YOUNG CHILDREN’S SELECTIVE TRUST: DOES SEEING INDICATE KNOWING?

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The present study investigated whether young children trust selectively by considering why others may provide inaccurate information. Previous research indicates that children select others who are reliable as informants. However, it is unknown whether children consider the reasons for other’s inaccuracy in situations where the speaker’s response tendency is consistent. In this study, children (N = 40) aged 3 to 6 years chose who to trust between two inaccurate informants. One informant was inaccurate because of wearing a blindfold, whereas the other was inaccurate for no obvious reason. Children didn’t show a preference for either informant. Furthermore, it was revealed that age differences were material in understanding the relationship between information access and the speaker’s accuracy. This finding supports the contention that children do not consider why informants may be inaccurate when choosing whom to trust.

Key words: selective trust, mental state attribution, word learning

INTRODUCTION

Children as well as adults learn by receiving information from others. However, such information is often wrong or inaccurate. Therefore, it is necessary to evaluate reliability actively rather than receiving information passively. It is important to distinguish between others who have accurate information and those who have inaccurate information. Selecting others who have accurate information requires trusting others selectively. According to Koenig and Harris (2005), if children are sensitive to whether an informant makes an accurate assertion, they can use that information to decide whether the informant is a reliable source of new information. Koenig and Harris defined this type of sensitivity as selective trust. That is, selective trust consists of selecting others who have accurate information. Selective trust of others is an important ability to learn.

Previous researches indicate that children spontaneously track and learn from a speaker’s history of accuracy or inaccuracy (Birch, Vauthier, & Bloom, 2008; Koenig, Clément, & Harris, 2004; Koenig & Harris, 2005). In Koenig et al. (2004), first, two

This work was supported by JSPS Grants-in-Aid for Scientific Research Grant Numbers JP15H05398, JP18H01084.

We express our gratitude to the children and teachers at the nursery school for their cooperation with the experiment.

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speakers named familiar objects. One speaker named correctly, while the other named incorrectly. Next, two speakers labeled novel objects with different names. Children judged each speaker’s accuracy based on information that the speaker had provided and selected the trustworthy partner. That is, 3- and 4-year-old children trusted the previously accurate speaker and learned novel words from that individual without any prompting. Koenig and Harris (2005) examined selective trust from the perspective of not only the speaker’s accuracy but also with respect to the presence of knowledge. They compared the reliability of accurate speakers, inaccurate speakers, and ignorant speakers. Three- and four-year-old children selectively learned from a previously accurate speaker rather than an inaccurate speaker, and an accurate speaker rather than an ignorant speaker. Furthermore, Birch et al. (2008) extended selective trust to domains other than language learning. That study found that 3- and 4-year-old children selectively learned from a previously accurate speaker versus an unreliable speaker when learning not only new words but also object functions. Children may have determined their reliability by comparing the speaker’s accuracy.

Children may not simply look at whether the speakers’ answers are correct; they may also consider reasons for incorrect answers (Nurmsoo & Robinson, 2009b). Consideration of reasons for inaccuracy should be important when judging reliability. For example, even if a person knows the name of a target, it will be difficult to identify the name of the object when he is not able to see it. Therefore, even if he has the correct information, it can be inaccurate depending on the situation. Previous findings, investigating whether children judge a speaker’s reliability by considering the reasons for speaker’s inaccuracy, have been inconsistent; Nurmsoo and Robinson (2009a) revealed that children do not consider the reasons for speaker’s inaccuracy, whereas Nurmsoo and Robinson (2009b) revealed the opposites.

The discrepancies in their findings, with regard to consideration of the speaker’s inaccuracy, may be related to the consistency of speaker response tendency. The consistency of speaker response tendency could be defined as follows; accurate speaker’s answers are consistently correct except when the perceptual access of the speaker is restricted, whereas inaccurate speaker’s answers are consistently wrong. Nurmsoo and Robinson (2009a; Studies 2 and 3) presented two inaccurate speakers whose response tendency was not consistent; one inaccurate speaker answered correctly on specific trials. However, other previous studies on selective trust have been typically conducted in situations where the speaker’s response tendency is consistent (e.g., Clément, Koenig, & Harris, 2004; Koenig et al., 2004; Nurmsoo & Robinson, 2009b; Sabbagh & Baldwin, 2001). Consistency in speakers’ response tendencies carries weight, as children use the speaker’s consistent past behavior to predict the speaker’s future behavior (Koenig & Harris, 2005). Nurmsoo and Robinson (2009a) may result in no consideration of the reasons for a speaker’s inaccuracy by children because the speaker’s accuracy was not consistent; that is, children cannot detect the response tendencies of the inaccurate speaker appropriately, and thus, led the difficulty to compare the response tendencies between speakers.

Therefore, the present study investigated whether children consider the reasons for
the speaker’s inaccuracy in situations where the speaker’s response tendency is consistent. In this study, we examined the selective trust in the word learning situation. The trustworthy is one of essential factors in learning novel words. In fact, previous studies have investigated the selective trust in word learning situation (Koenig & Harris, 2005; Nurmsoo & Robinson, 2009a). In present study, two inaccurate speakers were presented to children, similar to Nurmsoo and Robinson (2009a). One speaker answered incorrectly in half of the trials when blindfolded and answered correctly when the blindfold was removed in the remainder of the trials. The other speaker was completely inaccurate for no obvious reason in all of the history trials. By setting the situation where the speaker’s response tendency is consistent, children can clearly characterize the speaker’s response and may consider the reasons of the speaker’s inaccuracy.

This study also investigated the history trials. Children’s judgement of the accuracy of each speaker’s answer was confirmed through the analysis of history trials. Judging whether a speaker’s answer is correct may lead to the detection of speaker’s response tendency. Fabricius, Boyer, Weimer, and Carroll (2010) suggested the development in understanding of a relationship between information access and speakers’ accuracy in preschool age. Thus, there may be age differences in the understanding the speaker response tendencies that a blindfold speaker is inaccurate because of the blindfold and the other speaker is inaccurate for no obvious reason. Considering the possibility of different understandings of speaker’s response tendency during preschool age, we did a detailed analysis of the history trials.

In summary, the present study was conducted under the condition of the consistency in speaker’s response tendency contrary to Nurmsoo and Robinson (2009a). The aims of this study were twofold. First, we investigated whether children considered the reasons for the speaker’s inaccuracy in situations where the speaker’s response tendency was consistent. Second, whether children can detect the speaker’s response tendency was examined through the detailed analysis of the history trial. In the present study, the target age was 4 to 6 years based on research covering a wide range of preschool years (Nurmsoo & Robinson, 2009a, 2009b). Furthermore, understanding the relationship between information access and speaker accuracy might be different for preschool children (Fabricius et al., 2010). Thus, we needed to cover preschool period. If children judge reliability while considering the reasons for a speaker’s inaccuracy, then children would selectively trust the inaccurate speaker who had limited information access (i.e., the blindfolded speaker). In contrast, if children judge reliability while not considering the reasons for a speaker’s inaccuracy, then children would not show selective trust of either speaker.

**METHOD**

**Participants**

Participants were 22 4-year-olds ($M = 4 \text{ years, 8 months; range: } 3 \text{ years, 11 months to 5 years, 5 months; } 11 \text{ girls})$ and 18 6-year-olds ($M = 6 \text{ years, 3 months; range: } 5 \text{ years, 11 months to 6 years, 7}$
months; 11 girls). Informed consent was obtained from the children’s caretakers before the children participated. Additionally, we verbally confirmed each child’s willingness to participate before starting the experiment. The procedure was approved by the ethics committee of the Faculty of Human-Environment Studies at Kyushu University, Japan.

Materials

The present study was based on Nurmsoo and Robinson (2009a). There were 7 video clips, 4 history trials, and 3 test trials. In each clip, two hand puppets acted as speakers and an object appeared. The two speakers provided conflicting labels for each object in both history and test trials. However, the history and test trials differed in the types of objects. In history trials, these objects were familiar to participants: a fork, an eraser, a paper clip, and a smartphone. In contrast, in test trials the objects were novel. These objects were created by combining two or more objects or were objects inferred as likely to be unfamiliar to children.

A towel was used to blindfold one of the puppets. The same blindfold was presented in initial familiarization and appeared in the video clips in the history trials.

Design and Procedure

The procedure of the present study was based on Nurmsoo and Robinson (2009a). Participants were tested individually in a room at their nursery school. All history trials and test trials were presented to participants as video clips, one at a time. Puppets used in the test trials were identical to the puppets used in the history trials.

First, participants took part in a familiarization phase in which they touched a towel used as a blindfold, and the experimenter explicitly confirmed that wearing the blindfold allowed one to see nothing. In video clips (history trials), the same towel that was used in the warm-up was used as a blindfold. Then, each participant was tested on two kinds of tasks—namely, history trials and test trials—sequentially as follows. Roles of the puppets (blindfolded or inaccurate for no obvious reason) were counterbalanced between subjects.

History trials (4 trials). First, participants were shown a photo of an object that was to be presented later and confirmed that they knew the correct name of the object. Next, video clips with two puppets and one familiar object were shown (see Fig. 1). The experimenter’s voice was the only speech in the video clips. The experimenter asked the puppets, “What do you think this is?” Puppets provided conflicting
labels for the familiar object; for example, “It is a fork/brush.” One puppet named familiar objects incorrectly only when he wore a blindfold. The blindfolded puppet wore a blindfold in the first 2 trials in which he provided an incorrect object name, whereas he provided the correct name in the latter 2 trials. The other puppet provided incorrect names in all trials, even though he did not wear a blindfold. The experimenter asked participants whether the answer was correct or not after one puppet spoke, and asked the same question again after the other puppet spoke. There were four such trials, each of which used a different object.

**Test trials (3 trials).** The structure of the test trials was similar to that of the history trials. First, participants were presented with a photo of an object that was presented later. However, unlike in the history trials, the objects presented to participants were novel. Children were asked whether they knew the names of these objects before starting the test trials. After asking this question, video clips of two speakers and one novel object began. The experimenter’s speech was the only voice in the video clips. The experimenter asked the puppets, “What do you think this is?” Puppets provided different meaningless labels for the novel objects; for example, “It’s soyu/riwa.” Labels provided by the puppets were selected from meaningless words in Japanese from Hayashi (1976). The puppet that wore a blindfold in the history trials did not wear a blindfold in any test trials; the blindfold did not appear in the test trials at all. After watching the video, the experimenter asked the children, “This puppet called it a soyu, and the other puppet called it a riwa. Which puppet do you think is correct?” and “Why did you select this puppet?” There were three trials, each of which used a different object.

**Analysis**

For the history trials, participants were regarded as passing if they correctly answered the question “Is it right?” regarding the speaker’s labeling on all four trials. A pass mark was given when both questions about the blindfold speaker’s remarks and the inaccurate speaker’s remark (for no obvious reason) were answered correctly. Participants who provided wrong answers were failed. The purpose of this analysis was to confirm that the children understood the speakers’ traits and the circumstances.

In the test trials, participants were considered to have chosen the blindfolded speaker if they answered that the blindfolded speaker was correct in more than half of the trials. In contrast, participants were considered to have chosen the speaker who was inaccurate for no obvious reason if they answered that the inaccurate speaker was correct in more than half of the trials. Other answers, such as “Both speakers are correct” or “Both speakers are incorrect,” were classified into an “other” category. In this study, “other” answers were excluded from the analysis because they included various reactions which made it difficult to interpret the results.

**Results**

In the history trials, the pass rate differed significantly between the 4-year-old and 6-year-old groups ($\chi^2(1) = 9.72, p < .01$). The 6-year-old group had a higher pass rate than the 4-year-old group (see Table 1).

Among the 15 participants who could not pass the history trial, the breakdown of these failures was as follows. Five participants answered that the speaker was wrong when the blindfolded speaker removed the blind; five answered that the speaker with the

| Age group | Success | Failure |
|-----------|---------|---------|
| 4-year-olds | 9       | 13      |
| 6-year-olds | 16      | 2       |
blindfold was correct; three always answered that the speaker was correct; and two answered that the inaccuracy of the speaker’s answer for no obvious reason was correct.

In the test trials, the age groups did not differ in terms of the number of participants who selected the blindfolded speaker in over half of the trials and the number who selected the inaccurate speaker in over half of the trials ($\chi^2(1) = 0.94, ns$). There was no preference expressed for either speaker (see Table 2). Furthermore, the test trial was analyzed only for the participants who passed the history trial. As a result, neither speaker was preferred as in the previous analysis ($\chi^2(1) = 1.88, ns$).

As for the question of “why did you select this puppet?” 45 out of 120 trials (40 children x 3 trials) responded. The most frequent answer was that, “The speaker knows” (8 trials).

**Discussion**

The present study examined whether children excuse a speaker’s previous inaccuracy when the speaker’s accuracy is generally consistent in the word learning situation. The results revealed no preference for either a blindfolded speaker or a speaker who was inaccurate for no obvious reason in the test trials. Speaker response tendencies have typically been examined in consistent situations, but that consistency did not affect the task of selective trust with a blindfold. An analysis of the test trial for only those children who passed the history trial did not change the results. This shows that even children who understood the characteristics of the speaker did not consider the reasons for the speaker’s inaccuracy when judging the reliability of others, which is consistent with Nurmsoo and Robinson (2009a). No evidence of selective trust was related to the kind of information provided by the speaker; children weighed a speaker’s history of accuracy, not the reasons for the speaker’s inaccuracy, when they were offered generalizable and semantic knowledge such as names of objects (Nurmsoo & Robinson, 2009a). Both Nurmsoo and Robinson (2009a) and the present study conducted a labeling task of the names of objects, which might lead to not considering the reasons for the speaker’s inaccuracy.

The questions posed by the experimenter and the explanations provided to participants may account for why there was no preference for either speaker in the test trials. In previous studies (Koenig et al., 2004; Koenig & Harris, 2005) that revealed a preference
for an accurate speaker, there were explicit explanations or questions in history trials, such as “One of these two people kept saying the wrong thing” or “Which one of these people was not good at answering questions?” In contrast, in the present research, participants were simply asked “Is it right?” with respect to the speakers’ answers. Similarly, in Nurmsoo and Robinson (2009a), whose results concur with those of the present study, explicit explanations and questions occurred after the test trials. Thus, explicit explanations and questions did not influence answers in the test trials in Nurmsoo and Robinson (2009a). The explicit question formats used in other studies implied that one speaker answered correctly and the other speaker answered incorrectly. The framework that one speaker is accurate and the other is inaccurate that was formed in previous research was difficult to form in the present study, because there were no explicit questions by which to make that judgment. Whether beliefs invariably do not form without a framework similar to the aforementioned studies requires further examination.

A second possibility why the children did not like either speaker is because of children’s memories of speaker characteristics. The present study did not ask whether children remember which speaker was blindfolded, based on the procedure by Nurmsoo and Robinson (2009a). Memory of speaker characteristic should be critical in judging a speakers’ reliability. Further studies need to confirm that children remembered each speaker’s characteristics.

The present study analyzed children’s judgement of the accuracy of each speaker’s answer in history trials. The different passing rate between 4 and 6 years of age was revealed; 6-year-olds were better at judging whether a speaker’s answer was correct/incorrect than 4-year-olds. This result is different from assumptions made in previous studies.

There are three possibilities which explain this result. The first possibility should be the development of understanding the relationship between information access and speaker’s accuracy. Based on the previous study, it is assumed that 4-year-old children understand the relationship between access to information and an informant’s accuracy (Koenig et al., 2004; Koenig & Harris, 2005; Nurmsoo & Robinson, 2009a, 2009b). However, 4-year-old children were less accurate in history trials than 6-year-old children. The assumption that 4-year-old children understand the relationship between limited information access and others’ knowledge requires further study, including consideration of different ways of assessing children’s understanding.

The second possibility should be the development of shifting. In the present study, two aspects were interchanged during the history trials; one is speakers’ wearing or removing a blindfold and the other is accurate or inaccurate answers of speakers. It appears that the young children were confused during the process of shifting information. Shifting is to go back and forth between multiple tasks (Huizinga, Dolan, & van der Molen, 2006), which is one of the key elements of the executive function that develops in preschool age children (Hongwanishkul, Happaney, Lee, & Zelazo, 2005). Four-year-old children have immature shifting abilities compared to 6-year-olds; therefore, 4-year-old children may have experienced difficulties in organizing the information present in
the history trials as compared to 6-year-old children.

The third possibility should be the bias toward positive (“yes”) responses. Fritzley and Lee (2003) noted that 2-year-old children consistently display a yes bias, whereas 4- and 5-year-old children do not. Fritzley and Lee (2003) indicated that appropriate responses to yes/no questions develop around 3 years of age. Participants in the current study included a 3-year-old child, who may have biased the responses to the history trial questions in the 4-year-old group.

When judging reliability, the perspective of the rate of accuracy and mentalistic interpretation appears to be important (Birch et al., 2008). From the perspective of the rate of accuracy, the blindfold speaker in the present study should be preferred because the speaker answered more questions correctly in the history trial. However, neither speaker was preferred in this study. Pasquini, Corriveau, Koenig, and Harris (2007) found that speakers with a correct answer rate of 75% or less were hard to be trusted. In the present study, the percentage of questions answered correctly was 0% or 50%; i.e., lower than 75%, thus both speakers may not have been trusted. This result indicates that the correct answer rate affects the emergence of selective trust. In the perspective of mentalistic interpretation, children can characterize others from the viewpoint of mental state (Birch et al., 2008). In the present study, one speaker was inaccurate because of the blindfold and the other was incorrect for no obvious reason, which was clearly different in mentalistic interpretation. Six-year-old children in the present study were successful in reasoning that a speaker would not know the name of the object because he did not see the object, but that preference did not arise for a particular speaker. Therefore, although it is possible to characterize others from the viewpoint of mental state, it may be difficult to reflect it in the judgment of other’s reliability.

In summary, the present results are consistent with those of Nurmsoo and Robinson (2009a). As speakers were not consistently accurate/inaccurate in Nurmsoo and Robinson (2009a), we made the speakers in the current study behave consistently in terms of accuracy. However, we obtained the same result as Nurmsoo and Robinson (2009a): children trust without considering the reasons for a speaker’s inaccuracy. Children have the cognitive ability to consider why others may be inaccurate, but the procedure used in the present study could not demonstrate the consequences of such cognition. Furthermore, we focused on test trials and history trials. Few studies to date have considered history trials. By focusing on such trials, we revealed that selective trust is influenced by various factors, such as biases or executive functioning development, aside from others’ accuracy. Future research should examine the criteria of children below the age of 4 years used to judge reliability.

AUTHOR’S CONTRIBUTION

M.M. and W.S. designed the study, read the draft, and approved it. M.M. collected and analyzed the data, and drafted the manuscript.
CONFLICT OF INTEREST

The authors declare no competing financial interests.

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(Manuscript received 24 January, 2019; Revision accepted 26 December, 2019; Released online in J-STAGE as advance publication 30 June, 2020)