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Experimental evidence for agent–patient categories in child language*

CARL J. ANGIOLILLO AND SUSAN GOLDIN-MEADOW
University of Chicago

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ABSTRACT

Evidence provided by contrastive word order for agent and patient semantic categories in young children's spontaneous speech is confounded. Agents (effectors of the action) tend to be animate; patients (entities acted upon) tend to be inanimate. In an experiment designed to circumvent this confounding and to test young children's linguistic sensitivity to the role an entity plays in the action, nine children (2;4.0–2;11.5) described actions involving animate and inanimate entities playing both agent and patient roles. Four linguistic measures were observed. On every measure agents were treated differently from patients. For the most part, these agent–patient differences persisted when animate and inanimate entities were examined separately. These results provide evidence for the child's intention to talk about the role an entity plays, independent of its animateness, and also suggest that the child uses role-defined linguistic categories like AGENT and PATIENT to communicate these relational intentions.

INTRODUCTION

Young children in the early stages of language acquisition are commonly believed to produce ordered sentences based on semantic categories such as agent and patient. The primary evidence that a child intends to talk about entities in the agent role (i.e. as effecting the action) or in the patient role (i.e. as being acted upon) is his use of consistent and appropriate word orders (Bloom 1970, Bowerman 1976, Brown 1973, Schlesinger 1971).

The argument runs that if children were 'simply naming in succession various features of a complex referent situation' without regard for the rela-

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tion of each entity to the action, they would place their words randomly (Brown 1973:41). Even in Stage I speech, however, children almost invariably use the word order adult English speakers would use to express the same relations: the agents of actions are placed pre-verbally and the patients of actions are placed post-verbally; e.g. *Kimmy ride bike* and not *bike Kimmy ride*, *ride bike Kimmy*, or other variants (Bloom 1970, Bowerman 1973*a*, Brown 1973, de Villiers & de Villiers 1973).

The word order evidence for relational intentions is only convincing, however, when it is 'contrastive'; i.e. when the placement of the same entity varies as that entity's relation to the action varies. Unfortunately, young children rarely talk about the same entity in both roles. In children's early corpora, agents tend to be animate while patients tend to be inanimate (Bloom 1970, Bowerman 1973*a*, Brown 1970, Brown, Cazden & Bellugi 1969, Chapman & Miller 1975, de Villiers & de Villiers 1974, Lange & Larsson 1973, Slobin 1970, Wall 1974). 'Animateness' and 'role' are thus confounded in the naturalistic data.

Children's earliest ordering strategy may be to distinguish animate entities from inanimate ones and to place animates pre-verbally and inanimates post-verbally. (Bloom (1970), Bowerman (1973*a*), Chapman & Miller (1975), and de Villiers & de Villiers (1974) entertain this hypothesis.) Young children might be systematically ordering animate and inanimate entities, and might have no intention whatsoever of talking about an entity as either the agent or patient of an action.

We present here an experimental study designed to test if, when children describe actions, they consider the role an entity plays in an action (e.g. agent or patient), independent of the animateness of the entity. We observed young children describing transitive actions involving animate and inanimate entities playing both agent and patient roles. Of special interest to us was the children's linguistic treatment of the same entity when it functioned in contrasting roles. Did the children treat an entity differently when it functioned in different roles, and was the effect of role equally apparent for both animate and inanimate entities?

Four linguistic measures were observed. Each was considered an opportunity for the child to vary his treatment of the same entity (cf. Brown's (1973) conception of word order as a 'discriminating response': (1) *word order*: the pre- versus post-verbal placement of the word referring to a participant; (2) *production probability*: the percentage of times a word referring to a participant was actually produced in the child's utterance, (3) *pronominalization*: the percentage of times an entity was referred to with a pronoun as opposed to a noun; and (4) *partitioning*: the percentage of times a PART of an entity (e.g. the arm of the toy doll, the wheel of the toy tractor) was designated as opposed to the entity as a whole.

METHOD

Subjects

As indicated in Table 1, nine children ranging in age from 2;4.0 to 2;11.5 participated in the study. Their mean lengths of utterance (MLUs) ranged from 2.20 to 4.72. The sample included five boys and four girls from a private pre-school. The children came from middle and upper middle-class families and were, with one exception, white.

TABLE 1. *Description of subjects*

Child	Mean length of utterance	Sex	Age
Amy	2·20	F	2;11.5
Beth	4·33	F	2;10.5
Cliff	4·41	M	2;11.0
Don	3·10	M	2;4.0
Emily	4·29	F	2;9.5
Fred	4·72	M	2;10.0
Gary	3·86	M	2;11.5
Helen	4·27	F	2;6.0
Isaac	4·11	M	2;9.0

Materials

The children watched as six different entities participated in transitive actions. Participants included the child's mother or father, the experimenter, a boy or girl doll, a toy elephant or dog, a toy tractor or airplane, and a toy tree or cup. Most of the actions occurred on the surface of a large cardboard box with the toy entities being manipulated from beneath by the experimenter.

The participants varied along two dimensions: (1) *animateness*: the live persons, dolls, and toy animals were classified as ANIMATE while the toy vehicles, tree,[1] and cup were classified as INANIMATE; and (2) *role in the action*: each entity functioned either as the AGENT (effector) of the action or as the PATIENT (the entity acted upon).

'Hitting' and 'pulling' were the two transitive actions portrayed. The experimental protocol for each entity was balanced across these two actions (i.e. the doll hit as many times as it was hit, and pulled as many times as it was pulled, etc.).

[1] Although trees are biologically animate, we follow Braine & Wells (1978: 114) in reserving the term ANIMATE for people and animals; we have therefore classified the tree as an inanimate entity.

Agent–patient combinations were randomly formed with the exception that no entity acted on itself. The sequencing of combinations was also random with the stipulation that no entity appeared in successive actions. An additional requirement was that after 24, 30 and 36 actions each entity was to have appeared in the agent and patient roles an equal number of times. This requirement was established to avoid extremely unequal numbers in the event that the child stopped before he or she had responded to the entire set of 36 actions. Finally, the right–left position of the agent and patient on the box 'stage' was randomized.

Procedure

Subjects were seen individually in their homes in a single session lasting about 1½ to 2 hours. At least one parent was present to act as a recorder. Pre-tests ensured that the production vocabulary of each child included some action words like *hit* or *pull* and that each child had a noun label for every entity.

It was also important that each child had a noun label for his mother's or father's arm, the experimenter's arm, the boy doll's arm, the elephant's trunk, the tractor's wheel, and the tree's branch. These appendages were the actual points of contact between entities (e.g. the boy doll always hit with his arm and was always hit on the arm).[2]

In the experiment, the child was instructed to describe what he saw. If a child did not include at least one action word plus a word referring to one of the participants in his description, a prompt followed (e.g. *Tell me more*). Four trials preceded the experiment during which the child's understanding of his task was confirmed. Once the task was established, very few prompts were necessary. A child was not included in the study unless he described a minimum of 24 actions. If a child could not be engaged in the task of repeatedly describing observed events, this usually became obvious during the four trials. Three children, however, began the actual experiment and then refused to continue after giving fewer than 24 responses.[3]

Reinforcements such as paper stars or raisins were used when interest flagged. The parent acted as a recorder and participated in the experimental protocol when it was so indicated on his/her record sheet. The entire session was tape recorded and the parent's recording of the child's responses was compared with the tape recording of the same session to ensure accuracy.

MLUs for each child were based on spontaneous speech collected as the

[2] The following entities were substituted when the child had no noun label for the original entity and/or its appendage: a girl doll, a toy dog, a toy airplane, and a cup. The arm of the doll, nose of the dog, wing of the airplane, and handle of the cup were the designated appendages.

[3] One child responded to 24 actions but with so many pronominalized references to the participants that his data were unanalysable and therefore not included in the study (see below on the problem of ambiguous utterances).

child played with another set of toys (blocks, farm animals, small vehicles, plastic dishes, a music box, etc.) in a free play situation which followed the experiment.

RESULTS

Data base

Only descriptions which included at least a transitive verb and a word which unambiguously referred to one of the participants were analysed. Transitive verbs were defined as those which are transitive in adult English. Ambiguous utterances were defined as those which included (1) a pronoun whose referent could not be determined, and/or (2) the noun *arm*, *hand*, *shirt* or *man* where it was not clear which entity in the action was being designated (e.g. mother hits experimenter's hand with her hand and the child says *bumping the arm*). Points and other nouns in the utterance were used to disambiguate nouns and pronouns whenever possible. Sixty-eight per cent (221 of the total of 326 utterances produced by the nine children) were unambiguous transitives, and these comprised the data base.[4]

Word order

Fig. 1. presents the percentage of unambiguous sentences in which agents or patients are placed post-verbally for eight of the nine children. The ninth child, Amy, will be considered in the next section. All of these eight children differentially placed agents and patients in their utterances. Patients, but not agents, were produced in the post-verbal position ($P < 0{\cdot}04$ Cliff, $P < 0{\cdot}003$ Helen, and $P < 0{\cdot}0001$ for the remaining children, Fisher's exact tests or Yates' corrected chi-squares). The crucial question here, however, is whether this order distinction holds when patients and agents are divided according to animateness.

Fig. 2 presents a reanalysis of the data in Fig. 1 according to the animateness of the agent and patient. The figure indicates that patients, whether animate or inanimate, were placed post-verbally while agents, animate or inanimate, seldom occupied this post-verbal position. For example, in describing an action involving a boy doll (an animate entity), the children were likely to say *the tractor's hitting the man* when the boy received the blow but *the man's hitting the elephant* when the boy himself dealt the blow ($P < 0{\cdot}03$ for each animate agent vs. animate patient comparison). Similarly, for the inanimate cup, the children would produce *the boy hitting the mug* when the cup was

[4] The remaining descriptions were categorized as ambiguous transitives (9% or 28 utterances), as intransitives (15% or 48 utterances), or as 'others' (9% or 29 utterances). Included in the last category were one-word utterances, descriptions of an event other than the one intended, and unintelligible utterances. Only five times did the children refuse to say anything about the action demonstrated.

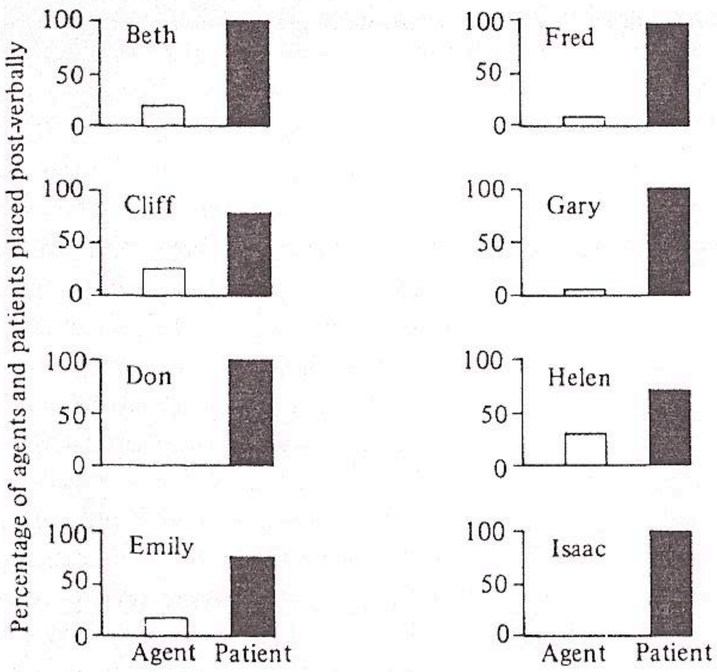

Fig. 1. The percentage of agents and patients placed in post-verbal position. Percentages are the number of post-verbal references to the agent (patient) divided by the total number of references to the agent (patient) and are calculated on the following totals: Beth, 15 agents and 24 patients; Cliff, 11 and 14; Don, 9 and 8; Emily, 36 and 33; Fred, 32 and 32; Gary, 19 and 20; Helen, 32 and 32; Isaac, 26 and 26.

struck but *the mug hitting mommy hand* when the cup did the striking ($P < 0{\cdot}03$ for each inanimate agent vs. inanimate patient comparison except for Helen, $P < 0{\cdot}08$ and Cliff, $P = 0{\cdot}05$). Thus, the children used word order to mark agents differently from patients, independent of animateness.

Production probability

We turn now to the ninth child, Amy, who produced primarily two-word sentences and consequently did not show contrastive word order for agents and patients. It is possible that such a low MLU child might distinguish agents from patients by explicitly producing words for one role more frequently than for the other. Thus the same entity might have a different 'production probability' depending upon its role as an agent or as a patient. We consequently measured production probability (the frequency with which a role is expressed) for both agents and patients in this child's data.

Amy was found to explicitly express patients significantly more often than agents, 0·92 (22/24) vs. 0·12 (3/24), $P < 0{\cdot}0001$ (Yates' corrected chi-square). She was much more likely to refer to an entity, e.g. to say *mommy* or *the boy*, when that entity was hit or pulled than when the same entity did the hitting

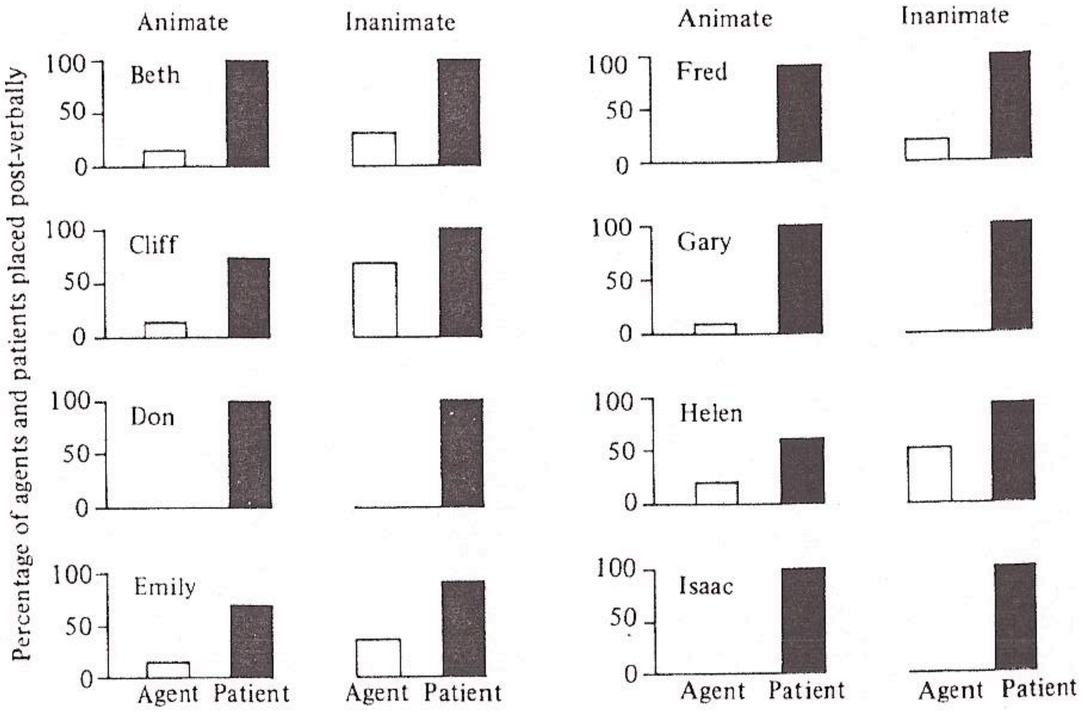

Fig. 2. The percentage of animates and inanimates placed in post-verbal position as a function of role. Percentages are calculated on the following totals: Beth, 8 animate agents, 16 animate patients, 7 inanimate agents, and 8 inanimate patients; Cliff, 8, 11, 3 and 3; Don, 3, 5, 6 and 3; Emily, 25, 22, 11 and 11; Fred, 22, 21, 10 and 11; Gary, 13, 12, 6 and 8; Helen, 20, 20, 12 and 12; Isaac, 18, 17, 8 and 9.

or pulling. In the latter case (i.e. the entity as agent), she rarely mentioned the entity at all.

Moreover, when her data were reanalyzed in terms of animateness, Amy's tendency to express patients more frequently than agents was found for both animate entities, 0·86 (12/14) vs. 0·12 (2/17), $P < 0{\cdot}0003$ (Yates' corrected chi-square) and for inanimate entities, 1·00 (10/10) vs. 0·14 (1/7), $P < 0{\cdot}0006$ (Fisher's exact test). In sum, Amy also appears to be sensitive to role differences independent of animateness, expressing entities affected by the action and omitting entities effecting the action. Parenthetically, Amy consistently placed all 22 patients, both animate and inanimate, in the post-verbal position; however, her infrequent agents (3) occupied both pre- and post-verbal positions.

We have shown that young children distinguish agent and patient roles, either by conventional linguistic markings (i.e. word order) or by markings idiosyncratic to the child (i.e. production probability). We turn now to two additional measures which appear to be further evidence for the young child's intention to express agent and patient roles.

Pronominalization

In any given sentence, a referenced entity can be marked by either a pronoun or a noun. In this analysis, agents and patients were examined to see if they differed in the frequency with which they were pronominalized, i.e. marked by a pronoun instead of a noun. Amy, having expressed few agents, was eliminated from this analysis.[5]

All of the eight remaining children tended to pronominalize a smaller percentage of patients than agents, but the difference was reliable for only four children (see Table 2). Thus, for half the children, the choice of a noun or pronoun label for an entity depended on whether that entity functioned as patient or agent of the action described. For example, when the boy doll was the agent or effector of the action, it was usually referred to as *he*. When the same doll was acted upon as a patient, the children usually used a noun phrase to refer to it, e.g. *the man*, *a boy*. Thus, when pronoun–noun variation appeared systematically in the child's language, this systematic variation could be related to the role an entity played in the action described.

TABLE 2. *Percentage of agents and patients pronominalized*

	Agent	Patient
Beth	0·08 (1/12)	0·00 (0/21)
Cliff	0·88 (7/8)	0·00 (0/11)***
Don	1·00 (9/9)	0·00 (0/8)***
Emily	0·48 (14/29)	0·16 (4/25)*
Fred	0·53 (16/30)	0·13 (4/30)**
Gary	0·28 (5/18)	0·05 (1/19)
Helen	0·27 (6/22)	0·04 (1/23)†
Isaac	0·23 (6/26)	0·04 (1/26)

† $P < 0·09$ * $P < 0·03$ ** $P < 0·003$ *** $P < 0·001$

When these agent–patient differences in pronominalization are examined for animates and inanimates separately (see Table 3), only Don and Fred were found to consistently pronominalize patients less frequently than agents for BOTH animates and inanimates. The other six children tended to pronominalize animate patients less often than agents (this difference was reliable for Cliff,

[5] All utterances with anomalous word orderings (27 utterances with a total of 26 misplaced agents and 22 misplaced patients) were removed from the data base for this and the following analysis, leaving 170 well-ordered, unambiguous transitives. The occurrence of word order anomalies was not unsystematic. Of the four combinations possible (animate agent + animate patient, animate agent + inanimate patient, etc.) the combination 'inanimate agent acts on animate patient' resulted in the highest percentage of anomalous orderings: 26% (15/58), followed by animate + animate, 10% (7/71) and inanimate + inanimate, 9% (1/11), and then by animate + inanimate, 7% (4/57).

TABLE 3. *Percentage of animates and inanimates pronominalized as a function of role*

	Animate		Inanimate	
	Agent	Patient	Agent	Patient
Beth	0·14 (1/7)	0·00 (0/15)	0·00 (0/5)	0·00 (0/6)
Cliff	1·00 (7/7)	0·00 (0/8)***	0·00 (0/1)	0·00 (0/3)
Don	1·00 (3/3)	0·00 (0/5)**	1·00 (6/6)	0·00 (0/3)**
Emily	0·59 (13/22)	0·20 (3/15)*	0·14 (1/7)	0·10 (1/10)
Fred	0·55 (12/22)	0·16 (3/19)**	0·50 (4/8)	0·09 (1/11)†
Gary	0·33 (4/12)	0·08 (1/12)	0·17 (1/6)	0·00 (0/7)
Helen	0·38 (6/16)	0·08 (1/12)	0·00 (0/6)	0·00 (0/11)
Isaac	0·33 (6/18)	0·00 (0/17)*	0·00 (0/8)	0·11 (1/9)

† $P < 0·08$ * $P < 0·05$ ** $P < 0·03$ *** $P < 0·001$

Emily and Isaac) but rarely pronominalized inanimate entities, regardless of role. Thus, for two of the eight children, the pronominalization measure appears to distinguish all agents from all patients; for at least three of the other six children, the measure distinguishes animate agents from animate patients, but does not distinguish inanimate agents from inanimate patients.

Partitioning

Children who have words for an entire entity (e.g. *doll*) and for a part of that entity (e.g. *arm*) can, in principle, use either term to describe that entity's participation in the hitting and pulling actions of this study. Use of the term *doll* focuses attention on the entity as a whole, while *arm* focuses attention on the appendage of the entity which actually comes into contact during the hitting or pulling action. Here we investigate whether the decision to name a part of an entity is dependent in any way on the role that entity plays in an action.

In this analysis the number of parts of entities named was observed as a function of the total number of noun phrases produced. The analysis was limited to nouns because of the difficulty in determining whether pronouns like *he*, *she* and *it* refer to the whole entity or to just a part of the same entity.

Eight of the nine children occasionally named parts of patients (e.g. *your hand*, *elephant nose*, *the wheel*, *the branch of the tree*) but NEVER named parts of agents, preferring instead to name the whole entity when it played an agent role (e.g. *mommy*, *elephant*, *the tractor*, *the tree*). Only one child, Cliff, on one occasion named a part of an entity, *the branch*, when it was an agent (see Table 4).

An analysis of agent–patient differences in partitioning according to animateness showed that this difference, although much more compelling for

TABLE 4. *Number of parts of entities mentioned as a function of total number of noun phrases produced*

	Agent	Patient
Amy	0/1	6/22
Beth	0/11	7/21†
Cliff	1/1	0/11
Don	—	3/8
Emily	0/15	5/21
Fred	0/14	9/26*
Gary	0/13	5/18
Helen	0/16	10/22**
Isaac	0/20	11/25***

† $P < 0{\cdot}09$ * $P < 0{\cdot}04$ ** $P < 0{\cdot}006$ *** $P < 0{\cdot}003$

animate entities, was found in small measure for inanimate entities as well. Mother's/father's, the experimenter's, and the doll's arm or hand were often referred to when these entities functioned as patients (e.g. *the man hitting my daddy's hand*) but never when they functioned as agents (e.g. *my daddy pulling the man* rather than *my daddy's hand pulling the man*). Parts of inanimate entities were mentioned only 7 times (by 5 children); however, 6 of those 7 times occurred when these inanimates functioned as patients. Thus, when the tractor was the patient, the children might say *you hit the wheel*, but when the tractor was the agent they would say *the tractor's pulling that tree*. In sum, it appears that the role an entity plays in an action determines the way it is talked about, although this effect of role is more apparent for animate entities.

DISCUSSION

The assertion that young children can produce ordered sentences based on agent and patient semantic categories essentially encompasses two claims about the child: (1) that the young child intends to express relations or action roles in his utterances, and (2) that the young child uses linguistic categories which are defined in terms of these relational roles. Below we discuss our results in terms of these two claims.

The nature of the child's semantic intentions

Word order evidence : agent vs. patient. These results provide evidence that the young child intends to express agent and patient roles which are not tied to animateness. Nine children described transitive actions involving animate and inanimate entities playing both agent and patient roles. Eight of the children showed contrastive word order for agents and patients independent

of animateness. As expected for children acquiring English, patients, both animate and inanimate, were placed in post-verbal position while agents, animate and inanimate, occupied the pre-verbal position.

Production probability and pronominalization evidence : the specified patient. The ninth child, who was still in the two-word stage, distinguished patients from agents by production probability: patients, both animate and inanimate, were more frequently expressed than agents, animate and inanimate. Production probability distinctions between agents and patients have been reported in other experimental studies of child language (Chapman & Miller 1975, Rosenberg 1979). Moreover, the same phenomenon has been observed in the spontaneous speech of hearing children (Bloom 1970, Brown 1973, McNeill 1966, Slobin 1973) as well as in the spontaneous signs of deaf children developing a gesture system without a conventional language model (Goldin-Meadow 1979). In all instances, the patient was more likely to be produced than was the agent.

This tendency to specify the patient is seen in another form in the pronominalization measure reported in this study. Nouns in general convey more specific information than do pronouns (e.g. *boy* vs. *he*) and nouns were more likely to be used for patients than for agents; pronouns tended to be reserved for agents. For the most part, these agent–patient differences in pronominalization persisted when we examined at least animate entities separately. This tendency for patients to be nouns and agents to be pronouns has also been observed in the spontaneous speech of young children (Bloom 1974, Bloom, Miller & Hood 1975, Bloom, Lightbown & Hood 1975, Bowerman 1978, Limber 1976).

Thus, young children appear to specify patients in their speech: they produce patients more frequently than agents, and they use nouns to refer to patients more frequently than they use nouns to refer to agents. What we have shown in our study is that this tendency to specify patients over agents with respect to production probability and pronominalization persists even when animateness is controlled.

Partitioning evidence : the controlling agent. The data from the final measure observed in this study, partitioning, also suggest that young children distinguish agents from patients, and further that the children associate the feature of control with the entity they refer to as the agent of the action. In the scenes created for this study, the same appendage of an entity, e.g. mother's hand, was involved in both the agent and patient roles: mother's hand (as agent) hit and pulled other entities and mother's hand (as patient) was hit and pulled by other entities. We noted in Table 4, however, that the hand was referred to only when it functioned as a patient. When the hand functioned as an agent, the whole entity (e.g. *mommy*) and not the hand was named as the agent. In other words, the size of the unit designated depended on the role the entity played in the action. For the children, parts of entities could be talked about

as being hit or pulled but only whole entities could be talked about as doing the hitting or pulling.

To explain the fact that parts of entities appeared as patients but not as agents in the child's speech, we hypothesize that the child is making two adult-like assumptions: (1) that parts of entities are not typically capable of controlling actions, and (2) that agents, not patients, control actions. Taken together, these assumptions allow parts of entities to be patients but not agents, the pattern we find in our data. To explain the patterns of our partitioning data, we have thus been led to hypothesize that the child, like the adult, intends to talk about the agent of the action as controlling the action it effects.

The nature of the child's linguistic categories

We have demonstrated here that the young child considers, at least at some level, the role that an entity plays in an action when he talks about that entity. However, we have not yet shown that the young child's grammatical system is organized around role-defined categories like 'agent' and 'patient'. The issue concerns the actual linguistic units upon which order rules, production probability rules, and pronominalization rules operate. Although these rules CAN be formulated in terms of agent–patient categories (and CANNOT, as we have shown, be formulated in terms of animate–inanimate categories), it is possible that the rules could also be formulated in terms of other types of categories as well (for example, pragmatic categories such as GIVEN and NEW or syntactic categories such as SUBJECT and OBJECT). We first consider the possibility that the rules of the child's language system are formulated in terms of pragmatic categories, and then consider syntactic categories as possible bases for the child's rules.

Pragmatic categories. It has recently been hypothesized that pragmatic categories like 'given' and 'new' underlie early action descriptions. The hypothesis is (1) that young children distinguish entities according to their 'givenness' in situations and (2) that the determining factor in the placement, production, and/or pronominalization of a word is the 'givenness' of its referent, i.e. that linguistic rules are applied to pragmatically defined categories. Our results allow us to evaluate several arguments for pragmatic categories in early child language.

Schlesinger (1977: 164), for example, suggests that WORD PLACEMENT is related to the young child's sensitivity to the differential 'salience' of entities in actions. The child thus tends to 'utter first the word denoting the more salient aspect of the situation.' In the present experiment, however, no entity appeared in successive actions, and agents varied as often as did patients. Presumably then, in our study, the 'salience' of agents and patients was equalized; agents and patients were equivalent in their 'informativeness' and 'givenness'. If the child were simply following the strategy 'place the word

for the salient entity first', patients (equivalent in salience to agents) would be just as likely to occur in pre-verbal position as would agents. This pattern was not observed in our data. Rather, patients were consistently placed in post-verbal position while agents were consistently placed in pre-verbal position. It is thus difficult to imagine how our subjects could have generated the well-ordered utterances we observed had they been using linguistic categories defined in terms of salience.

Arguments for pragmatic categories have also been advanced to explain why young children tend to specify patients more frequently than they do agents. Greenfield & Smith (1976), Greenfield and Zukow (1978), Limber (1976), and Weisenberger (1976), among others, have argued that the greater 'informativeness' of patients over agents can account for patient specification in child language. According to this hypothesis, patients, being more diverse and less predictable than agents in conversational situations, should be specified more often and more elaborately than agents in order to clarify potential ambiguities. Again, because the predictability and diversity of agents and patients were equalized in this experiment, these pragmatic factors cannot account for the agent–patient differences in production probability and pronominalization found in this study.

It is, of course, possible that from the natural conversational situations around them, children have developed the habit of specifying patients more frequently and more elaborately than agents, and carry over this habit into our experimental setting. What our study does show, at a minimum, is that in a specialized situation where the diversity and unpredictability of patients is no greater than that of agents, children still specify the patient more than they do the agent. Thus, in our study, pragmatic categories cannot form the basis for the production probability and pronominalization rules we observe. Rather, it seems more likely that production probability and pronominalization rules (and order rules as well) are formulated in terms of role-defined linguistic categories like agent and patient.

Syntactic categories. Surface 'subject' and 'object' are syntactic categories defined in terms of surface roles. In English, the surface subject is assigned the pre-verbal position, while the surface object assumes the post-verbal position. In an active sentence, it is quite clear that the child must be aware of the action an entity plays in order to assign the word for that entity to the pre-verbal (agent/subject) position or to the post-verbal (patient/object) position. However, it could be argued that, once position is assigned, pronominalization and production probability rules might just as easily be formulated in terms either of the derived subject–object position categories or the original agent–patient role categories.

There is some suggestion from our data that pronominalization rules at least are not formulated in terms of syntactic subject–object categories but rather depend on semantic agent–patient categories. We should note at the outset,

however, that it is not a simple matter to distinguish agent from subject categories primarily because in the young child's most common sentence form, the active sentence, agents tend to be subjects and subjects tend to be agents. As a result, our argument against the subject category will turn out to be somewhat complex.

One way to argue FOR a subject category would be to show that an entity is treated in a particular manner (e.g. pronominalized) ON THE BASIS OF SURFACE POSITION ALONE. Surface position would be the one and only criterion determining the child's treatment of the word, and pre-verbal words of all types would then have the same likelihood of being, in this instance, pronominalized. At first glance, the data presented in Table 2 lead us to precisely this conclusion. Table 2 reveals that, on the whole, words which occur in pre-verbal position did tend to be pronominalized more frequently than words in post-verbal position. However, a closer inspection of the data in Table 3 indicates that only two of the eight children pronominalized ALL types of pre-verbal words more frequently than post-verbal words: only Don and Fred pronominalized pre-verbal words for both animates and inanimates more frequently than post-verbal words (for either animates or inanimates). For Don and Fred, then, the decision to pronominalize could conceivably be governed either (1) by the grammatical function of the word in the sentence (subject versus object) or (2) by the role of the referent in the action (agent versus patient). That is, for these two children, the subject is indeed as adequate a basis for the pronominalization rule as is the agent category.

As Table 3 shows, however, the other children who used pronouns did NOT treat pre-verbal references to animates and inanimates alike on this measure. In particular, Emily, Gary, Helen, and Isaac often pronominalized words for animate entities in the pre-verbal position but avoided pronominalizing words for inanimate entities in the same pre-verbal position. Thus, for these four children, it was not the case that all types of pre-verbal words were treated alike: some pre-verbal words (for animates) were often pronominalized while others (for inanimates) were rarely pronominalized.

If we had formulated the pronominalization rule in terms of the subject category (i.e. subjects (pre-verbal syntactic forms) are more likely to be pronominalized than are objects), we are left with no ready explanation for the differential treatment of animate and inanimate entities found in the data of four children: there is no obvious reason for animate pre-verbal syntactic forms to be treated differently from inanimate pre-verbal syntactic forms. If, however, we had formulated the pronominalization rule in terms of the agent category (i.e. agents are more likely to be pronominalized than are patients) we can generate at least one not unreasonable hypothesis to explain the differential treatment animate and inanimate entities receive.

Specifically, it is at least arguable that to a young child an animate entity makes a 'better' agent than does an inanimate entity. In our protocol, a boy

makes a better hitter than does a cup, a mother makes a better puller than does a tree. Our data suggest that the children do make just such a distinction. In describing events involving animate agents, the children make relatively few ordering errors (see fn. 5): only 9% (11/128) of all utterances with animate agents were ordered in a non-English fashion. However, in describing events involving inanimate agents, the children made many more such ordering errors: 23% (16/69) of all utterances with inanimate agents were ordered in a non-English fashion. Thus the children seemed to be more unsettled by an inanimate entity playing an agent role than by an animate entity playing the same role. The child might well be capturing this difference in 'goodness of agent' by marking (i.e. pronominalizing) animate agents differently from inanimate agents.

In sum, while we can account for most, we cannot account for all of the pronominalization phenomenon for four of our subjects if we formulate the pronominalization rule in terms of the subject category. For these children, when we formulate the pronominalization rule in terms of the agent category, we are able to provide a more complete explanation, both of the appearances and of the absences of the pronominalized form.[6]

It is important to stress in closing that these observations of differential treatment of animate and inanimate entities with respect to pronominalization do NOT mean that the child's pronominalization rule is tied to categories of animateness. Recall that WITHIN the animate category, five of the eight children tended to pronominalize agents more often than patients. Thus, HOLDING ANIMATENESS CONSTANT, the pronominalization distinction between agents and patients remains intact.

SUMMARY

The present study can be viewed as a response to numerous challenges to provide strong evidence for the psychological reality of semantic categories like agent and patient in the young child's language (Bowerman 1976, Brown 1973, Howe 1976, 1977). We have demonstrated conclusively that the young child has relational intentions which are independent of animateness. Patients were placed post-verbally, agents were not; patients were produced more frequently than were agents; patients were pronominalized less frequently than were agents; and parts of patients were mentioned more frequently than

[6] Bowerman (1973*b*) has argued convincingly that unless the data require us to assign syntactic categories to the child's language (for example, data suggesting that the child has a passive transformation which operates identically on sentence constituents differing in their semantic functions), we should be content attributing to the child only the less abstract, semantic-based categories. Lacking data of a transformational sort, we are even more hesitant to describe the child's system in terms of subject and object syntactic categories.

were parts of agents. With few exceptions, these agent–patient differences persisted when animate and inanimate entities were examined separately. We have also presented evidence that other descriptions of the speech of these children, such as descriptions based on pragmatic considerations like salience, or descriptions based on syntactic considerations like placement with respect to verb form (subject–object), are less effective in describing the speech of these children than is a description based upon the semantic classifications of agent and patient. The linguistic measures used in this study may be helpful in more extensive and systematic investigations of the agent and patient categories in early childhood speech.

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