



The role of experience and discourse in children's developing understanding of pretend play actions

Hannes Rakoczy*, Michael Tomasello and Tricia Striano

Max-Planck-Institute for Evolutionary Anthropology, Germany

The present work investigated the development of an explicit understanding of pretend play actions. Study 1 revealed a long *décalage* between earlier implicit understanding of pretence as an intentional activity and a later more explicit understanding. Study 2 was a training study. It tested for two factors – systematic pretence experience and explicit pretence discourse – that may be important in development from early implicit to later explicit pretence understandings. Two training groups of 3.5-year-old children received the same pretence experiences involving systematic contrasts between pretending, really performing and trying to perform actions. In the 'explicit' group, these experiences were talked about with explicit 'pretend to' and 'pretend that' language. In the 'implicit' group no such discourse was used, but only implicit discourse in talking about pretence versus real actions. The two training groups were compared with a control group that received functional play experience. After training, only the explicit group showed improvement in their explicit pretence understanding. In none of the groups was there any transfer to tasks tapping mental state understanding, false belief (FB) and appearance-reality, (A-R). The findings are discussed in the context of current theories about the developmental relations between pretence, discourse, and mental state understanding.

From around 2 years of age, children, when engaged in joint pretending with others, show a solid understanding of pretend play actions. They are not confused about the non-literal treatment of objects in pretence, for example, they do not try to eat a ball in jointly pretending that it is an apple (Leslie, 1988, 1987, 1994). They know that an object can be assigned different pretence identities in different scenarios (e.g. that the ball can now be an apple and later an orange; Harris & Kavanaugh, 1993). And they can even draw systematic inferences about stipulated pretence situations and act accordingly, for example, when a partner pretends to spill some tea on the table, they pretend to clean it up at the corresponding place (Walker-Andrews & Harris, 1993;

* Correspondence should be addressed to Hannes Rakoczy, Max-Planck Institute for Evolutionary Anthropology, Department of Developmental and Comparative Psychology, Deutscher Platz 6, D-04103 Leipzig, Germany (e-mail: rakoczy@eva.mpg.de).

Walker-Andrews & Kahana-Kalman, 1999). These findings *prima facie* suggest that even young children have a quite sophisticated grasp of the nature of pretence actions.

However, when explicitly asked whether someone is pretending or what they are pretending, even much older children struggle. Not until late in their fourth year can children state what an object really is in contrast to what a person pretends it to be (Flavell, Flavell, & Green, 1987). Up to 5 years of age, children, in the so-called 'Moe' task, wrongly say that someone who behaves like an X, but does not know anything about Xs, pretends to be an X (Lillard, 1993b). This suggests that they lack a deeper understanding of pretence as based on knowledge and imagination.

Thus, in the realm of pretence understanding there seems to be a long *décalage* between sophisticated early competence and later emerging abilities to talk about things explicitly, similar to the *décalage* found in other areas of cognitive development. Unfortunately, however, in the study of pretence so far there have been no experiments that directly compared children's performance on different dependent measures - from looking time via action to language measures - in structurally similar tasks. In the area of physical cognition, for example, one such comparative study (though not comparing implicit action with explicit verbal measures, but dishabituation with action measures) was carried out by Hood, Carey, and Prasada (2000). Infants from 2½ months have been found to be sensitive to regularities pertaining to gravity, impenetrability of objects and physical support by looking longer at events violating these regularities in a dishabituation paradigm (Spelke, Breinlinger, Macomber, & Jacobson, 1992). Yet in the study by Hood *et al.*, even 2-year-old children failed to make use of this sensitivity when presented with the same events in an object search paradigm: they consistently looked for the object in places where it could not have been according to principles of gravity and impenetrability. In the area of social cognition, one study directly comparing implicit with explicit verbal measures was completed by Clements and Perner (1994) who presented young children with a traditional unexpected transfer (change of location) false belief (FB) scenario. However, instead of asking the child where the protagonist would look for the transferred object, more implicit measures (looking to one of the locations, and preparatory actions supposed to help the character at one of the locations) were chosen. In these more implicit measures, children revealed sensitivity to the FB of the protagonist long before they could explicitly state the protagonist's FB and take it into account in explaining and predicting his actions.

Following a similar logic, we wanted to compare children's early implicit pretence understanding as revealed in their actions with their explicit verbal understanding of pretending in structurally analogous tasks. Throughout this paper, by an 'implicit' understanding of a domain we mean an understanding in action such that children can competently respond to events and actions from that domain, that has something like a proto-inferential structure and so goes beyond mere discrimination, but is not yet 'explicit' in the sense that children can competently talk and reason verbally about the events in question. For example, in the area of social-cognitive development more generally, children's sophisticated and differential imitation of instrumental actions, failed attempts and mistakes (e.g. Carpenter, Akhtar, & Tomasello, 1998; Meltzoff, 1995) would thus be considered as indicator of an implicit understanding of intentions in 2-year-olds, though children do not become proficient in talking and reasoning about intentions until 4 or 5 years of age (e.g. Astington, 2001.) In the area of pretence, joint pretence with others, such that children imitate and competently react to someone else's pretence action (e.g. pretending to pour into a cup) with another appropriate

pretence action (pretending to drink from that cup), would thus be an indicator of an implicit understanding of pretence.¹

Pretending is intentionally behaving as if one were carrying out an action, different from only behaving as if performing an action unintentionally. Yet perhaps the most influential theory of the development of young children's pretence understanding, the behaving-as-if theory (e.g. Harris, 1994; Jarrold, Carruthers, Smith, & Boucher, Lillard, 1994; Nichols & Stich, 2000; Perner, Baker, & Hutton, 1994) holds that young children only have a superficial concept of pretending to perform an action X as behaving-as-if Xing, and of pretending that p as behaving as if p were true, which is defined as 'behaving in a way that would be appropriate if p (the counterfactual situation) were the case' (Nichols & Stich, 2000, p. 139). That is, according to this theory, young children's concept of pretence does not include the pretender's intention as essential, and so is much more coarse-grained than the mature one and has a much bigger extension than the class of pretence actions. Accordingly, it does not allow for distinguishing pretending from other kinds of as-if-behaviours (that do not produce outcomes), for example, mistakes and trying. The behaving-as-if theory predicts then that young children should make over-extension mistakes, such that they incorrectly apply their concept of pretending to other forms of as-if behaviours.

In a recent set of studies, Rakoczy, Tomasello, and Striano (2004) tested the behaving-as-if theory and showed that in more implicit and action-based tasks children in their third year perceived pretending and trying very differently: they perceive pretending to do an action as intentionally acting-as-if, in contrast to trying as behaving-as-if accidentally only (where one really wants to perform the action properly but fails) – in contrast to the claim of the behaving-as-if theory. In an imitation and turn-taking game, children were presented with pairs of superficially similar as-if-behaviours, trying to do an action, (e.g. to pour) and pretending to do the same action (e.g. to pour; importantly, from a container that could be used to really pour, i.e. contained water). In both cases the actor made the same pouring movements, but the action was not really done, no water came out of the closed container. The trying models were marked with signs of surprise and frustration as trying, the pretence models were marked with signs of playfulness as pretending. Two- and 3-year-old children responded appropriately to the two kinds of models: after trying models, they really performed the action or at least tried to (making use of novel means and commenting on their failure). After pretence models, in contrast, they only pretended to do the action themselves and went on to perform appropriate inferential pretence responses (e.g. after the actor had pretended to pour they pretended to drink).² That is, the young children in these studies showed in their actions and spontaneous language that they understood pretending as a specific intentional action form, as intentionally acting-as-if only, radically different from trying to do an action.

The first aim of the present work was thus to compare these findings with children's performance on a structurally analogous task with a more explicit verbal dependent

¹ What we term 'implicit' here would thus comprise the levels I, E1 and E2 in Karmiloff-Smith's (1992) taxonomy of levels of understanding in cognitive development. For different ways of spelling out the implicit–explicit distinction for the description of cognitive development more generally, see Bermudez (2003), Dienes and Perner (1999) and Karmiloff-Smith.

² The 36-month-olds in this study showed this pattern very clearly. The 26-month-olds showed it very clearly after trying models, whereas after pretence models, they often did make the mistake to really perform the action. However, they still pretended vastly more often after pretence than after trying models, showing that they did differentially perceive the two models.

measure: we presented children with the same kind of action pairs, but instead of looking at their imitations and other action responses, we directly asked them whether the actor had pretended to do X or had tried to do X (e.g. pour). Our prediction for the first study was thus that there would be a *décalage* between early action competence and later explicit verbal ability, that is, the verbal version of the pretending-trying task should be much harder and mastered much later.

In terms of theory, such *décalages* in the area of pretence understanding stand in need of explanation. The second aim of the present work, therefore, was to investigate which factors play a prominent role in the progression from earlier forms of pretence understanding in action, to later, more explicit forms of pretence understanding. In social cognitive development more generally, two factors that have been stressed as crucial motors of a developing social understanding are contrastive experiences, for example, between real and apparent properties of objects (e.g. Flavell, 1988), and specific forms of language and discourse, above all propositional attitude discourse about mental states (e.g. deVilliers & deVilliers, 2000; Harris, 1996; Tomasello, 1999;). In a training study that manipulated both of these factors, Lohmann and Tomasello (2003) recently found that they indeed both contribute to children's developing understanding of mental states, with children learning by far the most when their contrastive experiences are accompanied by explicit propositional attitude discourse about them.

In a second study, therefore, we looked at the role of specific contrastive pretence experiences and explicit pretence discourse in children's developing pretence understanding. Over the course of 2 weeks, two training groups of children were given systematic pretence experiences involving contrasts between real and pretend identities of objects, and between really doing an action, pretending to do that action, and trying to do the same action. For the explicit group these experiences were accompanied by explicit discourse, making use of 'pretend that' (e.g. 'we pretend this is an apple') and 'pretend to' (e.g. 'we pretend to eat') constructions. In the implicit group, in contrast, the experimenter talked about the pretence events in an implicit way, making use of specific implicit pretence discourse marking: only the pretence contents were described (e.g. 'this is our apple!', 'we eat!') in a funny, non-serious voice. The two training groups were compared with a control group who received training with functional play. In accordance with findings in the area of social cognitive development more generally, we expected that explicit discourse about pretence events should play a central role in the progression to a later, more explicit, understanding of pretence actions.

A third aim of the present work was to use the training study to test for the developmental relation between pretence understanding and understanding mental states more generally (so-called 'theory of mind'). In several studies it has been found that measures of pretence comprehension and production earlier in development are correlated with theory of mind measures (above all understanding FBs) later in development (e.g. Astington & Jenkins, 1995; Taylor & Carlson, 1997; Youngblade & Dunn, 1995). However, so far there has only been one systematic training study testing whether extensive pretence experience influences later performance in FB and A-R tasks. In this study (Dockett, 1998), one group of 3- to 5-year-old children (a whole preschool class) received extensive experience with pretend play: over several weeks these children were encouraged by their teachers to engage in diverse joint pretence activities. The control group was another class of a comparable age range that received no such experience. The children in the training group, but not those in the control group, significantly improved both on pretend play measures (complexity of their pretence etc.) and on FB and A-R measures. However, this study had some

methodological shortcomings. First, the lack of an appropriate control group makes it impossible to tell which factors contributed to the improvement of the training group. Specifically, the experience that the training group but not the control group received comprised several elements of which pretence was but one: joint peer interaction and discourse, negotiation of play topics, resolution of conflicting proposals, etc. An appropriate control group would thus have been one that received a treatment involving all these elements except pretence, for example, a group that received comparable amounts of joint functional play. Second, the study did not control for experience with pretence versus discourse about pretence. Our training study thus was an attempt to improve on this study by comparing pretence experience with or without explicit pretence discourse to functional play experience in its influence on the development of mental state understanding (as measured by FB and A-R tasks).

In terms of existing theories, our design allowed us to test some specific claims about the developmental relations of pretence, language, and understanding mental states. First, regarding the relation between pretence and mental state understanding, it has been argued – on the basis of correlational findings and the one training study mentioned above – that pretence presents a zone of proximal development (ZPD; Vygotsky, 1978) for developing mental state concepts (e.g. Bruell & Woolley, 1998; Dockett, 1998; Forguson & Gopnik, 1988; Garfield, Peterson, Garson, Nevin, & Perry, 2003; Lillard, 1993a; Youngblade & Dunn, 1995). The ZPD theory in its most general form claims that pretend play provides an area in which children can easily and concretely experience contrasts between the world as it is and false propositions towards which people can take an imaginative, non-serious as-if attitude. This contrastive experience then helps children to bootstrap themselves into an understanding of serious attitudes towards false propositions (i.e. FBs) such that a person can hold true a false proposition of a real situation (e.g. Garfield *et al.*, 2003; Perner *et al.*, 1994). The ZPD theory would thus predict that children in the two training groups, due to their additional structured contrastive pretence experience, improve on FB and A-R tasks.

The second theory we could test with our design regards the relation of linguistic development and the development of understanding mental states. Many theories claim that language plays an essential role in developing mental state understanding, by supplying mental state concepts and more generally a representational format to reason and talk about mental matters (e.g. Harris, 1996; Olson, 1988; Tomasello, 1999). These theories can be said to share a weak linguistic determinism, stressing the importance of language to the development of social cognition in general.

More specifically, the role of one grammatical factor, the development of the skill to understand and produce constructions involving ‘that’ complementation (e.g. in ‘he believes that the cat is on the mat’, ‘she hopes that the cat is on the mat’, and ‘they pretend that the cat is on the mat’) in the development of understanding mental states has been the focus of much recent debate. Many researchers would agree that ‘that’ complementation is an important and perhaps necessary factor for mental state understanding (e.g. Hale & Tager-Flusberg, 2003; Lohmann & Tomasello, 2003; Perner, Sprung, Zauner, & Haider, 2003). More ambitiously, however, the ‘strong linguistic determinism theory’,³ as it can be called makes the very strong claim that theory of mind development is solely driven by competency with ‘that’ complementation.

³ It is not really clear whether anyone really holds this theory in this radical form, but deVilliers and deVilliers (2000) can be read as having held it at that time, and Perner *et al.* (2003) seem to read them this way at some points.

The present study provides a good test case for the strong linguistic determinism theory in a training design: according to the theory, developing competence in complementation with which attitude verbs whatsoever should lead to improved mental state understanding generally. This could be tested in our training study by comparing children's improvement on 'pretend that' complementation constructions with their mental state understanding (as measured by FB tasks).

In sum, the present work pursued several aims regarding children's developing understanding of pretence and mental states more generally: First, in Study 1 we tested whether *décalages* between earlier pretence understanding in action and later more explicit understanding could be found in a more direct comparison of action responses and verbal answers to structurally analogous tasks. Second, in Study 2 we used a training design to investigate two factors that might account for the development from an earlier pretence understanding implicit in action to a later explicit understanding – systematic pretence experience and explicit pretence discourse. And third, by including FB and A-R tasks in the post-training session of the training study, we investigated the influence of pretence experience and discourse on the development of mental state understanding more generally.

STUDY I

Rakoczy *et al.* (2004) showed that in an imitation and turn-taking game 2- to 3-year-old children perceived pretending to do an action and superficially analogous instances of trying to do that action as radically different. After seeing someone try to do an action, the children mostly really performed the action, or at least tried to really perform it, often trying new means and verbally commenting on their unsuccess (e.g. 'It does not work', 'I cannot do it either'). After seeing someone pretend to do the same action, in contrast, they only pretended to do the action themselves and did not care about whether their action had any concrete effects, or did a pretence action that inferentially 'followed' within the stipulated pretence scenario (e.g. pretended to drink from a cup into which E had pretended to pour). These findings show an understanding in action. In the present study we followed up on these findings and tested when children show an analogous explicit understanding in language. The logic was straightforward: we showed children the same kinds of model actions, but instead of looking at their action responses, we asked them explicitly and verbally whether the actor was pretending to do the action or trying to do the action. Furthermore we included as a baseline measure tasks tapping at children's proficiency with the lexical semantics of words for pretending and trying on a simpler level. Children in these tasks were required to distinguish in their answers between as-if actions (pretending or trying to do X) and as-is actions (really doing X) after they had seen pretence, trying or real action models. That is, we tested their verbal understanding of what can be called the trying-really doing (T-RD) distinction and pretending-really doing (P-RD) distinction. The test questions here were, 'Did he only try to X or did he really X?' and 'Did he only pretend to X or did he really X?', respectively.

Method

Participants

Twenty-four young 3-year-olds (36–40 months; mean = 39 months; 10 boys and 14 girls), 24 young 4-year-olds (48 to 52 months; mean = 48 months; 14 boys and 10 girls)

and 24 6-year-olds (70–79 months, mean = 75 months; 13 boys and 11 girls) were included in the final sample. Two further 3-year-olds, one 4-year-old and one 6-year-old were excluded from the study because they were uncooperative. All children were recruited in urban day-care centres that participated in long-term research projects. Children came from mixed socio-economic backgrounds and were all native German speakers. Testing was done by two experimenters (E1 and E2) in a separate quiet room of the day-care centres.

Materials and design

The same kinds of model pairs with the same kinds of objects were used as in the Rakoczy *et al.* (2004) study. Figure 1 shows the objects that were used in the test phase. Object sets A and B were used to try/pretend to write. With object sets C and D, the actor (E1) tried/pretended to pour. Object sets E and F were used to try/pretend to drink, and objects G and H were used to try/pretend to eat. In all four pairs, the superficial movements were analogous in the trying and the pretending version of an action. One model was additionally marked by signs of surprise and frustration as trying, the other one was marked by signs of playfulness as pretending. For example, with both containers from object sets C and D, the actor (E1) made pouring movements (over a cup and over a flower, respectively) without really pouring (because the containers were closed). For a given child, for example, E1 would make pouring movements with the container from object set C over the cup and mark these by looking surprised and disappointed at the container while trying to pour. With the container from objects set D, he would then for this given child make pouring movements over the flower and mark these by signs of playfulness and 'Sssh' sound effects as pretending to pour. For another child, object set C would be pretended with and objects set D would be used in trying.

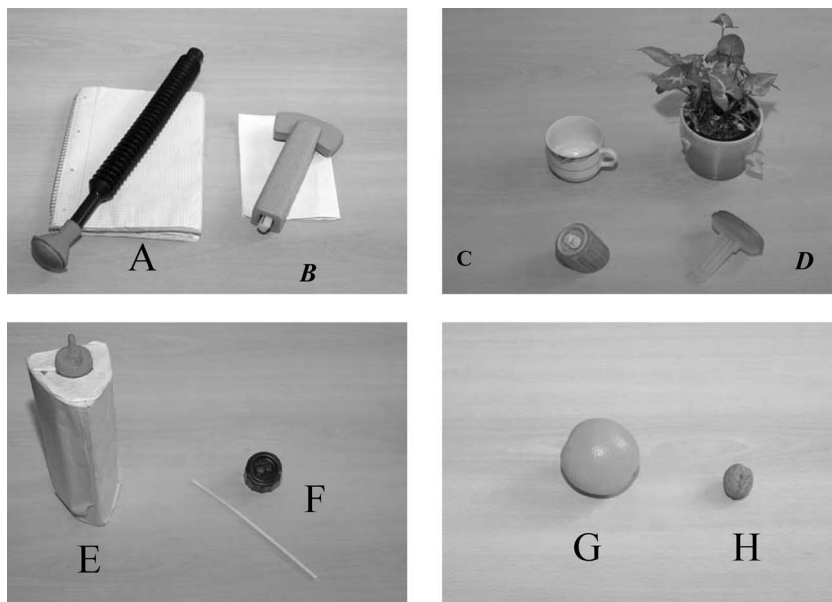


Figure 1. Objects used in Rakoczy *et al.* (2004) and in Study I.

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Each child thus saw eight action models, a block of four pretence models and another block of four thematically matched trying models. The order of the two blocks, the within-block order and the assignment of the two object sets with the same topic to the conditions 'pretending' versus 'trying' were all counterbalanced across children. The order of the topics within both blocks was the same (e.g. when a child would have in their pretence block 'writing' first, they would also have 'writing' first in their trying block).

Procedure

The experiment was done in German. In the beginning, E1, E2, and the child freely played with different toys until the child felt comfortable. Then E2 introduced a puppet hippo, Max, and told the child that Max was always sleepy and did not pay attention to what was happening. She explained that E1 was going to show her some things and do something with them, and that Max would not know what was happening and would then ask the child. The child should then help Max and tell him what had happened. Then there was a general introduction phase to accustom the child to Max and to forced-choice questions, where E1 showed the child four objects (e.g. a replica cat) and E2 (in the role of Max) asked the child, 'Is this a cat or a dog?', and then demonstrated some simple actions (e.g. reading) and E2 asked 'Is he reading, or is he sleeping?' In this general introduction phase correct answers were reinforced strongly by E2. When the children gave the wrong answer, E2 gave them another chance, saying, 'Well, look closely once more!' and repeating the question.

After this general introduction the experiment started (for an overview of the structure of the experimental session, see Appendix A). E2 did not reinforce correct answers any longer. E1 now, whenever he demonstrated pretend to X or try to X actions, announced before in a neutral way, 'I am going to X now'. The first phase was a general baseline phase in which we tested for children's ability to verbally distinguish T-RD and P-RD as a simpler baseline measure. The general baseline phase thus had two parts: E1 demonstrated first five actions, announcing 'I am going to X now', three of them failed attempts and two successful, and E2 asked the child the T-RD question 'Did he *only* try to X or did he *really* X?' (order of try to/really do counterbalanced across questions). Then E1 demonstrated five further actions, three of them pretence and two real actions, and E2 asked the child the P-RD question, 'Did he *only* pretend to X or did he *really* X?' (as in a previous German study on children's pretence concept (Sodian, Hülshen, Ebner, & Thörmer, 1998), the German word 'spielen' was used. The sentence for the pretending-really doing distinction was then 'Hat er nur Xen gespielt oder hat er wirklich geXt?'). The order of 'pretend to X'/'really X' was counterbalanced across questions. The large number of baseline questions were included because we expected the test questions to be difficult and so wanted to give children the chance to get used to simpler questions making use of 'pretend' and 'try'. Furthermore, the P-RD and T-RD distinction questions provided an interesting baseline for children's verbal distinction of trying and pretending.

In the second phase there were the two test blocks, each with a corresponding specific baseline phase. Exactly the same baseline actions and test actions were here used as in Rakoczy *et al.* (2004). In the specific baseline for the pretence test block, E1 demonstrated three pretence actions (e.g. pretended to brush his teeth) and E2 asked the child the pretence reality (P-R) question, 'Did he only pretend to X or did he really X?' In the specific baseline for the trying test block, E1 demonstrated three trying actions (e.g. try to open an object), and the child was asked the T-RD question, 'Did he

only try to X or did he really X?' That is, each child received in sum, in the general and specific baselines, eight T-RD questions (after six trying and two real actions) and eight P-R questions (after six pretending and two real actions). See Appendix A for the actions and corresponding questions.

The test models were the same as in Rakoczy *et al.* (2004) with the same counterbalancing of order of model-blocks, within-block order and assignment of objects to conditions. E1 demonstrated the actions in the same way as it had been done in the Rakoczy *et al.* (2004) studies, with one important exception: before each action (pretend to X or try to X) he announced, 'I am going to X now.' This was done in order to make the task easier for children by discounting one possible source of difficulty, children's possible ignorance of the corresponding verb. When the verb appeared then in the test question, the children had already heard it in E1's announcement. The test question was, 'Did he pretend to X, or did he try to X?' or 'Did he try to X or did he pretend to X?'⁴ The order of 'try' and 'pretend' in the forced-choice questions was counterbalanced across and within subjects. Importantly, each child received after the two thematically matched models (e.g. trying to write and pretending to write) the same question with the same order of alternatives. And each child received in each test block two questions with 'try' as the last alternative and two with 'pretend' last.

Results

First we analysed as a baseline measure children's performance on the distinctions between T-RD and P-RD. Table 1 shows the number of children showing 0–8 correct answers in the P-RD and the T-RD questions as a function of age.

As the focus of the present study was to test for individual children's competence in verbally distinguishing pretending, trying and really performing an action, individual performance was measured against a normative standard. For the P-RD and T-RD distinctions, ranging from 0 to 8, a score of at least six was considered as success. For the P-T distinctions after both pretence and trying models, ranging from 0 to 4 each, at least three out of four correct answers counted as a success. To analyse for differences between the age groups, non-parametric tests on the number of children fulfilling these criteria were performed.

According to these criteria, fifteen 3-year-olds, nineteen 4-year-olds and twenty-two 6-year-olds performed successfully on the trying-really doing distinction (with a marginal difference between the age groups, $\chi^2(2, N = 72) = 5.95, p < .051$). In contrast, eight 3-year-olds, nine 4-year-olds and twenty-three 6-year-olds performed successfully on the pretending-really doing distinction (with a highly significant difference between the age groups, $\chi^2(2, N = 72) = 23.74, p < .0001$). That is, all age groups were quite proficient at distinguishing trying to do an action from really doing that action, but the 3- and 4-year-olds found it difficult to say whether someone was pretending to do an action or really was doing that action.

Table 1 also shows the performance of the three age groups on the pretending-trying distinction at test after the four pretence and the four trying models. Ten 3-year-olds, thirteen 4-year-olds and twelve 6-year-olds performed successfully after trying models. After pretence models, seven 3-year-olds, nine 4-year-olds and sixteen

⁴ The German wording was 'Hat er Xen gespielt, oder hat er Xen versucht?' and 'Hat er versucht, zu Xen, oder hat er Xen gespielt?', respectively.

Table 1. Performance of the three age groups on P-RD and T-RD distinction tasks in the baseline phase of Study 1

		Number correct								Mean number correct	
		0	1	2	3	4	5	6	7		8
3-year-olds (<i>N</i> = 24)	P-RD	0	1	4	2	4	5	5	3	0	4.46
	T-RD	0	0	0	1	2	6	3	6	6	6.21
	P-T after pretence models (0–4)	7	4	6	4	3	–	–	–	–	1.67
	P-T after trying models (0–4)	2	1	11	2	8	–	–	–	–	2.54
4-year-olds (<i>N</i> = 24)	P-RD	0	0	10	1	2	2	3	6	0	4.21
	T-RD	0	0	0	0	3	2	3	10	6	6.59
	P-T after pretence models (0–4)	4	4	7	1	8	–	–	–	–	2.21
	P-T after trying models (0–4)	2	1	8	4	9	–	–	–	–	2.71
6-year-olds (<i>N</i> = 24)	P-RD	0	0	0	1	0	0	2	9	12	7.25
	T-RD	0	0	0	0	1	1	1	0	21	7.63
	P-T after pretence models (0–4)	4	2	2	4	12	–	–	–	–	2.75
	P-T after trying models (0–4)	6	3	3	2	10	–	–	–	–	2.29

6-year-olds were successful. Interestingly, if one takes at least three out of four correct answers after both models as a (minimal) criterion for overall successful performance, only one 3-year-old, three 4-year-olds and five 6-year-olds performed successfully after both models, with no significant differences between the three groups, $\chi^2(2, N = 72) = 3.05, p < .22$. In sum, although there was a slight increase in performance with increasing age, after both the trying and pretending models, none of the three age groups were very proficient at saying whether someone pretended to perform an action or tried to do that action.

These findings contrast sharply with the performance of the 3-year-olds in the original non-verbal version of the task in Rakoczy *et al.* (2004). In that study, children's non-verbal action responses to the same models were analysed. After pretence models, pretending to do the same action as E was considered 'correct', and really performing or trying to perform the action was considered 'incorrect', and vice versa after trying models. In a normative re-analysis of the data, similar to the one applied here, twenty-one out of twenty-four 3-year-olds performed more correct than incorrect actions after pretence models, and 21 of 24 performed more correct than incorrect responses after trying models, with 18 children performing more correct than incorrect responses after both kinds of models (see Table 2).

Table 2. Number of children performing successfully in Study 1, compared with the 3-year-olds in Rakoczy *et al.* (2004)

	Successful?	Successful?	
		Yes	No
P-T after pretence models	3-year-olds Rakoczy <i>et al.</i> (2004)	21	3
	3-year-olds Study 1	7	17
	4-year-olds Study 1	9	15
	6-year-olds Study 1	16	8
P-T after trying models	3-year-olds Rakoczy <i>et al.</i> (2004)	21	3
	3-year-olds Study 1	10	14
	4-year-olds Study 1	13	11
	6-year-olds Study 1	12	12
P-T after both models	3-year-olds Rakoczy <i>et al.</i> (2004)	18	6
	3-year-olds Study 1	1	23
	4-year-olds Study 1	3	21
	6-year-olds Study 1	5	19

Note. Success is defined as at least 3 out of 4 correct answers for Study 1, and as more correct than incorrect action responses for the 3-year-olds in Rakoczy *et al.* (2004).

Discussion

Rakoczy *et al.* (2004) found that in their action responses 3-year-olds show that they perceive pretending to do an action and trying to do an action as such, respectively, and as radically different from each other. When they see someone try to do an action, they mostly really do that action, or try to really do it with novel means, indexing that they understood the goal of the actor to properly perform the action. In contrast, when seeing someone pretend to do that action, they mostly only pretend to do that action and actions that 'follow' within the stipulated pretence scenario, showing an awareness of the intention of the actor to act non-seriously, as if performing the action only. Presented with the same kinds of models, even 6-year-old children in the present study performed rather poorly at answering the question whether the actor pretended or tried to do an action. Analyses of the simpler baseline tasks where children had to say whether someone was trying or really doing an action, and whether someone was pretending or really doing an action, suggest that it might be that younger children have specific problems with the lexical semantics of the word 'pretend': while 3- and 4-year-olds were good at saying whether someone was trying or really doing an action, they found the question whether someone was pretending to do or really doing an action difficult.

This latter finding might seem surprising in the light of results that children can verbally make distinctions between real and pretence identities of objects in their fourth year (Flavell *et al.*, 1987). However, the questions used in the Flavell *et al.*, study were of a different structure than the ones administered here. Whereas Flavell *et al.*'s questions had the form, 'Did he pretend that this object is an A or did he pretend that it is a B?' or 'Is the object really an A or a B', ours had the form 'Did he pretend to X or did he really do X?' That is, Flavell *et al.*'s question asked about identities either within the counterfactual pretence scenario or within the real situation, whereas we asked whether an action was done seriously in the real-world or in a counterfactual pretence scenario only. It is possible that the latter type of question is more difficult. Flavell *et al.*'s questions can be understood by children as something like: 'in the pretence scenario, is it an A or a B?' and as 'in reality, is it an A or a B?', whereas our questions required the

assignment of an action predicate X to either the counterfactual pretence scenario or the real-world. Studies using direct comparison between these two kinds of tasks are needed, however, to settle this issue.

The present findings, taken together with Rakoczy *et al.*'s (2004), thus show in a direct comparison a remarkable *décalage* between children's early implicit pretence understanding in action, and their much later emerging analogous explicit pretence understanding in words. This *décalage* seems even more dramatic than analogous ones in other areas of cognitive development. Even at 6 years children were not very good at verbally answering a task correctly, the imitation and action version of which even 2- to 3-year-olds solved quite proficiently. This pattern does, however, fit with other research on children's development of pretence understanding. On the one hand, in their third year children can follow counterfactual pretence scenarios and even describe them in simple ways (Harris & Kavanaugh, 1993). On the other hand, even 5- to 6-year-old children have a hard time correctly judging whether someone is pretending in such tests as the Moe task (Lillard, 1993b, 1998).

This *décalage* poses the conceptual question of how to characterize the earlier implicit abilities revealed in action and their relation to the later verbal abilities. In line with recent theoretical work on preverbal cognitive abilities (Bermudez, 2003; Hurley, 2003; Karmiloff-Smith, 1992), children's early understanding of pretending as revealed in the Rakoczy *et al.* (2004) study is best interpreted as being on an intermediate level in between mere perceptual discrimination and fully-fledged explicit conceptual thought. Children did not only discriminate pretending from trying, but they responded appropriately with imitations and creative acts. This level of understanding can thus be characterized as having a proto-conceptual structure, involving inferential and normative aspects. Children know what action 'follows' from the partner's action and what is warranted for them to do. However, though children's actions at this level reveal something like an inferential structure, inferential conceptual thought proper only comes into play later when children can competently talk and reason about pretending and trying (for a fuller discussion of these issues, see Bermudez, 2003).

The second, empirical question posed by the *décalage* is what developmental factors are responsible for it. Two possible factors that have been stressed as important in social cognitive development more generally are systematic contrastive experience and explicit structured discourse. First, it might be that, though even young children have a lot of experience with real states of affairs and with counterfactual pretence scenarios, they lack systematic experience involving structured contrasts between reality and pretence worlds. This may lie in the nature of pretend play. When pretending that a ball is an apple, one does not normally in the pretend play, touch upon the fact that the ball is a ball at all. Rather, the pretence is also temporally quarantined from reality: now the ball is our apple, later on - when we have finished our pretence - it is the ball again. Two- and 3-year-olds know what to do in serious contexts (really doing actions, trying to do actions) and in non-serious pretence contexts, and thus can solve the imitation and action version of the pretending-trying distinction. But perhaps lacking contrastive experience hinders them from coordinating serious and non-serious contexts, which is required to solve the verbal version of the pretending-trying distinction.

Second, explicit discourse about pretence actions and scenarios might play a prominent role in children's development of a more explicit pretence understanding. Discourse involving 'pretend that' and 'pretend to' constructions might be crucial in supplying children with a format to coordinate, talk, and think about pretence actions

and states of affairs in contrast to serious actions and real events. In fact, it is very probable that young children normally do not have very much experience with this kind of explicit discourse. The reason is that in talking about pretend play, explicit 'pretend that' and 'pretend to' constructions are not used very often, as there are other more implicit ways of marking discourse as being about pretence events (e.g. Garvey & Kramer, 1989; Lloyd & Goodwin, 1995). For example, one can speak in a more funny voice to signal that one talks about non-serious matters, just describing the pretence content ('Oh! Our apple') instead of explicitly stating that it is a pretence content ('we pretend that the ball is an apple'). Also, in many languages, special tenses are used to implicitly mark discourse about pretence events (e.g. subjunctive II in German and past tense in English; see Kaper, 1980; Lodge, 1979).

Therefore, in the next study, we tested for the roles of these two factors in the development of more explicit forms of pretence understanding with a training design.

STUDY 2

To pursue our second aim - to test for the role of systematic experience and explicit discourse in the development of more explicit pretence understanding - and our third aim - to test for the influence of pretence development on mental state understanding - we conducted a training study with 3.6-year-old children. In this study we were interested in the development of an explicit understanding of pretending in two respects: (a) explicitly understanding pretending as intentionally acting-as-if, different from trying, as indexed by the ability to say whether an actor is pretending or trying to do an action (P-T distinction as in Study 1); (b) explicitly understanding pretence contents in contrast to real states of affairs, as indexed by the ability to say what an object really is and what one pretends it to be (P-R distinction after Flavell *et al.*, 1987). There are two kinds of systematic contrastive pretence experiences that roughly correspond to the two kinds of understanding tested. First, experience involving contrasts between pretending to do an action, trying to do that action and really doing that action - corresponding to (a). Second, experience involving contrasts between real states of affairs and counterfactual pretence propositions, for example between the fact that the ball is a ball and the pretence scenario that the ball is an apple - corresponding to (b). Two training groups thus received these two kinds of contrastive experiences in the training sessions. The two training groups differed, however, in the kind of discourse that was used to talk about these experiences. In the explicit group, the experiences were talked about in an explicit way making use of the word 'pretend', both in 'pretend to' and in 'pretend that' constructions. In contrast, in the implicit group, the experimenter made use of common implicit pretence discourse markers (funny voice etc.) to talk about the same training experiences. Instead of 'we pretend to eat' he would say 'we eat' in a funny voice, instead of 'we pretend this is our apple' he would use 'this is our apple' in a funny voice. The two training groups were compared with a control group that received the same amount of play experience involving the same objects, but the children in this group received functional play. Based on the contention that natural language plays an essential role as motor of representational re-description (Karmiloff-Smith, 1992) of implicit into explicit cognitive abilities (Tomasello, 1999; Tomasello & Rakoczy, 2003), our central hypothesis was that explicit discourse should prove crucial in developing a more explicit conceptual understanding of pretence. Accordingly, the

explicit group should profit from the training experience and outperform the implicit and the control group on both pretence understanding measures.

To pursue the third aim of the present work – testing for the influence of developing pretence understanding on the development of understanding mental states – we included two kinds of traditional ‘theory of mind’ tasks in the study: A-R and unexpected content (‘smartie’) FB tasks. This allowed us to test two existing theories regarding the relation of developing pretence understanding, explicit complementation discourse and understanding mental states (measured by FB and A-R tests). First, regarding the relation of developing pretence understanding to the development of understanding mental states more generally, the zone of proximal development (ZPD) theory claims that pretence provides a ZPD for developing mental state understanding. It would thus receive support by an influence of pretence experience on mental state understanding. Second, regarding the relation of language development and developing mental state understanding, the strong linguistic determinism (SLD) theory claims that the development of understanding mental states (FBs being the paradigm case) can be accounted for by the development of one linguistic factor alone: the development of syntactic competence with finite ‘that’-complementation in explicit propositional attitude sentences. As ‘pretend that’ constructions are an instance of such complementation, the SLD theory predicts that improvement in ‘pretend that’ complementation should go along with improved mental state understanding.

Method

Participants

Sixty children were included in the final sample. There were 24 children in the explicit group (11 boys and 13 girls), 18 in the implicit group (9 boys and 9 girls), and 18 in the control group (8 girls and 10 boys). The children in each of the three groups had an age range of 40–44 months, with a mean age of 42 months. All children were recruited in urban day-care centres that participated in long-term research projects. Children came from mixed socio-economic backgrounds and were all native German speakers.

To be included in the final sample, children had to pass three criteria: first, they had to be in the normal range regarding their vocabulary; second, they must not have solved P-R and A-R distinction tasks in the pre-training session; third, they had to answer correctly control questions in a Moe task in the pre-training session. Ten children were excluded because they missed the first criterion, 20 because they missed the second (9 children performed at ceiling in P-R, 8 in A-R, and 3 in both), and three because they did not fulfil the third. Another 38 children had to be excluded because they missed a session due to illness or holidays, or were uncooperative. Thus, a total of 131 children (66 boys, 65 girls; age range = 40–45 months, mean age = 42 months) were seen for this study. The children that passed the three criteria were assigned to one of the three groups quasi-randomly, with age being the only factor controlled for, such that the three groups had the same age range and mean age.

Design

Each child participated in four sessions with one and the same experimenter within a period of 2 weeks. There were always at least 2 days in between two subsequent sessions. Testing was done in a separate quiet room of the day-care centre. Two experimenters participated in this study, with each experimenter testing approximately

the same proportion of children in all three groups. Sessions lasted 20–30 minutes. There were four sessions for each child:

Session 1: Pre-tests and some training elements

Session 2 and 3: Only training elements

Session 4: Short booster training and post-tests

There were more children in the explicit group because within that group, after the 12 first children were tested with a procedure as analogous as possible to the implicit group, another 12 children were tested with a slightly modified explicit procedure – less similar to the implicit group – to test for a possible confound in the original explicit procedure (details see below).

Materials and procedure

Pre-tests

The following pre-tests (see Appendix B) were administered (in this order⁵): (1) the vocabulary subscale of the Kaufman Assessment Battery for Children (K-ABC; Kaufman & Kaufman, 1999). (2) Two combined A-R and P-R tasks after Flavell *et al.*, (1987). The experimenter (E) brings an object that is an X (e.g. alarm clock) but looks like a Y (e.g. lemon) and asks the child what the object is. When the child says ‘a Y’, E gives the object to the child to explore it, and so on, and points out to the child that the object is not a Y, but an X. In the A-R tasks the two test questions are ‘what does it look like?’ and ‘what is it really?’ For the P-R task, E announces to the child that she/he is going to pretend something with the object and then pretends that the object is a Y (e.g. by pretending to take a bit of it and pretending that it tastes sour), and then asks the two test questions ‘what did I pretend this is?’ and ‘what is it really?’ The order of A-R and P-R questions with one object were counterbalanced across subjects, and for each subject it was counterbalanced across the two combined tasks which one was first. To pass an A-R or P-R task, children had to answer correctly both what the object really was and what it looked like (A-R) or what E pretended it was (P-R). (3) An adapted version of a Moe task (Lillard, 1993b; modifications after Davis, Woolley, & Bruell, 2002). In the original version of the Moe task (Lillard, 1993b) the test question is whether Moe pretends to be a rabbit. While the vast majority of children up to 5 years of age fail this original version, even some 3- and 4-year-olds performed proficiently on Davis *et al.*'s (2002) modified version, which is the reason for choosing the latter in the present study. The child is told a story about a character from a foreign land or planet, with the support of a hand puppet or doll that represents the character. The story contains two premises: first that the character is behaving just like a certain animal (e.g. hopping like a rabbit), and second that the character does not know this kind of animal because it does not exist where she/he comes from. The two control questions check whether children remembered these premises (e.g. ‘is he hopping like a rabbit?’ and ‘does he know what a rabbit is?’). When a child failed one of the control questions, the story was repeated and the questions were asked again (up to three times in total). The test question is whether

⁵ The K-ABC was presented first because children like it and it is a good warm-up. Furthermore, this order of tasks was chosen for successive screening. It was expected that most children would have to be excluded because of failing to fulfill the criteria in the K-ABC, next most because they were too good in A-R and/or P-R, and the least due to failure of criterion (i.e. answering control questions correctly) in the MOE task.

the character is pretending to be or just behaving like an animal of the respective kind, for example, 'is he pretending to be rabbit or is he just hopping so?' (order of alternatives counterbalanced across children and tasks).

Training sessions

In the training sessions, for all three groups, the same objects were predominantly used. All three groups received experience with (functional or pretend) play in two forms. First, the child and E interacted and played together (for a total of approximately 40 minutes across Sessions 1–3). In the real-life interaction between child and E, various kinds of objects – mostly semi-novel, novel or conventional – were used to play and pretend with (details see below and in Appendix C). Second, the child and E together watched (on a portable TV set) movies about a third person who did functional or pretend play (for about 10–15 minutes in Session 3). These two elements (real life interaction and watching videos) were combined to encourage children in the training groups to talk about pretence not only in the first and second person singular and the first person plural, but also in the third person.

The interaction between child and E in the two training groups included the following elements (in this order): (1) Simple pretence and imitation games (E pretends that an object is of another kind and pretends to do an action with it. The child is then given the object and told it is her turn). (2) Simple trying imitation games (E tries to perform an action with the object and fails. The child is then given the object and told it is her turn. If the child does not succeed in really performing the action, E helps). (3) A joint pretence scenario (E and child engage in an extended pretence scenario with complementary actions, e.g. pretend to cook and have a tea-party). (4) A joint trying scenario (E and child engage in an extended sequence of trying to accomplish a goal by trying different means and finally succeeding). (5) Trying and pretending combined. E tries to do an action with an object (e.g. cut a wooden block with a knife) and fails, gives the objects to the child, and the child tries as well. E then tries again and fails, looks frustrated. He/she then makes a short pause, thinking demonstratively, then says 'Ah!', switches to a non-serious expression and pretends to do the action only (with superficially similar movements). The child is then given the objects again. (6) Pretending with tools (E shows the child an object with conventional function. They first use it accordingly. Then they pretend that the object is of another kind).

The movies about the third person showed her performing the following kinds of actions (in this order): (1) Multiple pretence with one object. The person brought out an object, looked at it, thinking demonstratively. She then pretended that it was an X. She then thought demonstratively again and then pretended that the object was a Y, and so on. In total she pretended three different things with one object after the other. (2) Pretending with tools (as in the child-E interaction). (3) Really doing, trying and pretending combined. The person first did an action properly (e.g. cut a cookie with a knife), then they tried to do the same kind of action on another object (e.g. cut a wooden block). As in the trying and pretending combined interaction, the person looked frustrated, then paused and finally switched to a non-serious mode and pretended to do the action only.

These training elements thus essentially contained contrastive experiences between the real identities of objects and their pretence identities, between different pretence identities of objects over time, between pretending and really doing an action, between trying to do and really doing an action, and between pretending and trying to do an action. The two training groups differed, however, in the discourse E used to talk about these experiences. In the explicit group, E made use of 'pretend that', 'pretend to' and

'try to' constructions to explicitly describe the actions and events and to stress the contrast between real object identities and actions, pretence identities and actions, and failed attempts. For example, when watching the movie where the actor brings out a shoe and first uses it appropriately, that is, puts it on her foot, and then pretends that it is her cup, from which she pretends to drink, E would describe the actions in the following way: 'Look! This is a shoe. You can put it on your foot. Now she is putting it on her foot. But look what she is doing now! Now she is pretending that it is her cup, and she is pretending to drink'.

In the implicit group, in contrast, E would never make use of any 'pretend' or 'try' constructions, but rather talk about the actions and events in implicit ways. For example, the same movie would be described by E in the following way: 'Look! This is a shoe. You can put it on your foot. Now she is putting it on her foot. But look what she is doing now! Now it is her cup, and she is drinking (funny voice)'.

The control group received functional play experience that was structurally as similar to the experience of the training groups as possible, and with mostly the same objects as the two training groups (the objects differed only in one case because the corresponding training group actions involved replica cups and plates which afford pretence too strongly). For example, the objects that were used in the training groups in trying imitation games, were used in the control group for analogous normal imitation games. That is, instead of unsuccessfully trying to perform an action and handing the object to the child, E properly performed the action and handed the object to the child. The objects that were used in the training groups to first try to do an action and then pretend to do the same action (trying and pretending combined), for example, the knife to try and pretend to cut, were used in the control group to properly perform the action twice on different substrates (e.g. cut two different cookies). The objects that the actor in the movie used in the training groups to pretend three different things with, were used in the control group movie to perform three different proper actions with it (see Appendix C for details). In the control group, E just talked about the real identities of objects and the actions performed with them, for example, 'This is a knife. We cut this with it. And now we cut that with it'.

In all three groups, after E had described the experience with the respective kind of discourse, E asked the child specific questions about what had happened to encourage the child to use the same kind of discourse E had used. For example, when watching the movies about a person who pretended three things with one object (training groups) or performed three different actions with one object (control group) E first described the actions with the respective kind of discourse. After the movies, then, E asked the children in explicit group, 'What did she pretend it was first? And then?', and so on. The children in the implicit group were asked, 'What was it first? It was her? And then?', and the children in the control group, 'What did she do first with it? And then?' In all three groups E made heavy use of giving cues when necessary (e.g. 'he pretended that. . .'), of negative feedback and of positive reinforcement of correct answers.

Post-tests

In the post-test the following tasks were administered (see Appendix 2 for an overview): (1) two combined A-R and P-R tasks (as in the pre-test, but with different topics). (2) Two Moe tasks (as in the pre-test, but with different topics). (3) Tasks where children had to say whether an actor was P-RD and whether someone was T-RD, as used in Study 1. In the P-RD tasks, the child saw a movie of person that pretended to do four actions, for

example, to wash herself. After each action sequence in the movie, E asked the child, 'Did she only pretend to wash herself or did she really wash herself?' (order of alternatives counterbalanced). Analogously, in the T-RD tasks the person tried to do four actions, and the child was asked (by the same hand puppet as in Study 1) whether she had only tried to do the action or really done it. (4) The same pretending-trying (P-T) distinction task as in Study 1 was used. Children saw on video the same four pretence models and the same four analogous trying models and were asked (by the same hand puppet as in Study 1) whether the person had pretended to do the action (e.g. pour) or tried to do the action (e.g. pour). Children could thus get a score from 0 to 4 after pretence models and after trying models each, and a total score of 0–8. (5) Two unexpected content ('Smarties') FB tasks (after Gopnik & Astington, 1988): a familiar container (e.g. 'Smarties' box) is shown to children and they are asked what they think is inside. After having said 'Smarties', children are shown the real content of the container (e.g. a pencil), and are asked what is in the container. Then the container is closed again and the two test questions are asked, regarding the first person ('What did you think was in the box?') and the third person ('What would another child think is in the box?'). Each unexpected content task thus yielded a score of 0–2, and both together a total score of 0–4.

The test session (session 4) was the same for children of all groups except two short episodes of booster training in the session: The session was ordered as follows:

- (1) short booster training: two items from the simple imitation games done in Session 1;
- (2) P-RD or T-RD (counterbalanced across children within each group);
- (3) first block of P-T distinction (pretence models when P-RD was before, trying models when T-RD was before, as in Study 1);
- (4) A-R and P-R;
- (5) Moe;
- (6) second part of short booster training: two items from simple imitation games done in Session 1;
- (7) T-RD (when (2) had been P-RD) or P-RD (when (2) had been T-RD);
- (8) second block of P-T distinction (trying models when pretence models were first and vice versa), and
- (9) FB.

The short booster training was originally kept as similar as possible across groups: for the implicit group and the first 12 children of the explicit group, two short items of pretence imitation were used before the P-RD and P-T regarding pretence models. Analogously, two short items of trying imitation were used before T-RD and P-T regarding trying models (the control group got the corresponding simple imitation items with the same objects). This short booster training was supposed to 'reactivate', so to speak, children's experience with pretending and trying. There was, however, one possible concern: for the first 12 children in the explicit group, it could be argued that they might simply get primed to use the word 'pretend' and subsequently answer P-RD and P-T regarding pretence models correctly based on simple priming (and analogously for 'try'). However, no such concerns would apply to the implicit group that never heard E use the words 'pretend' and 'try' in the training, including the booster training. Therefore, another 12 children were run in the explicit group with a slightly modified procedure: both booster training blocks now consisted of one simple pretence and one simple trying

imitation item from Session 1. This modification could rule out simple priming of either 'pretend' or 'try' as possible explanations of success on the P-T distinction, because now children would hear both words equally often in both booster training blocks. As this modification did not make a difference to children's performance, the 24 children in the explicit group were eventually analysed as one group.

Results

Preliminary tests

A total of 131 children were seen for (parts of) the first session, all of whom completed the K-ABC vocabulary test (mean score = 13.81, $SD = 2.10$), 120 of whom completed the P-R and A-R pre-tests, and 102 of whom completed the Moe pre-tests.⁶ Table 3 shows the mean number of correct answers in these three tasks. As can be seen from the table, children were rather poor in all three tasks (chance level would be 0.5 for A-R and P-R, and 1 for Moe), and surprisingly they were not better in P-R than in A-R, Wilcoxon test, $Z = .70$, $p < .48$. That is, the present study could not replicate the result reported by Flavell *et al.* (1987) with English speaking children, and by Sodian *et al.* (1998) with German-speaking children, that distinguishing pretence from reality was easier for 3- to 5-year-olds than the structurally analogous A-R distinction. One reason for this could be the fact that the children in the present study were about 2 months younger than the ones in the Sodian *et al.*, study. These 2 months might be crucial in that children improve in their pretence understanding in this time, but not yet in their understanding of appearance and reality.⁷

Table 3 also shows the mean ages, vocabulary scores, and pre-test scores on A-R, P-R and the Moe test of the 60 subjects included in the final sample. Statistical analyses confirmed that there were no significant differences between the groups on these variables (ANOVAs for age and vocabulary score: $ps < .90$; Kruskal Wallis tests: $p < .92$ for A-R, $p < .54$ for P-R and $p < .24$ for Moe).

Pretence measures

To test for effect of training on children's P-R distinction, a difference score was computed, subtracting the pre-test P-R score (0-1; as children with a pre-test score of 2 were excluded from the study, see above) from the post-test P-R score (0-2). This difference score ranged from -1 to 2. Regarding the differential influence of pretence experience and discourse on children's ability to distinguish P-RD and T-RD, and on children's pretending-trying distinction (P-T), the three groups were compared against each other.

As preliminary analyses confirmed that the half of the explicit group with the modified booster training did not perform significantly different from the first 12 children in the explicit group (those with the booster training analogous to the implicit group) on P-RD (Mann-Whitney U test, $Z = .38$, $p < .70$), T-RD (Mann-Whitney U -test, $Z = .91$, $p < .36$), and P-T (Mann-Whitney U test, $Z = .56$, $p < .58$), all 24 children in the explicit group were analysed together as one group.

⁶ The session was stopped when a child performed below the norm in the vocabulary test (which explains why fewer children participated in A-R and P-R than in the vocabulary test), and when a child performed at ceiling in A-R or P-R, or when control questions were not answered correctly after three repetitions in the Moe task (which explains why there were fewer children in Moe than in A-R and P-R).

⁷ The present study also failed to replicate the results by Davis *et al.* (2002) that the revised Moe task is fairly easy for 3-year-olds. Many factors might be responsible for this difference, particularly linguistic differences between English and German.

Table 3. Means (and standard deviations) of age, vocabulary score, A-R, P-R and Moe scores of the included subjects ($N = 60$) in pre-test

	All subjects tested ($N = 131$)	Included subjects ($N = 60$)		
		Explicit group ($N = 24$)	Implicit group ($N = 18$)	Control group ($N = 18$)
Age in months	41.93 (1.12)	42.10 (1.05)	41.98 (1.24)	42.00 (1.05)
Vocabulary score	13.81 (2.10)	14.21 (1.50)	14.28 (1.67)	14.06 (1.55)
A-R (0–2)	.48 (.66)	.33 (.48)	.28 (.46)	.33 (.49)
P-R (0–2)	.53 (.67)	.50 (.51)	.33 (.49)	.39 (.50)
Moe (0–2)	.89 (.64)	.71 (.62)	.67 (.48)	1.00 (.69)

Table 4 shows the numbers of children in the three groups with P-R difference scores of -1 – 2 . Separate Wilcoxon tests for each group, comparing children's P-R pre-test and P-R post-test scores revealed that only the explicit group significantly improved ($Z = 2.55$, $p < .006$) from pre- to post-test. Neither the implicit ($Z = .71$, $p < .24$) nor the control group ($Z = 0$, $p < 1$) showed such an improvement.

Table 4. Number of children showing P-R and Moe difference score from -2 – 1 to 2 in the three groups

	P-R difference scores				Moe difference scores				
	-1	0	1	2	-2	-1	0	1	2
Explicit group ($N = 24$)	2	11	8	3	1	2	14	6	1
Implicit group ($N = 18$)	3	10	5	0	0	3	9	5	1
Control group ($N = 18$)	5	8	5	0	0	7	10	0	1

Table 5 shows the performance of the three groups on P-RD and T-RD. In contrast to the 3- and 4-year-olds from Study 1, all three groups performed quite well on both kinds of tasks. Taking answering at least three out of four questions correctly as criterion for success, at least two-thirds of the children in each group performed successfully in each task. There were no significant differences in the number of children performing above chance between the three groups on either P-RD, $\chi^2(2, N = 60) = 0.96$, $p < .62$, or T-RD, $\chi^2(2, N = 60) = 1.33$, $p < .51$.

Table 5 also shows the number of children answering 0–4 questions correctly in the P-T task after pretence and trying models. Taking as a criterion for successful performance that a child answers at least three out of four P-T questions correctly after both pretence and trying models (as in Study 1), children in the explicit group showed some proficiency, while the other two groups were at floor in their performance: 10 out of 24 children in the explicit group performed successfully, compared with 2 out of 18 in the implicit group, and 3 out of 18 in the control group (see Table 6). Significantly more children in the explicit group were successful than both in the implicit group, $\chi^2(2, N = 60) = 4.71$, $p < .015$, and in the control group, $\chi^2(2, N = 60) = 3.01$, $p < .042$.

Table 5. Performance of the three groups on P-RD, T-RD and P-T

		Number correct	0	1	2	3	4
Explicit group (<i>N</i> = 24)	P-RD (0-4)		1	0	4	6	13
	T-RD (0-4)		0	0	6	4	14
	P-T (pretence models, 0-4)		2	0	6	3	13
	P-T (trying models, 0-4)		4	0	4	7	9
Implicit group (<i>N</i> = 18)	P-RD (0-4)		0	1	5	4	8
	T-RD (0-4)		0	1	5	3	9
	P-T (pretence models, 0-4)		2	1	4	2	9
	P-T (trying models, 0-4)		2	2	7	2	5
Control group (<i>N</i> = 18)	P-RD (0-4)		0	0	5	4	9
	T-RD (0-4)		0	0	3	3	12
	P-T (pretence models, 0-4)		4	1	5	2	6
	P-T (trying models, 0-4)		1	4	4	3	6

Table 6. Number of children in the three groups answering at least three out of four questions correctly after both pretence and trying models in the P-T task

	At least three out of four correct after both models?	
	Yes	No
Explicit group (<i>N</i> = 24)	10	14
Implicit group (<i>N</i> = 18)	2	16
Control group (<i>N</i> = 18)	3	15

To test for influences of the training on children's performance on the Moe task, an analogous difference score between post-test (0-2) and pre-test (0-2) was computed for each child (see Table 4). None of the groups showed significant improvement in the Moe task from pre- to post-test (Wilcoxon tests, all $ps < .14$).

Transfer measures: FB and A-R tasks

To test for influence of training on performance on the A-R distinction, the same difference score as for P-R was computed, subtracting the pre-test score (0-1) from the post-test score (0-2) for each child. Table 7 shows the distribution of these scores in the three groups. None of the groups improved significantly from pre- to post-test (Wilcoxon tests, all $ps < .10$).

Children's performance on the FB tasks is also shown in Table 7. A one-way ANOVA with group as between subjects factor yielded no significant differences between-groups on the overall number of correct answers (0-4), $F(2, 60) = 0.27$, $p < .77$. For neither of the groups were FB or the A-R difference scores significantly correlated with any of the pretence measures (Spearman's rho, $ps > .05$).

Discussion

The explicit group, and only the explicit group, profited from training in two important aspects of a more explicit pretence understanding. First, children in the explicit group

Table 7. Number of children with pre- to post-test difference scores from -1 to 2 in the A-R task, and FB scores from 0 to 4

	A-R difference scores				FB				
	-1	0	1	2	0	1	2	3	4
Explicit group (<i>N</i> = 24)	3	16	2	3	3	1	10	5	5
Implicit group (<i>N</i> = 18)	2	12	3	0	0	3	7	3	5
Control group (<i>N</i> = 18)	2	11	4	1	1	1	7	5	4

improved from pre- to post-test in their ability to say what someone pretended an object was in contrast to the real identity of the object (P-R distinction). Second, they outperformed the other two groups in their ability to explicitly understand pretending as intentionally acting-as-if, in contrast to trying as behaving-as-if accidentally only, as measured by the pretending-trying distinction (P-T). They performed very well on the P-RD and on the T-RD distinction, but so did the other two groups as well, so that there were no differences between the groups on these two simpler tasks. (The good performance of all three groups on the P-RD and T-RD tasks is surprising given the poor performance of the 3- and 4-year-olds on these tasks in Study 1. One possibility is that there was a general and unspecific training effect, such that children became better at answering questions due to their experience of being asked frequently in the course of the training sessions.)

None of the three groups improved from pre- to post-test on the Moe tasks. In fact, performance of all three groups on the Moe tasks was rather poor both in pre- and in post-test, suggesting that the Moe test indeed taps at a more mature understanding of the cognitive prerequisites of pretending that goes beyond understanding pretending as an intentional action form (P-T distinction) and explicitly understanding pretence contents in contrast to real situations (P-R distinction). None of the three groups showed transfer effects of training to performance on the A-R task: there were no differences between pre- and post-test scores in any of the groups. There were also no differences between the three groups in their performance on FB tasks. That is, systematic pretence experience did not influence children's understanding of mental states more generally, not even in the explicit group that profited from the experience in their pretence understanding.

GENERAL DISCUSSION

In the present studies we investigated children's developing understanding of pretend play actions and mental states more generally. In Study 1, a long *décalage* was found between early competence implicit in action and later explicit competence regarding children's understanding of pretending as intentionally acting-as-if. Rakoczy *et al.* (2004) showed that 3-year-old children perceived pretending to do an action and trying to do that action as radically different in their intentional structures, and responded appropriately. When they saw someone pretend to do an action, they pretended to do that action and performed a creative pretence that fit with the stipulated pretence scenario. When they saw someone try to do an action, in contrast, they really performed the action, or tried to do it with novel means. That is, children in that study understood pretending as such - as intentionally acting-as-if - and trying as such - as intentionally

trying to really perform the action, thereby accidentally behaving-as-if only – though both are superficially analogous as-if-behaviours. The same action models were presented to 3-, 4- and 6-year-old children in Study 1, and they were asked whether the actor had pretended to do the action or tried to do the action. None of the three age groups were very proficient at answering this seemingly simple question. There was thus indeed a huge *décalage* between children's early implicit distinction of pretending and trying in action, and a much later ability to explicitly distinguish them in words.

This finding, together with much other research suggesting *décalages* between early implicit and later explicit pretence understanding more indirectly, poses the question as to which factors are important in the developmental progression from early implicit to later explicit understanding of pretence actions. In Study 2 we tested for two factors that have been stressed as important motors of social cognitive development generally: contrastive experience – in the case of pretence between pretending, really doing and trying to do an action, and between pretence and real situations – and systematic explicit discourse – in the case of pretence making use of 'pretend to' and 'pretend that' constructions. The main hypothesis was that explicit pretence discourse about systematic pretence experiences should be crucial in the developmental progression to a more mature, explicit understanding of pretence actions. Two training groups of children aged 3½ were given the same systematic contrastive pretence experience, but differed in the discourse that accompanied these experiences. In the explicit group, the experimenter made use of explicit 'pretend to', 'try to' and 'pretend that' constructions to talk contrastively about the training actions and events. In the implicit group, in contrast, the experimenter made use of implicit discourse marking to talk about pretence actions and events and the corresponding contrastive experiences. Both groups were compared with a control group that received functional play experience. Results on the two central pretence tasks revealed the essential role of explicit pretence discourse. Only the explicit group profited from training in their ability to make the explicit P-R distinction: children in this group, but not children from the other two groups improved from pre- to post-test on P-R. The explicit group also significantly outperformed the other two groups on the pretending-trying distinction (P-T) that had already been used in Study 1. In fact, the implicit and the control groups performed on this task as poorly as the 3- and 4-year-olds in Study 1. The explicit group, in contrast, performed even better than the 6-year-olds from Study 1. In sum, systematic pretence experience alone did not help children in Study 2 to acquire a more explicit understanding of pretending as an intentional activity (as measured by P-T) and of pretence as contrasted to reality (as measured by P-R). Only when the systematic pretence experiences were accompanied and structured by explicit pretence discourse did children improve in these forms of explicit pretence understanding.

In addition, in Study 2 we looked at the role of pretence experience and discourse in the development of mental state understanding more generally. Two specific theories regarding the developmental relations of pretence experience, explicit discourse, and mental state understanding could be explored. First, the SLD theory makes a specific claim about the role of linguistic development and the development of mental state understanding. According to this theory, one specific syntactic factor – mastery of 'that' complementation as a syntactic structure – accounts for the development of mental state understanding, paradigmatically measured by FB tasks. On this view, mastery of 'that' complementation is both necessary and sufficient for FB understanding. From the SLD theory thus the prediction can be derived that improvement in using 'pretend that' constructions should lead directly to improved FB understanding. This prediction is

clearly refuted by the data from Study 2: children in the explicit group, in contrast to the other groups, improved in their ability to use 'pretend that' constructions, as revealed by their improvement in the P-R task, but did not show better FB performance than the other groups. Now, as noted in the introduction, it is not clear whether anyone really holds the SLD theory in this radical form. deVilliers and deVilliers (2000), who could be read as holding such a strong version at one point have recently qualified their position and now incorporate more semantic aspects of 'that' complementation: what is crucial, they now stress, is so-called 'realis' propositional attitude 'that' complementation, where the mental state ascribed aims at truth about the world – belief being the paradigmatic case (deVilliers, 2003). In contrast, so-called 'irrealis' propositional attitude complementation, where the mental state can be understood as directed at possible future states of affairs and not at current reality, is a simpler matter and not the kind of 'that' complementation that explains the development of FB understanding. 'Want that' constructions, which are possible in some languages, for example, German, are the paradigmatic case of 'irrealis' complementation constructions. Based on this qualification, deVilliers (2003) argues that the findings by Perner *et al.* (2003) that 'want that' is mastered before FB tasks by German children do not threaten her theory. However, it remains unclear how 'pretend that' fits into this qualified theory. Clearly pretence does not aim at truth, non-seriousness being one of its defining features. It does, however, imply some directedness at current reality – one pretends of the ball that it is an apple, for example. In fact, pretence can be said to be the intentional application of false propositions to real states of affairs.

The general underlying problem for the SLD theory, we think, is this dilemma: the crucial element of 'that' complementation is understood as a formal syntactic structure. Then the theory is indeed strong linguistic determinism, but false, because it is refuted by Perner *et al.*'s (2003) findings on 'want that' and ours on 'pretend that'.⁸ Or else it incorporates more semantic aspects of 'that' complementation – truth and commitment to truth being the paradigm cases of semantic notions that distinguish 'believe' from 'want' and 'pretend' – and claims that only certain, realis, propositional attitude 'that' complementation constructions are what accounts for developing FB understanding. But then this qualified position is not strong linguistic determinism any more, because it is not 'that' complementation as a syntactic structure that is the explanans. Rather, certain semantically and pragmatically defined forms of 'that' complementation discourse, those about propositional attitudes that aim at truth, explain the development of FB understanding. In a word, this qualified position collapses into a form of weak linguistic determinism holding that 'that' complementation as such. Though probably necessary, is not sufficient for the development of mental state understanding. In fact, we think this position is a rather plausible weak form of linguistic determinism, compatible with several other theories and data in the area of linguistic and social cognitive development. Regarding language development, it is consistent with theories, supported by corpus data, stressing the item-specific nature of early development of propositional attitude discourse (e.g. Diesel & Tomasello, 2001). Regarding the development of understanding different kinds of mental states, it is compatible with different 'conceptual advance' theories stressing that some actions and mental states – wanting and pretending being among them – due to their logical structure can be understood in simpler ways before FBs and actions based on FBs are understood (see Perner *et al.*, 2003).

⁸ Another line of evidence against the SLD theory is presented by recent studies with Cantonese speaking children that failed to find correlations between theory of mind ability and that-complementation competence (e.g. Cheung *et al.*, 2004).

In sum, the present findings are inconsistent with a strong linguistic determinism that only focuses on 'that' complementation as a formal syntactic structure. They are, however, not inconsistent with weaker forms of linguistic determinism that view 'that' complementation as a syntactic structure as perhaps necessary but not sufficient for mental state understanding, and that stress semantic and pragmatic differences between different 'that' complementation constructions.

The second theory we could explore in Study 2 regards the developmental relation of pretence and understanding mental states. The ZPD theory in its general form claims that pretend play provides an area in which children can easily and concretely experience the powers of the human mind and bootstrap themselves into an understanding of mental states more generally. This theory receives no support from the training study: systematic pretence experience and discourse did not improve children's FB and A-R understanding. And improved pretence understanding in the explicit group did not transfer to these other tasks. Clearly, however, the present findings do not refute the ZPD theory. One reason is that some ZPD theories consider systematic, long-term adult-child (typically parent-child) interactions as crucial in helping the child to achieve higher cognitive levels, and that the interactions in which children participated in this study were not sustained enough to provide a ZPD. Another, complementary, reason is that the ZPD theory does not view pretence experience as sufficient for developing mental state understanding, but at most as necessary (or even as only supportive though neither necessary nor sufficient). Thus it is possible that systematic pretence experience leads to an improved understanding of mental states only after some more time. In fact, some ZPD theories (e.g. Garfield *et al.*, 2003) incorporate elements of weak linguistic determinism and claim that mastery of explicit pretence discourse provides a bootstrap into developing an understanding of propositional attitudes, above all belief. That is, children first learn to explicitly talk about pretence actions with 'pretend that' constructions (e.g. 'he pretends that the ball is an apple') and learn in this non-serious area of pretence to embed false propositions - 'the ball is an apple' - in true sentences. Only after they have acquired substantial proficiency with this form of discourse are children ready to learn that in discourse about serious actions - actions based on FBs - false propositions can be embedded under the matrix verb 'think'/'believe' in analogous ways - 'he bites into the ball because he thinks it is an apple'. The findings from Study 2 would be consistent with such an approach: even the children in the explicit group who improved in their understanding of 'pretend that', as indexed by their P-R distinction performance, at post-test were far from performing at ceiling in their P-R distinctions. That is, their proficiency with pretence discourse and understanding might have been still too fragile to function as a bootstrap.

In sum, regarding the developmental relation of pretence understanding and discourse and mental state understanding and discourse, the present findings do not rule out a combination of ZPD theory and weak linguistic determinism that seems viable and plausible. More long-term training studies are needed, however, to test such combined theories.

Acknowledgements

We would like to thank very much Eva Leermann, Dorit Jaschke and Kristin Liebal for help with data collection. Thank you to Jana Jurkat, Angela Loose and Susanne Mauritz for help with

recruiting children, to all day-care centres for their friendly cooperation, and to Andrea Kobiella for help with coding. Thanks very much to Dorit Jaschke and Katja Hummel for helping to make the movies.

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Appendix A

P-R and T-RD distinction questions and models from Study 1 and structure of the sessions

(a) Questions and Models

	Object and action	Question
General baseline	E tries to push a wooden nail into a pegboard	'Did he only try to push it in there or did he really push it in there?'
	E tries to build a tower with building block	'Did he really build a tower, or did he only try it?'
	T-RD distinction E tries to open a spectacle case	'Did he only try to open it or did he really open it?'
	E cleans a piece of dirt away from a plate	'Did he really clean it, or did he only try it?'
	E opens a container and takes out a piece of foam	'Did he only try to take it out or did he really take it out?'
P-RD distinction	E pretended to fall asleep (making snoring sounds, with open eyes)	'Did he only pretend to sleep or did he really sleep?'
	E pretends to wash his hands: takes a wooden block, makes wiping movements with it in his hands and sounds of flowing water	'Did he really wash or did he only pretend to wash?'
	E pretends to take a shower: takes a colour mixer, holds it above his head, making sounds of flowing water	'Did he only pretend to take a shower or did he really take a shower?'
	E claps his hands	'Did he really clap or did he just pretend to clap?'
	E cleans a piece of dirt away from a thermos	'Did he only pretend to clean it or did he really clean it?'
Specific baseline	P-RD distinction E pretended to feed a replica toy bear from a replica pan	'Did he really give the bear some food or did he only pretend so?'
	E pretends to make a telephone call with a colour mixer	'Did he only pretend to phone or did he really phone?'
	E pretends to brush his teeth with a household brush	'Did he really brush his teeth or did he only pretend so?'
T-RD distinction	E tried to make music on small children's piano (pressed a button that did not work)	'Did he really make music or did he only try so?'
	E tries to cut a piece of paper with blunt scissors	'Did he only try to cut it or did he really cut it?'
	E tries to open a box	'Did he really open it or did he only try so?'

(b) Structure of the sessions

1	First phase General Baseline	
1a	T-RD	5 models
1b	P-RD	5 models
2	Test phase with specific baseline	
2a	First specific baseline (same as first test block)	3 models
2b	First test block (pretence for half of the sample, trying for the other half)	4 models
2c	Second specific baseline (same as second test block)	3 models
2d	Second test block (trying when first test block was pretence and vice versa)	4 models

Appendix B

Tasks used in pre- and post-test

	Tasks	Score	
Pre-test	K-ABC	Vocabulary test (picture naming)	Verbal IQ
	A-R	Appearance-reality distinction ('What is it really?' and 'What does it look like?')	0-2
	P-R	Pretence-reality distinction ('What is it really?' and 'What did I pretend it is?')	0-2
	Moe	Moe task after Davis et al. (2002) ('Is he pretending to be a rabbit or is he just hopping?')	0-2
Post-test	A-R	As pre-test	0-2
	P-R	As pre-test	0-2
	Moe	As pre-test	0-2
	P-RD	Pretending-really doing distinction ('Did she only pretend to wash herself or did she really wash herself?')	0-4
	T-RD	Trying-really doing distinction ('Did she only try to open the box or did she really open the box?')	0-4
	P-T	Pretending-trying distinction ('Did she pretend to pour or did she try to pour?')	0-8
	FB	Unexpected content ('Smartie') false belief task ('What did you think was in there?' and 'What would another child think is in there?')	0-4

Appendix C

Training elements of the three groups

Form of presentation	Training groups	Control group	Number of items	
Direct interaction	Session 1	Simple pretence and imitation games (E pretends with an object that it is of another kind, child imitates)	Imitation of proper actions	5
	Session 1	Simple trying imitation (E tries to do an action on an object, child then gets the object)	Imitation of proper actions	5
	Session 2	Joint pretence scenarios (Extended pretence scenario with complementary roles)	Joint action sequence (modelling with play-dough)	1
	Session 2	Joint trying Scenario (Extended sequence of trying different mean to one end)	Joint action sequence (Fixing some parts with string)	1
	Session 2	Trying and pretending combined (First trying to X, then pretending to X only)	Doing the same action with one object on two different substrates	7
	Session 3	Pretending with tools (First using tool in conventional way, then pretending it is something else)	Using tools	9
Movies	Session 3	Multiple pretence with one object	Using object in multiple ways	2
	Session 3	Pretending with tools (as in the child-E interaction)	Using tools appropriately	4
	Session 3	Really doing, trying and pretending combined (really doing x, then trying to X, then pretending to X)	Doing the same action with one object on three different substrated	5

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