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Let's do it together! The role of interaction in false belief understanding



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ABSTRACT

From the interaction theory perspective, we aimed to verify whether the interactive context in which theory of mind is measured can allow children younger than 4 years to pass the verbal false belief task (FBT). Therefore, an interactive FBT (iFBT) was devised, in which children were actively engaged in the story, and was used to test 210 children twice: first when they were 3 years old and again when they were 3.5 years old. Most 3-year-olds were unable to pass the iFBT (28% passed), but a half year later their performance was enhanced and they passed at a rate above chance level (59% passed). In addition, among 3.5-year-olds, passing the iFBT increases the chance of passing the standard FBT by four times. We conclude that the interactive mode of the FBT facilitates false belief understanding in children under 4 years of age.

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Introduction

False belief understanding has been considered a “litmus test” for theory of mind (ToM) (for reviews, see Hughes & Devine, 2015; Rakoczy, 2017), and psychologists often use the so-called false belief task (FBT; Wimmer & Perner, 1983) to assess whether children have the ability to infer the mental states of others in order to predict their behavior. In the standard FBT, a character places a toy inside one container and goes out to play. In the meantime, a second character moves the toy to a different container. When the first character returns to the scene, children are asked to predict where the character will look for the toy. It is commonly believed that before their fourth birthday children are not able to pass this

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task because they do not understand the first character's false belief (Wellman, Cross, & Watson, 2001). Since a prominent study appeared nearly 25 years ago (Clements & Perner, 1994), this view has been challenged in two ways. First, researchers have proposed that when nonverbal, less complex, and less cognitively demanding versions of the FBT are used (e.g., the violation of expectation paradigm), even toddlers and infants present spontaneous or implicit false belief understanding (see Buttellmann, Carpenter, & Tomasello, 2009; Onishi & Baillargeon, 2005; Southgate, Senju, & Csibra, 2007; for reviews, see Heyes, 2014; Low & Perner, 2012). Second, Rubio-Fernández and Geurts (2013, 2016) argued that it is the attentional mechanism that is responsible for 3-year-olds' consistent failure on the standard verbal FBT. Here we propose a third alternative. We take a position based on interaction theory (for reviews, see Froese & Gallagher, 2012; Fuchs, 2013) and refer to pragmatic approaches in ToM research (Helming, Strickland, & Jacob, 2016; Westra & Carruthers, 2017) in explaining the important role of interaction in children's performance on the FBT. Moreover, a developmental perspective is taken, according to which it is argued that there exists a continuity in ToM development (Sodian, 2016; Thoermer, Sodian, Vuori, Perst, & Kristen, 2012); the development of basic communicative abilities in toddlers eventually allows older children to track the perspectives of others (Carpendale & Lewis, 2006; Liszkowski, 2013) during the FBT. Therefore, we postulate that when children actively participate in the FBT they can pass the task before their fourth birthday. Thus, the aim of the current research was to verify whether the interactive mode facilitates children's performance on the FBT.

Recently, Rubio-Fernández and Geurts (2013, 2016) provided strong evidence for the role of children's attentional processes during the FBT; allowing children to follow the character's behavior facilitates their performance on the FBT. Rubio-Fernández and Geurts (2013) proposed two important modifications of the FBT. The first modification involves the number of characters in the task and the way in which the displacement phase of the task is acted out. In the modified version of the FBT, called the Duplo task, a single character—a Duplo girl figure (i.e., made of large Lego blocks)—is present on the table throughout the telling of the story and, thus, could be observed by the child. The task begins when the Duplo girl puts the object in one of the boxes and then moves forward to the child and stays with her back to the boxes. The child is then asked about the character's perceptual access to the experimenter's activity, and if the child does not confirm the lack of the doll's access, the child is informed about it. At this point, the experimenter displaces the object to the second box behind the Duplo girl's back, and again a short exchange between the experimenter and the child takes place; the experimenter confirms that the character did not see the displacement. The second modification of the FBT is related to the test phase of this task. In the Duplo task, the child is not directly or indirectly asked about the false belief of the Duplo girl ("Where does she think the object is?" or "Where will she look for it?"); rather, the Duplo girl is handed to the child and the child is encouraged to show the experimenter: "What will happen next? What is she going to do now?"

In other words, two modifications to the standard FBT were applied. First, the story is about one character (instead of two characters) who is present while story is told. Second, the child is asked to act out the answer to an open-ended test question (instead of a standard question mentioning the object). Rubio-Fernández and Geurts (2013, 2016) showed that children are able to pass the Duplo task before their fourth birthday. According to the authors, these changes in the protocol allow children to follow the character's perspective and avoid priming the wrong answer, for example, by not mentioning the object in the test question (see Experiment 2b in Rubio-Fernández & Geurts, 2013, and both experiments in Rubio-Fernández & Geurts, 2016). We do not want to oppose this explanation, but we believe that an alternative explanation is also possible, especially concerning the function of the first modification in the FBT. We argue that the first modification in the Duplo task introduces an interactive or so-called "we-mode" (Gallotti & Frith, 2013; Tuomela, 2006) to the FBT. The child is no longer a passive observer of the story being presented by the experimenter but rather starts to be an interlocutor, a partner in a dialogue, who is asked and is informed—during the interaction—about the character's perceptual access ("Can the girl see me from where she is?" and "She hasn't seen what I did, has she?"). These short exchanges between the experimenter and the child about a third party (i.e., about the character's perceptual access), and the fact that in the context of these exchanges the experimenter displaces the object, may also *indirectly* inform the child about the experimenter's motive. In other words, the interactive mode or so-called we-mode is provided in the Duplo task. Children are actively engaged in the task; they actively participate rather than just observe the story being

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