



Young children understand multiple pretend identities in their object play

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This set of studies examined the ability of 3-year-olds to conceptualize multiple pretend identities with objects. Rather than relying on verbal response measures, as has been done in the past, children's creative and inferential pretend actions were used as indicators of their understanding. The common structure to all four studies was that children were confronted with one pretend scenario, moved to a second pretend scenario and then back again to the first. Children proficiently tailored their pretence to an object whose pretend identity changed between scenarios despite being less able to name each identity. Thus, using an inferential action methodology, these studies provide early and particularly convincing evidence that children can track the multiple pretend identities of objects.

Young children begin to pretend during their second year. One of the most impressive components of this activity involves object substitution in which the child plays with an item as though it were another. Interestingly, both pretend play in general and object substitution in particular can be seen formally as raising a type of perspective problem: when pretending, the child must act according to two incompatible propositions or representations (e.g. 'this is a wooden block' and 'this is an apple') that relate to the same object or situation (see Leslie, 1987, 1988). Structurally the challenge is similar to that when confronted with a contrast between visual perspectives or appearances and reality (e.g. see Schwebel, Rosen, & Singer, 1999). In these situations, children must understand, for instance, that while they see a picture of an animal standing on its feet, the person opposite sees it lying on its back, or that while an object may in appearance look like a rock it is actually a sponge (Flavell, Everett, Croft, & Flavell, 1981; Flavell, Flavell, & Green, 1983). This similarity also extends to children's grasp of subjective or false beliefs and reality in which they must contemplate, for example, that while an object is in one location, another person may wrongly believe it to be in another (Wimmer & Perner, 1983). Relative to these cases, however, perspective problems in pretence may be easier for young children to understand since the proposition encoding the pretence bears no truth relation to the real world. That is, the child does not have to

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consider whether or not the block really is an apple as well as a piece of wood (Perner, Baker, & Hutton, 1994). In addition, it has been proposed that pretend scenarios may be understood as a person simply acting in different worlds, one real and one pretend (Perner, Brandl, & Garnham, 2003). Nevertheless, the propositions 'this is a block' and 'this is an apple' can only be made compatible by relativizing them to specific contexts or perspectives such that *in reality* the block is really a piece of wood but *in the pretend game* it is an apple; the hallmark of a perspective problem (Perner, Stummer, Sprung, & Doherty, 2002; Perner *et al.*, 2003).

At the very least, children engaged in pretence must 'quarantine' or maintain two distinct descriptions of the same object (real vs. pretend or pretend vs. pretend) in order to pretend appropriately. In fact, young children do implicitly demonstrate an ability to separate the real and pretend identities of objects since they, for instance, consistently stop short of really biting into pretend apples (Leslie, 1987). But beyond this implicit ability to quarantine fact from fiction, what do young pretenders understand of the relation between multiple object identities or perspectives in pretence?

First, regarding real versus pretend perspective contrasts, young children appear to have a relatively solid grasp of the distinction between real and imaginary objects (see e.g. Wellman & Estes, 1986; Woolley, 1995, for a review). Several studies have found that 3-year-old children grasp an explicit pretend-reality distinction while failing the analogous appearance-reality distinction: they correctly state, for example, that although an experimenter is really playing with a piece of string, she is pretending it is a snake, or although someone is really playing with a spoon, he is pretending it is a telephone (Abelev & Markman, 2006; Flavell, Flavell, & Green, 1987; Lillard & Flavell, 1992). However, children are still prone to some fact-fiction confusions until middle childhood (see Bouchier & Davis, 2002, for a review) and other studies have produced more mixed results: Frye, Zelazo, and Palfai (1995, Exp. 1) found little competence on the pretence-reality distinction in younger 3-year-olds (in fact as little as in appearance-reality and false belief tasks), and Rakoczy, Tomasello, and Striano (2006, Exp. 2) also failed to find differences between pretend-reality and appearance-reality contrasts in young 3-year-olds. Similarly, in a study by Amsel, Bobadilla, Coch, and Remy (1996) children pretended themselves and were then asked to identify the real and pretend identities of objects that they had played with. While 4-year-olds were adept at indicating both identities from a selection of objects on a table, 3-year-olds were able to do so correctly on only around 20% of the cases.

With respect to contrasts between multiple pretence perspectives, older preschool children have been found able to conceptualize and talk about multiple, distinct fictional worlds (Skolnick & Bloom, 2006). However, 2-year-olds have been found able to track different fictional perspectives on objects specifically. For instance, they can pretend sequentially that an object such as a stick is a spoon at time one and a toothbrush at time two (Harris & Kavanaugh, 1993, Exp. 3). But this finding is difficult to interpret: Did children track and relate two pretend identities to the object simultaneously, or might they simply have forgotten at time two about the identity of the object at time one? What is needed here are procedures that demonstrate an ability to identify both pretend object identities consecutively (analogous to the pretend-reality distinction), or to switch back and forth between different pretend perspectives.

Two lines of research have used such procedures. First, when contrasting several people's simultaneous but different pretence stipulations, Bruell and Woolley (1998) found that both 3-year-olds and 4-year-olds could correctly state that one actor was pretending an object was, for example, a car while the other was pretending it was

a horse. Along similar lines, Hickling, Wellman, and Gottfried (1997) found that children of the same age understood that, although they were pretending that the cup contained chocolate milk, an absent experimenter would continue to think it contained pretend orange juice as it had previously. They also performed better on this task than on a false belief task. However, other research suggests a somewhat more mixed picture: One study failed to find above chance competence in 3-year-olds (Kalish, Weissman, & Bernstein, 2000, Exp. 1) and another failed to find superior competence on the pretence task compared to a structurally analogous false belief task in children of the same age (see Berguno & Bowler, 2004, Exp. 1).

A related line of research tested children's understanding of multiple pretend perspectives in their own pretence over time. In a study by Gopnik and Slaughter (1991), 3-year-old children were instructed to pretend first that an object was, for example, a spoon and then that it was a magic wand. They remembered well what they had originally pretended with the object (i.e. that it was a spoon), thus indicating an ability to keep present and past pretend object status in mind, and this result has since been replicated (Kalish *et al.*, 2000, Exp. 3). In a slightly more complex procedure, however, 3-year-olds, but not 4-year-olds indicated some confusion: they were asked after two sequential pretence episodes with an object what they had first pretended and children performed rather poorly (with only 35% success on their ability to recall the original pretend identity, Amsel *et al.*, 1996).

Against the background of this mixed pattern of results with 3-year-olds, it is interesting that most studies have used only verbal response measures. In particular, no studies have yet looked at young children's understanding of multiple pretence identities as indicated through their own inferential pretend actions. This is important because it can often be difficult to distinguish pretence proper (e.g. the child pretends to drink) from what are only apparently pretend actions (e.g. the child raises a replica cup to his or her mouth). Potential interpretive problems may arise, firstly, when children supposedly pretend with objects whose physical affordances render certain play actions obvious or more attractive than others (Baron-Cohen, 1990). Secondly, it has been noted that imitation of a pretence demonstration may not entail any comprehension of the action as non-literal (Harris & Kavanaugh, 1993) or any mental representation of what is being pretended (Jarrold, 2003; McDonough, Stahmer, Schreibman, & Thomson, 1997). Lastly, it has been suggested that instructing children to pretend, for example, by asking them to 'pretend to give teddy a drink', may encourage them to make 'intelligent guesses' about what is required of them, such that their responses might involve no pretend component at all (Baron-Cohen, 1990; Charman & Baron-Cohen, 1997). Thus, in order to distinguish pretence proper from only seemingly pretend actions, researchers have for the most part adopted one of two strategies. The first has been to look at generativity in children's pretence, that is, their ability to *creatively invent* their own pretend themes, identities, and actions (see e.g. Boucher & Lewis, 1990; Jarrold, Boucher, & Smith, 1996; Lewis & Boucher, 1988). The second approach has been to examine inferentiality in children's pretence, that is, their ability to *creatively extend* or *elaborate* on the preceding actions or verbal stipulations of their play partners. For instance, children as young as 2 years of age may, after an experimenter pretends to spill liquid on a table, pretend to wipe it up at the appropriate spot or comment that the table is 'wet'; when she pretends to pour into a cup, they may go on to pretend to drink from it or call it 'full' (see e.g. Harris & Kavanaugh, 1993; Harris, Kavanaugh, & Meredith, 1994; Rakoczy & Tomasello, 2006; Rakoczy, Tomasello, & Striano, 2004; Walker-Andrews & Harris, 1993; Walker-Andrews & Kahana-Kalman, 1999).

Importantly, the inferential actions elicited in studies such as these can be of a relatively complex structure, for example, pretending to wipe up tea that a partner has pretended to spill, or of a relatively simple structure such as generalizing a feeding action from oneself to an external target like a doll. The key criterion for being classed as inferential is that they cannot be explained in terms of motor mimicry (such that, for instance, the partner pretends to feed a doll and then the child does the same) or the inappropriate application of familiar action schemata to new objects (for similar concerns regarding play in non-human primates see Gomez & Martin-Andrade, 2002, 2005). In this sense, they indicate an active grasp of the pretence stipulations that define the game. Regarding such response measures, an interesting question in the present context is whether children can demonstrate an understanding of multiple pretence object identities through their inferential pretend actions.

In summary, pretend play, and particularly object substitution may be seen as posing a perspective problem: pretence presupposes some implicit pretend-reality distinction (otherwise pretending children would be considered delusional) and this implicit understanding is evident in the ability of 2-year-olds to engage in joint inferential pretence. Also, in this type of inferential pretending, 2-year-olds appear to grasp some implicit distinction between different pretend perspectives: they pretend with one object that it is an A at time one and that it is a B at time two (Harris & Kavanaugh, 1993, Exp. 3). Investigations into children's ability to coordinate multiple perspectives in pretence beyond such implicit perspective tracking abilities have revealed clear competence in 4-year-olds but somewhat more mixed findings in 3-year-olds. Furthermore, these studies have for the most part used purely verbal measures, and no study so far has documented children's ability to coordinate multiple pretence perspectives by eliciting inferential actions (analogous to the 2-year-olds in Harris & Kavanaugh, 1993) in a paradigm that involves switching between pretence scenarios.

In the present studies, therefore, we followed up on these existing lines of research in order to shed more light on the ability of 3-year-olds to track and coordinate multiple pretence perspectives. First, we employed an inferential action methodology as used by Harris, Kavanaugh, and colleagues. But rather than having children pretend inferentially in two sequential episodes, children were required to switch between two parallel pretence scenarios they had to keep in mind, and were required to act inferentially in each context. On the one hand, such inferential and systematic pretence acts are arguably the most convincing indicators of true pretence competence. On the other hand, however, action measures might well tap more precocious abilities than verbal ones, as has been documented in other areas of development (see Clements & Perner, 1994; Goldin-Meadow, 2003), as well as in pretence specifically (see Rakoczy *et al.*, 2006, Study 1). An additional advantage of using this kind of measure was that it allowed us to test younger children (3;0 years) than in previous studies and, furthermore, it enabled us to directly compare their ability to conceptualize multiple object identities as indicated by their appropriate pretend actions and their capacity to verbally name the object under two pretence descriptions.

In Studies 1A and 2A children were confronted with an object whose pretend identity changed between two separate contexts. These different contexts were established either in the form of two toy houses or by two different experimenters, and the children were required to switch from one pretend scenario to the other, and then back again to the first. Their ability to produce appropriate inferential pretend actions in each context and to verbally respond to the change in context were both investigated so

that they could be compared directly. Finally, to explore the extent to which children's difficulties in these tasks were specific to understanding that one object may have multiple pretend identities, analogues of both studies were conducted in which two identical objects rather than just one were used across contexts (Studies 1B and 2B) (see Table 1 for an overview of the study structures).

Table 1. Variations in the structure of the procedure across the four studies

Study	Contexts	Number of target objects	Procedure
1A	2 houses	1	P1: E and child play at house 1 P2: E and child play at house 2 P1: E and child play at house 1
1B	2 houses	2	(As above)
2A	2 persons	1	P1: E1 and child play together P2: E2 and child play together P1: E1 and child play together
2B	2 persons	2	(As above)

STUDY 1A

Method

Participants

Thirty-four children were included in the final sample (17 females, 17 males, age range: 2;10–3;2, mean age 3 years 1 month) and were from mixed socio-economic backgrounds. Two children had to be excluded because they became uncooperative.

Design

Each child received four trials consecutively (with a short break between the second and third in which they played a puzzle game). Each trial involved a different target object with no obvious function, (e.g. a plastic block). For each trial, one of these four target objects was used in two different pretend scenarios, while the other target objects were kept away for later trials. The object was given a different pretend identity in each scenario (see Table 2), and therefore had two different pretend actions related to it. For example, if the pretend identity was 'food', the related action was pretend 'eating' or 'feeding'. Importantly, both the order of trials and the order of pretend identities within each trial were counterbalanced across children. Thus, the order of trials and the order of pretend identities as detailed in Table 2 (and, consequently, the order of pretend actions) were not fixed.

Table 2. Target objects used in test trials, their pretend identities and related support props

Target object	Pretend identity 1	Support prop	Pretend identity 2	Support prop
Yellow stick	Toothbrush	Toothpaste	Spoon	Bowl
Purple block	Drink	Glass	Food	Knife
Red disc	Soap	–	Food	–
Gold cylinder	Shampoo	–	Drink	–

In addition, in two of these trials, the experimenter (E) and the child pretended with the target object only, and in two trials they played with the target object plus two additional support props (i.e. replica toys, see Table 2 for details). The target objects to which support props were related was fixed, but the order of presentation was counterbalanced. Therefore, each child received either two trials involving support props first, or two trials involving no support props first. In the final test phase of trials involving support props, the props were placed at equal distance from the child. However, since statistical analyses showed neither an effect of these props, nor any effect of trial type on the mean proportion of action trials passed, all tasks were collapsed for all further analyses (and the same applies to all further studies).

Procedure

In this and all other studies, testing was done in various urban day-care centres throughout Leipzig, Germany in a quiet room and took approximately 20 minutes. In order to get the child used to pretending with E, each session began with a warm-up in which she invited the child to perform pretend actions on some toy animals. Six different pretend actions were introduced in a fixed order and E modelled on herself where necessary in order to encourage the child to also pretend (Table 3 for details). If a child failed to complete at least two of the six warm-up actions, they were excluded on the basis that they had failed to engage with E at all. However, in this study, no child was excluded for this reason. After the warm-up, the test trials began. What follows is an example of one of these trials, the other three of which had the same structure but, as mentioned before, used different target objects (see Table 2). To start with, E and the child sat between two toy houses (approximately 1.5 metres apart). A toy pig was placed under a blanket 'sleeping' in one house while a toy bear sat in the other.

Table 3. Pretend actions and objects used on the cuddly toys during the warm-up

Object	Pretend identity	Action on cuddly toy
Metal rod	Carrot	Feeding
Piece of paper	Handkerchief	Blowing nose
Plastic cylinder	Shampoo	Washing hair
Red block	Milk	Giving drink
Blue block	Comb	Combing hair
Egg whisk	Shower	Giving shower

Note. For Studies 1A and 1B, the warm-up actions were performed once on either of two cuddly toys. For Studies 2A and 2B, the warm-up actions were performed once on either of three cuddly toys.

First pretend scenario (P1): E declared that when the pig awoke he would like to perform an action (e.g. eating) and then asked the child what the pig might like to eat. Upon an answer, such as 'carrot', E declared the target object to be a carrot. She modelled use of the object on herself (by pretending to eat the 'carrot') and then invited the child to do the same (i.e. to pretend to eat it themselves) by saying 'and now you'. If the child did not pretend, E encouraged her further and verbally (e.g. by saying, 'why don't you try it?') E then placed the target object on the ground and the game was temporarily suspended as she explained that they should allow the pig to continue sleeping.

Pretend scenario 2 (P2): Both E and the child moved with the target object over to the house opposite which the toy bear was sitting in. E explained that the bear wanted to perform a different action (e.g. drinking) and asked the child what the bear might like to drink. Upon an answer such as 'lemonade', E took the same target object that she had used previously in P1 and declared it to be lemonade. She then gave the test prompt which consisted of pushing the target object and bear towards the child whilst saying 'and now?' If the child pretended appropriately (e.g. by pretending to give the bear a drink) E continued the trial. If the child did not act or pretended with an action appropriate to P1, E modelled the action on herself and repeated the test prompt. If the child still failed to act, she was verbally but implicitly encouraged to act (e.g. 'the bear is thirsty!') (Explicit verbal prompts that included reference to the pretend action itself such as 'drink' were not given).¹ After the child had responded, the bear (E) asked the verbal test question 'and what is that thing there?' Regardless of the child's answer, the bear (E) responded 'ok bye now . . .'

Return to pretend scenario 1 (P1): E then collected the target object and, with the child, returned to P1 at the pig's house. She declared that the pig had woken up and prompted the child to act again by saying 'and now?' (as in P2). Lastly, after the child had responded, the pig (E) asked the second verbal test question 'and what is that thing there?'

Coding

All sessions were video-recorded and coded after testing. The following scheme was used to code children's responses on all four of their trials.

Individual action responses were coded at two points in the session: at P2 and on return to P1. They were coded as *correct* if the child pretended inferentially (i.e. with an action that E had not modelled or with an action that E had modelled on herself but that the child performed on a new target such as the toy bear or pig) and appropriately (i.e. according to that particular pretend scenario), *incorrect perseveration* if the child pretended in a way appropriate to the previous pretend scenario and *incorrect other* if the child failed to act, or acted ambiguously (i.e. in a way that could not be related to either of the pretend identities exclusively by way of distinctive movements, sound effects, verbal markers, or by placing the object at a body part that could not be related to one of the object's pretend identities exclusively).

Individual verbal responses were coded analogously at P2 and on return to P1 as *correct* if the child answered with an object identity that was appropriate to the theme of the pretend scenario, *incorrect perseveration* if the child answered according to the object's previous pretend identity and *incorrect other* otherwise.

For both action and verbal responses, each child was then given an overall trial score of *pass* if the child scored correct at P2 and correct on return to P1 and *fail* otherwise.

All sessions were coded by a native German speaker and a random sample of 50% of the trials were re-coded by a second native speaker in order to assess inter-rater reliability. This was acceptable, Cohen's $\kappa = 0.83$.

¹ It may be argued that the insertion of additional prompts here reduces the complexity of inferences that children had to make in order to pretend correctly on the cuddly toy. Therefore, although these simpler responses remain inferential, more conservative pass rates were also calculated as the mean proportion of trials passed excluding trials in which these additional prompts were given. Since, the same overall result was found for both liberal pass rates (see main text for analyses) and conservative pass rates (Study 1A: $t(33) = 1.82$, $p < .04$; Study 1B: $t(23) = 2.95$, $p < .01$ and Study 2A: $t(23) = 3.16$, $p < .01$; Study 2B: $t(23) = 3.19$, $p < .01$), for this and all further studies, only liberal pass rates are presented.

Results

Because some children ($N = 6$) received only three instead of four valid trials (due to experimenter error in one trial) for both action and verbal responses, the proportion of trials in which children pretended or answered correctly at both houses was calculated (see Figure 1). Children pretended correctly at both houses on 62% of trials, which was significantly above 50% chance, $t(33) = 2.31$, $p < .01$.² (In this and all further studies, hypotheses were directed and so p values are one-tailed, unless otherwise stated.) This parametric result was confirmed by a non-parametric test over the number of trials passed versus the number of trials failed (Wilcoxon test, $T^+ = 194$, $N = 24$, $p < .01$; for individual performance patterns for this and all further studies, see Table 4). Children answered correctly at both houses on 51% of trials. This did not differ significantly from chance ($t(33) = 0.27$, $p < .39$) and was significantly lower than the action scores ($t(33) = 2.16$, $p < .02$).

The predominant type of incorrect action response was to pretend correctly at P2 and then fail to switch back to the original game at P1 and this accounted for 28% of total responses. In the remaining 10% of trials, children either made an action that was irrelevant, unclear, or failed to respond at one of the two houses.

In the majority of trials, children either pretended and answered correctly (46%) or did neither correctly (33%). The proportion of trials in which children pretended but did not answer correctly at both houses was 16%, and the proportion of trials in which they did not pretend but did answer correctly at both houses was 5%.

Discussion

Children were able to tailor their pretend actions to an object whose pretend identity changed between different contexts. However, they were less able to correctly comment on the changing identity of that object and a significant difference was found between these two abilities. Despite this, for the most part, children either adjusted their actions and verbally commented correctly between contexts or failed to do either. The predominant incorrect response was to return to P1 at the end of the session but pretend in a way that was appropriate to P2 (i.e. fail to switch back to the original game) and so the question arises as to what might have caused children to persevere in this way.

One possibility is that problems unrelated to understanding that objects may have multiple pretend identities caused children to act incorrectly. For example, by the time children returned to P1 they might simply have forgotten what they had previously played with the object. Alternatively, children may have remembered the previous game but inhibition problems nevertheless caused them to persevere. Lastly, there may have been some factor within the general pragmatics of the experimental procedure that caused confusion in children's performance, such as spatial movement between the houses. If any of these were the case, incorrect responses would signify general performance problems and reveal little about the conceptual difficulties that children experience in coming to appreciate multiple object identity. The alternative, of course, is that children experienced a genuine conceptual difficulty in understanding that one and the same object may have multiple pretend identities.

² Since, trial scores were coded as a composite measure of responses from both P2 and P1, a chance rate of 25% might have been used for statistical comparison. However, in order to maintain a conservative measure of children's performance, 50% was used on the basis that assuming the child had responded correctly at P2, there was a 50% chance that they would switch correctly back to P1 at the end of the test.

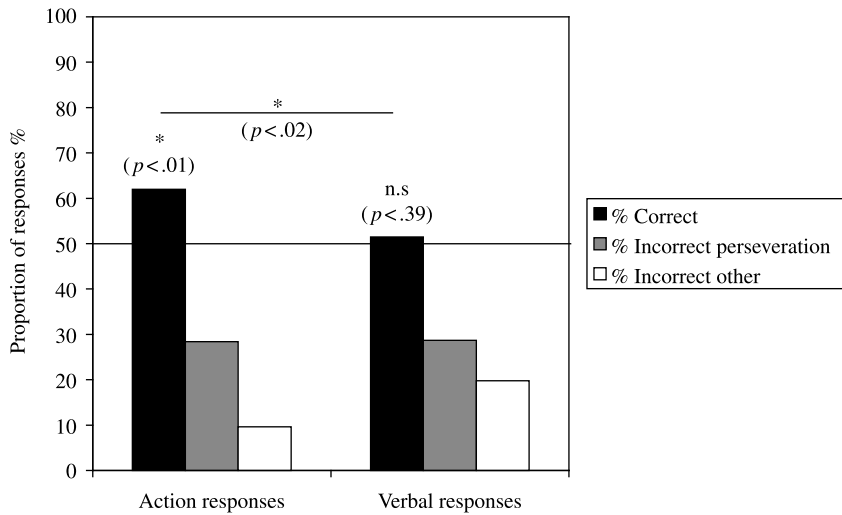


Figure 1. Mean proportion of action and verbal responses in Study 1A.

Table 4. Individual performance patterns

Study	Percentage trials passed							N
	0%	25%	33%	50%	66%	75%	100%	
1A	2	3	2	12	1	4	10	34
1B	1	2	0	6	1	5	9	24
2A	1	1	2	4	0	5	11	24
2B	0	5	—	2	—	6	11	24

Note. 33% and 66% apply to those children who received only 3 trials (instead of 4).

In order to tease these possibilities apart, Study 1B was conducted as a direct replication of Study 1A with only the following variation: instead of playing with one target object in P1, the same target object in P2 and then the same target object again at P1, two identical target objects were used, one for either game. The prediction was that if memory, inhibition, or general pragmatic problems were responsible for the level of perseverative errors observed in Study 1A, these should remain at roughly the same level in Study 1B. However, if conceptual difficulties related to treating one object as having two different pretend identities were responsible, the level of incorrect perseveration responses should be reduced.

STUDY 1B

Method

Participants

New participants were recruited for this study and for the two studies that follow. Twenty-four children were included in the final sample (15 females, 9 males,

age range: 2;10–3;2, mean age 3 years, 0 months) and were from mixed socio-economic backgrounds. One child had to be excluded from analysis because he was uncooperative and another because it became apparent that she was not a native speaker.

Design and procedure

The basic procedure, design and materials used were identical to Study 1A. The only difference here was that two identical target objects were used, one at each of the two houses. Thus, in P1, E invited the child to pretend creatively with the first target object at the pig’s house. Before moving to P2, E drew the child’s attention to the first object that would be left in the child’s view throughout by saying ‘we will leave this here’. At P2, a second, identical target object was produced and the child was invited to pretend creatively with this one. On return to P1, E and the child moved back to the pig’s house and the child was invited to pretend creatively again with the first target object.

The same coding scheme as in Study 1A was used and inter-rater reliability was acceptable, Cohen’s $\kappa = 0.89$.

Results

As in Study 1A, because some children received only three instead of four valid trials ($N = 3$), for both action and verbal responses, the proportion of trials in which children pretended or answered correctly at both houses was calculated (see Figure 2). Children pretended correctly at both houses on 71% of trials (significantly above 50% chance, $t(23) = 3.44$, $p < .01$). This parametric result was confirmed by a non-parametric test over the number of trials passed versus the number of trials failed, (Wilcoxon test, $T^+ = 147$, $N = 18$, $p < .01$). Children answered correctly at both houses on 61% of trials. This did not differ significantly from chance ($t(23) = 1.47$, $p < .08$) and was significantly lower than the action scores ($t(23) = 1.71$, $p < .05$).

The predominant type of incorrect action response on return to P1 was to pretend correctly at P2 and then fail to switch back to the original game at P1. This accounted for

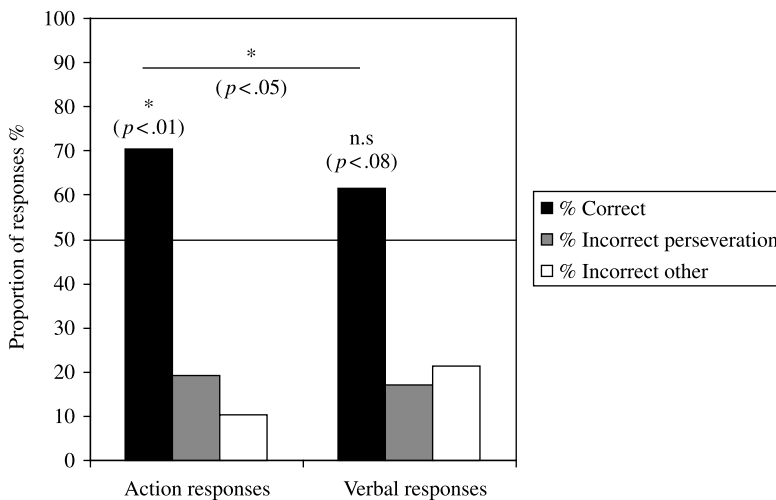


Figure 2. Mean proportion of action and verbal responses in Study 1B.

19% of total responses. The remaining 10% of children either made an action that was irrelevant, unclear, or failed to respond at one of the two houses.

In the majority of trials, children either pretended and answered correctly (57%) or did neither correctly (25%). The proportion of trials in which children pretended but did not answer correctly at both houses was 14%, and the proportion of trials in which they did not pretend but did answer correctly at both houses was 4%.

Discussion

The results of Study 1A were replicated. However, nearly one fifth of the action responses remained incorrect perseverations, despite the fact that children no longer had to attribute multiple pretend identities to one object but had to now distribute them across two objects. This raised the possibility that extraneous factors within the general pragmatics of the experimental situation might have been affecting children's ability to switch back to the original game on return to P1. For example, since the test prompt 'and now?' was highly non-specific, perhaps no tangible reason had been given to children to preferentially switch back to the original game. In a sense, the situation created no real 'correct' response as no substantive reason was given not to perseverate. (It is conceivable, for instance, that some of the children decided to teach or introduce the pig to the game they had played previously with the bear.)

Study 2A was, therefore, designed to parallel the two previous studies but further, to provide children with more *motivation* to keep the two games separate. Thus, P1 was established by an E who subsequently left the room. P2 was then created by a second experimenter (E2) who invited the child to collaborate with her by playing a 'secret' pretend game that should not be shared with the first.

STUDY 2A

Method

Participants

Twenty-four children were included in the final sample (13 females, 11 males, age range: 2;10–3;2, mean age 3 years, 0 months) and were from mixed socio-economic backgrounds. Some children had to be excluded because they were uncooperative ($N = 1$) or because they failed to complete two warm-up actions ($N = 2$).

Design and procedure

The basic design and procedure were identical to Study 1A. However, now pretend scenario 1 was created by one experimenter (E1) and pretend scenario 2 by a second experimenter (E2) and no toy houses were used. First, each child had a warm-up session in which she was invited to perform a total of six pretend actions on one of three toy animals (two on each of the toy animals).³ The two Es modelled where necessary in order to encourage children to pretend.

³ The order of presentation was fixed for all three toy animals for some children ($N = 7$) but random for two of the animals for the remaining children ($N = 17$). However, since statistical analyses showed no effect of warm-up order on mean proportion of action trials passed ($t(22) = 0.89$, $p < .19$), both groups were combined for all further analyses.

Pretend scenario 1 (P1): During this game, E2 sat quietly at some distance from the child and E1, looking on while they played. E1 declared to the child that she would like to perform an action (e.g. eating) and then asked the child what they themselves might like to eat. Upon an answer such as 'carrot' E1 declared the target object to be a carrot. She pretended to use the object herself (e.g. by pretending to eat the carrot) and then invited the child to do the same by saying 'and now you'. P1 was then temporarily suspended as E1 placed the target object on the ground in front of the child. She then explained that the bear would also like to perform this action (i.e. he would also like to eat some carrot) and left the room to fetch the bear. (Unbeknownst to the child, however, she remained within hearing distance so that she could return at the correct moment in the trial.)

Pretend scenario 2 (P2): Once E1 had left the room, E2 declared that she had another game but that it was a secret so the child should not tell E1 about it. Holding the toy pig in her hands, E2 explained that the pig wanted to perform some action (e.g. drinking) and asked the child what they needed to drink. Upon an answer such as 'lemonade' E2 took the same target object that had been left on the ground from P1 and declared it to be lemonade. She then gave the test prompt which consisted of pushing the target object and the toy pig towards the child whilst giving the verbal prompt 'and now?' If the child pretended appropriately (e.g. by pretending to give the pig a drink), E2 continued the trial. If the child did not act or pretended with an action appropriate to P1, E2 modelled the action on herself and repeated the test prompt. After the child had responded, the pig (E2) asked the first verbal test question: 'and what is that thing there?' Regardless of the child's answer, the pig (E2) responded with 'ok, bye now'. E2 then placed the target object back on the ground, explained to the child that E1 would return soon, and reminded her not to tell E1 about their secret game.

Return to pretend scenario 1 (P1): E1 returned to the room exclaiming that she had found the bear and prompted the child to act by saying 'and now?' (as in P2). After the child had responded, the bear (E1) then asked the second verbal test question 'and what is that thing there?'

The same coding scheme as in Study 1A was used and inter-rater reliability was acceptable, Cohen's $\kappa = 0.85$.

Results

As in Study 1A, because some children received only three instead of four valid trials ($N = 6$) the proportion of trials in which children pretended or answered correctly with both Es was calculated (see Figure 3). Children pretended correctly with both Es on 74% of trials (significantly above 50% chance, $t(23) = 3.84, p < .01$). This parametric result was confirmed by a non-parametric test over the number of trials passed versus the number of trials failed, (Wilcoxon test, $T^+ = 187, N = 20, p < .01$). Children answered correctly with both Es on 56% of trials. This did not differ significantly from chance ($t(23) = 0.77, p < .23$) and was significantly lower than the action scores ($t(23) = 2.60, p < .01$).

With regard to incorrect action responses, children pretended correctly for E2 but then failed to switch back to the original game with E1 on 14% of trials and in the remaining 12%, children made irrelevant or unclear actions or failed to respond for at least one of the Es.

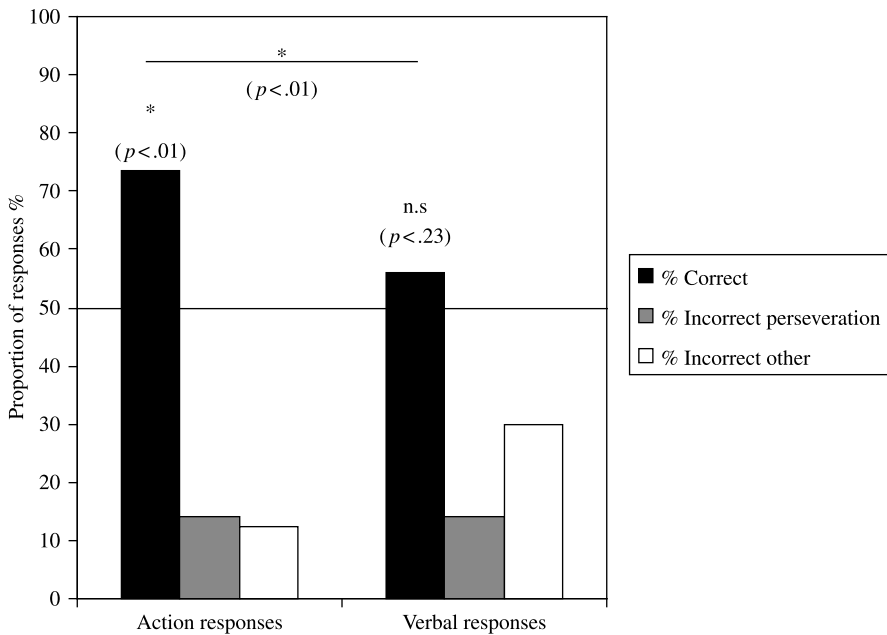


Figure 3. Mean proportion of action and verbal responses in Study 2A.

In the majority of trials, children either pretended and answered correctly (50%) or did neither correctly (20%). The proportion of trials in which children pretended but did not answer correctly for both Es was 24%, and the proportion of trials in which they did not pretend but did answer correctly for both Es was 6%.

Discussion

The results of Studies 1A and 1B were replicated showing again that young children competently tailor their pretend actions to an object's multiple pretend identities. In order to gain further information as to why at least around one quarter of all children failed to adapt their actions correctly, a last study was conducted which combined the key manipulations involved in Studies 1B and 2A. This last study was identical to Study 2A except that the multiple identity problem was essentially removed by the addition of a second, identical target object. The prediction was that a combination of both the secret game format and the second target object would aid children further in their ability to pretend appropriately across contexts. Remaining perseverative errors might then be attributed to general pragmatic demands associated with the task.

STUDY 2B

Method

Participants

Twenty-four children were included in the final sample (16 females, 8 males, age range 2;10–3;2, mean age 3 years, 0 months) and were from mixed socio-economic backgrounds. Some participants had to be excluded because they were uncooperative

($N = 1$), the procedure was interrupted by a teacher ($N = 1$), or because they failed to complete 2 warm-up actions ($N = 2$).

Design and procedure

The basic design and procedure were identical to Study 2A. The only difference was that now two identical target objects were used, one for each of the E's. Thus in P1, E1 invited the child to creatively pretend with the first target object. Before leaving the room she drew the child's attention to the first target object that would be left in the child's view throughout by saying 'I'll leave this here'. Then, at P2, E2 produced a second identical target object and invited the child to pretend creatively with this one. On return to P1, E1 invited the child to pretend creatively again with the first target object.

The same coding scheme was used as in Study 1A and inter-rater reliability was acceptable, Cohen's $\kappa = 0.83$.

Results and discussion

Children pretended correctly for both Es on 74% of trials (significantly above 50% chance, $t(23) = 3.92, p < .01$) (see Figure 4). This parametric result was confirmed by a non-parametric test over the number of trials passed versus the number of trials failed, (Wilcoxon test, $T^+ = 204, N = 22, p < .01$). Children answered correctly for both Es on 64% of trials (significantly above 50% chance, $t(23) = 1.88, p < .04$) but this was significantly lower than their action scores ($t(23) = 1.74, p < .05$).

With regard to incorrect action responses, children pretended correctly for E2 but then failed to switch back to the original game with E1 on 14% of trials. In the remaining 12% of trials, children made irrelevant or unclear actions or failed to respond at all for at least one of the Es.

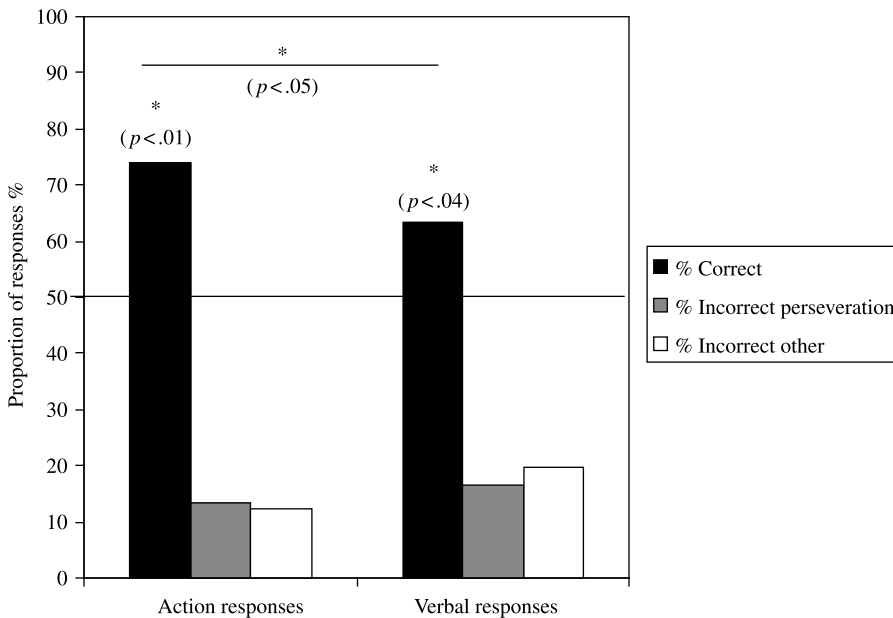


Figure 4. Mean proportion of action and verbal responses in Study 2B.

In the majority of trials, children either pretended and answered correctly for both Es (57%) or did neither correctly (20%). The proportion of trials in which they pretended but did not answer correctly for both Es was 17%, and the proportion in which they did not pretend but did answer correctly for both Es was 6%.

The results of the previous studies were therefore replicated, except that the combination of a second target object and the format of the secret game appeared to enable children to now correctly name each object's identity according to its particular context.

GENERAL DISCUSSION

Collectively, the present studies indicate that, by age 3, children understand that an object can have multiple pretend identities. Beyond pretending that an object had one pretend identity at time one and then another at time two (as in Harris & Kavanaugh, 1993), children switched back to the original game and adapted their pretend actions accordingly (Studies 1A and 2A). These results are in line with other studies that asked children to state different people's pretence stipulations such as Hickling *et al.* (1997) and Bruell and Wooley (1998) and those requiring children to report their own past pretend stipulations such as Gopnik and Slaughter (1991) and Kalish *et al.* (2000). They also extend such findings since younger children (3;0-year-olds) were tested than had been previously. Furthermore, children produced creative and inferential pretend actions after switching between contexts, that is, particularly convincing indicators of their ability to conceptualize multiple pretend object identities.

In a minority of cases, children had difficulty pretending appropriately between scenarios. However, it is possible that this difficulty was unrelated to limitations in their ability to assign multiple pretend identities to one and the same object, and may have been associated with more general performance factors such as memory or executive or perhaps the pragmatic demands of the tasks (for instance, movement between the two houses). In favour of this view, when children no longer had to relate both pretend identities to the same object, but were encouraged to assign them to two separate objects, they did not appear to be substantially aided in their ability to pretend appropriately between scenarios (Studies 1B and 2B).

Another central finding from the studies presented here was that children's ability to name an object's multiple pretend identities was consistently less proficient than their ability to pretend with it appropriately across contexts. This at first seems at odds with the general proficiency found using verbal response measures across previous studies, although procedural differences (such as type of questions, single vs. composite response measures) may account for the incongruity across studies. Indeed, it remains possible that the use of open-ended as opposed to forced-choice questions of the form 'and what is that thing there?' may have partially contributed to some of the difficulty children had in their verbal responses. However, prompts for the action responses were equally non-specific ('and now?') suggesting that the discrepancy between verbal and action-based competence here may also indicate an implicit appreciation that children have of multiple pretend identity that they are less able to explicitly articulate. This fits with a general decalage between young children's ability to demonstrate competence verbally and through their actions in other areas of development (see e.g. Clements & Perner, 1994; Goldin-Meadow, 2003). It is also in line with previous research in which young children demonstrate

pretence comprehension more competently through their pretend actions than their capacity to correctly answer verbal questions (Rakoczy *et al.*, 2006, Study 1), and it accords well with a result by Amsel *et al.* (1996, Study 1) who found that children were more able to reproduce a past pretend action than they were able to recall the past pretend identity of an object. Beyond this finding, the present results indicate that young children can not only repeat their initial pretend actions (responses that might be generated by association, for example) but can also make moderately inferential and appropriate extensions to them across contexts. This suggests that they indeed attribute multiple pretend identities to objects.

A potential objection to our interpretation of results might run as follows: Because of the necessarily sequential nature of pretend action responses (one cannot pretend to brush one's teeth and pretend to spoon soup with the same stick at the same moment) children's responses may not indicate any explicit perspective contrast at all. That is, children may simply have assigned each identity to the object in sequence, forgetting what they had previously played and so have no true concept of multiple pretence identities (see Perner *et al.*, 2002, 2003, on similar issues with regard to switching vs. confronting perspective problems). This account, however, seems unlikely because when children switched back to the original scenario, they did not merely reproduce pretend actions that they or E had performed. They inferentially extended the game in some way suggesting that they remembered something stipulated within its context from which they could then elaborate (e.g. 'here we pretend that this is a spoon'). One could even argue that the problem of determining whether a child conceives of multiple identities simultaneously or sequentially applies to verbal responses also. Answers, for example, to pretence-reality or pretence-pretence questions must also be given sequentially. This, again, highlights the value of inferential measures as useful indicators that both identities or perspectives have been kept in memory.

A further objection to the claim that children in these studies understood multiple pretend object identities might be that, on return to the first pretend scenario, they remembered the pretend actions that had been performed there and not the pretend identity of the object itself. Indeed, since children's understanding of object identity was assessed through their pretend actions here this seems theoretically possible, although nevertheless implausible. Research suggests that an object's function is conceptualized in terms of the potential actions it affords: robust associations between actions and objects are established during childhood and persist, operating critically to restrict and guide individuals' treatment of those objects (see e.g. Casler & Kelemen, 2005; Mounoud, Duscherer, Moy, & Perraudin, 2007; Tucker & Ellis, 1998). In the case of substitute objects used in pretence, these associations play an even more central role in guiding behaviour, because the physical properties of the object provide drastically insufficient information from which to infer function or appropriate action (unlike the way in which, for example, the shape and weight of a hammer make it easily identifiable as a tool and render it ideal for hammering nails. See Searle, 1995, on the distinction between physical and non-physical or 'status' functions). Thus, in the studies presented here, when children returned to the original pretend scenario it is possible that they either remembered the object's pretend identity thereby inferring which pretend actions they should produce, or instead remembered the previous pretend actions associated with it and inferred its pretend identity. But it seems unlikely that they remembered either one in isolation.

A rough developmental picture of children's ability to conceptualize multiple object identities in pretence might thus run as follows: Shortly before their second birthdays, children begin to engage in object substitution behaviour (Fein, 1975; Watson & Fischer, 1977), and soon after this that they pretend that the same substitute object has two different identities, one after the other (Harris & Kavanaugh, 1993). Three-year-olds take this a step further and are able to talk about multiple pretend identities through time in their own sequential pretence (Gopnik & Slaughter, 1991; Kalish *et al.*, 2000) and to talk about divergent pretence perspectives held by different people (Bruell & Woolley, 1998; Hickling *et al.*, 1997). The studies presented here suggest that this ability is in place by age 3;0, as indicated by children's own pretend actions, locating the emergence of such understanding somewhere between 2 and 3 years of age. Whether children between these ages might demonstrate a grasp of multiple object identity through their own pretend actions (as the majority of 3-year-olds in the studies here did), persevere on return to the first of two pretend scenarios, or simply resort to treating the objects in a literal manner (as 1-year-olds tend to in their sequential pretence, see Harris & Kavanaugh, Exps. 3 and 4) remains an open question. Similarly, while 3-year-olds correctly answer forced-choice questions about multiple pretence perspectives (Bruell & Woolley, 1998; Gopnik & Slaughter, 1991; Hickling *et al.*, 1997), and 4-year-olds correctly answer such questions on multiple perspectives in other domains (Flavell *et al.*, 1981, 1983; Wimmer & Perner, 1983), the earliest age at which they will correctly answer open-ended questions about pretence and other perspectives awaits future investigation.

In summary, the studies presented here provide the earliest and most compelling evidence that by age 3;0, children understand multiple pretend object identity. That is, they grasp that an object may be assigned non-physical or observer-dependent status such that it counts as something beyond itself (as in a yellow stick may count as a spoon). Interestingly, the process by which status is assigned in pretence bears some resemblance to the process by which it is assigned in more serious, institutional phenomena. For instance, in adult life, certain pieces of paper count as money or, certain people count as government officials (see Searle, 1995). But an additional feature of status is that it holds relative to specific contexts only. Thus, a piece of paper may count as ten pounds within the context of British exchange practices but as a valueless bank note or even a collector's item outside that context. In adult games too, objects may have multiple statuses that apply context-specifically as when an ace counts as the highest card in one card game and the lowest in another. It is intriguing, then, that this principle also applies in the case of children's pretence games, such that one and the same stick may count as a spoon in one game and a toothbrush in another (see Walton, 1990). Children in the present studies demonstrated an appreciation of this context-specificity, by tailoring their pretend actions to an object whose status changed between contexts set up either in the form of two toy houses or two different play partners. This raises the interesting possibility that children's games of joint pretend play might equip them with the rudiments of a conceptual framework that they will later come to elaborate and that will, in turn, enable them to participate in adult institutional life (see Kalish, 2005; Rakoczy, 2007; Walton, 1990).

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Cognitive Development



Normativity and context in young children's pretend play

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ABSTRACT

In two studies 3-year-olds' understanding of the context-specificity of normative rules was investigated through games of pretend play. In the first study, children protested against a character who joined a pretend game but treated the target object according to its real function. However, they did not protest when she performed the same action without having first joined the game. In the second study, children protested when the character mixed up an object's pretend identities between two different pretend games. However, they did not protest when she performed the same pretend action in its correct game context. Thus, the studies show that young children see the pretence–reality distinction, and the distinction between different pretence identities, as normative. More generally, the results of these studies demonstrate young children's ability to enforce normative rules in their pretence and to do so context-specifically.

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When growing into their society, young children must come to understand that social practices have a cultural dimension to them, such that members of their group do things a certain way. Some activities, particularly those of a more conventional nature, have a *normative* quality—it is implicit within the group that they *ought* to be done that way. For instance, in some cultures people may greet each other with a handshake, whereas in other cultures this greeting may be considered inappropriate and three kisses on alternating cheeks might be the convention.

In investigating the development of children's moral judgment, [Piaget \(1932\)](#) examined children's ability to practice and theorize about conventional rules in their games. A central idea arising from his research was that before around age 10, children view conventional rules as akin to both moral rules and natural contingencies, that is, as unchangeable and as existing universally. Work in this tradition has, however, gone on to show that children distinguish well between moral and conventional

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norms. Children claim, for example, that while it might be acceptable for people to dress according to different conventions in different cultures, it is unacceptable to steal regardless of the cultural background (Nucci & Nucci, 1982; Turiel, 1978, 1983). Other work has similarly shown that children also distinguish between conventional rules such as ‘children cannot play in the snow without clothes on’, and natural contingencies like ‘children cannot turn into fish’ (Kalish, 1998) and, additionally, recognize that norms such as ‘Anne ought to work alone’ may serve to motivate and guide Anne’s behaviour (Kalish & Shiverick, 2004). Interestingly, young children are better able to reason from prescriptive or ‘deontic’ conditional norms such as ‘if Anne wants to play outside, she must wear her coat’, than descriptive conditionals of similar form, as in ‘when Anne plays outside, she always wears her coat’. Furthermore, this deontic understanding applies both to rules that are set by higher adult authority, as well as those that emerge more organically between children, for example in agreements to swap toys (Harris & Nunez, 1996; Harris, Nunez, & Brett, 2001; Nunez & Harris, 1998). Finally, children appreciate that violations of prescriptive rules may result in upset, such that if Maxi’s mother buys him a bike in return for cleaning his room and Maxi breaks his part of the bargain, his mother might be sad (Keller, Gummerum, Wang, & Lindsey, 2004).

However, developmental work on conventionality since Piaget has focused almost exclusively on children’s understanding of so-called regulative rules, that is, rules that regulate already existing activities. To take an already mentioned example, Anne can play outside, whether the norm is to do so with or without her coat. The fact that the conventional norm is to do so whilst wearing a coat serves to shape her already existing activity. A relatively neglected area in normativity research concerns children’s understanding of the norms associated not with ‘regulative’ rules but with ‘constitutive rules’ (see Rawls, 1955; Searle, 1995). Such rules bring into existence the very activities they govern, and they do this by imposing non-physical or ‘status functions’ on objects and actions. Structurally, status functions have the logical form ‘X counts as Y in a certain context C’. For example, a piece of paper may count as money within the context of our exchange practices, or giving that money away may count as making a purchase in a particular social situation. The point is that the very rules of the exchange make the piece of paper a money token, and make performing a certain action an act of purchasing or selling, etc. (Searle, 1995). Thus, the imposition of non-physical status functions create what are then understood to be ten dollar bills and acts of monetary exchange. Importantly, these practices are also normatively governed in that there are certain ways that objects with status ought to be treated and certain ways that actions with status should be performed. An open developmental question, then, relates to whether young children grasp the norms associated with constitutive rules.

One particularly early and important area in which children appear to learn about constitutive rules is that of pretend play. In pretence, children must grasp that, for instance, a stick may count as a toothbrush, or that side-to-side movements may count as brushing within the context of their game, and they often witness and participate in the creation of constitutive rules of this nature (unlike the pre-established rules of non-pretend rule games; see, e.g., Piaget, 1932; Rakoczy, Warneken, & Tomasello, 2008). It is thus noteworthy that young children appear to understand the basic structure of constitutive rules in their pretence by proficiently and creatively tailoring their pretend actions to an object’s fictional status (Harris & Kavanaugh, 1993) even when this changes between contexts (Wyman, Rakoczy, & Tomasello, *in press*). However, relatively little is known about children’s understanding of the normative component of constitutive rules, and so games of joint pretence offer an interesting opportunity to probe this understanding.

Among established findings in the pretence literature is that 3-year-old children understand the *pretence–reality* distinction. They correctly state, for example, that while an object really is an X (e.g., a spoon), one may pretend that it is a Y (e.g., a ‘telephone’) in the context of a certain make-believe game (Abelev & Markman, 2006; Flavell, Flavell, & Green, 1987; Lillard & Flavell, 1992). Children of this age also differentiate between different pretence identities in different game contexts (what might be called the ‘*pretence–pretence*’ distinction)—they understand that one and the same object may acquire a fictional identity in the context of one pretence game (e.g., as a ‘car’) and another fictional identity in the context of a second pretence game (e.g., as a ‘horse’) (Bruell & Woolley, 1998; Gopnik & Slaughter, 1991; Hickling, Wellman, & Gottfried, 1997).

But do children at this age also understand these distinctions (between pretence and reality, and between different pretence games) in normative terms? With regard to the *pretence–reality*

distinction, do they understand that when an X (e.g., a spoon) counts as a Y (e.g., a 'telephone') in the context of a given pretence game (context C), it ought to be treated according to its fictional and not its real identity within the game (that is, used to make calls with and not to eat with)? And regarding the pretence–pretence distinction, do they understand that an X ought to be treated according to different fictional identities in the different contexts (C1 and C2, say) of different pretence games?

To our knowledge, there exists only a single study that indicates children's appreciation that constitutive rules in pretence have a normative dimension. In this study (Rakoczy, 2008), 3-year-olds watched a puppet confuse pretend status functions within a game, for instance, by pretending to eat the pretend knife. Children's responses were to normatively protest, for example, shouting 'No! That's our knife!', and they did not do so in a control condition in which the character pretended to eat the pretend carrot. Thus, within a pretend game, young children appear to recognize mistakes and protest normatively. But this study involved no contrast *between* contexts and so it remains unclear whether young children understand the pretence–reality or pretence–pretence distinctions as normative.

More widely, children's grasp of the normative dimension of these distinctions speaks to the issue of their ability to apply normative rules context-specifically. This is important because the essence of constitutive rules is that they, and their related norms, exist only within the context of certain cultural practices. For example, using a playing card to fan oneself might be perfectly acceptable during conversation, but highly inappropriate within the context of an ongoing game of Bridge. Similarly, a given card may count as a valuable trump card in Bridge but a poor, low value card in another card game, and ought to be treated accordingly.

In the two studies presented here, we sought to address multiple issues. First, we aimed to extend developmental normativity research by investigating whether young children grasp the norms associated with constitutive rules. Second, we aimed to extend existing pretence research by asking whether young children understand the pretence–reality and pretence–pretence distinctions as being normatively governed. Thus, we sought to contrast the norms operative in a pretend game (within context C) with reality (outside context C) in Study 1, as well as those that differ between pretence games (contexts C1 and C2) in Study 2. More generally, via this method, we hoped to investigate children's awareness of the context-relativity of conventional norms.

In both studies, a pretence game was created between the child and an experimenter, and a puppet entered and performed an action. Crucially, this action was identical in both an experimental and a control condition, the only difference being that in the experimental condition she first joined the pretend game (that is, entered C), and in the control condition she did not (that is, remained outside C). In consequence, the very same action that constituted an error within the target context should have been of no concern outside it, either because the puppet never joined the game at all (Study 1) or because she had decided to join a different pretend game (Study 2). Children's spontaneous protest and critique in response to the puppet's actions in each condition were investigated.

1. Study 1

1.1. Method

1.1.1. Participants

Twenty-four 3-year-olds (12 girls; mean age 36 months, range 35–38 months) were included in the final sample. Three were excluded due to experimental error and two because they were uncooperative. Children were recruited in urban day-care centres around Leipzig, East Germany. All were native German speakers and came from mixed socioeconomic backgrounds.

1.1.2. Design

In a within-subjects design, each child received two experimental and two control trials in blocks. The order of blocks was counterbalanced so that half the children received experimental trials first and the other half received control trials first. There were four different tasks (each existing in an experimental and a control version) and task order was also fully counterbalanced.

1.1.3. Materials and procedure

Each test session was conducted by two experimenters in a quiet room at the children's day-care centre and lasted around 20 min. At the start of the session, the first experimenter (E1) introduced a puppet named 'Max' who was animated by the second experimenter (E2). During a short warm-up phase, E1, Max and the child played with some conventional toys on which Max demonstrated some basic instrumental incompetence, and then engaged in a short pretend game with replica objects, in order to get the child used to pretending. Then the test trials began.

The common structure to both experimental and control trials was as follows: E1, the child and Max sat at a table and E1 produced an object with a conventional function, such as a pen. All three parties engaged in the functional activity associated with the object (in this case drawing) and then Max left. While he was absent, E1 declared that she and the child would play another game called, in this case, the 'toothbrush game'. She and the child pretended that the pen was a toothbrush and then called Max back for his turn. In both experimental and control conditions, Max returned and was told by E1 'We're playing the toothbrush game and this is our toothbrush'. He then performed the functional activity, that is, used the pen to draw with and afterwards lay the object on the table. However, in the experimental condition, before drawing, he asked the child, 'can I play with you?' and upon an answer declared, 'then I will play the toothbrush game'. By contrast, in control conditions, before Max drew, he explained 'no, I don't like the toothbrush game, I'd prefer to draw.' Therefore, while Max drew in both cases, in the experimental condition he had declared an intention to join the pretend game and so his drawing was inappropriate, but in the control condition he had never expressed such an intention so his drawing should have been of no particular concern.

The other three tasks followed the same procedural structure but involved the use of different objects with different functions and pretend identities: a sponge used both instrumentally to wipe up chalk marks and as a pretend 'bread roll', a pair of children's scissors used both to cut paper with and as a pretend 'spoon', and a dustpan brush used both to sweep with and as a pretend 'bottle of lemonade'.

1.1.4. Observation and coding

Sessions were videotaped and coded by a single observer. Twenty-five percent of trials were coded by a second, independent coder who was blind to trial condition (the section of film in which the puppet declared his intention to join or not to join the game was cut out).

All relevant verbal and non-verbal responses were precisely described and then coded as either *intervention* or *acceptance* from one of two coding hierarchies. Children's *intervention* responses were coded hierarchically as follows. The strongest category was *explicit intervention*, in which the child protested against the puppet's functional action, gave normative instruction to pretend or explicitly showed the puppet how to do the pretend action (e.g., the child said 'No! You must brush the teeth'). The second strongest was *implicit intervention*, in which the child instructed the puppet to act according to the pretend game (e.g., the child said 'tooth brushing!'), and the least strong was *descriptive intervention*, in which the child described the puppet's action forcefully (e.g., 'he's drawing!') or described something relating to the pretend game (e.g., 'this here is our toothpaste').

Children's *acceptance* responses were coded hierarchically in analogous ways as either *explicit acceptance* (strongest), in which the child verbally affirmed the puppet's functional action, gave normative instruction to act functionally or explicitly showed the puppet how to do the functional action (e.g., 'Yes! You must draw'), as *implicit acceptance* (next strongest), in which the child instructed the puppet to do the functional action (e.g., said 'drawing!'), or as *descriptive acceptance* (least strong), in which the child described something about the puppet's functional activity (e.g., 'he's drawing') or described something about the pretend game in a non-intervening way (e.g., 'that's not a toothbrush').

As the focus was on the most sophisticated form of intervention or acceptance produced, for each trial, the child was assigned two codes, one for their strongest verbal intervention and another for their strongest verbal acceptance. (Inter-rater reliability computed over these trial scores was very good .86 for intervention responses (weighted *Kappa*) and .97 for acceptance responses.) Then, over the two trials per condition, sum scores for intervention codes were computed (one sum for trials with explicit intervention as its highest code, one sum for trials with implicit intervention as its highest code and one sum for descriptive intervention as its highest code, each ranging from 0 to 2). Analogous sum scores were computed for acceptance responses. These formed the basis for statistical analyses.

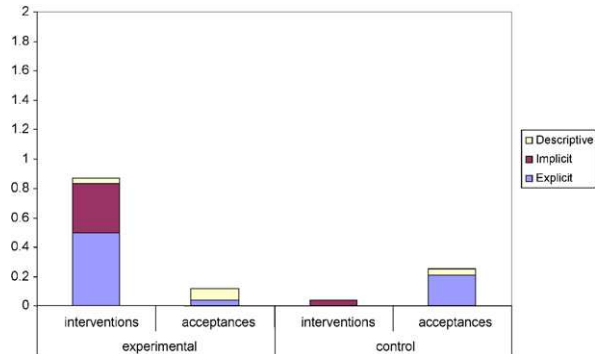


Fig. 1. Mean sum scores (0–2) of the different forms of intervention and non-intervention in Study 1.

1.2. Results

The mean sum of the different intervention and acceptance categories (explicit, implicit and descriptive) are presented in Fig. 1. On average, children intervened in 44% of experimental trials and 2% of control trials. They therefore intervened, significantly more often in the experimental than the control condition (Wilcoxon test, $p < .01$; this and all following p -values are 1-tailed). Children communicated acceptance of some sort on 6% of experimental trials and 13% of control trials, a pattern that revealed no significant difference between conditions (Wilcoxon test, $p < .20$). On an individual level, 12 children intervened on at least one experimental trial, and only one child intervened on at least one control trial. This difference also proved significant (McNemar's test, $p < .01$).

1.3. Discussion

Children in this study understood that the pretence–reality distinction is normatively governed. They grasped, for example, that in a pretend game not only might a pen be used as toothbrush, but that it *ought* to be used as such, and not for drawing. More generally, however, children showed understanding that the norms operative within a pretend game apply context-specifically. They protested when an individual joined the pretend game context and used the object functionally, but not when that individual performed exactly the same action without having first joined the game. In fact, in this situation, children often actively expressed acceptance (although not significantly more than in the experimental condition). In sum, then, 3-year-olds appear to understand something of the context-specificity of the normative rules that apply to games of joint pretence, as distinct from reality.

An analogous question arises here as to whether children of this age will apply different norms to different pretend games. That is, do they understand the pretence–pretence distinction as having normative consequences for action?

Additionally, it is possible that children in the experimental condition interpreted the puppet's declaration of intent to enter the game more richly than it in fact was. Although there is no direct evidence that they did so, perhaps they, for instance, interpreted the declaration 'I will play the toothbrush game' as an intention to perform a specific action of the form 'I will now do pretend tooth brushing'. If this were the case, children might have protested in the experimental condition because they felt the puppet failed to perform an action he had previously specified, and not in the control condition because they felt his declaration (for instance, 'I'd prefer to draw') to be consistent with his ensuing action.

Study 2, therefore, was conducted with two goals in mind—first, to explore children's normative understanding of the pretence–pretence distinction, and second, to rule out the unlikely possibility that children's previous protest could merely be due to perceived inconsistencies between the puppet's declarations and his ensuing actions.

Children were engaged sequentially in two different pretend games. The contexts were now marked spatially (one at location A, the other at location B) and by some minimal costume (each involving the

wearing of a different hat). At test, the puppet asked to take a turn and either entered or did not enter the target context, but without referring in any way to the action that might be performed. While in both conditions she performed the same pretend action, this action was inappropriate when performed at location B (and wearing a hat related to the theme of this game). By contrast, it should have been of no concern when performed at location A (whilst wearing the hat related to this particular game).

2. Study 2

2.1. Method

2.1.1. Participants

Twenty-four 3-year-olds (7 girls, mean age 37 months, range 35–39 months), none of whom had participated in Study 1, were included in the final sample. One child was excluded because he was uncooperative and, again, all children were recruited in urban day-care centres around Leipzig, were native German speakers and came from mixed socioeconomic backgrounds.

2.1.2. Design

The same within-subjects design as in Study 1 was used. However, since now two different pretend games were to be played (as opposed to one pretend game and a functional activity), the order of pretend identities within each task were also counterbalanced.

2.1.3. Materials and procedure

At the start of the session, the first experimenter (E1) introduced a puppet named 'Lola' who was animated by the second experimenter (E2). During a short warm-up phase, E1, Lola and the child played some non-pretence related games, such as rolling a marble down a wooden ramp. Here Lola made instrumental mistakes (for instance, trying to roll a cube instead of a marble down the ramp) in order to acquaint children with the puppet and with situations in which errors occur and they might intervene. Then the test trials began.

The child sat directly between two low-standing tables approximately one meter apart. On the 'Zoo' table to the child's left sat three furry animals. On the slightly lower table to their right stood 'Bob the Builder's house' as well as Bob the Builder and, lastly, his dog. E1 and Lola sat opposite the child, also between the two tables.

The common structure to both experimental and control trials was as follows: E1 explained that they would now play a game at Bob the Builder's house. She explained that for this game they would need to wear their helmets (which were uncannily similar to Bob's). E1 then produced an object with no obvious function (such as a yellow stick), and explained that Bob had grimy teeth. She declared the yellow stick to be their toothbrush, and all three parties, once having placed their helmets on, pretended to brush Bob's teeth with the stick. The object was then placed on the floor in plain view of the child, and E1 suggested they play 'the other game'. The helmets were taken off and replaced.

E1 then explained that they would now play another game and that for this game, they would need their animal-keeper caps, which E1 and the child proceeded to put on. E1 pointed out that the animals sitting on the Zoo table were 'hungry', declared the yellow stick to be a carrot, and both E1 and the child pretended to feed the animals in the Zoo. Then, in both experimental and control conditions, Lola asked if she could have a turn and proceeded to pretend that the stick was a toothbrush. However, in the experimental condition, before pretending she declared that she would also play at the Zoo, placed her animal-keeper cap on and pretended to brush the animal's teeth. By contrast, before pretending in the control condition, she declared that she would play at Bob's house, placed her helmet on and pretended to brush the teeth of Bob's dog at Bob's house. Therefore, while she performed the same pretend action in both cases, in the experimental condition she had joined the Zoo game and so her pretend tooth brushing was inappropriate. However, in the control condition she had returned to the Bob the Builder game, and so her pretend tooth brushing should have been of no particular concern. (Since this action was performed after the puppet moved to Bob's house, care was taken to maintain participants' constant attention. If this waned at any point, the puppet banged the object until the child looked back, and then continued the target action.)

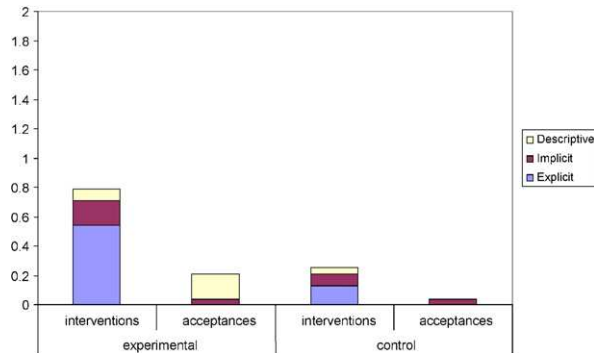


Fig. 2. Mean sum scores (0–2) of the different forms of intervention and non-intervention in Study 2.

The other three tasks followed the same procedural structure but involved the use of different objects and pretend identities—an oblong purple block used as pretend ‘shower gel’ in one game and a ‘bottle of milk’ in the other game, an orange cylinder used as a pretend ‘bottle of lemonade’ in one game and pretend ‘shampoo’ in the other, and a green disc used as pretend ‘soap’ in one game and a pretend ‘sandwich’ in the other.

2.1.4. Observation and coding

The observational, coding and scoring procedure was the same as in Study 1 although, of course, the coding of intervention and acceptance responses now focused on the two pretend games, rather than a pretend game and a functional activity. Thus, *explicit intervention* involved either protest against the puppet’s Bob game-related action, normative instruction to act according to the Zoo game or the demonstration of how to perform the Zoo game-related action; *implicit intervention* involved instructing the puppet to pretend according to the Zoo game; *descriptive intervention* involved description of something related to the Zoo game or forceful description of the puppet’s action. Analogously, *explicit acceptance* involved verbal affirmation of the puppet’s Bob game-related action or demonstration of such an action; *implicit acceptance* involved instructing the puppet to perform the Bob game-related action; *descriptive acceptance* involved the child describing something about the Bob game or the Zoo game in a non-intervening way.

Twenty-five percent of trials were coded by a second, independent coder who was blind to the hypotheses of the study. Inter-rater reliability computed over trial codes was .95 (weighted *Kappa*) for intervention responses. (It was not calculated for acceptance responses because both coders agreed that no child produced a response falling into this category on any trial.)

2.2. Results and discussion

The mean sum of the different intervention and acceptance categories (explicit, implicit and descriptive) are presented in Fig. 2. On average, children intervened in 40% of experimental trials and 13% of control trials. They, therefore, intervened significantly more often in the experimental than the control condition (Wilcoxon test, $p < .01$). They communicated acceptance of some sort on 11% of experimental trials and 2% of control trials, a difference which did not reach significance (Wilcoxon test, $p < .10$). On an individual level, 13 children intervened on at least one experimental trial and 6 children intervened on at least one control trial. This difference also proved significant (McNemar’s test, $p < .05$).

Children in this study understood that the pretence–pretence distinction is normatively governed. They grasped not just that an object may have two different pretend statuses, but that it *ought* to be treated according to one and not the other within a given game. Also, as in Study 1, children grasped that normative rules operate context-specifically. They protested when an individual performed some action having entered a particular pretend context but significantly less often when she performed the same action within a different context.

Unlike in Study 1, children rarely expressed acceptance in the control condition, although the reason for this is presently unclear. Perhaps they deemed returning to the game at Bob's house inadequate justification for failing to enter the Zoo game (thus intervening in 13% of control trials). However, since intervention behaviours are the target responses under investigation here, this will remain a question for future research.

Importantly, children intervened context-specifically in this study despite the removal of verbal cues that could potentially indicate the puppet's ensuing action. This suggests that children in the previous study may not have protested in the experimental condition on the basis of perceived inconsistencies between the puppet's declaration and his following action. It also suggests more generally that 3-year-olds understand that normative rules operate context-specifically, even when those contexts are marked implicitly by way of, for instance, spatial location and the wearing of associated clothing.

3. General discussion

Young children in the two studies presented here understood that the pretence–reality and pretence–pretence distinctions have normative consequences for action. They protested both when an individual joined their pretend game and acted instrumentally (Study 1) and when she joined their game but acted according to a different one (Study 2), and their interventions were unassociated with the particular way in which contexts were marked (verbally vs. non-verbally). Importantly, children failed to protest across both studies when exactly the same action was performed outside of the target context. This suggests that 3-year-olds apply norms context-specifically in their joint pretence.

These results are consistent with those of other studies in which children criticize the violation of norms within pretence games (Rakoczy, 2008). They also extend these findings by showing a grasp of the way in which an action becomes a violation depending on the context in which it occurs. In addition, they indicate an ability to judge instrumentally successful actions as nevertheless conventionally inappropriate (Study 1) and to judge actions that are conventionally appropriate in one context as conventionally inappropriate in another context (Study 2). More generally, their motivation to enforce game norms selectively is in line with findings in other areas such as non-pretence rule games (Rakoczy et al., 2008) but suggests further that this tendency may be generalized across various different types of activity.

It is worth noting here that, although more than half the children in each study intervened on at least one experimental trial, the overall intervention rates for the groups (as percent of trials) was below 50% in both cases. However, we used an especially demanding and particularly convincing measure of children's understanding of norm violations. Unlike in the case of card selection tasks (in which in which all possible answers are laid out as cards for the child to select from) or interview studies (in which children are given forced-choice questions), our focus on spontaneous and active protest required children not only to identify norm violations, but to actively police them. This, of course, produces a risk that the studies here underestimate young children's ability to identify normative rules violations. In particular, factors such as individual temperament or linguistic competence may have prevented children who recognized norm violations from expressing this understanding. However, even with such conservative measures, children demonstrated competence in this domain across both studies. And since children's tendency to protest normatively may not be something that is generally encouraged, and may indeed be actively discouraged, it seems all the more impressive that at least half of each group intervened at all. However, whether older children might intervene more readily is clearly an important question for future research.

Young children's appreciation of normativity and context has been assessed here through play, but later they will need to apply similar principles in order to understand more serious institutional practices. They will eventually need to appreciate, for example, that a hammer may be used in one context for carpentry and in another to adjourn court; that a hat may be used for rain protection in one context and in another to crown a king; or that while the words of a priest may constitute light conversation in one context, they may serve to consecrate a marriage in a different context. However, beyond this rather theoretical understanding, children may use context-specific normative rules to regulate their own actions. They may grasp, for instance, that in the context of the home or in the

company of kin, certain behaviours such as playing loudly, going naked or calling adults by their first name may be permitted, whilst in more public contexts, the same behaviours may be considered highly inappropriate. As children's own social status changes (they grow older, are formally initiated into their gender group and perhaps marry into new social or cultural groups, for instance), they must understand that this confers on them new rights, permissions and obligations—that is, that the normative context that a particular person inhabits changes through time.

Future research will elucidate the different cognitive skills that contribute to children's understanding of normativity and context. The possibility might be explored, for instance, that causal reasoning of the form 'if A happens, B will also happen' (Harris, 2000) forms some basis for subsequent deontic reasoning such as 'if A occurs, B *ought* to occur'. Another possibility is that a developing ability to switch between different conditional rules (Zelazo, Mueller, Frye, & Marcovitch, 2003) might contribute to an appreciation that normative rules operate context-specifically. Further open questions relate to how children develop an understanding of normativity and context across different domains (Kalish, 2005). Do they learn normative principles within each domain separately, for example, or first within a restricted set of activities which they then generalize to other areas? Interesting questions also remain with regard to the specific mechanisms by which they acquire such understanding. Candidate processes include experience and observation of the consequences of violations, of situations in which others use normative language ('you should/must/ought to X') and, perhaps, a broader assumption that the actions that they observe by others, including those on objects, all have a normative dimension to them (which would be in line with a seemingly human-specific and almost compulsive tendency to imitate others; Tomasello, 1999).

A complementary proposal is that children's conventional rule games, including those involving pretence, provide a developmental cradle within which young children come to understand the principles governing more serious institutional matters (Rakoczy, 2007; Rakoczy & Tomasello, 2007). In this regard, it seems significant that children equate game rules with conventional norms in some senses. They claim, for example, that in contrast to moral rules, acceptable variations in each may exist (Turiel, 1978). However, in addition to playing games in which the rules are pre-established, pretence may provide a particularly early and critical opportunity for young children to actively participate in the creation of conventional, constitutive rules. Experience with conventional and normatively regulated actions and objects in these non-serious and short-lived games, may familiarize young children with a rudimentary structure that they will later encounter as shaping important aspects of their adult life.

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Abstract

This study assessed the effects of joint attention on young children's decisions to coordinate with an adult. During the 'Stag Hunt' game players individually and continually collected low-value prizes (hares). Occasionally the additional option of collecting a high-value prize (stag) cooperatively with the adult arose, so children had to decide which to opt for. But if they tried to retrieve the high-value prize alone they lost everything. In the control condition, the child could see the prizes, see the adult monitor the prizes and was potentially aware that the adult could see the same of them. In the experimental condition, by contrast, the adult also looked over and made mutual eye-contact with the child, thus creating *joint* attention to the high value prize. Children coordinated with the adult to obtain the high-value prize more often in this condition, suggesting an important role for joint attention in children's decisions to coordinate towards joint goals with others.

Joint Attention Enables Children's Coordination with Others in a 'Stag Hunt' Game

In order to cooperate, people must coordinate (Brink & Gardenfors, 2003). For instance, if two individuals spot large prey on the horizon, and this prey requires cooperation for capture, each individual must decide whether or not to hunt. The problem is that this decision to act depends on what the other decides to do. Thus, to achieve a joint goal, individuals must coordinate their decisions.

The roots of these coordination skills are already apparent in the cooperative play of young children: In their cooperative games young children invite each other to join, for example, by offering out objects, and their peers respond to these overtures with complementary and reciprocal actions such that cooperative games get underway (Ross, 1982). Another key way in which young children initiate and coordinate cooperative games is by imitating one another (Eckerman & Didow, 1996). Further, infants readily repair breakdowns in coordination by communicating non-verbally with their partners (Ross & Lollis, 1987; Warneken, Chen, & Tomasello, 2006).

A little later, toddlers also begin to engage in cooperative problem-solving activities. Although they monitor and anticipate the actions of a partner during collaboration (by, for example, adjusting their position relative to them and pausing at appropriate moments to allow them to act, Brownell, Ramani, & Zerwas, 2006) little is known about how exactly this instrumental cooperation is initiated. Studies examining the conditions under which children cooperate

have used more formal, game theoretic models, and have focused on games embodying some kind of 'social conflict'. In the 'Prisoner's Dilemma' game, for example, children must choose an option representing either 'cooperation' or 'defection' (e.g. a card with circle or with a triangle). If both players 'cooperate', they each receive stickers. If a child 'defects' against a cooperator, he or she wins even *more* stickers. But if both defect against each other, they each receive the least amount of stickers possible. Faced with such decisions, children are understandably reluctant to cooperate, especially when they are unaware that they will play the game multiple times (Sally & Hill, 2006). Knowing that the game will be played repeatedly appears to promote cooperation with older children (Fan, 2000), and interpersonal processes affect the solutions they converge upon: Friends cooperate more with one another and the emotional reactions of players affect the likelihood that equitable solutions occur later (Matsumoto, Haan, Yabrove, Theodorou, & Carney, 1986).

However, although much attention has been given to 'conflict games' such as the Prisoner's Dilemma, they may not represent the ideal setting in which to investigate children's cooperation: Players benefit substantially from non-cooperation, and so the focus is on cooperative motivations when they conflict directly with players' own personal interests. But in other situations, cooperation may actually be best for all. These are modeled and known formally as 'coordination games', and here the focus shifts away from cooperative motivations, and further towards coordinative abilities. Again,

imagine two individuals who spot big game on the horizon and contemplate whether or not to embark on a hunt (with a continuous option of foraging for low-value foods individually). A joint decision to hunt cooperatively would mean huge gains for both but since a successful hunt requires two people, they must coordinate on a decision to attack. These decisions are especially important because hunting alone risks losing the secure, low-value option. Thus, the critical question becomes how to gauge whether the other person will also cooperate (with high uncertainty, a person might reasonably decide to forage alone, since this ensures the acquisition of at least some food). In fact, this particular situation is an example of a coordination game known in game theory as the 'Stag Hunt' (see Skyrms, 2004).

For two individuals to cooperate in a 'Stag Hunt' situation there needs to be mutual understanding of several things: Both must know that each prefers the high to the low-value option, that cooperation is required for its retrieval, and that this entails loss of the low-value prizes. Beyond this, when the particular opportunity arises, they both must know together that this high-value prize is indeed available. For instance, I may see a stag and also see you seeing it. But if you don't know I saw you seeing it, you might be unlikely to hunt. Moreover, even if you *do* know that I saw you seeing it, I may not realise this, and so still be reluctant to risk hunting alone. In fact, this problem iterates indefinitely, and so central to the solution of a coordination problem is some kind joint understanding, or 'mutual knowledge' of what the other sees, knows or intends to do (see Gilbert, 1989; Lewis, 1969; Schiffer, 1972).

However, a developmentally -and perhaps logically- more basic form of mutual knowledge may exist in the form of joint attention (Campbell, 2005; Peacocke, 2005; Tollefson, 2005). In conditions of joint attention to a target in which each attends to the object *and to each other's attention* (see Brink, 2001; Bruner, 1998; Tomasello, 1995, 1999) individuals may attempt to coordinate according to the following reasoning: if I see it, you see it, and we are both attending to each other, perhaps we can assume that enough critical information is shared between the both of us to launch our attack.

Regarding joint attention and cooperation, it has been found that toddlers who follow an adult's gaze direction and pointing gestures coordinate more with peers during a cooperative task (Brownell et al., 2006). However, to our knowledge, no studies have specifically examined the role of joint attention in children's decisions of whether to coordinate with others toward a joint goal. In the current study, therefore, we investigated whether and how joint attention to a target affected children's decisions to cooperate in a 'Stag Hunt' game. Both the child and an adult continually and individually retrieved low-value prizes. Occasionally, however, in addition to these, a high-value prize that could be shared became available. On seeing both types of prize available together, children had to make a critical choice: they could either retrieve the low-value prize alone (as they had been doing previously), or instead try to retrieve the high-value prize cooperatively with the adult. Importantly, if their attempt to cooperate was not matched by this adult, they would receive nothing at all. Children's decisions to cooperate or act

individually were investigated under two conditions. In the control condition, the child could see the prizes, see the adult see the prizes, and was potentially aware that the adult could see the same of them. However, the adult did not look to the child at all. In the experimental condition, the adult not only looked to the prizes but also made eye-contact with the child so that they had joint attention to the current prize situation - thus potentially establishing mutual knowledge of the presence of the high-value prizes.

Methods

Participants and Design

Forty-eight 4-year-olds (24 girls, mean age: 4 years, 9 months, range: 54-59 months) were included in the final sample (eight were excluded¹). All were recruited in urban day-care centers, came from mixed socio-economic backgrounds, and were randomly assigned to either the experimental or the control condition (between-subjects).

Materials

- i. *The Apparatus.* Three tubes were mounted approximately 30cm apart on a low table about half a meter high. The middle tube was twice the width of the two outer tubes, and all three tubes descended at a small gradient towards the players (see *Figure 1a*). The child (C) and the first experimenter (E1) sat on the floor at the lower end of the tubes such that the middle tube was between them, and each had a narrower tube to the outer side of their person.

Importantly, the tubes were open on the upper side so that when prizes were inserted in the top ends by a second experimenter (E2), they could easily be seen rolling down towards the two players. Also, each tube had a substantial-sized hole near the end where the players sat. When these holes were left unblocked, prizes inserted into the tubes would roll down and fall through into a large wooden box underneath (which was sealed except to allow prizes to fall inside).

ii. *Prizes.* There were two types of prize: Low value prizes (LVPs) consisted of a plain sticker for each of the players. High value prizes (HVPs) comprised both an attractive sticker plus a colored ball for each of the players (balls could be thrown into a yellow box to produce a fun sound)². Each player's LVP was placed inside a transparent plastic ball and these were always inserted individually into each of the *outer tubes* to roll downwards towards the players. The HVPs for both players were placed together in a larger transparent plastic container, and this was always inserted into the wider *middle tube* to roll downwards towards the players.

iii. *The blocks.* Each player was given a block (a small wooden disc). This could be inserted to block the hole in their own outer tube to prevent the LVP from dropping through the hole, and allow it to be retrieved. Alternatively, it could be inserted into the hole in the middle tube in an attempt to retrieve the HVPs. Crucially, however, since the hole in the middle tube was twice the size of the holes in the outer tubes, *both* player's blocks had to be inserted for

it to be properly blocked and to prevent the HVPs from falling through (allowing retrieval).

Insert Figures 1a and 1b about Here

Procedure

E1 and E2 collected C and brought him or her to the room with the toy. On arrival, a third experimenter (E3) greeted them, before sitting to the side to read. Then the procedure began (see Appendix for a detailed description of all rounds). The basic structure of the game was that players continually received *non-critical rounds* in which LVPs only were inserted into the tubes (so players could only retrieve a LVP each). However, these were interspersed with *critical rounds* in which both HVPs and LVPs were inserted, and on these rounds C was forced to make a decision: they could either retrieve their LVP alone, or else try to retrieve the HVPs together with E1.

- i. *Introduction.* Players received a short introduction to the toy and the round structure of the game: On each round E2 held the prizes up for E1 and C to see (either a LVP for each of the players, or a LVP for each plus HVPs for both). She then counted '1, 2, 3, go!' to signal that they should choose where to insert their blocks and do so. Once the blocks were in place, she inserted the prizes into the tubes to roll down for retrieval.

- ii. *Training.* C received some brief training with feedback to highlight the fact that the LVPs could be retrieved alone, but the HVPs could not.
- iii. *Pre-tests.* C received a series of pre-tests designed to ensure they understood the basic principles of the game, and mechanics of the toy (if a child failed any of these pre-tests, they were excluded).
- iv. *Visual barrier.* In preparation for the test rounds, a barrier was assembled which prevented players from seeing each other's actions on the toy (visual access was prevented both from above and below, see *Figure 1b*). Thus, although, they could still see each other, from this point onwards players had no visual information about where the other's block was placed. All then moved away from the toy for a short break.
- v. *Test rounds.* For the test section, E1 left the room. E2 then invited E3 (who had been reading quietly until now) and C to take up play positions at the toy, and pretended that a teddy bear had gone to sleep so they should try not to talk. Then in both conditions, players received a series of non-critical rounds interspersed with two critical test rounds. Again, on these rounds, C had to decide whether to retrieve the LVP by inserting the block into their outer tube, or to try to retrieve the HVP by inserting the block into the middle tube. But now, C played alongside E3 with whom she had no previous play history. In addition, she could not see E3's actions on the toy, and was also discouraged from communicating on account of the 'sleeping teddy'. The difference between conditions was that in the control condition, when the prizes were held up E3 visually monitored these only. In the experimental

condition, by contrast, when the prizes were held up E3 looked to the prizes *and* then made mutual eye contact with C, thus establishing joint attention with C to the prizes.

Observational and coding procedure

The central question of interest was whether the establishment of joint attention affected children's decisions to cooperate. Therefore, sessions were videotaped, and for each critical test round a coder recorded where C's block was when the prizes were either collected or lost through the holes in the tubes. Children were coded as either having *cooperated* if their block was in the middle tube, or as having played *individually* if their block was in the outer tube at this time. Twenty percent of trials were coded by second, independent coder, and inter-rater agreement was 100%. (Successful mutual eye-contact between E3 and C in the experimental condition was coded online by that experimenter³).

Results

The number of children who *cooperated* and who played *individually* across both test rounds by condition is presented in Table 1. However, the first test round was the main focus of analysis, since this likely established a precedent on which children's second choices were based. On their first test rounds, more children cooperated after joint attention had been established (Experimental condition: 19 cooperated; 4 played individually) than in

conditions of individual attention (Control condition: 11 cooperated; 12 played individually, Fischer's exact test, $p < .05$). As expected, children's choices to cooperate or play individually were highly consistent over their two trials, as can be seen in Table 2 (Experimental condition: McNemar's test, $p = 1.00$; Phi correlation, $z = .68$, $p < 0.01$; Control condition: McNemar's test, $p = 1.00$; Phi correlation, $z = .73$, $p < 0.01$). Children also cooperated more across both of their rounds after joint attention was established in the experimental condition than in its absence in the control condition (Mann-Whitney U-test, $p < .05$).

Discussion

The current study established that 4-year-old children's decisions to cooperate with a partner are strongly influenced by joint attention with that partner to the immediate payoff situation. Even when children could see the target, could see their partner seeing the target and were potentially aware that this partner could see the same of them, around half the children failed to coordinate with the adult (control condition). By contrast, the addition of mutual attention to one another, that is, the establishment of joint attention to the target led the majority of children to form a joint goal to cooperate (experimental condition).

These findings are in line with others which show that toddler dyads visually monitor each other's behaviour during cooperation, and that those who follow an adult's gaze direction and pointing gestures coordinate more

with peers on a separate task (Brownell, et al., 2006). However, they extend these findings by showing that joint attention plays a central role in children's online cooperative activities, and that it establishes the kind of mutual knowledge necessary for forming a joint goal in the first place. Our findings are also broadly in line with those demonstrating cooperative tendencies in children in social conflict situations such as the Prisoner's Dilemma (as in Fan, 2000; Matsumoto, et al., 1986). However, in our study children's cooperative tendencies were assessed in the absence of competing temptations to defect for higher gain. Thus our question was less about children's cooperative motivations and more about their skills in coordinating with others when cooperation was best for both. Lastly, by requiring that children act instrumentally to retrieve prizes (rather than choose cards or abstract shapes representing cooperation), it was possible to assess not only not only the decision-making aspect of children's cooperative engagement, but the way in which it manifests itself in actual joint action.

It is worth noting that even in the control condition, nearly half the children did attempt to cooperate. One explanation for this is that the uncertainty of the situation led children in this group to choose randomly. Another is that some children deliberately choose to play individually (being unsure of what the experimenter would do), while others simply assumed she would cooperate and so also did so. Such assumptions were conceivable for multiple reasons: In order to prevent children from monitoring the experimenter's actions either visually or by listening for movement, the adult

sat stationary and right beside the child. Thus some children may have assumed they were in joint attention with her, despite the fact that she had not looked over at them. In addition, this experimenter had greeted them upon arrival and was clearly an associate of the other two experimenters, so even this minimal interaction and background knowledge may have lead to assumptions of her cooperativeness. Although it is not possible to discern whether children were choosing randomly, systematically in opposite directions or a mixture of the two, it is clear that conditions of individual attention left children with uncertainties about whether their partner would collaborate. This points all the more strongly to the way in which a joint attentional framework provides a common foundation upon which children are willing to launch joint action.

The results of this study suggest more widely that joint attention may operate as a primitive form of 'common knowledge' in both children and adults (see Gilbert, 1989; Lewis, 1969; Schiffer, 1972, on such forms of knowledge). For one thing, there are structural resemblances in the way in which both joint attention and common knowledge can iterate recursively: Just as I may 'know that you know that I know etc', I may also 'see that you see that I see etc'. However, the perceptual nature of joint attention may allow individuals to bypass these complex inferences: each person can literally *see* the other person attend to a target and to themselves in a way that they cannot see each other's knowledge states (Peacocke, 2005). Under certain conditions, therefore, people may use joint attention as a heuristic for

assessing whether mutual understanding of a situation exists (see Clark & Marshall, 1981, on 'co-presence heuristics'), and may apply this specifically to solving coordination problems (Campbell, 2005). However, while joint attention may be useful in coordinating certain cooperative activities in adults, it may be rather critical in the case of young children whose abilities to reason via complex, iterated, recursive knowledge states are questionable, but who nevertheless engage skillfully in cooperation (Tollefson, 2005).

Future research will elucidate the role of joint visual attention in children's more natural cooperative interactions, and in particular, those involving peers. In addition, investigation may continue into the specific way in which joint attention promotes the enterprise of cooperative action: One possibility, for example, is that the establishment of joint attention simply raises children's expectations of cooperation by establishing a common base of shared perceptual information in the environment. But it is also possible that, in addition, it creates normative expectations, acting as an implicit form of 'agreement' to embark on a common goal together (see Gilbert, 1989). Further questions also relate to how more contextual factors affect children's ability to solve coordination problems: when they must settle on one of multiple solutions to achieve their goal, how children use salience of a target or particular form of action, or previously established precedents to decide how to coordinate together (see Lewis, 1969) may be interesting topics of research.

The way in which children coordinate towards a cooperative goal has been assessed here via the use of an abstract game theoretic model and a mechanical toy. However, the underlying decisions involved have real-world equivalents: Any activity in which individuals must decide whether or not to act cooperatively, and in which the success of the endeavor rests on mutual involvement of others poses the same dilemma. Thus, participating in a public protest, hunting for prey, or even doing a tango dance performance are all 'Stag Hunt' situations in some sense. What has been shown here is that joint attention may function as a coordination device in such contexts. Indeed, establishing joint attention with children appears to be particularly effective in inducing their cooperation.

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Appendix

Sequence of Rounds Given to Children During the Procedure

Phase	Structure of rounds
Introduction	<ul style="list-style-type: none"> - Players watch LVPs lost - Players win LVPs - Players watch HVPs lost - Players win HVPs
Training	<ul style="list-style-type: none"> - Teddy ‘takes’ C’s block away, E1 plays individually and then leaves, C inserts block with guidance from E2, E1 returns - E1 plays cooperatively, C inserts block with guidance from E2 - E1 plays cooperatively, C inserts block with guidance from E2 - C’s block is hidden, E1 plays individually and then leaves, C’s block is ‘found’, C inserts block with guidance from E2 - E1 returns
Pretests	<ul style="list-style-type: none"> - Training repeated with no guidance or feedback - E1 gives C her block (so C has both blocks) and leaves, C inserts block, E1 returns - E1 notices her block is ‘broken’ and leaves to repair it, C inserts block - Full barrier assembled
Test trials	<ul style="list-style-type: none"> - C and E3 play two critical rounds

Note. The introduction consisted of non-critical rounds only, but all other sections consisted of non-critical rounds interspersed with critical rounds.

Footnotes

¹ Five failed pre-tests, 1 due to experimenter error, 1 because she explicitly indicated which prizes she would retrieve at test and 1 because she failed to make mutual eye contact with the experimenter on either test trial (see procedure).

² Children were given a preference test in which they were asked whether they preferred the HVPs or the LVP, asked in counterbalanced order. There was a clear preference for the HVPs (Binomial test, $p < 0.01$, this and all results presented henceforth are 1-tailed), and there was no effect of the order in which prizes were presented on children's preferences (Fischer's exact test, $p = .35$).

³ Four children failed to spontaneously make eye contact with E3. In this case she either made a tapping or a 'pssst' sound in order to establish eye contact. In a conservative control analysis these children were excluded altogether, but since performance on children's first test round (the main focus of analysis) remained different between conditions even on this analysis (Fischer's exact test, $p = < .05$) these children are included in all further analyses.

Table 1

Number of Children who Cooperated and Played Individually on Each Test

Round Across Conditions

	Trial 1		Trial 2	
	Exp	Ctrl	Exp	Ctrl
Cooperate	19	11	15	13
Individual	4	12	4	10

Note. Some children in the experimental condition had 1 trial excluded because they failed to make eye contact with E3 ($N = 6$), and some in the control condition because they clearly communicated which prize they intended to retrieve ($N=1$) or they removed their block as the prizes were rolling down the tubes ($N = 1$).

Table 2

Number of Children That Choose Consistently vs. Switched Strategy Between

Trial 1 and Trial 2

		Trial			
		1			
		Exp		Ctrl	
		coop	indiv	coop	indiv
Trial 2	coop	13	1	10	2
	indiv	1	3	1	9

Figure Captions

Figures 1a and 1b. ‘Stag Hunt’ apparatus without and with full barrier

Figure 1a

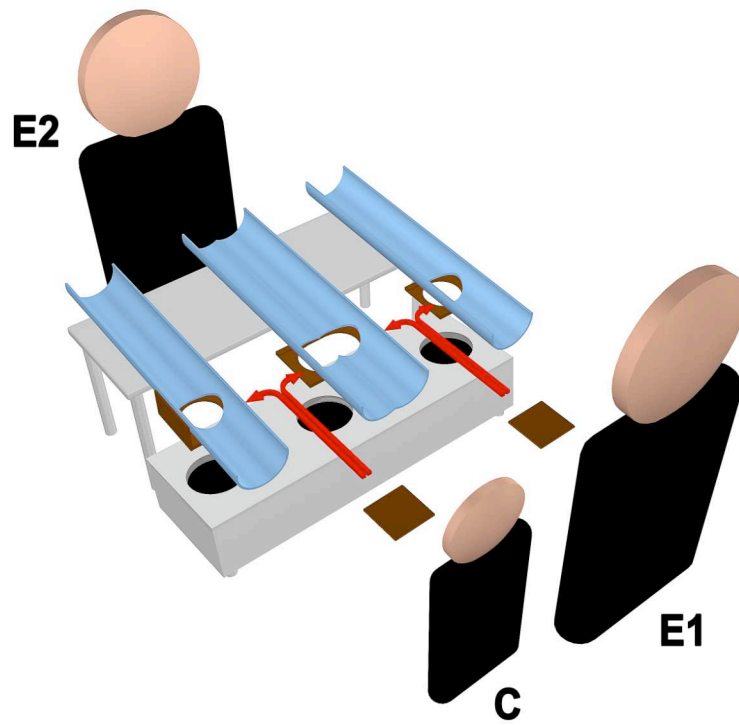
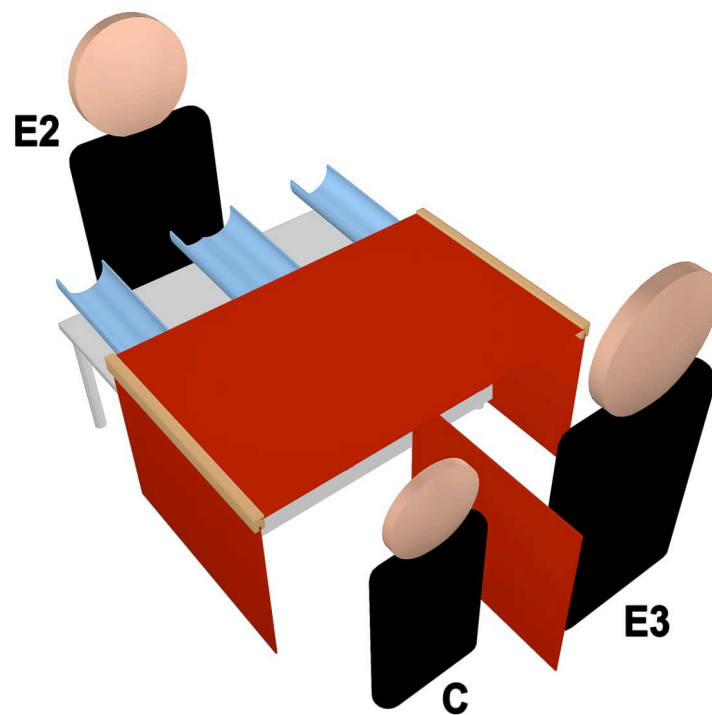


Figure 1b



**YOUNG CHILDREN'S UNDERSTANDING OF AND ENGAGEMENT IN
SOCIAL CONVENTIONS**

A thesis submitted to the University of Manchester for the degree of
Doctor of Philosophy
in the Faculty of Medical and Human Sciences

2009

EMILY WYMAN

SCHOOL OF PSYCHOLOGICAL SCIENCES

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Abstract

Adult social life is shaped by conventional practices, and these are often mediated by the use of conventional objects. For instance, we have conventional locations at which to gather for our meetings, conventional ways of cooperating with each other and conventional procedures for conducting formal ceremonies such as weddings. Objects with conventional functions are embedded within these practices, such that we may use train tickets that enable us to travel to those meetings, words to communicate with fellow cooperators, and wedding rings to signal our newly married statuses. This thesis investigates several aspects of children's engagement in, and understanding of social conventional practice. The question of what social conventions are, is complex. Chapter 1 reviews some influential philosophical attempts to tackle the issue, along some particular dimensions of disagreement. Special attention is given to the following questions: whether social conventions are solutions to situations in which people try to coordinate together, whether there is a normative dimension to social conventions, how the notion of 'fiction' relates to conventional phenomena, and what the psychological prerequisites are for understanding and engaging in conventional practice.

Chapter 2 reviews existing developmental data on children's understanding of conventionality. This starts with the work of Jean Piaget and his investigation of children's understanding of the underlying structures of social convention through their games. More recent empirical work is then reviewed in which children's understanding of conventionality across the domains of language, tool use and games have been explored.

Chapter 3 presents a series of studies in which children's understanding of conventional object functions were investigated. Children (mean age 3;0) played with an object whose pretend identity changed between two different pretend games. They competently tailored their pretend actions to this object when it changed between pretend contexts, showing a grasp of the context-relativity of conventional object functions. The pair of studies presented in Chapter 4, examined children's understanding of the normative aspects of conventional object functions. Children (mean age 3;0) observed a puppet use an object endowed with a pretend identity according to its real function or according to a different pretend identity. They protested when the puppet did this having joined the pretend game but not when he did so outside the game context. This shows a grasp of the way conventional object functions are normatively governed, and a tendency to enforce those normative rules in joint pretence. In Chapter 5, a new study is presented in which children's willingness to adopt a cooperative convention was investigated. Children (mean age 4;9) were engaged in a coordination game in which they could either cooperate with an adult to retrieve some high-value prizes, or act alone to retrieve a low-value prize. It was found that the establishment of joint attention to the high value prizes induced more children to coordinate towards the cooperative convention than did conditions of individual attention. The idea that joint attention may operate as a developmentally primitive form of 'mutual knowledge' in children, enabling coordination is discussed. Chapter 6 summarizes the results and theoretical implications of these studies, and highlights directions for future research.

Declaration

I declare that no portion of the work referred to in this thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

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Introduction

Consider a man who wakes up at eight in the morning. He goes to the kitchen for a drink of water. Then he takes his place at the breakfast table, and enjoys coffee and croissants together with his wife. He then puts on his suit and drives to work, arriving punctually by nine. On entering the office, he says ‘Hello’ to his fellow work-mates, joins a conference call, and strikes a big deal for the company. It is still only eleven in the morning.

This short story may be striking at one level for its sheer dullness. Indeed, one element of his morning practice, going to the kitchen for a drink of water, seems particularly mundane- he is thirsty, there is no water in the bedroom and so he goes to the kitchen to get some. But it is easy to overlook a remarkable feature of the other actions he performs. This is that nothing else this man does is in response to the features and constraints of his physical environment. He gets up for work at eight, eats croissants with his wife, wears a suit, drives on the left hand side of the road, greets people, speaks in English, and coordinates business deals because other people expect this of him, and he knows this. Unlike getting a drink of water, the man performs the rest of these actions for *social* reasons. The social motivation behind many of our activities lies at the heart of conventional practice.

The fact that these activities are not dictated by the material features of our environment leads to a degree of *arbitrariness* in their form. There is no physical or principled reason the man ought not to wake at nine and aim for work at ten, sit next to, rather than opposite, his wife, and drive on the left rather than the right.

But collective recognition of what are appropriate work, dining and motoring practices, essentially allow individuals to coordinate with one another. Indeed, this appears to be one of the central functions of social conventions: that they enable people to *coordinate* socially.

The social basis and arbitrariness of conventional practice also gives rise to a degree of *alterability*. If the man and his boss agree that ten o'clock is a better time to start work, they can change the convention in the office accordingly. It can even be agreed amongst staff that the people in accounts will arrive at work at ten, but those in human resources may arrive at ten thirty. This highlights another fundamental feature of conventions, namely that they exist *context-specifically*. This gives rise to wide cultural variations in practice such that, for example, people start work at different times, travel in different ways and communicate in different languages.

These, then, are the basic features of social convention: They are phenomena that exist by social consent or acceptance. They are to some degree arbitrary in nature, and as such are subject to change and contextual variation. And they allow people to coordinate in some way.

The aim of this thesis is to examine what young children understand of these aspects of social conventions, and how they engage in conventional coordination. To this end, three sets of studies are presented in which these issues were explored, and these are included in the form of published and submitted journal articles. My own contribution to these studies was as follows. I conceptualized and designed all games that formed the basis for the experimental procedures. I also developed and built all toys that were used. I either supervised, or myself

conducted, piloting for each procedure. I supervised the formal testing phase of each procedure, which was conducted by native speaking German research assistants. I devised coding systems for each data set, and trained coders to analyze and code the videotapes taken during testing. I analyzed the data for each study, wrote the papers and submitted them to the relevant journals. I also corresponded with the journals regarding revisions. My collaborators, Hannes Rakoczy and Mike Tomasello both played a central advisory role throughout the process.

Since the studies are presented in published (or publishable) form, they do not include the more extensive theoretical or empirical background that motivated them. They are, therefore, prefaced by two detailed chapters that explore the philosophical and developmental literature relevant to children's understanding of social conventions. Chapter 1 is devoted to exploring different philosophical approaches to the notion of social convention. Specific attention is given to the normative aspects of convention, how objects can be invested with conventional functions, the relationship between convention and the notion of 'fiction', and the psychological pre-requisites of conventional practice. Chapter 2 reviews previous research on children's understanding of, and engagement in social conventional practice. Specific attention is given to Jean Piaget's early work on children's understanding of conventional rules. This is followed by an analysis of more recent work on how children learn and understand the conventionality of language and conventional artifacts. Lastly, research on children's understanding of, and engagement in, conventional games is then reviewed. The three sets of studies are then presented separately as Chapters 3-5. Finally, the thesis concludes with a

General Discussion summarizing my findings and the research questions they raise. Their developmental and theoretical implications are explored, and a tentative developmental picture is offered of how children come to learn social conventions.

Chapter 1. What is a social convention?

Various different attempts have been made to characterize the notion of a social convention (for a comprehensive overview, see Rescorla, 2008). Most include the basic ideas that conventions have a social rather than ‘natural’ basis, an element of arbitrariness, and exist relative to a context or community, but accounts also differ along various lines: Lewis (1969), for example, sees the prototypical convention as a pair of actions in which several people coordinate together. Conventions for Gilbert (1989), however, are normative principles of action that several individuals may adopt. Millikan’s (2005) characterization of convention is far broader, and includes all phenomena that are reproduced, and take their form on the basis of precedent. Lastly, Searle’s (1995) notion of convention is tied to specific notions of conventional status and power. These will be discussed in turn in an attempt to highlight some basic similarities and points of disagreement.

The question of what kind of psychological pre-requisites might exist for understanding, and for engaging in conventional behavior is also complex. Theories of fiction offer interesting insights into the psychological dimension of conventionality, and those proposed by Walton (1990) and Searle (1979) will be discussed in this regard. Lastly, further psychological pre-requisites will also be explored, in particular, those of mutual preferences, mutual expectations, and the notion of ‘common knowledge’.

1.1 Four approaches

1.1.1 Conventions as coordinated actions

The most well known attempt to target the question of what social conventions are is that of David Lewis (1969). His aim is two-fold: to address the specific way in which language may be viewed as conventional, and to show that the first linguistic conventions need not have arisen by explicit agreement, since this would require some form of language in the first place. The result is a formal description of how conventions operate in language, but that is rooted in conventions of non-linguistic action.

A convention for Lewis is a regularity in the behavior of at least two people who face recurrent situations in which they desire to coordinate. For instance, two people may occasionally have their telephone call cut off. Each desires to continue the conversation and they must coordinate on who calls back and who waits to receive in order to finish the conversation. Importantly each person's decision about how to act is interdependent upon the other's. That is, in order to re-establish the conversation either one must call and the other wait, or vice versa. They cannot act independently if they are to achieve reconnection. In his game theory-based approach, coordination problems such as this are represented by way of payoff matrices that specify each player's actions as payoffs. For instance, if person A calls and person B waits (or vice versa) each receives a payoff of two. But if both call or both wait, each receives a payoff of zero. Conventions are

pairs of actions or ‘coordination equilibria’ that constitute solutions to the problem such that no player can attain higher payoff, given the other player’s move.

Central to his account is the notion of arbitrariness, captured by the fact that a coordination problem has at least two equilibria (or pairs of actions), in which no player can gain by unilaterally changing his decision. In some coordination games there may be joint preferences as to which of these equilibria is preferred. For example, both prefer that the caller calls back. But in ‘pure’ coordination games there is no preference, so A could call while B could receive or vice versa. However, in all coordination games players prefer overall to settle on a solution rather than fail to coordinate at all.

The fact that agents must choose between multiple solutions, and that their decisions are interdependent adds a social-psychological dimension to the notion of a convention: each *prefers* to conform to the convention if others do, and so each must form *expectations* about the other’s likely actions. Thus, in order to figure out what one agent should do, he or she has to reason about what the other will do. For example, if person A expects that B is likely to call, she will prefer to wait and receive the call. If, on the other hand, she does not expect person B to call, she will prefer to do the calling herself rather than risk coordination failure.

However, a recursion problem may arise here: when one person reasons about the likely actions of the other, she must take account of the fact that the other person is likely to be reasoning the same of her. For instance, if I am trying to decide whether to call back, I have to reason about whether you will decide to call back. But you are probably reasoning the same about me. Therefore, in order

to figure out what to do, I must reason about the way in which you are reasoning about my own reasoning and so on, potentially *ad infinitum*. Thus the defining features of a convention, for Lewis, also include recursive expectations, and some ancillary premises about each other's rationality and inductive standards. These produce 'mutually concordant expectations' about each other's actions and if these are commonly known (in a way to be detailed later), coordination on a convention will result.

So, how do agents coordinate between multiple coordination solutions? They can of course just agree on what to do together. But Lewis' goal is to explore the alternatives. One tool he borrows from Shelling (1960) is that of 'salience'. For example, if our call gets disconnected, we may both reason that the fact that one person originally called makes his calling back a salient solution. Perhaps we even discussed such a situation that happened to friends, in which the caller rang back, further increasing the salience of that solution. In familiar coordination situations, however, the particular form of salience responsible for two people having mutually concordant expectations is 'precedent'. If the same thing happened to us last week, and the caller called back that time, this will provide a basis on which the problem can be solved in future instances. The idea is that precedent acts as a particularly strong form of salience when individuals face recurrent coordination problems.

More generally, coordination problems are seen to arise in a wide range of circumstances. For example, a famous pure coordination taken from Hume (1740/1967) is of a situation in which two people seek to settle on a common rowing speed in a boat. Neither cares much about the particular rhythm, as long

as each row in time. Communication is also considered to pose a series of coordination problems, as Lewis originally argued with regard to language. Individuals wish to interact such that the speaker's communicative intention is successfully conveyed to the listener. Neither cares much as to which particular linguistic devices are used in order to achieve this, as long as they allow coordination such that mutual understanding is achieved. Another famous example borrowed from Rousseau (1762) is known as the 'stag hunt'. Two individuals can either hunt hare individually, or rather cooperate to hunt a stag for substantially more meat. But there is a risk: capturing the stag requires two people, and if an individual attempts it alone, his hare escapes and he ends up empty-handed. Other examples include choosing which side of the road to drive on, which language to communicate in, and whether to wear formal or informal dress to a party.

In sum then, Lewisian conventions are instances in which people act to solve recurrent coordination problems. They are characterized by the existence of conditional preferences to conform to one course of action over another, depending on what others do, and mutual expectations of action that are commonly known to the parties involved. This framework for investigating conventions is used in the study presented in Chapter 5. Specifically, children played a game representing Rousseau's 'Stag Hunt'. They and an adult were faced with two possible courses of action. They could either act individually to receive a low payoff (hare), or rather cooperate to retrieve a high payoff (stag). However, their decision required coordination because if one player tried to retrieve the high payoff alone, they would receive nothing. The philosophical

background to this study will be further elaborated on later in this chapter in section 3.1 on psychological pre-requisites. However, Lewis's notion of a social convention has been criticized on many fronts and so, first, it is with reference to these criticisms that alternative notions of conventions will be discussed.

1.1.2 Conventions as normative principles

Gilbert (1989) criticizes Lewis along two key lines. She claims that social conventions may not necessarily involve coordination, although many do. But also, and more profoundly, she claims that he fails to illustrate the intrinsically normative nature of conventions. These points will be dealt with in order.

Firstly, she attempts to show how a convention may arise outside a context of coordination as evidence against a necessary connection between convention and coordination. While it is not clear that emergence within a coordination context is necessary to a definition of social convention in any case, her example does highlight a degree of subjectivity in characterizing the notion of coordination in general: Peter happens to have cooked spaghetti the last three Sunday nights. His daughter Anne comes to expect this. Once in a while he does tuna (they are out of spaghetti). Anne is always surprised when this happens, and Peter occasionally apologizes or states an excuse (e.g. 'we were out of spaghetti'). Later, Anne is in charge of dinner and does tuna salad, and he says 'I thought we were supposed to have spaghetti on Sundays'. Anne replies, 'I know but I don't know how to cook spaghetti' (see pg 398). The claim is that this shows that conventions may emerge without a need for coordination. But this example may

be read as analogous to the telephone reconnection example: The two want to eat together. One cooks, the other waits to be served. They have no preferences about what is eaten, but want to eat together for sure. They settle on spaghetti as a solution and, unless contextual factors change, they continue with their established precedent and have a mutual expectation that this will be so. As further examples of non-coordinative conventions, Gilbert notes that, for example, while in one culture it may be conventional to sleep on a bed, in another the convention might be to sleep on a rug. However, in defence of Lewis, these behaviors may be more aptly termed collective habits, rather than anything that might be considered a specifically *social* convention (see, Bicchieri, 2006). And it is important to note that the fact that there is cross-cultural variation in a particular behavior does not make it conventional. If something is done for practical reasons (for example, people normally sleep on the floor, but in countries where the ground gets cold at night they use beds), this is a practical matter, not a conventional one (Millikan, 2005). Another of Gilbert's arguments against conventions involving coordination is the fact that people often observe conventions when others in the group are absent (e.g. men do not wear skirts, even when they are alone). But surely personal observance is not evidence against any previous or current social function.

In any case, Gilbert's primary criticism of Lewis's definition of convention is that it fails to capture the aspect of social conventions that render them 'a moving force' (pg 348). More positively, it is the essence of convention for Gilbert that it involves, firstly, the notion of a group of individuals who recognize themselves as a group and, secondly, who adopt a principle of action that is

normatively binding. The idea is that in order to engage in some form of conventional behavior, there must have been a manifestation of willingness to be subject to it. This manifestation essentially results in the formation of a social group or, what she terms, 'plural subject' defined by its readiness to engage in action together, should the occasion arise. So what makes a plural subject? Communication of some sort is central to her account. For instance, one person may ask another to dance, and the other replies 'with pleasure'. However, it need not be verbal. One example she gives is of a person who begins to build a tower. Others join in and this comes to happen repeatedly over time. It may become open in such a situation, she claims, that all have expressed their quasi-readiness to join into such activities and all realize this. The point is that the fact that there has been open manifestation to be part of a group entails commitments, and further tacit acceptance of a simple fiat of the form 'under certain conditions we will build together'. This, for Gilbert, is a convention. Now, it is debatable whether this is an accurate description of what is necessarily required to characterize the notion of a social convention. But for the purposes of this discussion, what is important is that for Gilbert, conventions involve the notion of 'doing something together as a group' (at least potentially), and resemble a kind of tacit or quasi-agreement, so that if the convention is not adhered to (for example, one fails to join in building under the appropriate circumstances), there will be consequences following the violation.

There are a number of difficulties in addressing the question of whether conventions have, by definition, normative force. Since definitions of convention vary in the first place, it is possible to claim that there are conventions that are not

normatively governed, but also to claim these are not conventions in the first place. To further complicate the issue, the notion of normativity is itself characterized in many and varied ways in general, as well as with regard to social conventions. Thus while Gilbert describes normativity as deriving from quasi-agreement type phenomena and joint commitments suggesting that non-conformity would lead to interpersonal dispute, Bicchieri (2006) discusses the consequences of norm violations more in terms of reputation, loss or ostracism. Yet other accounts (one to be dealt with shortly) recruit, rather, the notion of ‘deontic’ normativity entailing prescribed rights and obligations (and for different accounts of normativity, see Elster, 1989; Searle, 1964; Zangwill, 2005). However, across accounts, there is some agreement that social conventions, at least sometimes, have a normative component: We ought to drive on the correct side of the road, ought to greet people appropriately, ought to cooperate with colleagues in some particular way, and so on. A deeper question, then, is whether this ‘ought’ derives from external norms operating in conjunction with conventions, or rather a normativity that is intrinsic to the notion of convention itself.

In light of this dilemma, one option might be to treat the question as an empirical one. Indeed, there is some data relevant to the question in adults. Guala and Mittone (forthcoming) asked whether individuals who engaged in coordinative conventional behavior might see those conventions as having intrinsic normative force. They reasoned that, if they do, experience in such coordination would prevent people from abandoning the convention if an opportunity to do so for some gain presented itself. If, on the other hand

conventions are not intrinsically normative, the rational move in such a situation would be to abandon coordination. They had adults repeatedly play a pure coordination game in which they could not see each other's actions. If players chose matching colors they would receive equal reward, regardless of which color they settled on. But they would receive nothing if they failed to choose a common color. Indeed, players settled on a common color over just a few rounds that they stuck too thereafter. However, in the last round, potential deviants were told that the game had been turned into a conflict game. That is, if they defected against the others they would receive higher payoff. However, their potential cooperators did not know this opportunity for defection had arisen (implying they would continue to play as they had been doing based on precedent). They found that only 30% of subjects defected, suggesting the operation of some norm associated with sticking to the convention.

However, it was unclear whether this was a general external norm or rather something deriving from previous adherence to the convention. Thus, the effects of previous coordination were removed: subjects were given the same decision of whether to coordinate or defect, but without the previous rounds of coordination to the convention. Now 68% defected. The authors conclude that the external norms and instrumental rationality were the same in both cases, but what had been removed was the intrinsic normativity associated with repeated conformity to the convention. While there are alternative interpretations to this conclusion, what is important here is that the issue of whether social conventions have a normative component may potentially be regarded as an empirical issue.

The studies presented in Chapter 4 ask the specific question of whether young children view conventions as normative. More specifically, children played with objects invested with conventional functions. A puppet then entered and used the objects somehow ‘inappropriately’, and children’s normative protests were examined in response to this. The point for now, however, is that theoretical and definitional disagreement over whether conventions have a normative component may not be the end of the story.

1.1.3 Conventions as reproduced phenomena

For a distinctly non-normative account of social conventions, Millikan (2005) offers a reproduction-based account of the phenomenon. On her ‘biological’ model, a convention is any entity that is reproduced and takes its form at least in part from weight of precedent. Thus while she takes care to exclude practices that persist through time because of instrumental efficacy (buttoning shirts from top to bottom, for example,) practices such as driving on the left-hand side of the road or sending a thank you note after a dinner party are conventional because they at least partly take their form by virtue of what was done before. An element of arbitrariness is thus captured on this account too.

Like Gilbert, Millikan claims that some conventions may not involve coordination, but her counter-examples are often equally unconvincing. For example, non-coordinative conventions include handing out cigars after a baby boy is born, decorating with red and green at Christmas, and wearing white socks to tennis matches. Since these practices are seen to be reproduced through time,

and take their form partly due to precedent, they are considered conventional on this definition. But, as with Gilbert's examples, the fact that people often wear white socks to play tennis would be classed as a collective habit by others accounts (see again, for example, Bicchieri, 2006). In addition, although some of Millikan's non-coordinative examples do not comprise cases of dyadic bodily coordination, they may be coordinative in a different sense. For, example, might not handing out cigars on the birth of a baby boy be part of an interaction in which fathers and friends coordinate joint celebration?

In addition, Millikan's definitional focus on reproduction and precedence leaves open the question of how conventions emerge. This is important because it is unclear whether many of the examples of non-coordinative conventions cited might not have originally have performed coordinative functions which were later lost or became opaque to those practicing them. It is possible to imagine, for instance, that there was at some point a social signaling function to decorating one's house at Christmas in a particular way (with specific colors being adopted arbitrarily), although the coordinative function is no longer easily discernable. Millikan does not argue either way on this point, since her key interest is in convention transmission, not emergence. Therefore, coordinative conventions become a subclass of the phenomena on her account.

Nevertheless, coordinative conventions remain of central importance particularly with regard to her main focus, language. Millikan, like Lewis, sees communication as posing a series of coordination problems and linguistic devices as solutions to these problems. Thus in wishing to make an assertive speech act (see Searle, 1969), for example, so as to draw someone's attention to a dog, a

person might employ the conventional utterance, 'there is a dog'. The conventionality derives from the fact that had that person's predecessors used the word 'cat' in its place, the speaker would have also done the same.

More interestingly, however, Millikan argues that conventionality can enter even the semantic conditions that govern speech acts, such as assertions, directives, or requests. Her claim is that the specific conditions of satisfaction that define the successful production and subsequent interpretation of speech acts are conventional: Speakers learn ways of, for example, making assertions in accordance with the semantic conventions that guide assertion-making. In this case, these conditions specify that one is committed to the truth of the assertion, able to justify it with evidence, that it is unobvious in the first place, and that one sincerely believes it (Searle, 1969, 1979). Millikan's argument is that hearers learn conventional procedures for interpreting utterances using these semantic conditions as standards of interpretation, and consequently respond by forming beliefs (or not). Semantic rules are thus conventional, learned and persist because they successfully perform a coordinative communicative function. If speakers never communicated in accordance with those conventions, that is never made assertions in accordance with the semantic conditions, hearers would not interpret assertions in accordance with those rules and would not form beliefs based on them. The semantic conventions themselves would die out. Thus, this type of coordination leads to the proliferation not only of the specific type of utterance or speech act in question, but also the semantic conventions governing that type of speech act.

It is somewhat intuitively odd to think of the truth conditions guiding such acts as assertions and the resultant formation of beliefs as conventional or as being learned. Many of our beliefs seem to be formed automatically, without any assessment or deliberation, and without us realizing they are. However, to imagine the process by which we assess whether or not to believe the assertions of, for example, a known liar suggests the procedure might not be entirely automatic. And this may apply especially in the case of interpersonal communication. On the subject of learning, it also seems noteworthy that most people are familiar with scenes in which, for example, young children are informed that something is ‘dangerously hot’ but have to learn to believe their parents the hard way. That the semantic conditions guiding the successful performance and interpretation of speech acts might be conventional has interesting implications for the analysis of conventions in fictional discourse and, perhaps, the analysis of pretend play in children as will be discussed below.

1.1.4 Conventions as constitutive rules

A much wider perspective on conventionality than those discussed so far is provided by Searle (1995). The central question he is concerned with is how we can live in a world composed of conventional institutional facts such as ‘he is our president’, ‘they are married’ and ‘this meeting has been adjourned’, when there is nothing in the physical or ‘brute’ world that makes these things so.

His answer to this question derives from a basic distinction between two different kinds of rules that govern our social behavior (see also Rawls, 1955).

‘Regulative rules’ govern already existing patterns of action. For example, people drove their cars prior to the imposition of our current systems of traffic regulation which were later adopted to regulate the practice. ‘Constitutive rules’, by contrast, bring into existence the very activities they govern. Consider, for example, the rules governing a marriage ceremony. Couples did not enter churches, stand before priests and place wedding rings on each others fingers before rules existed dictating that this series of events counted as ‘getting married’. The rules governing marriage bring the practice into existence. Constitutive rules have the structural form ‘X counts as Y in Context C’ and impose non-physical or ‘status’ functions on actions, objects and events. Since these functions are non-physical, they exist only because we treat them as existing within our cultural practices. Thus, there is nothing in the physical make-up of the man who performs the marriage ceremony that allows him to marry them. We collectively recognize that the man (X) counts as a priest (Y) in our community (context C), and so he is licensed to conduct such ceremonies. Similarly, there is nothing intrinsic to the words ‘I pronounce you...’ or the wedding rings exchanged that makes the couple married. We simply recognize that they perform these functions in the context of that practice. Since there is nothing in the ‘X’ term that physically denotes the ‘Y’ term, Searle observes that engaging in actions and with objects that are assigned conventional status involves thinking at ‘two levels at once’ (Searle, 2009). Constitutive rules thus impose non-physical, conventional functions on actions, objects and events and this results in the formation of institutional facts such as ‘this couple are married’. According to

Searle, then, the whole of institutional reality is conventionally structured and governed.

One of the consequences of this account is that unlike those discussed so far, conventions are not restricted to actions. Quite centrally, conventional actions are mediated by objects invested with conventional status functions. Actions performed with these objects create whole events with conventional status, and social institutions.

Interestingly, some objects are invested with status functions that have semantic properties, meaning conditions of satisfaction. Linguistic statements, for example, mean something to the extent that can be true or false. But similarly, objects can also function much like speech acts. These are what Searle calls 'status indicators' and include objects used to signal the continued existence of status though time such as wedding rings, police badges and passports. The point is that they can be said to truly or falsely assert that 'I am married' or 'I am a policeman' etc. A different class of object, however, is not invested with symbolic meaning but is used to represent the existence or transfer of deontic power more directly. A dollar bill for example does not have semantic properties- it does not mean anything and does not have conditions of satisfaction (nor does it refer to anything). In fact, it acts as a representation of the standing possibility of acquiring some goods or services, or is 'just the continuous possibility of the activity' (Searle, 1995, pg 36). Similarly, points scored in a game and touchdowns do not have semantic properties, are not true or false, but rather represent deontic status directly. In any case, objects may have symbolic status

(such as words and utterances) or directly deontic status (such as bank notes), and both types of object play a central role in the mediation of conventional activities.

Before moving on, it is worth noting that normativity runs deep in Searle's account of conventional status. 'Roughly speaking', he claims, 'everything turns out to be deontic' (pg 109). The argument is as follows: Status functions appear initially to fall into different categories. Some status functions represent rights and obligations directly. For example, if a piece of paper counts as a banknote within our exchange practices, during the process of exchange possession of the bank note entails a right to make a purchase. Similarly, receipt of the note obliges a person to relinquish some goods. Other status functions, however, impose deontic rights and obligations via symbolic representation. For instance, in making a speech act, a person is obligated to act in accordance with the semantic rules governing the particular speech act. Thus in order to make a successful promise, one must mean it sincerely, intend to fulfill it, believe the other would like it to be fulfilled, and it must not be obvious that one would perform it anyway. That is, one is obliged to fulfill the promise. This also gives the listener the right to expect that the promise be fulfilled and the right to reprisal if it is not. Other status functions appear to be honorific, for example, when a person is deemed 'winner' of a game. However, in the end Searle points out that even honorific functions are simply those in which the rights and obligations have withered away over time (and are now valued for their own sake). Status functions, then, are all essentially involved in the creation and transfer of deontic rights and obligations, and as such are reducible to the notion of 'conventional power'.

The question of what children understand of constitutive rules will be addressed in Chapter 3. Specifically, children were engaged in games of pretend play. They were confronted with an object whose pretend status changed between contexts, and their ability to treat the object appropriately as it changed back and forth between these contexts was investigated. But what exactly is the relationship between conventional status, pretence and fiction?

1.2 Conventions and fiction

1.2.1 Conventional status and the generation of fiction

An account of conventional status that stands in interesting relation to Searle's is proposed by Walton (1990). However, the objects with conventional functions that he is concerned with are works of art such as paintings and sculpture as well as props in young children's pretend games. Works of art, he claims, also require appreciators to take a dual perspective on objects in terms of both their physical identity as well in terms of their status as works of art: Looking at a painting for instance requires an appreciation that a canvas sits in a frame on a wall with some paint marks on it. However, to engage with the painting as a work of art it is necessary that one ascribes to a set of prescribed imaginings. Indeed, this is precisely the intention of the painter. Such prescriptions may include imagining not only that, for example, a couple have stopped at the waters edge to take a view, but also that there is a duck on the water, that the sun is setting, and so on. Interestingly, he extends this analysis to include games of pretend play. Thus, if two children declare in the woods that that tree stumps are 'bears', it is prescribed within the context of their game that on discovering a stump they imagine it is a bear. Given the cultural background of a group of art appreciators or a group of children engaged in pretence, 'make-believe', he claims, is the use of external props for engaging in a set of joint and prescribed imaginings.

On the one hand this analysis adds an intriguing psychological dimension to Searle's theory of status functions and how they operate. Objects with status may prescribe a set of imaginings to people of a certain cultural group who are able to recognize their role within a cultural practice. Thus, just as we may collectively imagine that a couple stroll through the park while jointly engaged in the practice of appreciating a painting, we may collectively imagine that a couple who exchange rings at the altar are getting married according to our cultural practice. Clearly, in the case of the married couple, the quality of this imagining will need to be further qualified: It is not a matter of pure fantasy that they are married, it is 'true' that they are married in a sense to be qualified shortly. But it is prescriptive that we imagine they are to the extent that we ought to treat them in the appropriate manner, and there is nothing in their physical make-up that dictates this. In both the cases of appreciating works of art, and in engaging with more institutional forms of status, there is a set of object-mediated, prescribed imaginings that function against a set of background cultural practices. That is, for people outside our cultural or social milieu, neither the painting nor the wedding ring will be effective in initiating these imaginings.

Lastly, Walton's analysis draws the structural analogy between status functions in adult experience, and the temporary status functions that exist in children's games of pretend play. This largely motivated the use of pretence as a tool in investigating children's understanding of status functions in the studies presented in Chapters 3 and 4.

1.2.2 Conventions and intersubjective truth

So, in what sense can it be said that when we imagine the propositions ‘this stump is a bear’ in our game, or ‘this couple are married’ in our community, that either of these statements are ‘true’? One possible answer to this question may be gleaned from Searle’s (1979) analysis of how conventions operate in fictional discourse. Specifically, he asks how can it be that in non-serious utterance of a proposition ‘it is raining’ in fiction, the proposition remains an assertion, but one is no longer committed to the semantic conditions governing the practice of assertion making (commitment to the truth of the proposition, ability to back it up with evidence, that it must not be obviously true and that one must sincerely believe in its truth). That is, how can these semantic rules be suspended? What makes fiction possible, he argues, is a set of extra-linguistic, non-semantic conventions that break the connection between ‘words and the world’ established by these rules. These conventions do not change the meaning of words, or other elements of the language. Rather they enable the speaker to use the words with their literal meanings, but without undertaking the commitments normally required to perform the speech act. Fiction is thus made by the pretended performance of illocutionary acts. That is, speech acts performed with the intention of invoking horizontal conventions that suspend the normal illocutionary commitments of utterances.

This model of fiction as pretended illocutionary action suffers from some interesting weaknesses. One has to do with where exactly the horizontal conventions enter to break the conditions governing serious illocution. Searle sees

illocution as the imposition of conditions of satisfaction in two places: there are conditions of satisfaction on the utterance itself, that is, conditions governing the correct use of certain words in relation to the world. Then there are further conditions of satisfaction that dictate the felicity of the speech act, that is conditions that govern the correct use of utterances in relation to the speakers illocutionary intent (Searle, 2009). With regard to these two sets of conditions, it does not make much sense to propose that what makes fiction possible is a set of conventions that break the connection ‘between words and the world’ (Searle 1979, pg 66). Were they to do so, the words would no longer have their literal meaning in the utterance, which it is correctly noted they do. So if they do somehow act on the conditions governing the correct use of utterances in relation to the speakers illocutionary intent, it might be asked ‘how?’ They can not simply suspend these conditions, since the utterance would no longer be an assertion which, it is correctly noted, it is.

One possibility is suggested by an observation by Kalish and Sabbagh (2007) in relation to the notion of conventional knowledge. They observe that conventional knowledge sits in a kind of ‘middle ground’ between objective and subjective knowledge about the world. It differs from objective knowledge in that there is no naturally occurring standard in the physical world by which we can evaluate it independently of other people. If we have a belief about the fact that there is a mountain we can go check if there is a mountain and assess the truth of our belief against this brute feature of the world (although these issues are obviously infinitely messier and more complex than can be elaborated on here). However, conventional knowledge is not subjective in the usual sense either. It is

not a matter of personal opinion whether or not a piece of paper is a dollar bill, or whether or a couple are ‘really’ married. It is a dollar bill, and they are married. The interesting property of conventional knowledge, they point out, is that the standard by which the truth of a proposition in a conventionalized domain can be evaluated is whether or not there is some form of agreement about it between various social agents. To put it their way, ‘conventional knowledge is neither strictly objective, nor subjective. Rather, it is intersubjective’ (pg 2).

An extension of Searle’s account of fictional discourse might thus run along these lines: In fiction, that is, when pretending to make an illocutionary act, the semantic conventions that define, for example, a successful assertion are not simply suspended but are replaced by directly analogous, intersubjectively defined variants. Thus one who writes fiction is not committed to the truth of the proposition, but is committed to its intersubjectively defined truth. They may be not be committed to being able to justify the proposition with objective evidence, but rather with evidence considered valid intersubjectively. Correspondingly, the proposition must not already be intersubjectively true, which is to say it must not have been previously and intersubjectively established (one would not, for example, first write ‘it started to rain’, and then later ‘it was raining’). And one might not sincerely believe in the truth of the proposition, but might be described as sincerely ascribing to its intersubjective truth. In line with this, Searle goes on to note that as far as the possibility of ontology is concerned, anything is licensed. However, as far as the acceptability of ontology is concerned, coherence is a crucial consideration, and what counts as coherence ‘will be in part a function of the contract between author and reader about the horizontal conventions’ (pg 73).

This modified account of fiction as illocutionary action relates in obvious ways to young children's pretence. In such games, as Walton points out, there is intersubjective agreement to the effect that, for example, certain stumps now count as bears, and this prescribes certain imaginings. These imaginings may be construed richly as active attempts at imagining or rather minimally as prescribing certain types of action (for example, to pretend to be frightened on discovering one). But there are also parallels between the illocutionary account of fiction, and intersubjectively defined conventional knowledge. In the case of marriage, for example, explicit illocutionary acts are made such as 'I hereby pronounce you man and wife', (these are also made through action, for example, with the exchange of rings), that also establish intersubjectively defined truths. The community collectively accepts the intersubjectively defined truth that the couple are now 'married', that it is correct for them to wear wedding rings, and for the bride to now sign her name 'Mrs Brown' etc. The community may be said to imagine the couple are now married at least to the extent that there are now culturally prescribed ways in which they ought to be treated.

The question of how young children may act in accordance with conventionally defined fictions will be the subject of Chapter 3. Their reactions to an individual who joins a fictional context and then acts in some way that disrespects the intersubjectively established truths within it will be the subject of Chapter 4.

3.1 Psychological pre-requisites of convention

3.1.1 Mutual preferences and expectations

Various lines of criticism have been leveled against Lewis's (1969) characterization of the psychological prerequisites of conventions. Most systematic is Gilbert (1989) who points out that his conditions of mutual preferences and expectations may be neither necessary nor sufficient for explaining adherence to a convention. For instance, it is possible for individuals to adhere to a convention in the absence of expectations of others' adherence, as in the case that nobody really expects to receive a thank you note after a dinner party anymore, but one is sent in courtesy anyway. With regard to preferences of conformity, she argues that both game theory and rational choice theory test a distinctly singularist perspective on human social interaction: It is assumed that each person will try to maximize personal payoff and that players' preference rankings reflect what is best for the individual player without regard to others. However, real life examples may be more complex. I may have a complex system of individual preference rankings, for example with regard to how I dress, with one particular mode being highly preferred. But with respect to group conformity my preferences may be the exact opposite or even indifferent. Plus, I might even prefer not to conform to a convention so as to stand out as a trend setter.

A further problem, she argues, is that the notions of salience and precedent do not suggest why a person should eventually act in accordance with a convention.

For this one could add an axiom to rationality that states that if a strategy succeeded last time, a rational agent ought to follow it again. But this would entail endowing rational agents with further tendencies that stand outside the formal domain of rational specifications and game theory in general. This concern is also raised by others who note that game theory matrices describe the conditions under which conventions might emerge, rather than providing any plausible mechanism of how agents actually come to engage in conventional behavior (Bicchieri, 2006).

In fact there is somewhat of a dilemma in assessing the ecological validity of game theory approaches to coordination. On the one hand, it seems that what is specified as necessary may be insufficient to account for people's actions. But on the other hand, rational choice theory assumes an impressive psychological machinery on the part of players: they are rational, utility maximizers with perfect reasoning abilities, perfect knowledge of the payoff matrix, and this is all assumed to be common knowledge. Indeed, Gilbert's richer account of the necessary pre-requisites for such engagement include not just a capacity for communication, a grasp of joint commitment (or at least the ability to act according to such commitments) but also an ability to entertain the complex notion of common knowledge. This will be dealt with next.

3.1.2 Common knowledge

As mentioned in section 1.1.1, situations in which individuals desire to coordinate appear to present a type of recursion problem: For example, if two people desire

to coordinate in hunting large game and successful capture depends on both hunting, each must consider whether the other person will attack. The way Lewis formulated the problem of common knowledge was as follows: I may expect you to try to hunt. I might further expect you to expect me to hunt. But if I am unsure whether you will expect me to expect you to hunt, I ought not to waste my time or energy. The problem is, even if this last condition is fulfilled, additional levels of reasoning can be added, potentially infinitely. So in principle I ought never to attack, because I can never be really sure of your actions (see also Schiffer, 1972). The solution he offers is that agents may have 'common knowledge' of each others' expectations and preferences. It is common knowledge in a group that you will attack if something in an environment (e.g. you communicated this), indicates to us that you will attack and this indicates to everyone that everyone has reason to believe this indication has taken place. These premises along with the mutual ascription of rationality, inductive standards and background information justify the inference of higher order expectations that the other will, for example, attack. His rather informal treatment of the problem, however, details no convincing mechanism by which agents with finite reasoning abilities may reason up such an inference hierarchy, nor why they might stop at any one point.

Gilbert also notes that an individual's readiness for action needs to be 'out in the open' in some way. But her definition of common knowledge differs from Lewis'. For Gilbert, two agents have common knowledge of their readiness to act if each has normal perceptual organs and reasoning capacities (and each perceive this), and each perceives that something such as quasi-readiness has been

expressed and that the others have perceived this. In addition, she introduces into this formula the notion of a 'smooth reasoner counterpart' for each agent involved. However, it is not clear from her account exactly what this counterpart is. On the one hand, she states it is 'roughly a being otherwise like X, but whose reasoning is untrammelled by the limits of time, memory capacity and perseverance'. On the other hand it 'represents roughly the power of principles that X has grasped'(pg 189). The general idea is that if an agent can see that the infinite chain of inferences applies to a situation, the smooth reasoner counterpart infers that the infinite chain of inferences obtains and so infinite recursive inferential reasoning is unnecessary. Perhaps, then, the smooth reasoner counterpart represents a hypothetical reasoning capacity on the part of each agent which, if certain conditions hold, would theoretically process an infinite number of recursive inferences (allowing the actual agent to assume they have been fulfilled). But this remains a speculative attempt to clarify her account.

It was out of concerns that humans are incapable of infinite recursive reasoning, and that proposed solutions simply cut-off the recursive reasoning at some arbitrary point, that other researchers have posited more psychological heuristics to tackle the common knowledge problem. Clark and Marshall (1981), for example, propose a 'co-presence heuristic' in which A and B are said to 'mutually know' something if they are looking at it simultaneously, see that each attends to the other and have evidence of each person's rationality. A more formal and detailed account of how this may work is provided by Peacocke (2005). He notes that the notion of 'joint attention' in which two people attend not just to an object but to each others attention to the object (Bruner, 1983, 1998; Tomasello,

1995) may offer a logically primitive form of mutual knowledge. The key insight is that knowledge based on mutual perception is not a matter to be inferentially reasoned about. Thus the perceptual basis of joint attention may allow individuals to by-pass the chain of recursive reasoning, because each can literally see the other attend to an object as well as themselves, thus establishing a degree of shared knowledge that is rooted in perception. Whether perception or attention are entirely non-inferential may be debatable. But the proposal that joint attention might be a form of mutual knowledge is an intriguing one. And this idea is developed further by Campbell (2005) who proposes that especially in coordination situations in which, for example, two individuals desire to coordinate a risky attack, joint attention may establish enough mutual knowledge to rationalize the joint action.

This hypothesis is tested directly in the study presented in Chapter 5. As mentioned previously (see section 1.1.1), children were engaged in a formal coordination game known as the ‘Stag Hunt’. In the game, they had to decide whether to act alone for a low payoff (the hare), or act together with the partner for higher payoff (the stag). However, they had to coordinate their decisions since if an individual tried to retrieve the high payoff alone, they would receive nothing. Children played this game and at a certain point were faced with a new partner with whom they had no previous play history. In addition, they were unable to visually monitor the actions of this partner, and were discouraged from communicating verbally with her. Within this context, the effects of being in conditions of both individual and joint attention with the partner on children’s tendency to coordinate an attack were investigated.

Chapter 2. Empirical background on conventions in ontogeny

2.1 Conventional rules

Research into children's understanding of social conventions starts with Piaget. His aim was to characterize broad transitions common to their conceptualization of both moral and conventional principles. According to his account children progress through a series of loose but identifiable stages in which they increasingly employ the notion of relativity in both domains (Piaget, 1932). That is, they progressively see conventions as operating relative to specific groups, and as based on agreements between members of those groups. And they increasingly take into account contextual factors in judging whether people's actions constitute moral transgressions. Post-Piagetian research in this area has gone on to examine how children distinguish conventional rules from morals. However, research is still lacking on what young children understand of the subjective basis and context-relativity of conventional rules.

2.1.1 Piaget on objectivity and relativity

In a series of highly detailed interviews with children from preschool age through the school years, Piaget extensively analyzed both their practice and their understanding of the conventional rules embodied in their games. Specifically, he asked children to show him how their marble games were played and found that, with age, children became increasingly able and motivated to

play responsively to others, and in accordance with the established rules. But he also probed their grasp of rule conventionality, in terms of whether children regard the rules as existing relative to specific groups and as alterable. Thus he asked children ‘could we play the game this (alternative) way?’ and ‘Can we change the rules?’ His results suggest that younger children (up to around age 10) conceptualize rules as deriving from external (often adult) authority, unchangeable and as holding an objective and almost ‘sacred’ status. That is, children commonly provide answers like ‘yes, people always play like this’ and ‘you couldn’t play any other way’. Older children (around 10 to 12) tend to answer that games can be played differently. By age 11-13, however, children indicate a full grasp of the conventional principles underlying their marble games. They understand that specific groups of children, and those in specific areas may play the same game differently, and importantly, children this age may be seen to actively negotiate and agree on which variants to play. Thus he characterized the development of children’s grasp of conventional rules as starting with a broadly objectivist notion of rules, seen to exist independently of human will, and progressing towards a more relativist understanding that conventional rules exist by consent, vary according to context and are thus changeable.

This developmental progression, on Piaget’s account, is seen to be roughly paralleled in the domain of children’s moral judgment. He documents an early progression which starts from a predominantly ‘moral realist’ stance in which moral transgressions are perceived as objective properties of a situation. For instance, he claims that younger children hold principles of ‘objective

responsibility' in which they evaluate situations based on material damage and tangible outcomes, without taking actors intentions and motivations into account. Thus younger children tend to claim, for example, that an individual who breaks more cups is naughtier than one who broke few, and a boy who steals a roll to give to his friend is equally or more punishable than a girl who steals a ribbon to make herself look pretty. With regard to moral transgressions, children claim that lying is 'saying something untrue', regardless of knowledge state of the actor. Older children, start to take a more 'moral relativist' stance in which they increasingly take into account where those moral principles derive from, how violations may be judged according to context, and the role of intentions in moral transgressions. For instance, they rely more clearly on notions of 'subjective responsibility' deeming a child who *intends* to do cause damage, steal or lie has been naughtier than one who accidentally does the same.

The driving force in the development from children's objectivist to more relativist notions of both moral and conventional rules is attributed to changes in the predominant types of social relationships that they engage in. Viewed as specifically critical, are the power relations embodied in those relationships: Children's interactions with adults are guided by a form of 'unilateral respect' because of the inequality in authority relations between parties. The effects of adult authority and constraint upon the child's behavior results in a conception of conventional and moral principles as obligatory and unalterable, that is, having objective existence.

But there is a critical difference in the quality of interactions that children have among each other. The more egalitarian relations that exist between peers

provide a context in which conflicts in conventional rule games and moral dealings come to be negotiated according to principles of mutual respect and reciprocity. So, while adult constraint imposes a set of rules that are to be accepted without question, peer cooperation suggests for children a method for the verification and reciprocal control of those rules. Children's experience in bargaining over differing conventional rules in their games then, and moral conflicts in which children feel they themselves have been done wrong, lead to an notion of moral and conventional rules that have been publicly negotiated, and in a sense validated by children themselves. The principles governing both conventional activities and moral affairs thus come to be increasingly conceptualized by children as subjective, negotiable and context-relative.

Piaget's analysis deals with children's understanding of conventional rules and their relation to child morality in striking detail and theoretical depth. However, his predominantly interview-based technique (and focus on a single conventional game) appears to have precluded children under around 5-years-old from any serious attention in the investigation. In addition to this, Piaget himself notes that questioning children may have led him to perceive a developmental progression based predominantly on the grasp of rules that children can fully verbalize, but that may not have related to the principles guiding their actions in any obvious way. He thus poses the question, the answer to which remains unclear 'In what relation does the verbal thought of the child stand to his active and concrete thought?' (pg 114). Lastly, while in the domain of moral judgment he questions children using short, structured stories, his interviews about their marble games are markedly less structured, and tend more to spontaneously

follow the lead of children's answers. This lack of standardization leaves open exactly what kind of developmental progressions might be found, firstly, with more standardized modes of investigation, and secondly with non-verbal methods that might allow examination into younger children's understanding. In any case, Piaget's claims have been followed up using similar interview methodologies. These will be dealt with next.

2.1.2 Children's distinctions between conventional and moral rules

In addition to undergoing common structural transformations in the child's cognitive development, Piaget also sees a number of interrelations in children's concepts of convention and morality. Early on in development, he associates the somewhat mystical respect the child has for game rules that derive from adult constraint with a type of morality, claiming the child 'regards them as endowed with divine right' (pg 56). But he goes on to use 'moral' more loosely in characterizing the broadly normative status of conventional games rules: Noting that the child has much experience with permissions and prohibitions in their daily activities (such as not touching things), he claims, that when they first comes across conventional rules games such as marbles it is possible that they already regard them as rule-governed. He thus notes 'And this is why the origins of consciousness of rules even in so restricted a field as that of marble games are conditioned by the child's moral life as a whole' (pg 53). However, it is with the third stage of rule consciousness that morality really enters the child's conception of conventional rules. For when children begin to cooperate with one

another, and understand that the rules exist by agreement and can be adapted, principles of reciprocity enter their thinking. Thus he claims 'it is from the moment that it replaces the rule of constraint that the rule of cooperation becomes an effective moral law.' (70). According to Piaget, then, conventional rule games have an inherently moral component because they are guided by cooperative rules of reciprocity and mutual respect.

The various parallels Piaget draws in the development of conventional and moral rules and the connections drawn have been interpreted as a claim that children are unable to distinguish conventions from morals. However, subsequent research has shown that they do. Children quite late in development (6- to 13-year-olds) respond to transgressions of moral and conventional rules differently: When one child hits another, children primarily refer to the intrinsic consequences of the violation, for example, in terms of pain. But when children do something they have been conventionally forbidden to, children tend more to refer to some aspect of the social situation, stating, for example, 'that's not allowed' or 'you'll get in trouble' (Nucci & Nucci, 1982).

Younger children too differentiate moral and conventional rules along a number of lines. They see conventions unlike morals as rule-contingent such that if a rule that 'children must sit on the carpet during story time' did not exist, one could do so. But if a rule against hitting others did not exist, children claim that it would still be wrong to hit. They also claim that conventions, unlike morals, apply locally so that while hitting is wrong everywhere, children may not have to sit on the rug during story time in other schools. And they indicate differences in the seriousness and legitimate punishment relating to violations of

morals and conventions. While hitting is serious and punishable, not sitting on the rug may be less serious a crime, and not so punishable (Nucci & Nucci, 1982; Nucci & Turiel, 1978; Smetana, 1981). In light of these distinctions then, it has been claimed that, rather than gradually developing a concept of relativity in a stage-like process which is applied across different domains as Piaget proposed, children may quite early understand conventions to be socially relative in a way that moral rules are not (Turiel, 1978, 1983).

These findings do indicate that children evaluate some rules as existing more objectively (universal and unalterable) and others as existing more subjectively (local and alterable). However, this provides information only about very general intuitions that children may have on acceptable variability between domains. For instance, that they sense that children in other schools may not have to sit on the rug during story time (Smetana, 1981) does not provide positive information about whether children actively assign different conventions to different groups. For example, might children understand that sitting on the rug is the convention in one school but sitting on chairs is so in another?

2.1.3 Conclusion

In sum then, a slightly mixed picture has begun to emerge with regard to younger children's understanding of the social basis of conventional rules. According to Piaget's account, children from around the ages of 10-12 years grasp that conventional rules are alterable. But it is only shortly after this that

they come to grasp that such rules operate context-specifically such that different groups may play different rules, and so the version needs to be actively agreed upon. Since then, however, it had been found that children quite early have general intuitions that conventions rules may vary especially more so than moral principles.

It seems fair to say, however, that these studies that rely on interview methodologies have not followed up on Piaget's original finding directly. While older children in Piaget's original studies showed a grasp of the context-specificity of different conventional rules, later studies rather show that younger children intuit that a rules sometimes does and sometimes does not apply (see studies by Turiel and colleagues). They do not examine whether children actively attribute different rules to different contexts. Nor do they examine what kinds of context markers children use in delineating conventional contexts and communities. Therefore, questions remain as to whether younger children (like the older children Piaget interviewed) attribute, for example, different conventions to different locations or specific groups.

Another issue is that most of the studies conducted since Piaget have focused on children's understanding of regulative conventional rules. As mentioned in section 1.1.4, these are rules that govern already existing activities (such as rules about the locations in which children are allowed to sit). Constitutive rules, by contrast, bring into existence the activities that they govern (for example, in the way that the rules of a marble game actually define the game). Therefore, questions remain about whether young children understand conventional constitutive rules as alterable and as existing according to context

(as the older children in Piaget's studies do). The studies presented in chapters 3 and 4 will examine what exactly preschoolers understand of constitutive rules. However, before coming back to Piaget's original questions, some research on children's understanding of conventionality in other domains will be reviewed.

2.2 Language

Communication has been characterized by some as a series of coordination problems in which individuals coordinate with one another (Clark, 1996; Lewis, 1969; Millikan, 2005). The common goal is to achieve some kind of mutual knowledge of (Clark & Marshall, 1981) or rather mutual attention to (Tomasello, 1999b) some aspect of the environment. Spoken languages and particular linguistic devices are then seen as solutions to these challenges.

In fact, language may more accurately be seen as referring to a system of communication composed of both speech and gesture (Goldin-Meadow, 2003). Gesture not only accompanies and complements information provided in speech, but can replace speech altogether taking on structural features of verbal communication (for instance, segmented, hierarchically organised messages), suggesting that speech and gesture constitute an integrated communicative system (Goldin-Meadow, 2006). In fact, conventional forms of communication, both in the form of words and conventional gestures (such as shaking the head for ‘no’), represent the first system of constitutive rules that young children come to learn: In conventional communication, there is nothing in the physical structure of the sounds of an utterance, or in the form of a conventional gesture that enables it to act as a communicative device. It is because of our collective practices, that speakers can use certain communicative devices to express their communicative intentions (Searle, 1969).

Young infants appear to use a variety of different gestures including, for instance, deictic gestures, iconic gestures, and conventional gestures that are more

arbitrarily related to their referents (see, for example, McNeill, 1985; Tomasello, 2008, for different gesture categories). Interestingly, arbitrary conventional gestures such as palms up for ‘all gone’ or shaking the head for ‘no’ appear to emerge in the infant’s second year, at a similar time as their spoken words (Acredelo & Goodwyn, 1988; Iverson, Capirci, & Caselli, 1994; Namy & Waxman, 1998). While their propensity to learn other, more iconic gestures (e.g. making a hammering motion to indicate the referent ‘hammer’) appear to remain stable into the preschool years, their ability to learn arbitrary gestures (e.g. making a dropping motion with the hand to indicate ‘hammer’) declines during the preschool years, only to re-emerge later on (Namy, Campbell, & Tomasello, 2004). This suggests that early symbolic gesture may perform a communicative function that is overtaken by spoken language around age 2, perhaps re-emerging later when children have wider experience with symbolic media such as pictures, models and maps (Namy, et al., 2004; Werner & Kaplan, 1963).

However, the frequency of young children’s conventional gestures is far outweighed by another type of gesture that also accompanies the learning of spoken language, that of pointing (Camaioni, Perucchini, Muratori, Parrini, & Cesari, 2000). The emergence of deictic gesturing such as pointing, occurs *prior* to language production, and accompanies the generation of infants’ first words (Carpenter, Nagell, & Tomasello, 1998). Objects that infants first point to emerge into their vocabulary soon afterwards, and their subsequent ability to combine pointing with single words (e.g. pointing to a teddy and commenting ‘sleep’) seems to support the emergence of two-word utterances (Iverson & Goldin-Meadow, 2005). Lastly, it appears that infants learn to perform the most basic

speech acts (such as directing, informing and sharing experiences with others, Searle, 1969) by pointing before they do linguistically (see Liskowski, Carpenter, Henning, Striano, & Tomasello, 2004; Liskowski, Carpenter, Striano, & Tomasello, 2006). Thus while children's conventional gestures may be learned in a similar way and around a similar time their first words, it seems that deictic gesturing in the form of pointing provides the communicative foundation for the acquisition of verbal speech acts (Bruner, 1983; Tomasello, Carpenter, & Liskowski, 2007).

In terms of acquisition then, young children's early gesture appears to lay the foundations for -and be intricately intertwined with- their learning of spoken language (Tomasello, 2008). But questions remain regarding the specific mechanism by which children come to acquire their first words, and how they understand their conventionality. The data that will be reviewed shortly suggest that children rely on cultural learning mechanisms in acquiring a spoken language. That is, they rely on an assessment of speakers' communicative intentions and the communicative context in order to decipher the meaning of linguistic utterances. With regard to understanding the conventionality of such language, most studies in this area conceive of conventionality quite broadly as 'sharedness' across individuals. However, a small handful of studies that have attempted to assess children's understanding of the arbitrary nature of linguistic devices, and their normativity will be reviewed.

2.2.1 Learning words

In order to explain the explosive rate at which young children learn new words in their second year, some accounts have posited word learning biases and assumptions. Two of these, for example, are called the ‘whole object’ and ‘mutual exclusivity’ assumptions. The whole object assumption states that children initially assume novel labels apply to whole objects, rather than parts or properties. The mutual exclusivity assumption suggests to children that words are mutually exclusive, such that each object may have only one label (Markman, 1991; Markman, 1990). Thus, when faced with a familiar object (such as a banana) and an unfamiliar one (such as a strange lemon press), when infants and young children hear a new label such as ‘dax’, they interpret it as applying to a whole object. They also presume it applies to the unfamiliar one, since they already have a label for the familiar object (Markman & Wachtel, 1988, Study 1; Markman, Wasow, & Hansen, 2003). However, if only one object is present, and they already possess a label for it (for example, they know it is called a ‘fire truck’) on hearing a novel word, such as ‘finial’ children assume it must relate to some part of the object (Markman & Wachtel, 1988, Studies 2 and 3). This effect seems to extend to children’s learning of new terms for object shapes as well as substances (Heibeck & Markman, 1987; Markman & Wachtel, 1988, Study 6).

However, a problem arises for any account of language acquisition that relies on the notion of ‘mapping’ meaning or linguistic terms to objects (see Carey & Bartlett, 1978, on the notion of ‘fast-mapping’). Even if children were

to learn via some principle that a term applies to a given object or action, the meaning of that term may vary according to communicative context. For instance, an infant who narrows down the meaning of the verb 'to give' as referring to something like 'the act of handing over', would still not be in a position to understand statements of the form 'stop giving me a hard time', 'just give me a minute', 'I won't give in to you', 'give it rest' and so on, because the same word is used to express different types of communicative intention. Thus, what children need to understand most fundamentally when confronted with new linguistic utterances may not be how to map specific words to objects or object types (in fact that would misguide them in the example just given), but rather how to interpret speaker's communicative intentions relative to the current activity (Tomasello, 2000, 2001).

The social-pragmatic approach to word learning thus examines the factors children use in identifying a speaker's referential intention, and the effects this has on their word learning. This perspective approaches language acquisition (see, for instance, Bruner, 1983; Tomasello, 2000, 2001) not with the question of how infants come to 'map' linguistic terms to aspects of the environment or abstract meanings. It asks, rather, how they come to understand that various types of communicative device may be used to direct attention. This approach therefore focuses on how a speaker's referential intention and the interactive context determine children's interpretations of new terms. In a finding game, for instance, infants use an adult's expressions of satisfaction to determine what his label refers to. If the adult exclaims let's find the 'gazzler' and then selects a number of objects in sequence to examine, 18-month-olds identify the word

‘gazzer’ with the object towards which she expresses satisfaction, even if this means ignoring several objects found beforehand (Tomasello, Strosberg, & Akhtar, 1996, Study 1). And this use of social pragmatic information in word learning is not restricted to the learning of nouns. When an adult introduces a novel verb, declaring she is going to ‘twang’, and performs two actions and marking one as intentional (‘there’) and the other accidental (‘oops’), 2-year-olds interpret the novel verb as identifying her intentional action, regardless of whether it is performed first or last (Tomasello & Barton, 1994, Study 3).

Interestingly, however, infants also rely on a history of shared experience with an adult to interpret the object of her referential intention. If an adult gets excited and requests a child to give her, for example a ‘gazzer’, toddlers provide the object that the adult and they have not jointly played with, despite the fact that the child has played with it with somebody else (Akhtar, Carpenter, & Tomasello, 1996, Study 2). Even more strikingly, young children may use shared information about the shared activity to determine ontological category. When 2-year-olds see a novel action performed on a novel object while an adult ambiguously exclaims ‘modi!’ when asked to ‘show modi’ they respond differently depending on what the previous joint activity has been: If they have previously been performing various actions on an object, they interpret ‘modi’ as a new action and demonstrate the action. But if they have previously been performing the same action on various objects, when asked to show modi, they indicate the object (Tomasello & Akhtar, 1995, Study 1). What these data suggest, therefore, is that joint experience or ‘common ground’ (Clark, 1996) is a powerful force in shaping children’s interpretations of referential intention.

However, children also need to grasp that linguistic terms are shared by others in the community, and so other researchers have investigated the conditions under which they do so.

2.2.2 Understanding conventionality in language

The principles of ‘conventionality’ and ‘contrast’ (see Clark, 1992, 2007) are assumptions proposed to shape children’s intuitions about word meanings.

‘Conventionality’ is the assumption that for members of a group there is agreement on the meaning of particular linguistic form. ‘Contrast’ is the assumption that contrasting linguistic forms contrast in meaning (Clark, 1992).

In line with the principle of conventionality, when an infant hears an adult label an object, and a second adult later enters and requests an object by the same label, infants assume she is referring to the same object. Importantly, they do not generalize desires to the second adult in this way (Graham, Stock, & Henderson, 2006), nor do they assume parties absent during a labeling event will also know proper nouns or novel facts given about objects (Diesendruck, 2005, Study 1; Diesendruck & Markson, 2001, Study 1). In line with the principle of contrast (and mutual exclusivity), if children witness a labeling event, and an adult later enters and requests with a new label, young children assume she is referring to a different object (Diesendruck & Markson, 2001, Study 2).

However, they also take into account whether the requester is a member of their own speech community. Bilingual children show this contrast effect when the

requester is supposedly bilingual (and therefore knows the labels they know), but not if he is monolingual (Diesendruck, 2005, Study 2).

Language acquisition, therefore seems to be shaped by complementary processes: Children employ their cultural learning skills in attending to speakers' referential intentions and information about the shared activity to decipher communicative action. This interacts, however, with a notion of conventionality construed broadly as an assumption of generalisability. Whether children have a more specific understanding of the conventionality of language is less clear.

There is suggestive evidence, for example, that children around age 4 recognize something of the arbitrariness of object labels. Thus when asked whether a table could be called a 'giraffe' or something novel such as a 'shig', they answer affirmatively (Rosenblum & Pinker, 1983). But it is not clear from this type of study that children necessarily recognize that linguistic devices are arbitrarily related to their communicative functions, or whether they simply agree that the adult may do as she pleases, while the name of the object remains fixed.

However, there is some indication that young children understand the normativity associated with conventional, communicative devices. Two-year olds, for instance, reject false labels that an adult produces (Pea, 1982) and young infants correct them by stating the correct label (Koenig & Echols, 2003).

2.2.4 Conclusion

In sum then, children's entry into the world of linguistic conventions is heavily shaped by cultural learning processes. However, these are apparently

accompanied by assumptions of generalizability, and a sensitivity to who members of the conventional community are. What young children understand more specifically of the conventional nature of language is less clear, however. Their grasp of the arbitrary relation between linguistic devices and their communicative functions is an open question, although there is some suggestion that they recognize normative constraints on language use, that it ought to be used in certain ways. More widely, what children understand of the constitutive rule structure of linguistic communication remains an open question. It may be that when they learn to use certain sounds to express their communicative intentions towards others they do so without ever having to reflect on the dual nature of the devices they use ‘as sounds’ and ‘as utterances’ simultaneously (Rakoczy & Tomasello, 2007). In fact, what young children understand of the constitutive rule ‘X counts as Y in C’ will be dealt with shortly, but in a different domain, that of material objects with status functions.

2.3 Conventional Artifacts

Man-made artifacts are not commonly thought of as having functions that are conventional. The relation between the structural features of a hammer, for example, and its appropriateness for hammering do not appear to be arbitrary, and the hammering function does not exist by agreement within a community. However, the functions of tools are often underdetermined by their physical properties. Objects often afford multiple and varied functions such that, for example, a pen may be used for writing or to stir coffee although its conventional function may be said to be ‘for writing’. Also, a number of different objects can be used to perform a particular function such as wedge a door open, although only a doorstop may be said to conventionally have that function. Since both mechanical and social conventional information enter into human artifact use and representation, questions arise as to what kinds of social factors influence how people use and conceptualize artifacts. In particular, how children learn artifact functions and what they understand of their conventional basis.

2.3.1 Learning conventional artifact functions

Infants begin to imitate others actions on objects around the end of their first year (Carpenter, Nagell, et al., 1998). Research on what exactly they imitate has revealed that social learning process much like those characterized for word learning are critical. That is, when infants and young children observe adults act

on an object, they attend not just to the surface regularities of the actions they observe, but importantly the actor's intentions with the object. For instance, when 1 year olds observe an adult press a button to make a light come on after some delay, they tend to imitate this action. However, they also look expectantly to the light suggesting that they were not only imitating the actors action, but his goal too (Carpenter, Call, & Tomasello, 2005). Similarly, 14-month-olds selectively imitate intentional over accidental actions (Carpenter, Akhtar, & Tomasello, 1998) and 18-month olds re-enact what an adult intended to do with an object after observing their failed attempt (Meltzoff, 1995). What this suggests is that children's interactions with objects is guided by the intention information contained in others demonstrations with them. Indeed, this has led to the proposal that in addition to understanding that objects have sensory-motor affordances, children also come to understand them as having intentional affordances such that the intentions of the demonstrator become, in a sense, embodied in the object (Tomasello, 1999a).

In fact, there is much evidence in favour of this view. Two-year-olds, for instance, use intention information not just in judging how to use a tool, but which tool to use. When faced with two tools which are equally affordant for a novel goal such as switching on a light box (and they know this having handled the tools similarly), when they themselves want to switch on the light, they preferentially choose the one that had been demonstrated for that purpose by an adult. That they do not imitate the adult on other imitation control tasks and use the alternative object to achieve an alternative goal suggests that even after one demonstration, toddlers map the tool to a specific function (Casler & Kelemen,

2005). Indeed, 2- and 3-year-olds seem so sensitive to how others intentionally use tools that they will copy other's tool uses after one demonstration, even if the tool is suboptimal for the job at hand (DiYanni & Keleman, 2008).

Older children appear to recruit, in addition to intentional use information, ideas about the original designer's intentions in assigning functions to artifacts. Thus, when told that an object has been made by one person to be used, for example, as a plate but that another person uses it as a frisbee, 6-year-olds, like adults categorize the object according to its design function claiming that it is in fact a plate (Matan & Carey, 2001). When an adult shows children aged 3 and 4 an object that that looks like a key and claims it is a spoon (though it functions as both), when asked to indicate what the object does children refer to the key function. But if the adult says he made it to be a spoon, children refer to its spooning function (Jaswal, 2006). And when confronted with completely novel objects, younger children age 4 and 5, like adults, claim that if the object was originally designed to stretch clothes on, then that is what it is for, even if it is used intentionally used to stretch one's back on (Keleman, 1999, Expt 3). Therefore, it has been proposed that information about the intentional use of objects in younger children is later incorporated into an emergent 'design stance' which guides older children's and adults' artifact concepts (Keleman & Carey, 2007).

2.3.2 Understanding conventionality in tool function

An interesting variation on research into children's use of design and intention information on their function judgments, is how information about collective use affects their intuitions about object function. Thus when 5- and 7-year-olds are asked about an object that was designed for trapping bugs but is used by one person for catching rain drops, they claim that it is for its designed function (Siegal and Callanan, 2007). However, when told that *many* people now use those objects to catch raindrops, they claim that this is its function. This finding remains tentative, however, since other studies have failed to replicate the disruptive effects of common use information on children's use of design information in guiding their decisions about function (see Deyfeyter, Hearing, & German, 2009, Study 2). However, it does suggest a sensitivity to the effects of common use on children's notions of artifact function. And this would be consistent with the data showing that children attend to intention use information in their function attributions in general.

Young children also seem to apply a broad notion of conventionality (as being generalizable) to tool functions similar to that which they apply to newly learned words. As already mentioned, having observed an adult select a tool for a particular novel purpose, they themselves select that tool. But when asked which tool another individual will need to perform the same task, children from age 2 indicate that she will need the same tool (Casler & Kelemen, 2005). This also remains a preliminary finding however, since it is not clear what replies to such a question indicate. Do children's answers indicate an expectation of which tool others ought to use or that they are likely to use? And in what sense does a person 'need' one tool over another?

Lastly, there is some indication that young children view artifact functions as having a normative component: When a puppet fails to use an object according to its conventional function, children from around age 3 protest, for example, ‘no you have to do this with it’ (Casler, Terziyan, & Greene, in press). However, it is not clear from this lone study whether children view the action as violating a normatively governed tool function since there was no difference in the amount of protest when the violations occurred and in a control condition in which the puppet used the tool in a different but irrelevant way. Therefore, further investigation is needed to determine whether children think that people ought to use tools in certain ways, or whether they simply expect people to treat tools in certain ways.

2.3.3 Conclusion

What these suggest overall is that young children’s learning of the conventional aspects of artifact function is heavily guided by cultural learning processes. As in the case of language acquisition, young children imitate others’ intentional actions with objects. There is some indication that they also see these functions as generalized to others in a community, and preliminary evidence suggests that they also view such functions as normative. However, the studies here relate to children’s understanding of what are known as ‘causal usage functions’ (see Searle, 1995), that is functions that are to a degree constrained by the physical properties of the object (for example, in the case of a hammer, it needs to be hard and have some kind of handle). ‘Status functions’ by contrast are assigned to objects merely as a matter of conventional practice (so, for instance, it would in

principle be possible for jelly beans to be used in place of coins and bills as currency). They are thus conventional in a stronger sense. By and large conventional status understanding in children has been studied far less. The studies presented in Chapter 3 will, therefore, ask the question of whether young children understand conventional object status, and the studies presented in Chapter 4 will explore whether and how they view conventional status functions with objects as having a normative dimension.

2.4 Status functions

2.4.1 Status functions and games

Piaget's (1932) use of children's marble games to analyze their understanding of conventions indicates an interest beyond children's understanding of regulative conventional rules such as rules of etiquette and correct behavior (see for example, work by Turiel and colleagues). It more substantially indicates recognition that the constitutive rule structure of such games are parallel in many ways to the conventional constitutive rule structure of adult institutional practice. In fact, Searle (1995) offers a more explicit formulation of this point, noting that games are especially useful objects of study because they provide a microcosm of larger social phenomena. Thus in the practice of exchange, for example, a slip of paper may count as '10 dollars', the act of handing it over may count as 'making a purchase', and the buyer may eventually count as 'owner', within the context of a certain community's exchange practices. But similarly, in a game of chess, a piece of wood may count as a 'queen', a certain move may count as a 'check' and one player will eventually count as 'winner' within the context of a pair's game. Piaget's methodological insight was, therefore, that since children's rule games have these conventional properties, they offer an ideal tool for the investigation of children's understanding of conventional constitutive rules.

However, his general classification of children's games may have led him to miss an important extension of the analysis. Namely, that children's games of joint pretend play have a similar conventional structure. For Piaget, children's

games fall into one of three categories: practice, symbolic and rule-governed games. Practice games such as jumping back-and-forth over a river, constitute a type of sensory-motor play, and are defined by their functioning purely for the child's pleasure. Symbolic games, by contrast, while also containing a sensory-motor element, involve make-believe representation. In symbolic play, a physical situation is compared with an imaginary one by the child who, for instance, pushes a box along in order to symbolize a car (although see, for example, Perner, 1991, on the symbolic status of such play actions). Importantly, Piaget made no essential distinction between individual symbolic games and those involving others, seeing both as deriving primarily from the child's own imagination. The defining feature of rule-games by contrast are that they necessarily imply social or inter-individual relations and as such have a normative dimension. He thus notes that in contrast to symbols, 'Rules are a regulation imposed by the group, and their violation carries a sanction' (Piaget, 1962, pg 113). This failure to distinguish social from individual acts of pretence (in fact, an almost exclusive focus on individual pretence) naturally leads to a failure to grasp the way in which pretend play is deeply, though perhaps less obviously rule-governed.

Since Piaget, it has been pointed out that children's games of joint pretence have a similar conventional constitutive rule structure to both institutional practice and other rule games (see Rakoczy, 2006, 2008; Walton, 1990). Games of joint pretence, for example, involve the temporary assignment of status functions according to the constitutive rule 'X counts as Y in C'. Thus children may, in their pretence, act according to the stipulation 'this block counts as an apple in our game' and 'this action counts as eating in our game'. Similarly, the constitutive

rules by which status is assigned bring also a normative structure to the games. Once a block is assigned the status of ‘apple’, certain actions are licensed and others proscribed. It is now appropriate to pretend to cut or eat it, but inappropriate to pretend to brush one’s hair with it. Importantly, the status functions in the game also apply context-relatively, such that while it may be inappropriate to use the block to build with during the pretend game, this would be perfectly acceptable beforehand or afterwards, that is, outside the game.

2.4.2 Young children’s understanding of constitutive rules

Children as young as 3 years old follow conventional game rules and appropriately respond to changes in those rules. For example, when red marbles are assigned the status ‘winners’ and this is changed to blue marbles, they understand that this changes how prizes are designated (Kalish, Weissman, & Bernstein, 2000). However, they also appear to appreciate the normative structure of such rules. When an object with an instrumental function, such as a sponge, is assigned a status function as a type of dice, 3-year-old children normatively criticize a puppet who uses it to clean with, protesting ‘no that’s our dice!’ (Rakoczy, Warneken, & Tomasello, 2008). This suggests not just an ability to act in accordance with constitutive rules, but a recognition that they have normative consequences for how people ought to act. Interestingly, if the puppet performs exactly the same action but without first joining the game, children see his action as unproblematic. They thus appreciate that the status functions and their related normative rules apply context-specifically.

However, there are also indications that children apply some of these principles in their games of joint pretence. They appear to understand, for example, that objects may count as certain things in pretence from age 2, as evidenced by their inferential pretend actions. Thus, when an adult pretends to pour juice into a cup, toddlers may go on to pretend to drink from the cup (Harris & Kavanaugh, 1993; Rakoczy & Tomasello, 2006; Rakoczy, Tomasello, & Striano, 2004; Walker-Andrews & Harris, 1993; Walker-Andrews & Kahana-Kalman, 1999). This ability to inferentially elaborate on the pretend stipulations of a partner are revealing: Firstly, they suggest that children are not, for example, merely mimicking the actions they have observed without true intentions to pretend (as argued, for example, by Jarrold, Boucher, & Smith, 1996; Lewis & Boucher, 1995). But, secondly, such actions suggest that children are engaged in shared intentions to pretend with others (Rakoczy, 2006). If the child pretends to drink after an adult pretends to pour, this indicates an active uptake and acceptance of the pretence stipulations set up by the other person. Indeed this is the only way of interpreting the child's action, since there are no physical contingencies between the actions of pouring and drinking (unlike in the case of real drinking where the one action physically enables the other).

Importantly, then, through their simple inferential pretence young children demonstrate an understanding not only that an object counts as something (for example, that a stick may count as a spoon) but that it may count as multiple different things. For instance, they pretend that a stick counts as a spoon at time one and as a toothbrush at time two (Harris and Kavanugh, 1993). This might potentially suggest an understanding not just that 'X counts as Y', but that it

does so in a certain context. That is, the full constitutive rule, ‘X counts as Y in C’. However, this interpretation may not be warranted, since children may simply forget or disregard their previous pretence when moving to time two. So, a remaining question is whether young children understand constitutive rules, including their context-specific nature. What are needed here are studies in which children are required to talk about different pretend perspectives consecutively, or to switch back-and-forth between pretend perspectives.

In the studies presented in Chapter 3, therefore, these existing lines of research were followed up in order to shed more light on the ability of young children to track and coordinate multiple pretence statuses and perspectives. The inferential action methodology as used by Harris, Kavanaugh, and colleagues was employed. But rather than having children pretend inferentially in two sequential episodes, children were required to switch between two parallel pretence scenarios they had to keep in mind. They were also required to act inferentially in each context. On the one hand, such inferential and systematic pretence acts are probably the most convincing indicators of true pretence competence. On the other hand, however, action measures might well tap more precocious abilities than verbal ones, as has been documented in other areas of development (see Clements & Perner, 1994; Goldin-Meadow, 2003), as well as in pretence specifically (see Rakoczy, Tomasello, & Striano, 2006, Study 1). An additional advantage of using this kind of measure was that it allowed the testing of younger children than in previous studies, in particular those of Piaget. Furthermore, it enabled a direct comparison of their ability to conceptualize

multiple object identities as indicated by their appropriate pretend actions and their capacity to verbally name the object under two pretence descriptions.

Lastly, there is some indication that 3-year-olds apply norms in their pretence. When a puppet in a pretend game pretends to eat the pretend ‘knife’ instead of the pretend ‘carrots’, 3 year olds make protests such as ‘no that’s our knife!’, seeing his pretend carrot eating in a control condition as of no particular consequence (Rakoczy, 2008). However, a further question remains as to whether they might see the norms governing pretend actions as applying context-specifically. That is, the puppet in the previous study was always engaged in the pretend game, his actions simply varying within that context (pretend knife vs. carrot eating). As in a game of chess, for example, where it may be incorrect to use the queen as a door stop during the game but perfectly acceptable outside that game, might children normatively regulate others’ actions depending on their entry into the pretend game?

This question is dealt with directly in the studies presented in Chapter 4. In the two studies, young children’s grasp of the norms associated with constitutive rules in their pretence was examined. More specifically, existing pretence research was extended by asking whether young children understand the pretence–reality and pretence–pretence distinctions as being normatively governed. Thus, children’s abilities to contrast the norms operative in a pretend game (within context C) with reality (outside context C) were investigated, as well as those that differ between pretence games (contexts C1 and C2).

2.5 Conventional coordination

Young children start to coordinate with others in their cooperative play during their second year. This is marked for example by mutual engagement with object, and repeating actions in turn taking sequences (Hay, 1979). They also become engaged in simple ritualized games with reciprocal actions and roles such as in peek-a-boo, give-and-take, as well as stacking and toppling blocks (Bruner, 1983; Ross, 1982). Some of the techniques young children use to coordinate include imitating others (Eckerman, Davis, & Didow, 1989; Eckerman & Didow, 1996), offering objects out in playful overtures (Ross, 1982) communicating non-verbally, for example, by pointing and showing objects (Ross & Lollis, 1987), and coordinating their vocalizations and eye-contact with their partners (Rutter & Durkin, 1987). From around age 2, children coordinate not just their instrumental play but in joint pretence in which they inferentially elaborate on the pretend actions of a play partner (Harris & Kavanaugh, 1993; Rakoczy & Tomasello, 2006; Rakoczy, et al., 2004). For example, if an adult pretends to pour water into a cup, 2-year-olds pretend to drink it. That is, toddlers are not only able and motivated to coordinate just to bring about tangible results in the environment. They also coordinate to share and elaborate on simple fictions, for example, of the form ‘this is our pretend apple juice’.

With regard to their cooperative problems solving activities, when coordinating together with an adult (for example in a task where a toy must be elevated in order to be retrieved), 18-month-olds show some ability, while 24-

month-olds are reliable and coordinated partners (Warneken, Chen, & Tomasello, 2006). This is indexed by their more often correctly positioning themselves in an appropriate location relative to their partner and a toy, visually monitoring the partner, waiting for the partner to position themselves and act, gesturing and vocalizing towards them. With peers, however, coordinated problem solving before 2 appears to be more fortuitous than purposive (Brownell & Carriger, 1990; Brownell, Ramani, & Zerwas, 2006). And it is really from age 2 onwards that young children start to cooperate reliably in their problem solving activities, for example by pulling handles together to make a toy available. By age 3, young children even start to give simple instructions to their partners in order to regulate and coordinate successfully (Ashley & Tomasello, 1996).

It seems then that toddler's coordination seems to be fairly sophisticated by age two. However, no studies have tested how children might coordinate in a formal coordination problem or between multiple solutions to a problem. Specifically, no studies have tested children's tendencies to coordinate on a conventional solution to a task in the way that Lewis (1969) characterized conventional coordination. The only area in which game theory has been adopted by developmentalists has been in mixed-motive games in which players do have to choose between two solutions, but when their interests conflict rather than coincide. In the 'Prisoner's Dilemma', for example, the typical set-up is that the child is presented with a board representing the potential payoffs (showing, for example, that if they choose triangle and the other child chooses circle, x number of stickers will be rewarded). Players must decide whether to

cooperate for some payoff (e.g. a couple of stickers) or rather defect against the other player for a higher payoff (e.g. many stickers). It is then not surprising that children, for example between 6 and 10, are reluctant to cooperate with peers when unaware that the game will be played for multiple rounds (Sally & Hill, 2006). Cooperation does increase with the introduction of repeated rounds (Fan, 2000), and play between friends increases the likelihood of cooperation (Matsumoto, et al., 1986). However, in these studies ‘cooperation’ is a notion used to denote cooperative motivation to achieve an abstract payoff, rather than cooperation in the sense of coordinated joint action.

The study presented in Chapter 5, therefore, investigated how children behave in a formal coordination game. The particular game they played is known as the ‘Stag Hunt’ (Skyrms, 1996, 2004), and is based on the following idea: Two individuals spot big game on the horizon and contemplate whether or not to embark on a hunt (with a continuous option of foraging for low-value foods individually). A joint decision to hunt cooperatively would mean huge gains for both. But since a successful hunt requires two people, they must coordinate on a decision to cooperate. This is especially important because hunting alone risks losing the secure, low-value option. Thus, the critical question becomes how to gauge whether the other person will also cooperate (with high uncertainty, a person might reasonably decide to forage alone, since this ensures the acquisition of at least some food).

What is required for two individuals to cooperate in a ‘Stag Hunt’ situation is mutual understanding of several things: First, they both must know that each prefers the high- to the low-value option, and that cooperation is required for

success. Beyond this, when the particular opportunity arises, they both must know together that it is indeed available. For instance, I may see a stag and also see you seeing it. But if you don't know I saw you seeing it, you might be unlikely to hunt. Moreover, even if you *do* know that I saw you seeing it, I may not realize this, and so still be reluctant to risk hunting alone. In fact, this problem iterates indefinitely, and so central to the solution of a coordination problem is some kind of joint understanding, or 'mutual knowledge' of what the other sees, knows or intends to do (see Gilbert, 1989; Lewis, 1969; Schiffer, 1972). However, as mentioned in Section 3.1, a developmentally -and perhaps logically- more basic form of mutual knowledge may exist in the form of joint attention (Campbell, 2005; Peacocke, 2005; Tollefson, 2005). In conditions of joint attention to a target (in which each attends to the object and to each other's attention, see Bruner, 1983; Tomasello, 1995) individuals may attempt to coordinate according to the following reasoning: 'If I see it, you see it, and we are both attending to each other, perhaps we can assume that enough critical information is shared between the both of us to launch our attack'. In the study presented, therefore, whether and how joint attention to a target affected children's decisions to cooperate in a 'Stag Hunt' game was examined.

2.6 Summary of questions for the thesis

To briefly summarize, rules games have presented a useful opportunity for investigating how children understand conventional rules. Pretend play offers a particularly interesting tool in this regard, and has been proposed to provide children with a ‘developmental cradle’ for children’s learning about the structure of conventional constitutive rules. In Chapter 3, a set of studies will be presented that examine whether children understand the constitutive rule ‘X counts as Y in C’. The studies presented in Chapter 4 will investigate whether they view such rules as normative. While these two sets of studies probe young children’s play with conventional objects, the study presented in Chapter 5 examines their conventional coordination more directly in action. Relatively little is known about how children initiate coordination with others, and no studies to date have placed children in formal coordination games in which they must coordinate between different solutions to a problem. This study therefore asks whether joint attention might enable coordination in such a context.

Chapter 3. Study set 1

Publication: Young children understanding multiple pretend identities in their object play

Publication Number: DOI:10.1348/026151008X322893

Chapter 4. Study set 2

Publication: Normativity and context in young children's pretend play

Publication Number: doi10.1016/j.cogdev.2009.01.003

Chapter 5. Study 3

Submission: Joint attention enables coordination in a children's "Stag Hunt" game"

Chapter 6. General Discussion

6.1 Discussion of results and open questions

6.1.1 Study sets 1 and 2

Children in Study set 1 demonstrated an understanding of the basic structure of the constitutive rule ‘X counts as Y in context C’. They switched between different pretend perspectives on an object and assigned these perspectives to different contexts, both in the form of spatial locations and as pertaining to different people. In addition, the inferential actions children produced in each context suggests a fairly subtle grasp of the consequences that status assignment has for what may be deemed appropriate action.

This data suggests that children substantially younger than originally supposed understand something of the alterability and context–relativity of conventional rules. While research by Turiel and colleagues (e.g. Nucci & Nucci, 1982; Turiel, 1983) suggests that pre-schoolers have an implicit understanding that some variability may exist in conventions (for example, a conventional rules might not apply somewhere else), they do not show active understanding either that conventional rules can change, or that different conventions might be assigned to different contexts. Nor do they speak to children’s understanding of constitutive, rather than regulative, rules (see Rawls, 1955; Searle, 1995). By contrast, Piaget’s (1932) study focused squarely on children’s grasp of the conventionality of constitutive rules. But it was not until around age 10 that he

detected an understanding of rule alterability, and it was not until age 11-13 that children in his study showed an active grasp of context-relativity (for example, in understanding that children in different areas might play the games differently). It is striking, therefore, that 3-year-olds, in the studies presented here, demonstrated such an understanding.

The discrepancy children showed in these studies between their ability to act appropriately according to the changing status of an object, and their ability to name the object context-specifically might be revealing in this regard. It suggests that the 'objective' notion of conventions that appeared in the younger children questioned by Piaget may have emerged as an artifact of his interview technique. That is, employing an action-based methodology may have allowed children to reveal a nascent understanding of some of the alterability and context-relativity of conventions they were unable to verbalize. Indeed, it has been found in other areas of development that some competencies that children are unable to express in language, they are able to express in action. For instance, Clements and Perner (1994) found that when children are asked where a character who was absent during the transfer of an object will look for that object on return, children aged 2 years 11 months erroneously claim he or she will look where the object actually is. However, they reliably look to the correct location suggesting an implicit understanding of the consequences of the character's false belief. A similar dissociation is found in the domain of pretence. Three-year-olds, for example, find it difficult to say whether an adult is pretending or actually trying to perform certain simple actions, such as pouring (Rakoczy, Tomasello, & Striano, 2005). However, on seeing an adult pretend to pour, children this age copy his pretend

action and pretend to pour themselves. But on seeing the adult frustratedly try to pour, they actually pour themselves. This indicates clear understanding of the different intentional structures of the two types of action (Rakoczy, et al., 2005).

However, the understanding of convention context-relativity that children may demonstrate precociously through their actions has further implications. It suggests more positively that they understand the consequences that context-specific changes in status have for active behavior. While previous studies on children's understanding of pretence perspectives show, for instance, that children may pretend that an object is a spoon and then a magic wand and remember what they previously pretended with that object (i.e. that it was a spoon, see Gopnik & Slaughter, 1991), the studies here provide evidence that they grasp the consequences that these different pretend statuses have for how the object should be treated. And the inferential action methodology used demonstrates this grasp particularly well since the actions children produced are not attributable to a simple mimicking strategy: Children actively elaborated the pretence stipulations that had been set up previously indicating an intention to act in accordance with the pretend status function set up previously.

Lastly, the studies presented here suggest that children grasp something of the collective intentionality underlying conventional status assignment, that is, that such rules vary according to collective practice. They grasped that a conventional rule can change according to the place at which they pretend (as seen in the studies with toy houses), as well as according to whom they pretend with (as in the studies with two different adults). This suggests that their context-specific assignment of the conventional rules defining the different games may not have

been by a simple strategy in which they, for instance, ‘mapped’ or associated those rules with people or places. Had this been the case, children would have failed to respond appropriately in one type of task (either that with the toy houses, or that with the different play partners). The fact that they pretended differently with the same person but at different locations, and differently at the same location but with different persons, indicates a more subtle understanding that it is joint activity or practice that determines status assignment.

Children in Study set 2 demonstrated a particularly refined grasp of the context-relativity of conventions. They understood that when an individual entered a joint fictional activity, they were subject to the conventional rules operative within it, but not otherwise. Thus, when the individual joined the game and violated the constitutive rule defining it (e.g. this pencil counts as a toothbrush in the context of our game), they protested at his actions. But when he performed exactly the same action without having joined the game, they left him in peace. Interestingly, children were not reliant on one specific indicator of entry into the joint fictional context in making this distinction. They regulated both an individual who explicitly declared he would join and then violated the rules, but they similarly criticized an individual who implicitly indicated entry by moving to the relevant location and by putting on the relevant attire. This indicates an intuition that there are multiple processes by which people can enter a conventional community.

In addition to this, however, it shows that young children see the conventional status assignments that define joint fiction as normatively structured. When an object is assigned conventional status it is not simply that it is often

treated a certain way, but that it *ought* to be treated that way. Thus when a pencil is assigned the status ‘toothbrush’ it ought to be used for tooth brushing and not drawing. And children are not only able to recognize a conventional norm relating to a fiction that contrasts with reality (e.g. a pencil that is used as a pretend toothbrush). They also recognized multiple norms operative within different fictions (e.g. a stick that is used both as a pretend toothbrush and a pretend spoon). Also striking in this regard is that children not only observe the conventional norms operative within a game, but actively police third party violations. This suggests not just an ability to identify transgressions, but a personal commitment to the norms themselves.

Young children thus appear to understand much of the structure of constitutive rules as outlined by Searle (1995). They have a relatively sophisticated grasp of the way in which joint practice can result in the assignment of status functions to objects (e.g. ‘this stick counts as our toothbrush’) through actions that also have conventional status (‘this action counts as tooth brushing’). In line with Gilbert too, young children appear to view conventions (with this constitutive rule structure, at least) as normatively structured, and are themselves committed to those norms to the extent that they actively enforce them.

However, it is important to point out that children’s games of pretend play fall short of full institutional practice in numerous ways (Rakoczy, 2007). The context of pretend play is highly restricted in that the status functions that are assigned are to be respected by a small group of pretenders rather than a whole conventional community (in the way that, for example, the context of currency operation may include a whole country). In addition, the status that is assigned is

not only temporary, but is non-serious. That is, when a piece of paper is assigned the status of a dollar bill, it really becomes a dollar bill. But in pretence when a stick is assigned the status of ‘toothbrush’ it does not really become a toothbrush, it is only fictionally so (see Walton, 1990). In fact, these differences may have implications for the role of pretence in the development of children’s status understanding in general, but these will be taken up separately in Section 6.3.

The results of these studies raise many interesting questions. One, for instance, relates to what kind of context markers young children privilege over others in delineating conventional contexts. It would, for instance, be interesting to see how children were motivated to pretend if different context markers were pitted against each other. For example, pretend status functions might be assigned to different locations (as in the toy houses studies in Study set 1), but also assigned to different adults. If at test, these factors were crossed, such that each adult sat at the location relating to the opposite status function, children would need to decide whether to pretend in accordance with the status related to the location or rather the one related to that adult. This might shed light on which kinds of markers are most salient for children this age.

Also, investigated in these studies were different cues that young children use to denote a conventional context (location vs. person) and different cues children understand to indicate entry into that context (verbal vs. location and costume). Another interesting question would be to investigate the different cues children require in order to understand that status has been assigned in the first place. In the studies presented, status assignment was always achieved verbally and explicitly. Thus, the adult would exclaim of the stick, for example, ‘this is our

toothbrush'. However, whether children might apply the same principles of context-relativity, and normativity to status functions that were assigned verbally but implicitly (for example, the adult observes that the teddy's teeth are 'dirty' and uses the stick as a toothbrush) or even non-verbally (by simply pretending accordingly) remains unclear. This would be interesting to know since many of the objects with status functions that children come to learn (such as linguistic utterances and tools, for example) are never explicitly assigned their status in the children's presence.

In fact, the methodologies employed in these two sets of studies might be usefully applied to young children's understanding of conventions in other domains. Do they see tools and words, as existing context-specifically (e.g. according to location or between different people), and are they viewed as normative? On the topic of artifacts, there is some suggestion of a notion of context-relativity. Liebal et al. (2009), for instance, found that infants as young as 18 months use the same object differently according to who they interact with. Here infants played a clean up game with one adult and a puzzle game with another adult. Then a new object was placed in view of the infant. Depending on which adult pointed to it the infants either cleaned it up or placed it in the puzzle, suggesting that quite young infants sense that artifact functions vary according to the partner or joint activity at hand. Whether they consider that the object *ought* to be used a certain way according to the joint activity is less clear. Casler (in press), for instance found that 3-year-olds protest when a puppet used a tool (e.g. as a toothbrush) for some novel purpose (e.g. to paint with). However, there was no difference in the amount of protest in this situation compared to one in which

the puppet used the tool in a different but irrelevant way (e.g. to insert into a tube container). Thus, whether children protested because the puppet violated the normative function of the tool, or because he did something unexpected or irregular with it remains an open question. The advantage of a control condition in which the puppet uses an object in exactly the same way, but without having joined the game context (as used in Study set 2), is that children may be seen to accept irregular uses of an object under certain conditions. This demonstrates that they do not simply form associations between objects and certain actions by observing regularities in its use. They understand, rather, that conventional object functions (instrumental or status) apply context-specifically, that is according to some joint activity, and that this has normative consequences for how they should be treated.

On the subject of language, it is far from clear whether young children grasp that the function of linguistic devices exists in virtue of collective practice or context-specifically. On the one hand, studies have demonstrated that young infants tend to generalize newly learned terms such as common nouns to other individuals (Diesendruck, 2005; Diesendruck & Markson, 2001; Graham, et al., 2006), perhaps indicating no notion of context-relativity. However, they also initially interpret the meaning of a new word contingently upon the joint activity that has preceded the labeling event. Thus when 2-year-olds are asked to ‘show modi’, they demonstrate an action if they have previously been performing various actions on an object. But they indicate an object if they have previously been performing the same action on various objects (Tomasello & Akhtar, 1995). This suggests that infants are heavily reliant on context and the joint activity in

their initial learning of labels, at least. However, no studies have examined whether children understand the context-relativity of object's labels by investigating whether they will use a linguistic term (such as a noun or verb) differently according to context or joint activity. An interesting investigation in this regard would be to run studies parallel to those in Study set 1 in which these contexts could be set up in the form of different locations or by different people to see whether children interpret and produce the same label differently across contexts.

Lastly, there is some evidence that infants view correct object labeling as a normatively governed practice. Thus, when an adult points to a doll and says that's a ball, infants may comment 'no' (Pea, 1982). They also produce the correct label in response to such an event (Koenig & Echols, 2003). However, similarly to the case of normativity in tool use, adequate control conditions are lacking to rule out the possibility that infants are responding to an irregularity in the use of a term rather than a violation in its normatively governed usage. In the first case, infants are seen to reject false object labels more often than true object labels, which is exactly what would be expected if they were simply responding to irregular usage. In the second case, infants correctly label an object after an adult's false labeling more often when the adult looks at the object than when they face away (or when they face it but an audio recoding produces the label). This does suggest that infants are motivated to correct what are perceived as *intentional* labeling acts. However, it does not rule out the possibility that they correct on the basis of a violated association that they selectively apply to intentional over questionably intentional labeling events. A particularly stringent

test of infants' understanding that linguistic communication is normatively governed would thus be to investigate whether they might normatively regulate the false labeling of an individual who had joined a conventional context, but allow such an action if it were produced outside the target context (as in Study set 2).

6.1.2 Study 3

This study examined young children's tendency to adopt a particular convention, traditionally and narrowly defined as one of two solutions to a coordination problem. The main finding relates to how increasing mutual understanding of a situation affects children's decisions on whether to adopt a cooperative convention. Under all conditions children had limited information. They were faced with a new partner with whom they had no previous play history, they were unable to monitor the actions of a partner, and they were basically unable to verbally communicate with them. In conditions of individual attention children had (in addition to this), visual access to a number of things. They could see the target, could see their partner seeing the target and were potentially aware that their partner could see the same of them. However, as a group, they showed signs of uncertainty about whether to coordinate. By contrast, when the partner also established mutual eye contact with the child, thus establishing joint attention to the target, children keenly coordinated together with them.

This raises questions about exactly how to characterize the 'jointness' brought about by the addition of mutual eye contact that enabled children to risk

coordination. On the one hand, it might be that children had some doubt about whether the adult had attended to them as they themselves attended to the prizes. Thus from the child's point of view, they might have thought, 'I see the prizes, I see her see the prizes, but has she seen me see the prizes?' This uncertainty may then have been allayed if the addition of mutual eye contact confirmed to the child that the adult was attending to her as well as the prizes. There are, however, both practical and theoretical reasons to doubt this. In practical terms the situation was set up such that the adult and child sat side-by-side, could always see each other in peripheral vision (this was ensured in each case) and the prizes were held up only a couple of meters in front of them. Since children from as young as two years understand what another person sees (Moll & Tomasello, 2006), and from around 3 or 4 years old understand even that another's visual perspective may differ from their own (Flavell, Everett, Croft, & Flavell, 1981), it seems unlikely that children were in doubt about whether the adult could see them seeing the prizes.

A deeper problem is that, even if the establishment of joint attention served to provide this information, this would simply have added another level of recursion to the reasoning process. The child would then effectively need to ascertain whether the adult saw her see the adult see her seeing the adult and so on. Thus, for theoretical reasons, it seems unlikely that the additional information children gleaned from the establishment of joint attention was in terms of content ('the adult sees me see the stag').

Another problem children may have faced is that, despite the fact that perceptual processes are more readily observable than knowledge states, what

people are actually attending to in their perceptual field remains a matter of assumption to some degree (although greatly narrowed down, of course, by cues such as direction of gaze). Thus children may have reasoned something of the form ‘I think she is attending to me and my attentional experience, but perhaps she is just fixated on the prizes’. Since the only new feature of the environment was the addition of the high value prizes, this ought to have made the relevance of the glance relatively clear. But the addition of mutual eye-contact may have acted as confirmation for children that each were indeed attending to *each other* and thus each other’s line of gaze, transforming the child’s perspective from something like ‘I attend to her attending to me attending to etc’ to ‘we attend’ to the prizes together. That is, rather than providing additional information about what the adult saw, it may have been more a transformation of the attentional format from individual (and potentially recursive) to joint attention that caused children to coordinate. Further studies are needed to tease these kinds of issues apart, and some suggestions in this direction will be offered shortly.

The results of this study may speak somewhat to the debate over whether mutual knowledge or psychological heuristics are involved in enabling engagement in conventional coordination. While some accounts posit recursive reasoning processes involving expectations or knowledge states (Gilbert, 1989; Lewis, 1969), others have posited the use of heuristics -mostly based in perceptual and attention processes- as a primitive form of mutual knowledge (Campbell, 2005; Clark & Marshall, 1981; Peacocke, 2005). For instance, Peacocke (2005) argues that perception is unlike knowledge in being neither counterfactual nor a matter of inference. Things can thus be jointly known about in perceptual terms

in a way that is not possible with knowledge states. This allows individuals to know something jointly without the need for recursive reasoning at all. Similarly, Clark and Marshall (1981) posit a joint attention-like heuristic by which individuals may have mutual knowledge of something in the environment (in their example, a candle), if there is evidence that enables a number of assumptions can be made: the evidence must suggest that they are looking at the object simultaneously, that they are not just looking but also attending to the other person and the object, and that the other person is drawing similar conclusions due to common rationality. If these conditions are met, agents will assume mutual knowledge of the object.

It thus seems relevant here that while children in conditions of joint attention tended to risk coordination in the stag hunt game, there is some evidence that it is not until relatively late that children can reason about embedded knowledge states of the form 'she knows that he knows' (see Astington, Pelletier, & Homer, 2002; Millar, Kessel, & Flavell, 1970; Sullivam, Zaitchik, & Tager-Flusberg, 1994). For example, in one study, children are told a story about a mother who fibs to her son about his birthday present in order to surprise him. But the little boy privately discovers the present. Somebody later asks the mother whether the boy knows what he is getting, and when children are asked what the mother will reply, only those over 5 ½ answer correctly suggesting that reasoning about recursive knowledge states does not occur in development until after the age that children utilize joint attention as a basis for coordination in the study here. This could provide support for the heuristic account of how children construct mutual knowledge.

However, these stories are highly complex, and so it remains to be seen whether children would be capable of such reasoning if less complex tasks were given. Perhaps not relying on verbal stories, and also involving the children themselves might enable them to demonstrate more complex reasoning. It would be interesting to see, for instance, how children would fare were they themselves to leave the room and, while away, peek back to watch a friend change the location of a toy. They could then be asked where their friend thinks they will search for the toy. If children who were unable to pass a task such as this one, were still motivated to coordinate in joint attention condition in the Stag Hunt, this might serve as particularly convincing evidence that co-presence heuristics are employed by children in the absence of recursive reasoning abilities in situations requiring mutual knowledge.

In any case, further questions are raised by the results of the study presented here. In relation to normativity, for example, one issue is whether the establishment of mutual knowledge in the form of joint attention raises children's expectations about what the adult is likely to do, or whether it creates normative expectations of what ought to be done. That is, the establishment of joint attention might act as a form of implicit 'agreement' or a commitment to embark on a common goal together as Gilbert's (1989) account would predict. One way to test this might be to combine elements of the method in Study set 2 and that of Study set 3, and investigate how children would react if the adult established joint attention with them and then failed to cooperate. The prediction would be that if they simply expect the adult to cooperate on the basis that joint attention had been established, they would respond with surprise. If, however, they form normative

expectations on the basis of joint attention, they ought to respond more with discontent and protest.

Another issue related to normativity, is whether children in the study here viewed the actual coordination they engaged in (rather than the joint attention itself) as having a normative component, as Gilbert would also predict. Put another way, once a precedent for coordination had been set, did children view it as normatively binding? One way to test this would be to replicate the study by Guala and Mittone (forthcoming) in which adults were allowed to establish coordination over several rounds of a game and then given a chance to defect for higher gain (while their partners continued to coordinate, see Section 1.1.2). The prediction would be that if children, like adults, view cooperative conventions as normative, after several rounds of coordination they would fail to defect because the coordination itself establishes a type of commitment or norm to coordinate. But in the absence of a history of coordination, they would defect for higher gain because this would be the rational course of action in the absence of any norms. If, on the other hand children do not view the convention as normative, they would be likely to defect regardless of whether or not they had a history of coordination with the other player. An alternative way to test this would be to have children play a series of rounds of successful coordination with an adult. Were this adult to then suddenly defect, children might be more likely to protest than, for example, if a new player with whom they had no previous play history entered and defected.

Some quite different questions relate to how children more subtly understand the content of the joint attentional triangle that is established with the adult. For

instance, do they interpret the establishment of joint attention as mutual knowledge that they will jointly act with the adult, or rather more specifically that they mutually know that higher prizes are available? A test for this would be to have the adult establish joint attention with the child and then have both parties observe the high value prizes being moved to the single balls (that can be retrieved alone), and the low value prizes being moved to the double balls (which require cooperation for retrieval). If joint attention establishes mutual knowledge that 'both parties will act jointly', children ought to attempt to retrieve the low value prizes because this would require joint action. But if joint attention establishes mutual knowledge of the availability of the high value prizes, children ought to opt to retrieve these individually.

Lastly, a further question relates to how the content of the joint attention that is established might be manipulated by varying the joint history, or common ground (Clark, 1996) that both parties share. So for example, if after some rounds the adult expressed that for some reason, she needed or had come to prefer the low value prizes, would the establishment of joint attention on critical test trials lead children away from cooperation and towards individual action? Or if two different adults pre-established that they had varying preferences with regard to the prizes, and then later played the Stag Hunt with children, would they respond to the establishment of joint attention differently in each case?

Overall, the study suggests that coordination problems as outlined by Lewis (1969) might be fruitfully used in investigating children's decisions to coordinate conventionally with others. And the procedure used in the study presented here may provide a opportunity for delving quite deeply into the various conditions

under which children will engage in conventional action, as well as the pragmatic and psychological factors that shape their decisions to do so. Next, however, a rough picture of how children's conventional coordination develops will be outlined. This will be followed by analysis of the relationship between children's coordination in fiction and their understanding of conventions. Finally, a tentative proposal will be offered of how children come to enter into the world of social conventions.

6.2 The development of children's conventional coordination

6.2.1 Dyadic coordination and intentions

From birth, infants show mutual responsivity to others through their motor mimicry of observed action (Meltzoff & Moore, 1977). But in their first months of life they begin to actively coordinate with others, though in simple ways: Trevarthen (1979) shows that their dyadic interactions with caregivers increasingly resemble a primitive form of dialogue in which vocalizations and smiles are exchanged in a turn-taking structure. These interactions have thus been termed 'protoconversations', and infants' ability to sensitively coordinate both with vocalizations and also eye gaze becomes increasingly refined thereafter (Rutter & Durkin, 1987).

At around 3 or 4 months, infants become increasingly engrossed in grasping, handling and mouthing objects (Trevarthen, 1979). This increases towards the end of the first year, as they begin to engage in more complex coordination with others around these objects in simple games such as give-and-take and peek-a-boo (Bruner, 1983). However, this is not a simple continuation of the mutual responsivity and coordination of early infancy. The infant's triadic interaction with others around objects is fundamentally affected towards the end of the first year by an emergent grasp of their understanding of others as intentional agents (Tomasello, 1999a). At 9 months, infants react differently to an adult who is unwilling to give them an object than one who is unable to do so (Behne, Carpenter, Call, & Tomasello, 2005). A little later, they selectively imitate an

adult who intentionally performs an action over one who accidentally acts (Carpenter, Akhtar, et al., 1998), and infants perform actions that an adult tries to perform rather than copying the frustrated attempts the adult makes (Meltzoff, 1995). They also assess the reasons behind an adult's unusual action, copying him when he apparently intended to act unusually, and failing to copy him when he seemed to do so for practical reasons (Gergely, Bekkering, & Kiraly, 2002).

On the one hand, this transforms the learning mechanisms by which infants learn about object functions. Thus, just as infants learn instrumental object functions by imitating the intentional demonstrations they witness (Casler & Kelemen, 2005; DiYanni & Keleman, 2008), they similarly learn the pretend functions of objects this way (Rakoczy, et al., 2005). But this sensitivity to the intentions of others not only guides children's learning of object functions. It also has a transformative effect on the development of infants' abilities to coordinate with others.

6.2.2 Instrumental coordination

Their emerging understanding of intentional action enables young infants to coordinate with others in joint intentional interaction. For example, they begin to jointly attend to aspects of their environment with others, and form joint goals in cooperative play and problem solving.

Towards the end of this first year, infants begin to coordinate attention with others in bouts of joint attention in which they and another individual attend to an object and monitor each other's attention to the object (Bruner, 1983; Tomasello,

1995). Also within this context, infants come to follow into others' attentional experience in their gaze following behaviors, and to understand that others may intentionally direct their attention by showing and pointing. But they also learn that they can do the same, and in parallel, begin to direct others attention by showing and pointing (Carpenter, Nagell, et al., 1998). Thus their engagement in coordinated attention forms the basis for intentionally coordinated communication (see also Tomasello, 2008).

Their understanding of intentional action also enables young children to coordinate in bouts of instrumental cooperation based on joint intentions. Young children coordinate together to achieve effects in the environment. For example, they may pull levers together simultaneously to make a toy available, and monitor the actions of a partner so as to coordinate sensitively (Brownell, et al., 2006). But they not only coordinate with others in order to achieve some effect in the environment. They also appear concerned that the goal is realized jointly. Thus, when an adult partner ceases to coordinate with an infant, they tend to vocalize and direct that adult's attention to the task at hand (Warneken, et al., 2006). Importantly, they do this even when they can perform the task alone (Graefenhain, Behne, Carpenter, & Tomasello, in press), suggesting that they are not just interested in achieving the goal for themselves, but have an interest in coordinating to achieve it together. Even young toddlers, then, are beginning to coordinate with manifestly joint goals.

During their second year infants' coordination with objects in play is also well under way. They increasingly make overtures such as handing out objects to others in simple games such as stacking and toppling blocks (Ross, 1982). They

take turns in cooperative interchanges such as rolling a ball back and forth (Hay, 1979) and, as in the case of instrumental coordination, these bouts of play appear sometimes to be based on joint intentions to coordinate with others. Thus when an adult ceases to play with the infant, they try to re-engage him regardless of whether or not the games can be played alone (Warneken, et al., 2006).

Furthermore, young children from 3 years old also appear to view joint play as involving commitment. Thus, if an adult interrupts the game by ceasing to coordinate, children try to re-engage and wait more often if that adult had previously established the game as joint (for example, by inviting the child to play, and exclaiming 'let's play this together') than if she plays in parallel alongside the child (saying 'I'll play that game'). In addition, the children excuse themselves when leaving a game more often if a commitment to play together had previously been established (Graefenhain, et al., in press).

6.2.3 Coordinating fiction

Towards the end of the second year, toddlers also begin to engage in the coordination of joint fiction in their pretend play (Harris, 2000; Lillard, 1993; Piaget, 1962). Like instrumental coordination in both play and problem solving, pretence requires a capacity for mutual responsiveness. However, this responsiveness is relatively sophisticated, since it is not based on physical enablement as is instrumental action (such that, for example, one's pulling may enable another's retrieval of an object). It is based on an appreciation of the inferential relations between the actions of different pretenders (see Rakoczy, 2006, for discussion).

Pretence also, by definition, involves an appreciation of actors' intentions, since one who does not intend to pretend is not pretending, and one who does not grasp an intention to pretend will mistake the action for trying behavior or an accidental action (Rakoczy & Tomasello, 2006; Rakoczy, et al., 2004). Lastly, joint pretence involves the temporary assignment of conventional status functions such that a block may count as a pretend 'apple', and flapping one's arms may count as 'flying' (Walton, 1990). Thus joint pretend play represents a complex form of coordination in which individuals must have joint intentions to pretend, be mutually responsive to the inferential relations governing the joint action, and respect the temporary status functions assigned within the game.

It is thus rather impressive that young children from the age of two engage in such games (Harris 2000, Lillard, 1993). They not only imitate the pretence acts of others (Rakoczy, et al., 2004) but inferentially elaborate stipulations set up within the game. Thus if an adult pretends to pour juice in a cup, children pretend to drink it. And if the adult pretends to make a spill, children pretend to wipe it up (Harris & Kavanaugh, 1993; Rakoczy, et al., 2004; Walker-Andrews & Harris, 1993). Toddlers, therefore, are not only able to engage in joint attention, and joint intentional coordination around objects with instrumental functions. They also, by age 2, engage in joint imaginings and coordinate conventional actions around objects with conventional status functions. This raises the possibility that pretend play may constitute an important area for the development of children's understanding of conventional actions and objects, to be discussed in detail next.

6.3 Pretend play and status understanding

One of Walton's most interesting observations is that there is a parallel between the way in which people who appreciate representational works of art and children who engage in pretend play must take a dual perspective on the props involved. He argues that individuals engage with props so as to allow their imagination to be directed by them in prescribed ways, but also maintain an awareness of such objects simply as props. Thus, for example, a person may appreciate the prescribed imaginings deriving from images in a painting, while simultaneously realizing that they stand before a two dimensional image on a canvas. Similarly, children may imagine in their pretend game that a wooden block is an apple, but continue to appreciate that it is still a block.

It is thus noteworthy that this dual perspective has been formalized in various different ways in theories of children's pretend play. Furthermore, each theory posits a basic dual structure that the child applies *outside* the domain of pretence. While there is not space here to fully review the different accounts, a representative sample will be used to illustrate. On Leslie's (1987, 1988) model of pretence, for instance, the dual perspective is characterized by way of primary and secondary representations. Children have a primary representation of reality, but a 'decoupling mechanism' copies this to produce a secondary representation. This can then be manipulated to generate various pretend stipulations without confusing them as real. Furthermore, this ability to entertain representations that contradict reality also underlies the child's general mental state reasoning processes. Thus, for example, children at around four years come to see that

others may entertain not just pretences that differ from reality, but more serious beliefs that similarly differ. While there are substantial differences between accounts, Perner (1990) too captures the need for some form of dual representation in pretence, but by positing multiple mental models. According to this account, one model represents reality, the other the pretend situation and these are therefore marked as 'real' and pretend'. This marking (like Leslie's 'decoupler') ensures that the child does not confuse models and, for example, really bite into her pretend apple. But the construction of multiple models underlies the development of a general representational ability. That is, Perner sees this as part of a global structural change in the child's social cognition that also, for example, allows children their second year to conceptualize temporal change. Thus children in their second year who are just beginning to pretend with multiple models, may also construct different models for 'now', 'future' and 'past'. These are marked as such, and so enable children this age also to pass tests such as invisible displacement, in which they systematically search for objects that were present previously, but that have now disappeared (Haake & Someerville, 1985). Lastly, on the model proposed by Nichols and Stich (2000), pretence representations are kept in a separate 'work space' they term the 'possible worlds box'. By their account, belief representations are all copied into the possible worlds box, and a 'script elaborator' enables the elaboration of the representations in the box both to generate pretend action as well to support hypothetical reasoning processes. The dual perspective that children take in pretence is thus characterized in various different ways across accounts, but as fundamental to their reasoning about phenomena outside pretence.

Another position developed more recently, is that joint pretence may provide a cradle for the development of young children's understanding of conventional status (Rakoczy, 2007). The basic idea here is that the dual perspective required in pretend play is also required for participating in institutional practice in which, as Searle notes, 'we have to think at two different levels at once' (2005, pg 15). By this he means, for instance, we have to be able to see physical movements but also see them as a 'touchdown', or see a piece of paper but also see it as a 'dollar bill'. But more concretely, like institutional practice, fictional play is seen to involve joint intentionality, the imposition of status functions, and a normative dimension that stipulates actions that are licensed and proscribed within the context of the game (Rakoczy, 2006; 2007). In institutional practice, a community may jointly accept that certain pieces of paper count as dollar bills in the context of their exchange practices, and ought to be used to make purchases and not as note paper. Similarly, children may jointly accept that a block counts as an apple within the context of their game, and that it therefore ought to be 'eaten' and not 'drunk' or used to build with. Plus, in pretence children may gain experience with performative speech acts that create status functions (such as 'this is our apple') that later aid them in grasping serious performatives that establish states of affairs in the world (such as 'I now pronounce you man and wife').

However, pretend play is not institutional practice, and the differences between the two are seen to render pretence 'proto-institutional' rather than directly analogous to the adult phenomenon. Typically in pretence, status is assigned and must be respected by just a few individuals, and so children do not need to consider whether and how a whole community engages in the related

practices. The status functions are not part of a wider ‘web’ of functions and practices as in the case of money, for instance, in which an individual must grasp not only what a dollar bill is, but how it is earned, the relative value of goods, and so on. And the status functions exist temporarily and non-seriously such that they do not have ‘real life’ consequences in the way that, for instance, acquiring and spending dollar bills does. In fact, it is precisely because of these differences that pretence has been proposed to provide a developmental ‘cradle’ for children to begin to grasp the basic structure of joint intentional status function assignment, and the related normativity that this entails (Rakoczy and Tomasello, 2007).

But this proposal raises further questions. Why should it be pretence rather than, for example, language that allows children to gain insight into dual perspectives, constitutive rules and status? The argument proposed is that when children learn language they are not forced to take a dual perspective on the sounds they and others produce as having both an auditory nature and as having status. The involvement of *material* objects in pretence, by contrast, is seen to force the child to consider both the physical object and the assigned status function (Rakoczy and Tomasello, 2007). However, it is not clear in principle why children are not confronted with the same problem of dual perspectives in the case of linguistic utterances. They hear sounds and produce sounds that are in no way instrumentally related to their functions utterances or speech acts. Why does the materiality of objects used in pretence present a problem different from this? On the other hand, it is not a given that the pretending child is always or continually forced to consider the dual nature of the actions and objects that occur in a game. A child could in principle pretend with an object ‘this is our apple’

without *attending* in any one moment to its real identity as a block of wood. This is not to say, of course, that the child can lose touch with reality altogether. Were he to do so, he would indeed be considered delusional, as Rakoczy and Tomasello (2007) note. But as in the case, for example, of an actor in a theater, there may be moments in which he or she or she becomes so engrossed in the play that they do not attend to themselves in terms of their real identities. Lastly, the proposal that the involvement of material objects in pretence forces children to consider the dual perspective involved in such a practice does not explain why other rule games that also involve material objects (such as Piaget's marble games, or hopscotch, for instance) should not do the same job.

However, one element of conventional practice that children are confronted with in fictional games but not necessarily in the case of language is the establishment of intersubjective truth (as outlined in Section 1.2.2). When engaging in adult conventional practice, we understand that certain actions and utterances have performative functions such that they establish truths within a community. Thus for example, the sprinkling of water on a baby's forehead establishes that he is now baptized, and the words 'I now pronounce you...' establishes the couple as married. And these facts are understood to be true within our community. Similarly, in pretence, when the child pretends to bite into an apple, this establishes, for example, that 'we are having breakfast' and that the apple is now partially 'eaten'. Early communication, by contrast, is shaped by children's needs to 'get things done' (see Austin, 1962) and so revolves around the production mainly of informatives, requests and declaratives (Tomasello, et al., 2007). A potentially critical difference in the status functions that children

must grasp in pretence, compared to language, therefore, may be this: unlike the performative function of pretend actions, the request, informative and declarative functions of early communication do not produce intersubjectively defined truths that appear so central to the generation of fiction.

But then why should it be pretence, rather than other rule games, that aids children in grasping the structure of conventional status and the notion of intersubjective truth? In fact, conventional rule games such as Piaget's marble games ought to be more appropriate in this regard since, as in the case of non-linguistic institutional practices, the status functions that are assigned do not have semantic properties. Certain physical movements do not *mean* baptism or making a touchdown. They simply *are* the baptism and *are* making a touch down. Similarly, in a marble game, knocking someone's marble out does not 'mean' anything. One possibility is that, the fact that the status functions are pre-established in rule games (as well as language) does not force children to consider their negotiability. For example, once we have agreed to play the marble game, I can not decide that the green marbles count as more than the blue, or that winning consists of getting rid of one's marbles instead of accumulating more. In pretence, by contrast, children witness and participate in the process of status creation. The child may decide that a block is his 'juice', a hat is his 'jug' and a funny movement counts as 'pouring'. Indeed, the goal in a game of joint pretence is precisely the manipulation and transformation of status such that if you 'pour' - the jug is now 'full', when I push - the juice is now 'spilled', the table is now 'wet', and so on. Perhaps, then, it is not the materiality of pretence, but rather the flexibility that fiction affords, and the way in which it produces intersubjective

truths that renders it an important tool for the development of children's status understanding.

6.4 The development of status understanding

Through cultural imitative learning, young children come to engage in conventional practices such as tool use (Behne, et al., 2005; Carpenter, Akhtar, et al., 1998; Casler & Kelemen, 2005; Meltzoff, 1995), linguistic communication (Tomasello, 2000) and games (Rakoczy & Tomasello, 2006; Rakoczy, et al., 2005). Piaget's (1932) developmental proposal was that young children start with an objective view of conventional rules and status as natural and unalterable, and progress towards a more relative view that sees them as changeable and negotiable.

A similar proposal is put forward by Kalish (2000, 2005) who characterizes children's early grasp of status as holding objectively and normatively, and sees older children as progressively grasping its subjective and collective intentional basis. Evidence offered in favor of this view, for example, is that children before age 7 do not seem to grasp that conventional rules have to be publicly represented to be operative. Thus, when told of a teacher who tells the class to write their assignments in pen, and later privately realizes she wishes them to write in pencil, they state that the children should act in accordance with the teachers current desire and will get in trouble if they don't (Kalish & Cornelius, 2007). Younger children also seem to take conventional obligations as an objective basis from which psychological states may be inferred: Five-year-olds are more likely to claim that a character will act in accordance with a conventional rule such as 'people should work together with someone else' than they are to claim the character will act in accordance with their preference such as 'she likes to work

together with someone else' (Kalish & Shiverick, 2004). Furthermore, it is suggested that children around age 3 think that if a conventional rule changes, everybody will think according to the rule regardless of their access to that information. Thus they claim that if the winning marble color in a game is changed from orange to blue, a puppet who is absent when the rule is changed will think the winning color is blue (Kalish & Cornelius, 2007; Kalish, et al., 2000).

However, there are problems with this analysis. The first is that the data presented in favor of it speak more to how children understand the subjective representation of conventions, rather than their subjective or intersubjective bases. For example it is not clear whether young children's failure to grasp that an absent puppet will think according to the changed or the old convention (Kalish & Cornelius, 2007; Kalish, et al., 2000) relates to a problem with false representation in general (see Wimmer & Perner, 1983, for example), or specifically to their notion of conventions. The second problem is that there is not enough research to gauge whether young children conceptualize conventions across domains as objectively or intersubjectively defined. On the one hand, the data from language acquisition shows that infants generalize labels across individuals, perhaps suggesting a notion that linguistic terms hold rather objective status. On the other hand, the data presented in Study sets 1 and 2 (as well as that of Liebal, et al., 2009) suggest that young children see conventional tool and toy functions as applying to particular individuals and joint activities. Perhaps, then, children begin with an intuition that conventional phenomena exist intersubjectively, that is, as relative to a group or joint activity and must learn to

make assumptions of generalizability. But this raises the question of the kind of mechanism by which this could occur.

This dilemma, in which children have to balance an understanding that conventions are general across a community but also exist context-specifically, has been called the ‘paradox of stability and flexibility’ by (2007), and their solution to it is intriguing. They argue that children’s generalizations of conventional phenomena (such as object labels and tool functions) do not result from intuitions about the objects themselves, but rather emerge from the way in which children perceive certain situations as recurrent coordination problems. Children employ the same labels or tools across situations because they simply recognize them as solutions to the recurrent coordination challenges they face. This produces an ‘illusion of stability’ -from an external observer’s perspective- about the way in which children conceptualize the conventional devices themselves as ‘shared’. In fact, this idea is consistent with the tentative developmental picture of how young children come to acquire social conventions that will be outlined next.

6.5 Children's entry into the world of social conventions

Young infants' joint attentional and imitative abilities enable them to coordinate their actions with others (Brownell, et al., 2006; Eckerman, et al., 1989; Eckerman & Didow, 1996) and heavily guides their learning about objects (Carpenter, Akhtar, et al., 1998; Casler & Kelemen, 2005; Meltzoff, 1995). Their ability to read the intentions of others enables them not only to understand what others do, but also to form joint intentions to act together with others (Tomasello, Carpenter, Call, Behne, & Moll, 2005). Importantly, joint intentional interaction entails commitments and norms of cooperation between parties, and children are sensitive to these cooperative norms (Graefenhain, et al., in press; Warneken, et al., 2006). This constellation of joint attention, cultural imitation, and social coordination based on joint intentions and commitment provides the rich interactive context in which young infants and children are confronted with conventional phenomena (Rakoczy & Tomasello, 2007).

Within their joint activities with others, infants and children face recurrent coordination problems. In the area of communication for instance, they realize that others are trying to direct their attention with the use of communicative devices, and face recurrent situations in which they need to do the same. Certain devices such as words are typically used in these situations, and infants rely heavily on social pragmatic information in order to decipher the intentions behind the use of particular words. But the lesson from social-pragmatic accounts of language acquisition, for example, is that infants and young children understand function of novel conventional devices within the context of *joint activity*. This

may lead them to a notion that these devices exist relative to the coordination problem and, perhaps, a type of context-relative grasp of them that they initially see as specific to certain people. But when -what children perceive to be- similar coordination problems arise, they may recruit the same conventional device (and think that others also recruit it) in order to solve them on this basis. This would result in the generalization of conventional devices across people and contexts.

Children's notions of context-relativity may be further supported by observations of variation in use. Thus seeing different people use a tool differently and hearing multiple names for an object (it is a 'dog' and an 'animal', for example) may solidify intuitions about the way in which conventional functions exist relative to different people and activities. But observed regularities in use will have the opposite effect, and serve to highlight the way in which recurrent problems are frequently solved with the use of the same tools. And where children fail to grasp regularities in use, they may encounter explicit corrections giving rise to familiar scenes in which children are guided with feedback such as 'no that's not a dog, that's a bird' and 'use the spoon for eating, not banging'.

The idea that the context of a joint activity forms the basis for children's learning of conventions may also help explain why children apply normative principles to conventional phenomena. If they understand, for instance, that during a pretend episode, an object has been assigned status as part of a joint intentional activity, quite general commitments to a joint goal (of the form 'we act together' or 'we pretend') may filter down into more specific commitments (of the form 'we pretend this block is an apple'). This could mean that infants and

young children might fail to view conventional actions they observe outside the context of joint action as normatively governed. But it could also be that only very young infants rely on the relatively encapsulated format of joint intentional activity for assigning normative status to the actions and objects that occur within it. Older children may rely on broader notions that many or all intentional actions they observe, joint or individual, will in some way constitute what ‘we as a community do’. This suggests yet another fertile area for investigation.

In sum then, infants’ and young children’s skills of intention reading, joint attention and cultural imitation seem to equip them with a rich cognitive repertoire for engaging with novel conventional phenomena. But their employment of these capacities in joint intentional interaction, involving joint goals and commitments, seems to provide a key context in which they are able to learn conventions. The relatively encapsulated context of joint action may lead them to first consider conventions as relative to the joint activity at hand and perhaps as specific to particular people. But the fact they face recurrent coordination problems across people and contexts may lead them to generalize. Hopefully what this discussion has brought out is some of the key lines of investigation that might be fruitfully pursued in order to clarify this picture somewhat.

6.6 Summary

Philosophical investigations of the problem of what a social convention is vary in their results. Common to the four main accounts reviewed in Chapter 1, are some notion that conventions arise within the context of people trying to coordinate together, have some degree of arbitrariness in character, and some element of normativity. An additional perspective is that in which conventional status is seen as central to conventional practice.

Research into young children's understanding of conventions has, in recent years, gained some impetus, as indicated by the drive to investigate the phenomenon outside the domain of language acquisition. Key findings are that children's joint attention, coordination and understanding of intentions provide them with cognitive tools that are important to their engagement with novel conventional phenomena. These are recruited into processes of cultural imitation and joint intentional coordination, that constitute children's developmental gateway into social-conventional life .

The studies presented in this thesis add to the growing body of information on what children understand of conventions and how they engage in conventional action. The general conclusions are this: Firstly, young children grasp the underlying structure of the constitutive rules that define much of our conventional practice. Secondly, they see certain conventional practices as normatively governed. Finally, joint attention to a situation affects children's decisions to adopt conventional forms of coordination. However, since developmental research on conventionality is still in its infancy, these results only add small

nuggets of information to our relatively sparse understanding of children's grasp of social conventions. Hopefully the discussions in this thesis will contribute to filling the picture out a bit.

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