The Role of Pronouns in Young Children's Acquisition of the English Transitive Construction

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Two studies investigating the linguistic representations underlying English-speaking 2 ½-year-olds' production of transitive utterances are reported. The first study was a training study in which half the children heard utterances with full nouns as agent and patient, and half the children heard utterances with both pronouns (i.e., *He's [verb]-ing it*) and also full nouns. In subsequent testing, only children who had been trained with pronouns and nouns were able to produce a transitive utterance creatively with a nonce verb. The second study reported an analogous set of findings, but in comprehension. Together, the results of these 2 studies suggest that English-speaking children build many of their early linguistic constructions around certain specific lexical or morphological items and patterns, perhaps especially around particular pronoun configurations.

Early in the process of language acquisition, English-speaking children produce transitive utterances such as *I'm pushing it*, *You spilled the juice*, and *He's eating grapes*. Recently, a number of experimental findings have helped to clarify the nature of the linguistic skills and representations underlying these utterances. The basic facts, which are highly replicable across experiments, are as follows.

Before about 3 years of age, very few children who hear a novel verb used in one linguistic construction can then use that verb creatively in another linguistic construction. Thus, in a number of recent studies, young children were taught novel verbs in either an intransitive construction (*Ernie's meeking*), a passive construction (*The cow's getting tammed*), or a presentational construction (*Look what Bert's doing to the car! It's called baffing*); each case refers to a transitive event in which an agent causes a change of state in a patient. They were then encouraged in various ways to produce transitive utterances with the newly learned verb, including direct questions such as "What is [agent] doing?" The main finding in all studies was

that only a small minority of children (less than 25%) under 3 years of age were able to produce a semantically appropriate transitive utterance with the novel verb (i.e., one in which the agent was in the preverbal and the patient in the postverbal position), whereas virtually all children older than 3 ½ years of age were able to do this quite readily (Akhtar & Tomasello, 1997; Berman, 1993; Dodson & Tomasello, 1998; Maratsos, Gudeman, Gerard-Ngo, & DeHart, 1987; Olguin & Tomasello, 1993; Pinker, Lebeaux, & Frost, 1987; see Tomasello, 2000, for a review). It is unlikely that these findings are due to 2-year-olds' general shyness with newly learned language or other experimental artifacts because (a) when they learn a novel noun, they immediately use it creatively in all kinds of syntactic constructions (Tomasello, Akhtar, Dodson, & Rekau, 1997; Tomasello & Olguin, 1993); (b) when they learn a novel verb in transitive utterances, they go on to use it in new and semantically appropriate transitive utterances (Brooks & Tomasello, 1999; Tomasello & Brooks, 1998); and (c) when they are tested for comprehension, they also have trouble identifying the agent and patient roles of utterances with novel transitive verbs (Akhtar & Tomasello, 1997). Together, these findings suggest that children's difficulties with the transitive construction in experimental contexts reflect something real about their underlying linguistic competence.

One way to account for these results is with the verb island hypothesis (Tomasello, 1992; Tomasello & Brooks, 1999). According to this view, young children do not produce transitive or any other kinds of utterances on the basis of abstract, adultlike constructions but rather on the basis of an inventory of item-specific schemas, each defined by the specific predicate involved (Tomasello, 1992). These verb island constructions often have open nominal slots, as in the classic pivot constructions with which many children begin language (Braine, 1976). These slots are presumably built up as children hear type variation in the same constructional role (e.g., *I spilled it*, *You spilled it*, *He spilled milk*, *He spilled juice*, etc.; see Bybee & Slobin, 1982, for evidence in the domain of morphology). Each verb island construction thus has its own minisyntax with its own semantic roles (e.g., preverbal

position = spiller; postverbal position = thing spilled).[1] It is thus clear that children operating with verb island constructions will be at a loss when they encounter a novel verb in one construction with a configuration of argument roles (e.g., intransitive) and then are asked to produce it in another construction with another configuration of argument roles (e.g., transitive). However, they should have no problems when they hear a novel verb in a transitive construction and then are asked to produce that same verb in that same construction with different nominals.

A key question is how children move beyond these item-based constructions to form more general and abstract constructions. A second aspect of the verb island hypothesis is that children build up abstract constructions by accumulating some "critical mass" of transitive verb island constructions (cf. Marchman & Bates, 1994). The critical mass serving as the basis for generalization in this case presumably comprises such things as __hit__, __chase__, __kiss__, __throw__, and so forth. Although it is not known precisely how many and what types of such schemas are required, the process of abstraction is based on some kind of "structure mapping" in which the language learner discerns analogies among the relational structures (items and their relationships) of the different verb island schemas involved (see Fisher, 1996; Gentner & Markman, 1997). It is relevant in this regard that English-speaking children typically learn more nouns than transitive verbs early in development, and so they may reach a critical mass with nouns much earlier than with transitive verbs (they also hear lots of utterances with something other than subject–verb–object ordering; e.g., many of the utterances English-speaking children hear are questions).

Another possible reason for young children's difficulties with the English transitive construction is that, at its most abstract level, the construction has no lexical or morphological content in common among all its exemplars. Thus, *Jeff hit Jim, The dog chases the cat,* and *Mary is kissing her mother* have no morphemes in common. So no matter the number of transitive verbs acquired, it is often difficult to see concrete commonalities among the utterances in which these verbs are used. However, the more common situation is that English-speaking children hear and use a pronoun subject in their transitive utterances, often with present-progressive morphology, and sometimes with a pronoun object as well. Thus, the most common transitive utterances that children hear and use are such things as *I'm [verb]-ing it, He's [verb]-ing it, [Verb] it,* and *I'm [verb]-ing the [noun].* Lieven, Pine, and Rowland (1998) therefore posited that young children may construct their syntactic constructions not only around verbs but also around other kinds of consistent lexical and morphological material—sometimes with verbs as the variable rather than the structuring element (as in the previous examples). According to this view, there is no privileged role accorded to verbs (as in the verb island hypothesis), but instead the key is the distributional patterns the child discerns among specific lexical and morphological items (see Maratsos & Chalkley, 1980, for one theory of distributional learning). This means that if a child hears a verb in constant form with variable linguistic material in its nominal slots, he or she could form a verb island schema around that verb as one special case of a more general distributional process that creates item-based linguistic constructions.

In support of this view, Jones, Gobet, and Pine (1999) used a computational model to perform item-based distributional analyses

on a corpus of child-directed speech. They found, not surprisingly, that many verb island constructions emerged. However, some other constructions, not based on verbs, emerged as well. Of special importance is that the model formed a number of "pronoun islands" because some high-frequency pronouns, such as *I, he,* and *it,* occur with regularity in certain utterance positions with consistent semantic functions. Evidence from actual children's language was also provided by Lieven et al. (1998), who found that over 84% of children's sentence subjects in their spontaneous speech before about 2 years 6 months of age consisted of the single word *I.* Similarly, Dodson and Tomasello (1998) found that 90% of the creative transitive utterances produced by children under 3 years of age—that is, those they produced in experimental circumstances with novel verbs—had either *I* or *me* as the subject, and this figure was 100% for children under the age of 2 years 6 months. The suggestion is thus that English-speaking children's earliest syntactic constructions are structured not just by the verbs involved (as in the verb island hypothesis) but also by the particular lexical and morphological material surrounding the verb, especially pronouns. Certain English pronouns such as *I, me, he,* and *it* may be special in this regard because they are not only highly frequent, but in many cases they also have different forms for use as subjects (*I* preverbally) and objects (*me* postverbally), or else they occur in one of these roles much more often than in the other (*it* as transitive object).

In the current studies, we investigated the nature of young children's understanding of the English transitive construction, with special reference to the role played by pronouns. The first study was a training study, the first of its kind in this area of research (but see Nelson, 1977, for pioneering research on the training of syntactic constructions). We gave 2 ½-year-old children fairly extensive training over three sessions with transitive utterances of various types and then, in a fourth session, assessed their ability to use a novel verb productively in the transitive construction (as in the studies reviewed in Tomasello, 2000). For half of the children, the training utterances had unfamiliar transitive verbs, and so the training served to increase their transitive verb vocabularies. For the other half of the children, the transitive verbs used were familiar to the children already, and so they learned no new verbs from the training. Within these groups, the transitive utterances in one condition were modeled with nouns only; thus, there was little lexical and morphological similarity across training exemplars (other than tense-aspect-modality morphology on the verb). In another condition the transitive utterances were modeled both with pronouns (*He's [verb]-ing it*) and with nouns; thus, there was more lexical and morphological similarity across exemplars but with some type variation in the slots as well. The question was simply which training regime would help children most on the subsequent productivity test with a novel verb. The verb island hypothesis predicts that children should do best when trained with new rather than with familiar verbs, regardless of whether they hear nouns or pronouns in the slots of those verbs, because learning more transitive verb schemas moves the child in the direction of the required critical mass of verb island schemas.

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[1] In other languages the syntactic marking could be done in other ways—for example, with case markers (see Dodson & Tomasello, 1998, for a pilot study with Russian).

However, the distributional approach predicts that children should do best when they are trained with both pronouns and nouns, regardless of whether the verbs involved are familiar or new, because the greater lexical and morphological similarities (distributional regularities) among training exemplars in this case facilitate schema formation.

In a follow-up study, we also examined whether hearing a novel verb with specific pronouns (e.g., *he, it*) as agent and patient, as opposed to hearing nouns as agent and patient, made it easier for 2 ½-year-olds to identify these roles in novel uses of that verb. This study thus concerned not children's construction of a verb-general transitive construction but rather their ability to benefit from the information provided by either nouns or pronouns in learning to comprehend a single new verb in various syntactic contexts.

Study 1

In this study we provided young children with many transitive utterances during three sessions of training—in which we used, in different conditions, either familiar or unfamiliar verbs, and either nouns or pronouns—in an effort to facilitate their performance on a productivity test with a novel transitive verb in a subsequent fourth session.

Method

Participants. Fifty 2 ½-year-old children (M = 2 years 6 months 2 weeks; range = 2 years 4 months to 2 years 10 months) participated in the study. There was an approximately equal number of girls and boys (27 girls, 23 boys). Eleven additional children were unable to complete the four sessions of the study within the 2-week time limit due to absence from school or uncooperativeness. We also eliminated 4 children from the study because they produced fewer than nine utterances containing the experimental verbs during the training sessions; 2 other children were hearing a substantial amount of a language other than English. Children were recruited from several day-care centers in a large metropolitan area in the southern United States. Informed consent was obtained through letters sent home to parents.

Materials and design. Children played 16 different games (each with its own associated verb) on each of 3 days during the training phase of the study. Each game involved a highly transitive action (an agent initiates an action that changes the state of a patient) that could be named by either of two English transitive verbs. One of these verbs was likely to be familiar to children of this age (all of these except one were on the MacArthur Communicative Development Inventory [CDI]; Fenson et al., 1994), whereas the other verb was not likely to be familiar to children of this age (it was not on the MacArthur CDI). In each game, one of eight puppets representing a familiar animate entity (e.g., a dog) served as agent (i.e., the puppet as manipulated by the adult female experimenter). One of a number of familiar inanimate toys (representing food items, vehicles, pieces of furniture, etc.) served as patient. There were also props used to enact each event (e.g., a wagon for "X [pulls/hauls] Y"). A complete list of the training events, verbs, puppets, toys, and props is provided in the Appendix.

Each child was randomly assigned to one of four training conditions defined by the crossing of verb familiarity (familiar, unfamiliar) with the manner in which agent and patient were labeled (nouns, pronouns), or else a child was assigned to a fifth control condition. Thus, the five experimental conditions were as follows:

1. *Familiar verb + nouns:* The experimenter described the events with transitive utterances containing a familiar verb and nouns only—for ex-

ample, "Look! The bird's swinging the bathtub. See? The bird's swinging the bathtub."

2. *Unfamiliar verb + nouns:* The experimenter described the events with transitive utterances containing an unfamiliar verb and nouns only—for example, "Look! The dog's hurling the chair. See? The dog's hurling the chair."

3. *Familiar verb + pronouns:* The experimenter described the events with transitive utterances containing a familiar verb and both nouns (on first mention) and pronouns (on second mention)—for example, "Look! The cow's pulling the car. See? He's pulling it."

4. *Unfamiliar verb + pronouns:* The experimenter described the events with transitive utterances containing an unfamiliar verb and both nouns (on first mention) and pronouns (on second mention)—for example, "Look! The bear's striking the tree. See? He's striking it."

5. *Control:* The experimenter and the child played with toys in an undirected manner for the same length of time as in the experimental conditions.

For testing, each child witnessed four completely new events that the experimenter described with four novel verbs; each game involved a highly transitive action named by a nonce verb. Agents were drawn from the same set of animate puppets used in training, and patients were drawn from a set of inanimate toys similar to those used in training. The four games were: (a) The agent pushes a toy through a trapdoor, (b) the agent turns a crank that rotates the toy into the air on a Ferris wheel, (c) the agent presses a button that pulls the toy to it by means of a string to which the toy is tied, and (d) the agent launches the toy into the air by hitting down on one end of a small catapult. The experimenter referred to two events using an intransitive utterance (e.g., "The bottle's meeking. See! It's meeking.") and referred to the other two events using a passive sentence (e.g., "The truck's getting tammed by the bird. See! It's getting tammed."). The games were played in a constant order, but the assignment of verbs (*meek, tam, gaff, pud*) to actions was randomized across children. Each child experienced the two different construction types in alternating order; half of the children began with the intransitive construction, and half began with the passive construction.

Procedure. All children in all conditions experienced basically the same procedure; the only difference was the language they heard. All children experienced three training sessions and then one testing session; each occurred on a separate day, each lasted 20–25 min, each was video-taped by an observer (who also took notes on the child's relevant language), and all were completed within a 2-week period. In the four experimental groups, the child played the 16 games with the experimenter during each training session, in random order depending on the child's and the experimenter's preferences. In the control group the play was with similar toys for the same length of time, but the experimenter followed no particular procedure and used no particular language.

In the four experimental groups, each game began by the experimenter's asking the child to select a puppet to play the game. The experimenter then enacted the event with the puppet and described it in the manner appropriate for the experimental condition (see above). Each event was enacted six times before proceeding to the next game. Because each of the six enactments was accompanied by a pair of utterances with the experimental verb, the child heard 12 uses of each verb on each day (for a total of 36 uses of each verb across the three training sessions). After the first three enactments of each game, the child was invited to use the puppet to enact the event in order to maintain interest and also to see if the child would produce any spontaneous language with the verb (because the experimenter did not use the verb during the child's enactment). After the final three enactments of each game, the experimenter asked the child two questions—"What's happening?" and "What's [agent] doing?"—to attempt to elicit production of the verb. This sequence—three experimenter enactments (with models), one child enactment (without models), three experimenter enactments (with models), and the eliciting questions—was repeated for each of the 16 games each day. This entire procedure was

identical on all 3 days of training. Total models in each of the four conditions was thus 576 (36 models for 16 verbs). The experimenter always responded positively no matter what the child did on any trial or in response to any question.

The testing session began for all children with a warm-up period in which the experimenter and the child played four of the games from the training sessions (randomly chosen) exactly as they had been played in those sessions. For testing, the experimenter then asked the child to choose a puppet to enact the first novel action. The experimenter also asked the child to name the inanimate toy that would be used as the patient in the event; if the child was unable to name one toy, it was replaced with a different toy the child could name. The experimenter then enacted the first novel event, describing the action with a novel verb in either an intransitive or a passive sentence (see previous discussion). She did this a total of four times and then gave the child the opportunity to enact the action, with no further relevant language from the experimenter. Any of the child's spontaneous uses of the novel verb were recorded. The experimenter then enacted the event and used the novel verb in a pair of sentences two more times (for a total of 6 events, with 2 models each, 12 total utterances with the novel verb) before asking the child the test questions, "What's happening?" and "What's [agent] doing?" This latter question has been shown to elicit transitive utterances in children in this general age range, as it encourages children to begin their sentence with the agent, "He . . ." or "The cow . . ." (Brooks & Tomasello, 1999; Tomasello & Brooks, 1998). This sequence was repeated until all four novel verb games had been played. Again, the experimenter always responded positively no matter what the child did on any trial.

Scoring. To assess the effectiveness of training in the different conditions, we recorded (live) all of the children's productions with the trained English verbs during training and checked them for accuracy from the videotapes. As the main measure of child learning, all of the children's productions of the novel verbs during the test session were recorded live by the observer and checked for accuracy from the videotapes. Each of these utterances with test verbs was then coded from the videotape either as *not transitive*—that is, if the child used the novel verb in any construction other than the transitive (almost always the one in which the child had heard it, either intransitive or passive)—or as *transitive*—that is, if the child used the test verb in an utterance containing the patient of the action in postverbal position (whether or not there was an agent subject). For purposes of assessing interrater reliability, a second coder then coded from the videotapes 25% of the utterances with test verbs, including a roughly equal number of children from each condition. Interrater reliability was estimated with Cohen's kappa as .86. The dependent measure in all of the following analyses was either the number of transitive utterances children produced or else the number of children producing at least one transitive utterance.

Results

First, as an assessment of the effectiveness of the training, children's productions of transitive utterances using the training verbs (during the training sessions) were compiled. Results showed that children produced transitive utterances with the trained verbs on average as follows: for familiar verb + nouns, 73.6 times; for familiar verb + pronouns, 75.4 times; for unfamiliar verb + nouns, 40.0 times; and for unfamiliar verb + pronouns, 69.7 times. A 2 × 2 analysis of variance (ANOVA) revealed a main effect for verb type such that children produced more utterances during training in the familiar verb conditions, $F(1, 39) = 6.30, p < .05$. There was also a marginally significant main effect for nominal type such that during training, children produced more utterances in the two pronoun conditions than in the two noun conditions, $F(1, 39) = 4.05, p = .052$. The interac-

tion effect was also marginally significant, $F(1, 39) = 3.18, p < .09$. These results thus show that during training, children most often produced the familiar verbs and showed a tendency to most often produce the verbs trained with pronouns. Most of this effect was due to the fact that children produced by far the least number of utterances during training with the novel verbs used with nouns (just over half of the other three values).

The results from testing are presented in Figure 1. As a very conservative analysis of productivity, it shows the number of children who produced at least one transitive utterance using at least one of the novel verbs during testing, as a function of experimental condition. For purposes of statistical analysis, each of the four experimental conditions was compared with the control condition in a separate 2 × 2 chi-square analysis. These analyses revealed that the familiar verb + nouns condition (5 children) and the unfamiliar verb + nouns condition (4 children) did not differ reliably from the control condition (2 children). However, the familiar verb + pronouns condition (9 children) and the unfamiliar verb + pronouns condition (8 children) did differ reliably from the control group, $\chi^2(1, N = 20) = 9.9, p < .01$, and $\chi^2(1, N = 20) = 7.2, p < .01$, respectively.

For a second method of quantitative analysis, the four experimental groups were compared with one another parametrically; in this case, the actual number of transitive utterances the children produced in each condition across all four test verbs combined was used as a dependent measure. We used a 2 (verb type: familiar, unfamiliar) × 2 (nominal type: noun, pronoun) ANOVA, which revealed a main effect of nominal type, $F(1, 40) = 4.78, p < .05$, with no effect of verb type and no significant interaction between variables. Overall, the children who heard pronouns during training produced almost twice as many transitive utterances in the test trials ($M = 1.85, SE = 0.29$) as the children who heard only nouns during training ($M = 0.95, SE = 0.29$).

Also of interest was a more qualitative analysis of the exact sentences children used with the verbs on which they were trained and tested, with special reference to the exact manifestation of the nominal arguments. A summary of the nominal material children
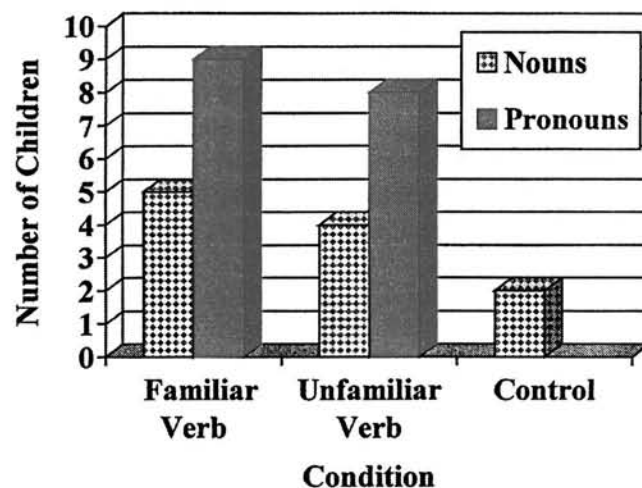

Figure 1. Number of children in each condition (out of 10) who produced at least one productive utterance with at least one nonce verb during testing.

used in their utterances during both training and testing (summed across verb type, because this variable showed no reliable statistical effects) is presented in Table 1. The most important result is that the children who heard both pronouns and nouns with their trained verbs produced 4 times as many utterances with either *he* as subject, *it* as object, or both, than they did any other argument types—and, of course, these are the exact pronouns they heard in these positions on the 3 previous days during training. They produced 35 times as many utterances with either these two pronouns or nouns (recall that in the two pronoun conditions, they actually heard half nouns and half pronouns) as all other argument types combined. During testing, these children produced about 1.5 times as many utterances with *he* as subject and/or *it* as object as any other argument types, and they produced over 9 times as many utterances with either one of these pronouns or a noun than with all other pronouns combined. In the complementary direction, an even stronger pattern can be seen in the children who heard only nouns. During training, they produced more than 18 times as many arguments with nouns as with all pronouns combined, and during testing they produced exclusively noun arguments (not one pronoun argument). These data demonstrate very clearly that the children were using the trained verbs with nominal arguments in ways very much like the ways in which they had heard them being used during training, and this even carried over to their use of the novel verbs during testing.

Another very interesting quantitative relation is the relation between the number of times children produced a particular argument type (as classified in Table 1) during training and testing. The relation between the pattern of responding in training and testing suggests a kind of entrenchment of the language the child was hearing and producing (or a kind of self-priming or priming from the adult during training). The basic finding is that the particular argument forms children used during the 3 days of training with 12 different verbs are essentially the same ones they used on the fourth day during testing with novel verbs. Using as pairs to be correlated the 12 pairs in Table 1 (i.e., the 12 pairs of testing–training combinations aligned horizontally in Table 1), we found a Pearson product–moment correlation of .91. This means that the argument forms children as a group used during training (very

similar to those they heard adults using) were highly predictive of those they would later use creatively with the novel verbs during testing.

Discussion

The results of this study were very clear. In previous studies, only about 16% of children at 2 years 6 months of age have been able to produce transitive utterances with novel verbs—given that they were provided with no training (see Tomasello, 2000, for a review). This estimate is confirmed by the finding that only 20% of the children in the control condition of the current study (i.e., with no training) produced transitive utterances with novel verbs during testing. In the two conditions in which children were trained with transitive utterances using only nouns as arguments, twice as many children as this were productive with the novel verbs during testing (40% with familiar verb + noun, and 50% with unfamiliar verb + noun), although this difference was not in either case statistically different from the control condition. In these two conditions, children produced on average during training about 55 transitive utterances (about 3.5/verb), but apparently this did not help them at test. However, the children who were trained with both pronouns and nouns as the subjects and objects of transitive utterances produced on average during training over 70 transitive utterances (almost 4.5/verb), and 85% of these children were productive with the novel verbs at test (i.e., 90% in the familiar verb + pronoun and 80% unfamiliar verb + pronoun conditions). The obvious inference is that children's experience of both pronouns and nouns as arguments during training helped them to form some kind of transitive schema, whereas the experience of other children in the two noun-only conditions was not helpful in this same way.

With respect to specific hypotheses, it seems clear that the verb island prediction that the two novel verb conditions should be most facilitative was not supported. Instead, the results supported the distributional approach, which predicted that the two conditions using pronouns would be most facilitative. The use of the pronoun-based schema *He's __-ing it*, in combination with nouns in other utterances within the same experimental conditions, was sufficient to help almost all the children become productive with the novel verbs during testing. As with all negative results in training studies, it is possible that in the novel verb conditions, we did not train the children long enough or in the right way (e.g., perhaps not enough verbs were trained, each verb was not learned well enough, we did not wait long enough to test, etc.); indeed, more children in this condition did make progress than in the control condition, albeit not significantly more. However, the point for the moment is simply that the conditions in which pronouns were used were the only facilitative conditions, and this provides strong evidence for the important role of pronouns in the process of linguistic schema formation, as predicted by the distributional approach.

One particularly interesting unanswered question is whether some pronoun frame by itself—with no exemplars containing nouns—would have been equally facilitative for children. On the one hand, it might well have been effective, because children would have heard the same exact frame (*He's [verb]-ing it*) many dozens of times, which presumably would facilitate learning. But in this case it might happen that the resulting transitive schema would be restricted to exactly this sequence of morphemes, with no

Table 1

Mean Number of Arguments of Various Types Used by Children During Training and Testing in Both Subject and Object Positions in Study 1

Argument type	Pronoun training		Noun training	
	Training	Test	Training	Test
Subjects				
He	27.1	0.5	2.3	0.0
Other pronoun	2.6	0.3	0.8	0.0
Noun	0.7	0.1	19.6	0.3
Objects				
It	54.1	1.1	1.0	0.0
Other pronoun	0.3	0.0	0.1	0.0
Noun	15.8	0.7	55.6	0.8

Note. The two experimental conditions using pronouns have been combined (pronoun training), as have the two experimental conditions using nouns only (noun training).

other possibilities for the argument slots. On the other hand, the combination of a consistent pronoun frame and type variation with nouns in the argument slots—as in the current study—may have contained just the appropriate mix of stability and variation. Or perhaps variation with just pronouns (i.e., only pronouns in each slot but with different pronouns across exemplars) would be most helpful. In any case, it should also be noted that the particular pronouns used in this study may have been especially helpful because (a) both *he* and *it* are used with reasonably high frequency in children's everyday experience; (b) the subject pronoun *he* is case marked (*he* vs. *him*); and (c) although not case marked, *it* is most frequently heard and used by children in the object position. These characteristics thus give children additional cues over and above conventional English word order for establishing a semantically coherent transitive schema. Given this reasoning, the pronoun *I* would have been an ideal candidate for training in this study, but this would have made it difficult to provide semantically comparable models in the noun only conditions (the experimenter would have had to perform an action and call herself by name, an odd locution at best).

The transitive utterances children heard in our training sessions were very similar to those they hear in their everyday lives, and in some ways the manner in which they heard them was similar as well. However, the rate at which children heard transitive utterances in our study—in terms of number, timing, and so forth—was almost certainly different from real life. Thus, in the Manchester corpus of twelve 2-year-old children learning English, mothers produced transitive utterances at the rate of about 67 per hr (Theakston, Lieven, Pine, & Rowland, 2001). In the current study, they heard 192 transitive utterances in 20–25 min, a rate roughly 7 times as rapid as in normal adult–child conversation. Moreover, within a training session, children heard 12 uses of the same verb with different nominals (and sometimes with pronominals) in rapid succession for 16 different verbs, and this was always in the simple transitive construction, which is much more syntactic consistency than mothers show in the real world (Naigles & Hoff-Ginsberg, 1995). In the two pronoun conditions, they heard pairs of transitive utterances in which the first member had nouns, followed immediately (and with reference to the same event) by the second member, which contained pronouns. They may or may not hear these kinds of model pairs frequently in natural discourse; we have no reliable numbers on this. In any case, precisely which components of our presumably accelerated training—rate of transitive utterances, number of transitive verbs, density in the sequence of exemplars—are the effective ones, and how they might interact with the specific content of the models, are important questions for future research.

Finally, an especially striking finding in this study was the degree to which children said what the adult said with the experimental verbs. That is, in the two conditions in which the adult used nouns only, children used nouns for over 90% of their arguments during training and 100% of the time during testing with novel verbs (albeit various specific nouns). Conversely, in the two conditions in which pronouns and nouns were used equally, children used pronouns 84% of the time during training and 71% of the time during testing with the novel verbs, a somewhat higher proportion than they heard, perhaps reflecting a greater facility with, or predilection for, pronouns. In the hypothesis of Akhtar (1999) and Tomasello (2000), children tend to follow adult models

when they do not have an abstract schema to guide their productions; when such schemas emerge, they can more easily choose their own way to formulate things for their own communicative purposes.

Study 2

Akhtar and Tomasello (1997) found that it was not until English-speaking children were almost 3 years of age that they could hear a novel verb in a syntactically neutral context (e.g., *Look what Ernie's doing to Bert. It's called meeking*) and then act out its agent and patient roles appropriately—for example, when they were asked to *Make Grover meek Elmo* (see also Fisher, 1996). In a control condition, they found that children could of course do well in this comprehension task if they first heard the new verb in a transitive construction (e.g., *Look. Ernie's meeking Bert*). The conclusion was that children below 3 years of age could not identify the argument roles of a novel transitive verb that they had never heard as a transitive because they did not have a verb-general transitive construction to which they can assimilate the newly learned verb on the basis of its real-world reference alone.

In the current study the question was whether hearing a novel verb in transitive utterances with pronouns in the argument slots would help 2 ½-year-old children understand the agent and patient roles of those verbs better than hearing them with just nouns in these argument slots. In addition, we also asked whether this effect would be different for different animacy configurations (viz., animate–inanimate, animate–animate, and inanimate–animate) for both nouns and pronouns. Of special interest was the effect of this second variable within the pronoun condition because its operationalization involved specific pronoun configurations varying in frequency in the child's daily linguistic experience (viz., *He's [verb]-ing it*, *He's [verb]-ing her*, and *It's [verb]-ing her*). The hypothesis was that frequency would have an effect such that the more frequent pronoun schema, *He's [verb]-ing it*, would be more facilitative than the least frequent schema, *It's [verb]-ing her*, with the third schema in between. This study thus concerned not children's construction of a verb-general transitive construction, as in Study 1, but rather their ability to benefit from the information provided by either nouns or pronouns in comprehending the argument roles of a single new transitive verb.

Method

Participants. Twenty-four 2 ½-year-old children (M = 2 years 6 months; range = 2 years 4 months to 2 years 9 months), an equal number of girls and boys (12 girls, 12 boys), participated in the study. One additional child participated but was excluded due to experimenter error, one child did not complete the study, and one child was excluded because he was extremely distracted during the study. Children were recruited from several day-care centers in a large metropolitan area in the southern United States. Informed consent was obtained through letters sent home to parents.

Materials and design. For training, each child played four games involving an agent performing a transitive action on a patient. First were two warm-up games used to introduce the child to the task: (a) an agent *bumping* a patient (off a hill), and (b) an agent *turning* a patient around on a merry-go-round (a lazy Susan). Then came the two experimental games. In the first game an agent pushed another toy through a trapdoor (called *dacking*). In the second game an agent launched another toy into the air by hitting down on one end of a small catapult (called *meeking*). Unlike in

Study 1, in this study agents and patients could be either animate or inanimate toys. Animate toys were figures of people and animals (a total of 16 in all, with some used in training and some used in testing). Inanimate toys were figures of cars, trucks, and other vehicles (16 in all, with some used in training and some used in testing).

There were three possible event types: animate–inanimate (AI), animate–animate (AA), and inanimate–animate (IA). Within these conditions, children heard one of the novel verbs used with nouns only and one with pronouns only. The design was thus a mixed design, with each child assigned to one event-type condition (either AI, AA, or IA), and then that child learned one of the novel verbs in the noun-only condition and the other novel verb in the pronoun-only condition. The conditions and the language the child heard in each condition were as follows (all examples use the verb *meeking* for illustration; I-noun and A-noun indicate one of several nouns, inanimate and animate respectively; the pronouns depicted here were the exact ones used):

AI-nouns:	The A-noun's meeking the I-noun.
AI-pronouns:	He's meeking it.
AA-nouns:	The A-noun's meeking the A-noun.
AA-pronouns:	He's meeking her.
IA-nouns:	The I-noun's meeking the A-noun.
IA-pronouns:	It's meeking her.

The order of the noun-training set and pronoun-training set was counterbalanced across children within each event-type condition.

Immediately following the training trials in each condition, the child was given a comprehension test in which he or she was asked to enact each of the two events using totally new toy participants (randomly chosen within animacy constraints); the experimenter used totally new words for these participants. The child was asked to do this on eight different occasions, with the following general instruction: "Can you show me: X is [dacking/meeking] Y." For six of these questions (three with nouns and three with pronouns), the participants conformed to the three training conditions in terms of animacy (AA, AI, and IA). The other two (one with nouns and one with pronouns) asked the children themselves to act as agent on an inanimate patient—one using their name (noun) and one using the pronoun *you* (pronoun). (These comprehension probes were used because some studies have suggested that children are better at understanding simple sentences when the verbs refer to their own actions; Huttenlocher, Smiley, & Charney, 1983; Roberts, 1983.) For the four noun questions, the experimenter used totally new participants and nouns; for the four pronoun questions, she used totally new participants and pronouns. The new pronouns were as follows: for AA, "Show me: She's dacking him"; for AI,

"Show me: She's dacking that one"; for IA, "Show me: That one's dacking him"; and for the first-person question, "Show me: You're dacking that one." Again, because of the new nouns and pronouns used at testing, the child heard no common pronouns or nouns across training and testing. Comprehension questions were presented in a random order across children.

Procedure. Each child participated in one 30-min session. The first two games were the "warm-up" games to introduce the children to the procedure. Then came the two experimental games in which the novel verbs were used. For each game involving a novel verb, the experimenter played the game two times, using a pair of utterances for each enactment. For example, for the AI-noun condition, she began by showing a horse *dacking* a truck while saying, "The horse is dacking the truck. Look! The horse is dacking the truck." The experimenter then repeated the action with a different patient while saying the same sentences (e.g., "Now look! The horse is dacking the bus. See? The horse is dacking the bus"). The comprehension test trials followed the training for each of the experimental verbs. For comprehension testing, each child was asked to enact each event on eight occasions (as described previously).

Scoring. For each of the eight comprehension probes in each condition, the child's enactment was coded live by the observer as correct when the child was able to demonstrate the event using the agent and patient in a way that corresponded to the way in which they were indicated in the experimenter's question (i.e., each character playing its agent or patient role as designated in the transitive utterance); otherwise the enactment was coded as incorrect. For purposes of assessing interrater reliability, a second coder then coded from the videotapes 25% of the enactments, including a roughly equal number of enactments from each experimental condition. Interrater reliability (i.e., whether the child enacted the action as described or not) was estimated using Cohen's kappa as .89.

Results

An initial analysis showed no systematic patterns in the way children answered the eight different types of comprehension questions. For purposes of statistical analysis therefore, each child received a score from 0 to 8 in each of the two conditions in which he or she participated. The means and standard deviations are presented in Table 2. A 3 × 2 mixed ANOVA was computed, with event type (AI, AA, IA) as a between-subjects factor and nominal type (noun, pronoun) as a within-subjects factor. This analysis revealed no main effects, but there was a significant interaction of

Table 2
Children's Enactment of Novel Verb Events as a Function of Experimental Condition in Study 2

Nominal type	Event condition		
	Animate–inanimate	Animate–animate	Inanimate–animate
Noun	3.0 (1.8)	3.9 (0.80)	3.9 (1.9)
	The A-noun's [verb]-ing the I-noun.	The A-noun's [verb]-ing the A-noun.	The I-noun's [verb]-ing the A-noun.
Pronoun	5.0* (1.6)	4.3 (2.1)	3.0 (2.1)
	He's [verb]-ing it.	He's [verb]-ing her.	It's [verb]-ing her.

Note. Reported are the mean number of trials enacted correctly (out of a possible eight) by children. Standard deviations are in parentheses. A = animate; I = inanimate.
* $p < .05$ (larger than corresponding noun condition).

event type and nominal type, $F(2, 23) = 4.67, p < .05$. To further investigate this interaction, we used planned comparisons to compare the noun to the pronoun training within each event type (note that for *dacking*, $M = 4.04$; for *meeking*, $M = 3.67, t = ns$). These analyses revealed that within the AI event type, children performed better after the pronoun exposure (*He's [verb]-ing it*) than the noun exposure, $t(7) = 2.83, p < .05$. No significant differences between noun and pronoun exposure were observed in the AA and IA conditions. When children's responses within the pronoun-training condition were compared, children in the AI group performed better than children in the IA group, $t(14) = 2.13, p < .05$.

Discussion

The results of this study support those of Study 1. Whereas the pronoun versus noun manipulation as a whole did not produce differences in comprehension, one specific pronoun configuration did. That is, children who heard a novel verb modeled with a pronoun for an animate subject (*he*) and a pronoun for an inanimate object (*it*) were better at acting out new transitive utterances referring to new event types with that verb than were children who heard a novel verb with two nouns as subject and object (i.e., the AI-pronoun condition produced better transfer than the AI-noun condition). Children who heard other pronoun combinations (e.g., *he–her* in the AA-pronoun condition and *it–her* in the IA-pronoun condition) did not seem to benefit when they were compared with their respective noun-only conditions or the AI-pronoun condition. One possible reason for the noneffects in these conditions is simple frequency of exposure in the experiment. Children heard each verb only four times, and this may not have been enough for appropriate learning in many of the conditions. Our rationale for this few exposures was simply that too many exposures in this task would very likely lead to good performance in all conditions—as demonstrated in the control conditions of Akhtar and Tomasello's (1997) study—and we simply wanted to know which exposure conditions were most facilitative.

It is possible that the *he–it* combination was best because it is more frequent than the others overall in children's daily linguistic experience. Related to this, in the AI-pronoun condition, each of the pronouns was playing the role it plays most frequently (*he* as subject and *it* as object). Although there are not exact numbers on these particular combinations, in Lieven et al.'s (1998) study, the *it–her* combination was not nearly as frequent in children's experience, and moreover, this combination has *it* playing a role that it does not normally play in the language children hear and produce (i.e., as the subject of a transitive verb; it is sometimes used as the subject in identificationals such as *It's a mouse;* see Childers & Echols, 2001, for related findings). The *he–her* combination would seem to be of middle frequency, and an additional problem in this case is that the pronoun object *her* is a word that is more often used as a possessive pronoun, which may cause additional problems (see Rispoli, 1998, for discussion of the special status of the word *her* in the English pronoun system). As for Study 1, using first- and/or second-person pronouns would be an interesting possibility for future research, although the comparison to noun conditions creates the same problem as in Study 1 (i.e., in first- and second-person models, the experimenter must use a proper name to refer to herself and the child).

In any case, the major conclusion to be drawn from this study is that children learn more about who is doing what to whom with a novel verb if they hear it used with the pronoun combination *he–it* than if they hear it either with nouns as agent and patient or with other third-person pronoun combinations using less frequently occurring pronouns.

General Discussion

The major finding of the two studies reported here is that for English-speaking children, pronouns play a crucially important role in the acquisition of the basic transitive construction. In Study 1, children who were trained with novel verbs did not become more proficient at using nonce verbs transitively than did children who were trained with familiar verbs. Apparently, increasing 2 ½-year-old children's transitive verb vocabularies did not by itself enable them to construct an abstract and productive transitive construction. Much more helpful was training children, whether with novel or familiar verbs, in utterance schemas that sometimes had the set pronoun frame *He's [verb]-ing it* and sometimes had nouns in the argument slots as well (with these two utterance types paired in close temporal proximity). Apparently, this gave children both a lexically and morphologically contentful transitive frame, as well as substantial type variation in both the preverbal and postverbal slots; indeed, in the nonce-verb test session, children most often used *he* as the subject of their productive utterances and *it* as the object. In Study 2, this same pronoun-based transitive frame, *He's [verb]-ing it,* was again the most facilitative frame for helping children to comprehend the functional roles of the preverbal and postverbal slots of a novel verb.

With respect to the larger overall hypotheses investigated, it is clear that the mechanism for abstraction inherent in the verb island hypothesis is not correct. Following Braine (1976) and others, Tomasello (1992) recognized many item-based schemas in children's early language but hypothesized that because of the special role of verbs in adult language, schemas that revolved around verbs and other predicates would be the most important for leading the child toward abstract and adult-like linguistic constructions. It turns out, however, that in English at least, pronouns in the slots of predicates are a crucial part of the picture. An integrated view might then go as follows. At the same time they are learning words, young children are also learning whole utterance-level syntactic constructions as meaningful linguistic units (Goldberg, 1995; Tomasello, 1998). To become more adult-like in their use of a particular construction (e.g., the simple transitive construction or the passive construction), children need to abstract across multiple utterances instantiating this construction. In the verb island hypothesis, the predicate was given a privileged role in this process, because it forms the semantic "backbone" of the utterance or construction in the sense that its meaning contains the arguments—an act of dancing requires a dancer—but does not care about their specific identity. But it turns out that semantic backbones may be formed in different ways, so that patterns like *I'm [verb]-ing it, He's [verb]-ing it,* and *[Verb] it* can also come to have a consistent semantics associated with them in a way that ignores the specific verb involved. The same may hold for patterns of

tense-aspect-modality morphology in combination with nominals such as X's [verb]-ing, or X can't [verb], or Don't [verb] it.[2] The key to this account is recognizing that in each act of linguistic comprehension, the child is attempting (among other things) to determine the adult's overall communicative intention, and any consistent morphosyntactic patterns that are consistently associated with that communicative intention (or type of communicative intention) may be used as the basis for forming a constructional schema.

Obviously, to use a novel verb creatively, as children did in the test session of our first study, they would have to have generalized across multiple exemplar utterances. It should also be acknowledged that it is possible that children did not actually create an abstract construction in our study but rather that the training simply facilitated their access to an already existing abstract construction in a way that the control condition did not. However, this would seem unlikely given the wealth of evidence for the item-based nature of children's early linguistic representations (Tomasello, 2000). In a set of naturalistic observations, Naigles and Hoff-Ginsberg (1998) found that verbs that were used in more diverse sentence frames by mothers were also used in more diverse ways by their children. In addition, in an experimental investigation, Naigles (1996) found that young children could indeed use multiple syntactic frames from adult language to learn the meaning of novel verbs. The finding that diversity of use in this case seems to help children might appear, on the surface, to conflict with the current findings that at least some stability of use (in the form of a consistent pronoun frame across exemplars) is most helpful. However, the difference is that Naigles and Hoff-Ginsberg were concerned not with children's acquisition of syntactic constructions but rather with their acquisition of individual verbs as lexical items, and, for this task, diversity of syntactic environments may indeed be crucial.

In contrast, in the current studies the focus was on acquiring whole constructions, and in this case at least some consistency of constructional frames would seem to be key. One hypothesis is thus that acquiring a lexical item requires extracting that item as a consistent element from the whole set of utterances/constructions in which it has been heard; diversity in those utterances/constructions facilitates the process of isolating the verb as a lexical item. In acquiring whole constructions, however, some consistency in the overall structure of exemplar utterances is needed and, if it is an abstract construction at issue, then there must also be some variability in the verbs used as predicates as well.

The current studies may thus be seen as a first step in an attempt to determine if there is some optimal amount of consistency and diversity in the language that children hear that helps them to construct verb-general, abstract constructions. From the current findings it would seem that in order to form constructional generalizations most readily, children need both some "anchor point" in terms of some specific, high-frequency morphosyntactic pattern (Valian & Coulson, 1988), as well as diversity in terms of type variation in some places in this pattern, including verbs (Bybee, 1995). And this pattern and type variation may need to be of a specific type or types. Thus, although a variety of naturalistic and experimental studies suggest that verbs, along with their associated morphology, may serve to create some item-based morphosyntactic patterns in English (i.e., verb island schemas of the following type: X is pushing Y), the current results suggest that abstracting

beyond this depends only on morphosyntactic consistency—such as case-marked pronouns in combination with some recurrent verbal morphology (e.g., He's [verb]-ing it)—not on the number of transitive verb island constructions the child has mastered. It should also not be forgotten that pronouns are by their very nature "placeholders" for nouns semantically; therefore, even when one pronoun is used consistently in a given constructional pattern (i.e., even when there is no type variation), it may still be possible to discern the presence of a potential abstract slot in that argument position simply on the basis of the semantics of pronouns. Exploration of precisely how the process of generalization works in the variety of cases children meet in the ambient language, and how it works in typologically different languages, are key questions for future research.

The current findings are the first to demonstrate that enriched experience with systematically presented exemplars of a linguistic construction can lead children to create an abstract representation such that they are then able to use novel verbs in that construction productively. Moreover, these results take a first step in identifying some of the features of that enriched experience that are especially important—namely, the use of certain pronoun configurations (varied with certain noun configurations) in the nominal slots of transitive utterances. The number of transitive verbs in the child's vocabulary—by itself and within the parameters studied here—does not seem to be a crucial factor. Variations of the number of exemplars needed, the rate of exposure to exemplars required, and the sequencing of particular types of exemplars are all factors that require future study.

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[2] It may even be that single lexical items such as I, he, and it can come to take on relational meanings of their own that are independent of specific uses (e.g., as an initiator of an action or experience) if they are used in specific functional roles with enough frequency and consistency.

References

Akhtar, N. (1999). Acquiring basic word order: Evidence for data-driven learning of syntactic structure. Journal of Child Language, 26, 339–356.

Akhtar, N., & Tomasello, M. (1997). Young children's productivity with word order and verb morphology. Developmental Psychology, 33, 952–965.

Berman, R. (1993). Marking verb transitivity in Hebrew-speaking children. Journal of Child Language, 20, 641–670.

Braine, M. (1976). Children's first word combinations. Monographs of the Society for Research in Child Development, 41(1, Serial No. 164).

Brooks, P., & Tomasello, M. (1999). Young children learn to produce passives with nonce verbs. Developmental Psychology, 35, 29–44.

Bybee, J. (1995). Regular morphology and the lexicon. Language and Cognitive Processes, 10, 425–455.

Bybee, J., & Slobin, D. I. (1982). Rules and schemas in the development and use of English past tense. Language, 59, 251–270.

Childers, J. B., & Echols, C. H. (2001). Children's use of animacy during sentence processing: Novel entities and novel events. Manuscript submitted for publication.

Dodson, K., & Tomasello, M. (1998). Acquiring the transitive construction in English: The role of animacy and pronouns. Journal of Child Language, 25, 555–574.

Fenson, L., Dale, P. S., Reznick, J. S., Bates, E., Thal, D. J., & Pethick, S. J. (1994). Variability in early communicative development. Monographs of the Society for Research in Child Development, 59(5, Serial No. 242).

Fisher, C. (1996). Structural limits on verb mapping: The role of analogy in children's interpretation of sentences. *Cognitive Psychology, 31,* 41–84.

Gentner, D., & Markman, E. (1997). Structure mapping in analogy and similarity. *American Psychologist, 52,* 45–56.

Goldberg, A. (1995). *Constructions: A construction grammar approach to argument structure.* Chicago: University of Chicago Press.

Huttenlocher, J., Smiley, P., & Charney, R. (1983). Emergence of action categories in the child: Evidence from verb meanings. *Psychological Review, 90,* 72–93.

Jones, G., Gobet, F., & Pine, J. (1999, August). *A process model of children's early verb use.* Paper presented at the meeting of the Cognitive Science Society, Philadelphia, PA.

Lieven, E., Pine, J., & Rowland, G. (1998). Comparing different models of the development of the English verb category. *Linguistics, 36,* 4–40.

Maratsos, M., & Chalkley, M. (1980). The internal knowledge of children's syntax: The ontogenesis and representation of syntactic categories. In K. E. Nelson (Ed.), *Children's language* (Vol. 2, pp. 87–101). New York: Gardner Press.

Maratsos, M., Gudeman, R., Gerard-Ngo, P., & DeHart, G. (1987). A study in novel word learning: The productivity of the causative. In B. MacWhinney (Ed.), *Mechanisms of language acquisition* (pp. 221–256). Hillsdale, NJ: Erlbaum.

Marchman, V., & Bates, E. (1994). Continuity in lexical and morphological development: A test of the critical mass hypothesis. *Journal of Child Language, 21,* 339–366.

Naigles, L. (1996). The use of multiple frames in verb learning via syntactic bootstrapping. *Cognition, 58,* 221–251.

Naigles, L., & Hoff-Ginsberg, E. (1995). Input to verb learning: Evidence for the plausibility of syntactic bootstrapping. *Developmental Psychology, 31,* 827–837.

Naigles, L., & Hoff-Ginsberg, E. (1998). Why are some verbs learned before other verbs? Effects of input frequency and structure on children's early verb use. *Journal of Child Language, 25,* 95–120.

Nelson, K. E. (1977). Facilitating children's syntax acquisition. *Developmental Psychology, 13,* 101–107.

Olguin, R., & Tomasello, M. (1993). Twenty-five-month-old children do not have a grammatical category of verb. *Cognitive Development, 8,* 245–272.

Pinker, S., Lebeaux, D. S., & Frost, L. A. (1987). Productivity and constraints in the acquisition of the passive. *Cognition, 26,* 195–267.

Rispoli, M. (1998). Patterns of pronoun case errors. *Journal of Child Language, 25,* 533–554.

Roberts, K. (1983). Comprehension and production of word order in Stage I. *Child Development, 54,* 443–449.

Theakston, A., Lieven, E., Pine, J., & Rowland, C. (2001). The role of performance limitations in the acquisition of verb–argument structure. *Journal of Child Language, 28,* 127–152.

Tomasello, M. (1992). *First verbs: A case study of early grammatical development.* Cambridge, England: Cambridge University Press.

Tomasello, M. (1998). The return of constructions. *Journal of Child Language, 75,* 431–447.

Tomasello, M. (2000). Do young children have adult syntactic competence? *Cognition, 74,* 209–253.

Tomasello, M., Akhtar, N., Dodson, K., & Rekau, L. (1997). Differential productivity in young children's use of nouns and verbs. *Journal of Child Language, 24,* 373–387.

Tomasello, M., & Brooks, P. (1998). Young children's earliest transitive and intransitive constructions. *Cognitive Linguistics, 9,* 379–395.

Tomasello, M., & Brooks, P. (1999). Early syntactic development. In M. Barrett (Ed.), *The development of language* (pp. 161–190). Hove, England: Psychology Press.

Tomasello, M., & Olguin, R. (1993). Twenty-three-month-old children have a grammatical category of noun. *Cognitive Development, 8,* 451–464.

Valian, V., & Coulson, S. (1988). Anchor points in language learning: The role of marker frequency. *Journal of Memory and Language, 27,* 71–86.

Appendix

Materials for Study 1

"Animate" puppets (agents):
A lamb, a dog, a frog, a ladybug, a butterfly, a bird, Tweety Bird, Cookie Monster

Verb pairs with their corresponding events presented during training:

swing/swirl:	A small bathtub hanging from a string suspended from a tripod
hide/conceal:	A basket of fruit that could be hidden in a drawer of a small dresser
get/procure:	An ice cream cone that could be taken from within a yellow bucket
pull/haul:	A green apple within a red wagon
carry/tote:	A plum inside a backpack worn by a small pig
throw/hurl:	A purple chair in a clear plastic box
stop/halt:	A wooden car on a lazy Susan
turn/swivel:	A birthday cake on a lazy Susan with an attached stick
take/seize:	A plastic race car on a round fabric-covered circle with a Velcro square
brush/whisk:	A pick-up truck and a paintbrush
catch/snatch:	A bottle of milk on an elastic band
cover/shroud:	A motorcycle and a small piece of cloth
bring/convey:	An apple eraser in a wheelbarrow
drop/release:	A bunch of grapes
hit/strike:	A fire truck
push/propel:	A large dump truck