

REPORT

Social and object support for early symbolic play

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Abstract

In this study we sought to determine the degree to which 2- to 3-year-old children use objects symbolically in the relative absence of adult symbolic actions or linguistic descriptions, and how the nature of objects influences symbolic play. Results revealed a dramatic increase in children's creative symbolic productions between 2 and 3 years of age, with the tendency to produce symbolic actions influenced to an equal degree by adult symbolic action models and verbal directions. Children of all ages were heavily influenced by the nature of the object to be used as a symbol, with the youngest children using only replica objects as symbols. In a second study, we examined children's looks to an adult as they engaged in different kinds of activities with objects. The main finding was that children looked to the adult immediately after performing a symbolic action more often than if they performed an instrumental action. We argue for the essentially social nature of symbolic play, both in terms of how children learn to use objects as symbols and in terms of the reasons they do so.

It is widely believed that children's earliest use of objects as symbols and their earliest use of linguistic symbols emerge in developmental synchrony in the second year of life, and that these two behaviors derive from the same underlying semiotic function (Piaget, 1962; Nicolich, 1977; McCune-Nicolich, 1981; Bretherton, 1984; Shore, 1986; McCune, 1995). The problem with this belief is that many of children's object-directed actions that adults interpret as symbolic, mostly in symbolic play, may not be symbolic from the child's point of view. Instead, it is possible that in many cases children are simply doing with objects what they have seen adults do with them (e.g. Fenson & Ramsay, 1981), and adults then interpret these actions as symbolic – often because the original adult act was symbolic or because the objects being manipulated were manufactured by adults with the intention that they be used symbolically (Tomasello, 1999). Related to this imitation interpretation of symbolic play, it is also common that adults tell young children explicitly how to manipulate toys with verbal instructions such as 'Put the car in the garage' or 'Brush the baby's hair'. When children dutifully perform the requested act, it is difficult to know whether they are simply placing the toy they know as a 'car' inside the toy they know as a 'garage' – as per their instructions – or

whether, alternatively, they are symbolically driving a real car into a real garage. Harris and Kavanaugh (1993) addressed this interpretative problem to some extent by presenting young children with a verbal script in which there was room for creative symbolic action; e.g. 'Teddy is having a bath. This is Teddy's soap [offering a block]. Show me what Teddy does with his soap.' Only sometime after their second birthdays were children good at this task, and even in this case it cannot be overlooked that the original identification of the block with soap was accomplished through the child's comprehension of adult language, not through her own symbolic imagination (see also Leslie, 1987, 1994).

Although this skeptical attitude is not often adopted by symbolic play researchers, it is a common research finding that children will use an object 'symbolically' much more often (a) if an adult has just done so (e.g. Jackowitz & Watson, 1980; Bretherton, 1984; Fenson, 1984) and (b) if they are actively engaged in interactive play with their mothers – which typically means much maternal language encouraging the child to use objects in ways that adults see as symbolic (Slade, 1987; Fiese, 1990). Indirect support for this skeptical line of reasoning also comes from a number of experimental studies of young children's comprehension of objects used as

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symbols. In particular, the work of DeLoache and colleagues has shown that children in the middle of their third year of life – well after they are supposedly engaging in symbolic play – still have many difficulties in comprehending the spatial relations represented in symbolic objects such as toy houses (see DeLoache, 1995, for a review). DeLoache's theoretical interpretation is that children have trouble using objects as symbols – even at the same time that they are dealing with linguistic symbols quite effectively – because objects used as symbols have a kind of dual status: they are both physical objects to be grasped and manipulated and they are simultaneously representations of other objects. DeLoache calls this the dual representation problem.

DeLoache's tasks using toy houses and rooms require the child to understand symbolic representations of fairly complex spatial relations, and so it is possible that this complexity, not problems of dual representation, are the source of children's difficulties in her tasks. However, Tomasello, Call and Gluckman (1997) found that children of this same age also have trouble in simply identifying the object an adult intends for them to retrieve when the adult communicates using an exact replica of that object (given that they had previously demonstrated their understanding of the task by retrieving objects the adult pointed to). Similarly, Tomasello, Striano and Rochat (1999) asked children to retrieve objects that an adult indicated in various ways and found that 18-month-old children could not use a toy replica to do this – even though they were quite good at the task when the desired object was indicated either with words or with a gesture associated with that object (e.g. hammering action for hammer) and even though the older children (26- and 35-month-olds) had no problems. One explanation for these findings is that young children have the general capacity to understand symbols, but words and gestures do not create dual representation problems in the same way as do replica and other objects (see Acredolo and Goodwyn (1988) and Namy and Waxman (1998) for interesting discussions of the symbolic status of early gestures). An additional finding was that even the older children had trouble comprehending the adult when she used as a symbol an object with a common instrumental function (e.g. using a cup as a hat in order to ask for a real hat) (see also Fein, 1975; Fenson & Ramsay, 1981; Killen & Uzgiris, 1981; Bretherton, O'Connell, Shore & Bates, 1984). Tomasello *et al.* (1999) interpreted the latter finding as evidence for something beyond a dual representation problem – what they called a 'triune representation problem'. In this task a cup is simultaneously (i) an

object to be grasped and manipulated, (ii) an artifact with a well-known function (e.g. in drinking) and (iii) a symbol for a hat.

Tomasello *et al.* (1999) also reported a small study of symbolic production in these same children, 18–35 months of age. The idea was to provide a context in which children could use objects in symbolic play, but with controlled amounts of social support from adult symbolic action models or verbal scaffolding. First, in a baseline period, the adult simply gave the child a sand-filled sock (meant to be a doll), a pyramidal block construction (meant to be a car) and several toys relevant to dolls (toy bed, toy brush, toy spoon) and to cars (toy road, toy tunnel, toy man). Second, in a model period the adult used the sand-filled sock as a doll (rocking it and putting it to bed) and the blocks as a car (putting the man in the 'car' and pushing it along the floor saying 'Vroom!'); she then gave the child the toys again. Finally, the adult gave the child a verbal script and repeated the actions (e.g. 'My dolly's tired. She's going to bed' as the adult rocks and puts to bed the sand-filled sock). Note that for each object set two supporting props were not used symbolically, i.e. the spoon and brush for the sock-doll and the road and tunnel for the block-car. The question was thus whether the children would produce any creative symbolic actions that the adult had not produced at any point in the procedure. Results were that the 18-month-old children produced almost no creative symbolic acts in the first phase before adult modeling, but then they produced a fair number of the symbolic acts after the adult performed them during modeling – with a few additional creative symbolic acts during that period as well. Children at 26 months old produced about four times as many creative symbolic acts overall, and 35-month-olds produced about double that number again. Adding in the verbal script led to even more creative symbolic acts at all ages, but because the verbal script phase was always last it is possible that this result was due to an order effect.

In the current study we sought to design a more systematic test of children's early symbolic production skills and the social support they require. In a pilot study – run with only a few children since they uniformly found it unenjoyable – we simply gave children some fairly plain objects and left them to their own devices to see if they would spontaneously generate symbolic activities. Given that they mostly did not, in the main study we provided children with a rich physical infrastructure for symbolic engagement in the form of a many-roomed doll house with many toy furnishings and potential symbolic activities. We then gave them (one at a time and counterbalanced for order across children)

different types of objects that might be used as human-like characters to engage in these symbolic activities: replicas in the form of a toy boy and girl, natural objects in the form of a rock and a stick, and instrumental objects in the form of a pencil and some scissors – this manipulation being aimed at issues of dual (and triune) representation. Children first had a baseline period with each object set, and then we provided half the children with symbolic action models that they might imitate and half the children with verbal scaffolding models suggesting symbolic activities to them. Both the adult models and verbal instructions were given for only half of the potentially symbolic activities in the doll house, with the other half left open so that the child could possibly engage in some unmodeled symbolic activities as well. In a final follow-up study we explored the extent to which children look to adults, presumably in order to share experience with them, when they are engaging in symbolic acts versus instrumental actions with objects – another indication of the inherently social nature of early symbolic play.

Pilot study

A major problem with the Tomasello *et al.* (1999) production study was that the props to be used symbolically were fairly familiar to the children (e.g. the spoon, brush and bed for the sock-doll). Moreover, the sock-doll and block-car represented only one type of symbolic vehicle, i.e. a fairly neutral one that was neither an iconic replica nor an instrumental object with some other use. In this study, therefore, we had three different object sets for children, each of which had one ‘replica’ object (toy man, car or road), one ‘natural’ object (rock, branch, carrot), and one ‘instrumental’ object (pencil, stapler, scissors). First we simply gave children the three objects that comprised a set to see what they would do with them on their own, and only after that did we provide them with symbolic action models using these objects. The problem was that in the initial baseline period in which we simply put three relatively plain objects in front of the child and attempted to encourage her to play (e.g. by drawing attention to interesting properties of the objects), many children were totally uninterested in playing with the objects and some refused to cooperate totally. We thus saw only about 20 children for this study and then decided that we needed to provide children with an environment that was more conducive to symbolic play. Nevertheless, the details of this study are important because they illustrate some of the conditions that facilitate and inhibit young children’s tendency to engage in symbolic play with objects.

Method

Participants

Thirteen children were recruited by telephone from a list of parents who had volunteered for studies on child development. There were four at 24 months of age ($M = 24$ months 28 days); five at 36 months ($M = 36$ months 17 days) and four at 48 months ($M = 48$ months 22 days). Participants were mainly Euro-American and middle class from the Atlanta Metro area. They received a small gift for participating. Seven additional children (three at 24 months and four at 36 months) were tested but were excluded from the study because they refused to cooperate.

Materials

Three object sets were used, each consisting of one replica, one instrumental and one natural object.

Set 1: a man made from a small plain yellow ball as the head attached to a green plastic cylinder for the body, a pencil, and a small rock.

Set 2: a plastic toy car without wheels, scissors, and a small tree branch.

Set 3: a toy road made from black foam core with painted white lines, a stapler, and a carrot.

The object sets were always presented in the same order (sets 1, 2 and 3) for all children. In addition to these object sets, a piece of blank white paper was given to the child with each set so that he/she could use the instrumental objects in conventional ways (draw, cut, staple). During the testing session, the unused object sets remained in a bin away from the child when they were not in use.

Procedure

Testing was done in a child psychology laboratory, with no other distracting toys in sight. Each child was tested individually and accompanied by a parent. Children sat on a mat with their parent sitting behind them and an experimenter (E) sitting across from them. Parents were asked to read a form during testing and not to interfere with the procedure. A second experimenter, occluded from the child’s view, timed the procedure and recorded the session on videotape. The study consisted of a baseline phase, three modeling phases, and a second baseline phase – repeated for each of the three object sets.

Baseline E introduced the first object set to the child. Prior to giving the objects to the child, E explored and manipulated each object for 10 s. During this procedure she highlighted the object's properties with positive affect and vocalizations. For example, while holding the pencil she would say something like, 'Wow, look at this. It is long and white!' E then gave the three objects to the child who then had 30 s to explore them. E was actively engaged with the child during this phase, but did not tell them what to do with the objects.

Modeling phases There were then three different modeling conditions for each object set. In the Control condition E performed an instrumental or exploratory action with each object, e.g. writing with a pencil or twirling the road in her hands. In the Symbolic Model condition, E provided a symbolic action model for each object, e.g. making the carrot walk on the floor as a man. In the Symbolic Script condition E used the objects in each set together and provided a 'man-car-road' verbal script, e.g. putting the carrot on top of the stapler and pushing the stapler along the road (saying, 'Look! The man is in the car, and he's going for a ride on the road'). The order of conditions was randomized across children. Each of these conditions began with E providing a 10 s demonstration, during which E actively obtained the child's attention through verbalizations and actions. Following each demonstration, the child had a turn for 1 min. For half of this time E was actively engaged with the child (looking at her and giving nonspecific verbal encouragement) and for half she was unengaged (turning away looking at a book) – order counterbalanced across children for each object set. The testing procedure was repeated in the same way for each of the three object sets.

Baseline 2 Following the testing phase with each object set, the child was given a 30 s baseline period in which there was no demonstration. As with the first baseline, E was actively engaged with the child throughout.

Coding

All video records were coded by two independent observers, where coding means that each symbolic action was identified and described briefly in English. If the child used two objects together symbolically, this was counted as one symbolic act. Any creative symbolic acts not falling within the man-car-road scheme were counted as well (e.g. using the road and carrot together as a guitar). If the child produced multiple instances of the same symbolic act within the same turn, this was counted as one symbolic act. Percent agreement between

the two observers was based on identical matches of the key English words (e.g. 'pencil as car'). Percent agreement based on all observations was 98%. Imitative acts were those symbolic actions that E had demonstrated previously with the objects, and novel acts were those symbolic actions the child had not previously seen.

Results

The main result of this study was that the younger children engaged in very little, if any, novel symbolic play in either baseline period: of the four 2-year-olds, one child produced one novel symbolic act and three children produced no novel symbolic acts; of the five 3-year-olds, one child produced one novel symbolic act and four children produced no novel symbolic acts. The 4-year-olds fared much better in this sparse social environment: three of the four 4-year-olds produced two or more novel symbolic acts. On the other hand, most of the youngest children and virtually all of the older children produced at least one imitative symbolic act in at least one of the modeling conditions. In addition, as expected, children produced almost double the number of symbolic acts in general (novel + imitative) when the adult was engaged ($M = 1.9$) compared to when she was not engaged ($M = 1.0$).

Discussion

The 2- and 3-year-old children in this pilot study were disinclined to play with us and our relatively unengaging toys, and they were especially disinclined to engage in symbolic play with these unengaging toys. As an anecdotal addition, we should also report that many of these younger children asked to play another game, or even to go home. This behavior is totally out of keeping with the behavior of children in our other very similar studies in which the same female experimenter interacted with children of this same age, including both studies reported by Tomasello *et al.* (1999) and the two studies reported below. Our hypothesis for this surprising outcome is that children were uncomfortable playing in the current situation because (a) the objects they were given to play with were, in a word, boring – indeed, two of the three in a given set were not really toys at all as one was an artifact (stapler, pencil or scissors) and one was a natural object (rock, stick or carrot); (b) there were no good substrate objects, such as a bed or a doll house, to scaffold symbolic actions; and (c) the experimenter spent half her time basically ignoring the child (in the unengaged condition). The 4-year-old children were much better in this situation, with no drop-outs and only one child failing to produce at least

two symbolic acts, presumably indicating these children's relatively greater independence from social context in their symbolic play activities.

Study 1

Although we had expected children to engage in only relatively small amounts of symbolic play in the spare situation of the pilot study, the extent to which they did not engage with us and our 'toys' was a surprise. Nevertheless, we still wanted to see how many and what kinds of symbolic acts children would perform independent of adult symbolic modeling and language. For the current study, therefore, we augmented our play sessions with a large, brightly colored, doll house that contained many smaller toy props within it (e.g. toy clothes, toy furniture etc.). Using as symbolic actors the three kinds of objects from the pilot study (replica, instrumental, natural), we then modeled symbolic acts for children using some of the toy props but not others.

Method

Participants

Seventy-two participants were recruited by telephone from a list of parents and children who had volunteered for studies of child development. There were 24 children at 24 months of age (10 males, 14 females; $M = 23$ months 21 days; range 23;16 to 26;8), 24 children at 30 months of age (13 males, 11 females; $M = 30$ months 9 days; range 28;26 to 31;5) and 24 children at 36 months (15 males, nine females; $M = 36$ months 21 days; range 35;2 to 38;4). Participants were mostly from middle-class families and received a small gift for participating. Sixteen additional children (10 at 24 months, three at 30 months and three at 36 months) were excluded from the study either because of experimental error ($N = 2$) or because they were uncooperative or their mother interfered ($N = 14$).

Materials and design

The apparatus was a colorful plastic doll house, approximately 2 ft \times 1 ft \times 1 ft, totally open faced (i.e. it was half a house) with a horizontal shelf that created two stories. The house was divided into four rooms (two on each storey) that were all equally within the child's reach when she was seated or kneeling on the floor. At any one time, each room had within it three props. There were three pairs of actors: Replica (a toy man and toy woman), Instrumental (a pencil and a scissors) and

Natural (a rock and a stick) (see Figure 1). Each child used each of the actor pairs, with order counterbalanced across children. There were three sets of props, a new one being used with each actor set for a given child, so that the pairing of actor and prop sets was randomized across children (see Table 1). Two additional within-subjects variables were (counterbalanced for order across children; see below): (1) symbolic action models versus symbolic language models, and (2) E engaged with child versus E distracted and so unengaged.

Procedure

Observations were done in a child psychology laboratory. Each child was tested individually and accompanied by a parent throughout the session. The child sat on the floor in front of the doll house and next to the experimenter (E). Parents sat on a couch approximately 4 ft behind the child and were told not to influence the child during the study. All sessions were video recorded, with the camera positioned over the doll house. The

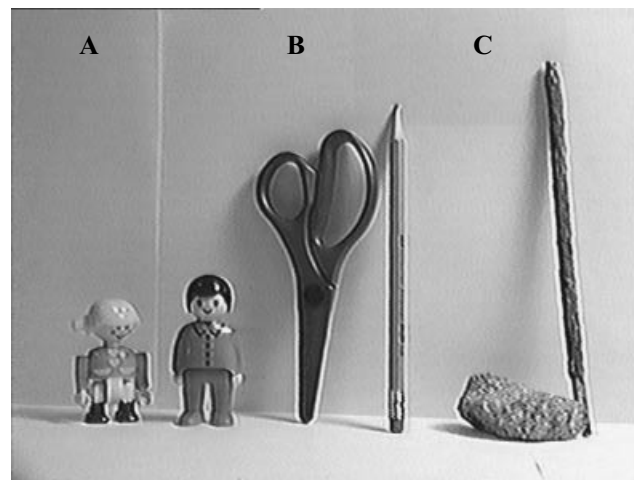


Figure 1 Actor sets used in Study 1: A, Replica; B, Instrumental; C, Natural.

Table 1 Object sets used in Study 1

Room	Constant ^a	Set 1	Set 2	Set 3
Kitchen	Stove	A. Hotdog B. Napkin	A. Cake B. Sponge	A. Hamburger B. Cloth
Bathroom	Scale	C. Potty D. Brush	A. Waste basket B. Lotion	C. Sink D. Washcloth
Bedroom	Bed	E. Hat F. Bear	C. Coat D. Dog	E. Shoes F. Toy
Living room	Lamp	G. Television H. Couch	E. Mirror F. High chair	G. Window H. Chair

^aProps remained in the rooms throughout the study.

study session consisted of the child playing with each of the three actor sets in turn. For each actor set the child experienced a warm-up period followed by three phases of testing as described below.

Warm-up E introduced the child to the doll house and told her they were going to play together. The house was equipped with the appropriate prop set. To accentuate each prop, E touched each one while commenting 'Look at this!' She then brought out and showed the child the appropriate pair of actors. E highlighted each of the actors by commenting on their physical characteristics, always using personal pronouns suggesting animacy, i.e. such things as 'Look at him. He's short' (e.g. rock), or 'Look at her. She's blue' (e.g. scissors). The child was then given the actors and encouraged to play with them in the house. E never made direct reference to the child's actions, but encouraged the child to play by commenting, 'Good' or 'What else can they do?' After 1 min, E asked the child 'What else can you do with him and her?' The child was then given an additional 1 min to play.

Testing phase E then asked the child for a turn playing with the actors. E took both actors, and with one of them performed one symbolic demonstration on one prop in each of the four rooms (randomized across conditions; see Table 1). E used a general verbal script as the actor went from room to room (e.g. 'He can go in the bedroom'). For a given child, only one of the actors was ever seen performing symbolic acts, and it only performed them on one prop per room. E used the other actor and props only in non-symbolic ways such as pointing to the props while saying 'And there is this', and putting the non-modeled actor in front of the child saying 'And there is him (or her)'. This meant that of the 12 possible symbolic actions the child might logically perform for a given prop set (three props per room \times four rooms), only four were actually demonstrated (one per room, and with only one actor).

For a given child, for the one actor, the first symbolic model was in the form of either an Action model or a Language model, with the order of model type counter-balanced across children. In the Action condition, E performed an action with the actor (e.g. scissors putting on shoes), but did not use language to describe the action. In the Language condition, E verbally described the actor performing an action (e.g. 'The scissors could put on shoes'), but did not physically model the action. E touched the four non-demonstrated prop objects saying, 'Look at this' for each. Children were then given a turn to use both actors together in the house for a total of 2 min. Following this 2 min period, E had another turn with the actors, and repeated her activities exactly

except using the other model type (Action or Language), i.e. she either performed or suggested the same act with the same prop using the same actor in both model conditions. The child then had another 2 min turn.

During each of the child's turns, E modified her engagement behavior. For one of the minutes E was engaged, and for the other she was unengaged. While engaged, E verbally encouraged the child by commenting something along the lines of 'That's good' or 'Wow, that's great'. While unengaged, E ignored the child's action and looked down to read a paper. The order of engagement conditions was counterbalanced across children, with a given child always experiencing this condition in the same order.

Upon completion of play with the first actor set, the child helped E put the support objects and actors away in a box, and then waited as E set up the doll house with the next prop set. The procedure for the second and third actor sets was then identical to that for the first, except of course that the actor set and supporting props changed as experimentally designed. The entire procedure with all three actor sets lasted approximately 25–30 min.

Observational and coding procedure

An observer (O) was present throughout the entire testing procedure to time the various phases of the study with a stopwatch and to operate the video camera. All video records were scored for symbolic actions together by two observers (non-symbolic actions on the objects such as banging, mouthing or throwing were not scored). Symbolic actions were described in shorthand English phrases of the type 'coat on rock'. Only one instance of a given symbolic act was scored for any given 2 min period (i.e. during warm-up, model and language phases) so that, for example, repeatedly putting the coat on and off the rock was scored only once (whereas putting the coat on the other actor or doing something different with the rock were scored as additional symbolic acts). Operational definitions for the most obvious of the symbolic acts were defined ahead of time, e.g. hat on top of actor, actor in front of mirror etc. Actions that were clearly not symbolic (e.g. scissors used to cut supports etc.) were not coded as symbolic acts. In addition, only actions that were performed with the actors were coded as symbolic, not instances in which the child used the support objects in relation to the self (e.g. brushing own hair) or used language to explain what the actors were doing without performing the actions. A third independent observer coded a sample of 20% of the children (equally distributed across ages). Agreement was defined as one match (objects and action

described with virtually identical English words) of the specific act during a period (since repetitions of the same act in the same period were not scored). Using this method, percent agreement was 96.9%.

Children could produce two different types of actions during testing. For any given period, they could produce symbolic actions not seen previously demonstrated by E (called Novel Actions) or they could reproduce any of the symbolic actions that E had shown them or suggested to them verbally (called Imitated Actions). Children varied in their style of play. Some children used the actor sets in scripted ways, pretending, for example, that the actors were having a birthday party in the kitchen or setting the table for dinner. Others used the actor sets in simpler ways, e.g. to visit each room of the house while performing more rapid and discrete actions with the props, and without necessarily commenting upon what they were doing. Actions were considered either novel or imitative regardless of which actor was used – since preliminary analyses showed that children did not treat the two actors very differently.

Results

The order in which children used the three different types of actor sets had no effect on the number of symbolic acts they produced, nor did it interact with any of the other variables. We therefore do not consider this factor further. Perhaps surprisingly, the engagement variable – whether E was engaged with the child or not as she played with the toys – also had no main effect on

the number of symbolic acts produced (although it did participate in one three-way interaction that was very difficult to interpret). We therefore do not consider this factor further, although we shall discuss the significance of this negative finding below.

The main analysis of the current results utilized a 3 (age: 2 year, 2.5 year, 3 year) \times 3 (object: replica, instrumental, natural) \times 2 (response type: novel, imitative) mixed design analysis of variance (ANOVA), using frequency of symbolic actions as the dependent measure. There was a significant main effect for object type, $F(2, 138) = 19.08$, $p < 0.0001$, with children producing more symbolic actions with the replica ($M = 1.2$), the next most with the natural objects ($M = 0.87$) and the least with the instrumental objects ($M = 0.57$) (Tukey's HSD procedure revealed $p < 0.05$ for all three comparisons; see Figure 2). There was also a main effect for response type, $F(1, 69) = 25.60$, $p < 0.0001$, showing that children produced more imitative actions than novel actions ($M = 1.19$ and $M = 0.713$ respectively). And finally, there was also a main effect for age, $F(2, 69) = 7.0$, $p < 0.01$, with 3-year-olds ($M = 1.3$) producing more actions than either 2.5- or 2-year-olds ($M = 0.95$ and $M = 0.58$ respectively; Tukey's HSD procedure revealed $p < 0.05$ in both cases), who did not differ from one another. There were no interactions among these three variables.

Because the older children produced more symbolic acts overall, of special interest was the proportion of novel and imitative actions performed at the different ages. We therefore performed a one-way ANOVA with

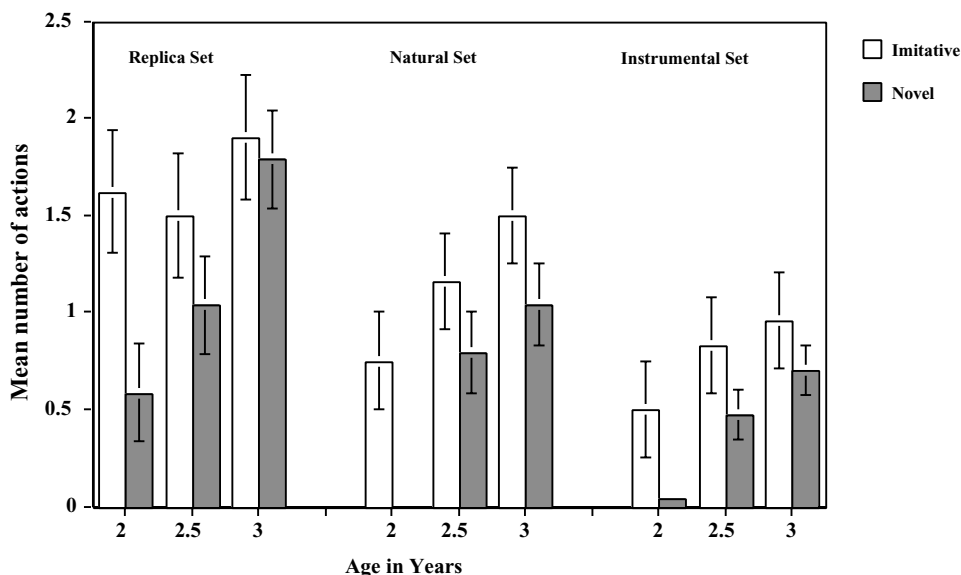


Figure 2 Mean number of imitative and novel actions as a function of age and actor set.

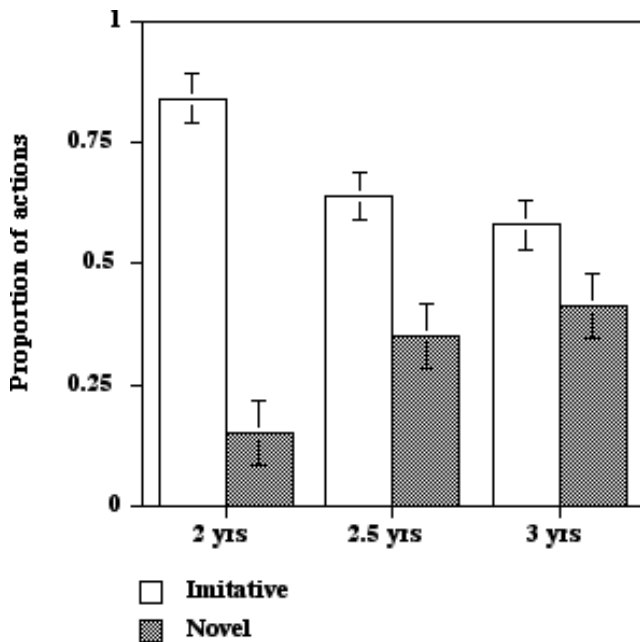


Figure 3 Proportion of imitative and novel actions as a function of age.

age as the independent variable on the mean proportion of children's novel symbolic actions. As shown in Figure 3, the analysis yielded a significant main effect of age, $F(2, 69) = 6.05, p < 0.004$, with Tukey's HSD *post hoc* comparisons revealing 2.5- and 3-year-olds produced reliably more novel symbolic actions than 2-year-olds ($p < 0.05$ in all cases). Confirming this general trend,

an analysis of individuals revealed that there were seven 2-year-olds, 16 2.5-year-olds and 20 3-year-olds (out of 24 in each case) who performed at least one novel symbolic act. (Note that because the proportion of imitative symbolic actions is the perfect complement of novel symbolic actions, the result of an ANOVA on this dependent variable would be the same.)

Also of interest was whether E's symbolic Action models or symbolic Language models were more effective in inducing children to produce symbolic actions themselves (either imitative or novel). We thus performed a mixed design 3 (age) \times 2 (demonstration type) \times 2 (response type) ANOVA on the frequency of children's symbolic actions following the first modeling phase only. Note that this means that the demonstration type variable is now a between-subjects variable as half the children had the Language model first and half had the Action model first. The general finding was, as in the main analysis, a main effect of age, $F(2, 66) = 6.09, p < 0.004$, and a main effect of response type, $F(1, 66) = 11.00, p < 0.001$ – both ordered consistently with the main analysis (older ages had more responses and there were more imitative than novel responses; see Figure 4). Most importantly for the current question, there was no effect of demonstration type (and no interactions with other variables). E's symbolic Action models and symbolic Language models were equally effective in encouraging children to produce symbolic actions, for both imitative and novel responses. It is interesting to note, however, that the 2-year-olds' imitative responses were more than twice as high in the Language model condition as in the Action model condition.

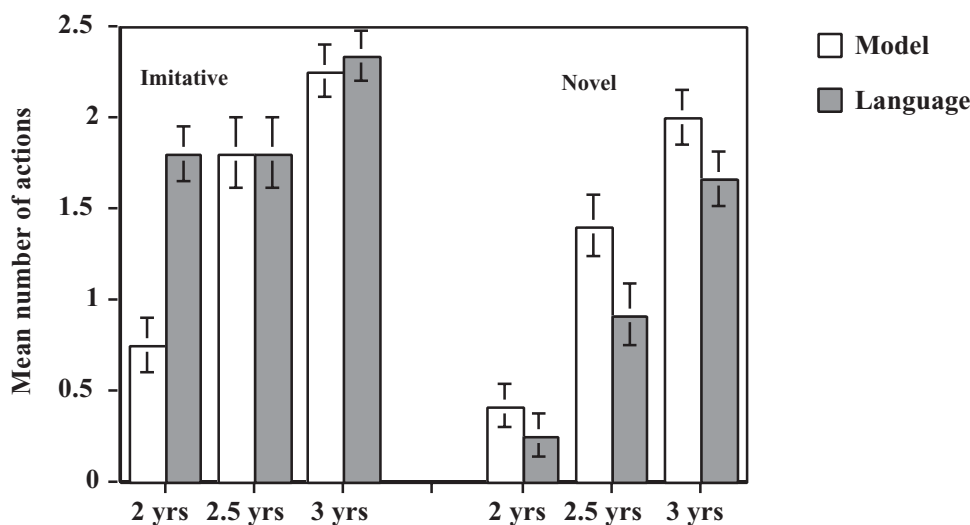


Figure 4 Mean number of imitative and novel actions as a function of model type.

Discussion

Almost all of the children engaged with us and the toys eagerly in this study, a totally different situation from that of the first pilot study. The presence of the doll house seemed to be sufficient to change children's perception of, and attitude toward, the interactive context. Our informal impression was that upon entering a room with only a few not-so-child-oriented objects, as in the pilot study, children felt as if there was nothing 'for me', whereas the doll house, in the current study, made them feel as if there was something 'for me'. Indeed, this effect was so strong that the manipulation in which the adult either engaged with or temporarily ignored the child had no significant effect on their interactions with the toys. In any event, the toys in the current study engaged children in a way that made feasible an assessment of factors affecting their symbolic play productions.

A major finding of the current study was that children's tendency to imitate the symbolic acts produced by adults was much stronger at the younger ages. That is, the 2-year-olds produced approximately four times as many imitative as novel acts (indeed they produced very few novel symbolic acts – almost none with the non-replica objects), the 2.5-year-olds produced about twice as many imitative as novel acts, and the 3-year-olds produced slightly more imitative than novel acts. This strong age effect suggests the possibility that children's earliest symbolic acts are mostly in imitation of adults – which, from some theoretical perspectives, calls into question their truly symbolic nature – whereas older children more often engage in symbolic actions generated by their own creative imaginations. We can thus imagine a kind of Vygotskian account in which children produce symbolic acts first interpsychologically, i.e. only in imitation of others, and only later do they create such acts on their own intrapsychologically.

The objects with which symbolic acts might be performed had a strong effect on children of all ages as well: they produced more symbolic acts, both imitative and novel, with the replica objects (dolls of man and woman) than they did with the natural objects (rock and stick) than they did with the instrumental objects (scissors and pencil). This finding is in perfect accord with the findings of the symbolic comprehension study of Tomasello *et al.* (1999). One interpretation is thus that 2- to 3-year-old children understand something about what different types of objects are 'for', what 'we' do with them. Replica toys are made for symbolic play and so the children know to incorporate them in symbolic acts. Natural objects are not made for symbolic play – indeed, it is not clear what things such

as sticks and stones are made for, if anything, in the child's experience – and so they afford symbolic interactions less well than replica objects. Instrumental objects are made for activities that are not symbolic play, and so to use them as vehicles in an act of symbolization requires an additional step. Instrumental objects present children not only with a dual representation problem as any physical objects used as symbols, but also with a triune representation problem originating from sensorimotor and symbolic affordances, as well as competing instrumental affordances of the object (Tomasello, 1999).

However, another interpretation is that the children in this study had previous experience with replica dolls similar to ours, and so their symbolic acts with those dolls represented a kind of deferred imitation from past occasions in which they had seen adults use similar dolls in similar ways. Such acts would not require a deep level of understanding of the symbolic significance of, for example, putting a toy hotdog in the toy mouth of a toy man. A striking finding that might be compatible with this interpretation is the fact that the 2-year-olds produced almost no novel symbolic acts with objects other than the replica objects. Considering that all symbolic acts with the replica objects were potentially imitative based on previous experience, this might mean that all of the 2-year-olds' behavior in the current study was imitative and not symbolic in nature. It should also be mentioned that a radical skeptic might even question the fact that virtually all our props in the doll house that served as the basis for the symbolic actions were very likely familiar to children as well. Thus, symbolic acts might still be based partly on deferred imitation of other persons in the past using props like these with other actors.

In summary, the results of this study strongly suggest that young children acquire most of their symbolic skills with objects by either imitating adult symbolic actions or by responding to adult linguistic descriptions of symbolic actions. This finding is also consistent with some informal reports that children living in cultures in which there are few toys, and in which adults do little to model or encourage symbolic play, engage in very little symbolic play with objects themselves (J. Linaze, P. Brown, personal communications).

Study 2

Study 1, in conjunction with other studies investigating different aspects of symbolic play, suggests that young children may learn to use objects symbolically initially by interacting with adults and observing their interactions with objects; only later, in an act of Vygotskian

internalization, do they learn to create a novel symbolic relationship that they have not observed adults demonstrating. A related Vygotskian hypothesis is that, when young children perform a symbolic act, initially they intend to symbolize something for someone else – in much the way they use linguistic symbols initially for someone else's benefit – and only later, again based on a Vygotskian internalization process, would they intend to symbolize something for themselves alone. As one way of investigating this hypothesis, the current study compared children's pattern of looking to the adult when they were performing symbolic as opposed to instrumental acts. The hypothesis was that the children would look to the adult more when, or perhaps immediately after, they performed a symbolic act because they are doing it for the adult's benefit.

Participants

Seventy of the children from Study 1 also participated in Study 2. Study 2 was always run after Study 1. Included were 22 of the original 24-month-olds (10 males, 12 females) and 24 of the original 30- and 36-month-olds. In addition there were two children at 30 months (13 males and 13 females in total) and three at 36 months (16 males and 11 females in total) who were added to Study 2 but were not included in the final sample of Study 1. In all, there were 75 children included in the current study: 22 at 24 months, 26 at 30 months and 27 at 36 months.

Materials

Six objects, two props and four other objects, were used. The first prop was a doll's bed. It was given to the child along with, alternatively, either a doll or a wooden block. The second prop was a pegboard, given to the child along with, alternatively, either a hammer or a hairbrush. The idea with the first set was that the child could either put the doll to bed or put the hammer to bed. In either case this was potentially a symbolic act, with the difference being that the doll was a replica object (i.e. for the real baby being symbolically put to bed) whereas the block was only a neutral object for use in symbolizing a baby going to bed. The rationale for the second set was that the child could potentially use the brush as a pretend hammer with the pegboard – the brush in this case being an instrumental object used symbolically (thus potentially creating triune representation problems). If the child used the hammer as a hammer with the pegboard, that would be a straightforward instrumental use of the object.

Procedure

The child sat directly facing the experimenter. There were four 30 s periods of testing. During each of these periods the child played with a pair of objects: the bed + doll, the bed + block, the pegboard + hammer, and the pegboard + brush. The same basic procedure was followed in each of the four periods. First, placing the two objects side by side in front of the child, E said 'Here, you can play with these'. E responded naturally to the child by saying things such as 'Wow, good', but only if the child looked to her first spontaneously. After 30 s, E then removed the object pair and gave the child a second pair, and so on for all four pairs. Children were always given the 'conventional sets' (i.e. doll + bed or pegboard + hammer) one after the other, and then the 'unconventional sets' (doll + block or pegboard + brush). The order of object sets within each pair was counterbalanced across children at all ages.

Coding procedure

Videotapes were scored by a naive observer using a computerized event recorder. While viewing the on-line video recording of the child, and pressing a particular key of a computer corresponding to a specific behavior, the observer activated a channel of the event recorder. Two aspects of the child's behavior were recorded: (A) instances in which one of the target actions was being performed (put doll in bed, put block in bed, hit pegboard with hammer, hit pegboard with brush) and (B) the child's gaze behavior, specifically instances when the child was looking to the face of E. A second, independent observer coded a randomly chosen 20% of all recordings. For both measures, the mean Cohen's kappas were 0.88 for the target actions and 0.94 for gazing. The child's looking behavior of interest, as determined via the event recorder, was that which occurred during the 5 s before a target act began, that which occurred during the target act, and that which occurred in the 5 s after the target act had terminated.

Results

Figure 5 presents the mean number of children's looks that occurred in the 5 s before, during and after children's initial target act as a function of object set, collapsed across age (given that the pattern for all three age groups was highly similar). The main analysis performed was a 3 (age: 2 year, 2.5 year, 3 year) \times 4 (object set: doll/bed, block/bed, brush/pegboard, hammer/pegboard) \times 3 (time: before, during, after) mixed design ANOVA. (Note that for this analysis subjects

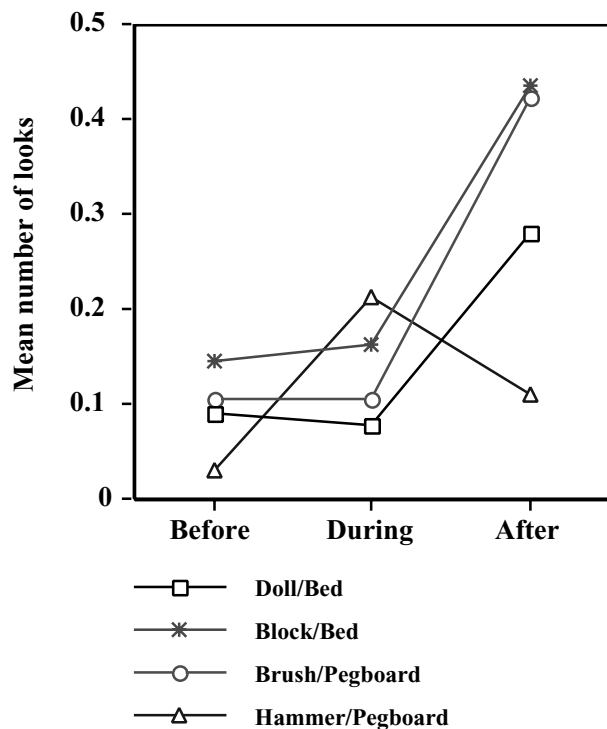


Figure 5 Mean number of looks toward E before, during and after production of target action.

were only children who performed each of the four designated actions.) This analysis revealed a main effect for age, $F(2, 26) = 3.88$, $p < 0.03$, with 3-year-olds ($M = 0.21$) looking more frequently to E compared to 2-year-olds ($M = 0.14$) and 2.5-year-olds ($M = 0.07$) who did not differ from each other. Age did not interact with any of the other variables. There were also significant main effects for object set ($F(3, 84) = 5.00$, $p < 0.003$) and for time ($F(2, 56) = 12.46$, $p < 0.0001$), but these are best understood in the context of a significant object set \times time interaction, $F(6, 168) = 4.20$, $p < 0.001$. Children looked differentially for object sets only in the period after the target action, $F(3, 84) = 6.53$, $p < 0.001$, with Tukey's HSD procedure revealing that children looked less frequently with the hammer/pegboard ($M = 0$) than with the block/bed ($M = 0.55$), doll/bed ($M = 0.27$) and the pegboard/brush ($M = 0.41$), which did not differ from one another. That is, children looked to the adult more often immediately after they performed a symbolic action (no matter which type) than they did immediately after they performed an instrumental action. Complementing this finding, analysis of the mean duration of children's looks to the experimenter before, during and after the target action followed the same pattern. In other words, not only did

children look more frequently to the experimenter *after* a symbolic action, but these looks were longer on average than those in the before or during time period.

Importantly, there were no differences in looking behavior among any of the symbolic actions (i.e. putting the doll in bed, putting the block in bed, or using the brush as a hammer). The only differences were for the symbolic actions compared to the instrumental action (hammering with hammer). The finding that there was no difference for looking behavior among any of the symbolic actions is important because one interpretation of the results could be that hammering with a hammer is less surprising, or novel, than hammering with a brush, and that the increased number of looks for hammering with the brush could be due to a greater surprise effect and not because of the symbolic status of the brush *per se*. But if this were the case, putting the doll to bed might be expected to show the same looking pattern as hammering with the hammer since this is also a quite frequent and usual act with this object set.

Discussion

The basic finding of this study is that young children look up to adults after they perform a symbolic action more than after they perform an instrumental action. This finding is compatible with the hypothesis that children are performing the symbolic act with the adult in mind, and so they are looking up to her more often in the period after they have performed the symbolic action to check if she is sharing the experience with them. Another possible interpretation is that children look to adults after they have performed something surprising with the object set such as using a brush as a hammer. However, arguing against this hypothesis is the fact that children looked up to the adult quite frequently, for all three types of symbolic acts, even following the very familiar action of putting a doll to bed.

The fact that age did not play a significant role in children's looking patterns as a function of object sets is puzzling, particularly in light of the few novel symbolic actions the youngest children produced in Study 1. That is, although the older children looked to the adult more often overall – which is consistent with a growing understanding of objects as symbols – it is puzzling that the youngest children, who were not doing many symbolic acts in Study 1, nevertheless looked to the adult in the same differential way across instrumental and symbolic object sets as the older children. The most important fact to keep in mind, however, is that the looking measured in this study was only for trials in which the child performed the target behavior. And so it is possible that the younger children were really engaged

in symbolic acts in this study, but just not very often. The fact that it was a bit more often than in the first study might be because there were no adult models to 'lure' the child into imitation. In any case, the key point is that the majority of 2- and 2.5-year-olds still did not perform symbolic actions in this study, especially not with objects that are typically not used together in their play (i.e. brush and pegboard). It is of course also possible that looking behavior does not index symbolic comprehension for these younger children in a way that it does for older children, but is simply a sign of social referencing or checking the adult when something interesting is done.

General discussion

For many people the prototype of symbolic play is the child, by herself, pretending that a block is a car, in order to amuse herself. This picture may be accurate for 3- and 4-year-old children who have overcome problems of dual representation and who may even be able to answer explicit questions about appearance and reality. But it would not seem to be an accurate picture for children under 3 years of age. For children this young, symbolic play is an inherently – and, we would argue, exclusively – social activity. The first and most obvious point is that early symbolic play almost invariably takes place in a social context. When the social context is relatively barren, as in the pilot study, 2- to 3-year-old children are not inclined to engage in symbolic play at all, and indeed this is a point that has been made in various ways by many researchers (e.g. Slade, 1987; Bornstein, Vibbert, Tal & O'Donnel, 1992). But there are two more profound ways in which symbolic play is social, and these are not nearly as obvious.

Although future research is needed to further specify the developmental link between imitation and symbolic functioning, the results of these studies suggest that the earliest symbolic play is most likely imitative in nature, either directly in social interaction or less directly in deferred imitation as children come to perceive what can and should be done with objects through watching adults using them. In Study 1 children produced more imitative than novel symbolic acts at all ages, with the discrepancy being especially large at the younger ages (approximately 4:1 for the 24-month-olds). Moreover, the non-imitative symbolic acts of the 24-month-old children involved almost exclusively the replica objects (even though the natural and instrumental objects were tested separately and in an identical manner) and in all cases these acts involved replica props in the doll house as well (e.g. toy brush). The younger children basically

never used the stick, stone, pencil or scissors as symbolic actors with the replica props in acts of symbolic play – the older children did so more often, but still less often than they used the replica actors (but see Bretherton *et al.* (1984) for evidence of increased resistance to unconventional object substitution in play over age; see also Golomb (1977)). Because our replica objects and replica props were fairly common toys in middle-class American culture, one interpretation of this result is that when the children were using the toy people with the toy props they were engaging in deferred and generalizing imitation, in the sense that they were using these toys in the way they had seen adults using similar toys in the past. Children of all ages produced fewer symbolic acts with the natural objects, either spontaneously or in imitation of the adult, and the fewest symbolic acts (either spontaneously or in imitation) with the instrumental objects – presumably because they already knew that these objects had other conventional functions, some of which were incompatible with symbolic play (and, of course, they learn about the conventional uses of instrumental objects through observation and imitation as well).

Our overall interpretation is thus that in the 1 to 3 years age range, with the exception of sensory-motor exploration, young children mostly do with objects what adults do with them. During this period they are observing adults manipulating objects and thereby learning their 'intentional affordances' – what 'we' do with them, what they are 'for' (Tomasello, 1999). In the case of replica toys, they are 'for' pretend activities, whereas this is not true in the case of natural objects and it is manifestly untrue of instrumental objects that have other conventional functions. The degree to which children understand the symbolic nature of the symbolic activities they are imitating from adults is at this point an open question. But it is likely that they come to appreciate them in more deeply symbolic ways over the course of the second and third years of life – as evidenced by the fact that during this age range they come to use objects for more and more creative and novel symbolic functions that they themselves have invented. An especially important test of this hypothesis would involve children in cultures in which there are few child-centered objects designed and/or used by adults for symbolic purposes, given that there are some informal reports of very little symbolic play in these cultures (J. Linaze, P. Brown, personal communications).

Second, children use objects as symbols for fundamentally the same reason they use linguistic symbols: to share attention with and to communicate with other persons. Thus, children use an object symbolically to

'comment' to another person something of their view of things. The object qua object is the topic the child shares with the adult (mostly visually), and the child is in effect saying, 'Look. The stick is a man' – in much the same way she might say 'The stick is dirty'. This is why children looked up to the adult in Study 2 just after they did something symbolic, but not when they did something instrumental: they wanted to make sure that the adult was sharing with them their construal of the block as a doll or the brush as a hammer. As discussed above, a competing explanation might involve the child's surprise at objects being used in something other than their conventional fashion – and they look to adults to confirm their surprise – but the fact is that all symbolic acts involving objects involve an element of surprise as an object takes on its dual reality. Some support for this view is the fact that the object sets that elicited the highest number of sharing looks from the children were the two sets involving the instrumental object (the brush as a hammer) and the natural object (the block as a doll), which are not only symbolic but symbolic in unusual ways. And so the 'surprise' interpretation of the results of Study 2 cannot be ruled out entirely, but it may also be seen as one component of a more general symbolic interpretation.

It would seem that the current results are at odds with those of Mandler and McDonough (1996, 1998), who interpreted their 1-year-olds' behavior as symbolic. They found that when children were shown a toy-dog pretend-drinking from a cup and were then give a toy-cat and a toy-car, they more often made the toy-cat drink from the cup. The inference is that something like 'animal' and 'vehicle' are conceptual categories for children of this age, and the toys are symbolic representations of those categories. However, recent work by Rakison and Poulin-Dubois (2000; see also Rakison & Butterworth, 1998) calls this interpretation into question. Based on their results in a similar task, they concluded that what children are doing is imitating adult behavior, and the children generalize to the most perceptually similar choice (thus the cat is more similar to the dog than is the car). Thus, when these investigators showed 1-year-old children a car engaged in an activity characteristic of animals, children imitated this behavior (inappropriately) with another vehicle not with an animal. These results thus accord quite well with our documentation of young children's strong imitative tendencies in these kinds of social interactions with objects, and they thus undermine the symbolic interpretation of Mandler and McDonough's results.

Overall, then, the current findings suggest that what has been considered by most researchers as an early propensity for symbolic play may better be

conceptualized as children's inclination to do what adults do with objects – or what adults tell them to do with objects. This imitative tendency is then instrumental in leading children to use their existing symbolic skills, e.g. as manifest in linguistic communication, as they interact with objects, perhaps especially objects designed and used by adults explicitly for this purpose. When children then use an object symbolically, it is telling that they look to the adult immediately after doing so – perhaps because they want to share this experience with the adult from whom this odd behavior, ultimately, derives. Later in development, of course, 3- and 4-year-old children can create symbolic actions with objects by themselves, with objects not explicitly designed for this purpose, and they tend to produce these symbolic actions for themselves alone – in much the same way that children of this same age begin using language in more individually creative ways, sometimes directed to the self alone. How all of this might work in cultures offering less social and object support for symbolic play is at this point an open question.

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