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A Cognitive Theory of Pretense

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Abstract

Recent accounts of pretense have been underdescribed in a number of ways. In this paper, we present a much more explicit cognitive account of pretense. We begin by presenting a number of real examples of pretense in children and adults. These examples bring out several features of pretense that any adequate theory of pretense must accommodate, and we use these features to develop our theory of pretense. On our theory, pretense representations are contained in a separate workspace, a Possible World Box which is part of the basic architecture of the human mind. The representations in the Possible World Box can have the same content as beliefs. Indeed, we suggest that pretense representations are in the same representational “code” as beliefs and that the representations in the Possible World Box are processed by the same inference and UpDating mechanisms that operate over real beliefs. Our model also posits a Script Elaborator which is implicated in the embellishment that occurs in pretense. Finally, we claim that the behavior that is seen in pretend play is motivated not from a “pretend desire”, but from a real desire to act in a way that fits the description being constructed in the Possible World Box. We maintain that this account can accommodate the central features of pretense exhibited in the examples of pretense, and we argue that the alternative accounts either can’t accommodate or fail to address entirely some of the central features of pretense.

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1. Introduction

Pretend play in young children is so familiar and so natural that it's easy to overlook how remarkable and puzzling it is. The wonder of pretend play hasn't been lost on major figures in developmental psychology (e.g., Piaget 1962, Vygotsky 1967). Until recently, however, the capacity for pretense received surprisingly little attention in the cognitivist tradition. Only in the last decade has there been a sustained attempt to map out the cognitive mechanisms underlying pretend play. During this period there has been an explosion of conceptual and empirical work on pretense (e.g., Leslie 1987, 1994; Harris & Kavanaugh 1993; Harris 1991, 1994, 1995; Perner, et al. 1994; Currie 1995a, 1997; Gordon & Barker 1994; Lillard 1993, 1994). Though controversy abounds in this area, it is widely agreed that a theory which succeeds in explaining the capacity for pretense will shed light on the mechanisms that underlie many other cognitive capacities as well.

Much of the recent discussion of pretend play can be traced to Alan Leslie's attempt to give a cognitive account of pretense (Leslie 1987). Leslie maintains that there are important connections between the child's capacity for pretend play and the child's capacity for understanding other minds or "mind reading". Since children pretend and seem to understand pretense in others fully two years before they succeed on standard versions of the false belief task,¹ Leslie maintains that pretend play constitutes a strikingly early example of mind reading skills. (Leslie 1978, 1994) The selective impairments of autistic children, who show deficits both in pretend play and in their ability to solve mind reading problems like the false belief task, provides one important piece of evidence for the connection between mind reading and pretend play. (Baron-Cohen 1995).

¹ In the classic false belief test, Wimmer and Perner (1983) had children watch a puppet show in which the puppet protagonist, Maxi, puts chocolate in a box and goes out to play. While Maxi is out, his puppet mother moves the chocolate to the cupboard. The children are asked where Maxi will look for the chocolate. Until about the age of 4, children fail this and similar tasks.

Although most researchers agree that there is an important connection between pretend play and mind reading, there are quite fundamental disagreements about the mental mechanisms that make mind reading possible, and pretense has played an important role in these disputes. One of the most heated debates is between advocates of the theory-theory and advocates of simulation theory.² Writers on both sides maintain that their theory provides a better explanation of mind reading phenomena and of the deficits seen in autism (e.g., Currie 1996, Carruthers 1996). As we'll see, simulationists have also argued that simulation theory provides the best account of the processes underlying pretend play (Gordon & Barker 1994). The stakes here are high, since if the simulation account of pretend play is right, it would mean that the basic mechanisms posited by simulation theorists have to be in place. And if that is true it might lend considerable plausibility to simulation theorists' claim that mind reading also depends on a process of simulation (Gordon & Barker 1994).

The capacity for pretense has also been awarded enormous importance in the recent literature for reasons that are quite distinct from the connection between pretense and mind reading. Simulation theorists have argued that the capacity for pretense is implicated in a wide variety of important cognitive capacities including counterfactual reasoning (Goldman 1992), conditional planning (Goldman 1992, Harris 1993), empathy (Goldman 1992, Currie 1995b, Sorensen 1997), and visual imagery (Currie 1995d). Simulation theorists have also argued that the capacity for pretense underlies imagination more generally (Currie 1995a,b). For instance, our imaginative encounters with fictions have been tied to pretend play or make-believe (Currie 1990, 1995a,b; Walton 1990, 1997), and Currie (1995c) has suggested that these same imaginative mechanisms are also used in moral understanding. Although much of this work has been pursued under the auspices of off-line-simulation theory (Gordon 1986; Goldman 1989, 1992), one needn't be sympathetic with off-line-simulation theory to think that the capacity for pretense is crucial for many of the above capacities. Indeed, though we have been frequent critics of off-line-simulation theory (Stich & Nichols 1992, 1995, 1997; Nichols

² For a good overview of this debate, see the essays in Davies and Stone (1995a & 1995b) and Carruthers and Smith (1996).

et al. 1995, Nichols et al. 1996), we think it's quite plausible that many of these capacities are intimately connected with the capacity for pretense. But before such proposals can be elaborated and defended, it's essential to have a plausible theory of the mental mechanisms that underlie the capacity for pretense itself.

Our goal in this paper is to offer such a theory and to compare it with other theories that have been proposed in the recent literature. The theory we will defend is a highly eclectic one which borrows ideas from writers on both sides of the debate between theory-theorists and simulation theorists. We don't think there is any principled way to classify our theory as falling into one camp or the other. Indeed, in another paper (Stich & Nichols 1997) we have argued that there *is* no principled division between these two "camps" and that it is high time that the labels "theory-theory" and "simulation theory" were retired. Though we won't argue the point further here, we think the theory of pretense we will defend buttresses the case for this conclusion by making it clear that there are plausible theories for which neither label is appropriate.

It is our contention that all the other theories of pretense that have been proposed in the recent literature are under-described in important ways, and in particular that all of them tell us far too little about the sort of mental architecture (or cognitive "boxology") that the theory is presupposing. As a result, as we'll argue in Section 4, it is often difficult or impossible to know exactly how these theories would explain one or another example of pretense, or how they would account for various aspects of the capacity to pretend. In an effort to avoid these problems, the theory we'll set out will be much more explicit about the mental architecture that the theory assumes, and about various other matters on which competing theories are silent. Though this approach has obvious benefits, there is a downside as well. For at a number of junctures there are several quite different paths that might be followed and, for the moment at least, there is little empirical evidence to indicate which is preferable. At some of these junctures we'll pause to consider a variety of options. More often we'll just make our best guess without stopping to explore the alternatives. Inevitably, some of these guesses will turn out to be wrong, and so too will our theory. But that doesn't really worry us, since it's our view

that the best way to make progress in this area is to develop detailed theories that can be refuted and then repaired as evidence accumulates, and not to rest content with sketchier theories which are harder to compare with the growing body of evidence. Being false, as the Logical Positivists often emphasized, is far from the worst defect that a theory can have.

Here's how we propose to proceed. In the Section that follows we will describe a number of examples of children's pretense drawn from various sources; we'll also recount some examples of adult pretense from our own studies. Then, in Section 3, we'll draw attention to some of the features of these episodes of pretense – features which, we maintain, a fully adequate theory of pretense must be able to explain. The list of features we assemble will thus serve as a sort of checklist against which competing theories can be compared. In Section 4, we will set out our theory of the cognitive mechanisms that underlie pretense, and show how the theory can account for the features on the checklist in Section 3. Finally, in Section 5, we'll sketch some of the other theories of pretense that have been offered and argue that our theory does a better job at explaining the facts.

2. Some Examples of Pretense

Before setting out our theory, it will be useful to offer several examples of the sort of episodes of pretending that we want our theory to explain. A familiar armchair strategy here is simply to make up some examples. But for a variety of reasons, we're not inclined to take that route. We worry that important features of pretense might be neglected if we limit ourselves to examples of our own invention. By looking at a number of genuine examples of pretense, we hope to get a much better idea of the richness and the range of the phenomena to be explained.

2.1. Pretense in children

Much of the literature on pretense is guided by two examples from the work of Alan Leslie. We will recount these examples below, because we too think that Leslie's examples are important to understanding pretense. In addition to the examples from Leslie, we will include two more examples of pretend play that haven't been discussed in the literature, but are genuine instances of spontaneous pretend play in children.

2.1.1. Pretending that a banana is a telephone

"How is it possible for a child to think about a banana as if it were a telephone...?" With this question Leslie (1987, p. 412) ignited the recent explosion of interest in pretense in cognitive psychology and simultaneously provided what is perhaps the most widely discussed illustration of pretense in the literature. There are really two different banana-telephone scenarios that often get discussed together. In one scenario, an individual child pretends that the banana is a telephone. For instance, a child might pick up a banana, hold it up to his ear and mouth and say, "Hi. How are you? [Brief pause.] I'm fine. OK. Bye." This kind of pretense will no doubt be familiar to parents of young children. Children also engage in pretense with others. For instance, a child and his mother might pretend together that a banana is a telephone. In an episode of this sort the mother may pass the banana to the child, saying, "It's for you." From a young age, children will play along in these pretend games, taking the banana and saying "Hello" into it. These scenarios get treated together by Leslie since he thinks that any child who can pretend that the banana is a telephone can also understand pretense in others. For our purposes, we want to maintain a clear distinction between individual pretense and group pretense.³

³ Leslie has never used the banana / telephone scenario in his experimental work though he observed a number of spontaneous examples of the scenario in his own children. (Personal communication.)

2.1.2. Leslie's tea party

Another widely cited example of pretense also comes from Leslie's work. In a set of experiments, Leslie had children participate in a pretend tea party. Leslie describes the scenario as follows: "The child is encouraged to 'fill' two toy cups with 'juice' or 'tea' or whatever the child designated the pretend contents of the bottle to be. The experimenter then says, 'Watch this!', picks up one of the cups, turns it upside down, shakes it for a second, then replaces it alongside the other cup. The child is then asked to point at the 'full cup' and at the 'empty cup.' (Both cups are, of course, really empty throughout.)" (Leslie 1994, 223). When asked to point at the 'empty cup', two-year olds pointed to the cup that had been turned upside (Leslie 1994).

2.1.3. Monsters and parents

Our next example of pretend play in children comes from the CHILDES (Children's Language Data Exchange System) database (MacWhinney & Snow 1990). Though this database was initially established to study children's language it is an invaluable resource for studying a number of features of child psychology (see, e.g., Bartsch & Wellman 1995). In the following protocol, Val is 4 years and 7 months, and Abe is 4 years and 9 months (Garvey 1979).

VAL: Pretend we're on the bus ok?

(VAL gets on, then off, gets on climbs on back.)

VAL: Enough room for two of us right?

ABE: Right.

VAL: You say hold on to me.

(ABE drives seriously while VAL talks. VAL puts arms around ABE to keep from falling off.)

VAL: Pretend we passed one and pretend there's a monster coming ok?...

ABE: No let's don't pretend that.

ABE: Cause it's too scary that's why.

VAL: Oh I don't think so....

VAL: Pretend ... we can play mother and father.

ABE: Ok and this was our car.

VAL: Ok. You're going to work.

(VAL gets off car as part of game; ABE follows her.)

VAL: Hey look look. We got this [a lunch box]; we got work tools.

(VAL speaks in high enthusiastic voice; VAL presents lunch box to ABE who seems to accept it as part of game; ABE takes tools to car VAL goes to stove, opens oven...)

VAL: We could cook this [shoes] for food.

(VAL holds up shoes to show ABE.)

(VAL puts shoes in oven, turns knobs, then takes them out and shows ABE.)

VAL: For food. Do you like chicken?

2.1.4. Dead cat

The final example of childhood pretense that we'll recount comes from a set of protocols of spontaneous pretense in children that was assembled by Rosalind Gould (1972). Gould reports that one three-year old boy on a jungle gym said, "I'm a pussycat. Meow, meow." He then came down from the jungle gym and lay on the ground, saying, "I'm dead. I'm a dead pussycat... I got shooted." (Gould 1972, p. 212).

2.2. Pretense in adults

There are a number of limitations to the available examples of pretending in children. However, since we want to develop a theory of pretense that can accommodate adult pretense as well as pretense in children, there's no need to restrict ourselves to examples of pretend episodes in children. Pretend episodes in adults will work just as well. As it happens, there are surprisingly few examples of adult pretense described in the

psychological literature. So we set out to collect our own. Our goal wasn't to design an experiment with a clever manipulation, and the kind of data we have doesn't admit of any sort of statistical analysis. Rather, we merely wanted to collect some genuine examples of pretense in adults.

10 college students participated in our little study. We asked individuals and groups of two to carry out a variety of scenarios. Each scenario was described on a separate sheet of paper. At the beginning of the session, participants were told to consult the written description and act out each scenario. For the individual pretend scenarios, the descriptions were as follows:

"Pretend that the banana (on the table) is a telephone."

"Pretend that you're home alone at night and you hear a suspicious noise in the basement."

"Pretend that you're a train."

"Pretend that you're a dead cat."

"Pretend that you're sleeping."

"Pretend that you're baking a cake."

For group pretend scenarios, the descriptions were as follows:

"Pretend you are in a fast food restaurant. Decide who will be the cashier and who will be the customer."

"Pretend you are in a fancy restaurant. Decide who will be the server and who will be the diner."

Eight of the subjects participated in the group pretend scenarios. Six of the subjects participated in the individual pretend scenarios. The order of the scenarios was always the same. Subjects were told that they could use whatever props were in the room. The scenarios were carried out in a lab room that had a telephone in it, along with typical office supplies. We supplied a banana for the banana/telephone scenario, and we provided the subjects with play money for the fast food restaurant scenario.

After subjects carried out the scenarios, we had an informal oral interview with them. We asked questions about what the subjects remembered from the scenarios, why

they behaved the way they did, and about the possible confusion between reality and pretense. For the group pretense participants, the interview was conducted with both participants at the same time. The four subjects who participated in both individual and group pretense were interviewed about their individual pretense with the other participant in the room. The remaining two individual pretense participants were interviewed alone. All sessions and interviews were videotaped, and the participants knew that the sessions were being videotaped. The videotapes were later reviewed to produce the transcripts.

In the sections to follow, we'll draw from the transcripts where appropriate. But before we conclude this section, we want to include two extended protocols, from which we will draw throughout the rest of the paper.

2.2.1. Fancy restaurant scenario, episode 1

The participants were two female college students.

B gets pencils and pens for silverware. Gets a piece of paper for napkin

A: Hi, how are you doing? (Hands B a syllabus as the 'menu'.)

B: Hi. Good how are you?

A: I'm fine. Can I get you something to drink to start?

B: Yeah, can I just have um, just water to start with. I'm waiting on someone.

So.... He'll be a second.

A: Would you like to see a wine list or do you wanna wait until your...

B: No, that's fine.

A: You sure? OK. You want me to just come back in a few minutes?

B: (Looking at menu) Yeah. Thank you.

A: Ok I'll get that water for you.

A: (Gets cup from table, pretends to fill cup with water. Brings cup to B.) Still looking? Do you still want a few more minutes?

B: No, I think I'm ready to order. (Pretends to be reading from menu.) I'll have the chicken pasta without any pepper on it. Is there pepper in the sauce?

A: Yeah. I can do it without pepper that's fine. (Starts to write on pad, "chicken pasta".)

B: I'm allergic to pepper. I'll have the house salad with ranch dressing.

A: Oh, we don't have ranch. We have a vinaigrette.

B: Okay, yeah that's fine. And he should be here soon, but go ahead and bring him a house salad too. I'll wait till he gets here. I'll let him order. I don't want to order for him.

A: Do you still want me to bring the salad out?

B: Yeah That'd be fine.

A: Okay. I'll be back in a few minutes

2.2.2. Fancy restaurant scenario, episode 2

The participants were two male college students.

D: Pardon me I'd like to give you our specials for this evening. We have a grouper with a side portion of potato. As well as some cranberry juice poured on top as well as a great deal of greenery, I'm not sure what that is. Very pretty.

C: All right, that sounds wonderful. Let's see I had a question about the menu. The lobster tail is that pan seared or is it deep fried? Because I've got bad blood pressure I gotta watch it.

D: It is deep fried.

C: What about the lamb chops.

D: The lamb chops are exquisite.

C: Give me the lamb chops. Medium rare.

D: And for the woman.

C: I'll order for her. Give her the honey glazed chicken. And as a starter, let's see... (Pretends to pore over menu.)

D: I recommend the portabello mushrooms simmered in black oil.

C: I think I'm looking more at the herb crusted goat cheese. Oh, also, we were looking through the wine list. Um, which would you recommend out of these two Merlots?

D: The one from France.

C: The McGuigan brothers?

D: No, that would be the Scottish one. It's a Merlot from Champagne.

C: Oh, I've heard that's great. We'll have that one.

D: Certainly. (Pretends to leave.)

D: (Returns) And the food for the lady, for yourself . (Pretends to put food on table.)

There's your wine sir. (Pretends to pour into pretend glass.)

(C pretends to swirl the wine in glass, sniff, drink.)

D (Pretending to pour again.): Go ahead and have some more it's really good.

Can I get you anything else?

C: Can you get me a sharper knife for the lamb chops.

D: Certainly. Anything else?

C: No.

D: All right. (Leaves)

D: (Returns with arms outstretched and pretends to be carrying a large object, pretends to hand large object to C.) Here's your knife sir. It's the biggest we have. I'm sure you'll find it's quite sharp. It is a two handed serrated blade sword of Japanese descent. Just be careful, we had a gentleman previously chopped...

C: (Pretending to look over the object, incredulous.) Did you take this off the wall?

D: It's the chef's. He's a Japanese man.

C: This is very ... pretty.

D: Well, it is specifically for chopping. You requested a sharp knife.

C: Well, thank you. (Pretends to lay down object on table.)

D: Can I get you anything else? Some bread?

C: Maybe a little freshly ground pepper?

D: Certainly. (Leaves)

D: (Returns, pretends to put peppercorns on table, pretends to chop them up with the knife.) Let me chop them up here.

C: Uh, ground. Do you have a grinder?

D: Well I really can't. I'll just, I'll just... (Puts foot up on table, pretends to crush the peppercorns with his heel.) Excuse me. I know that's a little crass. (Pretends to put the pepper on C's food.) Is that enough?

C: I think that's going to be about it.

D: Certainly. For the lady? Would she like some too?

C: Do you think I could talk to your manager?

D: (Pretends to be chopping more peppercorns.) Uh sure. (Turns, then whips around pretending to be waving the knife.) Oh, I've cut her head off. I'm sorry. That's a sharp knife. I'll definitely need the manager for this one. Oh, she's bleeding profusely. One moment please.

C laughs and indicates that he's finished with the pretense.

3. Some Features of Pretense

In this section we want to draw attention to a number of features that can be found in the examples of pretense we've recounted. Since they can be found in many other cases as well, they are features which a complete theory of pretense might reasonably be expected to explain. The theory that we'll offer in the following section won't have satisfying explanations for *all* the features on our list, though as we'll argue in Section 5, it can handle more of them than any of the other theories that have been proposed.

3.1. Getting pretense started: The initial premise

Typical episodes of pretense begin with an initial premise, an assumption about what is to be pretended. In Leslie's tea party experiments, the assumption is that the child and the experimenter are going to have a tea party. In our fancy restaurant scenario, the assumption is that one of the subjects is a diner in a fancy restaurant, and the other is the server. In the example from Gould, the assumption is that the boy is a pussycat. To get the pretense going the pretender must either produce the initial premise (if she initiates the pretense) or (if someone else initiates the pretense) she must figure out what

the initial premise is and decide whether or not she is going to proceed with the pretense. If the pretender decides that she will proceed, her cognitive system must start generating thoughts and actions that would be appropriate if the pretense premise were true. People don't always agree to accept the premise of a pretense, of course. In the example from CHILDES, Val proposes that they pretend there is a monster coming, but Abe refuses, because "it's too scary."

3.2. Inferential elaboration

Inference often plays a crucial role in filling out the details of what is happening in pretense. From the initial premise along with her own current perceptions, her background knowledge, her memory of what has already happened in the episode, and no doubt from various other sources as well, the pretender is able to draw inferences about what is going on in the pretense. In Leslie's tea party experiment, for example, the child is asked which cup is empty after the experimenter has pretended to fill up both cups and then turned one upside down. To answer correctly, the child must be able to infer that the cup which was turned upside down is empty, and that the other one isn't, although of course in reality both cups are empty and have been throughout the episode. In one episode of our fast food restaurant scenario, the subject who was pretending to be the cashier informed the "customer" that his order cost \$4.85. The customer gave the cashier \$20.00 (in play money), and the cashier gave him \$15.15 change, saying "Out of \$20; that's \$15.15." In order to provide the correct change, the cashier must perform a simple mathematical inference. An adequate theory of pretense should provide an account of the cognitive processes that underlie these inferential elaborations.

3.3. Non-inferential elaboration (embellishment)

In addition to inferential elaboration, children and adults elaborate the pretend scenarios in ways that aren't inferential at all. In some instances, this is a matter of filling out the story provided by a scenario. For instance, in the protocol from CHILDES, Val, in playing the mother, pretends to cook chicken, using some shoes as props. However,

this elaboration is not logically or causally *entailed* by the pretend scenario. Similarly, in the first fancy restaurant episode we reported, the diner elects to have the chicken pasta for dinner. Some of these elaborations cohere with the decisions and choices that the person pretending would actually make. For instance, in the post-pretense interview, the diner in the first fancy restaurant episode said that she really would refuse a wine list because she doesn't like to run the risk of being asked for identification to prove that she's old enough to drink. In other cases, the elaborations depart from what the person would actually decide. The same subject claimed (in the pretense) that she was allergic to pepper, but in the post-pretense interview, she said that she just made this up. In another version of the fancy restaurant scenario, the diner behaved quite rudely, but in the post-pretense interview, he claimed that he would never behave that way in a real restaurant. More dramatically, in the second fancy restaurant episode we reported, the waiter pretended to decapitate one of the diners. This subject assured us in post-pretense interviews that in real life, he would never be so careless with a sword. A theory of pretense needs to be able to accommodate these kinds of elaborations as well as the more sober inferential elaborations.

3.4. Production of appropriate pretend behavior.

Perhaps the most obvious fact about pretense is that pretenders actually *do* things -- they engage in actions that are appropriate to the pretense. The child in Leslie's famous example takes the banana from his mother, holds it in the way one might hold a telephone, and talks into it. The adults who participated in our study did the same. In the fancy restaurant scenario, when the "diner" subject orders a meal some "waiters" wiggle one hand in a stylized imitation of writing, while holding the other hand as though it grasped a pad. Other waiters use a real pad and actually write down what the diner is ordering. The boy in the dead cat pretense that Gould observed lies on the ground, as a dead cat might, though his accompanying verbal behavior is not what one would expect from a dead cat, or from a live one. Adult subjects do much the same, though they are quieter. One adult in our study embellished the dead cat pretense by holding her arms up rigidly to imitate the rigidity of the cat's body after rigor mortis has set in. A theory of

pretense must explain how the pretenders determine what behavior to engage in during an episode of pretense. How do they know that they should walk around making jerky movements and saying “Chugga chugga, choo choo” when pretending to be a train, and lie still when pretending to be a dead cat, rather than vice versa? Equally important, an adequate theory of pretense must explain why the pretender does anything at all. What *motivation* does she have for engaging in these often odd behaviors?

3.5. Cognitive Quarantine: The Limited effects of pretense on the later cognitive state of the pretender.

Episodes of pretense can last varying lengths of time. When the episode is over, the pretender typically resumes her non-pretend activities, and the events that occurred in the context of the pretense have only a quite limited effect on the post-pretense cognitive state of the pretender. Perhaps the most obvious way in which the effects of the pretense are limited is that pretenders do not believe that pretended events, those which occurred only in the context of the pretense, really happened. A child who pretends to talk to Daddy on the banana / telephone does not end up believing that he really talked to Daddy. Moreover, as Leslie emphasizes, (1987), even very young children do not come to believe that bananas sometimes *really are* telephones. Nor, of course, do adults.⁴ Moreover, even during the course of the pretense itself, what the pretender really believes is typically kept quite distinct from what she believes to be the case in the context of the pretense episode. Our adult subjects did not really believe that they were in a restaurant, or that they were baking a cake, or that they were dead cats. For example, we asked “At any time did it ever seem like you were really in a restaurant? Did you ever get confused and think that you were really in a restaurant?”; our subjects uniformly said ‘no’. However, the pretender’s belief system is not entirely isolated from the contents of the pretense. After an episode of pretense people typically have quite accurate beliefs about what went on in the pretense episode; they remember what they pretended to be the case.

⁴ In our study of adult pretense we asked subjects who had pretended that a banana was a telephone (i) “Have you ever seen a real telephone that looked like a banana?” and (ii) “Have you ever seen a telephone that was made out of a real banana?” They all answered “No” to both questions.

Moreover, Gopnik & Slaughter (1991) reported that children find it much easier to recall what was pretended than to recall their own earlier false beliefs. Indeed, children exhibit the capacity to recall what was pretended a year *before* they can report their own earlier false beliefs. In Gopnik & Slaughter's experiment, all the children (3 and 4 year olds) performed at ceiling on remembering past pretenses, but most of the younger children (3 year olds) were unable to attribute false beliefs to themselves. A theory of pretense should be able to explain how the pretender's cognitive system succeeds in keeping what is really believed separate from what is pretended. It should also explain how the pretender can have accurate beliefs about what is being pretended.

While the contents of pretense episodes usually do not affect what the pretender really believes, pretense can often have a significant effect on other mental states. In particular, pretense can apparently have powerful emotional effects. In the CHILDES protocol, Abe seems to expect to be scared if they pretend that there is a monster coming. But there's little serious research on emotions in pretend play. However, as we'll explain in section 4, we think that our theory of pretense is also a theory of imagination. And there is plenty of research demonstrating that imagination can have a significant effect on emotions. Indeed, a standard way to elicit emotions in the laboratory is by asking the subjects to imagine something that will produce predictable affective responses (Izard 1991, 172). Imagining that something dangerous is happening can lead subjects to feel real fear, or something very like it. Imagining that one is having a heated conversation with an annoying acquaintance can lead to affect resembling real anger. Most of the research here depends on subjects' reporting their affect. However, there is a growing body of work showing physiological effects of imagining. Not surprisingly, there is evidence that imagining erotic encounters can lead to real sexual arousal, as evidenced by both self-report and physiological changes (e.g., Smith and Over 1987, 1990; Mosher et al. 1989). More recently, David Buss found that when males imagined their partner having sex with someone else, they showed marked physiological changes, including a significant increase in heart rate (Buss et al. 1992). On our view, the link between the imagination and affect raises lots of interesting questions to which neither we nor anyone else has answers. For instance, we don't know whether the imagination always has at

least weak links to the emotion system, no matter what the imagination is being used for; and we don't know whether the affective consequences of *imagining that p* always resemble the affective consequences of *believing that p*. We suspect that developing a detailed account of pretense will help clarify these sorts of issues.

4. A Theory About the Cognitive Mechanisms Underlying Pretense

4.1. Two framework assumptions.

In setting out our account of the cognitive mechanisms underlying pretense, we'll begin by sketching a pair of quite basic assumptions about the mind. Both assumptions are very familiar and we suspect that both of them are shared by most other people working in this area, though more often than not the assumptions are left tacit. We think it is important to be very explicit about them, since keeping the premises in mind forces us to be clear about many other details of our theory, details which other writers sometimes leave unspecified. The assumptions will serve as a framework upon which we will build as we develop our theory of pretense.

We'll call the first of our assumptions *the basic architecture assumption*. What it claims is that a well known commonsense account of the architecture of the cognitive mind is largely correct, though it is far from complete. This account of cognitive architecture, which has been widely adopted both in cognitive science and in philosophy, maintains that in normal humans, and probably in other organisms as well, the mind contains two quite different kinds of representational states, beliefs and desires. These two kinds of states differ "functionally" (as philosophers sometimes say) because they are caused in different ways and have different patterns of interaction with other components of the mind. Some beliefs are caused fairly directly by perception; others are derived from pre-existing beliefs via processes of deductive and non-deductive inference. Some desires (like the desire to get something to drink or the desire to get something to eat) are caused by systems that monitor various bodily states. Other desires, sometimes called "instrumental desires" or "sub-goals," are generated by a process of practical reasoning

that has access to beliefs and to pre-existing desires. The practical reasoning system must do more than merely generate sub-goals. It must also determine which structure of goals and sub-goals are to be acted upon at any time. Once made, that decision is passed on to various action controlling systems whose job it is to sequence and coordinate the behaviors necessary to carry out the decision. Figure 1 is a “boxological” rendition of the basic architecture assumption. We find diagrams like this to be very helpful in comparing and clarifying theories about mental mechanisms, and we’ll make frequent use of them in this paper. It is important, however, that the diagrams not be misinterpreted. Positing a “box” in which a certain category of mental states are located is simply a way of depicting the fact that those states share an important cluster of causal properties that are not shared by other types of states in the system. There is no suggestion that all the states in the box share a spatial location in the brain. Nor does it follow that there can’t be significant and systematic differences among the states within a box. When it becomes important to emphasize such differences, we use boxes within boxes or other obvious notational devices. All of this applies as well to processing mechanisms, like the inference mechanism and the practical reasoning mechanism, which we distinguish by using hexagonal boxes.

