

Two-Year-Olds Use Pragmatic Cues to Differentiate Reference to Objects and Actions

**Michael Tomasello
Nameera Akhtar
Emory University**

Previous studies have found that children can use social-pragmatic cues to determine "which one" of several objects or "which one" of several actions an adult intends to indicate with a novel word. The current studies attempted to determine whether children can also use such cues to determine "what kind" of referent, object, or action, an adult intends to indicate. In the first study, 27-month-old children heard an adult use a nonce word in conjunction with a nameless object while it was engaged in a nameless action. The discourse situation leading into this naming event was manipulated so that in one condition the target action was the one new element in the discourse context at the time of the naming event, and in another condition the target object was the one new element. Results showed that children learned the new word for whichever element was new to the discourse context. The second study followed this same general method, but in this case children in one condition watched as an adult engaged in preparatory behaviors that indicated her desire that the child perform the action before she produced the novel word, whereas children in another condition saw no such preparation. Results showed that children who saw the action preparation learned the new word for the action, whereas children who saw no preparation learned the new word for the object. These two studies demonstrate the important role of social-pragmatic information in early word learning, and suggest that if there is a Whole Object assumption in early lexical acquisition, it is an assumption that may be very easily overridden.

The social-pragmatic theory of language acquisition holds that language is an inherently social phenomenon and that young children can learn new pieces of language only by entering into some type of joint attentional focus with a mature language user (Bruner, 1983; Tomasello, 1992a). Within this

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Correspondence and requests for reprints should be sent to Michael Tomasello, Department of Psychology, Emory University, Atlanta, GA 30322.

theory, recent research has begun to identify some of the social-pragmatic cues by means of which young children can establish joint attention with adults and so determine the semantic intentions that underlie their use of novel lexical items. Most straightforwardly, Baldwin (1993a, 1993b) found that 19-month-old children learned a new object label for its appropriate referent by noting which of several available objects the adult was looking at while she said the new word. They did this even in a situation in which the adult looked into a bucket while saying the new word (so that the target object was invisible to children) and another object was made available to them before they actually saw the target.

Adult gaze direction is a very useful word learning cue for young children, but other research has shown that they can use less straightforward cues as well. They do this in learning both new object labels and new action words. With regard to object labels, Tomasello and Barton (1994) had an adult use a nonce word to announce to 24-month-old children her intention to find an object: "Let's find the gazzer." She then proceeded to find a particular object from among five nameless objects, with the finding event always being accompanied by obvious glee but no language. In one condition the adult did this immediately after saying the new word (so that the found object was the object next looked at by both adult and child), but in another condition she first picked up and rejected two objects, with obvious disappointment (but no language), before finding the target object. Children learned the new word equally well in the two experimental conditions. To learn a word in this situation, children had to identify the adult's intention to find a specific object, monitor her behavior in the ensuing search process, and attach the new word to the object that seemed to satisfy her finding intention. Tomasello, Strosberg, and Akhtar (in press) replicated this result with 18-month-old children.

Following up on this result, Akhtar and Tomasello (in press-a) also had an adult use a nonce word to announce to 24-month-old children her intention to find an object. In this case, however, children had previously been made familiar with the locations of several nameless objects. Immediately after announcing her intention to find the object, the adult went to a specific location but was unable to find the object there (the toy barn in which it was hidden was locked). In a subsequent comprehension test, children were able to identify the object the adult intended to find from among the other nameless objects from the same game, even though they never saw the target object at all after hearing the new word (until they had to pick it out). In this case, learning the new word required children to remember which object had been hidden in the target location previously, to identify the adult's intention to find that object, and to attach the new label to that object. Tomasello et al. (in press) replicated this result with 18-month-olds.

Finally with regard to object labels, Akhtar, Carpenter, and Tomasello (in press) had an adult exclaim to 24-month-old children "There's a modi! Look, there's a modi!" while looking in the direction of four nameless objects. The child had played with all four objects previously, but the adult had joined the child in this play for only three of them. In a subsequent comprehension test asking them to get the modi, children picked out the object that was novel for the adult. To learn the new object label in this situation, children had to identify which object was new for the adult, and they also had to know that adults use new language (and an excited demeanor) to talk about things that are new for them in the discourse context.

With regard to action words, there are two relevant studies. First, Tomasello and Barton (1994) had an adult use a novel word to announce to 24-month-olds her intention to perform an action on an object: "Let's go twang it." In one condition, she immediately performed the action, followed by an "accidental" action (identifiable by its clumsy execution). In another condition, she first performed the accidental action, and only then the intentional action. Children in both conditions learned the word for the intentional action. To learn which action the adult intended in this study, children had to discriminate the accidental from the intentional action, and they had to know that when an adult announces her intention to perform an action it is an ensuing intentional action that she intends to indicate.

Second, Akhtar and Tomasello (in press-a) also had an adult use a novel word to announce to 24-month-old children her intention to perform an action on an object: "Let's meek Ernie." In this case, however, children had previously been exposed to particular nameless actions in association with particular toy characters and props (e.g., catapulting Ernie with the catapult). Immediately after announcing her intention to perform the action, the adult took out the prop but was unable to find the character and so did not perform the action. In a subsequent comprehension test when children were asked to meek a new character children performed the action the adult had intended to perform previously. Learning a new word in this situation required the child to remember which action went with which prop and to identify the adult's intention to perform that action and attach the new label to it.

These findings indicate that young children are capable of using a wide variety of different types of social-pragmatic cues to determine adult semantic intentions, with direction of adult gaze being but one such cue. They demonstrate that nascent language learners know a great deal about adult behavior and attention, and that they use this knowledge in determining the communicative significance of novel pieces of language they observe adults using. However, one limitation of these studies is that they all involve children working within the ontological categories of either object or action. That is, in all of the object-label studies children knew, from linguistic and

other cues, that the adult was referring to an object and their job was to figure out which one of the available objects was intended. In all of the action-label studies, children knew that the adult was referring to an action and their job was to figure out which action was intended. In none of these studies were children required to use pragmatic cues to determine what kind of referent, object or action, the adult was intending to indicate. It is thus unclear whether in addition to using pragmatic cues to determine “which one” of several referents is the target of a new word, young children can also use such cues to determine “what kind” of referent is being labeled.

This question is an important one, because the approach to lexical acquisition based on hypothesized “constraints” on word learning (e.g., Markman, 1989, 1992) is justified in part by the supposed difficulty of determining from pragmatic information alone what kind of entity people are referring to with novel language. Thus, one hypothesized constraint is the Whole Object assumption, which tells young children that if there is no specific information to the contrary, they should assume that a novel word is being used to refer to an object (see Golinkoff, Mervis, & Hirsh-Pasek, 1994 for a similar proposal). However, many researchers have argued that if children display a bias toward objects that has any strength at all, it will be a positive hindrance to lexical acquisition—given that they need to learn words of all types early in development (Bloom, 1993; Nelson, 1988; Nelson, Hampson, & Shaw, 1993; Tomasello, 1992b, 1995). If pragmatic information is sufficient to indicate to children whether adults are talking about objects or actions, this would (a) make children’s learning of all types of words more readily comprehensible, and (b) undermine to some extent the need for lexical constraints, in particular the Whole Object assumption.

The two studies presented here were designed to test the possibility that young children can use pragmatic information to cross ontological boundaries in their early learning of words. Each study set up a situation in which an adult produced a novel word (as a single word with no morphology) in the presence of a nameless object performing a nameless action. In each study, the pragmatics of the situation were manipulated in an attempt to influence the children to think that the adult intended to indicate the action or the object. In the first study, the manipulation concerned which element, object, or action, was new to the discourse context. The hypothesis was that young children know that adults are more likely to be using novel language to indicate the element that is new to the current discourse context, even if this involves ontological distinctions. In the second study, the manipulation concerned which element, object, or action, was most relevant to the non-verbal behavior of the adult—in particular, the adult’s gaze alternation (between child and object, or between child and the action apparatus), and whether or not the adult engaged in preparatory behaviors indicating her desire that the child perform the action. Again our hypothesis was that

children would understand adult intentions in this situation, even across ontological boundaries. If children can indeed be induced to cross ontological boundaries with such mundane social-pragmatic cues, the need for the Whole Object assumption would be seriously undermined.

STUDY 1

In this study, children heard a novel word said in conjunction with a nameless action being performed on a nameless object. The events leading up to this model were manipulated so that in an Action-Novel condition the action was new to the discourse context, whereas in an Object-Novel condition the object was new to the discourse context.

Method

Participants. Potential participants were identified and recruited from a pool of children whose parents had volunteered to take part in studies of child development. The pool consisted mostly of middle-class families. Only normally developing children who had some productive language (determined by parental report) were invited to participate, and parents also completed a productive vocabulary checklist after the experimental session. All children received small gifts for participating. Forty-one children ranging in age from 2;0 to 2;6 participated. Five of these children (all boys) were inattentive or uncooperative and were dropped from the study. The final sample thus consisted of 36 children: 22 girls (17 firstborn) and 14 boys (12 firstborn), ranging in age from 2;0.9 to 2;6.21 ($M = 2;3.15$). This age was chosen as one at which acquiring a novel verb on the basis of a brief exposure would be possible.

Materials. In an initial pretraining test (see subsequent discussion) three objects very likely to be familiar to children of this age were used: a ball, cup, and spoon. In the experiment itself two novel and nameless objects were used: a small wooden toy that wobbled when rolled and a complex string of blocks with bells inside. Other novel and nameless objects were available as replacements if a child had a name for either of the two primary objects (e.g., a wooden ratchet and a plastic horseshoe). The action apparatus consisted of a curved plastic chute (6 in. PVC pipe for an elbow joint) attached to a wooden base in a manner that allowed it to swivel vertically. Two distinct actions on objects were possible with the apparatus: (a) dropping an object down and through the chute, and (b) catapulting an object into the air from the bottom-front of the pipe (on which was mounted a small wooden platform) by pulling down quickly on the top-back of the pipe. The apparatus was made so that it was possible to block

each action as needed: the chute-action could be blocked by placing circular pieces of Styrofoam in the top and bottom openings of the chute, and the catapulting-action could be blocked by bolting the pipe to the wooden base.

Training Procedure. Participants came to a psychology laboratory playroom for one half-hour visit. Upon arrival, a female experimenter (E) asked the parent to examine the two primary experimental objects. They were asked, without any labels, whether their child knew (i.e., produced or comprehended) a name for either of these objects. If a parent reported that their child did know one or both of the toys (which was very infrequent), they were replaced with other toys from the reserve set. Parents were also asked to complete a productive vocabulary checklist (Form A of the short version of the CDI Words checklist; Reznick & Goldsmith, 1989). All sessions were videotaped by an Observer (O) who kept a written record of experimentally relevant child utterances during the training and testing phases of the session, and who prepared the apparatus as prescribed by the experimental conditions.

After a short warm-up period in which E played with the child to familiarize him or her with the setting, the experimental session began. There were four phases in the training procedure: pretest, nontarget training, target training, and freeplay. The training phase was followed by comprehension testing.

Pretest. The procedure began with a pretest designed for two purposes. First, it served to familiarize the child with the form of the request that would later be used in the testing phase: "Show me ____." Note that the request was somewhat unusual because it did not contain any linguistic cues as to whether the requested element was an object or an action; that is, there were no morphological markers or articles to indicate word class. Second, because it would be possible in the comprehension test for children to respond to E's request by performing the target action with the target object—a potentially ambiguous response—the pretest also sought to establish for each child his or her prototypical ways of responding to E's request when they thought it was an object named in the request versus when they thought it was an action named in the request. Our expectation was that certain characteristic "showing object" responses (e.g., holding up the object to E, pointing to the object for E, or giving the object to E) would be used for the object words and that these would be easily discriminable from "acting out the action" responses which would be more characteristic of the response to action words.

For the pretest, E presented children with the three familiar objects (a ball, cup, and spoon) and asked them to show her, serially, each of the three objects and three associated actions, for example, "Show me spoon," "Show

me eat,” and so forth. If a child hesitated, E demonstrated the appropriate response and then repeated her request to the child. All the children in the final sample made at least two appropriate responses to E’s requests to show her objects by either showing, pointing, or giving the correct object; 34 of the 36 children also made at least one appropriate response to the action-requests by acting out the action.

Nontarget Training. For purposes of the two training phases, three children in each condition (see subsequent discussion) were randomly assigned to one of the four possible object-action combinations (designating the nontarget and target object-action pairs). For example, a given child might be assigned the wobble-toy and catapult-action as the nontarget object and action pair and the blocks-toy and chute-action as the target object and action pair. The nontarget phase was first for all participants in all conditions. In this phase E and the child simply performed the nontarget action with the nontarget object 10 times (the target action was blocked and the target object had yet to be made available). In this and every other way the nontarget object-action pair was treated exactly as the target object-action pair would be treated in the subsequent target phase, with the exception that it was never paired with any novel language (E simply said, “Watch this!”, as she performed the nontarget action with the nontarget object). The point of this phase of training was simply to have available for the final comprehension test an object and an action that had been treated identically to the target object and action. Between the nontarget and target phases of the procedure, E distracted the subject while O readied the apparatus by unblocking the target action and blocking the nontarget action.

Target Training. In the target phase of training there were two experimental conditions—Action-Novel and Object-Novel—and two corresponding control conditions. In both experimental conditions, children heard a nonce word modeled (as a one-word utterance: “Modi!”) just as the target action was performed on the target object. What differed between conditions was what led up to the model. In the Action-Novel condition, E and the child first performed multiple actions on the target object for approximately 2 min (rolling, throwing, knocking the object off the edge of the apparatus) and only then performed the target action (along with the language model). That is, the script was that E and the child brought out a nameless object, did a number of things with it, and then, just as a new action was being performed with this (still nameless) object, E said “Modi!” E presented five models of the word *modi* as she performed the target action on each of five occasions (one model per occasion). This entire sequence was then repeated: target object, set-up actions on target object, target action on target object (plus model) on five occasions. Thus, children heard a total of 10 models of the new word.

In the Object-Novel condition, E and the child first performed the target action on multiple objects for approximately 2 min (using the familiar objects from pretraining) and only then brought out the target object and performed the target action on it (along with the language model). That is, the script was that E and the child brought out familiar objects, performed the target action on them a number of times, brought out a new and nameless object, and then, just as the action was being performed on the new object, E said “Modi!” E presented five models of the word *modi* as she performed the target action on the target object on each of five occasions (one model per occasion). This entire sequence was then repeated: target action with familiar objects multiple times, target action on target object (plus model) on five occasions—again for a total of 10 models of the new word. It is important to emphasize that the language model was identical in the Action-Novel and Object-Novel experimental conditions; in both cases E exclaimed “Modi!” just as the target object was dropped down the chute or catapulted into the air.

In the two corresponding Control conditions—Action-Novel Control and Object-Novel Control—children experienced the same procedures as their experimental counterparts, but they never heard a new word modeled. Instead, E simply said, “Watch this!” with each performance of the target object-action pair. This meant that the first time these children heard the novel word was in the comprehension test. The point of these control conditions was to ensure that when experimental children later responded in the comprehension test to the request to “Show me modi,” it would be clear that they were indeed responding to the language and not reacting on the basis of what E had done previously in the training phases; that is, the controls provided a baseline measure of how children would respond to such a request when they had gone through the same procedures but heard no new language.

Children were randomly assigned to one of these four conditions ($N = 12$ per experimental condition; $N = 6$ per control condition) such that there were approximately equal numbers of males and females and firstborns and laterborns across conditions. The two control conditions were collapsed to form one combined Control group because they did not differ from one another on any of the dependent measures (see the discussion that follows). As a check on random assignment, the mean values for the parental estimates of total vocabulary, number of object labels, and number of action words were computed and compared across the three conditions (two Experimental and one combined Control; see Table 1). One-way ANOVAs were conducted and indicated that these values did not differ significantly across the three groups of participants.

Freeplay. Before moving to the test of comprehension, E unblocked the nontarget action, set out all of the objects (target, nontarget, and the three

Table 1. Means of Vocabulary Estimates^a in Each Condition of Study 1.

	Action-Novel	Object-Novel	Control
Total Vocabulary	98.9 (14.2)	84.3 (26.1)	85.3 (28.6)
Object Labels	49.9 (7.2)	42.7 (10.9)	44.2 (11.9)
Action Words	15.8 (2.7)	12.8 (4.8)	12.8 (6.0)

Note. Standard deviations are in parentheses.

^aMeasured by Form A of the Reznick & Goldsmith (1989) checklists.

familiar objects), and showed the child that both actions were now available on the apparatus. She then allowed the child to engage in free play with the objects and apparatus for approximately 3 to 5 min. This phase of the session had two functions: (a) to show the child, in preparation for the comprehension test, that the apparatus now afforded both actions, and (b) to give each child the opportunity to spontaneously produce the new word. The apparatus and objects were then returned to O who prepared them for the comprehension test while E distracted the child.

For purposes of scoring children's productions, the following procedure was followed: Children were only given credit for production if it could be determined that they were clearly referring to either the object or the action. Thus, if a child uttered "Modi" while pointing to or showing the object to E, he or she was given credit for object production. If he or she uttered "Modi" while performing the target action on an object other than the target object, he or she was given credit for action production. If a child said "Modi!" while performing the target action with the target object, he or she was not given credit for production as it was impossible to determine his or her referential intentions. However, if the child spontaneously used the new word in a syntactic frame, and with behavioral accompaniments, that made it clear to which class she thought the new word belonged (e.g., "I want the modi" while reaching for the object, or "Let me modi" followed by performance of the action) the child was given credit for spontaneous production of the appropriate type. To receive credit for a production both O (live recording) and the second author (viewing videotapes) had to agree both on whether the target word was uttered and whether it met the criteria for reliable association with object or action.

Testing Procedure. While E and the child were distracted, O set out the apparatus with all the objects arranged in front of it (i.e., the three familiar objects, the nontarget object, and the target object). E then called the child's attention to that area of the room by a sweeping pointing motion and said: "Look over there! Can you show me modi?" If the child did not respond, the request was repeated until an object was chosen or an action

was performed. Children who clearly pointed to the target object, or showed or gave the target object to E in response to this question were credited with an object interpretation of the novel word. Children who performed the target action with an object other than the target object in response to this request were credited with an action interpretation. If the target action was performed with the target object, the request was repeated in an effort to disambiguate the response. (If children had shown an object and then immediately performed an action, or vice versa, the comprehension request would have been repeated also; however, this kind of response did not occur.) For the children who continued to respond by performing the target action with the target object, videotapes of their initial responding in the pretest were consulted to see whether they had ever performed an action response when asked to show known objects. None had, and so these target-action-with-target-object responses were counted as action responses.

After each response, E simply said "Okay" in a neutral tone of voice. The second author coded all responses from the videotapes into one of four categories: Target Object, Target Action, Other Object, or Other Action. An independent coder who was blind to the hypotheses and to the experimental conditions later reviewed one third of the videotapes (four participants randomly chosen from each of the three conditions). Videotapes were forwarded to the comprehension trials so that the blind coder did not view any of the preceding interactions. This blind coder achieved 93% agreement (11 out of 12 decisions) with the original coder.

Results

Children could show their learning of the new word in one of two ways: by spontaneous production or by comprehension. The number of children who showed evidence of associating the new word with the target action or target object in one of these two ways (or both) is shown in Table 2 as a function of experimental condition. (The text below will provide information breaking down children's performance into comprehension, production, or both.)

The two dependent measures of interest are the number of children who used or responded to *modi* as if it were the word for the target action and the number of children who used or responded to *modi* as if it were the word for the target object. The independent variable in all cases is the three experimental conditions: Action-Novel, Object-Novel, and Control. (As reported previously, the two control conditions did not differ from one another on either of the dependent measures [Fisher's exact $ps > 0.40$ in all cases], so they were combined to form one Control group with $N = 12$.) In making the appropriate nonparametric comparisons chi-square tests of significance were used when expected frequencies were sufficiently high;

Table 2. Number of Children Who Performed the Target Action, Showed the Target Object, or Made Another Response in Each Condition of Study 1.

	Action-Novel N = 12	Object-Novel N = 12	Control N = 12
Target Action	9	3	1
Target Object	1	7	0
Other Response	2	2	11

where they were not, Fisher exact probabilities were calculated (Siegel & Castellan, 1988). Because we had directional predictions for all comparisons, one-tailed tests of significance were used in all cases. Also of interest are the Other responses subjects made.

Target Action Responses. In the Action-Novel condition, 9 of 12 children comprehended and/or used the word *modi* (or did both) in association with the target action. This is a significantly greater number than the one child in the Control condition who performed the target action in the comprehension test, $\chi^2(1, N = 24) = 10.97, p < 0.01$, indicating that the Action-Novel children indeed learned the new word for the new action. It is also a significantly greater number than the 3 children in the Object-Novel condition who performed the target action, all with the target object; $\chi^2(1, N = 24) = 6.00, p < 0.01$, indicating that the Action-Novel children learned the new action word on the basis of the experimental manipulation performed. It is also important to note that the action response was by far the most frequent response of the Action-Novel children, being higher than the other two types of responses combined, $\chi^2(1, N = 12) = 6.00, p < 0.01$.

Of the 9 children in the Action-Novel condition who showed evidence of associating the new word with the target action, 2 both comprehended and produced the new word appropriately, 3 produced the word appropriately while they were performing the target action with a nontarget object (but never clearly responded to the experimenter's request in the comprehension test), and 2 performed the target action with a nontarget object in the comprehension test. These children all clearly understood the novel word as referring to the target action because they comprehended or produced it for the target action being performed by a nontarget object. Two additional children responded in the comprehension task by performing the target action with the target object. Both of these children were given credit for an action interpretation, as in the pretest both had produced very distinct showing or pointing responses (unaccompanied by action) when asked to "Show me *object*." The clear implication is that if they had thought that *modi* referred to the object in the comprehension test they would have

indicated this to E in the same general manner as they had indicated objects in the pretest. In any case, excluding these children and comparing target action responses in the Action-Novel and Control conditions yielded a Fisher's exact $p < .02$. Moreover, excluding all children who made these target-action-with-target-object responses enhances the difference between the Action-Novel and Object-Novel groups, as all three of the children in the Object-Novel condition who got credit for an action interpretation had performed the target action with the target object in the comprehension test, Fisher's exact $p < .01$.

Target Object Responses. In the Object-Novel condition, 7 of 12 children comprehended and/or used the word *modi* (or did both) in association with the target object. This is a significantly greater number than the zero children in the Control condition who chose the target object in the comprehension test (Fisher's exact $p < 0.01$), indicating that the Novel-Object children indeed learned the new word for the new object. It is also a significantly greater number than the one child in the Action-Novel condition who chose the target object (Fisher's exact $p < 0.03$), indicating that the Novel-Object children learned the new object word on the basis of the experimental manipulation performed. It should also be noted that the object response was the most frequent response of the Object-Novel children, being higher in frequency than the other two types of responses combined (Target Action and Other), although this difference was not statistically reliable. Also important is the fact that all 7 children in the Object-Novel condition who showed evidence of associating the new word with the target object did so in an unambiguous manner in the comprehension test, that is, by showing or pointing to the object without performing any action. Five of these children also spontaneously produced the word *modi* for the target object.

Other Responses. Of the two responses classified as Other in the Action-Novel condition, one was an action (the nontarget action for that particular child), and one was an object (the nontarget object for that child). Similarly, in the Object-Novel condition, one of the two Other responses was an action (the nontarget action), and one was an object (a picture on the wall). Children in the control condition, who heard the word *modi* for the first time in the comprehension test, reacted in some interesting ways to the odd request "Show me *modi*." Only one of the Other responses was coded as an action (play with one of the familiar objects). Of the remaining 10 responses, one was pointing to the nontarget object, one was indicating the action apparatus by patting it, three were pointing to other pictures or objects in the room, and four were pointing to the Observer (presumably thinking that *modi*, with no article, was a proper name).

Discussion

The findings of this study were quite clear. When children heard a nonce word used in conjunction with a nameless action being performed with a nameless object, with no morphological or syntactic cues available, they learned it for whichever element was new to the discourse context. The fact that children in the two control conditions almost never associated the new word with either the target object or the target action argues that the experimental subjects did indeed learn the new word and that there were no artifactual aspects of the experimental setup that somehow led children to choose the target object or action in the comprehension test. The significant differences between the two experimental groups in the predicted directions argues that the manipulation of novelty was indeed the effective variable that influenced children in their determinations of the adult's referential intentions.

Novelty to the discourse context is a variable that previous investigators have found to be a very powerful one in children's early language use (Greenfield, 1979, 1982) and language learning (Akhtar et al., in press). Greenfield in particular has argued that language is an effective communicative tool precisely because its users, including children, have their attention drawn to certain things in common and that discourse newness is one of the most powerful factors inducing common attention. In this context, however, there are still two possible interpretations of our findings. One is that the children in this study learned the word for the novel element because their attention was automatically attracted to the new element and they heard the novel word at the same time—and they associated them. In this case, it would not be necessary to credit two-year-olds with understanding the adult's referential intentions. The other possibility is that the children were indeed making active inferences about the adult's referential intentions based on their knowledge of the pragmatics of discourse: People talk about things that are new and interesting. It is also possible that they might have applied a "negative" version of this principle: The adult is not talking about the old element in the situation because if she had wished to do that she would have done so earlier (see Merriman, 1995, for a relevant finding). Obviously, the positive and negative versions of this pragmatic principle may well work together, or may even be different aspects of the same thing.

Although we do not have evidence in the current study to differentiate between these interpretations—one egocentric and one indicating sensitivity to another's perspective and intentions—there is evidence from a recent study of word learning that even younger children (M age = 24 months) are actively involved in determining what is new from an adult's perspective (Akhtar et al., in press). In this study, the child and an adult played with three objects together, and the child played with one object while the adult was out of the room. When the adult re-entered the room and exclaimed

“There’s a modi” without singling out any one of the four objects, the child was able to infer that the adult intended to indicate the one she had not previously seen. As this particular object was not new to the child, the egocentric hypothesis cannot explain this finding. We therefore believe that children in the current study also learned the new word for the new element in the situation while in the process of trying to determine the experimenter’s attentional focus.

If the children of this study did bring with them an object bias, it was easily overridden by pragmatic information. And it was overridden in what is presumably a very common situation in the lives of children of this age: hearing a new word just as some entity appears or materializes in the situation. It might still be a question what children would do in a “neutral” situation, if there were such a thing. In this study the closest thing to a neutral situation might be presumed to be the control condition in which children were asked, out of nowhere, to “Show me modi,” and in this situation they did often point to objects (or to the observer, presumably indicating that they thought *modi* was a proper name). But in reality there is no such thing as a neutral situation, and in particular we believe that the “Show me ____” request used in the comprehension test was biased toward objects. It is certainly arguable that in the child’s daily life “Show me ____” is a request more often associated with objects than with actions (which are typically requested by the use of verbs in the imperative form). The fact that in the pre-test children were less willing to perform familiar actions than to show familiar objects when this form of request was used supports this interpretation. Again, however, it should be noted that whatever influence the comprehension question had in the direction of objects was overcome by almost all of the children in the Action-Novel condition—demonstrating the power of discourse newness as a cue to speaker intentions.

STUDY 2

In Study 2, children again heard a novel word said in a situation with a nameless action and a nameless object. In an Action-Highlighted condition, before giving the language model, E made preparations indicating her desire for the participant to perform the action, whereas in an Object-Highlighted condition she made no such preparations.

Method

Participants. Participants from Study 1 also took part in Study 2. Assignment to conditions for this study was also random with the stipulation that participants from the first study who had been in a control condition would not be in a control condition again. Because two participants com-

pleted the first study but not the second, an additional two new participants were recruited for inclusion in Study 2 only; they also participated in the procedures of Study 1 so that their experience was equivalent to that of the rest of the children. In addition, 4 participants had to be deleted for reasons of inattention or noncompliance. Thus, the final sample consisted of a total of 16 boys (13 firstborn) and 20 girls (16 firstborn), ranging in age from 2; 0.9 to 2; 6.21 ($M = 2; 3.13$).

Materials. Two novel toys were used: a small wallpaper roller and an unusual top. Other novel toys (e.g., a wooden ratchet and a plastic horse-shoe) were available as replacements if a child had a name for either of the two primary objects (as determined by parental report, as in Study 1). The apparatus in this study was a merry-go-round structure consisting of a modified two-tiered lazy Susan; the top tier had a hole cut in the center, with a hinged platform immediately adjacent. Two distinctive actions on objects were possible with the apparatus: (a) putting an object on the platform and spinning the apparatus so that the object flew off, and (b) putting an object on the platform and tipping the platform by its handle so that the object fell through the hole. The apparatus was made so that it was possible to block each action as needed: the spin-action could be blocked by bolting the bottom tier to the base, and the dumping-action could be blocked by bolting the platform to the top tier, and stopping up the hole.

Training Procedure. After the completion of Study 1, children continued on for another half-hour session for Study 2 (with the exceptions noted above). E and O played the same roles they had played in Study 1, and, as in Study 1, three participants in each condition (see discussion that follows) were assigned to one of the four possible combinations of objects and actions. Because children had already been through the pretraining of Study 1, there were just three training phases: nontarget training, target training, and freeplay—followed later by comprehension testing.

Nontarget Training. The nontarget phase was first for all subjects in all conditions. In this phase E and the child simply performed the nontarget action with the nontarget object 10 times (the target action was blocked and the target object was as yet unavailable)—taking five turns each in alternation. In this and every other way the nontarget object-action pair was treated exactly as the target object-action pair would be treated in the subsequent target phase, with the exception that it was never paired with any novel language. Between the nontarget and target phases of the procedure, E distracted the subject while O readied the apparatus by unblocking the target action and blocking the nontarget action.

Target Training. As in Study 1, in the target phase of training there were two experimental conditions—in this case, Action-Highlighted and Object-

Highlighted—and two corresponding control conditions. In both experimental conditions, each child heard a nonce word modeled (“Widget”), just prior to his or her performance of the target action. What differed between conditions was what occurred just prior to the language model. In the Action-Highlighted condition, E first demonstrated the target action with the target object, then readied the apparatus for the child (moving the “dumper” into position and placing the object on it, or putting the object on the apparatus ready to be whirled). Then she secured the child’s attention by calling his or her name, and looked back and forth between the child and the apparatus, and said: “It’s your turn now. Widget, Jason, widget.” There were five E turns and five child turns in alternating sequence. Since the models came only on the child’s turns and there were two tokens of the word used for each child turn, each experimental participant heard the word “widget” used a total of 10 times. The same procedure was followed in the Action-Highlighted Control condition with the one difference being that the child’s turn was preceded by neutral language only: “Now it’s your turn, Jason, it’s your turn.”

In the Object-Highlighted condition, E again began by demonstrating the target action with the target object. She then held up the target object, alternated her gaze between the object and the child and said: “Widget, Jason, widget.” She then placed the object on the apparatus and said to the child: “Now it’s your turn.” As in the Action-Highlighted condition, there were five E turns and five child turns, in alternating sequence, so that each experimental participant heard the word “widget” modeled a total of 10 times. In the Object-Highlighted Control condition, the same procedure was followed but each child turn was preceded by neutral language only.

It should be emphasized that, unlike the unidimensional manipulation of Study 1, in this study there were a number of differences between the Action-Highlighted and Object-Highlighted conditions. They were: (a) E’s preparations for action: placing the object on the apparatus before the language model versus afterwards; (b) the order of the accompanying language: whether “Now it’s your turn” came before or after the new language; and (c) E’s eye gaze pattern: alternating between child and apparatus or between child and object.

Children were randomly assigned to one of these four conditions ($N = 12$ per experimental condition; $N = 6$ per control condition) such that there were approximately equal numbers of males and females and firstborns and laterborns across conditions. The two control conditions were collapsed to form one combined Control group because they did not differ from one another on any of the dependent measures (see the discussion that follows). As a check on random assignment, the mean values for the parental estimates of total vocabulary, number of object labels, and number of action

words were computed and compared across the three conditions (two Experimental and one combined Control; see Table 3). One-way ANOVAs were conducted and indicated that these values did not differ significantly across the three groups of subjects.

Freeplay. Before moving to the test of comprehension, E unblocked the nontarget action, set out all of the objects (target, nontarget, and the three familiar objects), and showed the child that both actions were now available on the apparatus. She then allowed the child to engage in free play with the objects and apparatus for approximately 3 to 5 min. For purposes of scoring children's spontaneous productions during this phase, the same procedure used in Study 1 was followed: Children were only given credit for production if it could be determined that they were clearly referring to either the target object or the target action, and if both O and the second author agreed both on whether the target word was uttered and on whether it met the criteria for reliable association with object or action.

Testing Procedure. While E and the child were distracted, O set out the apparatus with all the objects arranged in front of it (i.e., the three familiar objects, the nontarget object, and the target object). E then called the child's attention to that area of the room by a sweeping pointing motion and said: "Look over there! Can you show me widget?" If the child did not respond, the request was repeated until an object was chosen or an action was performed. If the child performed the target action with the target object, the request was repeated in an effort to disambiguate the response. After the child clearly chose one object (by pointing, showing, or giving) or performed an action in response to E's request, E said "Okay" in a neutral tone of voice. Responses were coded as in Study 1. The second author coded all responses from the videotapes into one of four categories: Target Object, Target Action, Other Object, or Other Action. A blind and independent coder later reviewed one third of the videotapes (4 participants randomly chosen from each of the three conditions) and achieved 100% agreement (12 out of 12 decisions) with the original coder.

Table 3. Means of Vocabulary Estimates^a in each condition of Study 2.

	Action-Highlighted	Object-Highlighted	Control
Total Vocabulary	86.2 (35.7)	84.2 (19.9)	94.8 (15.7)
Object Labels	44.8 (15.7)	43.2 (7.0)	47.8 (6.9)
Action Words	12.5 (7.1)	12.4 (3.9)	15.8 (1.9)

Note. Standard deviations are in parentheses.

^aMeasured by Form A of the Reznick & Goldsmith (1989) Checklists.

Results

As in the first study, children could demonstrate their learning of the new word in either of two ways—spontaneous production or comprehension—and analysis of results is in terms of the number of children in each condition who associated the new word with the target action or the target object. Once again, chi-square and Fisher tests of significance were used depending on the expected frequencies involved. The number of children (out of 12 in each condition) who showed evidence of associating the new word with the target action or target object is shown in Table 4. Once again, the two control conditions (Action-Highlighted Control and Object-Highlighted Control) did not differ from one another on either of the dependent measures (Fisher's exact $ps > 0.40$), so they were combined to form one Control group with $N = 12$ to serve as a baseline for comparison with the two experimental groups.

Target Action Responses. In the Action-Highlighted condition, 9 of 12 children demonstrated comprehension of the word *widget* for the target action by performing the target action in the comprehension test (there were no productions). This is a significantly greater number than the zero children in the Control condition who performed the target action in the comprehension test (Fisher's exact $p < 0.01$). It is also a significantly greater number than the one child in the Object-Highlighted condition who performed the target action, $\chi^2(1, N = 24) = 10.97, p < 0.01$. It is also important to note that the action response was by far the most frequent response of the Action-Highlighted children, being higher than the other two types of responses combined, (Target Object and Other), $\chi^2(1, N = 12) = 6.00, p < 0.01$.

It should be noted that of the 9 children in the Action-Highlighted condition who showed evidence of associating the new word with the target action, 7 performed the target action on an object other than the target object in the comprehension test. As in the first study, there were 2 children who were given credit for action responses based on their having performed the target action with the target object based on the fact that in the pre-test

Table 4. Number of Children Who Performed the Target Action, Showed the Target Object, or Made Another Response in Each Condition of Study 2.

	Action-Highlighted $N = 12$	Object-Highlighted $N = 12$	Control
Target Action	9	1	0
Target Object	0	7	3
Other Response	3	4	9

both of these children had given very distinct showing or pointing responses when asked to "Show *object*." However, even when these children are not given credit for an action interpretation, the differences between the Action-Highlighted condition and the Control and Object-Highlighted conditions remain statistically reliable (both Fisher's exact $ps < 0.02$).

Target Object Responses. In the Object-Highlighted condition, 7 of 12 children comprehended or used the word *widget* (or did both) in association with the target object. This is a significantly greater number than the 3 children in the Control condition who chose the target object in the comprehension test, $\chi^2(1, N = 24) = 2.74, p < 0.05$, and than the zero children in the Action-Highlighted condition who chose the target object (Fisher's exact $p < 0.01$). It should also be noted that the object response was the most frequent response of the Object-Highlighted children, being higher in frequency than the other two types of responses combined (Target Action and Other), although this difference was not statistically reliable. All 7 children in the Object-Highlighted condition who showed evidence of associating the new word with the target object did so in an unambiguous manner, that is, by indicating the target object in the comprehension test (3 participants), both indicating the target object in the comprehension test *and* producing its name spontaneously (2 subjects), or by producing the name spontaneously in freeplay when the target action was not being performed (2 subjects).

Other Responses. All three of the responses classified as Other in the Action-Highlighted condition were object responses: 1 child chose the nontarget object, 1 chose a familiar object, and 1 pointed to the Observer. In the Object-Highlighted condition, however, two of the four Other responses were actions (in both cases, the nontarget action), and two were object responses (one the nontarget object, and one a picture on the wall). Once again in the Control condition most responses fell in the Other Object category. One of the Other responses was coded as an action (the nontarget action), five were pointing to the nontarget object, and three were pointing to other pictures or objects in the room.

Discussion

The general findings of this study are in accord with the findings of the first study. When an adult uses a word children have never heard before, and no morphological or syntactic cues are available, the children use pragmatic cues to determine whether an adult intends to indicate an object or an action. The difference in this study was in the specific cue used. In the first study the cue was a single unidimensional variable, discourse newness. In the current study the cue was a complex of the adult behaviors specifying her

intentions toward the experimental materials: E's preparations (or lack thereof) for action on the apparatus; the timing of the language relative to E's behavior; and E's eye gaze pattern. This confirms and extends the findings of other lexical training studies in which children of this age and younger use intention cues to determine adult referential intentions (see e.g., Tomasello & Barton, 1994). It should also be noted that in this study the model was not given during an ongoing event, as in Study 1, but rather in preparation for, or perhaps a request for, an upcoming action (Tomasello & Kruger, 1992). It is thus likely that children in the Action-Highlighted condition were using their knowledge of the current event structure (their knowledge of what action was coming next), in addition to E's behavior, to discern E's referential intentions (Akhtar & Tomasello, in press-a).

Once again, children's behavior in the control conditions showed something of an object bias, but that is most likely explained by the format of the "Show me ____" request. And again, whatever bias children might have had was easily overridden by the social-pragmatic cues available in the experimental conditions. It should also be mentioned that in this study the word *widget* was chosen purposefully. In some pilot work E found it very difficult to simulate an adult talking to a child about a transitive action with an utterance such as "Modi, Emily, modi." The word *widget* was thus chosen because it did have the *-it* phoneme on the end, in parallel with such utterances as "Spin it"; but it is also consistent with some object names such as *blanket* and *faucet* (as well as the well-known nonce name for objects *blicket*). The word thus felt natural to E in both contexts. In any case, this linguistic form clearly did not deter children in the Object-Highlighted condition from associating the new word with the target object.

GENERAL DISCUSSION

The studies presented here have demonstrated two sets of pragmatic cues that are sufficient to enable young children to determine when an adult is intending to indicate a novel action versus a novel object. Both of these sets of pragmatic cues are well known from research in other areas of language acquisition. Discourse newness is an important variable in various aspects of language acquisition and use (see, e.g., Greenfield, 1979, 1982), and general event knowledge and adult intention cues have been shown to be effective cues in children's learning of new words within ontological categories (see Akhtar & Tomasello, in press-b, for a review). What is new in the current studies is the finding that these same types of social-pragmatic cues can lead young word learners across a very basic ontological boundary.

These findings clearly undermine the object bias hypothesis in its strongest form—that children always assume that a novel word refers to whatever nameless object is present. But no one holds this strong position any more,

and indeed both Markman (1992) and Golinkoff et al. (1994) are very clear that the Whole Object assumption may be overridden in certain circumstances. But they have not attempted to spell out, much less to identify experimentally, what those overriding circumstances might be. At the very least, what we have demonstrated in the studies presented here are some conditions under which the Whole Object assumption may be overridden by young children who are in the early stages of lexical acquisition. However, the fact that children's word learning across ontological boundaries may be manipulated in such simple ways, involving very simple and mundane social and pragmatic contexts, suggests to us that the whole rationale for the Whole Object assumption is questionable.

Support for this skeptical view of the Whole Object assumption is provided by other recent findings as well. For example, it has been found that in some languages (not fully documented in Gentner's, 1982, classic review) the noun bias is not in evidence, most prominently, in Korean (Gopnik & Choi, 1995) and in Mandarin Chinese (Tardif, in press). Moreover, in a recent examination of English-speaking children's early vocabularies Bloom, Tinker, and Margulis (1993) found that less than 50% of children's early vocabularies were object labels. They also found that there was not a decrease in the proportion of object labels in children's vocabularies across early development, which would be expected if there were an initial bias toward nouns that abated as the accumulation of object labels enabled words of other types to be learned (see also Nelson et al., 1993). Finally, Tomasello and Farrar (1986) found that children may be trained to learn action words at the same young age (17–18 months) at which they may be trained to learn object labels.

We should be very clear that we are not arguing that children do not build up a kind of object bias as they acquire language; they may or may not. We would argue, however, that if there is an object bias in early language it is *a posteriori*, not *a priori*, and the reasons it develops are pragmatic, not purely linguistic or cognitive. Objects are the focal point of much adult–infant interaction in many cultures, and adults in many cultures talk to young children about objects frequently and perhaps highlight objects for children in special ways (Bridges, 1986). But adults also talk to children about other things and children learn to talk about these other things as well, and in the same way that they learn to talk about objects: by discerning what in the current discourse context the adult is endeavoring to focus their attention on. The implication of this view is that children are never in an “all other things being equal” situation in which they have no feel for the context in which they are interacting (Nelson, 1988). The communicative context is always informative in one way or another—which is just another way of saying that children have at their disposal a number of very rich cues to adult semantic intentions.

It is also worth mentioning that children learned the action words in the current studies without any syntactic or morphological cues; all models were one-word utterances and the request during comprehension testing was neutral syntactically and morphologically as well. It is true that children did not combine these new words with others in their spontaneous productions—which might lead one to question their status as “true verbs”—but children only interacted with the appropriate materials for about one-half hour each. In another study in which children of this age were seen for a number of sessions over a several week period they not only learned new verbs without syntactic cues, they went on to combine them with object words in a variety of novel ways as well (Olguin & Tomasello, 1993). The point is that the current findings would seem to conflict with theories of syntactic bootstrapping of the strong form (e.g., Gleitman & Gleitman, 1992) in which it is claimed that young children can *only* acquire verbs when they experience them inside syntactic contexts.

In conclusion, the most general lesson to be drawn from the current studies is that lexical acquisition rests fundamentally on children’s skills of social cognition and cultural learning (Tomasello, 1992a; Tomasello, Kruger, & Ratner, 1993). Over time, children may build up certain expectations about what kinds of things adults talk about (i.e., learn some lexical principles), and they may learn that certain linguistic forms indicate certain types of referents (i.e., syntactic bootstrapping). But these expectations and linguistic cues are only two of many sources of information children use in determining what adults are talking about when they use novel pieces of language. The immediate pragmatic and discourse context—what the adult is doing, why she is doing it, where the adult’s attention is focused, and what has occurred just previously in the conversation—is the setting in which all of these sources of information come together in helping the child to understand the adult’s language. It is our contention that researchers would do better to study all of the different kinds of information that children use in acquiring the communicative conventions of their language, rather than to confine their attention to some supposedly *a priori* constraints on the process.

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