Is Joint Attention Deficit in Autistic Children Curable ? : From the viewpoint of Dohsa-method based "body-experience sharing theory (BEST)"

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Abstract Recently, the mechanism of communication deficits in autistic children has been argued from various theoretical background, such as "cognitive theory (Theory of mind)", "affective theory," and "affordance theory." Most studies consider the joint attention to be a precursor of communication skill. We can realize well functioning speech or reciprocal communication in a social context, when both the speaker and the listener have common affective states or mind shared with one another. Then, how can human being develop the ability to have affective states or joint attention? The author proposes "body-experience sharing theory (BEST)." This theory insists on the importance of sharing body-experience or reciprocal communication through body sensation such as warmth and softness, as the premise for developing affect sharing and joint attention. Based on the shared good body-experience with caregivers, children come to be able to get into a world in which common meaning is shared. In this article, the author suggests that the disturbance of shared body-experience causes joint attention deficits in autistic children, and discusses the BEST based intervention strategy of developing joint attention.

Key words : autistic children, joint attention, Dohsa-method, body-experience-sharing theory.

Social and Communication Deficits in Autistic Children

Kanner (1943) initially recognized a social and emotional deficit in autism, and proposed that autistic individuals "have come into the world with innate inability to form the usual, biologically provided affective contact with people." According to the earliest description of the social deficits in autism by Kanner (1943), we can find the following different aspects of social deficit : lack of apparent affection, withdrawal from people, lack of attention to people, non communicative use of language, lack of communicative gestures, treating parts of people as detached objects, lack of eye contact, treating people as inanimate objects, lack of behavior appropriate to cultural norms, attention to nonsocial aspects of people, and lack of awareness of the feeling of others.

Wing & Gould (1979) defined what all autistic children have in common as a distinctive triad of

impairment, namely, impairment of social, communicative, and imaginative activities. They also found that the social deficit could be distinguished into three types : social aloofness, passive interaction, and active-but-odd interaction. This latter description referred to social behavior that was undertaken mainly to indulge some repetitive, idiosyncratic preoccupation, showing no interest in the other person's needs.

Autistic children have severe deficits in pragmatic skills as well. The definition of pragmatics is using speech and gesture in a communicative way, appropriate to social context (Bates, 1976). Therefore, pragmatics is defined as a part of social skills. Baltaxe (1977) found that autistic children frequently failed to shift out the hearer role to become a speaker. She also found that autistic children violated "conversational postulates" of acceptability and politeness. Their behavior did not suggest that they intended to be rude, but simply that they did not understand the social rules governing what is acceptable in conversation.

Landgell (1980) reported that autistic children tend-

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ed to ask embarrassing questions, such as "How old are you?" to a stranger in the supermarket, and not recognize that is not acceptable. Another pragmatic deficit he noted was the pedantic and formal style of speech frequently heard in higher-level autistic children, inappropriate to an informal social context. In addition, autistic children often start to talk to people without first using boundary markers such as "Hello" or attempting to engage the listener's attention by trying to establish mutual gaze. Landgell concluded that such examples reveal autistic children's difficulty in taking another person's perspective.

Hurting, Ensrude & Tomblin (1982) manipulated other variables, namely, listener-response to questions. They found that more conversational breakdowns (discontinuation) occurred if the listener did not ask a question back to the child, suggesting that the autistic children were unable to maintain the conversation by themselves. In addition, the autistic children appeared to use questions as their main device to initiate and continue conversation, but tended to ask questions to which they already knew the answers. They appeared not to understand the function of questions as requests for information.

According to Speech Act Theory (Austin, 1962), there are a number of reasons why a speaker must be aware of the listener's mental states in order to communicate in a socially appropriate way. These include the following: (a) The listener holds certain beliefs about what particular words refer to when the speaker use them; (b) the listener is trying to represent the message in just the way the speaker intended it to be represented; (c) the listener and the speaker share some information. This involves the speaker making what Bates (1976) calls "psychological representation"; and finally; (d) the listener holds certain beliefs about how the speaker will act, such that the speaker will be informative, truthful, sincere, etc. Under this theory, the pragmatic impairments in autistic children are not restricted to spoken language, but include the deficits in use of gesture, comprehension and production of communicative facial expression.

Joint Attention as a Premise of Communication

Most investigators recognize that language, cognition, and social behavior are intimately interconnect-

ed in development, and tend to agree that the social deficit, especially joint attention deficit is the most central to autistic disturbance.

Joint attention is defined as three-way exchanges that involve another, self, and object and may be expressed in the form of referential looks between people and object, protodeclarative pointing and showing gestures. The goal of joint attention appears to be in sharing an experience about an object or event with other people (Brunner, 1983). Joint attention does not seem to involve obvious object goals and therefore differ from other types of gestural communication behaviors that emerge within the same developmental period, such as requesting behaviors or protoimperative pointing.

According to the model of communication development, the emergence of joint attention succeeds an earlier phase of face-to-face interaction (Adamson & Bakeman, 1982). The preceding dyadic phase consists largely of the regulation of mutual attention and the exchange of affective expressions between the infant and the care-giver. As infants become interested in object play towards the middle of the first year of life, there is a shift from exclusively dyadic affective interactions to interactions that involve both objects and people. The shift to object play generally marks the beginning of joint attention interactions. That is the joint attention process is expanded as infants become able to coordinate gaze between the object of focus and the care-giver and back again to the object during play episodes (Walden & Ogan, 1988) and to use the more advanced joint attention gesture and showing (Hannan, 1987; Leung & Rheingold, 1981). Gestural joint attention skills refer to children's use and comprehension of conversational gestures such as pointing to objects and showing objects to other people. These social skills also involve the use of eye contact in conjunction with gestures when children alternate their gaze between an interesting object and a care-giver. In general these behaviors serve to coordinate attention between interactive social partners in order to share an awareness of objects or events.

Recent investigations of normal language development have suggested that joint attention is an important premise for learning about conversation skills.

Tomasello & Farrar (1986) explored the role of joint attentional process in the child's acquisition of language. They found that during periods of joint attentional focus both mothers and children talked more, the dyads engaged in longer conversations. This evidence suggests that the periods of joint attentional focus in some way build the foundation for early mother-child linguistic interaction.

Kasari, Sigman, Mundy & Yirmiya (1990) examined the association of shared positive affect during two different communication contexts : joint attention and requesting. Compared to normal children, autistic children failed to display high levels of positive affect during joint attention. This result supports the hypothesis that the joint attention deficits in autistic children are also associated with a disturbance in affect sharing. Loveland & Landry (1986) examined the relation between joint attention skills and language development in autistic children. They found that an autistic child's language problem was compounded by a developmental impairment of the mechanisms that are the basis for effective communication, and that impairment of joint attention skills will certainly affect the acquisition of strategies and techniques for using language effectively in a social context.

Gestural joint attention skills refer to children's use and comprehension of conversational gestures such as pointing to objects and showing objects to other people. These social skills also involve the use of eye contact in conjunction with gestures or alone as when children alternate their gaze between an interesting object and a care-giver. In general, these behaviors serve to coordinate attention between interactive social partners in order to share an awareness of objects or events. Mundy, Sigman & Kasari (1990) and Mundy & Crowson (1997) examined the degree to which individual differences in gestural joint attention skills predicted language development among autistic children. They found that even controlling for language level, mental age, or IQ, autistic children displayed deficits in gestural joint attention skills. Furthermore, the measure of gestural nonverbal joint attention was a significant predictor of language development in the autistic children.

Theoretical Considerations on Joint Attention Deficits

There are several interesting theoretical considerations that focus on the joint attention and communication deficit in autistic children ; cognitive theory, affective theory, and affordance theory.

1. Cognitive Theory

Cognitive theory represented by "theory of mind" starts from the premise that mental states are not directly observable but have to be inferred, and that an inference requires a complex cognitive mechanism. Cognitive theory places more emphasis on the ability to infer mental states such as beliefs and desires than on emotions. Beliefs and desires are held to be the most important mental states in making sense of the social world, because they have a causal relationship to action. Our beliefs about the physical world may be called "primary representations." On the contrary, our beliefs about other people's mental states (such as beliefs and desires) are representations of other's representations. Therefore, these beliefs may be called "second-order representations" or "meta-representations."

Baron-Cohen (1995) described four mechanisms in the development of "theory of mind", the intentionality detector (ID), the eye-direction detector (EDD), the shared-attention mechanism (SAM), and the theory-of-mind mechanism (ToMM). These mechanisms can be thought of as four separate components of the human mindreading system. Baron-Cohen (1989, 1995) suggests that the shared-attention mechanism (SAM) is an important precursor of the theory-of-mind mechanism (ToMM), and argue that meta-representation is involved in the mechanism of joint attention. In his analysis, two components are necessary to understand the meaning of another person's joint attention behavior (particularly, the person's attention to something). The first is percept diagnosis, which is knowing whether another person can see something. Percept diagnosis could be accomplished using a line-of-sight strategy, which would involve "rule-based operations on a primary representation." The second component is attention diagnosis, which is the additional ability to know if another person is interested in the object seen. If this analysis of joint attention is correct, the child must know something about the other person's mental state

before joint attention can be achieved. In Baron-Cohen's view, the ability to "represent another person's representation" in this fashion constitutes an example of meta-representation. Thus, the young child who is beginning to manage joint attention must in some sense have a theory of mind.

Cognitive theory posits that in autism the capacity for meta-representation is impaired in autistic children. The deficit of meta-representation brings about consequent deficits for the following reasons. Autism is caused by central cognitive deficits. One such deficit is in the capacity for meta-representation. A meta-representational capacity is required in social skills which involve attributing mental states such as beliefs and desires to others. Social skills which do not require a meta-representational capacity may be unimpaired in autistic children. A meta-representational capacity is required in symbolic skills (e.g., pretend play). Almost all pragmatic skills require a theory of mind, which itself requires a meta-representational capacity.

The cognitive theory represented by "theory of mind" is now considered to be a very elaborate and plausible hypothesis to explain the social and communication deficits in autistic children. However, this theory is restricted to cognitive function in understanding others' minds, while ignoring the emotional function or empathy (Nakano, 1997).

2. Affective Theory

According to affective theory, autistic children essentially have a deficiency in interpersonal awareness, including understanding of other people's feelings. This deficiency begins very early in development. Hobson (1989a) postulates that normal infants are programmed or "pre-wired" to be sensitive to and comprehend another person's emotions. This assumption is drawn from studies on mother-infant interactions such as that of Murray and Trevarthen (1985). According to Hobson (1989b), their ability to do this is "beyond cognition." He argues that, unlike Cognitive theory, other people's mental states do not need to be inferred, but can be perceived "directly" in their bodily expressions. He calls this "non-inferential empathy." In autistic children, however, this biological, non-cognitive prewiring for understanding emotional states in others is nonfunctional.

Furthermore, He proposes that the development of a symbolic capacity and a conceptual role-taking ability are both directly derived from the infant's affective relationships with others. In such relations, the infants come to appreciate another person's way of conceiving and seeing an object, and it is this that provides the infant with the awareness of symbolic interpretation and other people's conceptual viewpoints.

Form the affective theory, autistic children may lack the basic perceptual-emotional ability which is indispensable for establishing joint attention. Normally developing children have an innate ability to perceive other's attitudes in their bodily expressions and respond to them sympathetically, that is the intersubjective communication with their caregivers. However, because of this impaired intersubjectivity, autistic children may fail to develop understanding of others' mind. If this is true, this failure may also affect the development of imaginative activity, pretend play, and context appropriate verbal behavior or thought processes.

In summary, joint attention and communication deficits in autism are considered as follows. Autistic children lack the constitutional components of action and reactions as are necessary for the development of reciprocal personal relations with other people, relations which involve feelings. Such personal relations are necessary for the 'construction of a common world' with others. Autistic children's lack of participation in intersubjective social experience has two results: (a) a relative failure to recognize other people with their own feelings, thoughts, wishes, and intentions, and (b) a severe impairment in the capacity to think abstractly and to feel and think symbolically.

3. Affordance Theory

Affordances are perceived directly rather than inferred, deduced, or retrieved by association (Gibson, 1986). They are neither in the environment nor perceiver, but are derived from the ecological relationship between perceiver and perceived. From the ecological viewpoint, therefore, joint attention deficits in autistic children would have to do with a difficulty perceiving what other people's gazes and indicating gestures afford to the observer, as well as what the

observer's behaviors afford to others. It should be emphasized that the affordances of other people's attention-directing behavior derive from the interaction of the observer and the environment.

Loveland (1991) proposed three exclusive categories of affordances. These categories of affordances may be thought of as "layered," in that a given object, event, person, simultaneously present multiple kinds and levels of meaning to the human perceiver. The first category of affordances is that for physical transaction with the environment such as grasping, walking, and eating. Failure to discover the first category of affordances in the human environment would lead to a catastrophic inability to survive.

The second is culturally selected affordances that reflect preferred but not necessary interactions. A person who perceives an idiosyncratic set of preferred affordances will look bizarre, perhaps un-human. This is, for example, the person whose use of the telephone consists of swinging the receiver, or the person who gathers trash along the street and hoards it in a bag, or who spends a lot of time watching his or her own fingers move.

The third is social affordances that reflect the meaning of human activities. Social affordances include not only the affordances of symbolic behavior such as human conversation and writing but also the affordances of non-symbolic activity such as facial expressions, gestures, body postures and movements, tone of voice, and direction of gaze. Complete failure to grasp the third category (social and communicative affordances) would certainly lead to an absence of communication and to a complete disruption of interpersonal behaviors. An imperfect grasp of what human language, gesture, postural behavior, and so on afford would result in a less severe but still serious handicap, such as difficulty anticipating what others know or believe, difficulty identifying the meaning of facial expressions or matching them with appropriate gestures, difficulty anticipating what a listener needs to know, and difficulty using and understanding attention directing gesture.

According to the retrospective reports written by people with high-functioning autism (Grandin, 1992a ; Williams, 1996), autistic children were hypersensitive to and embarrassed by external stimuli, and felt them-

selves as being surrounded by a chaotic stimulus world. Based on these findings, Endo (1998) postulates that hypersensitivity to physical affordances in conjunction with hyposensitivity to social affordances may cause idiosyncratic interpersonal experiences and joint attention deficit, thus resulting in deficits of theory of mind (FIGURE 1).

FIGURE 1 The developmental model of mentalization (from Endo, 1998)

Deficit of Body-Experience-Based Joint Attention

As mentioned, Cognitive theory posits that autistic children have special difficulty reasoning about what others know and believe, while Affective theory emphasizes that they have difficulty detecting and interpreting information of other's emotional states. According to Affordance theory, autistic children appear to have trouble developing an awareness of the physically and culturally determined meanings of objects and events they encounter. From the view of Affective theory, the normally developing infant is biologically ready to perceive social affordances and to be attuned to affective expressions of other people and to be appropriately responsive to these expressions. This early form of intersubjectivity then forms the basis for the development of more sophisticated interpersonal activities, including joint attention.

According to the model of communication development, the emergence of joint attention succeeds an earlier phase of face-to-face interaction (Adamson & Bakeman, 1982). The preceding dyadic phase consists largely of the regulation of mutual attention and the exchange of affective expressions between the infant and care-giver. As infants become interested in object play towards the middle of the first year of life, there is a shift from exclusively dyadic affective interactions to interactions that involve both objects

and people.

Although this explanation stresses the role of gaze or visual attention in joint attention development, the author considers that the most important factor for establishing joint attention is good body-experience which is shared with other people. This experience indeed involves total modalities of sensation, not limited to visual modality. The reciprocal sharing of body-experience may contribute to establishing a basis for the early formation of intersubjectivity and for the affective world in which the infant and the care-giver live, then the infant and the care-giver come to share the visual world.

Then, what are the primary causes of joint attention deficit in autistic children? One of the causes may be a disturbance of arousal self-regulation (Ornitz & Ritvo, 1968). In this model, because of the disturbance of the arousal self-regulation mechanism, autistic children are hyperresponsive to simple visual and auditory stimuli, then they may be flooded with feelings in certain social situations that make it difficult for them to distinguish their own emotional experiences. This suggests that the display of strong emotion by another individual is confusing or disturbing to the autistic child (Sigman, 1994).

The development of "non responsiveness" can be explained by this model. According to Ornitz, & Ritvo (1968), autistic children cover their ears or eyes with their hands to exclude the external stimuli, because they are oversensitive to the sensory stimuli. Kobayashi (1976) also reported that autistic children developed a variety of stereotyped movements as they confronted psychological stress. Thus, autistic children would try to reduce their psychological stress by making these activities. That is to say, the development of "non responsiveness" is considered as a defensive strategy of the child minimizing the overload stress, resulting in a state of aloofness in which the child disregard, ignores, and shuts out most of the stimuli that come from outside (Engeland, 1984).

These studies suggest that some types of avoiding behaviors and stereotyped movements are considered as learned behaviors, with which they would try to adapt to their internal and external environments. Consequently, they have come to suffer from difficulties in establishing the schemata which are neces-

sary for relating to both their environments and themselves in an ordinary way.

FIGURE 2 The schematic illustration of the process of joint attention deficit in autistic children

FIGURE 2 represent schematic illustrations concerning the disturbance of the mind-body relation causing joint attention deficit in autistic children. One of the conceivable reasons why autistic children have developed a functional discrepancy between mind and body is that they are too sensitive and vulnerable to stimuli which include human interaction. Since those stimuli strain their mind-bodies, they perceive those stimuli as being too stressful to accept, resulting in a distortion in the linkage between mind and body from very early life. Thus, autistic children may fail to establish a bodily-identification or body-image which is an integral construct of self-identification or self-image with which they relate to both themselves and others. They also develop defensive attitudes towards environmental stimuli and withdraw from their environments (Konno, 1992). In addition, since autistic children have difficulties accepting their bodily sensations or bodies from very early life, they may perceive their bodies as alien to themselves, unacceptable as their own, and fail to make sense of bodily experience, thus resulting in deficit of body-experience-based joint attention (Konno, 1993).

Establishment of Joint Attention through BEST

According to Stern (1985), in human babies, the earliest form of communication may be accomplished by "vital affect," which stems from an optimum level of bodily tension or activity. Unfortunately, autistic children may lack the experience of "vital affect" because of unstable arousal level; either hyperarousal or hypoarousal. This, in turn, may disturb the development of rhythmical-reciprocal communication based on "affect attunement" or "intersubjectivity," which is necessary for establishing joint attention (Trevvarthen, 1993; Endo, 1997). Hutt, Hutt, Lee & Ounsted (1964) and Grandin (1992b) indicated that reducing chronic hyperarousal states could improve autistic behaviors, especially stereotyped repetitive behaviors and withdrawal behaviors. Sigman (1994) and Kobayashi (1996) also suggested that the improvement of hypersensitivity could develop social behaviors in autistic children.

Beppu (1997) suggests that pleasant and comfortable emotional experience may help establish the basis of communication in autistic children. That is, shared good emotional experience with their caregivers may facilitate establishing of "attachment," in which autistic children may develop intersubjective communication. Ito, Kondo, Kihara, Matsuda & Kojima (1991), Beppu (1991) and Ito (1992) reported the effects of emotion eliciting activities such as tickling and swaying may have in some way a beneficial effect for establishing intersubjective communication in autistic children. However, Beppu (1997) indicated that these approaches are not enough to produce good bodily experience, and recommended the need for a more fundamental approach. According to Wallon's theory in which a prototype of mental activity emerges from the experiences of muscular tension-relaxation and of postural control, Kametani (1987) suggested the importance of bodily approaches such as Dohsa-method.

The Dohsa-method was originally developed for the purpose of improving motor control in cerebral palsied children suffering from poor skills in controlling motor and postural activities (Naruse, 1973). One of the factors leading to these poor skills is considered to be related to an inadequate or an excessive bodily tension. In normal developing subjects,

an adequate sense of bodily activities may enable them to recognize their body as their own, and realize their mind-body relationships as being in a harmonious state. Therefore, establishing a well-functioning body-image may be an essential part of the Dohsa-method for the people suffering from poor ability in experiencing and controlling mind-body processes (Konno, 1990). In addition, an increasing number of clinical attempts demonstrating the beneficial effects of the Dohsa-method for children with autistic and hyperactive disturbances, and people with neurotic anxiety as well have indicated the importance of therapeutic relationships between the therapist and the client (Oda, 1994; Jubashi, 1995; Tsukakoshi, 1995).

Therapeutic relationships depend much on good bodily experiences, such as the sense of warmth, the sense of softness, the sense of harmonious movements, and so on, reciprocally exchanged between the therapist and the client (Tokunaga, 1996; Konno, 1997). This reciprocity may also serve to establish joint attention in autistic children, that is "body-experience-based joint attention." For the purpose of establishing the body experience based joint attention, the author has devised a new version of the Dohsa-method, called "Tokeau-taiken (Therapeutic-touch with sense of melting experience)."

Tokeau-taiken is one of the relaxation techniques of the Dohsa-method especially for the purpose of establishing "body-experience-based joint attention" between the therapist and the client (Konno, 1997). The first purpose of this method is enhancing a well-functioning body-image, harmonious states in mind-body, and reorganizing self-activities based on good mind-body experiences. The second purpose is to facilitate the therapeutic relationships or communication between the therapist and the client through the shared good mind-body experiences with each other. Especially, the author designated the second purpose as "body-experience sharing theory (BEST)," in which shared good body-experience may have an important role for establishing joint attention.

The procedure of the Tokeau-taiken is as follows. The therapist softly places his hands on the client's body, on such regions as the shoulder, the back, the waist, and the foot, and gently press them for three to

four seconds, then releases the pressure slowly for four to five seconds while keeping the palm in contact with the client's body. For example, while releasing the pressure at the shoulders, both the therapist and the client can feel good bodily sensations such as the sense of warmth at the shoulders, the sense of stretching at the shoulders, and the sense of movement of the shoulders, and can share these good sensations with each other.

According to the several clinical attempts with autistic, hyperactive, or down syndrome children, Tokeau-taiken may have beneficial effects for improving hypersensitive behaviors, stereotyped repetitive behaviors, withdrawal behaviors, and establishing joint attentional behaviors such as exchange of eye contact accompanying joyful facial expression, protodeclarative pointing gestures, and referential looks as well (Kizawa & Konno, 1993 ; Kizawa, Eto, Arikawa & Kobayashi, 1994 ; Konno, 1997). However, in our studies using Tokeau-taiken, to what extent communication deficit in autistic children can be improved, or whether the theory of mind deficit can be cured or not is still unknown. Therefore, in the future, more systematic investigations on the relationship between the shared good body experience and the social development are needed.

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