JAPANESE CHILDREN’S DIFFICULTY WITH FALSE BELIEF UNDERSTANDING: IS IT REAL OR APPARENT?

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There is an argument regarding whether Japanese children may show a delay in false belief reasoning. The authors investigated whether this apparent delay is genuinely due to the children’s difficulty with false belief reasoning, or whether the verbal questioning technique underestimates the competence of the participants. The authors gave 4- and 5-year-old Japanese children a verbal and a nonverbal false belief task. The results revealed that the children performed significantly better in the nonverbal task than in the verbal task. In addition, 5-year-old children performed significantly above chance in the nonverbal task, but not in the verbal task. The results suggested that Japanese children show difficulty with false belief tasks because verbal tasks may underestimate their competence. The results are consistent with the universal view of the development of false belief reasoning.

Key words: theory of mind, false belief task, nonverbal task, preschool children

During preschool ages, children develop an explicit understanding that people may have different mental representations of the world and that people sometimes have false representations. Location false belief tasks, such as the Sally-Anne task (Baron-Cohen, Leslie, & Frith, 1985) and the Maxi task (Wimmer & Perner, 1983) are traditional measures of such understanding in young children. Recent meta-analysis has shown that children could pass the false belief tasks at around four years of age (Wellman, Cross, & Watson, 2001).

There is an argument regarding whether the development of false belief reasoning is universal across cultures. Many studies have supported the universal development of false belief understanding (Avis & Harris, 1991; Callaghan et al., 2005; Lee, Olson & Torrance, 1999; Liu, Wellman, Tardif, & Sabbagh, 2008; Vinden, 1999). For example, Callaghan et al. (2005) reported that children in five cultures could not pass the false belief task until they were between four and five years of age, and that the developmental trend was similar across cultures. On the other hand, according to Wellman et al. (2001), although false belief performance of children from different countries similarly increased during preschool years, culture might be one factor that had significant impact on the performance on false belief tasks (see also, Bradmetz, 1998). Wellman et al. (2001, p668) stated “those in Austria and Japan perform somewhat worse ... If at 44 months of age children in the United States are 50% correct, then...children in Japan are 40% correct.”

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Indeed, empirical studies have repeatedly reported that Japanese children may show a delay in false belief reasoning (Martin & Kikuno, 2005; Naito & Koyama, 2006; Ohtsubo, 2007). Naito and Koyama (2006) showed that performances on the false belief tasks in Japanese children may be worse than those in British children, and suggested that Japanese children may have a one to two year delay in false belief understanding.

Why is the performance of Japanese children on false belief tasks worse than that of children in other cultures? There are two possible explanations. One explanation is that Japanese children have difficulty with understanding the false beliefs of other people, and thus, their performance in the false belief tasks was worse than that of children in other cultures. Naito and Koyama (2006) suggested that difference as well as delay in false belief understanding is responsible for the poor performances of the false belief tasks in Japanese children. Specifically, Japanese children’s difficulty with the false belief tasks could in part be due to the cultural differences in folk psychology. People in Western cultures, such as America, are likely to have a more “independent” view of the self whereas people in Asian cultures, such as Japan, have a more “interdependent” view (Markus & Kitayama, 1991). In the interdependent culture, the interpersonal situations and social norms are regarded as important determinants of human actions. Therefore children in the cultures may pay attention to the factors rather than internal states of human actions, which may lead to the worse performances on the false belief tasks and other theory of mind tasks (see also, Naito, 2003). This explanation is consistent with the proposal that Japanese children’s difficulty with false belief reasoning is real rather than apparent.

The second explanation is that Japanese children understand the false beliefs of others, but cannot pass the false belief tasks for some reason. In other words, researchers may underestimate the competence of Japanese children. Naito and Koyama (2006) suggested that some laboratory settings and experimental situations may be responsible for Japanese children’s difficulty with the false belief tasks. There is a good reason to believe the explanation. It has been suggested that Japanese children may not be good at answering when given verbal questions by an adult. Gardiner, Harris, Ohmoto, and Hamazaki (1988) reported that a number of Japanese preschool children fell silent during developmental psychological experiments in which they were told some stories and then asked to answer questions about the protagonist’s emotions. Also, Okanda and Itakura (2008) found that Japanese preschool children may have stronger response biases than Western and Vietnamese children when asked questions by an interviewer. For example, Japanese preschool children are more likely to answer “yes” when given yes-no questions, and, sometimes, not to respond to the interviewer’s questions.

Given these facts, we hypothesized that verbal questioning might underestimate Japanese children’s competence, and that their “true” performance on false belief tasks could be assessed by nonverbal tasks. The present study tested this hypothesis. We used the nonverbal false belief task developed by Call and Tomasello (1999). The task was originally developed for great apes, but it has often been used for a special population of children, such as deaf children (e.g., Figueras-Costa & Harris, 2001). According to Call and Tomasello, the performance of 4-year-old Western children in both verbal and
nonverbal tasks was at chance, whereas 5-year-old children performed significantly above chance in both tasks. Importantly, there were no significant differences of performance between tasks. In the present study, Japanese children were given both verbal and nonverbal false belief tasks. If Japanese children really have difficulty with false belief reasoning, there ought to be no differences in performance between tasks. However, if Japanese children’s poor performance in false belief tasks was due to their difficulty with answering verbal questioning, we expected that children would perform better in the nonverbal task than in the verbal task.

**METHOD**

**Participants**
Twenty-three typically developed 4-year-old children (\(M = 54.7\) months, \(SD = 3.4\), 13 girls) and twenty 5-year-old children (\(M = 67.0\) months, \(SD = 3.9\), 11 girls) were recruited from nursery schools in Tokushima.

**Materials**
Materials consisted of two identical opaque containers (15 cm × 10 cm × 5 cm) and a small plastic block (5 cm × 5 cm × 2 cm) that was used to designate the box containing the reward (a small toy).

**Procedure**
The procedure exactly followed Call and Tomasello (1999). Each child was placed in a room with two adults: the hider and the communicator. The hider and a child sat on opposite sides of a table. The communicator sat on the floor behind and to the side of the hider, so as to have a good view of both the child’s face and the hider’s actions. The communicator’s role was to observe the hiding process and to indicate for the child the toy’s location by placing the plastic block (marker) on top of the container. The experiment consisted of pretests, control tests, and false belief tests. In each phase, the location of the toy was randomized.

**Pretest**
This phase was to demonstrate for children the communicator’s intention to help them in finding the toy, and the role of the plastic marker. At the beginning of each trial, the hider hid the toy inside one of the containers under the table. During the process, the communicator overtly observed the process. Both containers were placed on the table. The communicator placed the marker on top of the box containing the toy and removed it after 1–2 s. The child was asked “Where’s the toy?” and allowed to pick one of two containers. Each child had to perform correctly on three consecutive trials.

**Control tests**
This phase was to demonstrate that the children had the three prerequisites for successful performance: the ability to follow the toy as it is visibly moved from one container to the other (visible displacement), the ability to follow the toy as the container in which it is known to reside is displaced (invisible displacement), and the ability to override the communicator’s indication with the marker when it is known to be incorrect (ignore communicator). Children were presented with one trial of each type, and then this procedure was repeated (total \(N = 6\)). Any child that failed both trials of any one of the control tests was excluded from the analyses.

In the visible displacement control, the hider hid the toy and then presented the containers to the child. The communicator placed the marker on top of the baited container, picked up the marker after 1–2 s, and left the room. The hider opened both containers and switched the toy from one to the other box in full view of the child, and closed both boxes. The communicator returned to the room, and the hider asked the child to find the toy.

In the invisible displacement control, the hider hid the toy and presented the containers to the child,
whereupon the communicator marked the correct container and left the room. The hider switched the
locations of the containers as the child watched. The communicator then returned to the room, and the hider
asked the child to find the toy.

In the ignore-communicator control, the hider hid the toy and presented the containers to the child.
Then, the communicator left the room. The hider watched the communicator leave. The hider then opened
the containers and switched the toy from one to the other in full view of the child. Since the toy’s location
was changed while the communicator was absent, when she returned to the room she marked the incorrect
container, that is, she marked the container at the location she had seen the toy hidden. After the
communicator had removed the marker from the container, the hider presented the containers to the child and
asked him/her to find the toy.

**False belief tests**

Each child was given the verbal and the nonverbal location false belief tasks. The former had two trials
and the latter had four trials. Each was presented as a block. The order was counterbalanced.

The structure of the verbal task was identical to the ignore-communicator control tests except that the
child was asked about the future behavior of the communicator before she returned to the room. When the
communicator was out of the room, the hider asked the child “Which boxes do you think she (communicator)
would mark?” When the communicator returned, the marker was placed on the wrong box, and the hider
asked the child about the location of the toy.

The structure of the nonverbal task was identical to the invisible displacement control except that the
hider switched locations of the containers before the communicator had indicated where the toy was located.
When the communicator returned to the room, the container was marked at the location where it had been
hidden, which was incorrect because the containers had been switched while the communicator was out of the
room. The hider then asked the child to find the toy. The child had no knowledge of the toy’s location until
the moment at which the communicator placed the marker.

**RESULTS**

Children were regarded as correct when they could find the toy on the first response. The results of pretest and control tests are given in Table 1. All 4- and 5-year-old children
could pass the pretest. On the control tests, two 4-year-old children were excluded from
the analyses because they failed to pass both trials in the invisible displacement control
task. One-sample *t*-tests revealed that the performance of both 4- and 5-year-old children
were significantly above chance (see Table 1).

<table>
<thead>
<tr>
<th></th>
<th>4-year-old children</th>
<th>5-year-old children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>3.3 (0.8)</td>
<td>3.1 (0.3)</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visible displacement</td>
<td>1.9 (0.2)*</td>
<td>2.0 (0.0)**</td>
</tr>
<tr>
<td>Invisible displacement</td>
<td>1.7 (0.6)*</td>
<td>2.0 (0.0)**</td>
</tr>
<tr>
<td>Ignore communicator</td>
<td>1.8 (0.4)*</td>
<td>1.9 (0.4)*</td>
</tr>
</tbody>
</table>

*Note. * Significantly above chance (*p* < .001), **Performed perfectly
The results of the verbal and nonverbal false belief tasks were worth investigating. Figure 1 shows the percentage of correct trials in the verbal and nonverbal false belief test as a function of age. First, as in the previous study (Call & Tomasello, 1999), we confirmed that there was a significant correlation between performances in both tasks (Pearson’s correlation $r (41) = .50, p < .002$). Next, we examined whether the performance of children in both age groups was significantly different from what would be expected by chance. One-sample $t$-tests revealed that 4-year-old children failed to select the correct box at above-chance levels in verbal and nonverbal tasks, $t(20) = –1.671, p > .10$, $t(20) = 1.307, p > .10$, respectively. The performance of 5-year-old children was also at chance in the verbal task, $t(19) = 1.165, p > .10$, but, interestingly, 5-year-old children selected the correct box at greater than chance level in the nonverbal false belief task, $t(19) = 4.723, p < .001$.

Finally, a 2 (age) $\times$ 2 (task) mixed design ANOVA revealed a significant main effect of condition, $F(1, 39) = 92.557, p < .001, \eta = .70$, a marginally significant effect of age, $F(1, 39) = 3.816, p < .06, \eta = .09$, but no significant interaction, $F(1, 39) = 0.134, p > .10, \eta = .003$. In addition, given that the number of the test trials in the nonverbal task (four trials) were different from the number in the verbal task (two trials), we examined whether the performances on the first two trials in the nonverbal task were also significantly different from those in the verbal task. We conducted the same 2 (age) $\times$ 2 (task) mixed ANOVA and found a significant main effect of condition, $F(1, 39) = 4.863, p < .04, \eta = .11$, a marginally significant effect of age, $F(1, 39) = 4.4024, p < .05, \eta = .10$, but no significant interaction, $F(1, 39) = 0.209, p > .60, \eta = .005$.

**DISCUSSION**

There were three main findings in the present experiment. First, there was a
significant correlation between the verbal task and the nonverbal task. These tasks may require common underlying processes. Second, 4-year-old children performed both the verbal and nonverbal tasks at chance whereas 5-year-old children performed the nonverbal task significantly above chance although their performance on the verbal task was at chance. Third, the performances in the nonverbal task was significantly better than those in the verbal task.

In the verbal false belief task, both 4- and 5-year-old children failed to select the correct box on the first response. The results were consistent with the reports that the performance of Japanese children in the false belief tasks was worse than children in other countries (Naito & Koyama, 2006). At first glance, the results appeared to suggest that Japanese children have more difficulty with false belief reasoning than children in other countries. However, we found that their performance in the nonverbal task was significantly better than in the verbal task. In addition, the performance of 5-year-old children in the task was significantly above chance. These results supported the hypothesis that the poor performance of Japanese children in the standard false belief task may be partly caused by their difficulty with answering questions asked by an adult.

One could argue that Japanese children may improve their performance in the nonverbal false belief task, but their performance may still be worse than that of children from other cultures. However, in the present study the performance of 4-year-old children in the nonverbal task was about 60%, and that of 5-year-old children was about 76%. These results were comparable with those of Western children in the nonverbal task (Call & Tomasello, 1999). In the Western study, the performance of 4-year-old children was below 50%, and the performance of 5-year-old children was about 80%. Given this, we suggest that the performance of Japanese children in the nonverbal false belief task might be comparable with children in other cultures.

Also, one might argue that the differences of performances between the tasks may be due to that the nonverbal task was simply easier for children to solve than the verbal task. However, it should be noted that Call and Tomasello (1999) found no significant differences of performances between the tasks. If the nonverbal task is easier than the verbal task, the Western children would have performed the nonverbal task better than the verbal task. Furthermore, it could be argued that the nonverbal task may not be purely non-verbal. In fact, in the nonverbal task, we verbally encouraged the children to find the toy. However, we did not provide children verbal questions. The verbal statement was a sign that showed the beginning of the test trial. In the sense, at least, we could say that our nonverbal task was almost non-verbal.

The present results are consistent with the proposal that the development of false belief reasoning might be universal across cultures (Callaghan et al., 2005; Liu et al, 2008). Although Callaghan et al. (2005) indicated that the developmental trend was similar across cultures, the pattern in Samoa was slightly different from other cultures. This might be due to the fact that Callaghan et al. used the verbal false belief task. The present study suggested that the nonverbal task might be more useful than the verbal task for theory of mind research and that the nonverbal false belief task would likely enable researchers to conduct an exact comparison across cultures. The poor performance of
Japanese children in the verbal task could possibly be attributed to their difficulty with verbal questioning, and thus, the same explanation could be applied to Samoan children.

The present study showed that Japanese children’s poor performances on the false belief tasks could be partly due to an experimenter’s verbal questioning, but does not exclude the possibility that Japanese children’s false belief understanding may be different from other cultures. Indeed, Naito and Koyama (2006) pointed out the difference in false belief understanding between Japanese children and Western children. Western children showed a specific difficulty in one condition of false belief tasks, where children were asked to predict where a protagonist search for a person transferred through his/her intention, as compared with the conditions where an object or a person was transferred externally (Symons, McLaughlin, Moore, & Morine, 1997). However, Japanese children did not show the differences of performances between conditions (Naito & Koyama, 2006, Experiment 2). Given the evidence, Naito and Koyama suggested that Japanese children may have paid more attention to situational cues rather than internal states of another person, and thus were not affected by how many mental states were involved. We assume that the development of false belief understanding may be fundamentally universal, but may include some cultural variations which are manifested by modified false belief tasks.

Although it is still unclear why Japanese children show the specific difficulty with a verbal task and we have to address the issue in further researches, the present study showed that a nonverbal task may be more appropriate for assessing Japanese children’s competence. More generally, the present results are important not only for theory of mind researches but also for cross-cultural studies in developmental psychology. In the cross-cultural developmental studies, particularly those that included verbal questioning, researchers often adopted translation/back-translation approaches. However, it is not always the case that there is a one-to-one correspondence between the languages in two cultures. In that case, the translation might not be enough for an exact comparison between two cultures, and it is unclear whether the study could assess the same ability in both cultures. The present study may shed light on the utility of nonverbal tasks for cross-cultural studies in developmental psychology.

REFERENCES


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