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# Understanding deceptive intentions behind pointing gestures in 12-15-month-old infants

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ABSTRACT

We examined the comprehension of deceptive intentions revealed in searching task in infancy, on the theoretical basis of natural pedagogy and epistemic trust. The main findings showed that 12-15-month-old infants are able to discriminate the reliable and the deceptive actions of adults, but they do not generalize their previous experience in connection with a novel person, who is treated as a new reliable source of information.



Deception is a fundamental biological and psychological action involving a wide range of behavioral repertoires such as trickery, seduction, pretense, concealment, masquerading, or distraction. During their development, children learn how to speak and behave in a social situation when the behavior is associated with honesty or deception. The first evidence for early tactical deception is recorded with nine-month-old children, who can manipulate their emotional expressions for reaching a separate goal or use 'false' intentional gestures to deceive their caregivers (Reddy, 2007). However, besides these early natural observations, there is no clear experimental evidence that children as young as one year old are able to understand others' deceptive intentions.

In the developmental literature two main approaches, the concepts of natural pedagogy and the epistemic trust provide interpretations about how toddlers naturally engage in a learning situation and select trustworthy informants. These approaches are relatively independent from each other, and focus on different ages (Eaves & Shafto, 2012). The studies on natural pedagogy examine infants, in terms of how they learn from the adults and engage in a learning situation and gain new knowledge, and emphasize the ostensive cues of a communicative partner (Csibra & Gergely, 2009; Tomasello, Carpenter, Call, Tanya, & Moll, 2005). Children's aim is to explore the surroundings with the help of a reliable and helpful informant. In the second approach, studies on epistemic trust investigate how children can distinguish the informants based on their reliability. These studies rather focus on the ways of obtaining the appraisal of the informants.

The fact that children gain new knowledge from observing others' behaviors, raises an important question, whether children trust all informants regardless of their helpfulness and knowledgeability or children are able to recognize who is a credible source of information. Most of the studies in the field of epistemic trust have examined preschoolers' abilities with similar methods, wherein children were given false information from a "tricky" experimenter about a hiding location.

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The findings revealed that it was difficult for children to ignore the unreliable experimenter before they are 3–4-years old (Ganea, Koenig, & Millet, 2011; Jaswal, Croft, Setia, & Cole, 2010; Mascaro & Sperber, 2009).

Very important starting points in early developmental research are the studies which found evidence that toddlers at the age of 14 months follow the gaze of those actors to target behind the barrier whose past looking behavior was reliable (Chow, Poulin-Dubois, & Lewis, 2008), or show that 16-month-old infants could encode the identity of agents based on their past reliability (Poulin-Dubois & Chow, 2009). According to the findings of Zmyj, Daum, Prinz, Nielsen, and Aschersleben (2012) the imitating behavior of 14-month-olds is influenced by cues such as the familiarity of the actions, or the age of the model (Zmyj et al., 2012). In their most recent paper Poulin- Dubois and Brosseau–Liard review the research findings which attest that children are selective in their learning behavior even in their earliest years. They are sensitive to teacher's competence, age, confidence and to a number of communicative cues, however they underline that infants' appraisal mechanisms require further investigations (Poulin-Dubois & Brosseau-Liard, 2016; Poulin-Dubois, Brooker, & Polonia, 2011).

In our current study, we address the question whether infants at the age of 12–15 months (N= 53) are able to distinguish their partner's instructions based on the source of information (helpfulness and knowledgeability). Whether infants trust selectively in adults' instructions depends on their previous experience and the communicative signals of a particular partner. We wanted to observe what happens, if the informants have clear intentions to deceive their social partners. The natural pedagogy approach is also significant in our study, as we maintain that together with the ability of selective learning the setup of the pedagogical situation (eye-contact, being called by their own name, nonverbal communicative gestures) also plays an important role in helping the child to understand the intentions of the teaching person.

We employed three conditions varying the intentions and knowledgeability of the partner (experimenter). In the Reliable condition (N = 17, 10 boys; mean age was 13.51 months; SD = 1.21), the experimenter gave true information about the location of a hidden toy, she was knowledgeable and helpful. While in the Deceptive condition (N = 21, 10 boys; mean age was 13.14; SD = 1.06) the unhelpful but knowledgeable experimenter pointed to the false location and laughed at the children like a clown, confirming that the situation was tricky. In the Ambiguous condition (N = 15, 7 boys; mean age: 13.46 months and SD = 0.91) the experimenter behaved very clumsily, she looked uncertain showing that she had no knowledge about the hiding location. The ambiguous informant was most indecisive but seemed helpful in her gestures, while the deceptive person had precise knowledge of the hiding location, but proved unhelpful in finding the object. This means that one of them seemed unreliable for the child because of her ignorance, while the other because of her clear deceptive intentions. We expected that if children are able to infer from the actor's communication and the outcome of the trial situations, they follow only the reliable experimenter's instructions as opposed to the deceptive and ambiguous ones. We expected children to turn to adults contacting them mostly with trust, and based on their early discriminating ability they will be able to distinguish between reliable and unreliable information sources stable enough. This should result that they follow the signals of the basically reliable person.

During the experiment each infant sat on the parent's lap at one side of a table facing the experimenter. In the warm-up situation, in a modified version of Repacholi's procedure (Repacholi, 1998) all infants observed that the experimenter showed them two identical containers, then she looked inside one of them and found a toy. After that, the experimenter put the toy into one of the containers and placed them on the table upside down while encouraging the infants to search for the toy. In the training trials infants saw two empty containers on the table then the experimenter hid a toy under one of them, and she mixed them very quickly in front of the infant. Then the experimenter looked into the containers while saying: "I know where the toy is" and pointed to one of the containers indicating that the toy was inside. In the Reliable condition the experimenter pointed to the true location while in the Deceptive condition she pointed to the false location. If the child chose the suggested false location the experimenter laughed at him/her while commenting with "I have deceived you!" In the Ambiguous condition the experimenter said with agonized face "I do not remember where the toy is". She looked confused and pointed randomly to the one and then to the other container while expressing that she was totally indecisive and she pointed to the false location in half of the trials. Each training trial lasted approximately 15–20 s. The side of the target container was counterbalanced across the trials. Infants completed two warm-up trials and three training trials before the test phase. The test trial replicated the training trials identically, except that the experimenter pointed to the true location in all conditions. Each trial was recorded to determine whether children followed the adult's instruction. The response measure was categorical, the observers, who were blind to the conditions, coded whether children chose the location suggested by the experimenter. Two independent observers coded the videotaped sessions. Using Pearson correlation, the inter-rater reliability was r = 0.92.

Preliminary analyses on children's performance on their first training trial showed that almost all infants chose the correct container indexed by the experimenter (47 out of 52), indicating that they basically rely on the experimenter's communicative gestures as the theory of natural pedagogy suggested. Then, we used Pearson $\chi 2$ tests to examine differences in infants' behavior (choosing the location the experimenter suggested and showed) across all three conditions in the test trial following the three training trials. There was a significant difference among three experimental conditions, and the infants' responses to the experimenter pointing depended on her past reliability ($\chi 2$ (2, 52) = 9.959; $p < 0.007$). Children followed the experimenter's instruction more in the Reliable condition (82.41%) than in the Deceptive condition (38.1%) or in the Ambiguous condition (33.32%). The results also show there was no difference between the Deceptive and Ambiguous condition ($\chi 2(1, 36) = 0.086$; p = ns.), indicating that children evaluated these conditions similarly (Table 1).

Interestingly, the effect of the experimental manipulation directly occurred following the first training trial, and was more exactly in the outcome of the third training trial ($\chi 2$ (2, 53) = 11.217; $p < 0.004$). In the Deceptive condition only 42.9% of the