The Development of Performing and Understanding Pretend Play:

A Cultural Learning Perspective

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Acknowledgements

1   Pretend Play: The Phenomenon and its Development

> Make-believe –the use of (external) props in imaginative activities- is a truly remarkable invention.
>
> (Kendall Walton ,1990).

Eve gives Adam a yellow wooden block: "Look! What a nice apple!". Adam says "Thank you", turns to the wooden block and announces "Hm. It is delicious", puts the block before his mouth, makes chewing movements and "Yumyum" sounds, finally states "Eaten up. It was very delicious". Upon seeing a piece of rope on the floor, Adam points to it and screams "Oh no! Not the snake again!". Adam and Eve are three-year-old twins. Are they victims of early childhood schizophrenia?

Unless we were Martians or completely lacked a sense of humor and fantasy, such a question would surely never occurr to us. We would just find it very clear and natural that Adam and Eve are not deluded about blocks and apples, but engaged in pretend play (sometimes called 'make-believe' or 'symbolic' play). In fact, this form of play –probably quite bizarre to a Martian- is so natural to us that at first sight we do not find it very remarkable that even very young children engage in it. But as so often in developmental psychology, at second sight what seemed to be an unproblematic fact turns into a puzzle. Where does this strange form of activity come from in ontogeny? How do children as young as two years manage not to get confused about blocks and apples? How do young children understand other persons' pretense behaviour, for example, what does Adam make of Eve's statement "Look! What a nice apple!" directed at a block? Underlying these questions is the fact, revealed by a second closer look, that pretend play has a quite complex logical structure: persons act in relation to a real state of affairs in the world ("this is a wooden block") in a non-serious way, establishing some sort of relation of the real state to a false proposition ("this is an apple"). Thus the real situation and the false proposition have to be coordinated somehow, and in extended sequences of pretense, the implications of the stipulated pretense proposition ("This is an apple") have to be respected, e.g. "This can be eaten". Furthermore, in joint pretense one has to understand the other person's coordination of real situation and false pretense proposition in order to be able to join into the play. Given this logical structure of pretense, and given robust findings from other areas of cognitive development where similarly structured problems are mastered much later, it becomes an even greater puzzle that children from around two years of age seem to comprehend and perform pretend play actions. One other area of cognitive development relevant here is counterfactual reasoning. Confronted

with explicit counterfactual reasoning tasks, such as "Suppose all bears were blue, and that Jimmy was a bear. What color would Jimmy be?", even school-aged children have considerable difficulties (Dias & Harris, 1988; 1990; Harris, 2000). Yet in pretense comprehension it seems that even very young children do draw such counterfactual inferences, e.g. from "If this were an apple" to "I could eat it". Another area of cognitive development relevant here is children's developing understanding of false beliefs. Not until four years of age seem children to understand that one can believe a false proposition ("This is an apple") to be true of a real situation ("This is a block") in the world (for a review see Wellman, Cross & Watson, 2001). Yet in pretend play, considerably younger children seem to understand structurally analogous states of affairs: that a person can pretend that a false proposition ("This is an apple") is true of a real situation in the world ("This is a block").

In a word, pretend play poses some deep developmental puzzles deserving a closer logical analysis and careful empirical investigation. The focus of the present work will be on the emergence of pretense in ontogeny, on the early developing understanding of pretense actions, and on the relation between understanding and acquiring pretend play actions. Chapter 1 will be devoted to a preliminary logical analysis and definition of pretense (Section 1.1) and an ontogenetic overview of pretense development in the preschool years (Section 1.2). The most important theories about emergence and developing understanding of pretend play will be presented in Chapter 2, which lays the foundation for developing the theoretical framework (Section 3.1) and specific research hypotheses (Section 3.2) of the current work in Chapter 3. The studies conducted to test these hypotheses are reported in Chapter 4, followed by a concluding discussion in Chapter 5.

1.1   Logical Analysis and Definition of Pretend Play

Adam receives the block from Eve, says "Hm. It is delicious", puts it to his mouth and makes chewing movements. Badam, Adam's six-month-old brother, upon seeing a similar yellow wooden block, takes it into his mouth and bites on it. Cadam, Adam's grandfather with bad eye sight, sees a similar wooden block, mistakes it for an apple and tries to take a bite. In a sense, all three of them act as if a wooden block were an apple. But only Adam pretends that the block is an apple. What, then, are the criteria upon which we base the verdict that Adam, but not Badam and Cadam pretend that the block is an apple? A closer logical analysis and definition of pretend play actions is required to explicate these criteria.

The reason Badam does not pretend that the block is an apple is that he simply does not know enough about apples yet, and is surely not concerned about apples in this situation at all

–he is just orally exploring an object. Pretending thus requires some sort of cognitive background, knowledge or at least concepts about what is pretended, and these concepts somehow have to be applied in the pretense action. The reason why Cadam is not pretending that the block is an apple is that he really believes the block is an apple and seriously tries to eat it. Pretending thus requires knowledge that the counterfactual pretense proposition ("This is an apple") is not really true, and the intention not to perform the action properly, but to act as-if only. This last point is also brought out by the fact that one cannot pretend to do an action by really doing it (Austin, 1979). In contrast to proper actions (Badam) and mistakes (Cadam), pretending incorporates some kind of dual orientation towards reality. Whereas Badam only treats the block as what it is, and Cadam only treats the block mistakenly as an apple, Adam both knows that it is a block, and in some sense treats it as if it were an apple, being aware of what is real and what not. By performing real actions (saying "Hm. It is delicious", making chewing movements etc.) he alludes to a counterfactual proposition ("This is an apple") and an action not really done (eating). Badam, in contrast does not allude to anything at all. Cadam does not allude to the proposition "This is an apple" and the action of eating, he simply believes the first and tries to perform the second. That is, pretend play actions –in contrast to proper actions and failed attempts- somehow point beyond themselves and carry meaning. Pretending can then be defined roughly in the following way:

> *D1a*: Pretend play is an intentional action form in which an actor –for the sake of playing- knowingly projects a (mostly)[1] false proposition onto a real state of affairs and intentionally, non-seriously acts in some sense as if the proposition was true, but intentionally and openly stops short of really acting as if the proposition was true or trying to properly perform the pretended action[2].

In the case of Adam: He knowingly projects the proposition "This is an apple" onto the state of affairs that "this" is a block (he imagines that the block is an apple), i.e. he is not confused about

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[1] The qualification "mostly" is added here because it is possible to pretend that some true proposition is true. First, one can pretend that p in cases where one does not know whether p is true, and p is in fact true. Second, in exceptional cases one can even pretend that p when one knows that p is true. For example, we can pretend to have tea in our cups and pretend to drink them empty. We then pretend that they are empty, which is true. Arguably, however, such pretense is only possible when one has pretended some false propostion before and pretends now that a change of states of affairs happens in the scenario (e.g. one drinks the cups empty). In most cases, however, one pretends that p where p is false and one knows this. For the sake of simplicity, I will concentrate on these standard cases.

[2] This definition is similar in many respects to one recently proposed by Lillard (2002). It differs from that one, however, in one crucial respect: According to the definition here acting is an essential component of pretend play (this being the difference between pretending and imagining), whereas according to Lillard's definition it is only characteristic.

fact and fiction, and acts intentionally as if the block were an apple, but not as if it really were an apple –he intentionally stops short of taking real bites, for example. Some qualifications are in order, however. *First*, it should be noted that "knowinlgy" here does not have to be read as implying too high a level of reflective awareness. It does not mean, for example, that Adam has to be able to say to himself, so to speak, "Oh, I am applying this false proposition to reality again". Rather, it just means that Adam has to be practically, implicitly aware of the difference between what he believes and what he pretends, by being disposed to draw inferences about what to do in reality according to his beliefs and what to do in the pretense scenario according to the pretense proposition, and by being able not to confuse the two realms. *Second*, the definition as it stands applies mainly to "pretending that". There is, however, an arguably simpler form of pretense, namely "pretending to". Clearly, mostly pretense involves both forms, and in most cases one cannot pretend that something is the case without pretending to do a certain action, but it seems there are cases where one can pretend to do an action without pretending that something specific is the case (see Leslie, 2002). For example, one can pretend to eat a wooden block without specifying what one pretends the block to be, or one can pretend to sleep. The first sketch of the definition can easily be modified to fit these cases:

> *D1b*: Pretend play ("pretend to") is an intentional action form in which an actor –for the sake of playing- knowingly projects an action concept onto an action of his/hers and intentionally, non-seriously acts in some sense as if the concept would apply to the action, but intentionally and openly stops short of really acting as if the concept really applied to the action[3] or trying to properly perform the pretended action.

In the case of Adam: he knowingly projects the action concept "eating" to his action of making chewing movements, being aware that it does not really apply, i.e. that he does not really eat, and intentionally stopping short of really eating or trying to.

It should be noted that the definitions are supposed to capture specifically pretend play, and not other forms of pretending, above all pretending in order to deceive. Suppose Dadam's mother, who has poor eye sight as well, wants Dadam to eat his broccoli. Dadam, however, does not like broccoli at all and tries to deceive his mother. He throws his broccoli to the dog under the table, places a green wooden block on his plate instead and says "Hm. My broccoli". He puts the block in front of his mouth, makes chewing movements etc. In a word, he pretends that the block

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[3] It is necessary that the action concept does not really apply to the action. That is, one can not pretend to do an action by really doing that action. This presents an in teresting asymmetry to pretending-that. One can pretend in exceptional cases that a true proposition is true, but one can never pretend to do an action when one really does that action.

is a broccoli and he pretends to eat, but with the aim of making his mother mistakenly believe that he is eating his broccoli. The qualification in the definitions that the pretense be done for the sake of playing thus ensures that such deceptive pretense does not fall under the definition. There are further essential differences between deceptive pretending and pretend play. Above all, in pretending in order to deceive one aims at making the action seem to others like the pretense proposition was really true. For example, Dadam's aim is that his mother really believes that the block is a broccoli and that he is eating. Accordingly, in pretending in order to deceive one acts as realistically as possible, e.g. puts the block really into the mouth etc. In pretend play, in contrast, one normally aims at making it public that the pretense proposition is not true and that one is not really performing the pretended action. Rather, as pretend play is essentially shareable, one openly indexes the non-seriousness of one's actions to others, e.g. demonstratively holds the block in front of the mouth only. This is the reason for the qualification in the definitions that one "openly" acts as-if. The present work will only be concerned with pretend play, as defined by D1a and D1b, but at some later point (in chapter 5) will pick up the question whether young children have a unitary concept of pretending that is applicable both to play and deception contexts.

Somewhat simplifying, one could say that pretend play has two kinds of prerequisites. *First*, there are cognitive prerequisites, such that a pretender has to have some knowledge, or at least concepts about what is pretended. When I do not know what "centrifugating" is, I cannot pretend to centrifugate. When I do not know what racoons are, I cannot pretend to be a racoon. *Second*, there are intentional prerequisites. I have to act intentionally according to a pretense proposition. When during an epileptic seizure I behave as if I was a techno dancer, that does not count as pretending to be a techno dancer.

These essential features and prerequisites, captured in the definitions of pretend play, can be helpful in describing pretense development in two ways. *First*, they can provide criteria and heuristics to decide when and in which ways children themselves pretend. *Second*, they can provide a framework to study children's developing understanding of pretend play actions in others and themselves. Importantly, by distinguishing different essential elements in the concept of pretend play, the definitions open up the possibility to describe children's developing grasp of concepts of pretend play as a gradual process of conceptual change (see e.g. Carey, 1985, 1988). For example, it is possible –and in fact, I will argue for that later (in section 3.3.2)- that children grasp the intentional nature of pretending before they fully grasp the cognitive prerequisites of pretense.

A final word is in order about the relation between performance and understanding of pretend play. As noted in the definitions, it is essential to pretend play that the pretender be somehow aware of the fact that she is not acting properly, and of what is fact and fiction. The awareness

required, however, is practical –such that the pretender distinguishes between fact and fiction in her actions, not necessarily involving reflective conceptual understanding of her actions- and does not imply anything about understanding pretense in others. Is the case of pretend play thus analogous to many other areas of cognition, for example to believing, where we usually grant young children with beliefs even if they do not yet have any conceptual understanding of beliefs in others or themselves? It has been argued that the answer is "No" (Leslie, 1987, 1988, 2002), on the ground that children, when they begin to pretend, engage in joint pretense –which requires some understanding of others' pretense actions- right from the start. For now I will leave the question open. But on similar grounds I will argue later (in sections 3.3.1 and 3.3.2) that the emergence of pretense presupposes some understanding of pretense in others, the reason being that pretense is imitatively learned from others to a large degree.

Armed with these conceptual clarifications and distinctions I now turn to an overview of the development of pretend play performance and understanding in early child development.

1.2   Ontogenetic Overview

1.2.1 Early Performance of Pretend Play

There is quite wide agreement that the second half of the second year, at the latest, marks the ontogenetic onset of simple forms of pretend play. Children at this age have been found, both in naturalistic observations and in experimental studies (where children were asked to perform specific pretense acts, or these were modeled for them), to do simple pretense actions, for example, pretending to pour from toy pots into cups or pretending to eat with toy spoons (e.g. Bretherton, O'Connell, Shore & Bates, 1984; Fenson & Ramsay, 1981; McCune, 1995; Ungerer, Zelazo, Kearsley & O'Leary, 1981; Watson & Fischer, 1977). Though there has been some disagreement about operational definitions determining when such behaviour deserves to be called pretend play, that is, when an "incomplete" and seemingly non-serious behaviour can be said to fulfill the criteria for pretending as, for example, captured by the definition D1a and D1b, most researchers agree that towards the end of the second year it is plausible to view children's as-if-behaviours as real pretending[4]. Several behavioural symptoms have been taken as rather

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[4] Some researchers (e.g. McCune, 1995) would already ascribe to 12-month-olds the capacity to pretend when they, for example, see a cup and lift it to the mouth. Others, adopting a more conservative coding scheme (e.g. Tomasello, Striano & Rochat, 1999) would doubt whether such behaviour is not a purely 'recognitory gesture' and would apply more strict operational criteria for calling something pretense (e.g. verbal comments, coordinated action sequencing, non-seriousness and exaggeration of movements etc.).

plausible operational criteria for calling a behaviour pretend play: verbal comments given by the child, the non-serious and coordinated yet unterminated way in which the action is performed, appropriate sound effects, exaggeration and truncation of movements and the lack of signs of really wanting to perform the action on the part of the child[5].

While pretending to pour from a pot might be considered a relatively pure case of "pretend to", around the same time also the first instances of "pretend that" have been observed in what is called "object substitution pretense". In object substitution pretense one pretends that an object is of another kind, e.g. that a block is an apple. Several studies have found that children start to engage in this form of pretend play towards their second birthday (e.g. Jackowitz & Watson, 1980; Musatti & Mayer, 1987; Pederson, Rook-Green & Elder, 1981; Ungerer et. al., 1981; Watson & Fischer, 1977; Watson & Jackowitz, 1984). For example, Ungerer et. al. (1981) found that children in the second half of their second year pretended that a wooden block was a carrot or a cookie and pretended to eat it. Note that in such cases of seemingly non-serious behaviour with objects, especially when it is accompanied by seemingly non-serious verbal comments (e.g. calling a block an apple), the problem of deciding whether some action deserves to be called pretense seems less drastic. Most researchers find it rather plausible to assume that when a child seemingly non-seriously acts with an object as if it were something else and applies a corresponding verbal label to it, she really pretends that the object is something else.

Many different classification schemes and stage models have been proposed to capture the subsequent development of pretend play from its emergence around the second birthday onwards (e.g. Corrigan, 1987; Nicholich, 1977; Ungerer et. al., 1981; Watson & Fischer, 1977). While disagreeing in several points, most of them converge in stressing the three following reliable developmental trends: (1) Decontextualization: Children in development become less dependent on realistic objects (replicas) in object substitution pretense and more able to use objects flexibly in pretense generally. One special related trend that has been found in this context concerns the use of one's own body in object substitution pretense. Children up to four years of age will frequently make use of body parts as substitutes for objects in pretend play. For example, when asked to pretend to brush their teeth, two- and three-year-olds usually act as if their index finger were a tooth brush. That is, they pretend that their finger is a tooth brush. Four-year-olds, in contrast, will hold their hands as if they were holding a tooth brush and move it accordingly. That is, they pretend to hold a tooth brush without any physical tooth brush-

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[5] Note that there inevitably is a gap between theoretical definitions of pretend play like D1a and D1b and operational definitions determining criteria for calling specific acts pretense (especially in children that cannot yet be asked whether they are pretending) that can only be bridged by plausibility assumptions. In the present work I will follow some recent work (e.g. Baron-Cohen, 1987; Striano, Tomasello & Rochat, 2001) in assuming that not every act that looks like pretending in very young children should be classified as pretense, and therefore in applying rather conservative operational criteria for pretending.

substitute (Suddendorf, Fletcher-Finn & Johnston, 1999; Suddendorf, 2001). (2) Decentration: Children develop an ability not only to pretend to perform an action themselves but to inculde other pretend actors into their pretense. For example, it has been found that children first pretend to perform simple actions themselves, then pretend to perform actions with a passive other agent involved, e.g. pretend to feed a doll. Finally, they pretend that there is another active agent, e.g. they pretend that the doll is taking a walk (Watson & Fischer, 1977). (3) Integration: Children develop an ability to integrate simple pretense actions into extended and structured sequences, e.g. pretending to pour into a cup, then pretending to drink and pretending to give a doll a drink from the cup.

In sum, much research suggests during the second half of the second year, Western children usually start to become pretend players. Much of this research, however, is mainly descriptive and does not directly address explanatory questions about the origins of pretend play in ontogeny. Many of these studies (e.g. Ungerer et. al., 1981; Watson & Fischer, 1977; Watson & Jackowitz, 1984) modelled pretense actions for the children and looked at children's imitations of pretense acts to test whether and at which level they can pretend. Such studies thus are compatible with a wide variety of interpretations, including ones stressing cultural learning from others as a crucial origin of pretend play in ontogeny. Other studies have tried to address the question of ontogenetic origins of pretense by using naturalistic observations of children's spontaneous solitary pretense (e.g. McCune, 1995). As children in these studies did perform spontaneous and solitary pretense actions, they have been taken as showing that pretense arises spontaneously as an individual invention on the part of the child. However, as these studies mostly used toys rather well known to the children and did not control for the child's previous pretense experiences (that is, looked at children's pretense acts that might have been individually created or imitatively learned), they do not warrant any firm conclusions about the origins of pretense either. A related line of research has also used naturalistic observation of children's pretending, but in the family context, and has found that children's early pretending is mostly done in joint pretense episodes with parents, with parents highly scaffolding children's actions (e.g. Haight & Miller, 1992; Slade, 1987). These studies have thus been interpreted in the opposite direction: as showing that early pretense is mainly learned from adults. Some studies have also looked at pretense development from a cross-cultural perspective and have found that how and about what children pretend greatly varies as a function of cultural backgrounds –parental attitudes towards pretend play, encouragement by adults to pretend etc. (Gaskins, 1999; Göncü, Tuermer, Jain & Johnson, 1999; Haight, 1999; Carlson, Taylor & Levin, 1998). These studies have been interpreted as showing that pretense develops in cultural-specific ways. However, this cross-cultural research has so far not directly addressed the more ambitious

questions whether pretend play ontogenetically arises through cultural learning in the first place, and thus in different ways in different cultures.

In a more indirect way, related lines of research have speculated about the ontogenetic origins of pretense by looking at possible precursors in development. It is clear that pretend play rests on the foundation of performing serious actions properly: first one has to acquire the ability to properly perform an action (or at least to know how that kind of action could be performed), then one can acquire the ability to pretend to do it, intentionally stopping short of really doing it. What is called "teasing" has been considered by some as the first indication of an ability to non-seriously play with stopping short of performing actions. For example, around their first birthday, children sometimes hold out an object for another person to grasp it and then, when the other persons is about to take it, pull it away and laugh (Reddy, 1991). Such behaviour has been interpreted as the first sign of children's awareness of how actions are normallly performed and how the normal course of acting can be violated, that is, as first signs of humor and thus as a possible precursor of pretending (Reddy, 1991).

Another line of research has looked for possible precursors to pretend play in parent-child interaction. At least in Western cultures, parents quite commonly perform pretend play actions even for their very young children. In a series of studies, Lillard and colleagues (Lillard & Witherington, 2001; Richert, Lillard & Vaish, 2002), investigated such parent-child interactions with parent pretense. One finding was that parents make use of several markers, such as exaggeration and truncation of movements, increased gazing and smiling to the child, and modified pitch, to signal that they are not acting seriously but pretending. Another finding was that even very young children in their second year, who do not pretend themselves yet, show some sensitivity to these markers of the non-serious character of the adult's pretense actions: they gaze and smile more toward their parent when she pretends than when she does a proper serious action (Richert et. al., 2002). These findings have been taken to suggest that this early sensitivity might present a precursor both to children's own pretense performance and to their developing understanding of pretense actions. It is to the latter that I will now turn.

1.2.2 Understanding Pretense in the Preschool Years

Several levels of understanding pretend play actions can be distinguished. The most mature level would be, of course, an explicit adult-like understanding of pretense as intentional action form with certain cognitive and other prerequisites along the lines of the definitions D1a and D1b. But simpler forms of understanding something about pretense are possible. A minimal requirement for even the simplest forms of understanding pretense, however, is the practical ability to keep apart what is real from what is pretended, and to reason about fact and fiction

separately. For example, a child seeing Adam pretend that the block is an apple can only be credited with some understanding of the pretend play action if she knows the block is really a block, but somehow treated as an apple in the pretense, and that the block can really be used to build, but "eaten" in the pretense. That is, the child does not have to have the explicit ability to think "It is really a block" and "He pretends that it is an apple", but she has to have the practical ability to treat the two propositions "It is a block" and "It is an apple" very differently: the first pertains to a fact, the second pertains to Adam's non-serious action. The first is used in reasoning about the world, the second is used in reasoning about the pretense scenario, for example, in deciding what to pretend next in a game of joint pretending. I start with a review of evidence for such a minimal understanding of pretense, and then go on to describe more complex and explicit forms of pretense understanding in subsequent development.

1.2.2.1   Pretense Reasoning

Many studies have produced converging evidence that at around two years of age children develop a minimal understanding of pretend play actions (Harris & Kavanaugh, 1993; Harris, Kavanaugh & Meredith, 1994; Walker-Andrews & Harris, 1993; Walker-Andrews & Kahana-Kalman, 1999; for a review see Kavanaugh & Harris, 1999). The structure of the tasks used in these studies is the following: an experimenter sets up a pretense scenario and establishes a pretense proposition (often by introducing an object substitution), e.g. that a block is a bottle of juice, and pretends accordingly, e.g. pretends to pour or drink from the "bottle". The scenarios are varied in their complexity, e.g. in the number of object substitutions involved or the number of sequential pretense actions. The child is then asked to perform a pretense action in a frame of joint pretense, or is asked to describe the pretense happenings. Harris and Kavanaugh (1993, Study 1) showed that children at around 24 months understood pretense propositions involved in object substitution and use them in pretense reasoning. For example, when the experimenter introduced a Teddy bear and a wooden block, and said in a pretense mode "Look! This (the block) is our soap. What can you do with it and Teddy", the children pretended to wash Teddy. That is, children must have made something like a practical inference from "This is a soap" to "I can use it to wash Teddy" regarding the pretense scenario and kept it apart from reality –otherwise they should have searched for water first. And 25 to 30-month-olds were even proficient at such tasks when one and the same object was used in several subsequent pretense scenarios where it acquired different pretense identities, e.g. was first a pretend soap and then a pretend apple (Harris & Kavanaugh, 1993, Studies 3 and 4). In more complex tasks, children at this age could not only use pretense propositions explicitly introduced by the experimenter, but could follow slightly more elaborated pretense sequences, infer pretense propositions from

pretend actions, and use these in their own pretense reasoning. For example, in one such task, the experimenter pretended that an object was a tea pot, pretended to pour from it into some cups, and then pretended to spill some tea on the table by saying "Oops! All wet" (Harris & Kavanaugh, 1993, Study 5). The child was then asked to clean the table where the tea had been spilled. 25- to 30-month-old children in this study took a piece of cloth and pretended to clean the table where the experimenter had pretended to spill tea. That is, they reasoned from "This is a tea pot" and the experimenter's pretend actions to "There is tea on the table here" in the pretense scenario. Children at this age are even able to follow more than one transformation of pretense states of affairs. Walker-Andrews and Harris (1993) showed children two qualitatively identical objects, e.g. two cups, and in a first step pretended to transform the two in the same way, e.g. pretended to pour some tea into the cups. In a second step then, the transformation on one of the objects was reversed again, e.g. the experimenter pretended to drink one cup empty. The child was then asked to give the experimenter some tea. Most of the 22 to 32-month-old children in this study gave the experimenter the correct cup, indexing that they kept track of the sequence of transformation of the state of the two objects in the pretense scenario and reasoned accordingly. Finally, older two-year-olds are quite proficient at describing the contents of such simple pretense sequences. For example, when asked very generally what happened, and more specifically whether each cup was full or empty, 31- to 35-month-old children quite accurately reported the pretense events (Harris & Kavanaugh, 1993, Studies 6 and 7).

In sum, these studies show that at the beginning of their third year, children have a minimal understanding of pretense actions such that they can to some degree systematically and productively reason about the contents of pretend play scenarios. In fact, what children in these studies did can be considered a kind of simple counterfactual reasoning. From obviously false proposition such as "There is tea on the table here" they drew correct inferences such as "The table has to be cleaned here". This is very remarkable given the findings that even 4 to 6-year-old children find explicit counterfactual reasoning tasks very hard, when they are asked in a non-playful context to suppose an obviously false proposition was true and to draw inferences from it (see Dias & Harris, 1990).

Though these findings are indeed remarkable in this respect, it remains somewhat unclear what exactly they reveal about children's early pretense understanding (for similar concerns see Wellman & Hickling, 1993). The reason for this lies in the structure of the tasks: the children only had to respond and talk within the pretense scenario, e.g. by handing the experimenter a cup in the pretend play or by telling which cup was full. By these responses they showed that they kept track of the pretense scenario and drew appropriate inferences about it. And it seems very plausible that children implicitly kept these inferences apart from inferences about the real world –otherwise they should have been confused about the fact that there was no real tea on the table

or that there was no real water to wash Teddy with. But children's contrastive distinction between reality and the pretense scenarios was never directly tested. All the children had to do to solve the tasks was to reason within the pretense scenarios. Thus, a very sceptical argument could go, children might have temporarily forgotten about reality and become totally absorbed in the pretense events. Borrowing another theoretical vocabulary (Perner, Stummer, Sprung & Doherty, 2003; Perner, Brandl & Garnham, in press), the studies might thus only show that children at this age are able to switch perspectives from reality-oriented to pretense-oriented back and forth, but not that they are able to confront the two perspectives simultaneously. For example, they might just be able to see the block as block now, and as an apple later, but not to see it as a real block that is pretended to be an apple at the same time. To address these concerns, studies with a different structure are needed. The clearest cases are studies where children are explicitly asked about contrasts between real and pretend states of affairs. The next section will give a review of such studies. To test for a more implicit understanding of confronting reality and pretense perspectives, another possibility is to look at children's actions responses as in the above-mentioned studies, but in contexts where there is a choice between pretending and really performing an action, a choice, that is, between the simultaneous perspectives of reality- and pretense-orientation. Some such tasks will be developed in the present work and will be reported later (in section 4.2).

1.2.2.2   Distinguishing Pretense from Reality

In the most straightforward task testing for children's explicit ability to contrast real and pretend states of affairs, Flavell, Flavell and Greeen (1987) presented children with an actor who pretended that an object of kind A was a B, e.g. pretended that a block was an apple. The test questions (modelled on the appearance-reality task, where children are asked about an object of kind A, that looks like a B, what it really is and what it looks like) were then "What is it really?" and "What does she pretend it is?". Older three-year-olds were quite good at answering these two questions. Interestingly, they found this pretense-reality distinction task much easier that a structurally analogous appearance-reality distinction task.

Wellman and Estes (1986) asked children questions about real object in contrast to objects only imagined or pretended to exist. Three-year-olds were quite successful at telling that real objects could be touched, seen etc., whereas fictional objects only imagined or pretended to exist could not be touched or seen by anyone. Using a somewhat different task structure, several studies have found that three-year-olds can competently answer explicit questions about the content of someone's pretense that contrasts with reality (Lillard & Flavell, 1992; Custer, 1996). For example, children in a study by Custer (1996) were told a story about a protagonist who

pretended that some false proposition was true, for example, pretended that an empty cereal box was full. They were then asked to choose from two pictures –one depicting an empty cereal box (the real state of affairs) and the other depicting a full cereal box (the pretended state of affairs)- the one corresponding to the protagonist's pretense. Note that the correct picture was always the one false of the real situation. Three-year-olds mastered this task, but interestingly failed on an analogous version of the task where the protagonist falsely believed the proposition in question, e.g. that the box was full.

Related to the ability to explicitly keep apart reality and pretense contents is the ability to understand that different people can pretend different things of the same states of affairs (for example, I can pretend of a wooden block that it is an apple, and you can pretend that it is a time bomb). Three-year-olds have been shown in several studies to possess this latter ability (Hickling, Wellman & Gottfried, 1997; Bruell & Woolley, 1998). In a study by Hickling et. al. (1997), for example, one experimenter, the child and a second experimenter pretended something together, for example, that a glass contained milk. The second experimenter then left the room, and during her absence the first experimenter and the child pretended something else of the glass, for example, that they drank from it so that it was empty. When asked upon the second experimenter's return what she would pretend about the glass, three- and four-year-olds correctly said that she would pretend that the glass contained milk. That is, even three-year-olds could ascribe contents to someone else's pretense (milk in glass) that differed from their own pretense contents (glass empty). Only the four-year-olds, in contrast, could solve a structurally analogous false belief task, where a real state of affairs was changed during the second experimenter's absence and the test question was what she would think upon her return was the case (analogous to a traditional change of location false belief task, see Wimmer & Perner, 1983).

It should be noted, however, that while these studies show that young children by three years of age show some competence in explicitly making judgements about pretense scenarios in contrast to reality and in contrast to other persons' pretense, there is another line of research suggesting that children at this age still sometimes confuse fact and fiction when being engaged in intensive, especially frightening pretense themselves. In several studies (Harris, Brown, Marriott, Whittall & Harmer, 1991; Bourchier & Davis, 2000; Woolley & Phelps, 1994; for a review see Bourchier & Davis, 2002) three-year-olds first pretended something together with an experimenter and later seemed to confuse the pretense contents with facts. For example, after having pretended with the experimenter that there was a friendly character in one box and a monster in the second box, children afterwards in a serious context appeared unsure whether the second box in fact contained a monster: they sometimes said there was a real monster in the second box, and were reluctant to open it (Harris et. al., 1991, Bourchier & Davis, 2000).

In sum, there is converging evidence that older three-year-olds –though they sometimes seem to confuse fact and fiction in their emotional own pretense- can by and large proficiently make explicit contrasts between reality and pretense scenarios. The general picture about children's early reasoning about pretense and their distinguishing pretense from reality, drawn from the research reviewed so far, is this: From the end of their second year, children can keep track of pretense stipulations and scenarios and implicitly distinguish them from real states of affairs, as shown by the work of Harris and colleagues. Roughly one and a half years later, in their fourth year, children then acquire the ability to explicitly distinguish and contrast pretense and real states of affairs, and pretense stipulations of different people towards the same real situation. Importantly, however, even children's explicit distinctions between reality and pretense do not directly speak to the question what exactly they understand about pretending as an intentional action form with specific cognitive requirements. The reason is that even explicit pretense-reality distinction tasks can theoretically be solved in ways simpler than understanding pretending in the full-fledged adult sense (as captured in the definitions D1a and D1b). All that is required to solve these tasks is the ability to understand that two propositions ("It is a block" and "It is an apple") somehow apply to the same situation in the world, one describing the facts ("It is a block") and the other describing an alternative possibility ("It is an apple") that is somehow linked to specific agents (see section 2.2 and Perner, 1991, 1995 for details of such an account). But this coordination of two propositions does not necessarily involve an understanding that the pretense proposition is projected onto reality by the pretender knowingly and intentionally and that she acts intentionally as if it were true etc. These considerations receive support from the findings that pretense-reality tasks are reliably easier than structurally analogous false belief (Custer, 1996; Hickling et. al., 1997) and appearance-reality tasks (Flavell et. al., 1987). These latter two types of tasks are standardly considered as litmus tests of understanding cognitive mental states, and the fact that children can fail these tasks while succeeding in pretense-reality tasks leaves open the possibility that pretense-reality distinctions can be mastered without understanding the essential cognitive elements in pretense. Therefore, the question what young children understand about the essential cognitive and intentional elements in pretending has been pursued more directly by many recent studies, to which I now turn.

1.2.2.3   Understanding the Cognitive and Intentional Elements in Pretending

The tests of children's pretense-reality distinctions reported in the last section had the following logical structure: the child was confronted with a real situation and a pretense scenario already established by an experimenter, and then had to tell what was real and what pretended. That is, the child had to follow the real and pretended states of affairs and keep them apart. To test for

children's understanding of the cognitive and intentional requirements for pretending, tasks with a different and more complex structure have been used. Children were told stories about a character, with premises about her behaviour and her mental states that either fulfilled or failed to fulfil some requirements for pretending, and had to answer the test question whether the character was performing some pretense. In the most famous of these tests, the Moe task, Lillard (1993) told children a story about the protagonist Moe (a boy from the land of trolls) with two premises: first, Moe was behaving like some animal, e.g. hopping like a rabbit. Second, however, Moe did not know anything about rabbits (because in his land there were no animals at all). The test question was whether Moe was pretending to be a rabbit. As the second premise states that one of the cognitive prerequisites for pretending to be a rabbit –knowledge about rabbits- is not fulfilled, it demands the inference that Moe is not, and can not, be pretending to be a rabbit. Yet children up to five years of age answered the test question affirmatively, claiming that Moe was indeed pretending to be a rabbit. In a similar study, Lillard, Zeljo, Curenton and Kaugars (2000) told children a story about inanimate objects that "behaved" like some animal, e.g. about a stone that "hopped like a rabbit", and asked them whether the stone was pretending to be a rabbit. Of course here there was no second premise about the stone's missing knowledge, (because knowledge predicates do not apply to stones) –rather, implicit in the story was the premise that there were no mental states involved at all. Again, children up to five years of age wrongly ascribed pretending to be a rabbit to the stone. To test for children's understanding of the cognitive elements in pretense in contrast to acting mistakenly, Perner, Baker and Hutton (1994) presented to 3- and 4-year-old children stories in which persons acted according to a counterfactual proposition, but in one case they knew that the proposition was false and in the other case they did not know. For example, a boy put a carrot in a rabbit box when there was no rabbit in there. In one version (the pretend version) of the story the boy had watched how the rabbit had left the box, in the other version (the think version) he had not (analogous to standard false belief tasks). The test question was then whether the boy put the carrot in the box because he thought there was a rabbit in the box or because he had just pretended. Most 3-year-olds wrongly said that the boy who falsely believed the rabbit to be in the box had only pretended. That is, three-year-olds could not distinguish between pretending that some false proposition was the case and acting mistakenly on some false proposition in their cognitive aspects.

These studies thus suggest that young children lack an understanding of the essential cognitive nature of pretending as being based on some knowledge and as being different from acting on false beliefs, as indexed by their over-extension errors. They over-extend their concept of pretending to instances outside of the class of pretend actions that lack some cognitive prerequisites for being pretense. It has been argued, furthermore, that young children's concept

of pretense does not only lack essential cognitive elements, but also does not essentially include intentional criteria, above all the criterion that pretending is intentionally acting-as-if. Evidence for that claim comes from a study by Lillard (1998). Children were told a similar story about Moe, with the same kind of first premise, e.g. that Moe was hopping like a rabbit. The second premise, however, now was that Moe did not want to nor try to hop like a rabbit. That is, the second premise stated that the intention criterion for pretending was not fulfilled and thus demanded the inferences that Moe could not be pretending to be a rabbit. Yet children responded as in the original Moe study: when asked whether Moe was pretending to be a rabbit, children up to five years of age wrongly answered affirmatively.

In sum, verbal studies with a very stringent inference structure suggest that children do not have a firm grasp of the essential cognitive and intentional requirements of pretending until four to five years of age. They over-extend their concept of pretending erroneously to behaving-as-if without the prerequisite knowledge and to behaving-as-if without the prerequisite intentional background. However, it should be noted that these tasks have been criticized on methodological grounds for being too stringent and confusing, and thus underestimating children's competence due to performance factors (see e.g. Davis, Woolley & Bruell, 2002; German & Leslie, 2001; Hickling et. al., 1997; Leslie, 2002). Some of these methodological concerns will be taken up at a later point in this work again (section 3.3.2), with the aim of developing alternative tasks for tapping young children's understanding of the intentional structure of pretending. These methodological concerns aside, the findings from the Moe and related studies prima facie seem plausible to many researchers in the wider context of children's developing mental state understanding (e.g. Lillard, 1994, 2002; Nichols & Stich, 2000; Perner, 1991, 1995; Smith, 2002). Given that children develop an understanding of mental states[6] in a more full-fledged sense at around age four –as standardly measured by false belief tasks- and given the fact that understanding the cognitive and intentional presuppositions of pretense

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[6] Two terminological notes: (1) In referring to children's developing understanding of other persons and their mental states, I avoid the term "theory of mind" whenever possible –though it has become the technical term in developmental psychology. The reason lies in the connotations this term has in the philosophy of mind, where it comes from– i.e. it implies that mental state concepts are theoretical concepts (e.g. Churchland, 1981). Instead I will mostly talk of "mental state understanding". (2) I assume, and will explicate this in chapter 3 (see also Footnote 17, p. 35) in more detail, that children develop an understanding of different mental states gradually, with a simple understanding of intentional action and perception in place from the second year on, and a full-fledged understanding of beliefs being acquired around age four. As with the standard usage of "theory of mind" in the literature (which is used both to refer to all different kinds of understanding persons, actions and mental states, and to refer more specifically to the acquisition of a concept of belief at around four), when I talk of "mental state understanding", I sometimes mean more generally all kinds of understanding other persons (covering everything from a simple and implicit understanding of perception to an adult-like concept of higher-order beliefs). Sometimes, however, I mean the development of a concept of belief at around age four more specifically. In most cases the context should make clear what is meant. In some cases, when the context does not make clear what is meant, I use terms like "understanding mental states in a more full-fledged sense" to qualify that I refer to the development of understanding beliefs at around age four.

requires understanding mental states (knowledge, beliefs etc.), it actually seems natural that children should not be able to solve complex pretense tasks before they solve false belief tasks. This is thus one way in which the developmental relation of pretending and understanding pretense and of mental state understanding has been stressed –complex pretense understanding conceptually presupposing complex mental state understanding. However, more substantial claims have been made about a developmental relation in the other direction –such that pretense developmentally plays a supporting role in acquiring mental state understanding. It is to findings suggestive of such claims that I now turn.

1.2.2.4   Pretense Understanding as a Precursor to Mental State Understanding?

Three kinds of evidence are presented as suggestive for claims about a substantial role of pretense in the development of mental states understanding. *First*, as reported above, several studies have shown that children succeed reliably earlier in pretense-reality distinction tasks than in structurally analogous false belief and appearance-reality tasks. These findings have nourished speculations that pretense understanding might provide a zone of proximal development for understanding mental states more generally, such that mastery of pretense comprehension leads to transfer to understanding structurally analogous matters involving mental states, above all beliefs (see e.g. Smith, 2002). *Second*, analyses of individual differences in both domains have revealed some interesting correlations between some aspects of pretense competence and mental state understanding (Astington & Jenkins, 1995; Rosen, Schwebel & Singer, 1997; Suddendorf at. al., 1999; Taylor & Carlson, 1997; Youngblade & Dunn, 1995). While some of the studies only revealed correlations cross-sectionally at one point of time, the most interesting correlation was found by Youngblade and Dunn (1995) in a longitudinal design: Frequency of pretend role enactment at 33 months was positively correlated with performance in tasks of mental state understanding 7 months later. *Third*, there has been one published training study looking at the influence of pretense experience on understanding mental states (Dockett, 1998). A training group of three- to five-year-old children was given extensive experience with joint peer pretending in the class room over a period of several weeks, and was compared to a control group that participated only in their normal classroom curriculum. Only the training group improved in the complexity of their pretend play, and importantly, in their mental state understanding (as measured by false belief and appearance-reality tasks). However, this study had some methodological shortcomings that make it hard to interpret the findings. Above all, the fact that the control group got no additional experience at all, makes it impossible to tell whether it was specifically pretense that accounted for the training group's improvement in mental state understanding, or some other factor confounded with pretense experience (for example, peer cooperation and discourse, role negotiation etc.).

In sum, there are some findings that are compatible with speculations about a substantial role for pretense experience in developing mental state understanding. These findings fail, however, to lend anything like stringent empirical support for such a role. In one of the studies of the present work, to be reported later (in section 4.3), therefore, these speculations were tested with a more stringent longitudinal training design.

Summarizing somewhat crudely the ontogenetic overview of the development of pretense production and comprehension, the following picture emerges: At the end of the second year, both production of simple pretense actions and a nascent understanding of others' pretend play emerge. This understanding is revealed in children's practical responses to other persons' pretending –they keep track of simple pretense stipulations, join into shared pretense scenarios with appropriate inferential responses, and do not to become confused about real versus pretended states of affairs. Two-year-olds thus show an implicit practical understanding of pretend play actions as somehow non-serious and separated from real states of affairs in their actions. A central question in this context is how production and understanding of pretense actions are related developmentally. Do children first pretend themselves before they can understand others' pretense, or is a nascent understanding of pretense a prerequisite for the acquisition of pretense as an action form? The next section about theoretical approaches to pretense development will take up this question again. The present work aims to contribute to the clarification of this question theoretically in chapter 3 and empirically in the first studies reported in chapter 4 (sections 4.1 and 4.2).

Some time later, in their fourth year children acquire the ability to discursively distinguish pretense from reality, and the pretense stipulations of different people from each other. That is, what was implicit in their actions some time before becomes now explicit in their words. It is not clear, however, how rich an understanding of pretense as being an intentional action form based on mental states these pretense-reality distinctions require. Two kinds of findings suggest that even this explicit pretense-reality distinction might be mastered without a full-fledged understanding of the mental nature of pretending. First, pretense-reality distinction tasks are mastered reliably earlier than structurally analogous false belief and appearance-reality tasks (the standard task for mental state understanding). Second, it is not until later, at four to five years, that children acquire an explicit understanding of cognitive mental states underlying pretense actions (as measured by the Moe and similar tasks). It thus seems that children do not acquire a full-fledged concept of pretending, as captured by the definitions D1a and D1b before four or five years of age. It remains an interesting question in this context, however, how exactly young children do understand pretense actions before that time. On the assumption that conceptual development can proceed gradually rather than in an all-or-nothing fashion, it seems possible –and I will, in fact, argue for that later (in section 3.3.2)- that three-year-olds do understand

pretending as an intentional activity before they fully understand the cognitive mental states underlying pretense. That is, their concept of pretending incorporates intentional criteria –that pretending is intentionally acting as-if- before it incorporates cognitive criteria –that pretending is necessarily based on the possession of knowledge and concepts.

Finally, findings from correlational studies and one training study suggest the possibility that the development of pretending and understanding pretense might play an important role in promoting mental state understanding. That is, three-year-olds' not yet full-fledged understanding of pretense might provide a bootstrap for children to acquire conceptions of mental states which enable in turn a more mature understanding of pretense. Study 3 of the present work will attempt to contribute to an exploration of this possibility.

1.2.3   Pretense in Autistic Children

It has long been noted that in everyday life autistic children hardly engage in spontaneous pretend play (e.g. Baron-Cohen, 1987; Ungerer & Sigman, 1981; Wing, 1978). In fact, in the DSM IV (American Psychiatric Association, 1994) lack of social pretend play is even among the diagnostic criteria for autism. Autism has played a major role in the recent study of social cognitive development because it presents the unfortunate case of a syndrome where the development of social understanding seems to be specifically and to some degree selectively impaired. Autistic children have been shown to be impaired in the development of joint attention (Charman, Swettenham, Baron-Cohen, Cox, Baird & Drew, 1997), imitation (see Smith & Bryson, 1994, for a review), false belief understanding (Baron-Cohen, Leslie & Frith, 1985) and the ability to engage in deception (Sodian & Frith, 1992). And it has been argued that pretend play fits into this pattern of impaired social cognitive development. The impression of a deficit in spontaneous pretense in autistic children (compared to matched controls of both normally developing children and children with developmental delays but same mental ages) has been confirmed in several studies (Baron-Cohen, 1987; Riguet, Taylor, Benaroya & Klein, 1981; Sigman & Ungerer, 1984). However, it is not clear whether this deficit is specific to pretend play, or applies to all kinds of play in autistic children –the findings are mixed on this point (see Jarrold, Boucher & Smith, 1993, for a critical review). Furthermore, there is some evidence that this impairment might be confined to spontaneous pretending. Lewis and Boucher (1988), and Libby, Powell, Messer and Jordan (1997), for example, found that autistic children were unimpaired in their pretense when it was scaffolded and elicited through modeling and instruction to imitate in highly supportive social contexts. One study (Jarrold, Smith, Boucher & Harris, 1994) also found some competence in simple pretense understanding in autistic children. In this study, autistic children were not worse than matched controls in answering simple questions about pretense events (e.g. "Is the table

wet or dry?" in a pretense scenario where the experimenter pretends to spill tea on the table) taken from the study by Harris & Kavanaugh (1993). However, autistic children were poor at answering simple pretense-reality questions (e.g. "Did I spill real tea or did I only spill pretend tea?") in this study.

In sum, the existing evidence on pretend play development in autistic children, apart from agreeing that there is a deficit in spontaneous pretending, remains rather inconclusive. Accordingly, wildly differing theoretical explanations of the nature of the deficit have been put forward (for a review see Jarrold et. al., 1993). There are two kinds of competence theories, the first (e.g. Baron-Cohen, 1987; Leslie, 1988, 1994) arguing that pretending requires an ability to engage in metarepresentational thought (details see below in Section 2.2), the lack of which explains the pretense deficit in autism. Another competence theory views the autistic pretense deficit as rooted in the more fundamental social impairment of autistic children that hinders them from engaging in pretense as a socially meaningful activity (e.g. Hobson, 1990). Various performance theories, in contrast, based on the findings that autistic children have been found to be able to pretend in more supportive situations, argue that autistic children could but normally do not engage in pretense, either because they are not interested in it (Harris, 1989), because they lack ideas about what to pretend (Boucher & Lewis, 1989), or because of an executive problem in action coordination (e.g. Harris, 1994).

2   Explaining Pretense Development: Theoretical Approaches

To my knowledge, there is nothing like one big ambitious theory that claims to explain the development of pretense production and comprehension as a whole. But there are several theories on a slightly smaller scale that do attempt to explain in a coherent framework central aspects of pretense development. Though the emergence of pretense production and the development of pretense understanding surely cannot be separated completely, and in fact it is an empirical question –on which different theories widely disagree- how independent they are of each other developmentally, I will first review two traditional big theories about the former and then the two main recent theories about the latter.

2.1   Emergence of Pretense: Piaget versus Vygotsky

As in so many areas of child development, the debate about the origins of pretending in ontogeny has traditionally been shaped by Piagetian individualism versus Vygotskian culturalism. Figure 1 shows schematically Piaget's (1962) conception of play development in relation to the development of other action forms. This conception is organized around Piaget's notions of assimilation and accomodation.
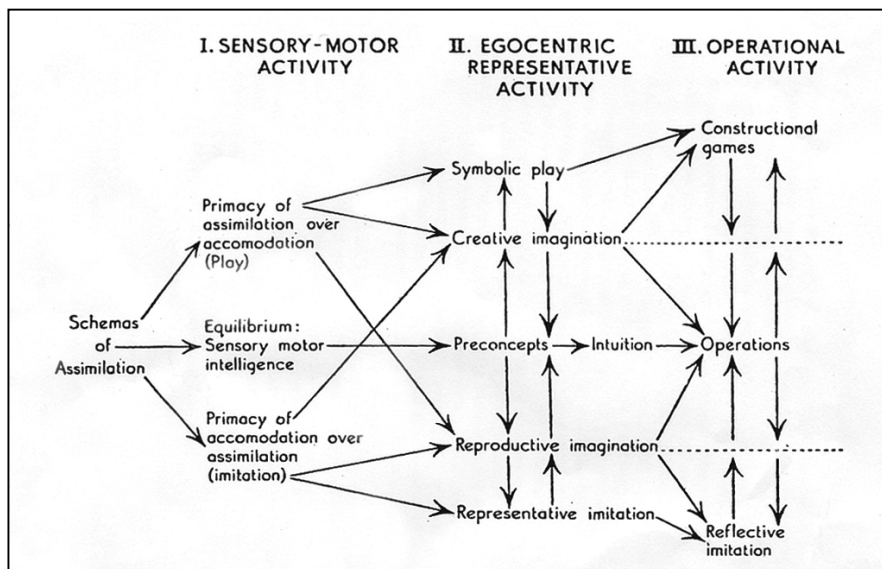
Figure 1. The development of play and imitation according to Piaget (1962)

Putting it somewhat simplified, in assimilation the world is assimilated to the ego, whereas in accomodation the ego is adapted to the world. Regarding action forms, assimilation means subsuming objects under known action schemata. Accomodation means adaptation of action schemata to new objects. Intelligent development, according to Piaget, is characterized by an equilibrium between assimilation and accomodation. There are, however, paradigmatic domains where early in development such an equilibrium is not yet achieved, either because assimilation dominates over accomodation or vice versa. Play and imitation are in Piaget's view two such domains, play being the paradigm case for the primacy of assimilation over accomodation, imitation being the paradigm case for the primacy of accomodation over assimilation. Early imitation could thus be called the social pole, where the child unreflectively copies other persons' actions without the capacity to intelligently apply them to new circumstances. Play, in contrast, for Piaget is a prime example of early childhood egocentrism: After having acquired instrumental action forms from sensorimotor stage IV around 9 months on, the child becomes more and more flexible in extending action schemata to new objects. Action schemata are first extended to contexts where the child does not really pursue concrete aims but performs action sequences for their own sake –this becomes functional play[7]. Later in the second year then action schemata are extended to clearly inappropriate contexts such that objects are treated as if they were of some other kind –leading to the emergence of pretend play (mostly called "symbolic play" by Piaget). To take Piaget's most famous example, his daughter Jacqueline at the age of 15 months took a cloth, put her head on it as if going to sleep and said "Nono" (as if saying that she was not really sleeping), signalling by her smiles and amusement an awareness of the non-seriousness of her act (Piaget, 1962, p. 96, observation 64 (a)). That is, the action schema of going to sleep was extended in a non-literal way to an inappropriate context, the cloth being treated symbolically as if it were a pillow. Actions like this one, where one object is symbolically substituted for another kind of object, mark the onset of pretend play, with more complex forms of pretending arising subsequently –such as pretending to be someone else, pretending that inanimate objects are animals or persons etc. Two general aspects of Piaget's theory of pretense development are remarkable. First, whereas most recent approaches stress the cognitive sophistication of coordinating fact and fiction that children reveal in their pretense, Piaget basically considers pretending as a defective form of reality orientation (borrowing notions of "primary thinking" from Freud and Bleuler). Young children's pretense, according to Piaget, shows that they have not yet achieved a solid conception of reality. Accordingly, Piaget claims, when children in the concrete

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[7] "Functional play" has been used in different ways in the literature. It is here used in a rather wide sense to refer to all kinds of playful actions where actions are performed and objects are used for the sake of playing, yet without any non-literal, as-if or symbolic elements. For example, throwing a ball back and forth would count as functional play in this usage, as would building with bricks. Whether a given behaviour counts as merely functional play or as pretense, however, depends on the context: Building with bricks can be pretense when one, for example, pretends to build a Zoo for some pretend animals and acts out a corresponding scenario.

operational period of the early school years do acquire a solid conception of reality, they cease to engage in pretend play. Second and relatedly, early pretense acts, according to Piaget, purely spring from the individual child's imagination and creativity. Not only does Piaget not view early pretense as situated in specific social contexts (above all joint parent-child pretending), he even views early pretense as essentially unsocial. Play and imitation present the two opposing poles of early action development, with basically no role for imitation in the emergence of pretending[8]. In his stage model of play behaviour, shared social pretense is a later achievement, solitary pretense being primary. In fact, all his observations of early pretending in his own children only report –from an unengaged perspective- instances of pretend play actions in seemingly solitary contexts –a fact about which many commentators have wondered (for example, Leslie asks sarcastically: "Did Piaget, who spent so much time on the carpet with his three children, making the most intricate and insightful observations while interacting with them, never join in their pretend play?" (2002, p. 107)). According to Piaget's theory then, early production of pretense does not presuppose any understanding of pretending in others. In fact, it remains unclear how joint pretending –which requires an understanding of others' pretense- develops from solitary pretending.

In sharp contrast to Piaget's individualism, the Vygotskian Soviet school of developmental psychology has considered play as essentially situated in specific social and cultural contexts[9]: "Piaget attempts to understand the development of symbolism as a purely assimilative process, independent of the process of socialization, of the intercourse of the child with the adults who are in his environment and teach him, as a process of spontaneous development that occurs as a result of the direct collision of the child with objective reality. Such an abstraction seems improper to us and is not in conformity with the actual course of development "(El´Konin, 1966, p. 39). The actual course of pretend play development, according to El´Konin, does not present an individualistic, assimilative counterpart to the imitative development of other actions, but as with all other action forms proceeds primarily in social contexts. Early pretending does not rest upon the child's individual imaginative creation of fantasy worlds, but arises mainly through being taught by adults and by imitating the pretense acts of adults. Consequently, early child pretense is very object-specific and not yet creative, such that early on children only perform pretense acts with objects that they have seen others perform with the same object. In support of these claims

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[8] Imitation does only play a role in Piaget's theory of pretense in two very indirect ways. First, Piaget uses the indiosyncratic notion of "self imitation" to describe how pretending arises out of serious action schemata: the child imitates her own serious actions in non-serious contexts in modified ways, e.g. imitates her going-to-sleep behaviour in non-serious ways with the cloth. Second, in later stages of pretending the child imitates other persons' serious actions in modified non-serious ways in pretense, e.g. pretends to read in a way she has seen her father read.

[9] Vygotsky himself has hardly written about pretend play. The central theoretical work in this domain comes from El´Konin (1966, 1969), one of his students.

El´Konin cites studies by Fradkina (1946) and Neverovich (1948) that showed that young children only did pretense actions they had seen in others and were unable to transfer them to new objects. The role of objects in early pretending is thus not unlike the role of tools in instrumental actions –in sharp contrast to Piaget's account. Whereas for Piaget in early pretense the child creatively can make any object be everything, unlike tools that do have a fixed function, in El´Konin's view both tools and objects in pretense have a rather fixed function for the child: Hammers are for hammering and toy cups are for pretend drinking. Only gradually does the child then develop a more context-general and creative ability to engage in object-substitution pretense with objects she has not experienced others pretend with. Still, however, such later more creative and flexible pretend play is not assimilative in Piaget's sense. It is not an expression of an immature reality orientation –on the contrary, it is reality-oriented in the sense that the topics of pretend play are taken mainly from everyday life (eating, drinking, cooking, playing father, mother and child etc.) which the child can "practice" in pretense contexts.

Another point of disagreement between Piaget and El´Konin regards the role of language in pretense development. On Piaget's account, both language and pretend play rest on a common underlying semiotic function –an ability to use one object or action to symbolically refer to something beyond itself- that develops in the second year. This semiotic function enables the social acquisition of language and the individual creation of pretense, but there is not a more intimate role for language in pretend play development. On El´Konin's account, in contrast, language plays an essential role in pretend play development. First children have to have some basic mastery of serious uses of language, then based on this ability early object substitution pretense is essentially acquired through imitation of adult pretense actions (e.g. chewing movements etc.) accompanied by corresponding non-literal use of language (e.g. "This is an apple").

In sum, the stage for the debate about the emergence of pretend play has been set by the opposing approaches of Piagetian individualism and Soviet culturalism. For the former, pretend play presents the assimilative pole of early action development and arises out of the child's individual imagination and creativity, whereas for the latter pretend play arises out of social contexts through imitation and adult instruction in similar ways as other action forms do. More recent debates about the ontogenetic origins of pretend play can be seen as variations on this theme[10]. Individualistic theories refer to naturalistic observations of children's spontaneous pretense as main evidence for their position (e.g. McCune, 1995, McCune-Nicolich, 1981). Culturalist theories, in contrast, present data on children's imitative learning of pretense acts, on

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[10] For some recent indivualistic variations, see e.g. Mitchell (2002); McCune & Agayoff (2002); Nichols & Stich, (2000). For some culturalist variations see e.g. Gaskins (1999), Haight (1999), Göncü et. al. (1999).

parents' scaffolding and support in joint pretense with the children (e.g. Haight & Miller, 1992; Slade, 1987; Striano et. al., 2001) and on cross-cultural variation in children's pretense development as main sources of empirical justification (e.g. Haight, 1999; Miller & Garvey, 1984; Striano et. al., 2001). The theoretical framework of the present work (developed in chapter 3) can be seen as a culturalist variation, attempting to develop further El´Konin's approach and relating it to children's developing understanding of mind.

2.2   Early Pretense Understanding: "Behaving-as-if" versus Early Metarepresentation

Whereas Piaget's and Vygotsky's main concerns were with the emergence of pretense production, recent developmental psychology since the birth of "theory of mind" research has become interested in early pretense understanding and its relation to understanding mental states. Here the stage has been set by two competing theories. The basic claim of the rich theory is that even very young children already possess an adult-like concept of pretending and understand pretense in a meta-representational way (Leslie, 1987, 1988, 1994, 2002; German & Leslie, 2001). Starting point for this theory are two observations. *First*, in order not to get confused about fact and fiction, it is necessary that even young children –in pretending and seeing others pretend- somehow cognitively keep apart the proposition describing the pretense content and propositions about the real world. *Second*, there seem to be some structural isomorphisms between forms of pretend play on the one hand and reports about mental states on the other. Sentences reporting about mental states, for example "Oedipus believes that Yocaste is not his mother", are different from sentences about simple events in the world, e.g. "Yocaste is Oedipus' mother", in at least three respects (these sentences are called "intensional" in contrast to most sentences about the non-mental world that are extensional; see e.g. Quine, 1961; Searle, 1983, chapter 7). *First*, in the embedded sentence that gives the content of the mental state substitution of co-referential terms is not licensed. For example, it is not allowed to substitute "his mother" for "Yocaste" in the sentence about Oedipus -from "Oedipus believes that Yocaste is not his mother" it does not follow that "Oedipus believes that his mother is not his mother". *Second*, from the truth of the whole sentence the truth of the embedded sentence does not follow. For example, from "Oedipus believes that Yocaste is not his mother" it does not follow that Yocaste is not his mother. *Third*, so-called existential generalization fails in mental state reports. That means that from sentences of the form "X believes that the a is F" it does not follow that the a exists. For example, "Peter believes that the king of France is bald" does not license the inference that there is a king of France. Leslie (1988) has argued that there are three forms of

pretend play that correspond to these three forms of intensionality (see table 1). Object substitution pretense –e.g. pretending that a block is an apple- corresponds to the first form. In pretending that a block is an apple, the child has to know that one object somehow gets two labels –"block" in describing the real world and "apple" in describing the pretense scenario- and that these must not be substituted for each other. Imaginary property pretense – for example, pretending that an empty cup is full- corresponds to the second form of intensionality. Here the content of the pretense ("the cup is full") does not license the truth of the sentence "the cup is full". Third, imaginary object pretense, for example pretending that there is a monster behind the curtain, corresponds to the third form of intensionality. From pretending that there is a monster behind the curtain it does not follow that there really exists a monster.

Table 1. Isomorphisms between properties of mental state reports and forms of pretend play according to Leslie (1988)

	Mental state reports	Pretend Play
1	Substitution of co-referential terms not licensed	Object substitution pretense
2	Truth of whole sentence does not imply truth of embedded sentence	Imaginary property pretense
3	Failure of existential generalization	Imaginary object pretense

Based on the intuition that these correspondences are no coincidence, but rather reveal deep underlying cognitive commonalities between pretending and understanding/reporting mental states, Leslie (1987, 1988) has developed an information processing account of the cognitive architecture involved in pretending in even very young children. According to this account, both in pretending, in understanding others pretend, and in understanding mental states such as beliefs, a specific modular architecture of meta-representational information processing is crucially involved. Meta-representation here means that cognitive representations, for example, "this is an apple"[11], are not processed in the normal literal way, but are embedded in complex representations of the form "person – attitude 'content'" as specifying the contents of pretense or

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[11] Leslie is an explicit adherent of a Language of Thought model of cognition á la Fodor (1975) and accordingly conceptualizes cognitive representations as Mentalese sentences in the head. Describing his position accurately, one would actually have to talk about the Mentalse translation of "this is an apple" etc.

mental states. For example, the proposition "this is an apple" is embedded in the complex meta-representation "I pretend that 'this is an apple'" when the child pretends herself, and in the complex meta-representation "She pretends that 'this is an apple'" when the child sees someone else pretend so. But the same structure of meta-representation is also used when the child interprets someone with the false belief that this is an apple: "She believes that 'this is an apple'". Meta-representations have a common cognitive structure, and according to Leslie they are all processed by a specialized modular information processing device, the so-called 'Theory of Mind Module' (ToMM). The only differences between different kinds of meta-representations lie in the attitude concepts that are used and in the different processing demands that different attitudes pose. Though all of the attitude concepts "pretend", "desire", "believe" etc. are basically inborn, they mature according to different timetables. Importantly, "pretend" is among the first proper attitude concepts children possess and make use of in meta-representations from two years on, while the concept "believe" needs some more time to mature, and its application involves some more demanding executive processes (above all inhibition of the prepotent response to assume beliefs to be true in the case of false beliefs), and thus can be used in meta-representation only later[12]. In fact, according to Leslie children from two years already possess the same concept of pretending as adults. This radical contention is rooted in Leslie's non-descriptivist conception of concepts as atomistic primitives. While descriptivism holds that concepts are individuated holistically by inferential and other logical relations with other concepts, anti-descriptivism views all concepts along the lines of demonstrative or natural kind concepts which are not individuated by their semantic relations with other concepts but by causal and historical relation to their referents. The developmental relevance of the descriptivism – anti-descriptivism debate lies in the different conceptions of learning and conceptual growth that the two positions imply. While descriptivism naturally leads to a developmental picture where concepts are acquired gradually and holistically in the process of learning new conceptual relations, Leslie's version of conceptual anti-descriptivism leads to a developmental picture where there are some conceptual primitives that remain unchanged in development and where there is only learning of new facts involving these concepts. Importantly, however, according to Leslie's position learning does not change the concepts in any way. Applied to our definitions D1a and D1b of pretending –which are supposed to give the descriptive content of our adult concept of pretending- a descriptivist position would hold that children can acquire the concept of pretending holistically and gradually, for example, by first understanding the conceptual relations between pretense and intentional action, and by only later understanding the conceptual relations between pretense and cognitive

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[12] Though Leslie holds that standard false belief tasks are a poor indicator of possession of the concept "belief" (because they involve too many performance factors) and that children have a concept of belief much earlier than they master these standard tasks.

mental states. Leslie's anti-descriptivism, in contrast denies from the beginning that the concept of pretending is individuated along the lines of our definitions. Adults might have beliefs about pretending along the lines of the supposed definitions, but these are just empirical beliefs about pretense and do not individuate the concept "pretend". Rather, this concept is a logical primitive, individuated by the causal relation to instances of pretense in the world (the concept "pretend" gets triggered in the child's head regularly when she sees instances of pretending[13]).

According to Leslie, his theory can explain several developmental phenomena. Pretense understanding and production is easier and occurs earlier than false belief understanding because it involves fewer executive demands, and the concept "pretend" matures earlier. The specific impairments of autistic children both in pretend play production and comprehension and in understanding mental states can be traced back to the common underlying impairment of the ToMM. And the theory can explain why children seem to become able to understand pretense in others (as indexed by engaging is joint pretense) at the same time as they become pretenders themselves: Both in pretending and observing someone else pretend, children use meta-representations involving the concept "pretend". In sum, the rich meta-representational theory credits even very young children with the adult concept of pretense that they apply, using a specialized cognitive architecture processing meta-representations.

The opposing lean approach is the "behaving-as-if"[14] theory (e.g. Harris, 1994; Harris, Lillard & Perner, 1994; Jarrold, Carruthers, Smith & Boucher, 1994; Lillard, 1994; Nichols & Stich, 2000; Perner et. al., 1994). Its basic contention is that young children lack an adult concept of pretending, because they do not yet have a grasp of mental states and thus do not yet understand the cognitive and intentional elements in pretense. Rather, young children have a concept of pretending-that-p as behaving-as-if-p, defined as "behaving in a way that would be appropriate if p (the counterfactual situation) were the case" (Nichols & Stich, 2000, p. 139) and of pretending-to-X as behaving-as-if-Xing. That is, young children's concept of pretending is purely defined in terms of behaviour and does not include cognitive and intentional criteria. Young children's concept of pretense is thus much more coarse-grained than the mature one and has a much bigger extension than the class of pretense actions. Accordingly, it does not allow for distinguishing pretending from other kinds of as-if-behaviours. The theory predicts that young children make at least two kinds of overextension errors. First, they should inappropriately apply their pretense concept to as-if-behaviours that fail to fulfil the cognitive criteria for pretending, for example, behaving as if p on the false belief that p, and behaving as if one was an X without

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[13] This is thus a radical causal version of concept externalism, though untypically combined with nativism.

[14] In fact, this theory is standardly called "acting-as-if" theory. But for reasons that will become clear later, "behaving-as-if" is a theoretically more adequate name for this theory, and so I will use this rather than the standard name.

knowing what an X is. Second, they should overextend their pretense concept to instances of as-if-behaviours that fail to fulfil the intentional criteria for pretending, for example, behaving-as-if accidentally (e.g. behaving like a techno dancer during an epileptic seizure where one has no intention at all) and trying to properly do an action (where one intends to really do the action).

The contrast between adult's and young children's pretense concept according to the behaving-as-if theory can be nicely illustrated with the help of Figure 2 (taken from Perner et. al., 1994, p. 263). In the mature adult conception of action forms, reality adequate actions (acting-as-is) are distinguished from reality inadequate ones (acting-as-if). The latter class, however, is further divided into at least pretense actions (where one knows what is real and what only fiction, and acts intentionally according to fiction) and mistaken actions (which fail to fulfill the cognitive criteria for pretending because one acts on a false belief). One could add here further subcategories of as-if-behaviours that are not pretense because they fail to fulfill the intention criteria for pretending, such as trying to perform actions, behaving-as-if accidentally only etc. The crucial point about this classification schema is that the adult concept of pretending allows pretense to be essentially distinguished from acting-as-is on the one hand, and other forms of behaving-as-if on the other hand. Young children's pretense concept, in contrast, merely allows the distinction between acting-as-is and behaving-as-if, but not the more subtle distinction between pretending and other forms of behaving-as-if.

FIG. 12.1   Kinds of action.
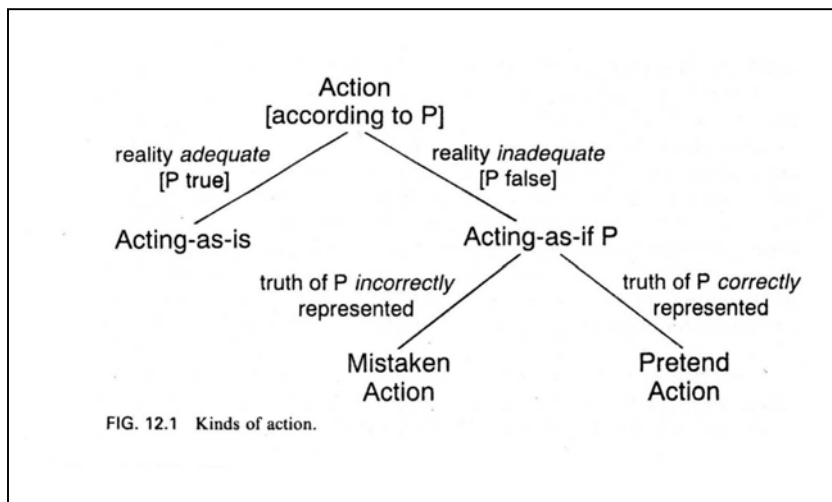
Figure 2. Acting-as-is and Acting-as-if according to Perner et. al. (1994)

Several verbal studies (reviewed in section 1.2.2.3) are taken as empirical support for the behaving-as-if theory. Regarding the first overextension prediction (overextension of the concept of pretense to as-if-behaviours without the essential cognitive elements of pretending), the

studies by Perner et. al. (1994) and Lillard (1993, 1996; Lillard et. al., 2000) are taken as evidence. In Perner et. al.'s (1994) study 3-year-olds tended to say that a person who behaved as if there was a rabbit in a cage because she mistakenly believed this, was pretending that there was a rabbit in the cage. In the studies by Lillard (1993) young children claimed that a character who did not know anything about rabbits was pretending to be a rabbit. And most dramatically, in the study by Lillard et. al. (2000), 4-year-olds ascribed pretense to inanimate objects. Regarding the second overextension prediction (overextension of the concept of pretense to as-if-behaviours without the essential intention elements of pretending), the study by Lillard (1998) is presented as main evidence. In this study, 4-year-old children were again told that Moe was hopping like a rabbit, but then they were told that Moe did not want to, nor was trying to, hop like a rabbit. When asked "Is Moe pretending to be a rabbit?" most 4-year-olds wrongly answered affirmatively.

These findings, behaving-as-if theorists argue, thus show that up to the age of four to five young children only have a superficial concept of pretense. This simpler superficial pretense concept of the two- and three-year-olds, however, is already sufficient for understanding others' pretense in everyday life and for joint pretending, and it can explain the proficiency of even young children in pretense reasoning and simple pretense-reality distinction tasks (see e.g. the theoretical model of Harris & Kavanaugh, 1993, that presents such a behaving-as-if theory as explanation of their pretense reasoning findings). Because all the young child has to be able to do in order to join into shared pretense is to somehow establish a simple connection between pretender and pretend proposition, represent real and pretense situation separately, and act seriously on the former and non-seriously on the latter. But for this it is not necessary that the child understand the pretender's cognitive and intentional relation with the pretense proposition. Only the four-year-olds, when they have acquired a mature understanding of mental states (as measured by false belief and related tasks), begin to get a grasp of these relations.

It should be noted that under the roof of the behaving-as-if approach one finds quite diverse theories, that reveal a family resemblance, in that they all stress that young children have a pretense understanding that is genuinely simpler in logical structure and comes earlier in development than a proper adult understanding of pretending and mental states, paradigmatically false beliefs. The theoretical frameworks of the different behaving-as-if theories, and their explanations for the developmental primacy of simple pretense understanding, however, differ wildly. Most dramatically, behaving-as-if positions are put forward both by theory theorists (e.g. Perner, 1991) and by simulation theorists (e.g. Gordon & Barker, 1994; Harris, 1994)[15]. According to Harris' (1994) simulation theory, for example, pretense understanding is easier

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[15] Though it should be noted that in some more detailed analyses both approaches are not as mutually exlusive as sometimes assumed (see e.g. Heal, 1996, Perner, 1996). In fact, Nichols and Stich (2000) incorporate elements of both approaches in their theory of pretense.

because it requires less sophisticated forms of simulating the contents of other persons' actions or attitudes (see Gordon, 1992, for a more detailed account of levels of complexity in different forms of simulation). Whereas in simulating others' pretense contents, there is not much of a problem to set aside current reality –one simulates their actions and attitudes in relation to a counterfactual scenario only-, simulating others' false beliefs requires a simulation of the false content of their attitude referring to a real state of affairs and using this simulation to explain and predict their actions in the real world. That is, in simulating others' false beliefs one has to temporarily set aside reality as it is, but nevertheless use this simulation to explain others' actions in relation to this reality: "According to this view, the major breakthrough between two and four years is [...] an ability to share temporarily the stance that someone may take to the counterfactual. Whereas two-year-olds appreciate that someone may act as if a nonexistent situation were the case, four-year-olds appreciate that someone may believe that such a situation is the case" (Harris, 1994, p. 252).

Perner's (1991; 1995) theory theory, in contrast, offers a rather different analysis. A simple understanding of pretense, on this account, is easier than understanding false beliefs, because it only requires children to somehow relate another person to two different situations –the real ("this is a block") situation where she acts as-is versus the pretend situation ("this is an apple") where she acts as-if. Two- and three-year-olds, understanding pretense in these simple ways, are thus said to operate with a "situation theory". They can distinguish reality-appropriate behaviour from reality-inappropriate behaviour, but cannot distinguish within the latter class. What this does not yet require, however, is to understand the other person as mentally representing and acting on either of the real or pretend propositions. Such an understanding requires a "representation theory" (acquired around four) such that the child can ascribe to other persons mental representations with contents that refer to real situation that either match or fail to match the contents. Understanding false beliefs can not be accomplished by relating another person to a real situation and to some counterfactual situation only. Rather, it has to be understood that the other person acts seriously according to the counterfactual situation in the real world. The only way to achieve this, according to Perner, is to ascribe to the other person a mental representation with the counterfactual proposition as content and with causal powers in guiding the person's actions in the real world. Only the "representation theory" then allows the four-year-old to distinguish between acting seriously according to a true mentally represented and believed proposition (acting as-is), acting intentionally according to a mentally represented, but only imagined proposition (pretense) and acting mistakenly on a mentally represented and believed proposition (acting on false beliefs).

Despite these different theoretical backgrounds, however, behaving-as-if theories agree in drawing roughly the following ontogenetic picture: From around two on children pretend

themselves, have a simple understanding of others' pretense, and based on this can engage in joint pretending. The theory in its general form does not make any specific claims about the ontogenetic origins of pretending, nor about the early relations between production and comprehension of pretense. Both individualistic accounts viewing individual pretense production as primary, and more socio-cultural approaches that view pretending as rooted in understanding others' pretense and joint pretending are compatible with a general behaving-as-if theory. The crucial change in children's pretense understanding happens later when they have acquired an understanding of mental states at the age of four. Only then begin children to get a grasp of the cognitive and intentional criteria for pretending and thus to leave behind their earlier superficial pretense concept, acquiring an adult-like concept of pretending as intentionally acting non-seriously, according to a pretense proposition one knows to be false. Behaving-as-if theories are also compatible with viewing children's early pretense understanding not only as a precursor to a later developing pretense concept after they have acquired an understanding of mental states, but in addition as zone of proximal development for developing such mental state understanding itself: Early understanding of pretense presents children with a bootstrap into understanding the mind which in turn enables a more mature understanding of pretending (see e.g. Smith, 2002 for a review of such lines of argument).

Remember, in contrast, the ontogenetic picture according to the early meta-representation theory: From around two years of age children simultaneously start to pretend, understand others' pretense and engage in joint pretending. All this is explained by the use of specific meta-representations using the adult concept "pretend". In subsequent development other mental state concepts mature and children then learn more about pretending and its relations to mental states, but their initial pretense concept remains unchanged.

These are the two big theories about the development of conceptual understanding of pretend play. It is very important to note, however, that –contrary to the impression often conveyed in debates about early pretense understanding- these two theories do not pose logically exhaustive alternatives. For example, one can question the assumption of the behaving-as-if theory that young children do not understand pretending as an intentional action form, without thereby having to embrace Leslie's theory. In fact, the theoretical approach of the present work developed in the next chapter will, by doing exactly this, present itself as a third game in town.

3   Theoretical Approach and Research Questions of the Present Work

The present work approaches the development of pretense performance and comprehension in the preschool years from a Cultural Learning perspective. First, Cultural Learning theory will be outlined in its general form in the next section, and then a Cultural Learning approach to pretense specifically will be developed from the general theory in the section after that.

3.1   Preliminary: Cultural Learning Theory – Bringing Together Vygotsky and ”Theory of Mind“ Research

Cultural Learning theory brings together two strands of developmental approaches, Vygotskian historical materialism on the one hand, and the recent research program on children's developing mental state understanding (so-called 'theory of mind' research) on the other (Tomasello, 1999a; Tomasello, Kruger & Ratner, 1993). With Vygotksy it shares the emphasis on the role of society, history and culture in shaping the individual developing mind. However, in contrast to Vygotsky it asks more specifically about the individual cognitive prerequisites for participating in different forms of culture. With the 'theory of mind' program it thus shares the focus on the development of understanding other persons as determinant of social development. Cultural Learning theory is thus a dialectical program: It tries to clarify the individual cognitive prerequisites for entering into different forms of culture, and how these forms of culture, above all language and cultural practices, in turn shape individual cognitive development (Tomasello & Rakoczy, 2003). And it is an essentially comparative program, one of its aims being to explain the uniqueness of human cognition and culture.

   Putting it somewhat simplified, the general ontogenetic picture according to Cultural Learning theory is this: While human children in their first months of life develop in most respects just as their non-human primate relatives do (they perceptually learn to discriminate and categorize events and things in the world, acquire ever more coordinated behaviours towards the social and non-social environment etc.), towards the end of the first year of life a crucial developmental step occurs that divides human ontogeny from that of even the closest non-human relatives. While both non-human primates and children in their first year can be said to perceive the world and act in it intentionally in some sense, only human children at the end of their first year begin to

understand other persons and themselves as intentional agents perceiving and attending to the world, and intentionally acting in and on it –that is, as having some simple mental states towards the world (Carpenter, Nagell & Tomasello, 1998a; Tomasello, 1995). This cognitive revolution of social understanding manifests itself in several distinct –but cognitively related- behaviours that first emerge from around this time: After having been engaged in 'dyadic' behaviours with either persons or objects for some time in the first year, children now for the first time begin to engage in 'triadic' behaviours that involve a referential triangle between child, other person and outside object/event which is jointly perceived/attended to or acted upon. Thus, infants at this age begin to flexibly and reliably look where adults are looking (gaze following), use adults as social reference points to disambiguate novel events (social referencing), and act on objects in the way they have seen adults act on them (imitative learning) –revealing an understanding of the adults' attitude/directedness towards the outside events. At this same age, infants also begin to use communicative gestures such as the pointing gesture to direct adult attention and behaviour to outside entities and make proto-comments on them (Liszkowski, Carpenter, Henning, Striano & Tomasello, in press)- trying to influence the adult's attitude/directedness towards the outside events (Tomasello, 1995). The fact that all these skills emerge in developmental synchrony and correlated fashion (Carpenter et. al., 1998a) suggests a common underlying cognitive basis –an emerging understanding of oneself and others as intentional agents. This new understanding then opens up for children the gate to participating in a culture. Based on their understanding of instrumental intentional actions, through imitation they acquire new action forms, participate in practices and learn the functions of artefacts –what they are for, what is to be done with them. Based on their understanding of communicative intentional actions, they acquire conventional communicative action forms such as pointing, gesturing and above all a natural language (Tomasello, 2000).

Normally developing children in their second year thus enter into culture and society with shared, normative practices and collective intentionality. Language is central in this respect because it provides a practice that is not only shared and normative, but aims at truth or fulfilment (assertions aim at truth, commands aim at fulfilment etc.) and is essentially conceptual and perspectival: In learning a language children learn to interpret and evaluate speech acts as true/false or fulfilled/unfulfilled; objects and events are brought under descriptions in discourse, with different descriptions and perspectives being applicable in one and the same discourse as a function of different standpoints and interests. Furthermore, natural language provides an explicit recursive and reflective practice: One can refer to previous speech acts in reflective discourse ("I do not agree with what you just said"), and talk about language itself ("'The cat is on the mat'

means that the cat is on the mat"[16]), and in propositional attitude discourse one can use embedded sentences to report the mental states of others without embracing these sentences ("He believes that India is in South America, but that is false"). Based on these unique properties, language then plays a central role in further cognitive development from the second year on. As the problem of understanding mental states in a more full-fledged sense[17] (false beliefs being the paradigm case) can be viewed as essentially the problem of explicitly understanding different incompatible perspectives on the world (Perner et. al., 2002, in press), natural language, with its inherent perspectivalness and reflective structure, plays a leading role in coming to acquire such a mental state understanding at around four –what has been considered the classical revolution in social cognitive development. Theoretically, language can be considered a medium that allows the 'representational redescription' (Karmiloff-Smith, 1992) of early more implicit abilities into later explicit conceptual understanding of persons and their mental states. In the domain of non-social cognitive development language also plays such a role, by providing an explicit perspectival medium to talk and think about domains in which children have an early implicit sensitivity, such as mathematical and spatial cognition or reasoning about physical matters (Tomasello, 1999a)[18].

In sum, cognitive development proceeds in dialectical fashion: From around one, children have a nascent understanding of themselves and others as intentional agents. This enables

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[16] By supplying the possibility to use and mention words in the same medium, natural language is thus object and meta-language in one.

[17] Another terminological note: I keep here in line with standard usage in the literature in distinguishing between a nascent and simple understanding of some mental states –above all intentions and perception- from around one year on, and a later, more mature and full-fledged understanding of more complex mental states such as beliefs from around four years of age. It is a notoriously difficult question in the field of social cognitive development, how to explicate the difference between "simpler" and "more mature" forms of understanding mental states. One proposal to illustrate the difference goes like this (e.g. Perner, forthcoming; Tomasello & Rakoczy, 2003): The standard adult form of explaining rational actions makes use of the *practical syllogism*: Rational actions are described and explained as an inference from at least two premises, one specifying what the person wants (her "pro-attitudes", Davidson, 1963), the other one specifying what she knows, perceives or believes about the situation (her cognitive attitudes). For example, "She wanted to get rid of her hunger, and she thought that eating the apple would be a good way to get rid of her hunger, so she took the apple and ate it". Children from their second year, the proposal goes, can apply a rudimentary form of the practical syllogism. They understand something about intentions and desires as pro-attitudes (that they aim at goals and can be fulfilled or not). And they understand something about cognitive attitudes. They understand, for example, that a person can see or fail to see something (e.g. an apple) and that this makes a difference for how she acts. However, they lack a full-fledged concept of the central cognitive attitude –belief- that aims at truth, and that can be true or false. They can thus not yet apply the practical syllogism in the full sense, because they do not yet understand that actions can be explained by persons' beliefs, irregardless of whether they are true. Furthermore, as belief is the central propositional attitude, and as the propositional attitudes can only be understood holistically –most of the mental states are defined at least partly in relation to beliefs the person has about the world (e.g. I can only intend to do an action of which I believe that I can do it)- children cannot understand most mental states in the full adult sense before they have a concept of beliefs.

[18] This contention also fits with some recent theoretical and empirical work from the "core knowledge" tradition where now language is assigned an important role in transforming innate more implicit core knowledge into domain general knowledge. See e.g. Carey (2001) for such an approach to numerical cognition and Hermer-Vazquez, Spelke & Katsnelson (1999) for such work on spatial cognition.

them to imitatively learn from other persons and thus to enter into cultural practices, instrumental action forms on the one hand and communicative action forms, above all language, on the other. In a dialectical process then language, being based on children's early social cognitive abilities, in turn radically transforms children's social understanding and non-social cognition.

Autism –according to Cultural Learning theory- presents an unfortunate case of pathology in this dialectical cognitive and cultural development: Very generally, the abnormal development of autistic children in early development, their problems with joint attention, interpersonal engagement and communication can be traced back to a cognitive deficit in the understanding of others and oneself as intentional and communicative agents. And this deficit leads –above all via an imitation deficit- to deficits in language acquisition, and participation in culture more generally, which in turn prevents autistic children from developing more sophisticated forms of social understanding (Tomasello et. al., 1993).

3.2   Cultural Learning and Pretense Development

Pretending is a human action form. Understanding pretense is a form of social cognition. The present work is an attempt to apply Cultural Learning theory in its general outlines to the specific development of pretending and understanding pretense.

3.2.1 Understanding Intentional Action, Imitative Cultural Learning and Pretending

> It would be interesting to see a revived interest in the relation between action and pretense within a more contemporary theoretical framework.
>
> (Alan Leslie, 2002).

Armed with a nascent understanding of intentional action as behaviour where a person wants to bring about changes in the world by using certain means, children from one year on develop the ability to imitate other persons' instrumental actions. A narrow notion of imitation will be used in this work along the lines of Tomasello et. al. (1993) which is defined as intentional performance of an action one has seen someone else perform and the intentional structure of which one has understood. According to this narrow notion, imitation stands in contrast to other, simpler forms of social learning. One such simpler form is mimicking, where superficial behaviour (in the sense of movements) of others is copied without any understanding of its intentional structure (vocal

mimicry in birds being an example). Another form is emulation learning, where one learns about causal properties of objects by observing someone else act on them. For example, by observing someone else use a stone to crack open a nut I learn that the stone is very hard and can be used to open things. However, I would have learned the same by observing the stone simply fall on the nut –the other actor is not necessarily perceived as an intentional actor, but only as one more part in the causal flow of events (for an overview of these types of social learning see Tomasello et. al., 1993; Want & Harris, 2002). According to more wide notions of imitation, it is true that even newborns imitate simple facial movements (Meltzoff & Moore, 1977, 1983). But there are good reasons not to call this imitation in the narrow sense. First, these imitations (in the wide sense) are restricted to some very specific movements and disappear after some months –which makes an explanation in terms of local inborn release mechanisms plausible (Anisfield, 1991). Second, copying superficial movements can be more parsimoniously explained as simple mimicry because it does not require the infant to attribute any intentions to the other person that are distinguished from the behaviour itself and can be fulfilled or not.

At around one year, however, there emerge behaviours that are most fruitfully explained as proper imitations, where the child understands that the actor acts intentionally, aiming at bringing about changes in the world by making use of specific means. When one-year-old infants see someone else make use of a certain means to achieve an effect, they re-enact the action and simultaneously look in anticipation to the goal-object (Carpenter et. al., 1998a) –indexing an awareness of the intentional directedness of the action and not only its superficial structure. And they show some awareness of when an action is only a means and when it is done for its own sake: They imitate a bizarre action A by an actor that leads to effect B only when the actor could have done a less bizarre action to achieve B, but not when the actor had no other possibility to achieve B except by doing A (Gergely, Bekkering & Király, 2002). Also, when 18-month-olds see an actor unsuccessfully trying to do something they do not copy her superficial behaviour but perform the intended action properly –even if they have not seen the other person performing it (Meltzoff, 1995; Bellagamba & Tomasello, 1999). Further, 16-month-old infants preferentially imitate intentional actions over superficially analogous accidental behaviour (Carpenter, Akhtar, & Tomasello, 1998b), demonstrating an ability to interpret basically "the same" behaviour in different ways (as a goal-directed action or as an accident). Taken together, this evidence suggests that from around one year children become capable of real imitation of instrumental actions in the narrow sense. This capability opens up for them the way into cultural practices and traditions: by imitation they learn new instrumental action forms and the functions of artefacts, what they are for, how one uses them –what can be called the 'intentional affordances' of objects (Tomasello, 1999b).

Not only, however, do one-year-olds understand instrumental intentions –where the goal is to bring about concrete changes of the world- and imitatively acquire instrumental action forms. They also show an understanding of communicative intentions –where the goal is to perform communicative acts, above all (proto-)assertions and (proto-)requests, towards other persons- which lays the foundation for the acquisition of communicative action forms, above all language. One-year-olds understand, for example, proto-declarative pointing gestures in other persons (Carpenter et. al., 1998a) and produce them competently themselves (Liszkowski et. al., 2003). They imitatively learn simple symbolic gestures as labels for objects and actions (e.g. Namy & Waxman, 1998). Most importantly, they learn words and linguistic constructions to refer to objects and events in the world and make statements and requests about them (see Tomasello, 2000 for an overview of early imitative word learning). Somewhat later, from two years on, children learn not only to make contentful communicative actions with gestures and language, but also to understand and engage in the symbolic use of objects to make assertive and imperative communicative acts. They understand that markers, replica objects, drawings and scale models can be used to refer to situation in the world and perform illocutionary (assertive or imperative) acts about them (Callaghan, 1999, 2000; Tomasello et. al., 1999; Tomasello, Call & Gluckman, 1997; DeLoache, 2002).

How then does pretend play, for example pretending that a block is an apple, fit into this picture? Some important conceptual clarifications and distinctions are in order to address this question. First, symbolic actions in a wide sense have to be distinguished from actions that are not symbolic. Symbolic actions have semantic content, they somehow allude to something beyond themselves –about them it can be asked what they mean. Answers look like this: "By 'the cat is on the mat' he means that the cat is on the mat", "By pointing to that box he means that the candy is in there", "By drawing the house to the left of the tree he means that the house is to the left of the tree". Instrumental actions and actions done just for their own sake (e.g. dancing, sports etc.) are thus not symbolic. It is true, about some instrumental actions it can be said that they mean something, for example "That she takes an Aspirin means that she has a headache". But this is not meaning in the required sense –it is only a matter of causal regularity and covariation in the world (if someone takes an Aspirin then she normally has a headache), called 'natural meaning' (Grice, 1957). The required sense of meaning, in contrast, is non-natural meaning which is not a matter of brute regularities and correspondences in the world, but is conferred on actions and objects through the intentions and practices of actors and users –meaning is use. Nothing inherent in words, maps, models and other actions and objects that can be symbolic makes them intrinsically symbolic –rather, they acquire this status by being used in contentful acts.

There have been some sceptical concerns about whether pretend play really deserves the title "symbolic play" as Piaget called it (e.g. Perner, 1991, Tomasello et. al., 1999). We can now see that it is harmless to call pretend play "symbolic" in the wide sense of actions that have some sort of content. "His making these chewing movements and eating sounds with the block mean 'eating'" –this seems to be a clear case of non-natural meaning in the wide sense. Introducing another conceptual distinction, however, we will see that the sceptical concerns are right insofar as pretense is only symbolic in the wide sense. Within the class of symbolic actions we have to distinguish between denoting actions which are symbolic in the narrow sense, and actions that are non-denoting and symbolic only in the wider sense (Goodman, 1976). Denoting symbolic actions have semantic content, refer to situations in the world and make illocutionary –paradigmatically assertive of imperative- acts about them which can be true/false or fulfilled/unfulfilled more generally. Paradigmatic cases, of course, are speech acts. Assertive speech acts have semantic content (e.g. "the cat is on the mat"), refer to the world and make claims about it, and are true if the world matches the semantic content (if the cat is on the mat), false otherwise. They have 'word-to-world direction of fit' (Searle, 1969) –it is the job, so to speak, of assertions to fit the world. Imperative speech acts, in contrast, have semantic content, refer to the world and aim at changing the world according to the semantic content –they have 'world-to-word direction of fit' (Searle, 1969). Assertive and imperative denoting acts, however, can also be performed by means other than linguistic ones. For example, when asked where the cat is, I can produce a drawing of cat-shaped scribbles on mat-shaped scribbles to assert that the cat is on the mat. Drawing is a good case to illustrate the distinction between denoting and non-denoting acts. Because in most cases when I draw cat-shaped scribbles on mat-shaped scribbles I do not make any assertive or imperative acts at all – I just draw a cat on a mat, that is all. I do not mean any specific cat or mat, nor do I claim or request anything – I draw non-denotingly. Pretend play is in this respect similar to non-denoting drawing. When I take the block and make chewing movements and eating sounds, this act has symbolic meaning in the wide sense – that 'I am eating an apple'. But it is not symbolic in the narrow sense of denoting, because I do not make any claims or requests about me or apples. It is not the job, so to speak, of pretense to fit the world or make the world fit to it[19].

It is interesting to note, and has fruitful implications for the analysis of developmental phenomena, that the logical structure of non-denoting actions with objects is in some sense less complex than that of denoting actions with objects. Whereas in non-denoting actions with objects

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[19] Though in exceptional cases pretending can be used in denoting ways, for example in historical drama. When asked "How come that we were driven from paradise?" I can take the block, say "apple", make chewing movements etc. to make a historical claim about Adam, Eve and the apple. These, however, are truly exceptional cases and much unlike normal pretend play.

one has only to somehow assign a semantic content to an object, in denoting actions one has to coordinate object, semantic content, referent situation and has to evaluate truth/fulfilment of the content with regard to the reference situation. For example, understanding a non-denoting drawing of a cat on a mat just requires me to understand that the content "a cat is on a mat" is somehow assigned to the object by the user. In contrast, in order to understand the denoting act of claiming that the cat is on the mat by drawing a cat on a mat, I have to understand that the content "the cat is on the mat" is assigned to the drawing by the user and that she thereby refers to the world and makes an assertion that has to be evaluated as true or false. Non-denoting symbolic acts –due to their less complex structure- should thus be easier to understand, and accordingly developed earlier than analogous corresponding denoting acts[20]. This analysis might help to solve the developmental puzzle about which many researchers have wondered why children come to understand the symbolic denoting use of objects (for example of scale model houses to indicate locations of objects in real houses) so much later than they understand structurally analogous pretense (for example, pretending with doll houses; see DeLoache, 1991).

The main tenet of Cultural Learning theory, based on these analyses and as applied to the emergence of pretend play, is then that pretending (as a subclass of symbolic actions in the wide sense), other symbolic actions and non-symbolic actions should –in spite of important structural differences between them- be acquired in fundamentally similar ways through cultural (imitative) learning. Pretending should be acquired in similar ways as, but after instrumental actions and simple communicative actions (including language). And it should be acquired before more complex denoting symbolic action forms with objects (such as use of models etc.).

The main focus of the present work regarding the emergence of pretend play will be on comparing the acquisition of instrumental actions and pretend actions with objects. In a wide sense of "tool", objects that are used in instrumental actions to achieve concrete changes in the world can be said to become tools. In a wide sense of "toy", objects that are used in pretense actions can be said to become toys. In contrast to Piaget (1962), who claimed that young children might imitatively learn instrumental actions with tools but individually invent pretense actions with toys, and in accordance with El´Konin, Cultural Learning theory views the ontogeny of both action forms as similar in a fundamental respect: Both pretense actions on toys and instrumental actions on tools are acquired to a large degree through cultural imitative learning. In both cases, children through understanding and imitating the intentional actions of other persons

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[20] All this is valid only with the restriction, however, that the first symbol system children acquire –language- necessarily has to be a denoting system that is learned in triangulation contexts (Davidson, 1982), where the child and a communicative partner share common scenes of reference in the world (child – partner – world triangle), and where words and sentences are learned in referential and truth-evaluative ways. Otherwise words could not get off the ground. Language as basic denoting action form is also necessary to ground the symbolic relations in other non-denoting action forms –language is the basic interpretational scheme.

come to acquire new actions and an understanding of object "functions" themselves. In contrast to Piaget, and in accordance with Leslie (1988), on the present account there is thus a more intimate link between early pretense production and comprehension: As early pretend play is mostly acquired through imitation, it presupposes some sort of understanding of pretending in others. And in contrast to behaving-as-if theories it presupposes an understanding of pretending in others as an intentional activity and not just as superficially behaving-as-if.

But of course there are also fundamental differences between instrumental action and pretense actions, both in the structure of the individual intentions constituting them, and in the framework of collective intentionality in which they normally take place. It is to the individual and collective intentionality in pretense and other actions forms to which I now turn.

3.2.2   Individual and Collective Intentionality in Pretense and Other Action Forms

> Props generate fictional truths. But they do do so only in a social setting, only because there is a certain convention, understanding, agreement in the game of make-believe.
>
> (Kendall Walton ,1990).

Instrumental action with tools and pretense actions with toys are both forms of intentional action –albeit with rather different intentional structures. The intentions in instrumental actions specify as goal (a change of) states of affairs in the world and means to bringing them about. In pretending, in contrast, the intention is to act symbolically (in the wide sense) as if performing an action only or as if some state of affairs were the case. As the intentions in pretending –as a symbolic action form in the wide sense- are thus more complex (and understanding them in fact presupposes some understanding of serious actions) than in instrumental actions, early in development proficiency in understanding, imitating and creatively performing instrumental should precede the corresponding proficiency with pretense actions.

On the present account both instrumental and pretense actions are to a large degree acquired by imitative learning in contexts of collective intentionality. Collective intentionality here means, in a rather broad sense, that there are not only several individual actors acting separately from each other, but two or more persons understanding each other as acting and responding (imitatively) to each others' intentional actions (see Searle, 1995). In both cases children learn about functions of objects. Yet the kinds of functions they learn about and the corresponding types of collective intentionality are of a different structure: In imitatively learning to act instrumentally with tools, children learn in a *socially mediated* way about *physical functions* of objects. *Physical functions*

of tools are out there in the world, anchored in the causal properties of objects –the hardness of the hammer, the sharpness of the knife- and get expressed in the formula "X can be used to do Y in context C" (Searle, 1995). For example "The hammer can be used to hammer things in normal contexts". They can thus be learned through imitation in a *socially mediated* way, which means the child learns through another person's intentional action about this function, but could have discovered that function by herself as well. Toys in pretense, in contrast, have *status functions* which are not out there in the world, but are conferred onto them by the intentions of the pretenders (Walton, 1990). *Status functions* are expressed in the formula "X counts as Y in context C" (Searle, 1995), for example "This block counts as apple in our pretense context". They can thus not be learned in socially mediated ways alone –one can not discover *status functions*-, but in *socially constituted* ways where two or more persons create the *status function*. In sum, on the present account the collective intentionality involved in the acquisition of pretend play actions with toys is of a stronger kind than that involved in imitatively learning instrumental actions with tools. Note that this claim is in sharp contrast to Piaget's views on pretense and other actions. Whereas for Piaget early pretense –as the assimilative pole of action development- is less social than instrumental actions, where there is some room for imitative learning, on the present account early pretense, in contrast, is even more social than instrumental action forms. Young children should thus show more social behaviour when imitating pretense than when imitating instrumental actions.

In addition, whereas for Piaget pretending, as the assimilative pole of action development, should be very creative right from the start, according to the present approach it is to be expected that early in pretense development the creation of *status functions* is supplied by adults to a large degree, with children joining into already established scenarios. Creativity in pretending, in contrast, should be an only later achievement.

3.2.3   Context Specificity in Pretense Development

It has long been noted in research on the development of pretending that early pretend play is rather confined to specific contexts and objects (see section 1.2.1). Above all, children early on mainly pretend with replica toys, some time later with neutral objects, and latest with objects that have different conventional functions (e.g. Elder & Pederson, 1978). Such early context specificity is not surprising on the present account in terms of imitative acquisition of pretending. Given that children early in development mostly pretend what they have seen others pretend, it is easiest for them to pretend with replica toys. Pretense is what replica toys are made for and the main way in which they are used. Through children's frequent observations of others pretending with these objects, they have acquired something like enduring pretense *status functions* for

children[21]: Upon seeing the replica apple, children just see the intentional pretense affordance that it is for pretending to eat. On the other hand, it should be hardest for young children to pretend with objects that have different conventional *physical functions*. Because by children's observing other people acting instrumentally with these objects, they have acquired for children enduring intentional affordances to use them instrumentally in specific ways. For example, it is hard to pretend that a soap is an apple, because the soap is for washing. In analogy to the "dual representation problem" (e.g. DeLoache, 2002) often invoked to explain children's early problems with understanding symbolic relations (such that children find it hard to see one object as simultaneously interesting in itself and referring to something else), Tomasello et. al. (1999) have called this the "triune representation problem": Children have to understand that an object that (1) has some interesting properties in itself (can be grasped, manipulated etc.), and that (2) has an already established physical function can be pretended (3) to be of some other kind. Put in a somewhat different vocabulary, pretending with objects that are already tools for children poses the executive challenge to overcome "functional fixedness" (Duncker, 1945). Another related aspect (that will be of interest in Study set 2 of the present work, section 4.2) in which early pretense might be context specific is that initially young children might only be able to pretend to do an action in context where it is not possible to really perform that action. For example, beginning pretenders might be able to pretend to eat a wooden block, but might find themselves unable to pretend to eat an apple only (which they could really eat). In sum, the present account predicts context specific development of pretending as a consequence of the cultural learning history of the child –again in sharp contrast to Piaget (1962) who claimed that in pretending children learn early on that everything can be pretended to be anything.

3.2.4   The Dialectical Role of Language

As in other areas of developing social understanding and cognitive development more generally, on the present account language and discourse should play an important dialectical role in the development of pretense understanding. Once the child has a basic mastery of language and a basic understanding of pretending as intentionally acting-as-if, she can engage in simple pretense scenarios with non-literal use of language, for example call the block "apple" and make chewing movements (see the results of Harris & Kavanaugh, Studies 6 and 7). Such non-literal use of language is one of the central means to establish, coordinate and sustain joint pretense scenarios –e.g. to make sure that both Adam and Eve remember that the block is an apple in the pretense. Many languages, English and German among them, supply diverse means of implicit discourse

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[21] Which is not deny that the iconocity of replicas may have a facilitating role as well.

marking to signal that utterances are not to be taken literally but read as being about pretense scenarios only (e.g. Kaper, 1980; Lodge, 1979). Among these markers are the use of funny voice when talking about the pretense proposition in the indicative, and talking about the pretense proposition in specific tense (Subjunctive II in German, e.g. "Das wäre jetzt unser Apfel" (Kaper, 1980), and Past Tense in English, e.g. "This was now our apple" (Lodge, 1979)). However, while these implicit forms of talking about pretense and real states of affairs allow switching between (real and pretense) perspectives (Perner et. al., 2002, in press), e.g. between "This was now our apple" in funny voice and "It is a block" in serious voice, they do not allow explicitly confronting the two perspectives. Such confrontation is only possible with explicit discourse involving "pretend that" and "pretend to" constructions. These reflective discourse forms allow explicitly contrasting real situations and pretense propositions –e.g. "We pretend that it is an apple, but really it is a block"- and real, serious actions and pretense actions –e.g. "I am only pretending to eat, I am not really eating". As in social cognitive development more generally, the acquisition of such discourse forms should play a crucial role in developing a more mature understanding of pretense. Young children, on the present account, have a basic understanding of pretending as intentionally acting-as-if from the time they become pretenders. Explicit pretense discourse then should supply a medium for representationally redescribing (Karmiloff-Smith, 1992) this nascent understanding into a more explicit understanding of pretense as contrasting with reality, and as having specific cognitive prerequisites in subsequent development.

In sum, the present Cultural Learning approach to the development of pretend play performance and understanding draws the following ontogenetic picture: Pretend play emerges in children's ontogeny in similar ways as other action forms, through cultural imitative learning –though imitative acquisition of pretense involves even stronger collective intentionality, is in a sense more social, than instrumental actions. This imitative learning of pretense is enabled by children's nascent understanding of pretending as an intentional non-serious, symbolic (in the wide sense) action form. Even young children –though surely not possessing the adult concept of pretense- thus have an understanding of pretending as intentionally acting-as-if, and not just as superficial as-if behaviour, contra the behaving-as-if theory. Subsequent development is characterized by children's pretense comprehension and production becoming more flexible and less context specific, and by children's gradual acquisition of a more explicit, mature understanding of pretense (as contrasting with reality and as having specific cognitive prerequisites). Explicit forms of pretense discourse play a central role in this latter development.

3.3   Specific Research Questions and Hypotheses

Three sets of studies were conducted, the first set being mainly concerned with commonalities and differences in the imitative learning of pretense actions and instrumental actions with objects. The second set of studies looked more specifically at young children's understanding of pretending as an intentional action form, testing the behaving-as-if theory. The third study was a training study, investigating factors in the development from an earlier understanding of pretending implicit in action to a later more explicit understanding, and also tested for possible influences of pretense development on developing mental state understanding.

3.3.1   Study Set 1: Imitative Learning of Pretense and Instrumental Actions with Objects

Many studies have found that adult modelling of pretense actions has an influence on children's own pretending such that seeing an adult perform pretense actions with an object increases children's own sophistication in pretending with the object (e.g. Jackowitz & Watson, 1980; Lyytinen, 1989; Ungerer et. al., 1981; Watson & Fischer, 1977; Watson & Jackowitz, 1984). Striano et. al. (2001) compared more specifically children's pretense with replica toys (e.g. a toy man), neutral (e.g. a stone) and instrumental objects (e.g. a pencil) following an adult's demonstrations. The results revealed that children engage in pretense most often with replica toys, the next most with natural objects, and the least with instrumental objects. The authors' Vygotskian interpretation of these findings –in line with El´Konin's approach- is that the pretense affordances of replica toys, established previously in the child's experience through interaction with adults, enhance children's pretend play with these relative to the natural and instrumental objects, in similar ways as instrumental actions create instrumental affordances of objects for children.

   Another line of research tried to test more directly El´Konin's (1966) claim that pretense is culturally learned and bound to specific contexts and objects early in development. McLoyd (1983) found that 3-year-olds pretended on a much higher level with high-structure play objects (mostly replicas of everyday household objects that could be used to pretend to do everyday action such as cooking) than with low-structure objects (neutral objects such as cardboard boxes etc.) –the interpretation being that the high-structure objects were those that for children had acquired pretense functions through the pretending demonstrated to them by adults in everyday life. However, these studies used mostly known objects and could thus not control for children's previous learning experiences with these objects. Furthermore, none of these studies has

investigated the phenomenon of learning from others' pretend play action models in direct relation to imitatively learning other kinds of actions.

Therefore, Studies 1a to 1c of the present work were designed as follow-ups on these studies, with a refined methodology and the aim of exploring more directly the Cultural Learning framework developed above (sections 3.1.1 and 3.1.2) with regard to the imitative acquisition of pretense and instrumental actions. To test this framework I tried to experimentally simulate children's first encounters with new objects the affordances and functions of which they do not yet know. In a novel objects paradigm sometimes used in imitation and word learning studies (e.g. Bellagamba & Tomasello, 1999; Meltzoff, 1995; Tomasello & Barton, 1994), I presented "virgin objects" to the children -unfamiliar objects without any prior established function- and demonstrated different types of actions with these objects. In a model phase I showed the children the "virgin objects" and demonstrated different pretense and instrumental actions on the objects. The number and quality of demonstrations was varied between the different objects both for pretense and for instrumental actions. In a test phase the children could then act on each object themselves up to three times (called trials 1-3). This setup allowed me to take children's actions on the objects as a straightforward and simple measure of imitative learning and affordance creation. Comparing children's actions on objects as a function of different frequency of demonstrations (either pretense or instrumental), and comparing the course of actions over the three trials made it possible to look for structural commonalities in the learning of pretend and instrumental actions. To test for the hypothesized differences in the acquisition of pretense and instrumental actions I also analyzed children's creative actions of both types, and their social gazes and smiles during both kinds of acts.

Several specific claims were derived from the general theoretical background. Based on the hypothesized commonalities in the acquisition of both types of actions, I expected qualitatively comparable patterns of imitative learning of pretense and instrumental actions. Based on the hypothesized differences in acquiring both types of actions I expected that, since pretense intentions are more complex, pretense acts should be more difficult to understand and imitate than instrumental actions for children around their second birthday, when they start to become proficient pretenders. Furthermore, as pretense is a matter of collective assignment of status functions, it is to be expected that early on this assignment is mainly supplied by adults, with the children sharing into an already established framework, in the style of a "zone of proximal development". Consequently, in early pretense individual creativity by the child is expected to be rare. Finally, as the collective intentionality involved in early pretense is of a qualitatively stronger

sort, I expected some special interpersonal behaviour by the child in pretending, specifically more social gazing[22] and perhaps more "knowing smiles" than in instrumental actions.

3.3.2 Study Set 2: Understanding Pretending as Intentionally Acting-as-if

Studies 1a to 1c were done to test for children's imitative learning of pretense actions. According to the Cultural Learning approach developed here and its rich notion of imitation as insightful reproduction of an intentional action, such imitative learning of pretend play would presuppose an understanding of pretending as intentional action form. In fact, it is one of the central claims of the present work that young children at some point understand pretending as intentionally acting-as-if, and based on this understanding imitatively acquire pretend play. Yet the behaving-as-if theory, while not denying that young children somehow reproduce pretense behaviour, could launch sceptical concerns against such a rich interpretation of imitation data in studies with such a design. Comparing children's imitations of instrumental and pretense acts, one concern goes, only licenses claims about children's distinctions between serious behaviour (as-is) and somehow non-serious deviant behaviour (as-if). What is not licensed is the claim that children understand pretending as intentionally acting-as-if, different from both serious as-is actions and other form of behaving-as-if that fail to be pretense because they fail to fulfil the intention criteria for pretending. Studies 2a to 2d were therefore done to investigate more stringently young children's understanding of pretending as intentional action form and to test the behaving-as-if theory.

The behaving-as-if theory, remember, claims that young children only have a superficial concept of pretending as behaving-as-if, lacking at least two essential elements of the adult pretense concept. First, young children do not grasp the cognitive prerequisites (knowledge about what is pretended etc.) for pretending. Second, they do not grasp the intentional prerequisites (intentionally acting in non-serious ways) for pretending. Consequently, they make two kinds of overextension errors: They overextend their concept of pretending to instances of behaving-as-if that fail to fulfil the cognitive criteria for pretending (behaving-as-if unknowingly), and to instances of behaving-as-if that fail to fulfil the intention criteria for pretending (behaving-as-if unintentionally). In the present work I do not question the first claim about the cognitive elements in young children's pretense concept. This claim seems empirically well substantiated,

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[22] One recent study (Striano et. al., 2001) has found evidence for more social gazes during children's pretense than during their instrumental actions. However, in this study children's gazing was only analyzed during three predetermined pretense actions and one instrumental action. Furthermore, objects well known to the children were used. These two aspects make it hard to interpret the findings as showing a general phenomenon. The present studies were thus a follow-up on the Striano et. al. (2001) study with the aim of improving on the methodology and investigating social gazing in more varied contexts.

and in addition gains independent plausibility by the fact that young children up to four or five fail to have an adult-like understanding of cognitive mental states in general (as standardly measured by false belief tasks)[23].   What is questioned in the present work is the second claim of the behaving-as-if theory about young children's lack of understanding of the intentional elements in pretending. The main evidence cited for this claim is the study by Lillard (1998) where young children said that a character behaving like a rabbit without wanting to do so was pretending to be a rabbit.

There are, however, several concerns, both methodological and theoretical, with this Moe study and the behaving-as-if theorists' conclusion based on it. *First*, as many researchers have noted (e.g. Aronson & Golomb, 1999; Custer, 1996; Hickling, Wellman & Gottfried, 1997: Joseph, 1998), the scenario presented by the two somewhat incongruent premises is very confusing. What is one to make of a person that hops like a rabbit without wanting to do so? With regard to children's picture understanding Bloom & Markson (1998) have argued that children "see it as very unlikely that someone would produce a drawing that is shaped uniquely like an object without having intended to represent that object" (p.203). Analogously, children might see it as very unlikely (as it indeed is) that someone shows systematic rabbit-behaviour without wanting to do so[24].

There is also a *second* and more fundamental concern with the Moe study. As children had to answer questions whether someone was pretending, it is unclear whether their poor performance was due to conceptual deficits or to problems with the lexical semantics of the word "pretend". Indeed, one study that suggests that even four-year-olds have not mastered the basic lexical semantics of the word "pretend" is Lillard et. al. (2000), where the children said that inanimate objects that behaved as-if could pretend. What this study shows, in fact, is that young children use the word "pretend" in a deviant way, that they have not yet mastered the basics of the language games that are played with this word. Rather they use it in a superficial way that extends to all kinds of as-if behaviours, even those of objects. "Pretend to be an X" then roughly means for young children "behave in a way such that one looks like an X". All this, however, does not necessarily mean that young children's concept of pretending, which they apply in everyday perception of other people's pretense, is of this sort[25].

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[23] However, for an interesting critique both of this first claim and the claim that the false belief task is the best measure of an adult-like understanding of cognitive mental states see German & Leslie, 2001.

[24] A recent study by Richert & Lillard (2002) lends prima facie support to these concerns: when a reason was given for Moe's behaviour –he is walking on hot pavement and does not want to burn his feet- the children who remembered this reason on a control question performed better. These results suggest that the children in the original study might have simply ignored the premise that Moe did not want to hop in coming up with their answers.

[25] One recent study by Sobel & Lillard (2002) attempts to take into account this concern by testing children's pretense comprehension without using the word "pretend" in the test questions. However, instead children in this study are asked about a pretender whether he needs a brain for his activity. It is not clear whether this type of question

While these two concerns equally apply to the original Moe (Lillard, 1993) study testing children's appreciation of the cognitive prerequisites of pretending, the claim based on the original Moe study that children do not understand the essential cognitive aspects of pretense before 4 years gains independent plausibility from the robust finding that children do not understand false beliefs (as measured by standard tests) as cognitive aspects of mistaken actions before 4 years (Wellman et. al., 2001). In contrast, -and this is the *third* concern, specific to the intention version of the Moe study (Lillard, 1998)- the claim that children up to 4 or 5 years do not understand pretense as an intentional activity seems implausible both in light of the findings that children from their second year show some understanding of the intentional nature of human behaviour, as indexed for example in their differential imitation of others' intentional, accidental and failed acts (e.g. Meltzoff, 1995; Carpenter et. al., 1998b; Gergely et. al., 2002) and in light of the findings that young children from at least 2 years can imitate other people's pretense actions (e.g. Watson & Fischer, 1977).

It thus seems possible that young children's pretense concept does incorporate the intention criteria for pretending, but the Moe study is a poor method for tapping at this. Therefore, in the current Studies 2a to 2d I pursued the hypothesis that young children do not only have one undifferentiated category of as-if-behaviours, but have a concept of pretense as an intentional activity different from other types of as-if-behaviours, and that they bring to bear this concept before they become proficient with the lexical semantics of words for pretending. This hypothesis could be called a revised "acting-as-if" construal in between Leslie's rich theory and the more parsimonious "behaving-as-if" theories. Contra Leslie, it does not dispute that children do not have an adult-like concept of pretending with its cognitive aspects until four or five years. In contrast to the "behaving-as-if" theories, it claims that young children do distinguish different forms of behaving-as-if in their intentional aspects and perceive pretending as intentionally acting as-if.

I tested this hypothesis by investigating children's perception of different forms of superficially analogous as-if behaviours. The two types of as-if-behaviours I was interested in were pretending and trying to do something. Children as young as 18 months show some awareness of the nature of trying (Meltzoff, 1995; Bellagamba & Tomasello, 1999) and are capable of simple pretense reasoning (e.g. Harris & Kavanaugh, 1993), but it remains to be tested whether young children distinguish trying from pretending as two different forms of as-if-behaviours with different underlying intentions. There is one recent study (Joseph, 1998) showing some awareness of

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presents any advantage in giving children a chance to manifest conceptual proficiency in perceiving pretense events, or whether children's difficulty with the lexical semantics of "pretend" is traded for their problems with the lexical semantics of expressions like "need a brain for this".

trying-pretending relations in 3-year-olds, but this study, too, involved children in confusing discourse and had some methodological shortcomings[26].

In the current studies, therefore, I presented children with an as-if-behaviour in two forms, trying to do an action and pretending to do the same action. In the first form, the demonstrator was trying (unsuccessfully) to do something, for example, to write with a novel pen. In the second form the demonstrator was pretending to do something (the same action), for example, to write with a pen. Both trying to write and pretending to write are as-if-behaviours in the sense of "would be appropriate if the counterfactual proposition 'this pen is working' were true" (see the definition of Nichols & Stich, 2000, mentioned above in section 2.2). Both models were superficially alike: The demonstrator made writing movements with the pen on a sheet of paper, but no marks were made on the paper. The first model was marked by signs of surprise and frustration as trying to write; the second model was marked by signs of fun and playfulness as pretending to write. The child was then given the object. Importantly, the object could be made to work on closer inspection, for example, the pen could be made to really write. In Studies 2a and 2b children were instructed to play an imitation game, and differential imitation in response to E's model action was the dependent measure. In Study 2c children were not instructed to strictly imitate, but were given the chance to react more productively and creatively. The basic conceptual premise was here that actions necessarily can only be perceived, individuated, imitated and reacted to under a description (e.g. Anscombe, 1958), or more generally under a conceptual perspective[27].

The prediction was that if children perceive pretending to do X as such, that is, as intentionally pretending only, and trying to do X as such, that is, as intentionally trying to really X, although both are behaving-as-if-X, then they should show the following response pattern: After pretense demonstrations they should do the pretense action themselves (Studies 2a and 2b) or a

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[26]   Children in this study were presented with storied about two persons. A showed an involuntary behaviour, e.g. sneezing; B pretended to show the same behaviour, e.g. pretended to sneeze. The test question was "Who is trying to sneeze?", where the correct answer was supposed to be B (because the behaviour happened to A, whereas B performed it intentionally). Sixty per cent of the 3-year-olds gave this supposedly correct answer. However, this answer in fact is not correct for at least two reasons (actually the correct answer would be "neither A nor B"). First, part of the point of pretending is that one does *not* try do the real action. Second, "try to X" can only be used when X is an action verb (see e.g. Goldman, 1970), but "sneeze" is not an action verb. Therefore, it remains unclear how children's answers are to be interpreted.

[27] For the sake of simplicity, I will –in line with standard usage in developmental psychology- often talk rather loosely about two- and three-year-olds having a "concept" of e.g. pretending and perceiving events "under a description" (even if they cannot explicitly talk about the events) to refer to pre-linguistic abilites that could be called conceptual in a wide sense. By this, I do not want to imply that children have a Language of Thought before they acquire natural language. Rather, this way of talking is supposed to capture that young children can have cognitive abilites that go beyond mere discrimination in that they perceive something as being a certain way and can make use of these perceptions in systematic inference-like ways. For now I will pretend that it is unproblematic to talk this way, but the questions in how far it is justified to call such abilites conceptual in a more narrow sense, and how pre-linguistic conceptual abilites might be understood will be taken up in the final discussion in chapter 5.

productive pretense actions that "follows" from E's pretense (Study 2c). After trying demonstrations, in contrast, they should try to do the real action themselves, or really do the real action, or indicate in some other way that their goal is to do the action properly (Studies 2a and 2b) or try to do the real action productively with different means (Study 2c).

The design of these studies also allowed me to test for children's pretense-reality distinction implicit in action more directly. In contrast to the tasks used by Harris and Kavanaugh (1993) where the children only had to reason and respond within the pretense scenario, the present tasks required children to make a choice between serious reality (really performing the action, or at least trying to) and a pretense scenario (pretending to do an action only).

A further goal of this set of studies was to include a direct test for décalages between earlier pretense understanding implicit in action and a later understanding explicit in language. In children's ability to distinguish pretense from reality, for example, there seems to be such a décalage between early understanding of the pretense-reality distinction implicit in children's actions at two (as indexed, for example, by their proficient performance in Harris & Kavanaugh's (1993) tasks) and later explicit ability to tell what is real and what only pretended (as indexed by Flavell et. al.'s (1987) tasks). Unfortunately, however, in the study of pretense there so far have been no studies that directly compare early, more action-based and implicit competence and later explicit competence. In the area of physical cognition, for example, one such comparative study was done by Hood, Carey and Prasada (2000). Infants from 2 _ 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 dis-habituation paradigm (Spelke, Breinlinger, Macomber & Jacobson, 1992). Yet in the study by Hood et. al. even two-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 at places where it could not have been according to principles of gravity and impenetrability. In the area of social cognition, Clements and Perner (1994) presented young children with a traditional unexpected transfer (change of location) false belief 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 on his arrival at one of the locations) were chosen. In these more implicit measures, children revealed a sensitivity to the false belief of the protagonist long before they could explicitly state the protagonist's false belief and take it into account in explaining and predicting his actions.

Following a similar logic, I wanted to compare more directly children's early implicit action-based pretense understanding with their explicit verbal understanding of pretending in structurally analogous tasks. Therefore, in Study 2d three- to six-year-old children were presented with the

exact same action models as used in Study 2a and were asked whether the actor had pretended to or tried to do the action.

3.3.3 Study 3: The Role of Experience and Discourse in Developing an Explicit Pretense Understanding

In the domain of pretense understanding there seems to be a décalage between earlier implicit abilities from around two and later explicit abilities developing from the fourth year on, similar to décalages found in other domains of social understanding and cognitive development more generally. Study 2d tested for such décalages more directly with different dependent measures to structurally analogous tasks. The aim of Study 3 was to investigate which factors might play a prominent role in the progression from earlier forms of pretense understanding in action to later more explicit forms of pretense 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. Harris, 1996; Tomasello, 1999a; deVilliers & deVilliers, 2000). In a training study that manipulated both of these factors, Lohmann and Tomasello (in press) 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 Study 3, therefore, I looked at the role of specific contrastive pretense experiences and different forms of pretense discourse in children's developing pretense understanding. Pretense discourse is a very interesting and specific domain, because in contrast to other discourse about actions and mental states, it provides the possibility both to explicitly talk about pretense scenarios as such, and to make use of implicit discourse marking to signal whether one talks about real situations or pretense scenarios. For example, one can explicitly say "We pretend that it is an apple, but really it is a block", or one can say "Hm. This is our apple now", implicitly marked with funny voice as being about pretense, and "It is a block" in serious voice.

Over the course of two weeks, two training groups of children were given systematic pretense 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, but really it is a block") and "pretend to" (e.g. "We pretend to eat, but we do not really eat") constructions. In the Implicit group, in contrast, the experimenter

talked about the pretense events in an implicit way, making use of specific implicit pretense discourse marking: only the pretense contents were described (e.g. "This is our apple!", "We eat!") in a funny, non-serious voice, whereas the real situations were described in serious voice ("It is a block"). The two training groups were compared to a control group who received training with functional play.

On the Cultural Learning theory adopted in the present work, reflective discourse plays a central role in social cognitive development as it enables the explicit confrontation of conflicting perspectives within one representational medium (Tomasello & Rakoczy, 2003). Both in "She believes that it is an apple, but really it is a block" and in "We pretend that it is an apple, but really it is a block", the proposition "it is an apple" is not asserted, but embedded as content in a report of a propositional attitude that someone takes towards reality, in explicit contrast to the true proposition about reality "it is a block" which is asserted. As implicit pretense discourse allows only switching between different perspectives ("It is an apple" in funny voice – "It is a block" in serious voice"), but not the explicit confrontation of perspectives that is possible in explicit pretense discourse ("We pretend that it is an apple, but really it is a block"), I expected explicit discourse about pretense events to be crucial in the progression to a later more explicit understanding of pretense actions. That is, I expected only the children in the Explicit group to profit from the training experiences in their explicit understanding of pretending as contrasting with reality and with really performing and trying to perform actions.

Another aim of Study 3 was to use the training study to test for the developmental relation between pretense understanding and understanding mental states more generally (so-called 'theory of mind'). In several studies it has been found that measures of pretense comprehension and production are correlated with theory of mind measures (above all understanding false beliefs) at the same point or later in development (e.g. Astington & Jenkins, 1995; Taylor & Carlson, 1997; Youngblade & Dunn, 1995).

As mentioned above, so far there has only been one training study that tested whether extensive pretense experience influences later performance in false beliefs and appearance-reality tasks (Dockett, 1998). Positive results were found. However, the methodological shortcomings of that study, above all the lack of an appropriate control group, make it impossible to tell whether it was really pretense experience or some other factor confounded with it, that accounts for the improved false belief task performance of the training group. The present training study thus was an attempt to improve on this study by comparing pretense experience with or without explicit pretense discourse to functional play experience in its influence on the development of mental state understanding (as measured by false belief and appearance-reality tasks).

In terms of existing theories, the design of Study 3 allowed me to test some specific claims about the developmental relations of pretense, language and understanding mental states. First, regarding the relation between pretense and mental state understanding, it has been argued that pretense presents a zone of proximal development (ZPD) for developing mental state concepts (e.g. Dockett, 1998; Garfield, Peterson, Garson, Nevin, & Perry, 2003; Youngblade & Dunn, 1995). The ZPD theory would thus predict improvement on false belief and appearance-reality tasks in the two training groups.

The second theory I could test with my 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, 1999a). These theories can be said to share a weak linguistic determinism, stressing the importance of language to the development of social cognition in general. In contrast, the 'strong linguistic determinism theory' (SLD)[28], as it can be called, is a specific theory about the role of one grammatical factor in developing an understanding of mind. It makes the very specific claim that theory of mind development is solely driven by one syntactic 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"). The present training study provides a good test case for the strong linguistic determinism theory in a longitudinal 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 my training study by comparing children's improvement on "pretend that" complementation constructions with their mental state understanding (as measured by false belief tasks).

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[28] It is not reall 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.

4   Experiments

4.1   Study set 1

The three studies in this first set of studies were conducted to investigate children's imitative learning of pretense actions with objects in direct relation to their imitative learning of instrumental actions with objects. Children's first encounters with novel objects were simulated by presenting them with "virgin objects" and demonstrating instrumental or pretense actions with them. To test for the hypothesized commonalities and differences between imitatively acquiring instrumental and pretense actions, Study 1a tested 24-month-olds for their imitative and creative actions of both kinds with the objects, and for specific interpersonal behaviour –above all social gazes and smiles to the experimenter- during the performance of these actions. Study 1b tested younger children, 18-month-olds, with an analogous, but slightly simplified procedure to investigate the developmental course of imitatively learning pretense and instrumental acts with objects. Study 1c, finally, tested 24-month-olds with a simplified procedure in order to validate the data from Study 1a on children's interpersonal behaviour during both kinds of acts.

4.1.1   Study 1a

4.1.1.1   Method

4.1.1.1.1   Participants

The participants were twenty-four 24-month-old children (13 males, 11 females; M = 23 months and 24 days, *range* = 21;25 - 25;28), all native speakers of German. Seventeen children were recruited by telephone from a list of parents and children who had volunteered for studies of child development, 7 were recruited in nurseries. Twenty-four additional children were excluded from the study either because of experimental error (N=2), because they turned out not to be native German speakers (N=2) or because they were uncooperative or their mother interfered (N=20)[29].

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[29] This high drop-out rate was due to the fact that the sessions were relatively long and taxing for 2-year-old children. See the Discussion below.

4.1.1.1.2   Materials and Design

An adult experimenter (E) presented seven novel objects, one at a time, to each child: a paint roller (A), a pink soft door stop (B), a green sponge-like little piece of fabric (C), a purple furry pencil (not recognizable as such) (D), a tube-connector looking like a hydrant (E), a black installation tube (F) and a red colour mixer (G) (see Figure 3). Each action that was demonstrated with one of these target objects involved a second "substrate" object. For example, in one pretense model the experimenter pretended the colour mixer (target object) was his toothbrush, involving as the substrate a pack of toothpaste[30]. In one instrumental condition he used the black installation tube (target object) to hit against a glass (substrate), thereby producing a nice sound.

Figure 3. Objects used in Study 1a

The first within-subjects variable was the kind of action model: three of the target objects were modelled with pretense actions, three with instrumental actions and one object functioned as a control object; it was only presented together with a substrate but not acted upon by E. The three pretense and three instrumental actions were each presented in a block, with the control object before, between or after these blocks (order of the blocks counterbalanced, position of the control object random). The three demonstrations within the two blocks were systematically varied and constituted the second within-subject variable: one object was acted upon only once (ONCE), the second four times in the same way (REPEATED) and with the third object E demonstrated three different actions, showing each action twice (MIXED). Assignment of the seven objects to the

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[30] In demonstrating pretense actions E made use of the usual markers for pretend, non-serious actions: exaggerated and truncated movements, sound effects, laughing, etc. (see Lillard & Witherington, 2001).

modelling conditions was counterbalanced across subjects (see Appendix A for the actions, corresponding substrates and the logic of assignment).

The central dependent measure was the type of children's actions with the objects in the test phase, when they were allowed to act on the previously demonstrated objects themselves. My main interest was in comparing children's behaviour with objects modelled ONCE and REPEATED both in the instrumental and the pretense model conditions. This created a 2 (model type: pretense versus instrumental) X 2 (model quality: ONCE versus REPEATED) design as main focus of analysis. Children's actions with the other three objects (the control object and the two objects modelled in the MIXED conditions served as a baseline for more qualitative comparisons). The second type of dependent measures were children's looks and smiles to E during their actions.

4.1.1.1.3   Procedure

Observations were done in a child psychology laboratory (n = 18) or in the nurseries (n = 6). Each child was tested individually. Children who came to the laboratory were accompanied by a parent throughout the session. E and the child sat at a table next to each other, with children sitting on their parent's lap (in the laboratory) or on a child's chair (in the nurseries). Parents were told not to influence the child during the study. Each session was videotaped. The study session consisted of a demonstration phase, where E presented the seven objects with their substrates to the child and acted upon six of the seven objects, in turn, and the test phase where the child was given the objects one at a time and allowed to act upon them herself.

Demonstration Phase.   E told the child that he was now going to show her some interesting objects he had in a box and also show her what he could with them, and that afterwards the child herself would get the objects and be allowed to act on them. He then brought out the first object, said "Look at that! And look what I can do with it!", brought out the substrate and then performed the action with the object on the substrate. All objects and their substrates were presented to the child for 50 – 80 seconds. Duration of presentation was matched for the respective pretense and instrumental conditions (around 50 seconds for the ONCE conditions, around 70 – 80 seconds for the REPEATED and MIXED conditions). In the ONCE conditions E performed the action (in a somewhat temporarily extended form), thereafter left the two objects for some seconds on the table and finally put them away again. In the REPEATED condition E modelled the action for the first time, left the objects for a short while on the table, said to the child "Look! I am going to show you once again what I can do with this!" and performed the same action again, repeating this two more times so that there were four demonstrations. In the MIXED condition, after the first demonstration E left the first substrate on the table and said to the child

"Look what else I can do with this!" He then brought out the second substrate and performed the corresponding action. This procedure was repeated with the third substrate and action. Then E started a second cycle through the demonstrations, saying to the child, "Look! I am going to show you once again what I can do with this!" and performed the three actions a second time in the same order. The control object was only shown to the children, with E saying something like "Wow, look at this! It is long and red. Look at the hole here!"

Testing Phase.   E then explained to the child that he had shown all the things from the box and that it was now her turn to act with the objects. He then placed the 11 substrate objects –that served as cues- in a semicircle on the table (equidistant from the child and in random order) and told the child to take a careful look at all of them. The child was then given one target object at a time, in the order of demonstration. On giving the object to the child E asked her "Now, what can you do with this (the target object) and one of these (pointed at the substrates)?" If the child did not react the question was repeated up to twice. In case of no reaction after the third question the object was removed and the next one brought out. E reacted to each action of the child with an equally positive emotional expression[31] and asked what the child had done, removed the substrate already acted upon and asked "What else can you do with this and one of these?" When the child performed a second action this procedure was repeated and the child got a third opportunity to act with the object. After the third action the target object was removed, all 11 substrates were placed on the table again and the child was given the next target object etc.

4.1.1.1.4   Observational and Coding Procedure

All video-records were scored for the child's actions with the target objects and for their looks and smiles to E by a single observer (O).

Actions.   Children's actions were described in shorthand phrases of the type: "pretends to brush teeth." Each of the children's actions during testing was categorized into one of 6 classes: First, I distinguished between pretense and instrumental acts. An action was scored "pretense" if it seemed clear on the basis of sound effects, language or coordinated sequencing of action that the child was deliberately acting as-if. Actions were scored "instrumental" when the child used an object purposefully to produce some observable effect on another object (e.g. used an object to roll play-dough, to wipe away dirt, to make a sound on a glass etc.). Purely exploratory sensorimotor behaviour with an object (e.g., banging, mouthing) was not scored at all. Second,

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[31] Ten per cent of the tapes were coded to check whether E really had followed the instruction and did not reinforce some specific sort of action. No difference in the amount of E's smiling to the child during pretense compared to instrumental actions could be found.

within these two classes I further distinguished imitative actions (same action with same object as E) from old actions (same action using different object as E) and creative actions (actions that had not been modelled at all). Importantly, to count as imitative or old, an action did not need to be performed on the same substrate as in the demonstration. For example, a child could pretend a target object to be her toothbrush in all of the trials, each time pretending a different substrate to be the toothpaste, or even without including a substrate into the action. In such a case all three actions were described as "pretends to brush teeth" and scored as "pretense, imitative" if pretend tooth brushing was modelled with this object. A second observer coded all videotapes for the children's actions. Interrater reliability was 91 % (Cohen's *Kappa* = .85).

Looks and Smiles.   Children's looking and smiling behaviour was coded from the tapes in real time, or if necessary by using the slow-motion function of a VCR. The "Interact" software package was used to determine the duration of gazes. Observers were trained in using the Interact software and the slow-motion function, and were trained to code gazes and smiles by experienced coders.

The first observer coded all of the children's action episodes for looks to E. Twenty percent of the sessions were coded by a second coder for reliability. Interrater reliability, assessed by means of a Pearson correlation on the scored number of looks per action episode was .98. With regard to children's smiling behaviour only smiles at E during gazing were coded, that is, looking smiles. Smiling was operationally defined as retracting both lip corners upward and backward. A binary measure was chosen: for a given gaze to E: was it accompanied by a smile (yes/no)? A second observer coded 20% of the tapes for reliability. Percent agreement was 97% (Cohen's *Kappa* = .95)[32]. In addition for each social smile it was coded whether the smile had its onset simultaneous with the gaze. Thirty percent of the episodes of social smiles were coded for reliability by a second observer, Cohen's *Kappa* = .74.

The same looking and smiling behaviours were coded for E during his demonstrations by O in 19 of the 24 sessions. In the remaining 5 sessions the camera angle did not permit to code E's facial behaviour. A second observer coded a random sample of 25 % of the sessions. Interrater reliability, assessed by means of a Pearson correlation was .94 for E's looks. Interrater agreement on E's smiles was 93 % (Cohen's *Kappa* = .80).

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[32] For the reliability here only those looks were considered that both coders had scored. A look was defined here as "the same look coded by both" when both coders coded a looking episode and agreed on on- and offset times within a time frame of 1 second.

4.1.1.2 Results

Actions. The first point of interest was children's imitative behaviour. Table 2 shows the mean number of imitative actions performed in the test phase in the six model conditions. In a first more qualitative analysis of the number of imitative actions performed over the three trials I included the MIXED conditions. Interestingly, the results across the three pretense model conditions show an analogous ordinal pattern as the results across the three instrumental model conditions: children performed most imitative actions in the MIXED condition, next most in the REPEATED condition, and least in the ONCE condition (see Table 2).

Table 2: Mean Number (and standard deviations) of imitative actions performed in test phase in the different conditions (n=24)

		Model frequency/quality		
		ONCE	REPEATED	MIXED
Type of model	Pretense	.50 (.78)	.83 (.70)	1.04 (.81)
	Instrumental	.96 (1.04)	1.42 (.83)	1.83 (1.13)

The main analysis regarding imitation was a 2 (type of model: pretense – instrumental) X 2 (frequency of model: ONCE – REPEATED[33]) within-subjects factors ANOVA on the number of imitative actions performed in trials 1 through 3. This analysis revealed a main effect for type of model, $F(1, 23) = 8.44$, $p < .008$, with children showing more imitative actions when these were instrumental ($M = 1.19$) than when they were pretense actions ($M = .67$). There was also a significant main effect for frequency of model, $F(1, 23) = 7.53$, $p < .012$, with children performing more imitative actions in the REPEATED ($M = 1.13$) than in the ONCE condition ($M = .73$). There was no interaction between type and intensity of model.

Of special interest were children's actions over the course of the three trials, above all on trial 1. Table 3 shows for each of the modelled actions ("Instrumental-ONCE action" in row 1 refers to the instrumental action that was modelled once with one object etc.[34]) the number of children that performed them on trial 1 with each of the seven objects (represented in the seven columns).

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[33] The MIXED conditions were not included in the main quantitative analysis, because they were not comparable to the other conditions due to asymmetries in baseline probabilities – children had been shown three different actions they could imitate in the test phase. A more qualitative analysis, however, revealed that the results across the three pretense model conditions show qualitatively the same pattern as the results across the three instrumental model conditions.

[34] As it was counterbalanced across subjects which model actions with which objects were in which conditions, for different children different actions were the "Instrumental-REPEATED", "Instrumental-ONCE" etc. actions.

Figure 4 shows the number of children that performed an imitative action in each of the three trials of the ONCE and REPEATED pretense model and instrumental model conditions respectively.

Table 3. Number of children who performed the target actions on trial 1 with each of the seven objects.

Number of children	Object/model condition						
	Instrumental REPEATED	Instrumental ONCE	Instrumental MIXED	Pretense REPEATED	Pretense ONCE	Pretense MIXED	Control object
Instrumental-REPEATED action	20[i]	0	1	0	0	1	5
Instrumental-ONCE action	0	12[i]	0	0	1	0	2
Instrumental-MIXED action	2	5	20[i]	1	1	3	3
Pretense-REPEATED	0	0	0	16[i]	0	0	0
Pretense-ONCE action	0	0	0	0	7[i]	1	0
Pretense-MIXED action	0	0	1	2	2	11[i]	1

Note: (1) The cells marked with [i] refer to imitative actions, that is, actions done were modelled with the same object in the model phase. (2) The three actions in the Pretense and Instrumental MIXED conditions were treated disjunctively here. That is, it was checked how many children produced *one of them*.

First, a control analysis was run to test whether children really imitated the modelled actions, that is, performed the target actions differentially as a function of model. This analysis revealed that for all target actions, children did produce them on trial 1 differentially with the different objects as a function of the model that had been demonstrated with the object (Cochran's Q Tests, all ps < .0001).

Second, the numbers of children performing the target actions on trial were compared in the four main conditions (Pretense and Instrumental REPEATED and ONCE). As can be seen from Figure 4 and Table 3, children more often imitated both pretense and instrumental actions on the first trial when the model was given REPEATED than when given ONCE. Generally, children imitated instrumental actions more often than pretense actions. A non-parametric analysis of the frequencies of children performing as first action the modelled action in the four different

conditions revealed significant differences between the conditions, Cochran's Q (3,22) = .003. Pairwise comparisons yielded significant differences both for the two pretense model conditions, such that more REPEATED than ONCE imitative actions were performed (Binomial test: n = 12, x = 2, p = .039), and for the two instrumental model conditions, also with more REPEATED imitative actions performed than ONCE imitative ones (Binomial test: n = 10, x = 1, p = .021). There were neither significant differences between the two REPEATED, nor between the two ONCE conditions.
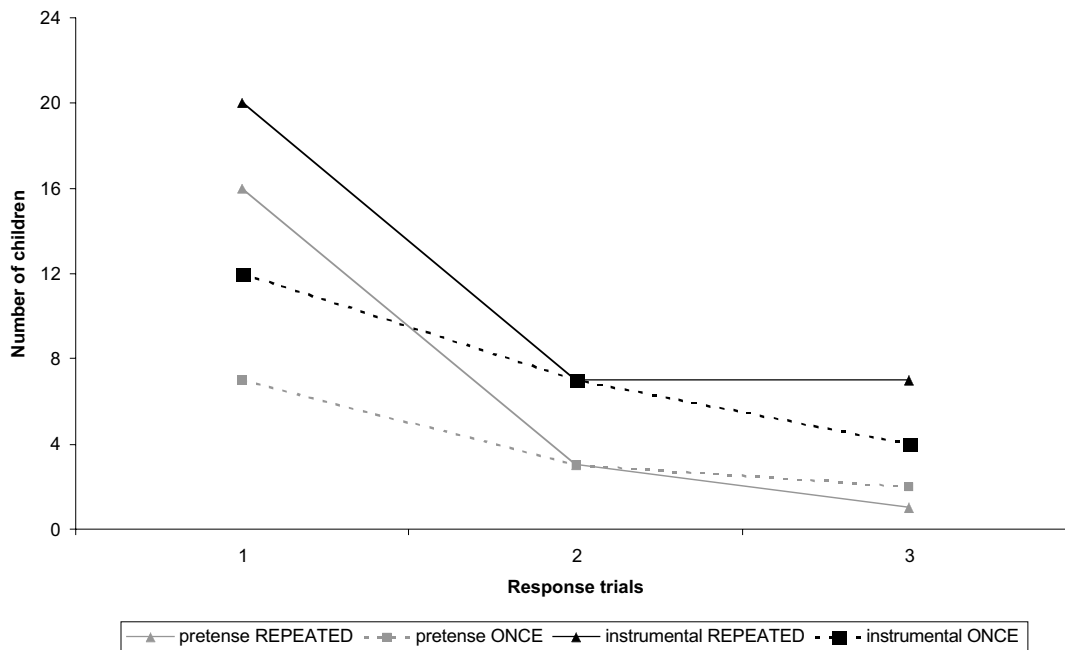
Figure 4. Number of children imitating as a function of model condition

Another point of special interest was children's creativity in performing pretense and instrumental actions. Therefore I determined for each child whether she had performed at least one creative action of both types. Table 4 shows the corresponding contingency pattern. Twenty-three of the 24 children performed at least one creative instrumental action (showing a total of 152 instances of a creative actions), whereas only 9 children produced creative pretense acts (14 in total). The

difference between children's tendencies to produce creative instances of both types of actions was highly significant (Binomial test: $n = 0$, $x = 14$, $p < .0001$)[35].

Table 4. Contingency between children's production of new pretense and instrumental actions (n=24)

		New pretense action?	
		Yes	No
New instrumental	Yes	9	14
action?	No	0	1

Looking and smiling behaviour. Table 5 shows the mean number of children's social gazes to E during both types of actions. A paired samples t-test revealed that children looked significantly more often, indeed twice as often, to E during pretense ($M = 1.01$) than during instrumental actions ($M = .49$), $t(23) = 3.84$, $p < .001$. [36]

Table 5. Mean number of social gazes, and proportion of gazes accompanied by a social smile during children's actions as a function of action type.

	Instrumental actions	Pretense actions
Mean number of social gazes per action	.49 (.35)	1.01 (.73)
Proportion of social gazes accompanied by a social smile	.29 (.25)	.16 (.24)

Note: Standard deviations are given in parentheses

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[35] One concern with this finding is that the criterion for an action being "creative" is too weak: when children perform an unmodeled action on trial 1, this might just be due to the fact that they have forgotten what E did. Therefore a control analysis was run with a more stringent criterion: only those actions were scored as "creative" that were performed after the child had done the modeled action. The results are qualitatively analogous: under this operational definition, three children showed creative acts of both kinds, 8 children showed neither creative pretense nor instrumental acts. Only one child showed creative pretense, but no creative instrumental acts. 12 children showed the opposite pattern (Binomial test: $n = 1$, $x = 12$, $p < .0001$).

[36] One possible concern with this result is that it might be a methodological artifact: all instrumental actions involved two objects all the time, whereas some pretense actions (eating, brushing teeth) can be largely done without a second object and mostly self-centered, so that children can look to E more during these pretense actions simply because they are performed close to the face and with less attention to the object needed. However, a more detailed analysis of the data can rule out this possibility: children's looking behaviour during these more self-centered pretense actions was not different from their looking behaviour during non self-centered pretense actions (pour, write, stir; drive a car etc.), $t(23) = .58$, $p < .95$, and during non self-centered pretense actions children looked significantly more often to E than during instrumental actions, $t(23) = 3.98$, $p < .001$.

For each episode of looking to E I scored if this look was accompanied by a smile. A proportion score was computed from these data: the proportion of looks to E during which the child also smiled at E. I analyzed the proportion measure as a function of action type. Table 5 presents the mean proportions as a function of pretense versus instrumental actions. The proportion of looks that included a smile was higher for instrumental actions than for pretense actions, though the difference between them was only marginally significant, $t(20) = 1.87$, $p = .08$.

This might seem like a surprising finding given the emphasis that is often given to children's "knowing smiles" as a sign of their engaging in shared pretense (e.g. Wellman & Hickling, 1993) and given that I found more looks in the pretense conditions. However, research on the development of emotion expression suggests that smiling in social contexts is a more ambiguous behaviour than looking to an adult. Smiling can occur to share affect and experience (e.g. Jones & Hong, 2001), but it can also arise as a sort of "mastery smile" due to experiencing contingency or success (e.g. Lewis, Sullivan & Brooks-Gunn, 1985; Watson, 1972). My above mentioned proportion measure, however, cannot distinguish cases where children look and smile to E to share affect and experience from those where children experience mastery on acting with an object, start to smile because of this and then look to E, continuing their originally non-social smile. Therefore I ran a more qualitative analysis, taking into account the relative onset of looking and smiling. I reasoned that genuinely social smiles might tend to have their onset simultaneous with the onset of the look to E. There were 10 children who performed both pretense and instrumental actions while looking and smiling to E. In total these 10 children produced 50 episodes of an action with looking to E and smiling. For each episode it was determined whether the onset of the smile was simultaneous with the look onset or not. Table 6 presents the pooled contingency table over all these episodes. As can be seen from Table 6, pooled over all subjects smiles to E during pretense actions tended to occur simultaneous with looks to E, whereas during instrumental actions smiles tended to have their onset before or after the onset of the look. To test the statistical significance of this pattern, I assigned to each of the 10 children a "pretense score", that was +1 if during pretense actions the child showed more smiles with onset simultaneous with look onset, 0 when there were equal numbers of both types of smiles and –1 when there were more smiles with onset before or after look onset. Each child also got an "instrumental score" that was assigned in an analogous way. I then compared the instrumental score and the pretense score. When a child had a pretense score bigger than her instrumental score this meant that she showed more simultaneous look and smile onset during pretense than during instrumental actions. Eight of the ten showed exactly this pattern, one had equal pretense and instrumental scores and only one child had an instrumental score bigger than her pretense score (Sign Test: $x = 1$, $n = 9$, $P = .039$).

Table 6. Contingency of relative onset of smiles / looks and type of action (pooled over 10 subjects)

		Onset of Smiling relative to Look Onset	
		Simultaneous	Before or after
Type of action	Pretense	13	6
	Instrumental	10	21

Looking and smiling by E.   The main reason for analyzing children's looks and smiles was to investigate whether children non-verbally express a special cognitive and interpersonal attitude in pretense, thereby showing that they have a grip of the special social character of pretense. There is, however, a concern with this rich interpretation of looking and smiling in pretense: adults are known to show more looking and smiling when they pretend for and with children (e.g. Lillard & Witherington, 2001). Children's looking and smiling behaviour could then be explained more parsimoniously in terms of rather meaningless mimicking of the corresponding behaviour of adults. To establish whether this more parsimonious approach can explain the current data, I analyzed the looks and smiles of E towards the child during his demonstrations[37]. E looked significantly more often to the child during symbolic (M = 2.64) than during instrumental actions (M = 1.34), $t(18)$ = 7.79, p < .0001. A higher proportion of his looks was accompanied by smiling during symbolic (M = .10) than during instrumental demonstrations (M = .05), $t(18)$ = 2.05, p < .06. Correlations were computed, one for looks and one for smiles, between the behaviour that a given child saw E perform during the demonstration of all pretense actions and the analogous behaviour the child showed during all pretense actions in the test phase. Neither of these two correlations was significant (r = .13 for looks and r = .09 for smiles). This makes a simple mimicking explanation of children's looking and smiling during pretense implausible.

4.1.1.3   Discussion

The current study allowed me to investigate commonalities and differences between two-year olds' learning of pretense and instrumental actions with unfamiliar objects. The major findings in this study are consistent with the theoretical claims based on Cultural Learning theory. First, I had hypothesized that both pretense and instrumental actions can be imitatively learned in similar ways, in frameworks of collective intentionality. Children's imitations of both pretense and

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[37] Due to sub-optimal camera angles on E's face only the number of looks per action could be coded and the binary measure whether a given look was accompanied by smiling. The quality of the videotapes did not permit to analyze the exact onset of E's smiles.

instrumental actions indeed showed qualitatively similar patterns both across different frequency conditions and across the three trials.

With regard to the hypothesized differences between the two types of actions and their acquisition, the current findings also supply evidence in favour of my claims. As predicted, both absolute imitation rates and creativity were lower in pretense than in instrumental actions. These data can be taken to show that for young children pretense is more difficult to understand and imitate than instrumental actions, and that early pretense frames are mainly supplied by adults, with creativity in pretending being a later derived phenomenon.

Findings on children's more frequent social gazes during pretense actions suggest that the collective intentionality involved in early pretense is indeed of a qualitatively stronger sort than in instrumental actions. Prima facie somewhat surprisingly, I could not find any evidence for more social smiling during pretend play acts. More qualitative analyses with a small sub-sample of children yielded some preliminary hints that there may be instead a qualitatively specific pattern of social smiling –perhaps the famous "knowing smile"- in pretense acts, such that children simultaneously start to gaze and smile at the adult during pretense, but not during instrumental actions.

There is, however, a major methodological concern with this study: the design with its long demonstration phase, in which the child was only watching the adult and was not allowed to act herself, was very demanding for two-year-old children. Consequently, the drop-out rate was extremely high, with only half of the tested children included in the final sample. In a second and third study, therefore, I tried both to overcome the methodological shortcomings of the first study and to validate and extend its findings. With Study 1b, in which I tested 18-month-old children with a simplified design, I pursued two goals: first, I wanted to validate the findings on children's imitative learning of both pretend play and instrumental actions, and second, I sought to investigate and compare developmental trajectories in children's understanding and performing both types of actions. In Study 1c I tested another sample of young two-year-olds, in a significantly simplified design, with the goal of eliciting as many actions of both types as possible. I tried to validate the findings on children's actions and social gazes from Study 1a, and sought to obtain more clarifying data on children's social smiles.

4.1.2 Study 1b

Study 1a revealed that 24-month-old children are capable of imitatively learning pretense actions with unfamiliar objects. They do this in a way analogous to their learning of instrumental actions, but reveal by their gazing and smiling behaviour that they have a grasp of the specific

interpersonal nature of pretense. In this follow-up study I sought to determine the proficiency of 18-month-old children in this sort of task. In the light of other research showing significant development of pretense understanding during the second half of the second year (e.g. Harris & Kavanaugh, 1993; Walker-Andrews & Kahana-Kalman, 1999), I expected 18-month-olds to show the qualitatively same pattern of imitative and creative actions of both sorts, however, with less proficiency in pretense than the 24-month-olds.

4.1.2.1   Method

4.1.2.1.1   Participants

The participants were sixteen 18-month-old children (7 girls, 9 boys; M = 18 months and 10 days; *range* = 17;18 – 18;10), all native speakers of German. All children were recruited by telephone from a list of parents and children who had volunteered for studies of child development. Four additional children were excluded because they were uncooperative or their mother interfered.

4.1.2.1.2   Materials and Design

As the demonstration phase in Study 1a was quite long and many children refused to participate further, and as the MIXED model conditions were not entered into the main analyses of Study 1a, I chose a simplified design without the MIXED condition for the 18-month-olds: the first within-subjects variable remained the same, the kind of action model, but now only two objects were modelled with pretense actions and two with instrumental actions. The two pretense and the two instrumental actions were each presented in a block (order controlled), with a control object, not acted upon, always between the two blocks. The second within-subjects variable was frequency of modelling: within the two blocks one object was acted upon only one (ONCE), the other one four times in the same way (REPEATED). Thus an adult experimenter (E) presented five objects to each child. Objects C and D from Study 1a figured as control objects, each for half of the participants. The objects A, B, E and G were assigned in a counterbalanced way to the four model conditions. I used as the two pretense actions "pretending to brush one's teeth" and "pretending to eat", and as the two instrumental actions "hammering (a nail into a pegboard)" and "rolling (play-dough)" (see Appendix B).

4.1.2.1.3   Procedure and Coding

Observations were dome in a child psychology laboratory. The general procedure was the same as in Study 1a, only without the MIXED conditions. The coding procedure for the children's

actions was also the same as in Study 1a. All video-records were scored for children's actions by a single observer (O), a second observer coded 30 % of all tapes. Interrater reliability was 94 % (Cohen's *Kappa* = .89).

4.1.2.2   Results

As in Study 1a, one main point of interest was children's imitation of pretense and instrumental acts. Table 7 shows the mean numbers of imitative actions over the three trials in the four conditions. As in Study 1a, the main analysis was a 2(type of model: pretense – instrumental) X 2(frequency of model: ONCE – REPEATED) within subjects factors ANOVA on the number of imitative actions performed in trials 1 through 3. This ANOVA revealed a significant main effect of model type, $F(1, 15) = 13.15$, $p < .002$, with children showing more imitative actions when these were instrumental ($M = .88$) than when they were pretense actions ($M = .22$). There was neither a significant main effect for frequency ($p < .25$) nor a significant interaction effect ($p < .48$).

Table 7. Mean Numbers (and standard deviations) of modelled actions performed in test phase in the different conditions (n=16)

		Frequency	
		ONCE	REPEATED
Type of model	Pretense	.19 (.40)	.25 (.45)
	Instrumental	.69 (1.01)	1.06 (.93)

Again, the course of imitative actions of the three trials, above all on trial 1 were a special point of interest. Table 8 shows for each of the four target actions how many children performed them on trial 1 with the five different objects. Figure 5 shows the number of children that performed an imitative action in each of the three trials of the ONCE and REPEATED pretense model and instrumental model conditions, respectively.

Table 8. Number of children who performed the four target actions on trial 1 with the five objects.

Number of children	Object/model condition				
	Instrumental REPEATED	Instrumental ONCE	Pretense REPEATED	Pretense ONCE	Control object
Instrumental-REPEATED action	8[i]	4	4	1	1
Instrumental-ONCE action	2	5[i]	2	1	3
Pretense-REPEATED action	0	0	2[i]	1	0
Pretense-ONCE action on	0	0	0	3[i]	0

Note: (1) The cells marked with [i] refer to imitative actions, that is, actions done were modelled with the same object in the model phase.

First, the same kind of control analysis as in Study 1a was run to test whether children imitated, that is, responded with the target actions differentially as a function of the model condition of the respective object. As can be seen from Table 8, all four target actions were performed by more children with the corresponding object (the object they had seen this action with in the model phase) than with the other objects. This difference in the number of children performing the target act between the objects was significant for the Instrumental-REPEATED and the Pretense-ONCE actions, Cochran's Q Test, ps < .02. Though the patterns were in the right direction (more children performed the target action with the object with which it was demonstrated than with any other object), the differences failed to reach significance for the Instrumental-ONCE (Cochran's Q Test, p < .19) and the Pretense-REPEATED (Cochran's Q Test, p < .26). As can be seen from Table 8, the difference failed to reach significance for the Pretense-REPEATED action because children were at floor in imitating this action. That the difference for the Instrumental-ONCE action failed to reach significance might mean that children did not imitate this action with the corresponding object, but performed it spontaneously without any influence of the model. More likely, however, -given that all the objects were novel and did not afford any specific actions- is the possibility that children did indeed imitate the action with the object with which they saw it modelled (in fact, they performed it more often with this than with the other objects), but then also transferred it to the other objects.

Second, as in Study 1a the numbers of children performing the target actions on trial 1 were compared in the four main conditions (Pretense and Instrumental REPEATED and ONCE). Therefore the same non-parametric tests as in Study 1a were run on the number of children showing imitative actions on trial 1 of the different conditions. The difference between the numbers of children performing imitative actions in the four conditions approached significance,

Cochran's *Q* = .053. Pairwise comparisons did not yield significant differences between the two pretense, the two instrumental, the two ONCE and the two REPEATED conditions, respectively.
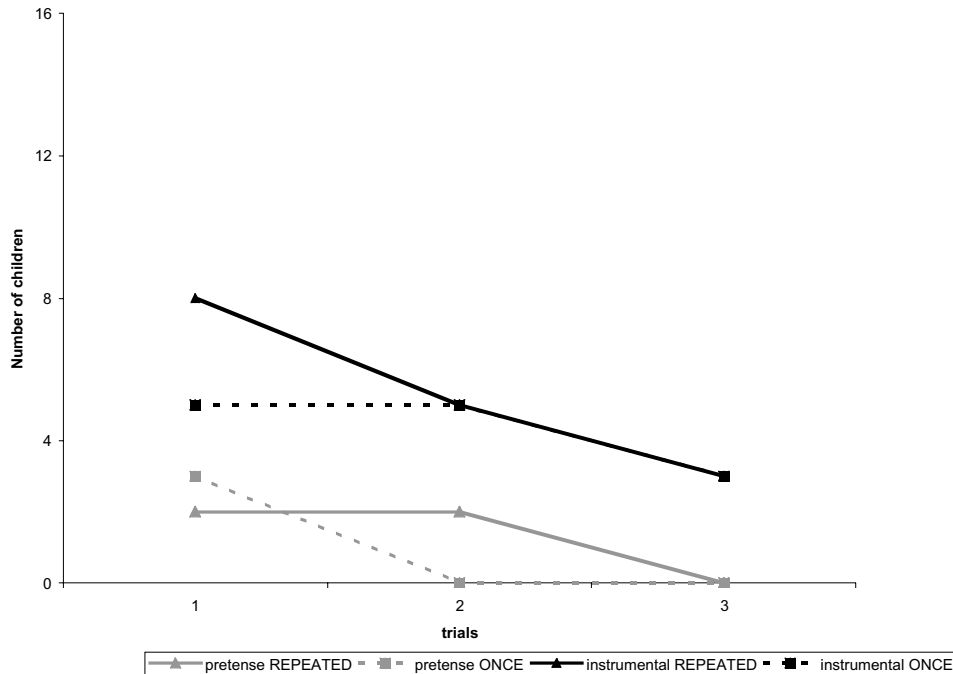
Figure 5. Number of children performing an imitative action in the three trials of the two pretense model and the two instrumental model conditions in Study 1b.

In a re-analysis of the current data and the data from Study 1a, I also compared the imitation rates of the 18- and the 24-month-olds in the four conditions across trials 1 through 3. The only condition where the 24-month-olds performed significantly more imitations was the Pretense REPEATED condition, *t*(38) = 2.94, *p* < .003, one-tailed. The difference in the Pretense ONCE condition approached significance, *t*(38) = 1.47, *p* < .06, one-tailed. There were no significant differences between 18- and 24-month-olds' imitations of instrumental actions.

Another major interest was the degree of creativity children showed in performing pretense and instrumental actions. Therefore I analyzed for all children, whether they had performed at least one creative pretense and/or instrumental action (an action not seen in the model phase), and if, how many. Table 9 shows the contingency pattern of children's performance of at least one creative action of both types. As can be seen from the table, only two children performed creative pretense actions, each child one action, making a total of two creative pretense acts. In

contrast, 15 out of 16 children performed at least one creative instrumental action, and together they performed a total of 90 such creative act tokens. The difference between children's tendencies to produce creative tokens of both action types was highly significant (Binomial test: $n = 0$, $x = 13$, $p < .0001$).

Table 9.   Contingency between children's production of new pretense and instrumental actions (n=16)

		New pretense action?	
		Yes	No
New instrumental action?	Yes	2	13
	No	0	1

Not only did the 18-month-olds hardly perform any creative pretense; they also showed very little pretense actions in general. Seven of the 16 children performed at least one pretense action, producing a total of 14 pretense act tokens, of which 7 were done by one single child. Of the 14 actions, two were creative (not modelled at all), 7 were imitative (same action with same object as E) and 5 were old (modelled action using a different object as E). Interestingly, all the 12 imitative and old actions performed by the children were "pretending to eat", that is, not a single child picked up the "pretending to brush one's teeth" action. This is in sharp contrast to children's performance of instrumental actions modelled in the demonstration phase: of the 30 imitative and old instrumental actions shown by the children, 20 were "hammering" and 10 were "rolling". In sum, the 18-month-olds in this study hardly did any creative pretense and little imitative pretense. If they did imitative pretense, this was confined to one action type, "pretending to eat".

In contrast to Study 1a, children's gazes and smiles were not analyzed, because too few participants produced too few instances of pretense actions to allow statistical comparisons between children's gazing and smiling behaviours during pretense and instrumental actions.

4.1.2.3   Discussion

In this study I tested 18-month-olds with a design similar to that in Study 1a, but simplified, thereby overcoming some methodological shortcomings of Study 1a. The qualitative patterns of the 18-month-olds' imitative and creative actions of both sorts replicated some important findings from Study 1a: children performed more imitative and creative instrumental than pretense acts. They also performed more imitative acts after REPEATED than after ONCE models, but due to floor effects in the pretense conditions (there was very little imitation of pretense acts in both conditions) this difference was not significant. There were, however, also interesting differences

between the two age groups: the 18-month-olds were less proficient in imitating pretense actions than the 24-month-olds, and performed almost no creative pretense acts. These findings are consistent with much other research showing emerging pretense understanding and performance towards the end of the second year.

4.1.3   Study 1c

The main goal of this study was to see whether the findings from Study 1a on children's gazes and smiles during both types of actions could be validated. For this reason I simplified the design significantly: in order to elicit in the children as many actions of both types as possible, I left out the delay between model phase and test phase, and also had no variation in frequency of model.

4.1.3.1   Method

4.1.3.1.1   Participants

The participants were twenty-four young two-year-olds (15 males, 9 females: *M* = 26 months and 9 days, *range* = 22;22 – 28;08), all native speakers of German. All children were recruited by telephone from a list of parents and children who had volunteered for studies of child development. Six additional children were excluded because they were uncooperative or their mother interfered.

4.1.3.1.2   Materials and Design

An adult experimenter (E) presented eight novel objects (six from Study 1a and two additional ones), one at a time, to each child. Again, E demonstrated with each object an action that involved a second "substrate" object. For each child, four of the objects were used to demonstrate a pretense action, with the remaining four E showed an instrumental action. Each object was presented to the child for approximately 50 seconds. Assignment of the objects to the conditions was counterbalanced across children (see Appendix C for the actions and corresponding substrates). All eight actions had occurred in Study 1a. The four pretense actions and the four instrumental actions were demonstrated in blocks, with the order of blocks and the within-block order counterbalanced across subjects.

Each action was shown twice to the child, without any further variation in frequency of model. That is, the main within-subject variable was type of model only: pretense versus instrumental.

Dependent measures were first children's actions and second children's gazes and smiles during their actions.

4.1.3.1.3   Procedure

Observations were dome in a child psychology laboratory. The general procedure was the same as in Study 1a, with one important exception: there was no delay between model and test phase, immediately after E had demonstrated the action, the child herself was given the chance to act with the object. After E had demonstrated the action with the first object, she placed four additional substrates not involved in the model actions (a replica street, a replica apple, a replica bed and a replica bowl) on the table, plus the substrate of the first target object. She then asked the same question as in Study 1a "What can you do with this (target object) and one of these (substrates)?" Again, each child could act up to three times per object. After the second model the substrate of the second target object was added to these five substrates. That is, incrementally there was added after the demonstration with each object one substrate to the set of substrates the child could choose from. E reacted to all kinds of actions by the child in an equally positive way[38].

4.1.3.1.4   Observational and Coding Procedure

The same coding schemes as in Study 1a was used for children's actions, gazes and smiles. All video-records were scored for the child's actions by a single observer; a second independent observer coded a random sample of 25 % of all the tapes. Interrater reliability was 91 % (Cohen's *Kappa* = .87). Two independent observers coded each half of the tapes for children's gazes and smiles, and some additional tapes for reliability, resulting in an overlap sample of 25 % of the children that were coded by both. Interrater reliability for the number of gazes, assessed by means of a Pearson correlation, was .92. With regard to children's smiles, the same binary measures as in Study 1a were chosen: during a gaze episode, did the child also smile (Cohen's *Kappa* = .92), and was the onset of the smile simultaneous with the gaze onset (Cohen's *Kappa* = .75)?

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[38] Again, a random sample of 10 per cent of the tapes was coded for E's behaviour during the child' actions. No difference in the amount of E's smiles to the child during different types of actions of the child could be found.

4.1.3.2   Results

Actions.   Figure 6 shows the mean number of imitative actions that the children performed on the three trials, summed up across the four objects in each condition, yielding values between 0 and 4. A 2(model type) x 3(trials) within-subjects ANOVA on the number of imitations yielded a significant main effect for model type, $F(1, 23) = 4.98$, $p < ,04$, with children showing more imitations of instrumental ($M = 1.65$) than pretense actions ($M = 1.22$). There was also a significant effect of trial, $F(2, 22) = 103.59$, $p < .0001$, but no interaction effect[39].
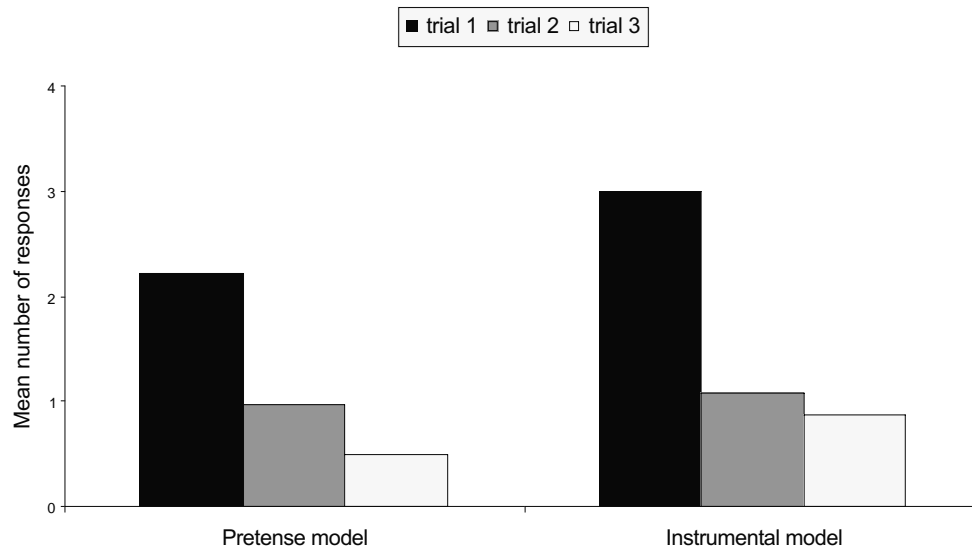
Figure 6. Mean sum of imitations in the trials of the two model conditions in Study 1c

Gazes and Smiles.   As in Study 1a, I computed for each child the mean number of social gazes to E during both types of actions. Table 10 shows the mean of these values for the 22 children that produced actions of both kinds. A paired samples t-test revealed that children looked significantly more often to E during pretense ($M = 1.03$) than during instrumental actions ($M = .60$), $t(21) = 3.28$, $p < .004$[40].

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[39] To test whether children did indeed imitate, that is, performed the modeled actions differentially with the different objects as a function of model condition, the same kind of control analysis as in Studies 1a and 1b was run: For each of the 8 target actions, it was analyzed how many children performed them on trial 1 with each of the 8 objects. The differences were highly significant (Cochran's *Q* Test, all *p*s < .0001) for all 8 actions.

[40] Again, this difference holds also when only children's non self-centered pretense actions are compared to their instrumental actions ($t(20) =$, $p < .047$, one-tailed). This rules out the possibility that the difference was due to the fact that some pretense actions allowed the child to look to E more often because they required less attention to the objects involved.

Table 10. Mean number of social gazes, and proportion of gazes accompanied by a social smile during children's actions as a function of action type.

	Instrumental actions	Pretense actions
Mean number of social gazes per action	.61 (.43)	1.03 (.56)
Proportion of social gazes accompanied by a social smile	.39 (.32)	.69 (.44))

With regard to children's smiles, for each child the proportion of gazes accompanied by smiles during both types of actions was taken as a measure of social smiling. Table 10 shows the mean proportions for the 21 children that performed actions of both kinds while looking at E. A paired samples t-test revealed that there was a significantly greater proportion of looks that were accompanied by smiles during pretense than during instrumental action, $t(20) = 2.43$, $p < .025$.

The same more qualitative analysis of the onset of smiles as in Study 1a was done. There were 18 children who performed both pretense and instrumental actions accompanied by social gazes and smiles. These 18 children performed a total of 112 episodes of an action with gazing and smiling to E. Table 11 shows the pooled contingencies over all these episodes. The pattern from Study 1a, such that smiles during pretense actions tended to begin significantly more often simultaneous with gazes, did not show up here. (Sign Test: $x = 4$, $n = 8$, $P = .39$).

Table 11. Contingency of relative onset of smiles / looks and type of action (pooled over 18 subjects)

		Onset of Smiling relative to Look Onset	
		Simultaneous	Before or after
Type of action	Pretense	9	37
	Instrumental	26	40

4.1.3.3   Discussion

Methodologically, the present study was successful in remedying the shortcomings of Study 1a: without the demanding delay between model and test phase the drop-out rate could be lowered significantly, and more model objects could be used, thus eliciting more actions of both sort. The findings of study1c replicated to a large degree those of Study 1a. With regard to children's

actions the same patterns of imitative learning and creativity could be observed as in Study 1a. The same pattern of social gazes was found as in Study 1a such that children looked significantly more often to the adult experimenter during pretense than during instrumental actions. The only deviations from Study 1a were found in children's social smiles: in contrast to the first study, children in Study 1c showed significantly more social smiles during pretense than during instrumental actions, but no specific qualitative pattern of smile onsets. Thus, no unambiguous evidence for "knowing smiles" in pretense could found, and the role of children's social smiles in different action contexts remains in need of further empirical clarification.

4.1.4 Discussion of Studies 1a - 1c

From the background of Cultural Learning theory I sought to investigate the ontogeny of young children's pretense actions on toys and instrumental actions on tools. The basic claim was that the acquisition of both sorts of actions shows important commonalities –imitative learning in a framework of collective intentionality- and fundamental differences in the structure of intention reading and collective intentionality as well. In three studies I presented 18- and 24-month-old children with novel objects and demonstrated pretense and instrumental actions with these objects.

One major finding was the similarity in patterns of imitation of instrumental and pretense actions as a function of the amount of modeling in Studies 1a and 1b. Varying the number of models by an adult experimenter affected children's tendency to imitate the observed action in the same way for pretense and for instrumental actions. The patterning of imitative actions over the three response trials children also was analogous for pretense and for instrumental actions in all three studies.

These findings can be taken to show (1) that both types of actions can be culturally learned in a similar way in a framework of collective intentionality and (2) that novel objects can become invested with both pretense and instrumental affordances by adults' model actions on them. It remains unclear, however, how comparable these two sorts of affordances are in early object use and play. One characteristic of mature pretense is its independence of fixed affordances of specific objects – objects can be flexibly substituted and assigned fictional identities. One could then speak of "temporary affordances" in the specific play episode that are "flagged" to the object (see the flagging model of Harris & Kavanaugh, 1993). Most everyday pretense of young children, however, arguably does not yet reveal this great amount of flexibility: it centers around replica objects always used in one specific way, toy cups and pots for pretend tea-parties, dolls

for pretend feeding and bathing etc. The exact nature of these different types and temporal extensions of affordances poses an important question for future studies.

The distinction between physical functions and status functions and the corresponding formulae "X can be used to do Y in context C" and "X counts as Z in context C", respectively, might be helpful in formulating speculations here. Whereas for tools context C remains virtually the same over time (because it is determined by the physical makeup of the object), and also for many objects with status functions (pieces of money remain pieces of money normally until a currency reform), in mature pretense context C is mostly very short-lived: now this object is assigned the status function of a make-believe sword in a drama, the next moment it becomes a pretend ploughshare. Put in these terms, one possibility is that for young children there is not yet much difference in the temporal character of the contexts C in physical and different status functions. That is, objects have rather permanent pretense status functions for young children: replica teapots are for tea pretense, dolls are for make-believe feeding etc. Only gradually do they then acquire an understanding of the temporally flexible nature of pretense status functions and their contexts as opposed to stable physical functions and more long-term status functions as for example in money.

Despite the similarities I found in the learning of both types of actions, however, the analysis of children's looks to the adult experimenter in Studies 1a and 1c revealed important differences between the intersubjective characteristics of children's pretense and their instrumental actions. Looks to the adult occurred more often during pretense than during the instrumental actions. These findings can be interpreted in the following way: while 2-year-olds seemed to learn pretend acts in the present studies in the same way as instrumental acts, pretense is not just another form of instrumental action for them. Their social gazes indicate that they are in some form aware of the strong collective intentionality in pretend play, of the fact that "we" create some fictional reality. These gazes can be understood as a complex form of social referencing and sharing attention: the child checks for fit in the common pretense perspective, sharing into the pretense proposal made by the adult.

Whereas the exact same pattern of children's social gazes to the experimenter during pretense could be found in two studies, thereby tapping an obviously robust phenomenon, the data on children's social smiles from Studies 1a and 1c remain contradictory. One explanation for this might be that the simplified design in Study 1c without the delay between E's and the child's actions provided a better framework for direct turn-taking and so encouraged children more to engage in collective intentionality, of which their smiling then was a sign. Future studies will have to clarify these issues and search in a more fine-grained way for evidence of the famous "knowing smile".

Apart from the looking there were further important differences between children's pretend actions and their instrumental actions in the present studies. First, though the pattern of imitation was analogous for both action types, instrumental actions were imitated significantly more often than pretense actions. I take these findings to suggest that the structure of pretense actions and the underlying intentions are more difficult to understand. Second, fitting with this interpretation, the 18-month-olds were less proficient than the 24-month-olds only in imitating pretense actions, but not in imitating instrumental actions. These results are consistent with other research showing on the one hand that children from one year on are proficient imitative learners of actions on tools (Meltzoff, 1988; Carpenter et. al., 1998a) and on the other hand that children become proficient in understanding and performing pretense towards the end of the second year (e.g. Harris & Kavanaugh, 1993) Third, children showed very few creative pretense productions, but many creative instrumental actions. I interpret these findings as suggesting that indeed in early pretense the assignment of status functions, the creation of a frame, is mainly supplied by adults, with children sharing into it, with creativity in pretense being a later derived phenomenon.

Taken together, the results of the present study can be interpreted in a broadly Vygotskian theoretical framework, in line with El´Konin's views: early pretend play is an inherently social activity, socially constituted and heavily scaffolded by adults through the use of verbal descriptions, action models, and special objects, that is, above all replica toys. Pretend play is then acquired by children in the same way as other cultural activities, by means of cultural learning (Tomasello et. al., 1993).

This interpretation puts the current approach in sharp contrast to Piaget's views, and to some purely cognitively oriented, individualistic theories of early pretense, such as that of Nichols & Stich (2000), who regard pretense as a primarily solitary activity which is done because of a primitive underlying motive to act according to a counterfactual proposition, without any requirement to understand pretending in others. The present approach does not deny the remarkable cognitive abilities –above all keeping apart fact and fiction- that children must have in order to understand and learn pretense in the first place, and agree that children have to be "cognitively ready" to learn pretense, as they have to be in any other domain of learning, such as imitative learning of novel actions (e.g. Meltzoff, 1988, 1995) or even language learning (e.g. Tomasello, 2000). But on the present approach early pretense is considered an inherently social activity, and the current findings are seen as supporting the hypothesis that pretense is culturally learned in a similar way as are other activities, albeit with a specific interpersonal function: Creating a "funny" violation of reality-appropriateness and sharing experience. Solitary and deeply creative pretense is a later derived phenomenon that arises through the internalization of early interpersonal activities in much the same way as solitary self-regulatory speech arises through the internalization of social speech.

A fundamental concern, however, with such a rich interpretation of the present data is that the data only show that it is *possible* to imitatively learn pretense actions. But they do not show that young children necessarily have to acquire pretend play in this way in everyday life. Perhaps Piaget has indeed neglected the role of imitation in early pretending, but was still right in claiming that pretense ontogenetically primarily arises spontaneously from individual imagination after all. It seems impossible to decide this issue conclusively with purely experimental studies. More naturalistic and above all cross-cultural studies are needed here. Cultures where adults and older children do not often and systematically pretend with children, and where there are no artifacts with specific pretend play functions like the replica toys in Western societies would provide the crucial test case. Many cross-cultural studies have found that cultural backgrounds influence how and about what children pretend (e.g. Gaskins, 1999; Göncü et. al., 1999; Haight et. al., 1999). However, to my knowledge there are no studies that have pursued more ambitiously and directly the question whether, when and how young children in different cultures become pretenders in the first place. In the absence of conclusive cross-cultural data the present results thus minimally show that imitation can play a role in the acquisition of pretend play similar to the role it can play in the acquisition of other action forms. And it seems very plausible to assume that in everyday life it indeed plays such a role.

There is a related concern about my interpretation of the social gaze findings in terms of the strong interpersonal nature of early pretense. Perhaps, the concern goes, it is true that young children can pretend in social contexts and then show some signs of strong intersubjectivity, such as looking to the play partner more often. But perhaps in everyday life they do not care very much about whether someone else participates in their pretense, but rather pretend in solitary fashion predominantly right from the start. Again, this issue is difficult to decide experimentally, but requires data from systematic naturalistic observations. Existing naturalistic data, however, remain somewhat inconclusive. On the one hand, some studies have found that in direct comparisons young children spontaneously engage in solitary pretense before they engage in joint peer pretense (Howes, Unger & Seidner, 1989; Howes & Matheson, 1992). However, the problem about these studies is that they did not compare solitary pretense to joint pretense with parents, which is likely the first form of joint pretense. On the other hand, naturalistic studies looking at spontaneous pretense in the family context have found that early pretense is mostly done socially with parents (Haight, 1999; Haight & Miller, 1993; Haight et. al., 1999).

Against the background of these somewhat mixed findings, the present data on children's social gazes during pretense acts can be interpreted as minimally showing that pretending is a strongly interpersonal activity for young children when they pretend with others. In light of the naturalistic data on early pretense in the family context by Haight and colleagues, it seems

plausible, though not strictly warranted by the present data, to assume furthermore that social and strongly interpersonal pretending is also the developmentally primary case in everyday life.

Young children by the age of two, the overall interpretation of the present findings in terms of cultural learning goes, have a nascent understanding of the basic intentional structure of pretending, and by observing and understanding others pretend come to imitatively acquire pretend play as an action form themselves. This interpretation thus implies that young children understand pretending as specific intentional action form. Against this it can be objected –above all from the background of the behaving-as-if theory- that Studies 1a – 1c do not warrant such a cognitively deep conclusion about children's understanding of the intentional structure of pretending. The reason lies in the methodology of these studies: Children were shown serious instrumental as-is actions and pretense as-if actions, and reproduced both behaviours. The most these findings show, the objection goes, is that the children distinguished as-is behaviour from as-if behaviour. But they do not give any insight into how children understood the two kinds of behaviours. Specifically, they do not speak to the claim that young children understand pretending as a specific form of behaving-as-if, namely as acting-as-if intentionally. More stringent designs are needed to test this claim. In Studies 2a – 2d therefore such designs were developed to test the present interpretation against the behaving-as-if theory.

4.2   Study set 2

Study set 1 suggests that two-year-olds, in their imitative learning of pretense acts, reveal an understanding of pretending as an action form. To some degree, however, it leaves open the question how exactly young children understand the intentional structure of pretending. The main aim of the second set of studies, therefore, was to investigate more stringently young children's understanding of pretending as an intentional activity, and to test the behaving-as-if theory against the claim of the revised acting-as-if theory of the present work that young children understand pretending as specific intentional action form. Children were presented with model pairs of superficially analogous as-if-behaviours, trying to do an action and pretending to do that action. In Studies 2a to 2c I looked at 2- and 3-year-old children's action and imitative responses to these models as an indicator of their understanding of the two kinds of actions. With this more stringent design –creating a more challenging context where children where confronted with the same superficial behaviour in different forms- the behaving-as-if theory could be tested, and a more stringent test of early implicit pretense-reality distinctions could be put forward. In Study 2d three- to six-year-olds were asked about the models whether the actor had pretended or tried to do the action. With this verbal study I could directly test for décalages between understanding of pretending as intentional activity implicit in action and a corresponding understanding explicit in language.

4.2.1 Study 2a

4.2.1.1   Method

4.2.1.1.1   *Participants*

Twenty-four young 2-year olds (25 – 29 months, M = 27 months; 12 boys / 12 girls) and 24 young 3-year-olds (34 – 38 months, M = 36 months; 14 boys / 10 girls) were included in the final sample. Children were recruited in urban daycare centres (N = 41) or by telephone from a list of parents and children who had volunteered for studies of child development (N = 7). Children came from mixed socio-economic backgrounds and were all native German speakers. Testing was done by one experimenter (E) in a separate quiet room of the children's daycare or in a child psychology lab, and sessions were videotaped for subsequent analysis. Four further 2-year-olds and four further 3-year-olds were tested but had to be excluded from the study because they were uncooperative.

4.2.1.1.2   Materials and Design

Figure 7 shows the objects that were used in the test phase. Object sets A and B (each consisting of a novel pen and paper) were used to try/pretend to write. In both cases E would use the novel pen to make writing/drawing movements on paper. He made these movements, with some pauses where he looked at the object, for about 15 seconds. In the pretending case his overall expression was playful, he looked at the object in the pauses in an amused way, and marked his writing movements with sounds ("Hm. Ah." as if looking at his graphic production). In the trying case he looked at the object with a surprised, frustrated expression and made a corresponding sound effect ("Hm?" as if saying "What is wrong here?"). The object sets could be made to work by taking off the caps behind which there were leads.

Object sets C (a novel container and a cup) and D (a novel container and a flower) were used to try/pretend to pour. Both containers contained water, visible to the child. From the container in object set C the experimenter tried/pretended to pour water into a cup by making repeated pouring movements over the cup for about 15 seconds, again with some breaks where he looked at the container. The pretending case was marked by a general playful expression with corresponding sound effects ("Shhh" - like the sound of water flowing into the container). The trying models, in contrast, were marked again with a puzzled, disappointed expression while looking at the object ("Hm?" in the sense of "why is there no water?"). The models with object set D were the same, except that the pouring movements were done above the flower. In both cases real pouring could be achieved by taking off a lid from the container.

Object sets E (a semi-novel bottle) and F (a novel container and a straw) were used to try/pretend to drink. Both the semi-novel bottle (object set E) and the container from object set F contained water, and the child could see and hear this. In pretending/trying to drink from the bottle E held the bottle above his mouth and shook it several times (as if making water come out into his mouth), with some pauses where he looked at the bottle, for about 20 seconds. The pretending case was marked by playful expression and drinking sound effects. The trying case was marked by surprised and frustrated looks at the bottle in the pauses and corresponding sound effects ("Hm?" as if expecting to be able to really drink). Real drinking could be achieved by opening the bottle at the top. In pretending/trying to drink with object set F the experimenter put the straw above the smaller of the two holes that the container had at the top, making sucking movements with some pauses to look at the straw for about 20 seconds. Pretending and trying were marked analogously as with the bottle. The child could really drink by putting the straw into the bigger of the two holes on the container.

Objects G and H were used to try/pretend to eat. E put both the orange and the nut to his mouth and bit on them, with short pauses to look at the object, for about 15 seconds. Trying was marked by surprised and disappointed looks at the object and corresponding sound effects,

pretending was marked by playful expression and eating sound effects ("Yum!"). Note that there is one difference between this topic and the other three topics: here the child could not do the real action herself alone. Therefore E closely observed the child during her response and interfered if he considered the response to be a clear instance of trying (the child bit on the object with obvious effort or tried to peel/crack it by hand). He then asked the child "Well, what shall we do?"), and helped the child to peel the orange/crack the nut if the child requested help.
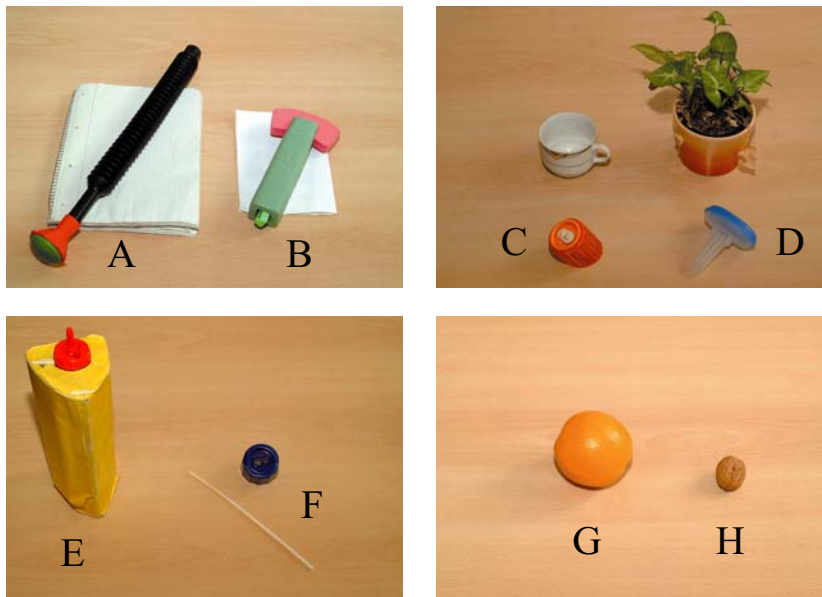
Figure 7.   Objects used in the model actions of Study 2a.

Each child saw eight action models, a block of four pretense models and another block of four thematically matched trying models. For example, a given child would see the experimenter try to write with object set A and pretend to write with object set B. 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 systematically varied across children. The order of the topics within both blocks was the same (e.g. when a child would have in her pretense block "writing" first, she would also have "writing" first in her trying block).

4.2.1.1.3   Procedure

In the beginning E and the child freely played with different toys until the child felt comfortable. Then there was an introduction phase where the imitation game was set up. E explained to the child that he was now going to show her some interesting things he had brought along, do something with these things, and that then the child herself could do the same action with the objects as E had done. He then showed some actions (e.g. pressing a wooden nail into a pegboard), gave the objects to the child saying "It's your turn now!" and reinforced the child for imitations. If the child did not imitate, E repeated that the child should do "what I have done", until the child imitated. When the child participated well in the imitation game, E then started the actual test phase, consisting of the two model blocks. For half of the children the first model block was pretense, for the other half trying. Before each model block there was a short specific warm-up. E showed the child three simple pretense actions that could not be really done (e.g. pretending to brush his teeth with an object) before the pretense block and three simple trying actions that could not be pretended before the trying block (e.g. trying to open an object). He then gave the object to the child, said "It's your turn!". In this phase E still differentially reinforced imitations. In the two model blocks, after the 8 actual test trials E then did no longer differentially reinforce any responses by the child, but reacted in an equally positive way to all actions shown by the child. A session lasted approximately 15 minutes.

4.2.1.1.4   Observational and Coding Procedure

All sessions were videotaped and coded from tape by a single observer (O). Each response of a child to the eight test models was coded. There were three categories. A given response was coded as *"pretense response"* when the child herself clearly pretended to do the action E had pretended to do. Criteria for pretense were that the child showed non-seriousness, playfulness, exaggerated or truncated movements typical of pretense, appropriate sound effects or language and did not care about any real effects of her actions (e.g. did not look surprised as the pen left no marks on the paper, did not investigate the pen and did not say that the pen was not working or anything similar). An action was coded as *"Trying response"* when the child either did the real action herself (e.g. took of the cap of the pen and really wrote) or clearly tried to really do the action. Criteria for clear trying were extended examination of the object, obvious execution of effort, expression of surprise and frustration when the object did not work, comments on the object's malfunctioning (e.g. "does not work"), "advises" to E during or after his performance of the model (e.g. "You cannot do it this way!" or "Look! I show you how to do it.") and pleas for help directed at E (e.g. "I cannot do it. Can you help me?"). In terms of my theoretical background I considered as "correct" trying responses after trying models and pretense responses after

pretense models. Trying responses after pretense models and pretense responses after trying models were considered "incorrect". Responses that neither fulfilled the criteria for "Trying response" nor those for "Pretending response" were given the code of the rest category *"Unclear"*. In this category there were mainly responses where the child only copied some surface behaviour of E or did some completely different action with the object. A second independent observer coded a random sample of 25 % of all the sessions for reliability. To test whether O's codes were influenced by having seen the model action before the child's response, reliability coding was done from edited tapes: from the original tapes only the response period was cut out and transferred to a new tape, so that E's model action was not visible. Interrater reliability was 89 % , Cohen's *Kappa* = .82.

4.2.1.2   Results

Figure 8 shows for the 2- and 3-year-olds, respectively, the pretense and trying responses as a function of model type. In a first statistical analysis, two difference scores were computed for each child: for both model type conditions (pretense and trying) the number of "incorrect" (pretense after trying model and vice versa) responses was subtracted from the number of "correct" (pretense after pretense model, trying after trying model) responses, yielding a score ranging from –4 to 4. A 2(age) x 2 (order of model blocks) x 2(model type: pretense versus trying) mixed factors ANOVA on these difference scores yielded a significant main effect of model, $F(1, 44) = 4.14$, $p < .011$, such that the difference score was bigger in the trying model condition than in the pretense model condition. There were two significant interaction effects: a model x order effect, $F(1, 44) = 5.47$, $p < .024$, such that the difference between the scores in the two model conditions was bigger when the trying models were first, and a model x age effect, $F(1, 44) = 6.56$, $p < .014$. This model x age interaction was due to the fact that the 3-year-olds showed significantly more correct than incorrect responses both after pretense ($t(23) = 6.63$, $p < .0001$) and after trying models ($t(23) = 7.85$, $p < .0001$). The 2-year-olds, in contrast, only showed significantly more correct than incorrect responses after trying models ($t(23) = 7.02$, $p < .0001$), but as many incorrect as correct responses after pretense models ($t(23) = 0$, $p = 1$). More detailed tests taking order of model blocks into account showed that these results held across order conditions: the three-year-olds performed more correct than incorrect responses after both models, irrespective of order, the two-year-olds performed significantly more correct than incorrect responses only after trying models, but not after pretense models, irrespective of order (all *p*s < .01).
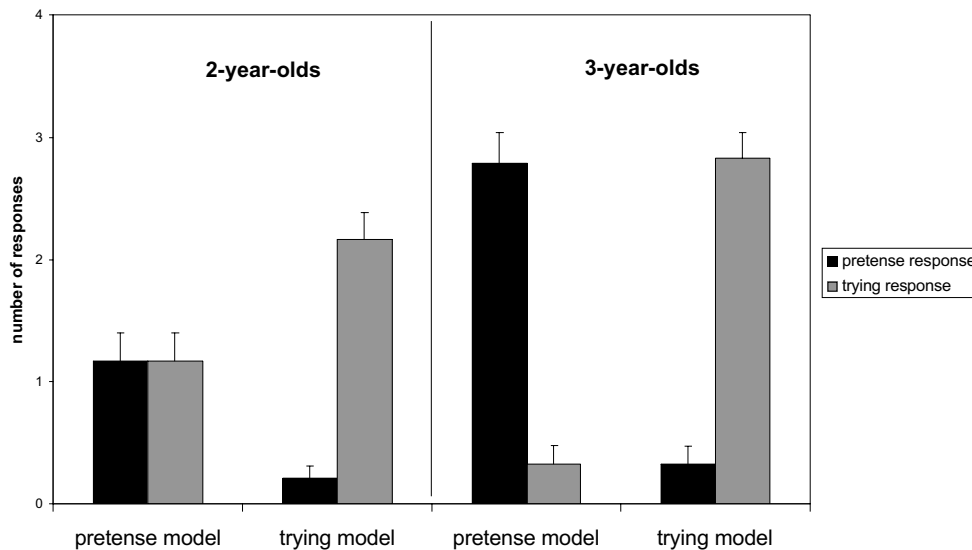
Figure8. Mean number of children's pretense and trying responses as a function of age and model type in Study 2a.

Arguably, however, this way of analyzing the data poses a very strict criterion for successful perception of pretending and trying as such: it requires children to respond significantly more often with the correct than with the incorrect response. Against this it can be argued that such an analysis does not take into account performance factors, such as prepotency of one reaction type, in this case trying responses. In an alternative approach, then, I specifically looked separately at children's pretense and trying responses as a function of model type to see whether the two-year-olds, if not fulfilling the strict criterion of the first analysis, showed differential pretense responses such that they more often pretended after pretense than after trying model, and vice versa for trying responses. A 2(age) x 2(order) x 2(model type) ANOVA on the number of pretense responses yielded significant main effects of model, $F(1, 44) = 94.10$, $p < .0001$ (there were more pretense responses after the pretense models), of age, $F(1, 44) = 20.68$, $p < .0001$ (such that the three-year-olds pretended more overall) and of order, $F(1, 44) = 6.76$, $p < .02$ (such that there were more pretense responses when the pretense models were first). There was also a significant age x model interaction effect, $F(1, 44) = 18.14$, $p < .0001$, such that the difference in number of pretense responses between the model conditions was bigger for the three- year-olds than for the two-year-olds. Most importantly, post-hoc t-test revealed that both age groups performed significantly more pretense responses after pretense than after trying models in both order conditions (all ps < .05, one-tailed). The analogous A 2(age) x 2(order) x 2(model type) ANOVA on the number of trying responses yielded only a main effect of model, $F(1, 44) = 79.69$, $p < .0001$ (such that there were more trying responses after trying models), and a model x age

interaction, $F(1, 44) = 14.64$, $p < .0001$ (such that the difference in number of trying responses between the model conditions was bigger for the three- year-olds than for the two-year-olds). Post-hoc t-tests revealed that both age groups performed more trying responses after trying models than after pretense models ($ps < .001$).

4.2.1.3   Discussion

The 3-year-olds in the present study showed exactly the pattern of differential imitation that I had expected based on my theoretical framework: when they saw an adult pretending to do an action, they then only pretended to do this action themselves and did not care about the real physical effect of their doing, whereas when they watched an adult trying to do the same actions they then really performed the action or tried to really perform it. That is, according to my interpretation, they perceived both superficially analogous as-if-behaviours in radically different ways. They perceived pretending to X as such, under the description of the goal: to act-as-if X only. They perceived trying to X as such, under the description of the goal to really do X.

The 2-year-olds, in contrast, showed a somewhat ambiguous response pattern: on the more lenient criterion (more responses of one type to models where they are correct than to models where they are incorrect) they performed successfully after both kinds of models. On the more strict criterion (more correct than incorrect responses to a given mode), however, they performed successfully only after trying models. After pretense models they gave overall as many pretense as trying responses. That is, under this strict criterion they only showed clear signs of perceiving trying as such, whereas it remains unclear how they perceived the pretense actions in this study.

One possibility is that the 2-year-olds do not really have a clear conceptual grip of the fact that in pretense one does not want to do the real action. This would seem somewhat in conflict with other findings showing that children at this age competently imitate pretense actions (e.g. Watson & Fischer, 1977; see also the findings from Studies 1a and 1c) and reason about pretense sequences (e.g. Harris & Kavanaugh, 1993). The other possibility –supported by the finding that the two year-olds performed more pretense responses after pretense models than after trying models- is that the two-year-olds' did differentially perceive pretending and trying as such, but the real actions might have simply been more interesting and somehow irresistible to them. That is, broadly executive problems may explain the two-year-olds' bad performance after pretense models: although they perceive the model action as pretending, they see that the object could be used to do the action really, perceive its function and enter into a state of "functional fixedness". They cannot overcome the prepotent action tendency to then use the object in a functional way themselves. Informal piloting observations lend prima facie support to this line of reasoning. In these I showed three-year-olds some of the model pairs in the same sort of imitation game, but

used known objects, e.g. a normal pen in the writing topic. Even three-year-olds in this task hardly showed any pretense responses after pretense models. This suggests that when the object is too familiar and its function too obvious, children neglect the model and the instruction to imitate, unable to overcome the tendency to use the object in the conventional functional way[41]. Said differently, these findings can be taken as suggestive of the context specificity of young children's pretense understanding. Although young children differentially perceive pretending and trying to do an action, 2-year-olds (and in some circumstances even 3-year-olds) find it very hard to pretend to do an action in a situation where it could really be done.

It might also be objected that my interpretation of the results in terms of differential imitation has created false positives. It might be argued, for example, that "simpler" kinds of social information transmission can explain the results, such as mimicking or emulation learning, rather than imitation proper (see Tomasello et. al., 1993; Want & Harris, 2002 for overviews over types of social learning). Emulation explanations, for example, would doubt that children perceived the adult's models as intentional activities and imitated these under the corresponding descriptions and claim instead that the children only learned something about the objects and how they causally work. Two points speak against such an explanation. First, in neither case did the children see that the object really worked causally. They did not learn that the pen could be used to write by seeing how it made marks on a sheet of paper. Second, it remains unclear, anyway, what an emulation explanation for children's pretense responses would look like. Because in pretense actions there is no concrete causal effect that the object brings about that could have been learned by observation.

The more serious concern with the present study is that the findings might be accounted for by a simple mimicking explanation. Such an explanation would claim that children just blindly copied the adult's surface behaviour. While such an account seems not very plausible for the trying cases (children often made speech acts referring to the malfunctioning of the objects, indicating that they understood what the goal of the action in question was), it is a serious possibility for the pretense cases: children rarely did any speech acts that made clear that they were pretending or what they were pretending, rather this was mainly coded from their non-verbal behaviour. As E had not announced what he was going to do, children might have simply not understood what the action was supposed to be, and so mimicked just superficial behaviour without deeper understanding that E had pretended or what he had pretended. To the eye of the beholder this mimicry might then mistakenly have looked like real pretense.

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[41] However, for a an interesting opposing view on the development of functional fixedness see German & Defeyter, 2000, who find that –counterintuitively- functional fixedness arises only later in development, at the end of the preschool period.

It can also be argued that simple conditioning and priming could explain parts of the present findings: as there were pretense warm-up blocks before pretense test trials, and analogously for trying test trials, and as in the warm-up children were differentially reinforced for imitations, a serious possibility is that operant conditioning and simple response priming could account for the findings. In two control studies I therefore tested 3-year-olds to see whether these two simpler learning processes –mimicking and priming- could explain the positive findings of the present study.

4.2.2   Study 2b

The same pairs of as-if model actions as in Study 2a –one trying to X, the other one pretending to X- were presented to children. Two modifications were added to test simpler mimicking and priming explanations. First, the warm-up in this study was not administered in blocks –as it was in Study 2a-, but pretense and trying actions were presented in the warm-up in alternating order. This was done to rule out simple priming of one response type. Second, before performing the model actions, E now verbally announced "I am going to X now" (where X was the action he then pretended or tried to do). This was done to give children more cues as to what E was doing and so to make an explanation in terms of blind mimicking less plausible.

4.2.2.1   Method

4.2.2.1.1   Participants

Twenty-four young 3-year-olds (34 – 38 months, *M* = 36 months; 16 boys / 8 girls) were included in the final sample. All children were recruited in urban daycare centers. Children came from mixed socio-economic backgrounds and were all native German speakers. Testing was done by one experimenter (E) in a separate quiet room of the children's daycare. Three further children were tested but had to be excluded from the study because they were uncooperative.

4.2.2.1.2   Materials and Design

The same materials as in Study 2a were used, and the same E presented the same 8 actions with them to the children in two blocks (4 pretense actions and the 4 corresponding trying actions). The model actions, systematic variation of order of test blocks and order of actions within blocks and of the assignment of object pairs to condition were all exactly as in Study 2a.

The two theoretically motivated differences to Study 2a were: First, the specific warm-up blocks before the two test blocks consisted of both pretense and trying action in alternating order (see Appendix D for the warm-up actions used). Second, before producing the model actions in the test blocks E verbally announced what he was going to do. For example, in the two eating scenarios he said "I am going to eat something now". He made the announcements in a neutral voice before trying actions and in a playful voice before pretense actions.

4.2.2.1.3 Procedure

In the beginning E and child freely played and the child was introduced to the imitation game as in Study 2a. When the child felt comfortable and participated in the imitation game, E began the first warm-up block, consisting of three pretense actions that could not be really done and three trying actions that could not (or not very naturally) be pretended (see Appendix D). In the warm-up blocks E did not explicitly reinforce the child, but laughed and reacted amused when the child pretended and reacted with surprise and appreciation when the child really did an action he had unsuccessfully tried to do ("Wow! You did it."). Then came the first test block of four model actions (pretense for half the children, trying for the other half), followed by another warm-up block of three pretense and three trying action. Finally, the second test block of four model actions (trying, if pretending had been first and vice versa) was administered. Each session lasted approximately 15 minutes.

4.2.2.1.4 Observational and Coding Procedure

All sessions were videotaped and edited afterwards: only the reaction periods of the child were selected and transferred to a new tape. A single observer then coded the child's reactions blindly, without knowing what E had demonstrated. Each response of a child to the eight test models was coded. The same coding scheme as in Study 2a was used. A second independent observer coded a random sample of 25 % of all the sessions for reliability. Interrater reliability was 91,7 %, Cohen's *Kappa* = .86.

4.2.2.2 Results

Figure 9 shows the pretense and trying responses as a function of model type. For the statistical analysis the same two difference scores as in the main analysis of Study 2a were computed: for

each child, for both model type conditions (pretense and trying) the number of "incorrect" (pretense after trying model and vice versa) responses was subtracted from the number of "correct" (pretense after pretense model, trying after trying model) responses, yielding a score ranging from –4 to 4. A 2(model type: pretense versus trying) x 2(order of model blocks) mixed factors ANOVA on the difference scores yielded no significant main effects, and a significant model type X order interaction effect, $F(1, 22) = 10.14$, $p < .004$, such that the difference between the two model conditions was bigger when trying was first.
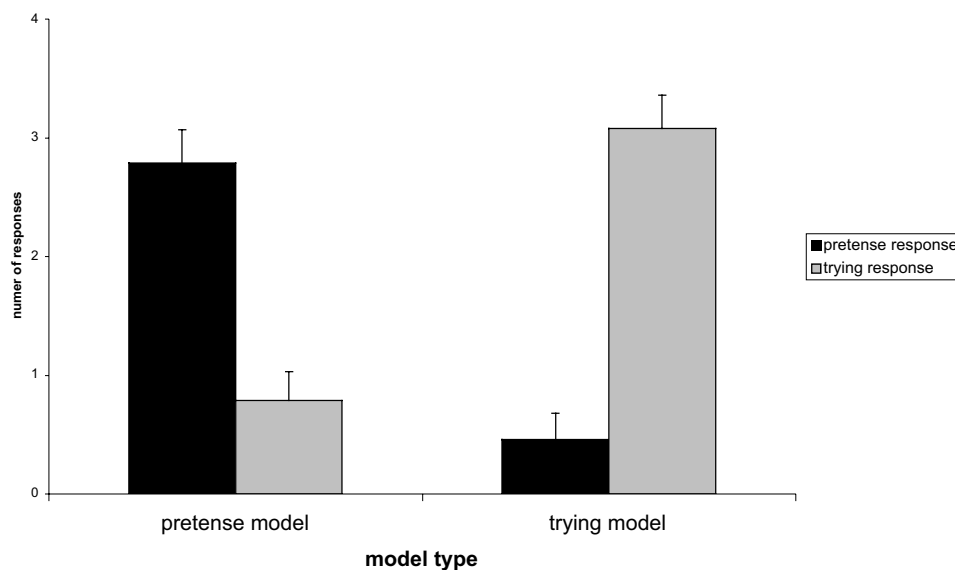
Figure 9. Mean number of children's pretense and trying responses as a function of model type in Study 2b.

Dependent sample t-tests revealed that the difference scores both in the pretense model condition ($t(23) = 3.89$, $p < .001$) and in the trying model condition ($t(23) = 5.55$, $p < .0001$) were significantly different from zero (post-hoc analyses of the difference scores as a function of model type and order revealed that children performed significantly more correct than incorrect responses after trying models irrespective of order of model blocks, and significantly more correct than incorrect responses after pretense models when pretense models were first (all ps < .05). Regarding children's responses to pretense models, when trying models were first, there was only a trend for the difference score, $p < .16$, one-tailed). That is, after both pretense and trying models, children performed significantly more "correct" than "incorrect" responses. Overall, the results from the 3-year-olds in Study 2a were replicated.

4.2.2.3   Discussion

In this study I presented three-year-olds with the same model actions as in Study 2a, but with a better controlled warm-up procedure. The findings from Study 2a –three-year-olds show differential and systematic imitation of pretending and analogous trying actions- were replicated and simple explanations in terms of priming or conditioning can be ruled out. Another concern with Study 2a was that children might have just mimicked E's surface behaviour, especially E's pretending, without understanding its meaning. Therefore, in Study 2b I had E verbally announce "I am going to X now" (where X was the action he then pretended or tried to do), in order to convey to children independent information about which action E pretended or tried to do. Three-year-olds surely do understand what "I am going to eat/drink/pour/write" means, and the fact that they showed the same systematic pattern of differential imitation as in Study 2a makes it seem less plausible that the findings in the two studies can be accounted for by a simple mimicking explanation. However, against this plausibility argument remains the concern that children might have understood the announcement in the first place, but then ignored it in interpreting the behaviour or just not understood the relation between the announcement and the following behaviour. That is, with regard to the mimicking concern, the present results remain less than conclusive.

   To rule out simple mimicking explanations more stringently, in a third study I therefore extended the methodology from Studies 2a and 2b and tested for more productive reactions than imitation as indicators of children's understanding of pretending and trying as different forms of behaving-as-if.

4.2.3   Study 2c

Understanding pretense, as all understanding, is inferentially integrated and structured: when I see you pretending that the telephone is a banana, I understand that it "follows" within the pretense scenario that is has to be peeled first (see Harris & Kavanaugh, 1993; Leslie, 1987, 1988). In a similar way, understanding trying essentially involves the appreciation of some inferences: when I see you trying to turn on the light by flipping switch A which does not work, and know that switch B works, then when I want to do what you tried to do I understand that it follows I should use switch B. However, the inferential understanding required for pretense comprehension is even more complex than that required in interpreting trying: pretense inferences have to be kept apart from inferences about reality (the telephone has not to be peeled).

Several studies have shown that two year-old children show some proficiency at drawing counterfactual pretense inferences (Harris & Kavanaugh, 1993; Walker-Andrews & Harris, 1993; see Kavanaugh & Harris, 1999, for a review). For example, two-year-olds presented with an adult who pretended to pour into two cups and then pretended to drink from one could correctly answer the question which cup was "empty" and which "full" (Walker-Andrews & Harris, 1993).

Based on these studies the rationale for the present study was as follows: I presented to children model action pairs from the previous studies, but did not instruct them to strictly imitate, and in addition supplied them with a richer warm-up and more props to act on other than the objects involved in the model actions. The purpose of these modifications was to supply children with the opportunity to react more productively and unambiguously. The prediction was: if children perceive pretending to X as such, that is as intentionally acting as if X only, and if they have the opportunity to show more productive reactions, then they should often perform a pretense action in response that "follows" from the model action. When they see E pretend to pour from a container (that actually contains water) into a cup, for example, they often should –when handed the container and the cup- pretend to drink from the cup themselves. In contrast, if they perceive trying to X as such, that is as intentionally trying to X really, and given the opportunity to react more productively they should often creatively try to X themselves, going beyond E's behaviour. When they see E try to pour from a container with water in it that does not come out, for example, and when there is a tool available they know can be used to open containers, they often should –when handed the container and the cup- make use of the tool to open the container first and then pour themselves.

4.2.3.1   Method

4.2.3.1.1   Participants

Eighteen young 3-year-olds (34 – 38 months, M = 36 months; 8 boys / 10 girls) were included in the final sample. Children were recruited in urban daycare centers (N = 7) or by telephone from a list of parents and children who had volunteered for studies of child development (N = 11). Children came from mixed socio-economic backgrounds and were all native German speakers. Testing was done by one experimenter (E) in a separate quiet room of the children's daycare or in a child psychology lab, and sessions were videotaped for subsequent analysis. Two further children were tested but had to be excluded from the study, one due to experimental error, one because he was uncooperative.

4.2.3.1.2   Materials and Design

Children were presented with two model action pairs from the previous studies: Pretending/Trying
to eat and pretending/trying to pour. The same objects as in Studies 2a and 2b were used, with
one exception: The container from object set D was used, but E now pretended/tried to pour into
a glass instead of onto a flower[42]. I only used two model action pairs in this study in order to
avoid memory overload and a too lengthy procedure (each action pair needed the introduction of
additional props for possible corresponding inferential reactions in the warm-up).

    In the warm-up several actions and props were introduced to give children the opportunity to
show creative pretense and trying responses in the test phase. Three of these props were placed
on a piece of cardboard and stayed on the table throughout the session, reachable for the child: a
Teddy (that one could pretend to feed or give a drink), a bowl with a toy fork (that could be used
to pretend to eat with or to pretend to feed Teddy. The fork could alternatively also be used to
open or cut objects) and pliers (that could be used to open containers and cut things) (see Figure
10). As in Study 2b, the pretending and trying warm-up actions were not done in blocks in order
to rule out simple priming of one action type in the children.

Figure 10. Additional props used in Study 2c.

Each child saw four action models, a block of two pretense models and another block of two
thematically matched trying models. For example, a given child would see the experimenter try to

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[42] The reason for this modification was that pretending to pour into a cup lends itself better to inferential reactions
 –above all pretending to drink- than pretending to pour onto a flower.

eat with object G and pretend to eat with object H. 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 systematically varied across children. The order of the topics within both blocks was the same (e.g. when a child would have in her pretense block "eating" first, she would also have "eating" first in her trying block).

4.2.3.1.3   Procedure

In the beginning E and the child freely played, and E did some simple actions (e.g. building a tower with building-blocks), two pretense actions (pretending to make a phone call and pretending to dig a hole) with a novel object (a doorstopper), one trying action (trying to make music with a small piano, pushing a wrong button) and asked the child to do the same after each action. E reacted with laughter and amusement to children's pretense and with surprise and appreciation when children performed successfully with the piano.

Then came the warm-up period where the three additional props were introduced. First, E put Teddy on a piece of cardboard on the table, saying "Look! This is Teddy. I am going to do show you some things I can do, then it's your turn and we can do something with Teddy as well". E demonstrated three pretense actions (pretending to brush his teeth, pretending to take a shower and pretending to drink) with novel objects and handed the objects to the child. Pretense imitations by the child and the corresponding pretense actions with Teddy (brushing Teddy's teeth, giving Teddy a shower, giving Teddy a drink) were reinforced by E. If the child did not spontaneously do the pretense actions with Teddy, E pushed the cardboard with Teddy towards the child, saying "And now?". If the child did not react, E finally explicitly asked the child to do the pretense action with Teddy.

Second, E brought out a novel container, announced "I am going to open it" and tried unsuccessfully to open it. He then said "Hm. It does not work. Ah, then we can take the pliers" and brought out a pair of children's pliers, saying "With the pliers we can open things" and opened the container. The child was given the pliers ("Now you may do it as well") and E helped the child to open the container with it if necessary. The pliers were placed on the cardboard, beside Teddy, and E brought out another novel container and unsuccessfully tried to open it. The child was then given the container ("It's your turn"). If the child spontaneously used the pliers to try to open the container, E reacted with appreciation ("Ah! That's how we can do it!") and helped the child if necessary. If the child tried to open the container without the pliers, E pushed the cardboard towards the child, saying "What do we do then?". If the child did still not take the pliers, E said "Hm. Or we could use the pliers!". To introduce the pliers as a multi-functional tool, E in addition showed the child that the pliers could be used "to cut things", cutting apart a piece of

play-dough and the child was given the chance to do the same. (Actually, the three actions with Teddy and the three actions with the pliers were not done in blocks, but –to avoid simple priming of one action type- temporally interspersed: two actions with Teddy, then two actions with the pliers, then one action with Teddy, then one action with the pliers. See Appendix E for details).

Finally, the bowl with the fork was introduced. E brought out a cardboard box and a replica carrot, said "Let's cook something" and pretended to cook the carrot in the cardboard box. He then pretended "Now it's cooked", brought out the bowl with the fork, put the carrot in the bowl and gave it to the child. If the child did not spontaneously pretend to feed Teddy, E pushed the cardboard with Teddy and the pliers on it towards the child and asked "And now?". If the child did not pretend to feed Teddy, E explicitly asked "What can you do with Teddy?", and if that did not help finally "Can you give Teddy something to eat?". E reinforced appropriate pretense actions (pretending to eat, pretending to feed Teddy). (The same procedure was repeated with a replica sausage that E pretended to cook). The bowl with the fork was then placed on the cardboard and the cardboard stayed on the table throughout the rest of the session, reachable for the child (approximately 40 cm in front of the child).

Then came the first test block, consisting of two model actions (pretense/trying for half of the children each). E presented the actions in exactly the same way as in Study 2, with a verbal announcement "I am going to ...(action) now" before the action[43].

After performing the model action, E gave the object(s) to the child. He did not reinforce specific responses but reacted equally positively to all responses. If the child did not spontaneously make use of one of the props E pushed the cardboard with the three props on it a bit closer to the child.

The first test block was followed by another warm-up block, consisting of two pretense and two trying actions in alternating order (see Appendix E), and finally came the second test block consisting of two model actions (trying for the children that had seen pretense first and vice versa). The whole session lasted approximately 15 minutes.

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[43] There were only two small modifications: first, before pretending/trying to pour with the novel container from object set D (now into a glass instead of onto a flower) E said „I am going to pour something now" instead of „I am going to water the flower now". Second, after E had done the pouring actions, in Study 2 he had put the container and the cup/flower equisdistant in front of the child . In this study, E put the glass/cup close in front of the child with one hand and the container in slightly further distance in front of the child with the other hand. The reason for this modification was that it made the sequence more naturally interpretable as part of an extensible scenario –"I pour, you drink" in the pretense case and "Look! Nothing in there, it did not work!" in the trying case.

4.2.3.1.4   Observational and Coding Procedure

All sessions were videotaped and edited afterwards: only the reaction periods of the child were selected and transferred to a new tape. A single observer then coded the child's reactions blindly, without knowing what E had demonstrated. Each response of a child to the four test models was coded. Importantly, a different and more differentiated coding scheme than in the previous studies was used. There were five categories into which a given reaction could be classified (per test model a given child could show several responses after each other, and these responses could be from different categories): A reaction was coded as *"inferential pretense"* when the child performed a thematically appropriate pretense action that went beyond what E did in his pretense model actions. Criterion for this code was that the child revealed by an action or by a non-serious speech act an appreciation of the pretense scenario in question. For the eating topic these were: speech acts like "I have eaten up" or "Hm, delicious" (after the child has obviously not really eaten but just put the orange/nut in front of the mouth, making chewing movements) and actions like "feeding" Teddy (putting the orange/nut to Teddy's mouth, making chewing movements and corresponding sound effects) and putting the orange/nut into the bowl, moving the fork to the bowl and then before the mouth, making chewing movements and appropriate sound effects. For the drinking topic these were above all speech acts like "Hm! Some tea in there!" and actions like pretending to drink and pretending to give Teddy a drink. A reaction was coded as *"simple pretense"* when the child performed what looked like a clear pretense action (with playfulness, exaggerated movements, appropriate sound effects etc.) but without any elements that went beyond what E did in his corresponding model action (That is, actions that were coded in this study as *"simple pretense"* would have been in the category *"pretense response"* in Studies 2a and 2b). When the child first performed a merely simple pretense action and then immediately went on to do pretense that went beyond E's model (e.g. first pretended to pour and then pretended to drink; first pretended to eat and then pretended to feed Teddy) in a thematically appropriate way, this whole episode was given the code *"inferential pretense"*.

Analogously, responses were coded as *"inferential trying"* when the child revealed by an action or by a speech act an appreciation that her goal was to perform the action in question really and successfully. This code was given when the child really performed the action successfully, or tried to perform it with means other than that used by E in his corresponding model action (above all, using the pliers to open containers, crack the nut or peel the orange), or said something that made reference to the goal (like "we have to open it first") or the malfunctioning of the objects (like "It does not work", "It's broken"). Responses were coded as *"simple trying"* when the child performed what looked like a clear instance of trying behaviour (extended examination of the object, obvious execution of effort, expression of frustration etc), but

without any elements that went beyond what E had done in his corresponding model action. When a child first performed a merely simple trying behaviour and then immediately went on to try with different means (e.g. first tried to eat by biting on the nut and then took the pliers to crack it; tried to pour by shaking the container and then made use of the pliers to open it), this whole episode was coded as *"inferential trying"*. Finally, there was a rest category *"unclear"* of responses that fulfilled neither of the criteria for the four categories mentioned above. In this category were mainly responses where the child did some different action with the object, or nothing at all or an ambiguous action (e.g. bringing the orange to the mouth, but without signs of either pretending or trying to eat).

A second independent observer coded a random sample of 25 % of all trials for reliability. Interrater reliability was 95 % , Cohen's *Kappa* = .91

4.2.3.2   Results

Only the children's first responses to a given model action were entered into the analysis, because only the first reaction was considered as indicator of how children have understood the action they had seen E perform. Figure 11 shows the mean number of simple and inferential trying and pretending responses (that children gave as a first response) as a function of model action. As the main purpose in this study was to test for children's understanding of pretending and trying more stringently, and to rule out simple mimicking as an alternative explanation, the focus of analysis were children's inferential pretending and trying responses. After pretense models only inferential pretending responses were considered "correct", and only inferential trying responses counted as "incorrect", analogously after trying models. As in Studies 2a and 2b, for each child, for the two model action conditions a difference score correct minus incorrect responses was computed, ranging from -2 to 2. A 2(model action: pretense versus trying) x 2(order of model blocks) ANOVA on these difference scores yielded no significant effects. Next, these difference scores were testes against zero. For both model type conditions, the difference scores were significantly bigger than zero (pretense models: $t(17) = 1.88$, $p < .04$; Trying models: $t(17) = 6.23$, $p < .0001$, one-tailed). After both pretending and trying models, that is, 3-year-olds performed significantly more correct inferential responses than incorrect inferential responses.
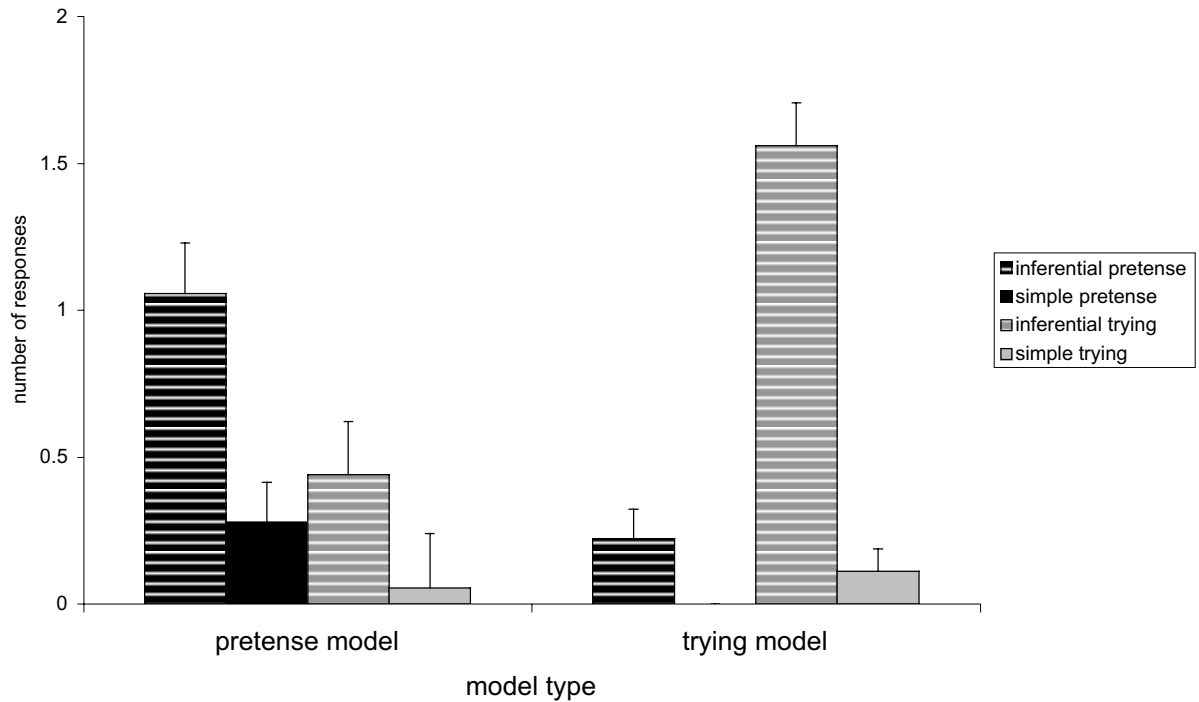
Figure 11. Mean number of children's simple and inferential pretense and trying responses as a function of model type in Study

4.2.3.3   Discussion

The results of Study 2c replicated the findings from the previous two studies: 3-year-old children showed by their systematic and differential responses to thematically matched pretending and trying models that they perceived these two kinds of as-if behaviours under different intentional descriptions. The present study, however, extended the previous findings in important ways: not only did young children differentially imitate these different kinds of model actions, they also showed systematic productive and inferential responses that respected the logical structure of the action they had seen. After pretense model actions, they performed pretense actions that fit to the stipulated pretense scenario (e.g. pretended to drink from a cup into which E had pretended to pour). After trying model actions, they tried to perform the action E had tried to perform, but made use of different means and verbally commented about their goal and obstacles to its achievement (e.g. after E had tried to pour they made use of pliers to open the container first and pour then, saying something like "we have to open it first"). These findings can also rule out a simpler explanation in terms of superficial mimicking that had been a concern in Studies 2a and 2b. Whereas in the previous studies it could have been objected that children's responses, especially to pretense model actions, just looked like insightful imitation but were in fact dumb

mimicking, this objection does not hold for the present study: in their responses children went beyond what E had done in a systematic way, indicating that they drew thematically appropriate inferences. Generally, parsimonious explanations of the present data in terms of mimicking, simple conditioning or some such superficial mechanism seem implausible given the systematic and productive inferential responses children gave.

4.2.4   Study 2d

The 3-year-olds, and to some degree the 2-year-olds, in Studies 2a to 2c showed in their differential imitations that they perceived both pretending and trying to do actions as such, under the descriptions of the goals involved: really doing the action in the case of trying, and intentionally acting-as-if in the case of pretense. These findings show an early understanding implicit in action.

In study 2d I followed up on these findings and tested when children show an analogous explicit understanding in language. The logic was straightforward: I showed children the same kinds of model actions, but instead of looking at their action responses, I asked them explicitly and verbally whether the actor was pretending to do the action or trying to do the action. Furthermore I 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 pretense, trying or real action models. That is, I 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.

4.2.4.1   Method

4.2.4.1.1   *Participants*

Twenty-four young 3-year-olds (36 – 40 months; M = 39 months; 10 boys and 14 girls), 24 young 4-year-olds (48 – 52 months; M = 48 months; 14 boys and 10 girls) and 24 6-year-olds (70 – 79 months, M = 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 daycare centers 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 daycare centers.

4.2.4.1.2   Materials and Design

The test models were they same as in Study 2a 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 he had done in Study 2a, 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, children had already heard it in E1's announcement. The test question was "Did he pretend to X, or did try to X?" or "Did he try to X or did he pretend to X?" [44]. 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 last alternative and two with "pretend" last.

4.2.4.1.3   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, 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 four 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.

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[44] 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.

After this general introduction the experiment started. 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 warm-up phase in which I tested for children's ability to verbally distinguish trying from really doing an action (T-RD) and pretending from really doing an action (P-RD) as a simpler baseline measure. The general warm-up 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?" [45] (order of try to/really do counterbalanced across questions). Then E1 demonstrated five further actions, three of them pretense and two real actions, and E2 asked the child the P-RD question "Did he *only* pretend to X or did he *really* X?"[46] (order of pretend/really do counterbalanced across questions). This large amount of warm-up questions was 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 warm-up phase. Exactly the same warm-up actions and test actions were here used as in study 2a. In the specific warm-up for the pretense test block E1 demonstrated 3 pretense actions (e.g. pretend to brush his teeth) and E2 asked the child the P-R question "Did he only pretend to X or did he really X?". In the specific warm-up for the trying test block E1 demonstrated 3 trying actions (e.g. try to open an object), and the child was asked the T-R question "Did he only try to X or did he really X?". That is, each child received in sum –in the general and specific warm-ups- 8 T-R questions (after 6 trying and 2 real actions) and 8 P-R questions (after 6 pretending and 2 real actions). See Appendix F for the actions and corresponding questions.

4.2.4.2   Results

First I analysed as a baseline measure children's performance on the distinctions between trying and really doing an action (T-RD) and pretending versus really doing an action (P-RD). Table 12

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[45] We translated "try" with "versuchen". The corresponding sentences for the trying-really doing distinction was "Hat er nur versucht, zu Xen, oder hat er wirklich geXt?".

[46] Unfortunately in German there is no equivalent word to "pretend" that is grammatically as simple. The one that comes semantically closest, "so tun, als ob" requires a lengthy and complicated subjunctive construction, which makes it impossible to use it with young children. Therefore we chose, as a previous German study on children's pretense concept (Sodian, Hülsken, Ebner & Thörmer, 1998), the German word "spielen", which is roughly equivalent to "play". The sentence for the pretending-really doing distinction was then "Hat er nur Xen gespielt oder hat er wirklich geXt?".

shows the number of children showing 0-8 correct answers in the P-RD and the T-RD questions as a function of age.

All three age groups were significantly above chance in the T-R distinction, but only the 6-year-olds were above chance in the P-R distinction. A 2(question type: T-R versus P-R distinction) x 3(age) mixed factors ANOVA on children's number of correct answers yielded both main effects of question type, $F(1,69) = 41$, $p < .001$, with more T-R questions being correctly answered ($M = 6.81$) than P-R questions ($M = 5.31$) and of age, $F(2, 69) = 138$, $p < .001$. There was also a significant question type X age interaction effect, $F(2, 69) = 6.3$, $p < .003$. Tukey's HSD procedure revealed that the 6-year-olds were better than each of the other two age groups both on P-R and on T-R questions (all $ps < .02$). There were no differences between the 3- and the 4-year-olds.

Table 12. Performance of the three age groups on P-RD and T-RD distinction tasks in the warm-up of Study 2d

	Number correct	0	1	2	3	4	5	6	7	8
3-year-olds (n = 24)	P-RD	0	1	4	2	4	5	5	3	0
	T-RD	0	0	0	1	2	6	3	6	6
4-year-olds (n = 24)	P-RD	0	0	10	1	2	2	3	6	0
	T-RD	0	0	0	0	3	2	3	10	6
6-year-olds (n = 24)	P-RD	0	0	0	1	0	0	2	9	12
	T-RD	0	0	0	0	1	1	1	0	21

Table 13 shows the performance of the three age groups on the pretending-trying (P-T) distinction at test after the 4 pretense and the 4 trying models. Both the 3- and the 4-year-olds were –as a group- above chance after the 4 trying models, but at chance after pretense models. Somewhat surprisingly, the 6-year-olds, in contrast, were only above chance –as a group- after the pretense models, but not after the trying models. A 3(age) x 2(model type) x 2(order of model blocks) on the number of correct answers yielded no significant effects.

Table 13. Performance of the three age groups on the P-T distinction after both pretense and trying models in Study 2d

	Number correct	0	1	2	3	4
3-year-olds (n = 24)	Pretense model (0-4)	7	4	6	4	3
	Trying model (0-4)	2	1	11	2	8
4-year-olds (n = 24)	Pretense model (0-4)	4	4	7	1	8
	Trying model (0-4)	2	1	8	4	9
6-year-olds (n = 24)	Pretense model (0-4)	4	2	2	4	12
	Trying model (0-4)	6	3	3	2	10

To test for individual children's competence in the verbal tasks against a normative standard, and to compare performance in these tasks with the performance of the children on the non-verbal task of study 2a, normative criteria for success were determined in a second analysis[47]. For the P-RD and T-RD distinctions, ranging from 0 to 8, a score of at least 6 was considered as success. For the P-T distinctions after both pretense and trying models, ranging from 0 to 4 each, at least 3 out of 4 correct answers counted as 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, 15 three-year-olds, 19 four-year-olds and 22 six-year-olds performed successfully on the trying-really doing distinction (with a marginal difference between the age groups, $\chi^2 = 5.95$, $p < .051$). In contrast, 8 three-year-olds, 9 four-year-olds and 23 six-year-olds performed successfully on the pretending-really doing distinction (with a highly significant difference between the age groups, $\chi^2 = 23.74$, $p < .0001$). That is, all age groups were quite proficient at distinguishing trying to do an action from really doing that action, but the three- and four-year-olds found it difficult to tell whether someone was pretending to do an action or really was doing that action.

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[47] There are several reasons for analzing the data in this way in addition to parametric analyses of group performance against chance and parametric between group comparisons. One is that it is more informative to know how many children actually performed well than to know whether the group as a whole performed above chance. Another reason is that there was no comparable analysis against chance for study 2a, because there was no fixed set of reponse alternatives and tus no chance level.   A third reason is that this non-parametric analysis allows one to take into account the performance of a given individual child to both kinds of models in the P-T distinction.

On the P-T distinction, 10 three-year-olds, 13 four-year-olds and 12 six-year-olds performed successfully after trying models. After pretense models, 7 three-year-olds, 9 four-year-olds and 16 six-year-olds were successful. Interestingly, if one takes at least 3 out of four correct answers after both models as a (minimal) criterion for overall successful performance, only 1 three-year-old, 3 four-year-olds and 5 six-year-olds performed successfully after both models (with no significant differences between the three groups, $\chi^2 = 3.05$, $\underline{p} < .22$). In sum, though there was a slight increase in performance with increasing age, none of the three age groups was very proficient at telling whether someone pretended to an action or tried to do that action both after trying and pretending models.

These findings contrast sharply with the performance of the three-year-olds in the original non-verbal version of the task in Study 2a. In that study, children's non-verbal action responses to the same models were analysed. After pretense 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, 21 out of 24 three-year-olds performed more correct than incorrect actions after pretense 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 14).

Table 14. Number of children performing successfully in Study 2d, compared to the three-year-olds in Study 2a.

	Successful?	Yes	No
P-T after pretense models	3-year-olds Study 2a	21	3
	3-year-olds Study 2d	7	17
	4-year-olds Study 2d	9	15
	6-year-olds Study 2d	16	8
P-T after trying models	3-year-olds Study 2a	21	3
	3-year-olds Study 2d	10	14
	4-year-olds Study 2d	13	11
	6-year-olds Study 2d	12	12
P-T after both models	3-year-olds Study 2a	18	6
	3-year-olds Study 2d	1	23
	4-year-olds Study 2d	3	21
	6-year-olds Study 2d	5	19

(Note: Success is defined as at 3 out of 4 least correct answers for Study 2d, and as more correct than incorrect action responses for the 3-year-olds in Study 2a.)

4.2.4.3   Discussion

Studies 2a to 2c found that in their action responses three-year-olds show that they perceive pretending to do an action and trying to do an action as such 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 to pretend to do that action, they mostly only pretend do that action and actions that "follow" within the stipulated pretense 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 six-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 tell 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": whereas even three- and four-year-olds were good at telling 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 pretense identities of objects in their fourth year (Flavell et. al., 1987, Sodian et. al., 1998). However, the questions used in these studies were of a slightly different structure than the ones administered here. Whereas the questions in these two studies 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", the ones in the present study 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 pretense scenario or within the real situation, whereas I asked whether an action was done seriously in the real world or in a counterfactual pretense 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 roughly "In the pretense scenario: Is it an A or a B?" and as "In reality: Is it an A or a B?", whereas my questions required the assignment of an action predicate X to either the counterfactual pretense scenario or the real world. One result of the Flavell et. al. (1987) study is suggestive of this possibility: In an additional test, performance on the question "Did he pretend that this object is an A or did he pretend that it is a B?" was compared to performance on the question "Is that a real A, or is it a pretend A?". Children found the latter question –which is more similar to the questions used in the present study- more difficult. However, the findings here are somewhat mixed insofar as the children who got the latter question were then better at answering the reality question "Is the object really an A or a B?" (this finding was also replicated by Sodian et. al., 1998). Another possibility is that the questions in the present study were more difficult

than Flavell et. al.'s and Sodian et. al.'s, because in the former children were asked about an action whether it was really done or only pretended, whereas in the latter they were asked about objects. One could argue that pretend-real questions about objects are easier than pretend-real questions about actions, because they can be solved by merely paying attention to the object itself. Future studies, using direct comparisons between these different question types and formats are needed to clarify these issues.

4.2.5   Discussion Studies 2a – 2d

In the current studies I tested young children for their understanding of different forms of as-if behaviours, specifically pretending to do an action and trying to do the same action. This presented an interesting case to test standard behaving-as-if theories against the present revised acting-as-if construal. Standard behaving-as-if theories claim that young children's concept of pretending-that-p is one of "behaving in a way that would be appropriate if p were the case" (Nichols & Stich, 2000, p. 139). The problem with these theories is that this hypothesized pretense concept is very coarse-grained and has many instances of non-pretense in its extension, above all trying to do an action: In trying to write with a malfunctioning pen, for example, one performs behaviour that would be appropriate if the pen was working. Accordingly, children would have one undifferentiated category of as-if-behaviours comprising pretending and trying.

According to the present revised acting-as-if hypothesis, in contrast, young children do not just have one undifferentiated category of as-if-behaviours, but distinguish between different forms of as-if-behaviours with different underlying intentions and perceive these under different descriptions. Specifically, they perceive trying to do an action and pretending to do an action under different descriptions, appreciating that the intentions involved are radically different in the two cases: In trying one wants to really do the action, whereas in pretending one does not.

The patterns of differential imitations in Studies 2a and 2b show that indeed by three years of age children perceive trying and pretending as such: When the three-year-olds saw a person try to X, they then really did X or tried to really do X. When they observed a person pretend to X they then only pretended to X themselves. The performance of two-year-olds in Study 2a, in contrast, was more ambiguous. When they saw a person try to X, they then really did X or tried to really do X. That is, they clearly perceived trying as such similar to the three-year-olds. But when they saw someone pretend to X, they equally often pretended to X and tried to X. That is, taking performance of more "correct" than "incorrect" response to models of one type as a criterion for competence, they did not clearly perceive pretending as such. However, they

showed more pretending to X responses when they saw someone pretend to X than when they saw someone try to X. This pattern, though not fulfilling the strict criterion for full competence, does show that even two-year-olds differently perceive and respond to pretending and trying as intentionally different forms of behaving-as-if. It is possible that the context-specificity of the 2-year-olds' pretense competence and broadly executive problems can account for these somewhat mixed findings: Though 2-year-olds do perceive pretending and trying as intentionally different forms of behaving-as-if, they find it very difficult to overcome the tendency to do a real action if possible and to pretend with an object with which they could really perform the corresponding action.

Most convincing is the performance of the 3-year-olds in Study 2c: When they saw E pretending to pour into a cup, for example, and when given the chance to show more productive responses, they did not only imitate the pouring pretense, but went on to pretend to drink themselves, indicating appropriate inferences about the pretense scenario stipulated by E. In contrast, when they saw E try to pour in superficially analogous ways, they tried to pour with novel means themselves, using a tool to open the container first. In sum, the present findings pose a problem for standard behaving as-if theories and are highly compatible with my revised acting-as-if construal.

There is, however, one potential objection that could be made to the present interpretation of children's performance in terms of early conceptual competence. It may be that young children do not perceive pretense actions and trying under different descriptions, that is, distinguish them by essential (defining) features, but only that they distinguish between trying and pretending in their accidental (characteristic) features (see e.g. Perner et. al., 1994; Harris et. al., 1994). There are many such accidental features of pretending and trying that I made use of in the demonstrations: Effort, surprised and frustrated expression in trying and non-serious, playful expression in pretending. This sort of objection can be read at least in two ways: *First*, it might be that children perceived both trying to X and pretending to X under the same description, that is as behaving-as-if X, but they perceived additional differences of the two models, above all the different expressions. This reading, however, seems unable to explain the systematic differential imitations and inferential responses shown by the 3-year-olds. Rather my interpretation of the data in terms of perception of both models under different descriptions of intentions seems more plausible: Not only did children perceive some sort of additional something between trying and pretending, but they perceived essential differences in the intentions of the actor and reacted appropriately. *Second*, it might be that children do not distinguish the essential cognitive aspects of pretending and trying, that is, they do not distinguish between the false belief of the trying actor that the pen would work and the imagination of the pretender that the pen would work. Rather they subsume both under an as yet undifferentiated concept of some sort of relation to a

counterfactual proposition ("prelief" or something like that, see Perner et. al., 1994). This second reading then is not in contrast with my interpretation of the data. I do here not dispute the claim that young children lack a distinction between the essential cognitive features of different forms of as-if behaviours, I only claim that their concepts of pretending and trying involve different essential intention features: In trying to X one intends to do X really (and so behaves as-if accidentally only), in pretending to X one intends to act as-if only (and so behaves as-if intentionally).

In sum, the results thus suggest that we must credit young children with a deeper understanding of pretense than that posited by the behaving-as-if theory. Does this then mean that we have to credit them with an adult-like concept of pretense posited by Leslie's theory (e.g. 1994)? First of all, as already noted, these two competing theories do not present exhaustive alternatives. In fact, the present construal can be seen as a third possibility. The findings do refute the claim of the behaving-as-if construal that young children do not understand pretense as intentionally acting-as-if different from other forms of behaving-as-if. They do not, however, directly touch upon the claim of the behaving-as-if theories that young children fail to distinguish between pretending and other forms of behaving-as-if in their cognitive aspects (e.g. do not take into account that pretense presupposes some knowledge about what one pretends to do[48]).

Regarding Leslie's theory, I believe that the present findings require an interpretation richer than that offered by behaving-as-if theories, but not as rich as that offered by Leslie's (1994) meta-representational claim. Leslie's claim is that in order not get confused about fact and fiction in producing and understanding pretense, even very young children must make use of a highly specialized mental architecture involving meta-representations and the adult concept of pretense. The present findings, however, do not necessitate such a rich construal. While the findings do necessitate ascribing to the 3-year-olds, and maybe even to the 2-year-olds, the capacity to understand that someone is acting intentionally according to a counterfactual proposition, such an ascription does not imply that 18-month-olds and adults share the same concept of pretense. In fact, I would argue that young children's pretense concept does probably not involve more complex cognitive criteria that are essential for the adult concept of pretense (e.g. that pretending that p in cases where p is false usually implies that the pretenders believes non-p, that pretense is defined by the suspension of commitment to truth etc). Furthermore, the present findings do not necessitate postulating a specialized, innate modular architecture to explain young children's pretense understanding. In a word, I argue that young children' s concept of pretense is more

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[48] Though it remains an interesting outstanding question for future research whether simpler, more action-based tasks similar to the ones in the present studies could be used to test whether young children do at least understand more about cognitive criteria for pretense as is suggested by the original Moe study (Lillard 1993).

similar to the adult one than hypothesized by the behaving-as-if theory, but not as similar as according to Leslie's theory (i.e. not identical)[49].

The general picture with regard to children's developing understanding –implicit in action- of different as-if-behaviours based on my findings then is the following: At latest by three years of age, and maybe by 26 months, children have the conceptual ability to distinguish between different forms of superficially similar as-if-behaviours. They perceive trying to X under the description of the goal of really doing X and pretending to X under the description of the intention to act-as-if only. That is, they do not have a concept of pretense as behaving-as-if only, but one of intentionally acting-as-if.

Study 2d found with a direct comparison a long décalage between this kind of early understanding implicit in action and later understanding explicit in children's language. Three- to six-year-olds, when confronted with the same action models as in Study 2a, found it very hard to tell whether the actor had pretended or tried to perform the action. These results fit nicely with other findings with more implicit measures on the one hand and verbal ones on the other that indirectly suggest such décalages in the developing pretense understanding, for example, in the understanding of the pretense-reality distinction implicit in the actions of 2-year-olds and explicit in the language of 3-year-olds. However, Study 2d has just descriptively found such a décalage, but does not speak to the explanatory issue how such décalages come about. It was the central aim of Study 3, therefore, to explore potential developmental factors in such décalages.

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[49] This disagreement between Leslie's and the present position is rooted in a much deeper disagreement regarding the nature and structure of concepts. Whereas Leslie opts for an atomistic individuation of concepts more generally along the lines of natural kind concepts (see section 2.2), I consider concepts as defined at least partly by their inferential relations. Accordingly, my position leaves room for gradual coneptual development, whereas Leslie's account views most concepts as primitives that are in place early and do not develop themselves.   With this qualification at hand, one can see that the present account is in one sense richer than Leslie's (it requires mastery of inferential relations for possession of the full concept 'pretend") and in another sense less rich (it does not ascribe to young children the adult concept of 'pretend' yet).

4.3   Study 3

Study 3 pursued two aims: First, I wanted to investigate with a longitudinal training design the role of two potential factors in the development from an earlier pretense understanding implicit in children's actions to a later understanding explicit in language. The two factors were systematic contrastive pretense experience, and explicit pretense discourse. Two training groups thus received systematic contrastive pretense experience. In the Explicit group these experiences were talked about with explicit pretense discourse making use of "pretend that" and "pretend to" constructions. In the Implicit group, in contrast, only implicit pretense discourse was used. The two groups were compared to a control group that received comparable amounts of functional play regarding their pre- and post-training performance on pretense understanding tasks. To pursue the second aim –to test for the influence of pretense on the developing understanding of mental states, above all false beliefs- the groups were also compared in their pre- and post-training performance on false belief and appearance-reality tasks. This allowed me to explore two theories about the role of pretense experience and specific forms of discourse in the development of false belief understanding, the zone of proximal development (ZPD) theory and the strong linguistic determinism (SLD) theory.

4.3.1 Method

4.3.1.1   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 pretense-reality (P-R) and appearance-reality (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. 10 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 3 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, *M* = 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.

4.3.1.2   Materials and Design

The following pre-tests were administered (in this order): (1) the vocabulary subscale of the Kaufman Assessment Battery for Children (K-ABC, Kaufman & Kaufman, 1999). (2) Two combined appearance-reality (A-R) and pretense-reality (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 etc., 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 is was counterbalanced across the two combined tasks which one was first. To pass an A-R or P-R tasks, 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, 1993, modifications after Davis, Woolley, & Bruell, 2002). 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, however, the character does not know this kind of animal because it does not exist where she/he comes from. The two control question check whether children remembered these premises (e.g. "Is he hopping like a rabbit?" and "Does he know what a rabbit is?"). Control questions were repeated up to three times when children gave a wrong answer. The test question is whether the character is pretend to be or just behaving like an animal of the respective kind, e.g. "Is he pretending to be rabbit or is he just hopping so?" (order of alternatives counterbalanced across children and tasks).

   In the post-test the following tasks were administered (see table 15 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 tell whether an actor was pretending to do or really doing an action (P-RD) and whether someone was trying to do or really doing an action (T-RD), as used in Study 2d. In the P-RD tasks, the child saw a movie of person that pretended to do four actions, e.g. 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 2d) whether she had only tried to do the action or really done it. (3) the same pretending-trying (P-T) distinction task as in Study 2dwas used. Children saw on video the same four pretense models and the same four analogous trying models and were asked (by the same hand puppet as in Study 2d) 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 0-4 after pretense models and after trying models each, and a total score of 0-8. (5) two unexpected content ("Smarties") false belief (FB) tasks (Perner et. al., 1987)), yielding scores from 0-2 for first person ("What did you think was in the box?") and third person questions ("What would another child think is in the box?") each, and a total score of 0-4.

Table 15. Tasks used in pre- and post-test in Study 3.

	Tasks		Score
Pre-test	K-ABC	Vocabulary test (picture naming)	4 - 19
	A-R	Appearance-reality distinction ("What is it really?" and "What does it look like?")	0-2
	P-R	Pretense-reality distinction ("What is it really?" and "What did I pretend it is?")	0-2
Post-test	A-R	as pre-test	0-2
	P-R	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

4.3.1.3   Procedure

Each child participated in four sessions with one experimenter within a period of two weeks. Testing was done in separate quite 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. Session lasted 20 to 30 minutes. There were four sessions for each child: the first including pre-tests and some training, the second and third were pure training sessions, and the fourth had some very short booster training and the post-tests.

Participants were quasi-randomly assigned to one of the three groups (with the only restriction that the age ranges and mean ages should be the same in all groups). 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).

In the training sessions, for all three groups mostly the same objects were 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). Second, the child and E together watched movies about a third person who did functional or pretend play (for about 10-15 minutes in session 3).

The interaction between child and E in the two training groups included the following elements (in this order): (1) simple pretense 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 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 pretense scenario (E and child engage in an extended pretense 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 pretense 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 etc. In total she did pretended three different things with the objects after each 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 she 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, she 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 pretense identities, between different pretense 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, pretense identities and actions, and failed attempts. For example, when watching the movie where the actor brings out a shoe and first uses it appropriately, i.e. outs 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 now does! 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 now does! Now it is her cup, and she is drinking (funny voice)".

The control group received functional play experience with mostly the same object as the two training groups that was structurally as similar to the experience of the training groups as possible. 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), e.g. 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 table 16 for details). In the control group, E just talked about the real identities of objects and the actions performed of the them, e.g. "This is a knife. We cut this with it. And now we cut that with it".

Table 16. Training elements of the three groups in Study 3

Form of presentation		Training groups	Control group	Number of items
Direct interaction	Session 1	Simple pretense 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 Pretense Scenarios (Extended pretense 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 pretense 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 substrates	5

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?" etc., the children in the Implicit group "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.

The test session 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: 2 items from the simple imitation games done in session1; (2) P-RD or T-RD (counterbalanced across children within each group); (3) first block of P-T distinction (pretense models when P-RD was before, trying models when T-RD was before[50]); (4) A-R and P-R; (5) Moe; (6) second part of short booster training: 2 items from simple imitation games done is 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 pretense 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 pretense imitation were used before the P-RD and P-T regarding pretense 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 "re-activate", 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 pretense models correctly based on simple priming (and analogously for "try"). No such concerns would apply to the Implicit group, in contrast, 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 pretense 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.

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[50] That is, the structure and order of tasks was kept as similar as possible to Study 1, where before the pretense models of the P-T distinction children had to solve some P-RD questions, and before the trying models of the P-T distinciton had to solve some T-RD questions.

4.3.2   Results

4.3.2.1   Preliminary Tests

131 children were seen for (parts of) the first session, all of which completed the K-ABC vocabulary test (*mean score* = 13.81, *SD* = 2.10), 120 of which completed the P-R and A-R pre-tests, and 102 of which completed the Moe pre-tests[51]. Table 17 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, $\underline{p}$ < .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 pretense from reality was easier for three- to five-year-olds than the structurally analogous appearance-reality distinction.

Table 17. 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)

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[51] 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 vocabulry 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).

Table 17 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).

4.3.2.2   Pretense measures

To test for effect of training on children's pretense-reality distinction (P-R), a difference score was computed, subtracting the pre-test P-R score (0-1)[52] from the post-test P-R score (0-2). This difference score ranged from -1 to 2. Regarding the differential influence of pretense experience and discourse on children ability to distinguish pretending from really doing an action (P-RD) and trying from really doing an action (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, p < .70), T-RD (Mann-Whitney U-test, p < .36), and P-T (Mann-Whitney U-test, p < .58)[53], all 24 children in the Explicit group were analysed together as one group.

Table 18. Number of children showing P-R and Moe difference score -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

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[52] Children that had a pre-test score of 2 were not included in the final sample.

[53] These are the tests to which the concern applied whether the original bosster training might have led to simple priming of the words "pretend" and "try".

Table 18 shows number of children in the three groups with P-R difference scores of -1 to 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 19 shows the performance of the three groups on P-RD and T-RD. In contrast to the three- and four-year-olds from Study 2d, all three groups performed quite well on both kinds of tasks: taking answering at least 3 out of 4 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 (χ^2 = .96, p < .62) or T-RD (χ^2 = 1.33, p < .51).

Table 19. Performance of the three groups on P-RD, T-RD and P-T

	Number correct	0	1	2	3	4
Explicit group (n = 24)	P-RD (0 – 4)	1	0	4	6	13
	T-RD (0 – 4)	0	0	6	4	14
	P-T (pretense models, 0-4)	2	0	6	3	13
	P-T (trying models, 0-4)	4	0	4	7	9
Implicit group (n = 18)	P-RD (0 – 4)	0	1	5	4	8
	T-RD (0 – 4)	0	1	5	3	9
	P-T (pretense models, 0-4)	2	1	4	2	9
	P-T (trying models, 0-4)	2	2	7	2	5
Control group (n = 18)	P-RD (0 – 4)	0	0	5	4	9
	T-RD (0 – 4)	0	0	3	3	12
	P-T (pretense models, 0-4)	4	1	5	2	6
	P-T (trying models, 0-4)	1	4	4	3	6

Table 19 also shows the number of children answering 0 -4 questions correctly in the P-T task after pretense and trying models. Taking as a criterion for successful performance that a child

answer at least 3 out of 4 P-T questions correctly after both pretense and trying models (as in Study 2d), 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 to 2 out of 18 in the Implicit group, and 3 out of 18 in the control group (see table 20). Significantly more children in the Explicit group were successful than both in the Implicit group (χ^2 = 4.71, p < .015) and in the control group (χ^2 = 3.01, p < .042).

Table 20. Number of children in the three groups answering at least 3 out of 4 question correctly after both pretense and trying model in the P-T task.

	At least 3 out of 4 correct after both models?	
	Yes	No
Explicit Group (n = 24)	10	14
Implicit Group (n = 18)	2	16
Control group (n = 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 18). None of the groups showed significant improvement in the Moe task from pre- to post-test (Wilcoxon tests, all ps < .14).

4.3.2.3   Transfer measures: False belief (FB) and appearance-reality (A-R) tasks

To test for influence of training on performance on the appearance-reality distinction (A-R), 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 21 shows the distribution of these score sin the three groups. None of the groups improved significantly from pre- to post-test (Wilcoxon tests, all ps < .10).

Children's performance on the false belief (FB) tasks is also shown in table 10. 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), $F(2, 60)$ = .27, p < .77.

Table 21. Number of children with pre- to post-test difference score 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 (n = 24)	3	16	2	3	3	1	10	5	5
Implicit Group (n = 18)	2	12	3	0	0	3	7	3	5
Control group (n = 18)	2	11	4	1	1	1	7	5	4

4.3.3 Discussion

The Explicit group, and only the Explicit group, profited from training in two important aspects of a more explicit pretense understanding: *First*, children in the Explicit group improved from pre- to post-test in their ability to tell what someone pretended an object was in contrast to the real identity of the object (pretense-reality distinction, P-R). *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 pretending-really doing distinction (P-RD) and on the trying-really doing distinction (T-RD), but so did the other two groups as well, so that there were no differences between the groups on these two simpler tasks. In sum, systematic pretense experience alone did not help children in this study to acquire a more explicit understanding of pretending as an intentional activity (as measured by P-T) and of pretense as contrasted to reality (as measured by P-R). Only when the systematic pretense experiences were accompanied and structured by explicit pretense discourse did children improve in these forms of explicit pretense understanding.

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. One possibility is that this 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 pretense contents in contrast to real situations (P-R distinction). It would remain then an interesting question for future research how, and influenced by which factors the more mature form of understanding pretense tapped at by the

Moe task develops subsequent to the ability to explicitly contrast pretense with reality and pretending with trying to do an action. One plausible possibility is that experience with even richer forms of pretense discourse are important for the acquisition of this more mature level of understanding. Above all, inferentially integrated discourse revealing the conceptual relations between pretending, believing, knowing etc. might be essential here. For example, explicit discourse between pretenders about what to pretend seems to be helpful in making explicit the cognitive criteria for pretending, especially when one of them makes a proposal to pretend something the other does not know about (e.g. A: "Let's pretend that we are the Marx Brothers!". B: "But I cannot pretend this". A: "Why not?". B: "I do not know the Marx Brothers. I do not know what to do then"). But there is also the possibility that the Moe task is excessively difficult due to some performance factors and thus underestimates children's understanding of the cognitive elements in pretense (e.g. Davis et. al., 2001; German & Leslie, 2001; Mitchell, 2000).

None of the three groups showed transfer effects of training to performance on the appearance-reality (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 false belief (FB) tasks. That is, systematic pretense 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 pretense understanding. These findings directly bear on the two theories about developmental relations between pretense, discourse and mental state (specifically false belief) understanding explored in the present study: *First*, the strong linguistic determinism (SLD) theory makes a specific claim about the role of linguistic development in the development of mental state understanding. According to this theory, one specific syntactic factor –mastery of "that" complementation considered as a formal syntactic structure- accounts for the development of mental state understanding, paradigmatically measured by false belief tasks. On this view, mastery of "that" complementation is both necessary and sufficient for false belief understanding. From the SLD theory thus the prediction can be derived that improvement in using "pretend that" constructions should lead directly to improved false belief understanding. This prediction is clearly refuted by the data from Study 3: 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, who could be read as holding such s strong version at one point (DeVilliers & deVilliers, 2000) have recently qualified their position and incorporate now 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 false belief understanding. "Want that" constructions, that are possible in some languages, e.g. German, are the paradigmatic case of 'irrealis' complementation constructions. Based on this qualification, deVilliers (2003) argues that the findings by Perner, Sprung, Zauner and Haider (2003) that "want that" is mastered before false belief tasks by German children do not threaten her theory. However, it remains unclear how "pretend that" fits into this qualified theory. Clearly pretense 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, pretense can be said to be the intentional application of false propositions to real states of affairs.

The general underlying problem for the SLD theory, I think, is this dilemma: *Either* the crucial element of "that" complementation is understood as a formal syntactic structure. Then the theory is indeed strong linguistic determinism, but false, because refuted by Perner et. al.'s (2003) findings on "want that" and the present ones on "pretend that". *Or* 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 false belief 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 false belief understanding. In a word, this qualified position collapses into a form of weak linguistic determinism. In fact, I 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 false beliefs and actions based on false beliefs are understood (see Perner et. al., 2002, in press).

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

(considered 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 I could explore with the data on transfer to false belief tasks in Study 3 regards the developmental relation of pretense and understanding mental states. The zone of proximal development (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 pretense experience and discourse did not improve children's false belief and appearance-reality understanding. And improved pretense understanding in the Explicit group did not transfer to these other tasks. Clearly, however, the present findings do not refute the ZPD theory. The reason is that the ZPD theory does not view pretense experience as sufficient for developing mental state understanding, but at most as necessary (or even as only supportive though neither necessary nor sufficient). A more specific possibility is that only certain more complex forms of pretend play experience are relevant for a developing understanding of mental states, specifically beliefs. For example, based on the correlational findings by Youngblade and Dunn (1995) it could be argued that only pretend role play, where children pretend to be someone else and have to pretend to act from others' points of view, are relevant for a developing mental state understanding. The present study, however, only gave children pretense experience of a less complex sort such that it was pretended that something was the case or one pretended to perform an action.

A more general possibility is that systematic pretense experience leads to an improved understanding of mental states in more indirect ways and only after some more time. For example, some ZPD theories (e.g. Garfield et. al., 2003) incorporate elements of weak linguistic determinism and claim that pretense experience first has to lead to a mastery of explicit pretense discourse, which in turn provides a bootstrap into developing an understanding of propositional attitudes, above all belief. That is, children first learn to explicitly talk about pretense actions with "pretend that" constructions (e.g. "He pretends that the ball is an apple") and learn in this non-serious area of pretense 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 false beliefs- 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". One finding from Study 3 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 pretense-reality distinction performance, at post-test were far from performing at ceiling in their pretense-reality distinctions. That is, their

proficiency with pretense discourse and understanding might have been still too fragile to function as a bootstrap.

In sum, regarding the developmental relation of pretense 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.

5   General Discussion

The present work pursued the aim to investigate several aspects of pretense development from the perspective of Cultural Learning theory. Study set 1 looked at imitative learning in frameworks of collective intentionality as a possible developmental origin of pretend play performance. Study set 2 investigated in more detail the cognitive aspect of children's early understanding of pretending in others as indexed by their imitative and creative action responses to others' pretense. Study 3, finally, tested for possible developmental factors in subsequent development from an early pretense understanding implicit in action to a later understanding explicit in discourse about pretense.

Study set 1 addressed the question of the ontogenetic origins of pretend play as an action form. The theoretical background for Studies 1a – 1c drew heavily from El´Konin's (1966) approach that –in contrast to Piagetian individualistic accounts- stresses the commonalities between learning to pretend and learning to perform other action forms in social contexts. Based on El´Konin's approach and more recent Cultural Learning theory, I hypothesized that the emergence of pretending should show some important commonalities with the emergence of instrumental actions –above all, both should be acquired to a large degree through cultural imitative learning-, but also some important differences. Pretending, due to its more complex structure, should be more difficult and less creative early in development, and learning to pretend should –in sharp contrast to Piaget- be even more social than learning to do instrumental actions. Studies 1a – 1c provided some evidence consistent with these hypotheses: 24-month-olds showed analogous patterns of imitative learning of pretense and instrumental actions with novel objects. They were, however, less proficient at imitating pretense and performed less creative pretending. Furthermore, during pretense acts children showed stronger interpersonal behaviour –they looked, and in one study smiled, more often to the partner than during instrumental actions. 18-month-olds, in contrast, showed the same pattern of imitative learning of instrumental actions as the 24-month-olds, but hardly any imitations of pretense acts and virtually no creative pretending –fitting with much other research showing that there is an important development in children's pretend play understanding and performance in the second half of the second year.

It should be admitted that the data of Studies 1a – 1c on imitative learning of pretend play acts only are consistent with and suggestive of the present theoretical approach, but fall short of providing anything like strict evidence for it. It could simply be that children can imitate pretense actions at some point, but that in everyday life they invent pretense right from the start as on Piaget's account. As mentioned above, this possibility present a fundamental problem for all

experimental studies, and only more systematic naturalistic observations and cross-cultural studies can help to clarify this issue.

Even if such more stringent studies existed and provided results in favour of the present approach, however, it would remain an interesting question for future research how exactly pretend play emerges ontogenetically through imitative learning. Surely it is too simplified and coarse-grained to just assume that children first imitatively learn instrumental actions from around one, and then become pretenders through imitative learning some time later. Surely there are interesting intermediate steps between learning instrumental actions and acquiring pretense, and some developmental precursors to pretend play.

One possible precursor already mentioned shortly is so called teasing behaviour in one-year-olds (Reddy, 1991), where children in a very amused way, for example, hold out objects to another person and pull them away when the other person wants to grasp them. Such behaviour can be interpreted as showing that children have a grasp of how actions directed at others are normally and seriously performed and make use of this in intentionally stopping short of really performing the action. Such an ability seems to be a necessary prerequisite for pretending where one non-seriously acts as if performing an action but intentionally stops short of really performing it[54]. Interestingly, parents –at least in Western societies do teasing for their children a lot, and thus teasing itself might be culturally learned from adults. One recent study has shown that even 9-month-old infants discriminate between teasing actions –where the person stops short of performing the action intentionally- and superficially similar actions where the person is unable to perform the action properly (Behne, Carpenter, Call & Tomasello, 2003). Based on this early sensitivity infants might thus learn teasing itself through imitation.

Another precursor of pretense development might be found in one-year-olds' still passive "participation" in pretense scenarios. In Western cultures, at least, parents perform a lot of pretense actions in front of and for their even very young children. Recent research has found that parents in pretending for their very young children make use of several behavioural markers such as exaggeration and truncation of movements, increased looking and smiling at the child, specific sound effects and higher pitch in even stronger way as in normal pretending (Lillard & Witherington, 2001; Richert et. al., 2002). And it has been found that children at around 18 months, when they are not yet firm pretenders themselves, do discriminate between parents' pretense and their serious actions, and show some signs of grasping the non-seriousness of pretense: Children look and smile more often to the parent when she engages in pretense actions

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[54] In fact, it could be argued that teasing is a form of pretending. While this might be true for adult teasing, Reddy (1991), for example, urges not to view early teasing as pretending, because it is confined to very specific interpersonal contexts and actions.

for the child. That is, children might first learn to make use of the markers parents use extensively in pretending for their children to discriminate pretending as somehow non-serious from normal actions. This might be thought of in analogy to children's early perception of serious goal-directed actions. In the case of serious goal-directed actions, recent research has shown that infants are sensitive to temporal and other structural aspects of everyday actions by the first birthday (Baldwin & Baird, 1999, 2001) – a possible precursor to understanding intentional action from 1 year on. Furthermore, parents intuitively scaffold children in segmenting and understanding actions by exaggerating certain movement characteristics of their actions when they act in front of and for the infants (so-called "Motionese", Brand, Baldwin & Ashburn, 2002). It has been speculated whether infants' early sensitivity to structural aspects of actions and parents' use of Motionese might dialectically supply a bootstrap for infants to enter into simple forms of the intentional stance. In the case of pretense, parents not only scaffold children by highlightening certain movements, but by supplying them with a rich set of markers indicating the non-seriousness of their behaviour. In analogy to the Motionese speculations, it is thus an exciting question for future research how exactly infants –equipped with at least a sensitivity for the structural aspects of pretending- come to make use of these markers in gaining an appreciation of the non-serious nature of pretense acts, and consequently come to enter what could be called a simple form of "silly stance".

Finally, children's developing understanding of different simpler serious action forms might be interesting in its relation to the development of pretense. From around one, children understand some basics of intentional instrumental actions, as indexed in their action responses to other persons' behaviour: They differentially imitate intentional instrumental actions over analogous accidental behaviour with the same effects (Carpenter et. al., 1998b), and they perform actions that they have seen others attempt to perform only (Meltzoff, 1995; Bellagamba & Tomasello, 1999). Most interestingly in the present context, they also show some awareness not only of instrumental actions (where the goal is to bring about concrete changes of states of affairs in the world), but also of actions done for their own sake. In a recent study 14-month-olds, for example, imitated a bizarre action A by an actor that lead to effect B only when the actor could have done a less bizarre action to achieve B, but not when the actor had no other possibility to achieve B except by doing A (Gergely et. al. 2002). A plausible interpretation of this pattern of differential imitation is that children perceived A as an action done for its own sake in the case where there was choice for the actor and only as a necessary means in the case of no choice.

Taking into account these different potential precursors, a possible developmental course from the ability to act seriously to perform pretense might proceed in something like the following way: Around one children have acquired a basic understanding of serious intentional actions, and are capable of imitating such acts. Armed with a nascent understanding of actions done for their own

sake, that is, actions that are not purely instrumental, and presented with parents that present teasing and pretense actions for them, children gain a simple grasp of "silly" actions, actions done somehow deviantly and non-seriously, done for the sake of playing. Based on this simple grasp they imitatively learn to perform "silly" actions such as teasing themselves. And children at this age might also imitate the "silly" behaviour of adults when they pretend for the children. This does not mean, however, that what the children themselves perform in response to others' pretending is itself pretense right from the start –it is possible, and indeed plausible, that there are intermediate stages where the child reproduces behaviour that she understands as somehow "funny", but does not yet grasp the pretend nature of it, the dual structure of the action as done in relation to a counterfactual pretense proposition. However, this fundamental ability to understand somehow non-serious actions done for their own sake and the ability to imitate them, together with being confronted with parents' pretending for the child, and with a nascent understanding of counterfactual affairs and the imagination, might lay the foundation for the emergence of understanding and imitatively learning pretend play proper –as a non-serious action form according to counterfactual pretense propositions collectively done for its own sake. Future microgenetic and longitudinal, ideally training studies looking at the developmental relations of these different abilities are needed to test these speculations.

While stressing the commonalities between the emergence of pretending and acting instrumentally as both being acquired to a large degree through imitation, the current approach hypothesized some crucial differences between them in the different intentional structures underlying them and in the kinds of intersubjectivity or collective intentionality which they require. Imitative learning of both kinds of actions with objects takes place in a framework of collective intentionality in the wide sense, such that two actors not only act separately from each other but perceive and (imitatively) respond to the intentional action of the other. In the case of instrumental actions children learn in a socially mediated way the physical function of objects. The imitative learning of pretense actions with objects, however, involves an even stronger form of collective intentionality such two actors not only understand and respond to each other, but together create some status function of an object (Searle, 1995). Children thus learn the status functions of objects in pretense in a socially constituted way. Evidence for the stronger kind of collective intentionality in pretending comes from the finding that children reliably looked (and in one study smiled) more to the adult play partner during pretense than during instrumental acts. However, as these data on children's social gazes are compatible with explanations other than the present one in terms of collective intentionality, more diverse measures should be used in future studies as possible indices of the hypothesized collective intentionality. Above all, if it is true that young children have some basic awareness of the collaborative constitution of status functions in pretense, we should expect them not only to gaze more to a play partners, but to

show some richer, normative reactions (see Currie, 1998; Walton, 1990). For example, we should expect them to show protest behaviour when the play partner violates the implications of the status function created together (e.g. pretends to drink from a wooden block that is currently an "apple" in the joint pretense). Furthermore, as the social constitution of status functions is basically a form of cooperation, future studies should relate early imitation of pretense to other potential forms of early cooperation. If children do indeed cooperate in early pretense imitation, it should be expected that they show some basic abilities to cooperate in other domains such as joint serious actions as well.

It is an interesting open question for future research in how far the present approach to the emergence of pretend play can be applied to the development of pretense in autistic children. One possibility compatible with the present approach would be, for example, that the deficit in pretending in autistic children is secondary to their problems with understanding intentional symbolic action and consequently with imitation of such acts. Some of the data –showing that autistic children have some understanding of pretense acts (Jarrold et. al., 1994) and are capable of imitating simple pretense actions (e.g. Libby et. al., 1997)- seem to speak against this possibility. However, to date there are simply not enough systematic results yet, and too many open questions about the existing studies, to draw any firm conclusions about this issue. For example, it has been wondered whether autistic children in some imitation studies only mimicked superficial behaviour without any understanding of its meaning and pretend nature (Libby et. al., 1997). That is, perhaps autistic children do indeed only have a very superficial behaving-as-if understanding of pretending. It would thus be interesting to test autistic children with more stringent imitation designs, comparing their imitation of pretense and instrumental acts as in Studies 1a – 1c, and comparing their differential imitation of different as-if-behaviours, as in Studies 2a – 2c.

Another, not incompatible possibility would be that though autistic children can imitate pretense acts they rarely do so in everyday contexts because they have difficulty participating in the required collective intentionality and cooperation –which could in turn be secondary to their social and communicative deficits (this would be to some degree compatible with a competence deficit account that stresses the social impairments as primary, e.g. Hobson's, 1990). Some results showing that autistic children do engage in joint pretense when adults provide more social scaffolding and support (e.g. Charman et. al., 1997) might be suggestive of such a possibility. It would thus be interesting to see whether autistic children show more social behaviour such as gazing and smiling –taken as an index of an awareness of strong intersubjectivity in the creation of pretense scenarios- during pretense acts as well (for some pilot work in this direction see Leekam, Gagliano, Meins, & Franco, 2002).

In sum, Study set 1 leaves open some questions for future research about the exact roles of imitative learning and collective intentionality in the emergence of pretend play (both in normal and impaired development). More fundamentally, however, while showing that 2-year-olds have some understanding of pretending and can reproduce it, Studies 1a – 1c taken alone also do not give conclusive insight into the exact nature of young children's pretense understanding. Specifically, these studies alone can not rule out the sceptical concerns of the behaving-as-if theory that young children might only have a superficial understanding of pretending as behaving-as-if. Studies 2a – 2c, with a more stringent design, however, can rule out such sceptical concerns. Three-year-olds in these studies (and to some degree 2-year-olds) perceived different forms of behaving-as-if, pretending to do an action and trying to do that action, very differently and responded appropriately in their own imitative and inferential actions. After pretense models, children themselves only pretended to do the action or did appropriate inferential pretense. After trying models, in contrast, they really performed the action themselves, or tried to, or even made use of creative novel means to do the action. That is, they perceived the two kinds of as-if-behaviours as radically different in their intentional structures –the intention in pretending being to act as-if for its own sake only, whereas in trying the intention is to really perform the action properly and achieve a concrete goal in the world. These findings clearly refute the claim of the behaving-as-if theory regarding young children's grasp of the intentional elements in pretense, namely that young children do not have a concept of pretending as intentionally acting as-if. The present findings, however, leave untouched the other basic claim of the behaving-as-if theory –that young children do not yet understand the cognitive elements in pretense. The reasoning behind this claim is usually that children up to four or five –until they master false belief tasks- do not yet have a concept of mental representation and therefore cannot understand that pretenders must mentally represent counterfactual pretense propositions. However, understanding of the cognitive aspects might come in degrees, with some simple understanding of, for example, knowledge prerequisites of pretense being possible before children understand the cognitive differences between pretending and acting on false beliefs (parallel to the claim sometimes made that children have a simple understanding of knowledge versus ignorance before they fully understand believing). While some recent studies (Davis et. al., 2001; Mitchell, 2000) suggest such a possibility, this issue awaits further empirical clarification. It is an interesting question whether the action-based methodology of Studies 2a – 2c could be adapted to contribute to this clarification. For example, would three-year-olds differentially imitate superficially analogous behaving-as-if-p of persons who do or do not have the requisite knowledge?

Whatever turns out to be the correct answer to the question how young children understand the cognitive criteria for pretending, regarding their understanding of the intentional elements in pretending the present work warrants the clear conclusion that in contrast to the behaving-as-if

theory young children do not have a coarse-grained concept of pretending as behaving-as-if only that is much wider than the adult one. In fact, it could be argued, taking into account findings from the are of deception development, that on the contrary young children do have a more narrow concept of pretense. It is a reliable finding that children up to four years do not understand and produce real deception, and thus do not understand pretending in order to deceive (Sodian, 1991, 1994; Sodian & Frith, 1992). On this ground it seems that young children do not have an adult-like context-free concept of pretending as intentionally acting-as-if for whatever reason, applying to pretend play but also to deception. Rather, they have a more narrow sui generis concept of pretend play as acting intentionally according to counterfactual propositions (mostly) collectively for its own sake.

The differential imitation findings supporting this theoretical interpretation were very clear in the three-year-olds in Studies 2a – 2c who showed more correct (imitative and inferential) than incorrect (imitative and inferential) responses to both pretense and trying models. The two-year-olds in Study 2a, in contrast, showed only a weaker pattern of differential responses and imitations. They did perform more pretense responses to pretense models than to trying models, and analogously for trying responses. That is, according to this standard comparison in imitation studies (comparing responses of one type to different models) they did show differential imitation, indexing thus that they differentially perceived pretending and trying. After trying models, they also performed more correct trying responses than incorrect pretense responses, but after pretense models they performed as many correct pretense responses as incorrect trying responses. That is, according to the more stringent analysis comparing correct to incorrect responses to a given model type, they were only proficient after trying models.

It remains thus an interesting question how these results with the 2-year-olds are to be interpreted, especially in relation to the findings with the 2-year-olds in Studies 1a and 1c. One possibility is that Study 2a –especially the responses to the pretense models- shows that the 2-year-olds have a real conceptual deficit such that they do not yet understand the intentional structure of pretending. For the interpretation of Studies 1a and 1c this would then mean that children's responses in these studies should not be taken as proper imitations of pretense acts (in the sense that children reproduced an action the intentional structure of which they have grasped), but rather as a simpler form of mimicking of a behaviour children did not understand in its intentional structure. The other, more plausible possibility is that the ambiguous performance of the 2-year-olds in response to pretense models in Study 2a is not due to a deep conceptual deficit, but rather due to performance factors, above all the context-specificity of young children's pretense competence, and broadly executive problems. Children in Study 2a were confronted with pretense models in situations where the pretended action could really be performed. This is not only a very unusual context for pretend play that children probably hardly experience in

everyday life, but requires children to overcome the natural tendency to use objects in instrumental serious ways if possible, and can thus be considered a demanding executive problem. The two-year-olds in Study 2a did imitate differentially, as shown by the fact that they performed more pretense responses after pretense than after trying models and vice versa. After pretense models, they did not perform more pretense than trying responses because trying responses –doing the action properly or at least trying to- presents a natural response bias hard to overcome. Informal piloting results where even 3-year-olds performed as the 2-year-olds in Study 2a when the objects used were too familiar (e.g. a standard pen was used to pretend to write) lend prima facie support to this possibility. This interpretation also seems plausible in light of other findings on children's context-specific competence early in pretending, e.g. the findings that two-year-olds find it very hard to perform pretense actions with objects that have a different conventional (instrumental) function (Pederson et. al., 1981). According to this second interpretation, two-year-olds do have a concept of pretending as intentionally acting-as-if, but have difficulty applying this concept and acting accordingly in certain unusual contexts. The 2-year-olds in Studies 1a and 1c thus really imitated pretense acts as understood in their basic intentional structure (there were no executive problems because the actions could not really be done with the objects), and the two-year-olds in Study 2a really perceived pretending and trying as different in their intentional structures, but were hindered by executive performance problems from performing as competently as the 3-year-olds. One way for future studies to test these two interpretations against each other is to systematically vary how obvious it is that the objects can be used to really perform the action pretended. On the first interpretation the degree of obviousness should make no difference, whereas on the second interpretation children should perform more competently when it is less obvious that the action could really be done with the object.

Three-year-olds (and to a weaker degree two-year-olds) in Studies 2a – 2c perceived pretending and trying to perform actions as very different in their intentional aspects, as indexed by their appropriate and systematic action responses. However, even six-year-olds in Study 2d found it very difficult to explicitly tell whether a person pretended or tried to perform an action when confronted with the same action models. This décalage poses the empirical question how the development from earlier pretense understanding implicit in action to later explicit understanding can be explained –addressed in Study 3. But it also poses the fundamental conceptual question –relevant to virtually all areas of cognitive development- how cognitive abilities not yet expressible in corresponding explicit discourse in a given domain are to be described. There are two radical, but unsatisfying answers: First, Language of Thought theories (Fodor, 1975) basically claim that concepts are inborn as symbols in the head and that conceptual thought is a matter of solipsistic manipulation of formal symbols in the head. Learning

a natural language is relatively irrelevant for thinking, rather it can be understood as learning to translate Mentalese (the Language of Thought) into whichever natural language happens to be spoken around the child. Leslie's approach is a variant of such a theory, the basic claim being that even the young child conceptually thinks about pretending, making use of her Mentalese concept "pretend", which she later learns to translate into natural language expressions for pretense. There are many reasons not to adopt a Language of Thought theory, among them its wildly implausible assumption that concepts such as "carburetor" are inborn, and the fact that it is simply incoherent to apply the concept of a language –as a public normative practice- in a solipsistic way to things in individual heads (e.g. Garfield, 2000; Hacker, 1996; Searle, 1994)[55]. The opposing radical view –radical pragmatism- equates thinking about something with being able to participate in discourse about it, and views all kinds of pre-linguistic cognitive abilities as merely discriminative (e.g. Brandom, 1994; Davidson, 1982; McDowell, 1994; Sellars, 1963). According to this position, only discursive abilities, above all the ability to bring events under linguistic descriptions and to use language with its holistic, normative and inferential structure –to know when which statements are appropriate, from which other statements they follow and which statements in turn can be inferred from them- license ascription of thinking. This view has been criticised as unsatisfying on the ground that it leaves no room in between ascribing dumb discriminative abilities in even the simplest animals and simple machines on the one hand, and ascribing mature conceptual thought to older children and adults only on the other hand (e.g. Bermudez, 2003; Hurley, 2001, 2003; Searle, 1994).

Fortunately, however, there are less radical approaches that, while conceding that full conceptual thought is only ascribable in concert with the corresponding discursive abilities, open up room for something like proto-conceptual abilities that, though not yet fully conceptual, are more than purely discriminative (e.g. Bermudez, 2003; Dummett, 1993; Hurley, 2001, 2003; Searle, 1994). On such accounts, cognitive abilities implicit in young children's or animals' actions can be seen as proto-conceptual, or as conceptual in a not yet full sense, if they exhibit something similar to the perspectival, holistic, normative and inferential structure of discursive abilities. Though such accounts still stand in much need of conceptual clarifications, above all of the question what are criteria for such structural similarities between simpler cognitive abilities and full-fledged conceptual thought, they can offer, very roughly, the following picture: When the child or animal can make use of her cognitive abilities in a rather general way, perceiving things (in a domain) under certain perspectives and generatively using this perception in the guidance of action, with an implicit awareness of which actions "follow" from which perceptions and what are successful or "correct" actions, the ascription of simple forms of thinking (about the domains

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[55] For an interesting clarification and partial critique of his own original ideas about the Language of Thought, see a recent book by Fodor (2000).

perceived) and rationality are warranted (see e.g. Bermudez, 2003; Hurley, 2003, for details of such an account)[56].

Such an analysis can be fruitfully applied to the findings from Study set 2. In Studies 2a – 2c children revealed differential perception of and systematic responses to pretending and trying that showed a generative, inference-like structure. Children's responses also revealed some implicit awareness of normative issues: They often referred to the object's malfunctioning ("It does not work") or to the actor's and their own inability ("I cannot do it either") when unsuccessfully trying to perform an action. Such utterances show that children were implicitly aware of what was the right thing to do, and what counted as success in this situation. Being aware of the many conceptual clarifications that such analyses of proto-conceptual thought still stand in need of, and thus without pretending to provide a totally clear analysis, we can at least say that in fact children in Studies 2a – 2c revealed a quasi- or proto-conceptual "understanding" of the intentional aspects of pretending and trying, implicit in their actions, before they had a corresponding explicit conceptual understanding explicit in their discursive abilities.

This is a possible answer to the conceptual question how to describe the findings with the two- and three-year-olds in Studies 2a – 2c in relation to the verbal performance of children in Study 2d. Study 3 with a training design aimed at providing answers to the related empirical question how the décalage between early competence in action and later competence in words regarding pretense understanding can be explained. The findings confirmed the hypothesis –based on the dialectical role of discourse, specifically reflective discourse in Cultural Learning theory- that explicit pretense discourse about systematic, contrastive pretense experiences should be crucial in the development of a more explicit pretense understanding. One way to make use of the conceptual analysis of proto-conceptual and fully conceptual abilities in describing this development is to apply the metaphor of representational redescription (Karmiloff-Smith, 1992)[57]: Three-year-olds reveal a proto-conceptual understanding of pretending implicit in their perceptions and actions. Learning explicit discourse about pretense then supplies them with a recursive medium to explicitly talk and think about pretending. What was implicit in action, now becomes explicit in discourse –with children's initial cognitive abilities being transformed ("redescribed") to a higher level.

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[56] The discussion of such positions is here very cursory, to say the least. For a fuller discussion of the philosophical issues in relation to the description of animal and child behaviour, see Bermudez (2003).

[57] Though this is a somewhat pragmatist variation of Karmiloff-Smith's approach: While she views representational redescription in a Piagetian way (not unlike achieving equilibrium between assimilation and accomodation) as a primarily individual cognitive process that enables explicitly thinking in language, the current approach assign a more substantial role to language, and so in some sense reverses the direction of explanation (see Tomasello, 1999a).

Furthermore, the findings from Study 3 on children's performance on false belief and appearance-reality tasks refuted the strong linguistic determinism (SLD) theory, and failed to provide evidence for the zone of proximal development (ZPD) theory. The findings refute the SLD theory in that they show that it is not "that" complementation as a formal structure that solely accounts for false belief understanding. But they leave open for future research the question whether and in which way "that" complementation is –if not sufficient- necessary for false belief understanding (Perner et. al., 2003, e.g. express some doubts about "that" complementation being even necessary). And they leave open the question whether a semantically defined subtype of propositional attitude "that" complementation discourse, namely 'realis' discourse about mental states that refers to current reality and aims at truth, might be necessary and perhaps even sufficient for developing false belief understanding.

The negative findings with the false belief and appearance-reality tasks are less conclusive regarding the ZPD theory. Study 3 failed to provide evidence for it. This might be because the theory is false. It might be, for example, that pretense experience simply has not the right structure to help children acquire an understanding of epistemic mental states such as beliefs. It is true, in pretense children somehow experience and understand two different perspectives, the serious one referring to reality as it is ("this is a block") and the other one giving the content of the pretense scenario ("this is an apple"). But these two perspectives are not truth-incompatible –one is about fact and the other about fiction (see Perner et. al., in press, for a detailed analysis of criteria for truth-(in-)compatibility of perspectives). Understanding beliefs and the distinction between appearance and reality, in contrast, requires an understanding of two truth-incompatible perspectives. For example, understanding Cadam's false belief that the block is an apple requires a coordination of the two propositions "this is an apple" and "this is a block" where both have to be taken to refer to the real situation –"this is a block" as describing the facts, and "this is an apple" as content of Cadam's mistaken belief that nevertheless refers to the real situation (in contrast to the case of pretense, in understanding false beliefs the content of the belief can not be understood as being about some other non-serious world). On this analysis, these differences in structure between pretending and believing are the very reason why pretense is understood earlier than belief. And based on this analysis one could then argue that pretense experiences, even systematic and contrastive ones, due to their different and simpler structure will not help children to acquire an understanding of false beliefs. Only contrastive experiences that involve truth-incompatible perspectives will help here (as shown, for example, in the recent training study by Lohmann and Tomasello, in press). The other possibility is that the ZPD theory in some version is in fact correct, but the pretense experience children received in Study 3 was not enough. Empirically this possibility gains plausibility from the correlational findings that earlier pretense competence has been found in some studies to be correlated with later false belief

understanding (e.g. Youngblade & Dunn, 1995). Theoretically, a refined version of the ZPD approach could incorporate elements of linguistic determinism and the distinction between different kinds of perspective problems along the following lines: Through pretense experience and explicit pretense discourse children learn to explicitly confront two different, though truth-compatible perspectives. Explicit reflective discourse making use of "pretend that" constructions supplies children with a representational medium to talk about two perspectives in one speech act and to think about them in one thought. Though not sufficient for understanding beliefs, this discursive ability presents a bootstrap to extend reflective discourse to mental state reports and reports about appearances and reality. Along the line of Vygotsky's (1978) classical formulation of the zone of proximal development, it might even be that children first learn such mental state discourse through imitation without first being fully able to think about the issues talked about, and then through internalizing this competence come to understand the truth-incompatible perspectives in false beliefs. Of course, such an account needs to be spelled out in more detail and to be tested in future studies.

"It would be interesting to see a revived interest in the relation between action and pretense within a more contemporary theoretical framework", Alan Leslie recently urged (Leslie, 2002, p. 110). I hope the present work can be seen as a first step into such a direction. It presents theoretical arguments and empirical grounds for situating the development of performing and understanding pretend play in the wider context of children's social cognitive, cultural and linguistic development more generally. Its contemporary theoretical framework is Cultural Learning theory. Pretend play is a human action form among others, and understanding pretend play is one among other forms of understanding intentional action.

The first two sets of studies provide evidence that the performance and the understanding of pretend play develop in close relation to each other and to the comprehension and cultural imitative acquisition of other action forms. The second set of studies and the third study together suggest that as in other areas of cognitive development, the understanding of pretense proceeds in a dialectical fashion: An early understanding of pretending as an intentional action form enables children to acquire pretense themselves, to engage in joint pretend play and to participate in simple forms of implicit pretense discourse. Explicit pretense discourse, supplied by the adult language community then provides children with a new representational medium to talk and think about pretense in explicit fashion –it makes explicit what used to be implicit in children's early understanding.

Of course, the present work is at most a first step toward taking the fresh look at pretense development requested by Leslie, far from providing anything like a comprehensive picture. It leaves open for future research many questions about the acquisition of pretense, especially in cross-cultural comparisons, about the exact course of the development of children's pretense

concept, and about the role of pretense and discourse about pretending in developing an understanding of mental states.

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Appendix

Appendix A. Objects pairs, actions and corresponding substrates in Study 1a

Objects	Pretense action and	Substrate	Instrumental action and	substrate
A, B	Brushing teeth*	Toothpaste	Rolling play-dough*	Play-dough
	Eating a carrot	Plate	Kicking a ball	Ball
	Stirring soup	Cardboard box	Cleaning	Piece of glass
C, D	Driving a car*	Toy street	Wiping away dirt*	Pile of dirt
	Eating a carrot	Plate	Kicking a ball	Ball
	Stirring soup	Cardboard box	Cleaning	Piece of glass
E, F, G	Writing*	Paper	Making a sound by hitting a glass*	Glass
	Eating a carrot	Plate	Kicking a ball	Ball
	Pouring from a bottle	Cup	Hammering	Pegboard

Explanation:

- Each object had assigned to it 3 pretense and 3 instrumental actions that were demonstrated with it when it was in the corresponding MIXED condition. One of these actions (the one marked with *) was demonstrated when the object was in the corresponding ONCE or REPEATED condition.

- For each object, it was systematically varied across children whether it was (a) in one of the pretense or instrumental conditions and (b) in the ONCE, REPEATED or MIXED condition.

- Half of the children received object F and the other half object G as control object. The control object was only presented with a yellow wooden block as accompanying substrate.

- For each child, 11 substrate objects were involved: three assigned to the two objects in the MIXED conditions each, one each belonging to the four objects in the ONCE and REPEATED conditions, and one (the yellow wooden block) that went with the control object.

Appendix B. Objects pairs, actions and corresponding substrates in Study 1b

Objects	Pretense action and	substrate	Instrumental action and	substrate
A, B	Eat carrot	Plate	Roll play-dough	Play-dough
E, G	Brushing teeth	Tooth paste	Hammering a nail into a pegboard	Pegboard

Appendix C. Actions and corresponding substrates in Study 1c

Pretense action and	Substrate	Instrumental action and	substrate
Writing	Paper	Hitting a glass	Glass
Pouring	Cup	Kicking a ball	ball
Eating	Plate	Cleaning	Dirt
Brushing teeth	Tooth paste	Rolling a piece of play-dough	Play-dough

Appendix D. Procedure and warm-up actions used in Study 2b

1. 1st mixed warm-up block

(1) pretend to dig a hole (with a novel object)

(2) trying to make music with a children's piano (pressing a button that does not work)

(3) pretending to brush one's teeth (with a novel object)

(4) trying to cut a piece of papers (with a malfunctioning pair of scissors)

(5) pretending to make a phone call (with a novel object)

(6) trying to open a box

2. 1st test block (pretense for half the children, trying for the other half)

3. 2nd mixed warm-up block

(1) pretending to saw a piece of wood (with a novel object)

(2) trying to cut a piece of play-dough (with a knife)

(3) pretending to wash onelsef (with a wooden block)

(4) trying to press a wooden nail into a pegboard

(5) pretending to lick ice-cream (with a novel object)

(6) trying to build a tower (with wooden blocks)

4. 2nd test block (trying when pretending was first and vice versa)

Appendix E. Procedure and warm-up actions used in Study 2c

1. Simple pretending and trying warm-up actions

    (1) pretending to dig a hole (with a novel object)

    (2) pretending to make a phone call (with the same novel object)

    (3) trying to make music with a children's piano (pressing a button that does not work)

2. 1st pretending and trying warm-up with the additional props

    (1) pretending to brush one's teeth

    (2) pretending to take a shower

    (3) trying to open a container (making then use of the pliers)

    (4) trying to open a second container (making then use of the pliers)

    (5) pretending to drink and pretending to open a bottle of juice

    (6) cutting a piece of play-dough with the pliers

    (7) pretending to cook something

3. 1st test block (pretending for half of the children, trying for the other half

4. 2nd pretending and trying warm-up with the additional props

    (1) pretending to comb one's hair

    (2) trying to open a box

    (3) pretending to wash oneself

    (4) trying to write (with a pen that still has its cap on)

5. 2nd test block (pretending when trying was first and vice versa)

Appendix F.   P-R and T-R distinction questions and models from study 2d

		Object & Action	Question
General warm-up	T-RD distinction	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?"
		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	"Die he really wash or did he only pretend to wash?"
		E pretends to take a shower: takes a colormixer, 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	"Die he only pretend to clean it or did he really clean it?"
Specific warm-up	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 colormixer	"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?"

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161 Seiten, 11 Graphiken, 21 Tabellen, 7 Anhänge, 210 Literaturangaben.

Abstract

The present work approaches different aspects of the development of performing and understanding pretend play from the perspective of Cultural Learning theory (Tomasello, 1999a;Tomasello, Kruger & Ratner, 1993).

Regarding the ontogenetic emergence of pretend play, it was hypothesized that early pretending is an essentially social action form that arises in similar ways as other action forms, through cultural imitative learning. Studies 1a -1c found evidence suggestive of this hypothesis with 18- to 26-month-olds: Children learned pretense actions on novel objects in similar ways through imitation as they learned instrumental actions with these objects. During pretense actions, however, children showed more social behaviour towards the partner, i.e. gazed (and in one study smiled) more towards her.

Regarding children's early understanding of pretending, it was hypothesized –in contrast to the 'behaving-as-if' theory of children's early pretense concept (e.g. Lillard, 1998)- that two- to three-year-old children do not only have a superficial behavioural understanding of pretense, but understand that in pretense a person intentionally acts as-if only. Studies 2a – 2c produced evidence for this hypothesis: When presented with pairs of superficially similar as-if-behaviours –pretending to do an action in one case, and trying to do that action in the other- young children differentially and systematically imitated and responded inferentially. That is, after seeing someone try to perform an action, they really performed that action, making use of novel means, if necessary. After seeing someone pretend to do that action, in contrast, they only pretended to do that action and other actions that "follow" within the pretense scenario. Study 2d showed that 3- to 6-year-olds find it very hard to solve a verbal version of this task.

Study 3, therefore, tested with a training design factors in the development from an early pretense understanding implicit in action to a later more explicit understanding with 3,5-year-olds. It was found that explicit pretense discourse, making use of "pretend that" constructions is crucial in this development.

The findings of the studies are discussed in terms of a dialectical development of pretense: An early understanding of pretending enables the acquisition of pretend play, participation in joint pretending and pretense discourse. Acquiring more complex forms of pretense discourse then in turn enables a more sophisiticated understanding of pretending.