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Title	Young Children's Development of Understanding Self, Other, and Language
Author(s)	Koyasu, Masuo
Citation	The Self, the Other and Language : Dialogue between Philosophy, Psychology and Comparative Education (2009): 103-112
Issue Date	2009-02-20
URL	http://hdl.handle.net/2433/142973
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Type	Article
Textversion	publisher

Young Children's Development of Understanding Self, Other, and Language

MASUO KOYASU
Graduate School of Education, Kyoto University

It has been pointed out that there are at least three types of perspective-taking abilities: to infer what other people see (perceptual), to infer what other people feel (affective), and to infer what other people think (cognitive). These three types of perspective- taking abilities should be integrated into a unified theory of understanding another's mind. In this paper, I will first discuss a unified theory of understanding another's mind in young children including their perspective-taking abilities, theory of mind and display rules. These three topics relate to young children's concepts of self and other. Secondly, I will discuss the role of language or verbal communication to conceptualise self and other. Caregivers' participa- tion in conversations with children, and interactions between peers contribute significantly to the nature of the concepts of self and other.

A clerk at the storefront asked a young boy, 'What can I do for you?'
He replied, 'Give me what Mommy asked me to buy'.

This is an episode written by a Kyoto University student in his report as one of the recollections of his young childhood. To tell what I know from what you know is the key to understanding self and other.

Every day we meet family, neighbours, friends, colleagues, and so on. We recognise other people. We live with them and we cannot live without them. In spite of this, it is not easy for us to understand other people. Those we believed akin to ourselves always reveal themselves to be different from what we first thought. This difference makes us aware of 'self and other' relationships.

I.   DEVELOPMENT OF PERSPECTIVE-TAKING ABILITIES

Jean Piaget (1896-1980) claimed that young children are egocentric. This does not mean that they are selfish or greedy, but that they do not have the mental ability to understand that other people may have different beliefs or knowledge from themselves. Piaget and Inhelder (1948) carried out an experiment whereby children aged from 4 to 12 viewed an arrangement of three model mountains (see Figure 1) along with a set of ten pictures from various positions around the display. They put a child in front of the display and then asked him or her to pick up from ten pictures the view that a wooden

doll at a different position would see. Younger children tended to select the picture of the view which they themselves saw.

Young children are 'egocentric' in that they show only their 'own view', so Piaget claimed. A lot of studies have argued with this conclusion. Follow up studies have shown that Piaget overestimated the levels of egocentrism in children. The three-mountain task has been criticised for judging children's egocentrism or visual perspective-taking ability. For example, Borke (1975) found that 3- and 4-year-olds can solve the three mountains task if the mountains are replaced with more familiar materials, such as dolls, toys and so on. Egocentricity can be manipulated by changing the complexity of cues, familiarity of materials, meaningfulness of the context and mode of responses. Therefore, the task is a rather 'noisy' insensitive measure (Flavell, 1977).

Figure 1 The three mountains task

However, the fact that young children fail in the original three mountain task and its similar tasks can never be denied. If it is true that young children are truly egocentric, why is it so? One reason might be that one cannot get feedback of other people's view. If this is the reason, then what would happen if they are given immediate feedback of other people's view? But how?

A camera can be used to indicate the point of view of others (Kielgast, 1971; Ives, 1980; Ives & Rakow, 1983). You can ask someone, 'What kind of scenes can you take by the camera there?' However, it does not give immediate feedback of view of others. I conducted two experiments on this topic using a camera and video camera. In the second experiment of Koyasu's (1997) study, a video camera on a tripod and a 6-inch colour CRT monitor were introduced. Three toy animals from a TV program, a small album including fifteen photographs and a piece of yellow cardboard were used. Participants were fifty-six 5-year-olds (5;4) from a Japanese kindergarten. They were divided into the self-feedback group (16 boys and 12 girls, 5;4) and the experimenter-feedback group (17 boys and 11 girls, 5;4). They were given a cover story such as; 'The three animals are going to have their photographs taken. Today they would like to have the same pictures taken as these again (showing the album). But, they cannot stand or line up by themselves. So please line them up here (pointing to the yellow cardboard) to face this video camera'. There were three sessions in the experiment. In the pre-test session, fifteen photographs were used without any feedback. In the feedback training session, the experimenter turned on the switches of the video system. The self-feedback group was just allowed to watch the monitor, while the child in the experimenter- feedback group watched the monitor and every error made was pointed out by the experimenter. And in the post-test session, fifteen photographs were used without feedback again.

The results of this experiment were as follows. In the pre-test session, six of the fifty-six children made front-back errors (89.3% correct). They put toy animals' face to themselves, not to the camera. Of these six children, only two continued to make these after the feedback session. It had been known from previous research that egocentrism for the right-left relationship is rarely de-centered even for 6-year-olds. As to the egocentrism for the right-left relationship, there was no difference between the mean scores of the pre-test and that of the post-test in the self-feedback
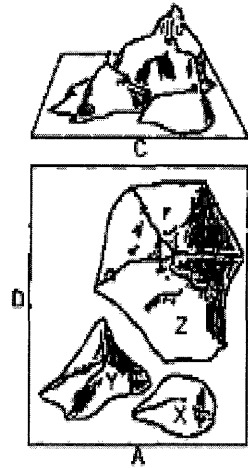
group, while the score was raised significantly (*p*<.001) between the two sessions in the experimenter-feedback group. Only a few showed egocentric responses for the front-back relationship, but there were many who were egocentric for the right-left relationship even after being given video feedback training. The effect of feedback-training was found only in the experimenter-feedback group. However, it is possible that they used an 'exchanging toy animals after the arrangement' strategy. Probably, they thought, 'This is a game to put toy animals as I think and then exchange them'.

From this experiment, it was concluded that egocentrism is partly accounted for the scarcity of feedback received about other people's view. This accounts for egocentric responses for the front-back relationship, but not for egocentric responses for the right-left relationship.

After these experiments, I have found an important fault in the three mountains task. It is that there are at least three ways for a child to answer it:

    1) To infer mental representations of others (perspective-taking);
    2) To infer mental representations of their own (mental simulation); and
    3) To infer by rotating the objects mentally (mental rotation).

The perspective-taking paradigm cannot distinguish these. This is the reason why I moved to research on '*theory of mind*'.

II.   DEVELOPMENT OF 'THEORY OF MIND'

The term 'theory of mind' was coined by Premack and Woodruff (1978) and is often used to refer to the ability to *impute* or *attribute* mental states to self and others. The ability to attribute these mental states was called a 'theory' because mental states are not directly observable and hypothetical constructs of mental states can be used to predict other people's behaviours. The concept was first proposed in primate psychology, especially in studies of chimpanzees' social behaviours. It was claimed that chimpanzees might know what another chimpanzee was thinking, or was about to do. However, ten years after his first article on theory of mind, Premack (1988) concluded that much of the putative evidence of theory of mind in chimpanzees was only anecdotal and it seems to be difficult to say that chimpanzees have a theory of mind.

The concept 'theory of mind' has fully evolved in developmental psychology. Wimmer and Perner's (1983) Maxi task was epoch- making in this respect. They told children a story about a child named 'Maxi', who places a piece of chocolate in a *green* cabinet and then goes out to play in the backyard of his house. While he is away, his mother moves the chocolate to a *blue* cabinet after having used it for making a cake. Later, Maxi comes in and he wants to have some chocolate. The test question is: 'Where will Maxi look for his chocolate?' Three-year-olds typically respond that Maxi will look for the chocolate in the *blue* cabinet, because they themselves know it is there and it is difficult for them to understand that their perspective is different from Maxi's. Alternatively, most six-year-olds take the perspective of Maxi and answer that he will look for the chocolate in the *green* cabinet where he left it. Thus, contrary to Piaget's suggestion, Maxi task has shown that young children as young as six can take the perspective of another person. Perner (1991) stressed that a strict definition of 'theory of mind' is to pass a false belief task, a general appellation of the Maxi task, or

to understand misrepresent- ations other people have.

I conducted a longitudinal research study on 'theory of mind' for three years in a kindergarten (Koyasu, Hattori, & Goushiki, 2003). Participants were a hundred and four kindergarteners (53 boys and 51 girls). Individual assessment of the children was undertaken once a year during the research period. Figure 2 shows the results of the false belief task. No children between the ages of three and four could pass this task while eighty-five percent of children between the ages of five and six could do so. Figure 3 shows the results of longitudinal changes in acquiring 'theory of mind'. This figure shows that there is no regression after having acquired 'theory of mind' but with one exceptional case.
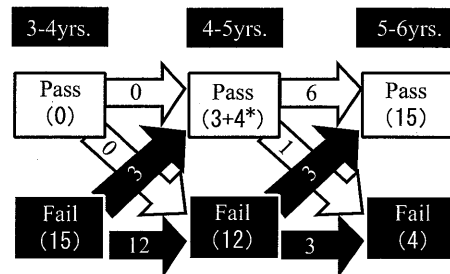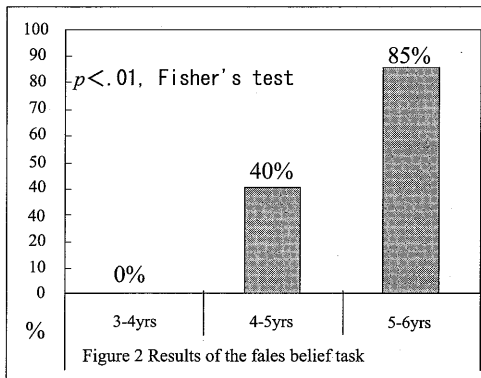

Figure 2 Results of the fales belief task

Figure. 3 A longitudinal data ond theory of mind
*Four children joined in the 4-5yrs class.

III. DEVELOPMENT OF DISPLAY RULES

Kurdek and Rodgon (1975) classified three types of perspective- taking tasks. They are:

   (a) To infer what other people see (perceptual);
   (b) To infer what other people think (cognitive); and
   (c) To infer what other people feel (affective).

Visual perspective-taking tasks measure type (a) and the false belief task measures type (b). Applying display rules is a candidate for measuring type (c).

   Research into emotions and facial expression is a very important area in psychology; the role of emotional communication in human development and the emotional underpinnings of normal and pathological social behaviour are but a couple of examples of areas of investigation. According to Ekman's (1971) theory of facial expression, the individual comes to learn a set of display rules (personal, situational, and cultural norms) that govern the presence and form of facial expressions. Display rules involve knowledge about the 'do's and don'ts' of expressing particular feelings in particular social contexts as well as the ability to control one's own behaviour in accordance with that knowledge. You should show a sad face in funerals, even if you hate them.

   Saarni's (1979) 'disappointing gift' paradigm is one of the most important methods:
What will you do when you are given a disappointing gift?
Do you hide your disappointment?
   To regulate behaviour in accordance with the display rule increased between the ages

of six and ten, and girls were more likely than boys to display positive behaviours. Gross and Harris (1988) showed that six-year-olds can understand that one can simulate an emotion while feeling another, and that such a display can mislead others.

Our recent study (Mizokawa & Koyasu, 2007) examined young children's understanding of apparent crying and its misleading consequences. We evaluated the relationship between children's performance of two false belief tasks and children's understanding of apparent crying, as well as its misleading consequences. There were three research questions:

> Q1. Do young children understand apparent crying?
> Q2. Do young children understand that apparent crying would mis- lead others? and
> Q3. Does understanding of apparent crying and its misleading consequences correlate with the acquisition of 'theory of mind'?

Participants were sixteen 4-year-olds, twenty 5-yead-olds, and twenty five 6-year-olds, who were all administered the tasks individually. Materials used were:

> • Three 'crying tasks' (two *apparent* crying tasks and one *real* crying task);
> • Standard false belief task (Wimmer & Perner, 1983); and
> • Second-order false belief task (Perner & Wimmer, 1985).

Three crying tasks include a story such as (a boy's version):

> 1. The protagonist and a naughty boy *Gonta* are playing in the room.
> 2. Gonta hides the protagonist's toy, and then he goes away.
> 3-A. The protagonist is rubbing his eyes because he feels itchy. He appears to be crying.
> 3-B. The protagonist finds his toy. He wants the naughty boy to apologise him. So, he decides to pretend to cry.
> 3-C. The protagonist finds that his toy is lost. He feels sad and starts to cry.
> 4. Then, *Gonta* comes back.

There were two questions for each story. The belief question is: 'Does *Gonta* think that he is crying or he is not crying?' The reality question is: '*The protagonist* looks like crying, doesn't he? So, is he really crying or not really crying?' A notebook computer was used to show three kinds of tasks on screen.

The second-order false belief task is to ask a child to think about an individual's thoughts about a second individual's thoughts about an objective event. Typically developing children should be able to pass this task between the ages of six and seven.

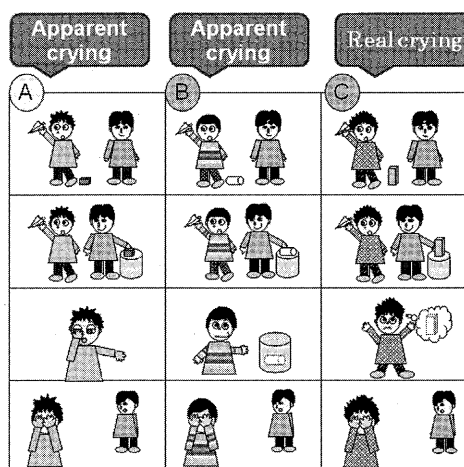The answers to the three research questions are as follows:

Figure 4 Three crying tasks;
Apparent crying without deception (A),
apparent crying with deception (B),
and real crying (C).

A1. The answer to the first question, 'Do young children understand apparent crying?' is that understanding of apparent crying develops between the ages of four and six (see Table 1).

A2. The answer to the second question, 'Do young children under- stand that apparent crying would mislead others?' is 'No'. Even for 6-year-old children, it is hard to understand misleading consequences of another's apparent crying (see Table 2).

A3. The answer to the third question, 'Do understanding of apparent crying and its misleading consequences correlate with the acquisition of theory of mind?' is that understanding of apparent crying only relates to the child's performance in the standard and second-order false belief tasks. But, this is not the case in understanding of misleading concepts.

Table 1 Number and percentage of correct answers in the reality questions in the crying task A, B, and C

Age group	Task A (apparent crying without deception)	Task B (apparent crying with deception)	Task C (real crying)
4 years old (n=16)	1(6.25%)	1(6.25%)	15(93.75%)
5 years old (n=20)	9(45.00%)	6(30.00%)	15(75.00%)
6 years old (n=25)	21(84.00%)	22(88.00%)	23(92.00%)

Table 2 Number and percentage of correct answers in the belief questions in the crying task A, B, and C

Age group	Task A (apparent crying without deception)	Task B (apparent crying with deception)	Task C (real crying)
4 years old (n=16)	0(0.00%)	0(0.00%)	13(81.25%)
5 years old (n=20)	0(0.00%)	2(10.00%)	14(70.00%)
6 years old (n=25)	2(8.00%)	2(8.00%)	22(88.00%)

IV.   TOWARD A UNIFIED THEORY OF UNDERSTANDING ANOTHER'S MIND

Younger children do not have a 'theory of mind' yet. This means that they are unable to separate their own beliefs, thoughts, and ideas from others. As far as feelings are concerned, children would exhibit empathy early on and are able to cooperate with others and yet they cannot understand that apparent crying would mislead others.

However, how these two findings relate to the facts about visual perspective-taking ability? To answer this question, we need to construct a unified theory of understanding

other people's mind using comparable methods. Research in 'theory of mind' uses a false cognition task and we can use a false affection task in the research on display rules. How about research in perspective-taking abilities? The answer is that we need to develop a false *perception* task.

I am now planning to use reflective glasses as materials. A person who wears *reflective glasses* can see through the glasses, but other people cannot see eyes of the wearer because the lenses are so coated that they reflect images like a mirror. I got a hint from Liben's (1978) study in which she used rose-coloured glasses. In her study, the experimenter and children aged three to seven each wore different coloured glasses and the child was asked to describe how a white card appeared to each of them. If the experimenter asked the child to infer the third person's belief about whether the wearer of reflective glasses can see things, it will be a false *perception* task. Using three comparable false representation tasks, we can come near to the unified theory of understanding another's mind.

Perception helps people to notice and recognise things and events. It is limited to the on-line information processing of things and events. Cognition is to know, to understand, and to decide things and events. Affection is a state of mind or body to approach or to avoid things and events. It is certain that we cannot do without these three functions of the mind. However, we have little knowledge about the roles these functions take in the development of understanding another's mind.
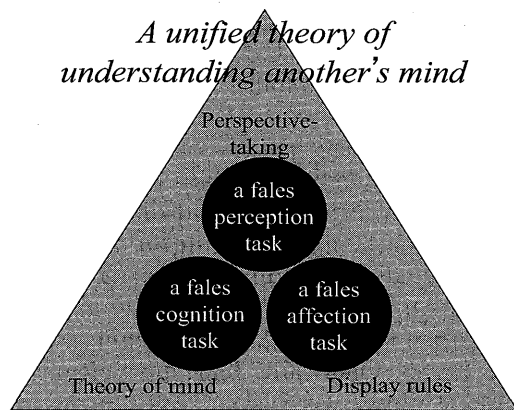

Figure 5
A schematic model of unified theory of understanding other people's mind

V.   THE ROLE OF LANGUAGE IN UNDERSTANDING SELF AND OTHER

Recent research has increasingly implicated the role of *language* in the development of understanding self and other. Is language necessary for understanding self and other? The answer can be both *yes* and *no*. Almost all animals can perceive the body of their own and that of others. They feel their own pain but not another's pain. They express their own pain bodily but not another's pain. However, is the expression of their own pain addressed to others? It is not always so. Language is important both in expressing their own pain to others and understanding pain other people might have, as well as in detecting other people's disguised pain.

Milligan, Astington, and Dack (2007), University of Toronto research group members, have done a meta-analysis on how children's language ability is related to false-belief understanding. Using data from 104 studies (*N*=8,891), the meta-analysis determined the strength of the relation in children under age seven and examined moderators that might account for the variability across studies and direction of effect. The results indicate a moderate to large *effect size* overall that remains significant when age is controlled. Receptive vocabulary measures had weaker relations than measures of general language. Stronger effects were found from earlier language to later false belief, but not the reverse.

Language is important for children to understand self and other relationship in many ways. Executive function and narrative comprehension play important roles in the development of this understanding, as I will explain.

Executive function: A series of studies has suggested that Japanese children pass the false belief task over a year after their Western counterparts. Wellman, Cross, and Watson (2001) reported that the lag in Japanese children's understanding is about six months. Naito and Koyama (2006) reported recently that while British children pass the false belief task by four and a half years, the same tasks are not reliably passed until the Japanese children are at least one and a half years older. This topic has been discussed as the relationship between 'theory of mind' and *executive function*, such as inhibitory function and working memory. Inhibitory function is essential to pass a false belief task because children should inhibit their knowledge that, in the Maxi task, chocolate is now in the *blue* cabinet. Working memory is needed because children need to remember the main parts of Maxi story before being able to answer the three questions.

Our recent study (Lewis, Koyasu, Ogawa, Oh, & Short, *in preparation*) has also shown a similar trend. Eighty-seven Japanese children (age range: 41-76 months) performed poorer on a false belief task, even though they showed more advanced skills in some executive tests as compared to eighty-one British children (age range: 32-63 months). Regression analyses showed that while in the British data conflict inhibition predicted false belief understanding, no such links were found in the Japanese data.

Asian children perform rather poorly on the false belief tasks, even though they show some advanced skills in some executive tests. Oh and Lewis (2008) assessed executive function and 'theory of mind' in Korean preschoolers. One example of inhibition measures is the day/night task in which eight cards depicting a picture of the sun and eight cards depicting a picture of the moon with some stars around it were used. Children were asked to say 'night' in response to sun cards and to say 'day' in response to moon cards. Oh and Lewis (2008) showed that Korean children younger than three and a half years of age showed ceiling effects on inhibition measures and the link between executive function and 'theory of mind' was not as strong as in the British sample.

There are a number of possible reasons for this. Asian mothers emphasise the importance of the roles of sharing and helping over controlling their children's emotions. Asian children under the age of seven sleep with their parents, which emphasises the familial bonds and interpersonal relationships. Using child-directed speech even in later years may be another important factor that contributes to slower conceptualisations of self and other.

Narrative comprehension: False belief tasks normally include a story in which at least two protagonists appear. This presupposes some abilities of narrative comprehension. In Slaughter, Peterson, and Mackintosh's (2007) study, Australian mothers read wordless storybooks to their preschool-aged children. Mothers' narratives were analysed for mental state language. Children's false belief understanding was also assessed. Children's (*N*=30; *M* age 3 years 9 months) false belief understanding was significantly correlated with mothers' explanatory, causal, and contrastive talk about cognition, but not with mothers' simple mentions of cognition. In the second study, the same pattern was found in an older sample of typically developing children (*N*=24; *M* age 4 years 7 months), whereas for children on the autism spectrum (*N*=24; *M* age 6 years 7.5 months), 'theory of mind' task performance was uniquely correlated with mothers' explanatory, causal, and contrastive talk about emotions.

Adrian, Clemente, and Villanueva (2007) explored the relation- ships between mothers' use of cognitive state verbs in picture-book reading and the later development

of children's understandings of mind. In their study, Spanish mothers read stories to their children (*N*=41: aged between 3;3 and 5;11), and two false-belief tasks were administered. One year later, mothers read a story to 37 of those children who were also given four tasks to assess their advanced understanding of mental states. Mothers' early use of cognitive verbs in picture-book reading correlated with their children's later understanding of mental states.

These two recent studies in Australia and Spain indicate that mothers' activities in fostering children's narrative understanding are decisive in understanding another's mind.

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