. One interesting result is that even the least involved fathers of premature babies in our sample, at least in light of the diaries, were quite active and involved when talking about their sons or daughters in semi-structured family interviews. One explanation can be that we were simply not able to track down non-involved fathers, and our subjects should all be considered "relatively involved parents" on a dimension of non-involvement – involvement.

Finally, selected limitations of the study require at least brief consideration. Some of them have already been mentioned, i.e. small sample size and underrepresentation of less involved fathers (especially fathers of full-term babies). Two other important weaknesses of the study pertain to both the theoretical

and the methodological approach. First of all, a simplified or even simplistic model of paternal involvement was used. Paternal involvement is a complex phenomenon, far exceeding the mere count of hours fathers spend directly interacting with their children (Lamb & Lewis, 2013). In the series of analyses that are still in progress we plan to analyze the quality of father-infant interactions, paternal responsiveness, and infant-directed speech. Other, indirect aspects of paternal engagement should also be considered, for example provision of broader educational opportunities, or other aspects of investment in the paternal role. From a methodological point of view, time-based measures of interactive attention sharing would serve as better indices of dyadic competence than a simple episode count. A distinction between *initiating joint attention* and *responding to joint attention*, which was not made in our coding scheme, could be of crucial importance if a comparison of social cognitive functioning of preterm versus full-term infants is the target. This is in line with the latest research results (e.g. Johnson & Marlow, 2011; Yamada et al., 2011) pointing to higher rates of autism spectrum disorders in premature children (especially with extreme prematurity). A number of questions remain unanswered. The crucial one relates to the very process of jointly coordinating attention around a shared object, event or topic in father-infant interactions. Future studies should bring new insight into how episodes of joint attention are co-constructed within the framework of the interplay of biological, psychological, social and cultural processes.

## References

Butterworth, G. (2006). Joint visual attention in infancy. In G. Bremner & A. Fogel (Eds.), *Blackwell Handbook of Infant Development* (pp. 213-240). Oxford: Blackwell Publishing.

Cabrera, N., Fitzgerald, H.E., Bradley, R.H., & Roggman, L. (2007). Modeling the dynamics of paternal influences on children over the life course. *Applied Developmental Science, 11* (4), 185-189.

Carpenter, M., Nagell, K., & Tomasello, M. (1998). Social cognition, joint attention, and communicative competence from 9 to 15 months of age. *Monographs of the Society for Research in Child Development, 63* (4), 1-143.

De Schuymer, L., De Groote, I., Desoete, A., & Roeyers. H. (2012). Gaze aversion during social interaction in preterm infants: a function of attention skills? *Infant Behavior & Development, 35* (1), 129-139.

Gaertner, B.M., Spinrad, T.L., Eisenberg, N., & Greving, K.A. (2007). Parental childrearing attitudes as correlates of father involvement during infancy. *Journal of Marriage and Family, 69* (4), 962-976.

Harel, H., Gordon, I., Geva, R., & Feldman, R. (2011). Gaze behaviors of preterm and full-term infants in nonsocial and social contexts of increasing dynamics: Visual recognition, attention regulation, and gaze synchrony. *Infancy, 16* (1), 69-90.

Harkness, S. & Super, C.M. (2006). Themes and variations: Parental ethnotheories in Western cultures. In K. Rubin & O.B. Chung (Eds.), *Parental Beliefs, Parenting, and Child Development in Cross-Cultural Perspective* (pp. 61-79). New York: Psychology Press.

Harkness, S., Zylicz, P.O., Super, C.M., Welles-Nyström, B., Bermúdez, M.R., Bonichini, S., Moscardino, U., & Johnston Mavridis, C. (2011). Children's activities and their meanings for parents: A mixed-methods study in six Western cultures. *Journal of Family Psychology, 25* (6), 799-813.

Johnson, S. & Marlow, N. (2011). Preterm birth and childhood psychiatric disorders. *Pediatric Research, 69* (5-2), 11R-18R.

Kmita, G. (2013). *Od zaciekawienia do zaangażowania. O rozwoju samoregulacji w interakcjach z rodzicami niemowląt urodzonych skrajnie wcześnie, przedwcześnie i o czasie* [*From Curiosity to Involvement. On the Development of Self-Regulation in Interactions with Parents of Extremely Premature, Preterm and Full-Term Infants*]. Warszawa: Wydawnictwa Uniwersytetu Warszawskiego.

Kozlowska, A. (2010). Childrearing beliefs and practices of Polish, Swedish and immigrant Polish mothers and the everyday life of their infants. Unpublished master's thesis, University of Warsaw.

Lamb, M.E., Pleck, J.H., Charnov, E.L., & Levine, J.A. (1987) A biosocial perspective on paternal behavior and involvement. In J. Lancaster, J. Altmann, A.S. Rossi & L.R. Sherrod (Eds.), *Parenting across the Lifespan: Biosocial Dimensions* (pp. 111-142). Hawthorne, NY: Aldine de Gruyter.

Lamb, M.E. & Lewis, C. (2013). Father-child relationships. In N.J. Cabrera & C.S. Tamis-LeMonda (Eds.), *Handbook of Father Involvement: Multidisciplinary Perspectives* (pp. 116-131). New York: Routledge.

Leidy, M.S., Schofield, T.J., & Parke, R.D. (2013). Fathers' contributions to children's social development. In N.J. Cabrera & C.S. Tamis-LeMonda (Eds.), *Handbook of Father Involvement: Multidisciplinary Perspectives* (pp. 148-164), New York: Routledge.

Mundy, P. (2003). Annotation: The neural basis of social impairments in autism: The role of the dorsal medial-frontal cortex and anterior cingulate system. *Journal of Child Psychology and Psychiatry, 44* (6), 793-809.

Mundy, P. & Jarrold, W. (2010). Infant joint attention, neural networks and social cognition. *Neural Networks, 23* (8-9), 985-997.

Nichols, K.E., Fox, N., & Mundy, P. (2005). Joint attention, self-recognition, and neurocognitive function in toddlers. *Infancy, 7* (1), 35-51.

Palkovitz, R. (1997). Reconstructing "involvement": Expanding conceptualizations of men's caring in contemporary families. In A. Hawkins & D. Dollahite (Eds.), *Generative Fathering: Beyond Deficit Perspectives* (pp. 200-216). Thousand Oaks, CA: Sage.

Sarkadi, A., Kristiansson, R., Oberklaid, F., & Bremberg, S. (2008). Fathers' involvement and children's developmental outcomes: a systematic review of longitudinal studies. *Acta Pædiatrica, 97* (2), 153-158.

Tamis-LeMonda, C.S., Baumwell, L., & Cabrera, N.J. (2013). Fathers' role in children's language development. In N.J. Cabrera & C.S. Tamis-LeMonda (Eds.), *Handbook of Father Involvement: Multidisciplinary Perspectives* (pp. 132-147). New York: Routledge.

Yamada, Y., Yoshida, F., Hemmi, H., Ito, M., Kakita, M., Yoshikawa, T., Hishida, M., Iguchi, T., Seo T., & Nakanishi, K. (2011). Atypical social development in neonatal intensive care unit survivors at 12 months. *Pediatrics International*, *53* (6), 858-866.