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Citation	乳幼児発達臨床センター年報, 28, 23-28
Issue Date	2006-03
Doc URL	<a href="http://hdl.handle.net/2115/25370">http://hdl.handle.net/2115/25370</a>
Type	bulletin (article)
File Information	28_P23-28.pdf



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## SIGNIFICANCE OF “PERIODS OF DIFFICULTY IN INTERACTION” IN THE DEVELOPMENT OF JOINT ATTENTION DURING INFANCY

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### ABSTRACT

To date, the development of joint attention has been regarded as the development of a child's individual ability, and the focus of most researchers has been to identify the time of emergence of the state of joint attention. This study examined the role of the caregiver's behavior to share attention with an infant in the development of joint attention behavior, and explains the mechanism of joint attention development. We first examined how a new state of attention between an infant and adult emerges, based on observations of the interaction between an infant and his mother. We identified the existence of periods of difficulty in interactions between an infant and adult in such processes of change. Finally, the significance of the periods of difficulty in interaction to the development of joint attention was considered through the application of Vygotsky's concept of “the critical periods in development”.

**Key Words:** Joint attention, Infancy, Emergence, Critical periods

### INTRODUCTION: SIGNIFICANCE OF JOINT ATTENTION

Joint attention between an infant and an adult begins to emerge later in the first year and clearly changes the quality of an infant's communication. Until joint attention is achieved, infants and adults are in undifferentiated relationship. The development of joint attention and sharing objects between adults and infants provides infants with the basis of verbal communication to convey objects that are not in existence here and now, or inner mental objects to a partner using a medium. Infants start to be concerned with the state of a partner's attention, in order to share objects with their caregiver.

To date, many studies have been conducted on the developmental process of joint attention between an infant and an adult. Furthermore, the developmental phases of joint attention have been proposed from observations of the state of attention between an infant and an adult. However, the issue that has occupied the interest of previous studies has been the timing of emergence of joint attention state. However, the mechanism responsible for the developmental shift to the joint attention state has yet to be studied. It is therefore necessary to investigate how and why these changes occur.

## THE ROLE OF THE CAREGIVER'S BEHAVIOR IN THE DEVELOPMENT OF JOINT ATTENTION

Tsuneda et al. (2001, 2002, under submission) assessed the adult's behavior to share objects of attention with their children in an interaction, as one of elements that constitute the mechanism of the development of joint attention. Tsuneda (under submission) found that a mother makes different approaches to her child corresponding to the development of her child's ability to control posture and motor, when she tries to share the objects of attention with her child, based on the observation of mother-infant interaction from two through nine months. According to Tsuneda (in press), mother-infant interactions proceed to the phase of joint attention through the following process.

### 1) Overall control of infant's gaze by mother

At two months, the mother uses herself to attract her infant's attention in 70% of cases. The infant-mother interaction consists of "showing own face to each other (Chen, 2004). However, infants and mothers also use other objects during this period. We can observe the behavior of a mother to use objects in the interaction and attracts the infant's attention to the object during this period. On these occasions, the mother puts her infant on his back, and places an object in the line of the infant's gaze towards her, and consequently, they achieve the state of joint attention. However, if the state of joint attention is achieved in that way, the interaction does not unfold further. When the object is removed from the line of the infant's gaze, then the state of joint attention is over. When the infant follows the movement of the object, the state of attention of the infant is "on looking" (Bakeman & Adamson, 1984). The duration of the interaction that starts from joint visual attention during this period is much shorter than other periods. At two months of infant age, the interaction between the infant and the mother is a simple state that "a mother shows an object then an infant looks it".

### 2) Emergence of joint visual attention

From approximately three months of age, as the infant's ability to control posture and body movement starts to develop, the mother begins to attract her infant's attention not only to herself but also to other objects. From three to four months of age, we can observe a new form of interaction that is "when a mother encourages her infant to approach an object, then he approaches it," "when a mother attracts her infant's attention to herself as he is approaching an object, then he looks at her face". A mother requests not only to look at objects but also to reach for and approach the objects, when the infant begins to look around as his likes by turning his face and to reach for objects.

### 3) Confusion of coordinated joint engagement to objects

From five months to seven months of age, we can observe a new form of infant-mother interaction that is "although the mother does not encourage her infant to approach an object, he approaches the object," "although the mother encourages her infant to approach an object he looks at her face," "although the mother attracts her infant's attention to herself, he approaches an object." Such interaction pattern is not observed at three to four months of age, and it indicates a gap in the behavior of the infant and mother. The infant

begins to spontaneously approach objects independent of his mother's encouragement, and to exhibit behavior different from his mother's requests. As a result, the duration of the interaction that starts from joint visual attention in this period is shorter than from three to four months of age/from the latter seven months to nine months. At 3-4 months, when an infant shifts his gaze from objects to his mother, he expresses no emotion. However, from five months to the first seven months of age, when the infant looks at his mother's face, he expresses the emotion of surprise. This indicates that the infant's behavior when he looks at his mother's face is not passive, and the behavior emerges in the interaction as meaningful for the infant. In this way, the emotional attitude shown by a mother when an infant looks at her may help the infant to understand the value of that interaction.

#### 4) Achievement of joint attention focusing on inner mental objects

From seven months of age, more than 80% of the objects that a mother uses to attract her infant's attention are objects. As the infant becomes stable in the seated posture, the infant-mother interaction begins to organize into that with a turn-taking feature. The stability of the seated posture allows the infant to separate himself from objects and to approach objects and keep his independence. From the previous period, the infant has become to look at his mother's face actively in the interaction. This also allows the infant to connect his own emotional results from operation of objects with the response that is shown by his mother at that time. The mother's supportive behavior in attracting her infant's attention to an object in the form of turn-taking functions in arousing some emotion in the infant. It may contribute in that an infant focuses even more attention to the inner objects. In this phase, the infant and mother's object of attention may shift from outer physical objects to inner mental objects.

Thus, the mother's supportive behavior related to attention change corresponds to the development of her infant's ability to control posture and motor; such behavior may play a role to make occur the new interaction pattern and to make develop the states of attention between an infant and mother.

#### RELATIONSHIP BETWEEN INFANTS, OBJECTS AND MOTHER AT 5-6 MONTHS: PERIODS OF DIFFICULTY IN INTERACTION IN THE DEVELOPMENT OF JOINT ATTENTION

At present, the end of the first year is considered the time that infants are able to engage in objects and their mother as direct their attention to both. A 5-6 month old baby turns his attention to the same objects with his mother, but the percentage of babies who turn their attention to the mother is much smaller (Adamson, 1996). During the age of 5-6 months, the duration of the interaction that starts from joint visual attention is relatively shorter than the other period.

According to Bakeman & Adamson (1984), at six months, children spend more than three times on "joint object involvement" than on "interpersonal engagement." Furthermore, it is generally considered that the mother of a 5-6 months old baby begins to feel a different impression from the previous period, because the baby starts to avoid the face-to-face interaction that she has enjoyed until this time, and begins to turn its attention to objects around her more than to the mother's face (Oyabu, 2004). Trevarthen and Hubley

(1978) described a play that uses objects between a 6-months old infant and mother, and they called the play "object game". The infant changed her expression and utterances by reflecting the behavior or utterances of the mother, but the infant did not smile or look at the mother's face; the infant paid attention only to the movement of objects. It appears that the infant had no interest in the partner's intention to move objects, or was even resistant to concern regarding the partner's behavior.

To date, it has been reported that the reciprocal relationship between an infant and a caregiver might be disrupted at approximately 5-6 months, and a divergence in their behavior arises (for example, Trevarthen and Hubley, 1978).

#### MECHANISM OF DEVELOPMENT OF JOINT ATTENTION FROM VYGOTSKY'S CONCEPT OF "THE STABLE PERIODS/THE CRITICAL PERIODS"

Vygotsky proposed the concept of "the stable periods/the critical periods of child development" in the paper "the problem of age (1998/2002)". It has been suggested that we can often observe the periods when a child cannot do any more, or they try to stop doing what could do until then ("the negative character of child's development" = critical periods) (Kinoshita, 2000). The developmental models preceding Vygotsky described the child's development from what a child acquires at that time, and have tried to comprehend the child's development as the processes through which that a child begins to do something. While Vygotsky pays attention to "the negative character of child's development" of delay, confusion, and disappearance. Furthermore, he comprehends the phenomenon of "the negative character of a child's development" by the concept of "difficulty of teaching." At critical age levels, children conflict sharply with those around them in the processes of education or rearing. Children deviate from the previous stable system of educational approach; becoming too difficult to teach in the critical periods, suggesting that the relationship has changed or is changing. It also means that a change may occur in the child's personality or consciousness, a "new something" may occur (Kato, 2001).

The objects of attention of infants and mothers shift developmentally to the inner mental objects that have no restriction of time and space from outer visual stimuli. In the joint attention of the latter term, two people do not only look at the same object at the same time. They share an emotion with each other intersubjectively through the conveyance of emotional messages about the objects by movements of eyes, expressions, and utterances. Thus, they share the partner's "attention" state, which are not able to know by only "gaze" direction. In a previous study, the terms of "joint visual attention" and "joint attention" have been used without any obvious distinction. However, these terms should be used with distinction to indicate the different developmental phases (Chen, 2004). How does this developmental shift from "joint visual attention" to "joint attention" occur?

Based on the concept of Vygotsky, we can consider the divergence of communication between an infant and a caregiver at approximately 5-6 months as the critical period in the development of joint attention. It is just the developmental shift from "joint visual attention" to "joint attention," that the change in the relationship between an infant and a caregiver which emerges through the critical period at 5-6 months. The 5-6-month-old infant starts deviating from the interaction in the form of "child responds to the request of adults" that has been acquired until then. The child at that age begins to approach objects

independent of invitation from adults, or to do something that is different from the requests of adults. For that sake, caregivers are pressed to adopt an approach different from the previous one. From latter half of six months of age, almost all objects that a mother will use to attract her infant's attention are objects. The mother tries to keep the interaction by attracting her child to objects and amusing him by the development of the matter that consist of the movement of objects. We can observe "supported joint attention (Adamson et. al., 1999)" in which the state of joint attention is achieved through as caregivers monitor the direction of the infant's attention and looks at the objects that infants are looking at. Caregivers attempt various ideas to keep the interaction with their infants. Such caregiver's behavior may be the driving power that leads children to the next developmental level.

In such interactions, infants will watch the caregiver's emotional attitudes shown to the objects that they are looking at together. The infant's spontaneous and active gaze at his mother allows infants to turn their attention to the inner objects of the partner. These may provide the foundation for infants and adults share the inner mental objects.

Kato (2001) schematized the dynamics of child's development based on the concept of Vygotsky (Figure 1-a). The application of this concept to the development of joint attention is depicted in Figure 1-b.

**CONCLUSION: THE SOCIAL RELATIONSHIP AS THE DRIVING POWER OF DEVELOPMENT**

Until now, the development of joint attention has been understood as the individual

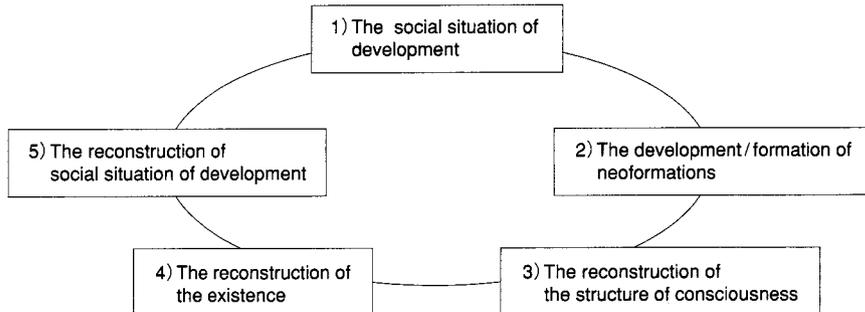


Figure 1-a Dynamics of the development (from Kato, 2000)

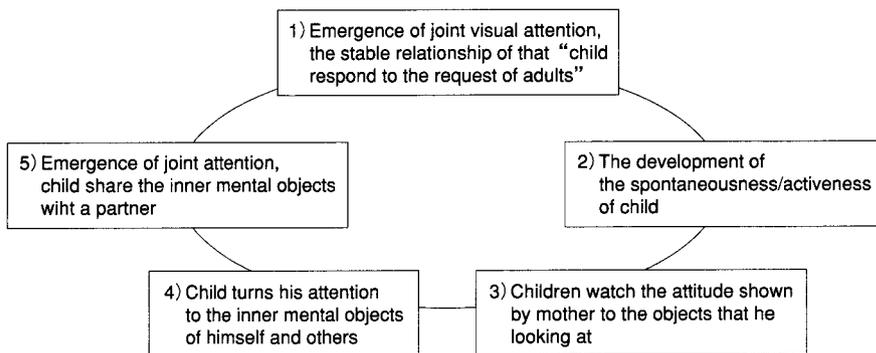


Figure 1-b Dynamics of the development of joint attention (Tsuneda, 2006)

development of a child. In such a view, it had been explained that a new relationship between the infant and adult, achievement of joint attention, occurs through the child's natural development ability (for example, Baron-Cohen, 1995; Butterworth, 2001). On the other hand, Vygotsky, from the standpoint of materialism, comprehends the child's development as the unification of individual and social aspects. All children's behaviors, when they are taken to the outside, are given some social meaning by others independently of the child's intention (Kato, 2001). Such inconsistency between the child's behaviors and adult's reactions may result in the source of new behaviors, and the driving power of development of new relationships. To understand the development of joint attention in the relationship between children and those around them, we should also investigate the mechanism of change, i.e., how and why a new state emerges.

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