

In search of differentiations in the development of a picture sign

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1. Introduction

The differentiation between expression and content is fundamental in the concept of signs. Even if the notions of signs are often revised, due partly to the attraction of a semiotic approach from markedly disparate objects of study, a common apprehension of the distinctive character of meanings by sign is its dual nature. (Saussure 1968, Piaget 1951, 1966; Vygotsky 1999; Sigel 1978; DeLoache 2000) Signs can be understood as objects of meanings, to some one, which also extend their perceptual expressions or sensations. All signs imply sign processes; the sign function is due to a mental capability or inclination in the sign user. But meaning is not equivalent to sign function and it is an important issue in the study of semiotics to investigate the differences and conditions between meanings that are merited to sign relations and meanings that are not. (Sonesson) To study the development of a sign function in the child does not only tell us something about child development, but also about signs.

To understand pictures involves to master sign relations. From my studies of the child becoming sign minded, and particularly learning to understand pictures, it has become clear that the differentiation between expression and content is a too broad an outline to be informative. In the perspective of child development the generic distinction between expression and content in the mature sign needs more specific distinctions to capture the emergence of such a delicate cognitive competence as the ability to master sign functions.

2. How to study the development of signs?

At birth, the young child is not endowed with the capacity to use signs, but it will learn. Within a Piagetian theory, this cognitive growth is explained in terms of epigenetic, constructive, development while Vygotskian tradition stresses socially driven mechanisms. Both traditions relate mental processes to the generative constructions of systems that sustain development, i.e. in culture or in the individual interacting with its environment (Wozniak 1996). The development of the picture sign in the child is, like all sign use, related to the emergences of several cognitive and social competences. The apparent obviousness to the adult that the picture

is *about* the depicted scene must not be taken for granted in the child. To understand pictures presupposes, but is not equivalent to, identifying depicted objects.

My standpoint is that picture comprehension is a semiotic function, or one of its appearances in behaviour in a Piagetian sense. (Piaget 1966: 42) Yet, Piaget does not discern picture comprehension in his list of the five manifestations of semiotic function. Drawing is one of them, and is of course related to picture comprehension but is not identical. Perhaps even Piaget took the understanding of pictures too much for granted. However, while Piaget argues for a stage related development of the mind, others (Liben 1999) argue for sequential processes and reduce the importance of demarcating thresholds but maintain the assumption of a general succession of mental competences. Which, then, are the decisive faculties to make the individual sign minded in general, and for picture understanding in particular? This is an open field for investigation. As noted above, I have become convinced that referring to the ability to differentiate the expression and content in a sign relation, based on a semiotic apprehension of the mature sign, is a too broad differentiation to be informative in studying the development of sign function in the child. I think a feasible method to investigate the development of sign function on a general level can be to investigate its lines of development in the different appearances of its manifestations, as for example in pictures, gestures and language. General outlines may be found within the variations of the emergent sign functions and with a Vygotskian insight: one also has to consider the means as crucial for the cultural line of cognitive development. This, I argue, opens for a theory that draws up implications for development of different streams of thought grounded on different resources for meaning, that is, different systems of signs affording different structures for streams of thought. (Lenninger in press)

Therefore, at this moment, I will only briefly discern three or four basic differentiations on a general level of developing signs. I do not take it for implausible that the sequences, if there are such or perhaps relations between differentiations, vary in their developmental lines between different semiotic resources, since different semiotic resources afford different constrains on the level of differentiation. One also has to take into account cultural and individual differences. The general differentiations are, shortly, to make a 1) rudimentary differentiation between expression and content (i.e. between related objects), 2) to differentiate a self, and 3) to differentiate the relation of signification. A fourth differentiation that the child has to discern could be to differentiate some categories (objects or events) as superior tools in social interaction. If this be a fourth differentiation in ontogeny it would antedate the differentiation of relation. My belief is that you can find support for these differentiations as not yet “merged” in studies on the child becoming sign minded. (Piaget 1951; Robinson 1994; Liben 1999) Since sign use primarily is a cognito-social-ecological project and only secondary a

formal one, I presume three general circumstances for developing sign functions in the child: 1) the child is born into a sign using social environment but is not yet taking part (Vygotsky 1999; Reed 1996), 2) adults invite the child to the social universe of signs (Vygotsky 1999; Colapietro 1989), 3) the child may be predisposed to social interaction of a special kind (Tomasello 1999; Colapietro 1989).

With these rough differentiations and considerations in mind I will now return to the investigation of an early picture understanding. At the 9th IASS conference in Helsinki I tried to stress the complexity of picture understanding in the child and to point out some indications of different levels of differentiation in the growing child.

3. Retrieval tests, using the picture as guide for action

Since the late 1980s Judy S DeLoache has made empirical studies on young children becoming sign users. In a series of retrieval tests she has argued for a rapid change in the ability of children at the age between 2.5 and 3 years to use “symbols” (i.e. signs) as guides for action (DeLoache 2004, 1999, 1994 1987). These findings confirm the idea of a cognitive change as a semiotic function. My studies have been highly influenced by hers but I have introduced some decisive variations in the paradigm. My aim is not to argue against DeLoache’s assumption of a rapid change in picture understanding, but to distinguish specific differentiations involved in picture understanding and to avoid ambiguity in sign relations within the succession of the test. Firstly I present to you the method of the test in my version, and then I will discuss some of my observations.

3.1 Method

The children in the test are between 24 and 36 months old, both sexes. Only photographic pictures are used. The test is performed at primary school by an experimenter and with assistance from preschool teachers or parents if wished for. The supporting adult was informed not to intervene with the test. The test, that in all takes about 20-25 minutes, includes a warm-up phase in terms of match-to-sample tests. The intention with the warm-up phase is on the one hand to direct the child’s attention to the pictures and on the other hand to provide the test with bases of comparisons between different levels of basic (or proto) picture understanding, with or without the necessity of using true sign relations. The test is introduced with a warm-up phase in two parts composed by a matching-to-sample trial in an object to picture condition (OP) followed by a recognition task in a picture to picture condition (PP). In matching-to-sample test (OP) the child should choose one out of three pictures, photographs 4x7 cm, matching one object, a toy or alike of the size of maximum 20 cm.

The main test is a retrieval test in which the child is asked to retrieve a toy after having seen it depicted at a place well known to the child but not in sight. The target toy, on the other hand, is only known to the child by its pictorial representation. Every child has three warm-up matching-to-samples and four retrieval trials with different locations and different target toys. All retrieval trials are introduced by the picture to picture question (PP) (warm-up part two) “Can you see if this cuddly toy shown in this picture [handing over a picture, 4x7 cm, of a specific toy only, to the child] also is shown in this other picture? [Handing over the picture, 11x15 cm, showing the target in context] Point at it!” In the succeeding test the child is told that the cuddly toy “is placed by me at the same place in the nursery school as you can see it in the picture” and “the cuddly toy is at the same place in the room as you can see it in the picture, can you go and get it for me?”

Prompting: in the matching-to-sample test (OP), if the child points out the wrong picture, the child is asked a second time like “do you really think that this picture shows that thing?” and the correct choice is confirmed. If the child needs help with the PP recognition the experimenter points to the target toy in the context picture and asks the child a second time. The prompting in the main test goes in three steps; the first one is to return to the picture, the second is again to return to the picture and to ask the child to take the picture along while looking for the right place. In the second prompting the experimenter also asks the child if it could *tell* which room or what place that is shown in the picture. The third prompting from experimenter is to show the place and in front of the right place asks if he or she can see the target. If the child is successful in the third prompting it has managed a picture to object recognition (PO).

3.2 Summarizing and observation

The test contains an object to picture recognition (OP), a picture to picture recognition (PP), a picture to object recognition (PO), and if the child finds the toy using the pictorial information, a picture sign condition (S). It is also worth noting that close to all target toys distracters are located.

The outcome of the test, so far, are in keeping with the result of DeLoache’s concerning a change in performance from about the age of 30 months. From that age the children learned between the trials. During the first and perhaps second trial they needed prompting, but in the third and fourth they found the target toy without help. When close to the age of 3, their performances on almost never failed. Since the tests are still going on final results will later be presented. Interesting at this phase of my investigation then, is to discuss some observations done. At the age about 22/24 months the children manage the OP but have difficulties with the PP and PO and have no clue about S. At about 26/28 months of age they pass OP, PP and PO but not S. After the

age of 30 months they easily pass OP, PP, PO and they start to learn S. Most astonishing were the performance of the 26-30 months old children who clearly handled the OP, PP, PO and really were keen on finding the target but could still not relate the “picture situation” to the “reality situation”. Despite prompting and even after they had correctly told the experimenter in which room or at what place they could see the cuddly of the picture, and the experimenter had once again said that “ I have put the cuddly at the same place in the room as you can see in the picture” they failed.

4. Taking the discussion further

4.1 A situation in the picture and in the room

According to Josef Perner (1991) the understanding of external representations, like pictures, is parallel with the understanding of ones mind and these children are “situation theorists”. They keep the situation in the picture apart from the situation in the room. Perner argues that not until the child is about four years old the child has come to think about its mind as representational and becomes a “representation theorist”. To coordinate the picture situation with its referent situation requires *metarepresentation*, that is a capacity “...of taking a cognitive, representational stance when needed” (Perner 1991; 284). Elizabeth J. Robinson (1994) does not agree, a consequence according to her would be that the three years old children “...treat pictures as alternative situations that can match or mismatch reality rather than as representations which can misrepresent.” (Robinson 1994; 167) The children tend to operate with assumptions of veridicality not only for beliefs but also for the picture, but do not relate them (Robinson 1994, Zaitchik 1990). Robinson suggests that to the child, the relation between reality and the picture is asymmetric but not differentiated. But how can something be asymmetric but not differentiated? To the child, according to Robinson, the relation between the picture and reality is asymmetric but not differentiated since the child presupposes the reality as primary and stable (it does not expect the world to chance on par with the picture) and *at the same time* the picture as secondary and unstable (the picture will change if the world changes). Robinson argues that the 3-year old child has constructed belief in the picture-thing as about something, but they misconceive the relation between picture and its referent and therefore also misconceives properties of the picture-thing as well as the picture-sign. Robinson’s principal critique to Perner is his assumption on such a close parallelism between the understanding of representations that has physical reality (like pictures) and understanding the mind. Sabbagh, Moses, and Shiverick (2006) findings on false belief and false photographs may support Robinson’s critique. In their study, understanding of false

photographs antedates understanding of false belief in the child. Their hypothesis is that judgements about false beliefs might pose greater executive demands relative to false photographs.

But what about “my” children, not finding the target toy? At 2.5-years-old they seem to be “situation theorists” according to Perner, they do not relate the situation in the picture to the situation in the room. But at 3-years-old they do.

4.2 Differentiations in the development of a picture sign in the child

Lynn S. Liben (1999) suggests a six-level developmental sequence on the emergence of cognitive and perceptual competencies in understanding pictures. The levels proposed by Liben imply differentiations within the child. The levels indicate focal competence for each phase but the phases also intermingle. Capacities on one level are prepared for on preceding levels and will continue to develop on the next. Ambiguities in earlier phases may back lash and cause “misconceptions” in picture understanding in later ones. This can for example be the case for the child, 21 months old, which by margin passed the difficulty of separating a three-dimensional object from its picture, when he tried the picture object with his mouth.

Liben’s assumption is that perception of space is crucial in recognizing depicted objects, since pictures are more or less flat but the scenes recognized (i.e. understood) are three-dimensional. And in some respect children seem to be sensitive to depth and distance in environment at birth or very soon there after. (Spelke 1998, p338; Bremner 1993) But sensitivity to depth specified pictorially, two-dimension surfaces, emerges later. According to Yonas & Granrud (1985) the responsiveness to “depth cues” in pictures appears when the child is about 5 and 7 months old, contemporary to the early recognition of depicted object according to DeLoache (1994). Lately Bertin & Bhatt (2006) have argued for this competence to emerge already at 3 months. However the point is that in the child, sensitivity to spatial information in the dynamic three-dimensional physical world occurs before the sensitivity to spatial information in the static picture.

The first phase in Liben’s sequence of competencies, is a non-picture category that occurs in the first year of life. This is the case when the young child identifies the referent but appears to confuse the picture and the depicted, as for example in trying to pick-up, or taste on, the depicted object.

Liben calls this level of competency “referential content” but in semiotic terminology this is confusing since “referential content” implies sign function and this phase antedates the sign. I suggest instead “analogon” inspired by René Lindékens (1976) or more simply “pattern recognition”.

The next phase is *global differentiation* and it emerges in the later part of the first year. This is when the child begins to differentiate the picture from its image, and responds to them differentially but does not reflect on the correspondence between the two. The third competence Liben argues, is *representational insight*; the child interprets or assigns a “stand for” meaning to the picture object. This implies that the child assigns a direction, vital in a sign relation, in the relation between expression and content. Passing the retrieval test above can be an indication of representational insight. *Attribute differentiation* is when the child appreciates that some, but not all attributes of the picture are motivated by attributes of the referent, and that some, but not all attributes of the referent motivate attributes in the picture. Liben expects his competence to occur in late preschoolers. The fifth phase is the growth of a system. In *correspondence mastery* the child comes to understand formal and informal rules in the medium. Correspondence mastery is understood within a specific media while *meta-representations*, the final competence is a coordination of understanding the variations among different representational media. This is a capacity to reflect on the semiotic resource itself, to choose between systems or combination of systems, and to provide different means of communicating different visions to others. Liben ascribes the last phase to adolescents and adults but perhaps this also can count for correspondence mastery.

The studies referred to above concern the three earliest phases and I will focus my discussion these. Firstly however, I will shortly comment phase III-IV: attribute differentiation, correspondence mastery and meta-representation. Returning to the assumptions of three basic differentiations in the development of sign use generally (above), my suggestion is that the emergence of attribute differentiation in picture understanding also indicates a new turn of focus in development on the differentiation of signification generally. This new turn of focus is to differentiate the relation of signification “from the vehicle conveying it and the object it conveys” (Deely 1990: 37). From now on this will be successively more clear, more socially shared and more sophisticated. This of course highly influences the differentiation of the self, but the differentiation of self and others begins already in earlier phases.

The first competence, analogon, presuppose a former state that lacks the faculty to perceive pictorially rendered information about space relations. Perhaps it is too much to say that there already is a world taken for granted in the child, but there seems to be a perception of a 3-dimensional world (in constant flux) from which an other world, frozen and in 2-dimension, will be differentiated. Thus it already forms a prerequisite for a hierarchy in later phases. Manipulation of objects is surely important for global differentiation, as Liben indicates, but also must be social interaction. From 9 months old the child attends to joint engagement and successively to joint attention according to Tomasello (1999). The sharing of attention towards the picture-thing

brings importance to it. There are also studies indicating that infants may imitate or model actions that others take towards pictures prior to having understood the referential function in the picture. (Callaghan et al. 2004) In the construction of the picture as a social “tool” the child may learn more about the picture *thing* as a category, than it conceives mediated information about the referent

When the child finds the target toy (above) this is an indication of representational insight, the child understands that the picture shows something about a situation “outside” the picture. In this case it must relate the situation in the picture to the situation at their nursery school in that moment. Passing OP, PP, PO does not necessarily involve this confrontation between reality situation and picture situation because comparative mapping will do. But still, it is intriguing to find that the children at about 2.5 years old so convincingly can tell that in the picture the cuddly is “on the sofa” but they will not go to the sofa to get it. At this phase it seems to me that the child has expectations on the picture thing that involves the display of known objects but they have no expectation on picture thing to be involved in their real world here and now.

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