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ABSTRACT

Studies on peer interaction in infancy seem to imply that social group structure emerges from infants' and toddlers' dyadic interactions. In contrast to this position, the present study hypothesizes that attention structure may be a major precursor for social group structure. To investigate that possibility, an attempt was made to develop a reliable and valid research instrument suitable for assessing the group structures of very young children. Four groups of infants 6 to 11 months of age were observed in groups of four or five at weekly intervals over a period of 3 months. Videotapes of the second, eighth, and fourteenth session were used for observational analysis. Over a continuous period of time totalling 15 minutes, the duration and orientation patterns of the subjects' behavior were coded. Additionally coded were quality of attention, social approach, and social interaction. Thus the coding scheme allowed for quantitative and qualitative analysis of the data for each individual child over time as well as for the group situation at each point in time. Results indicated the existence of group structures beyond dyads. Infants' social positions within group structures were cross-validated with qualitative indices of social competence. Applications for developmental research focusing on infants' social development are discussed. (Author/RH)

THE ANALYSIS OF PEER-GROUP STRUCTURE IN INFANTS

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Abstract

Studies on peer interaction in infancy seem to imply that social group structure emerges from infants' and toddlers' dyadic interactions. In contrast to this position, we hypothesize that attention structure may be a major precursor for social group structure. Four groups of infants, aged 6 to 11 months, were observed in groups of four or five at weekly intervals over a period of three months. Using data from the 2nd, 8th, and 14th sessions, measures of duration and direction of attention deployment were analyzed like sociometric indices of given and received positive "choices". Group structures beyond dyads emerged and infants' social positions within them were cross-validated with qualitative indices of social competence. Applications for developmental research on infants' social development are discussed.

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Social competence in infants and toddlers has been studied by looking at their dyadic social-functional behaviors or acts, such as hitting (for aggression) or giving toys, smiling at s.o. (for prosocial behavior); or by looking at their dialogue structures (e.g., initiations, number of turns), and, recently, at the shared meanings and themes in their interactions (see: Mueller & Vandell, 1979; Jacobson, 1981; Verba, Stambak, Sinclair, 1982). The behavioral units and the methodological approaches chosen would be adaptations from studies on mother-infant dyadic interactions. A typical study on early peer-interaction and early peer-structure focuses on dyads of infants and toddlers, while aiming at studying the effect of group experiences and the social competence in peer-groups (see: Mueller & Vandell, 1979). Only few studies look at units larger than dyads (Bühler, 1927; Klein & Wander, 1933; Lakin, Lakin, Constanzo, 1979). Instead, it is simply assumed that dyadic relations are the precursors for successful triadic or group interactions, and empirical studies seem to justify a confinement on studying peer dyads as models for social competence in groups.

Some empirical information exists about when peer interactions begin in the ontogeny of a human infant; less is known about the bases for these interactions. Focused dyadic peer-relationships seem to emerge towards the end of the first year of life (Zaslow, 1980); triadic inter-

actions begin to appear in the second year (Klein & Wander, 1933). Theories of the origins of social peer-interactions compete, yet unresolved, by suggesting three different models and variations thereof:
(1) Peer interaction results from social competencies and social-emotional relationships learned and practiced in the mother-child interaction (psychoanalytic theories, social learning theories, some ethologically oriented theories; e.g., Harlow & Suomi, 1970; Ainsworth et al. 1978; Pastor 1981, Easterbrooks & Lamb 1979; Lieberman, 1977). Since peers are less competent partners than are adults, the same degree of complexity is reached later in peer-interactions than in adult-child interactions (Holmberg, 1980). However, in extreme life situations, when an adequate adult care-taker is lacking, peer-interaction can ameliorate these deficiencies to a high degree, just because of its basic similarity to parent-child interaction (Freud & Burlingham, 1944; Suomi & Harlow, 1975).

(2) Social competence with peers is psychologically (and ontogenetically) unrelated to mother-child interaction. This position is held more or less extremely by some ethologically oriented researchers (Konner, 1975; Sluckin & Smith, 1977) who argue that, in evolutionary perspectives, mother-child and child-child interactions differ as well in their direct and indirect aims (social-emotional security vs fighting out a social dominance hierarchy and selection of the strongest) as in their means (attachment behaviors vs aggressive and assertive acts). Since the peer-system presupposes some degree of physical independence and strength, it appears later in the child's ontogeny than the parent-child attachment

system; and furthermore, it has evolutionarily been selected for mixed age-groups of children and not for same-age peer-interactions.

(3) Peer-interaction and parent-child interaction are two autonomous and complementary social systems, mutually influencing each other in diverse ways. This position has recently been advanced by Lewis (Lewis et al. 1975), by Mueller and his co-workers (Mueller & Lucas, 1975; Mueller, 1979; Mueller and Vandell, 1979), and by Youniss (1982). Peers are, in contrast to parents, persons "like me", and therefore the developing self-concept has to be considered as a major mediating factor for peer-relationships (Lewis et al., 1975). Parent-child relationships are necessarily asymetric social relationships because of the difference in competence and power or authority between an adult and a child, whereas peer relationships, esp. those of same-age peers, can be characterized as symmetrical and reciprocal, thus leading to different social, emotional and cognitive experiences (Youniss, 1982). Symmetrical relationships of equality among young children are based, as Mueller contends, on mutual exchange of toys, and leads to mutual imitation as a major means of learning and of mutual social control (Mangione, 1982). Minor asymmetrical social relationships between children of differing ages or competencies appear to be important learning situations stimulating age-related developments, esp. cognitive development, whereas symmetrical relationships seem to advance concepts of mutuality, equity and mutual understanding (Mangione, 1982). According to these theories, parent-child and peer systems develop in their own rights; advances in each realm, however, influences the other realm in intricate and not yet well-understood ways.

In our own theorizing we adhere to the last position, but assert in addition that peer interactions not only lead to social, emotional, and cognitive experiences different from those with adults, but, also, that social competencies in direct peer interaction and the formation of a group structure (objectively and subjectively) may be parallel though intermeshing developments worthy of separate consideration and assessment.

Our study aimed at answering the following questions:
(1) Do infants in the second half of their first year of life, when they start to get interested in peers, show first signs of a social group structure beyond dyads?
(2) If so, are these structures dependent on prior individual social competencies in dyads?

Our major subgoal was to develop a research instrument suitable for assessing group structures, similar to sociographic methods in older children, with sufficient reliability and validity.
A recent study of group structures in preschool children (Vaughn & Waters, 1981) suggests that attention structure may be a fundamental and valid measure of the social group structure. Vaughn and Waters observed the distribution of visual fixations of 22 four-year-olds during one hour of free play once a trimester. The rank order of attention received by members of the group correlated with sociometric preference (picture-based assessment), and both showed stability over several months. Dominance ranks, e.g. struggles that end with winners and loosers, on the other hand, were less stable and were not so closely related to attention and sociometric rank. Hence, they concluded that social competence rather than disruptive behavior, activity level or proximity to adults, were

responsible for positive attention from peers.

The direction and duration of attention can also be used to study group structure in infants. Differential attention patterns may be a major component of social interaction and, through its role as a precursor of sociometrically measureable social preference structures, may be a contributor to the development of social competence. The purpose of the study described here was to use attention patterns (defind as attention given to and received from peers) and to examine the relationship betweeh an infant's status in the social attention structure and other indices of social competence.

Method

Four groups of infants with initial ages of 6 to 10 months met once a week over a period of 3 months (15 sessions) in groups of 4 or 5 for about one hour in a playroom equipped with a 3x4 m mat and a selection of age-appropriate toys. Each group comprised boys and girls; the age-range within the groups was less than three months, the mean ages of the groups differed by one month (Table 1). None of the children had day-care experience. All but one were first-borns.

The parents, mainly the mothers, were present in the same room but remained off the mat, sitting on the floor or on chairs and talking to each other. The children were placed on the mat, and it became obvious from their behavior that the main attractions of that hour were the peers and the toys.

Videotapes of the second, eighth, and 14th session were used for observational analysis. A transcript form was developed which resembles an orchestral score (Figure 1). Over a total continuous time of 15 minutes (from a total tape of 30 minutes),

patterns were coded with respect to duration and orientation: toward which infant, toward adults, or socially neutral (i.e. involved with an object or own behavior). In addition, the quality of attention, social approach, and social interaction was also coded, according to direction: as positive approach (T1-5), or as refusal of contact (R1-5); and according to effort of involvement:

(1) passive-stationary, like intensive watching;
(2) active-stationary, like signalizing, waving, showing an object, activities to catch a partners attention;
(3) moving into another's field of vision, or parallel imitative locomotion;
(4) direct physical interaction with the partner;
(5) instrumental interactive contact with toys, sounds, gestures; parallel play or turn-taking.

This coding allows for quantitative and qualitative analysis of the data of each individual child over time (abscissa) as well as of the group situation at each point in time (ordinate). Observer-reliabilities, calculated between the main observer and two newly trained observers from one 15-minute session, were 73 to 87% perfect agreement on the qualitative codings and 66% on the quantitative index (ranks based on summed seconds of attention from each child to every other child).

Although these reliabilities are far from perfect, mechanization of coding the durations of attention deployment and more intensive training of the coders will improve these measures.

To ensure internal consistency, only the codings of the main observer have been used for the following analyses.

Results

Peers were of major interest. Over the 15-minute time period, an average (over groups and sessions) of 6.1 minutes of attention was directed to peers, whereas adults received an average of 3.8 minutes, and 4.8 minutes were spent with socially neutral activity. There is no linear trend for increase or decrease of peer attractivity that could be attributed to familiarity (number of group sessions), mean age of group, age of group entrance, sex, or stable characteristics of a group. Rather, the fluctuations in orientation of activity seem to reflect developmental changes in motricity (crawling, standing, walking) and dexterity (object exploration) and the concomitant need for adult assistance (Figure 2).

Within each group and at each time of observation, each child clearly showed differentiated attention towards his peers, although all mates got at least some attention (except in the group of 5 children) (see: Table 2).

These rank-orders of attention pattern were used for sociogram purposes with a slight correction: for a rank of 3, a minimal total attention duration of 30 seconds was required; for a rank of 2, the minimum was 60 seconds, and for a rank of one, a minimum of 120 seconds or two out of 15 minutes was a prerequisite.

The most frequent type of group structure that emerged, was two infants who reciprocated their first choices, while the other two gave their primary interest to one child of that dyad. This pattern was completely replicated in 6 out of 9 analyzed sessions, and partly in two more. Although the basic attention structure of the groups remained the same, the persons who made up the

"leading dyad" changed. - In order to avoid the possibility that this result may be a sheer artefact, we reread some of the group transcriptions; and, in fact, quite often two infants engaged in longer interactions were intensely watched by their remaining peers who entered into the ongoing interaction or took over when one of the dyad members "resigned".

In additional analyses, those children who received most attention from their peers in terms of total time and number of high rankings, were contrasted with those infants who received the least attention. Again, infants who were "stars" or "outsiders" according to these criteria at one session, did not necessarily hold these positions during another session, although there was some tendency towards stability, mainly in the positive position.

"Stars" and "outsiders" were also compared with respect to their own peer-oriented activity (amount of time) and the quality of their peer-interactions. For latter purposes, the children were rank-odered by evaluating the number of their social peer-directed activities with higher involvement (all categories, excluded T1: passive observing), the number of their long and varied interchanges (60 seconds and longer), and the number of their refusals; all these categories had proved to increase with age and experience.

Infants who got the highest regard (verbatim meaning!) within their groups, usually spent the maximum time in peer-orientation, esp. when the group was just constituted. At later meetings, their social competence became crucial for positive regard,

whereas sheer peer-interest was not sufficient. There were no sex differences in these positions; however, older children (though not necessarily the oldest) tended to be the most prefered and the most competent ones; and this relation stabilized with increasing group familiarity.

The infants that were least noticed or even ignored by their peers tended to be those of least social competence as defined above, though not necessarily the least peer-oriented ones. Peer-orientation paired with little social competence, did not lead to peer regard when the group was newly formed, whereas later it could partly compensate for lacking competence. Though there was little stability in this low position, the younger infants - and sometimes the oldest ones - were most prone to be disregarded by their groups, even with increasing group experience and familiarity.

Discussion

Attention status given by members of infant groups seems to be a viable method to study early processes of group formation. It can be assessed inobtrusively and reliably, and it seems to carry meaning that is equivalent to sociogram measures in nursery and kindergarten children (Vaughn and Waters, 1981; Strätz and Schmidt, 1982).

Infants even at the age of 6 - 10 months differentiate their peers clearly in terms of differential attention/or regard. Social group-structures of a specific kind emerge from these differential attentions that, though focused on a "leading dyad", can comprise up to four infants. This group structure shows up early (possibly at the first session) and may build a

framework for the developing social competencies of the group members. The group status of the individual may change, depending on his/her developing motor and interactive competencies; however, there is a possibility, also, that social personalities and social selves may be formed by continuous, stable status experiences.

If group structure is a major component of social peer experience, then peer relationships cannot totally be reduced to a product of parent-infant interaction. Experience in a group of peers involves, besides direct peer-interaction, the observation of interacting others close to oneself in competence: these are two different sources from which social peer competence may develop.

Group-structure, also, may be an indicator of the size and the kind of social world an infant can survey and/or handle. We do not know whether five infants in a group were simply too many or whether there were other reasons that one of the groups either never did form or else dissolved an integrative structure.

Further research, first, has to confirm and stabilize our findings, and, then, may use forms of attention structure as indices of social stress on or in groups of infants in cribs, group day-care, and play-groups.

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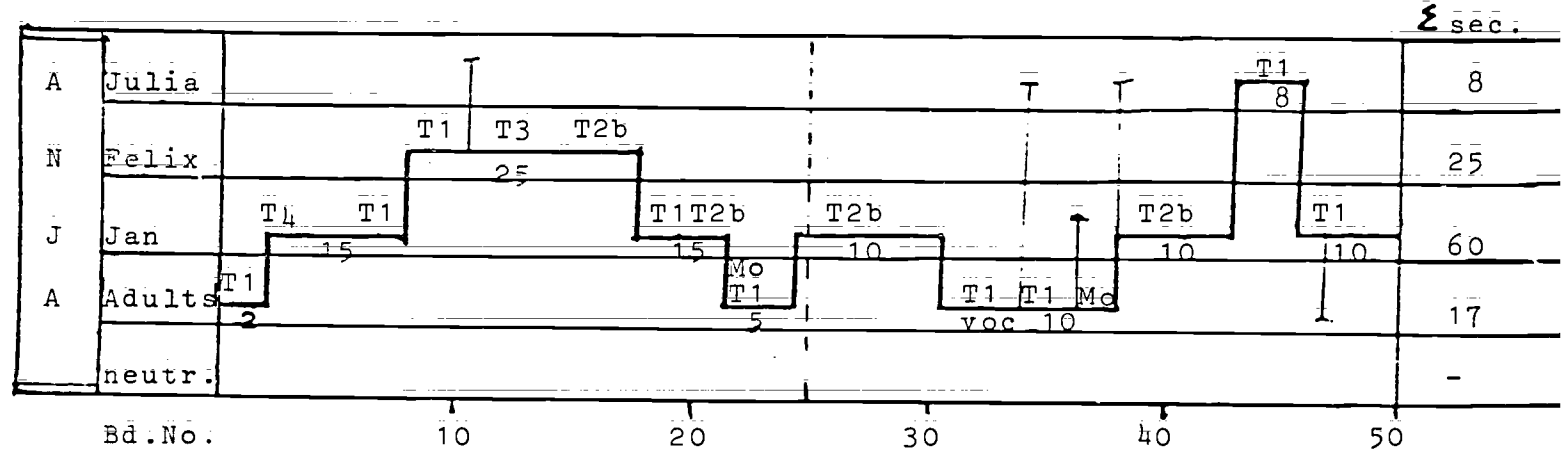
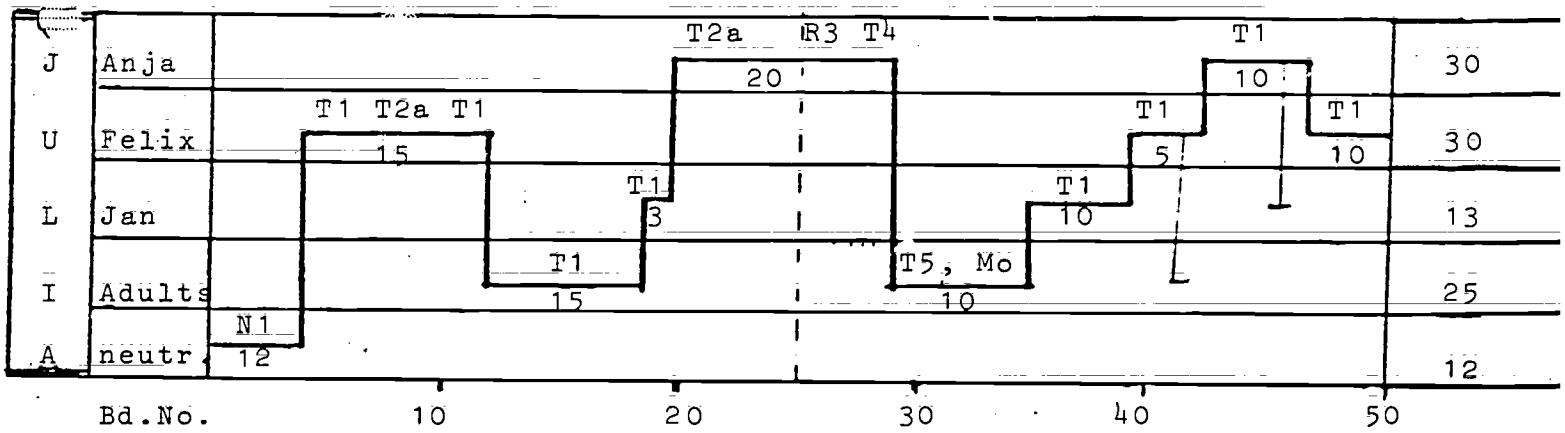
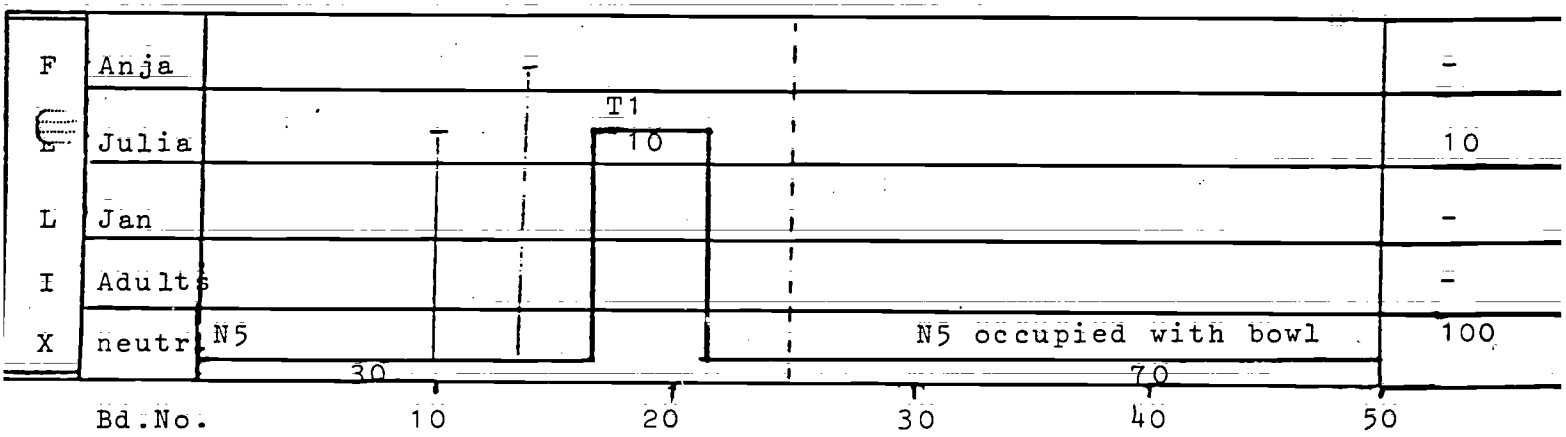
Figure: 1 Observation Record No. 1 Parent-Child-Group: B Date: 5/15/81

Total sec. 110







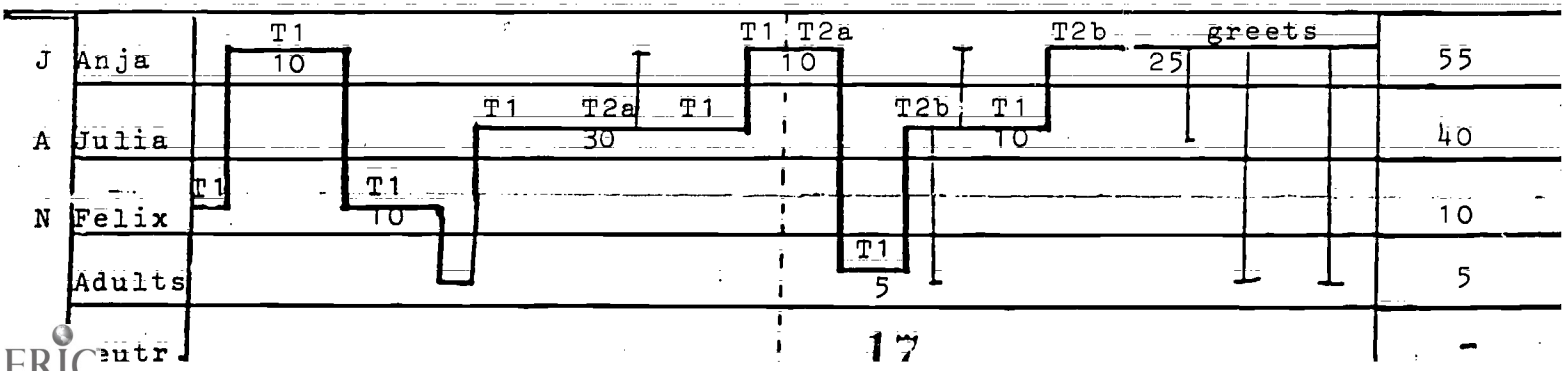
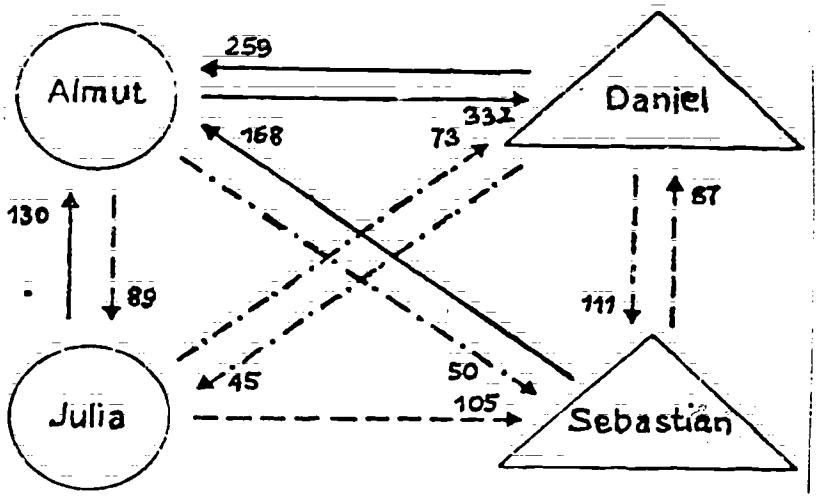


Figure 3 : Sociograms from attentiom preferences

Group A: 1st Assessment (2nd Meeting)



Group A: 2nd Assessment (8th Meeting)

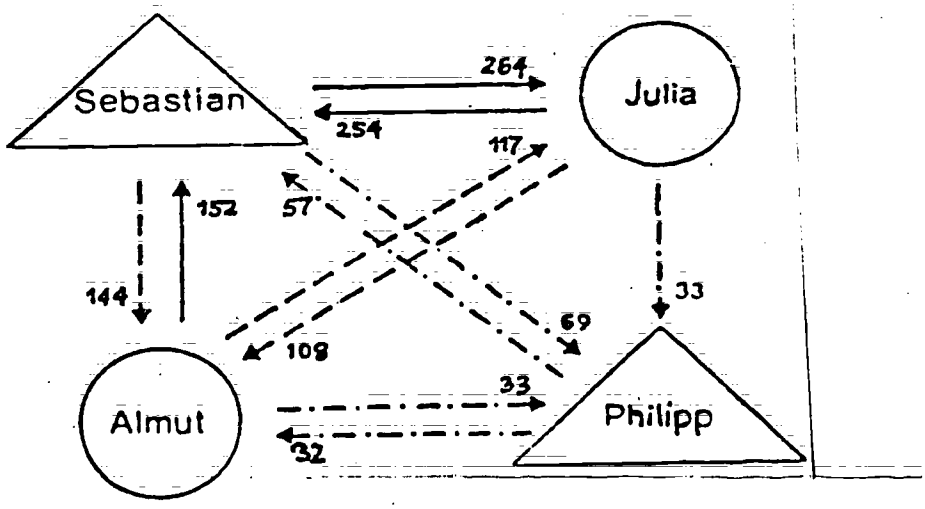
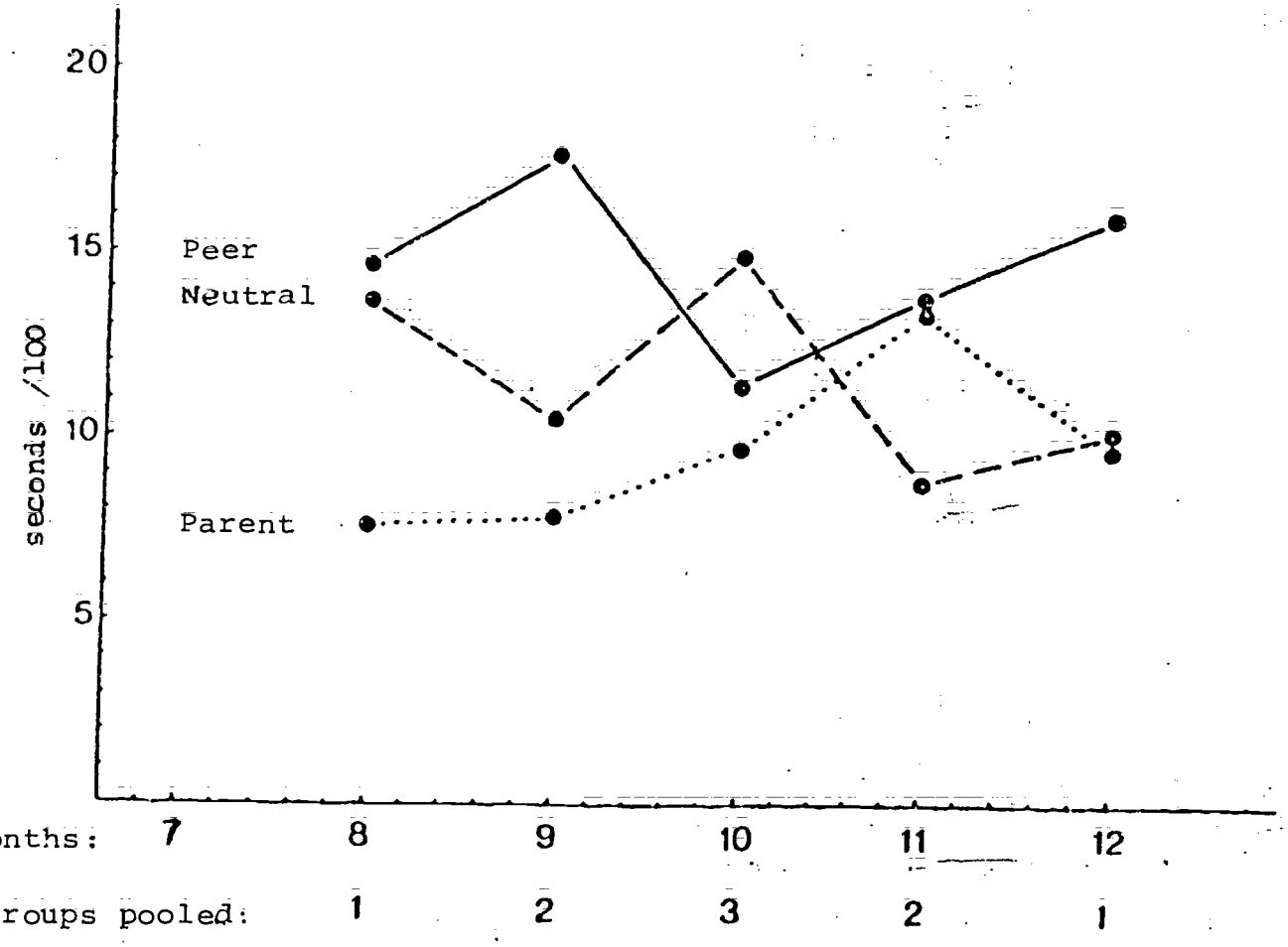
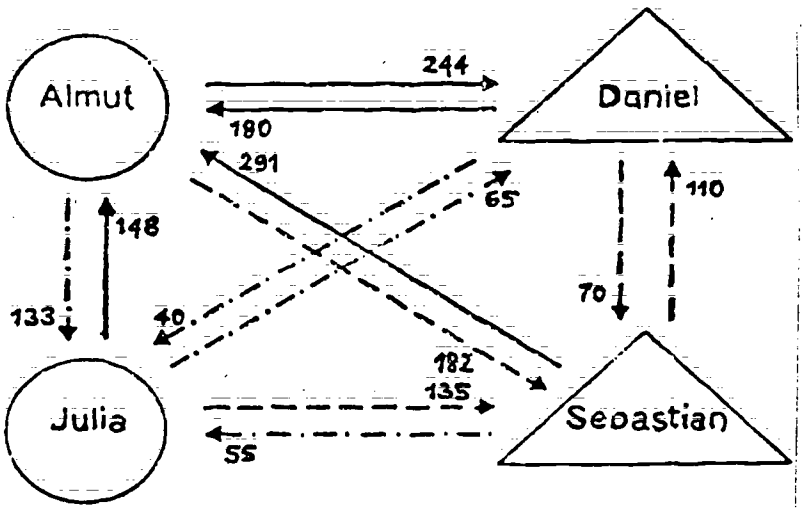


Figure 2: Changes in the three behavior systems over age

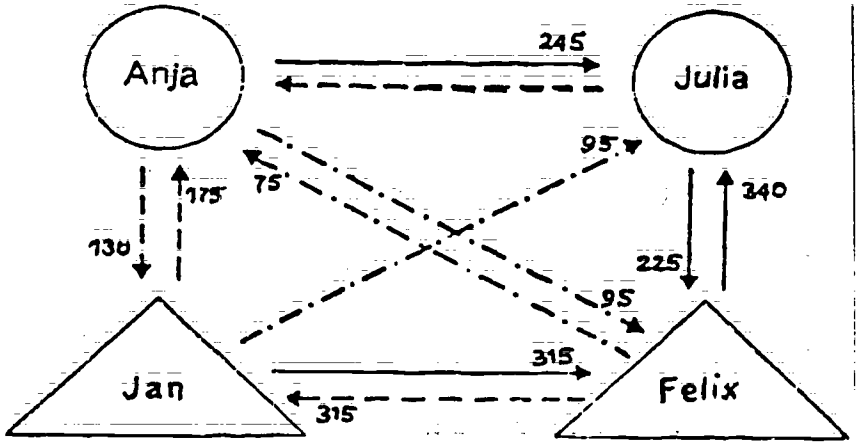


(Figure 3 - continued)

Group A: 3rd Assessment (14th Meeting)



Group B: 1st Assessment (2nd Meeting)



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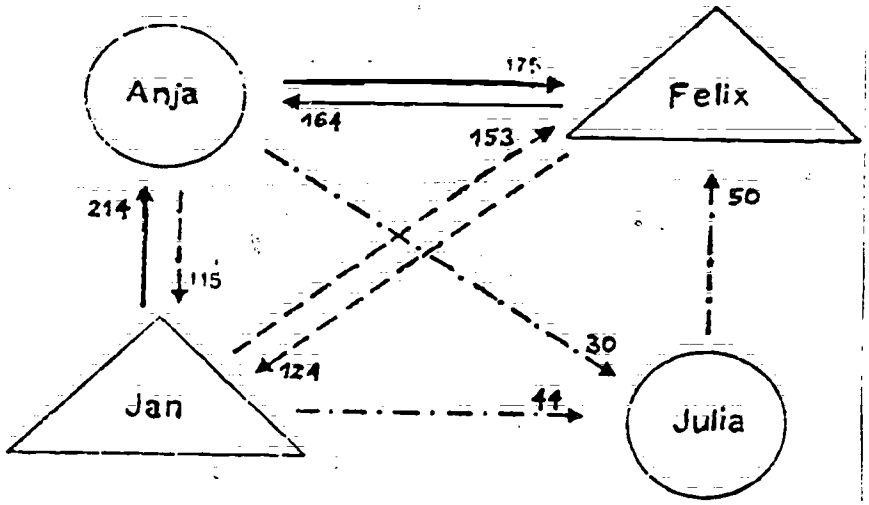

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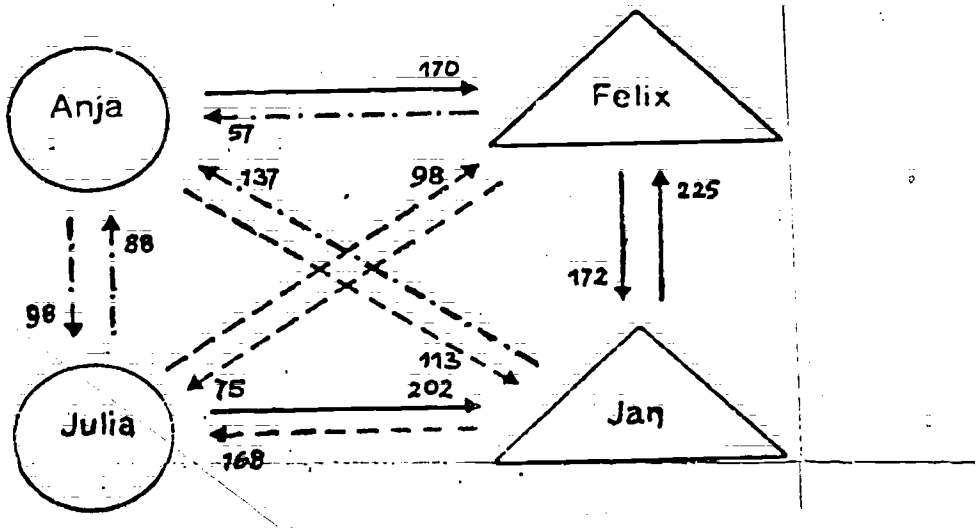

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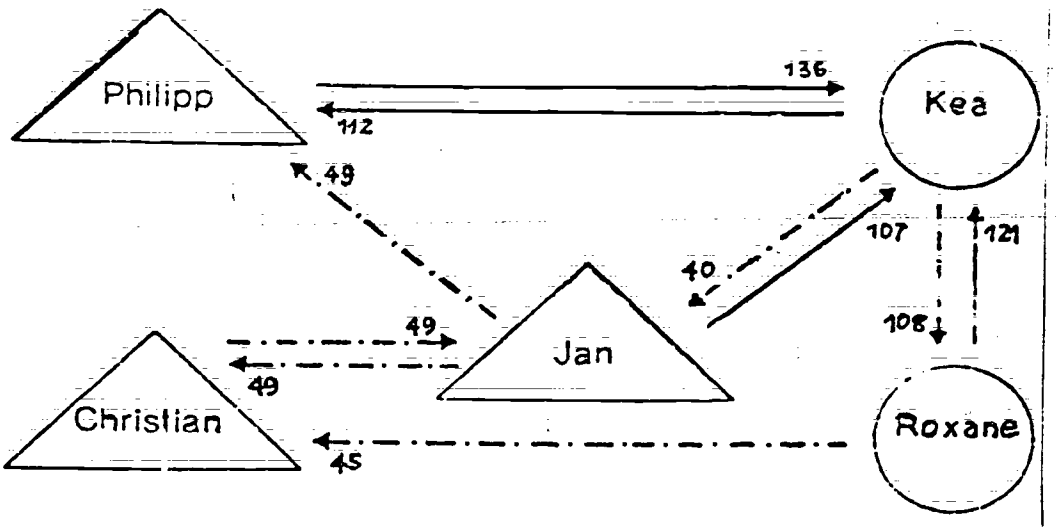
Group D: 1st Assessment (2nd Meeting)



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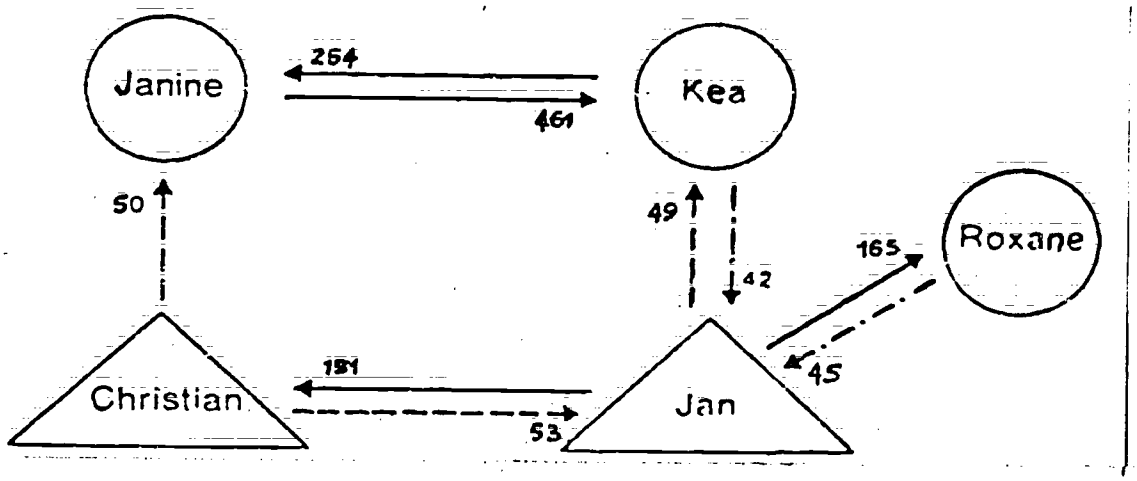

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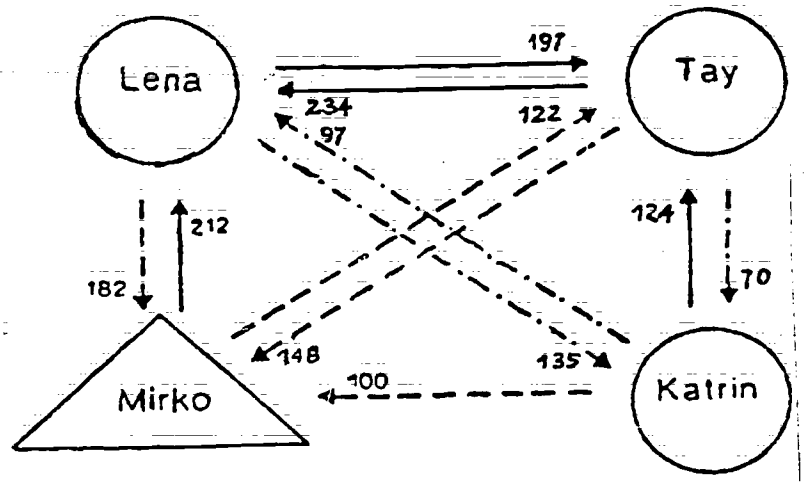
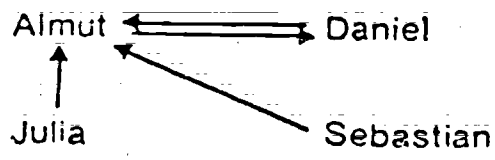
Group K: 3rd Assessment (14th Meeting)



Legend:
——— = 1st preference
- - - - = 2nd rank
—·—·— = 3rd rank
264 → = total of 264 seconds within the 15 minutes period

Figure 4 : Structure of first preferences

Group A: (1)



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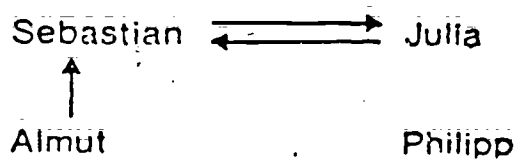

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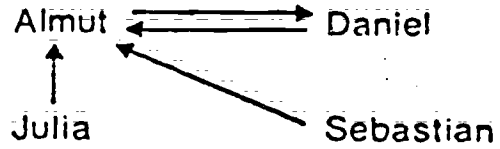
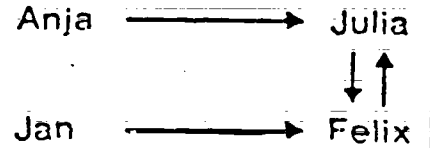
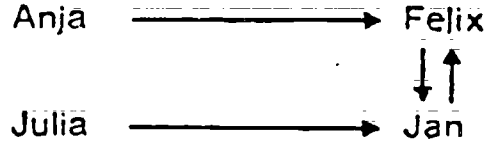


Group B: (1)



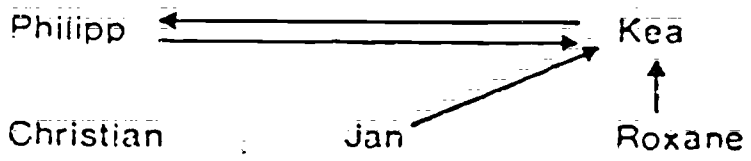
(2)

(3)

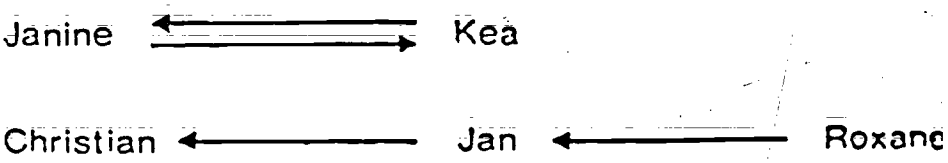


(Figure 4 - continued)

Group D: (1)



(2)



Group K: (3)

Table 1: Composition of infant groups

Group	Children per group	Sex	Assessments-	1.	2.	3.
			Meeting	2.	8.	14.
A Berlin	4	2 f, 2 m	Ø CA	7,5	9,4	10,5
			age range	2(1)+	2(1)	2(1)
B Berlin	4	2 f, 2 m	Ø CA	8,9	10,4	11,9
			age range	0(23)	0(23)	0(23)
D Hattingen	5	2 f, 3 m 3 f, 2 m	Ø CA	9,6	10,7	-
			age range	2(19)	2(19)	-
Hattingen	4	3 f, 1 m	Ø CA	-	-	9,8
			age range	-	-	1(21)

+ months (days)

Table 2: Differentiation of peer preferences

Group/ assessment	Rank 1		Rank 2		Rank 3	
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD
A_1	222,25	91,01	98,00	11,83	48,25	19,72
A_2	181,75	97,35	100,25	48,00	42,25	19,14
A_3	215,75	64,11	124,25	46,89	73,25	41,14
B_1	281,25	54,98	207,50	78,79	70,00	37,86
B_2	150,75	70,51	102,5	58,62	24,75	16,44
B_3	192,25	26,28	113,5	39,55	95,00	32,99
D_1	105,00	33,19	49,4	35,05	21,20	21,92
D_2	210,80	139,27	38,40	12,18	24,60	11,97
K_3	191,75	47,65	138,00	35,29	75,5	56,96

all differences between ranks are significant at $p < .05$.

Table 3: Concordance between different measures of social competence and social status

Highest Position

Lowest Position	I deployed peer attention	II received attention	III social rank	IV social competence
deployed peer attention I		6	6	7
received attention II	3		7	5
social rank III	3	9		7
social competence IV	4	8	7	

Footnotes

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